CITY OF MIDLAND, TEXAS
AGENDA FOR CITY COUNCIL MEETING
February 8, 2022 - 10:00 AM
300 North Loraine
Midland, Texas
Council Chamber - City Hall

Notice is hereby given that a public meeting will be held by the City Council of the City of Midland, in the Council Chamber, City Hall, 300 N. Loraine, Midland, Texas and via videoconference. A quorum of the City Council intends to be physically present at the aforementioned location.

Videoconference Information

Join from a PC, Mac, iPad, iPhone or Android device:

Please click this URL to join. https://us06web.zoom.us/j/86411350909?pwd=WEhXYlRzMDNWS0srMjJ0eWZyNG9Ddz09

Passcode: 284308

Or One tap mobile:

+13462487799,,86411350909# US (Houston)

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Or join by phone:

Dial(for higher quality, dial a number based on your current location):

US: +1 346 248 7799 or +1 720 707 2699 or +1 253 215 8782 or +1 646 558 8656 or +1 301 715 8592 or +1 312 626 6799

Webinar ID: 864 1135 0909

International numbers available: https://us06web.zoom.us/u/kbXwYEzAwZ

The City Council may discuss, consider, and take action on any item listed on this agenda.

OPENING ITEMS

1. Invocation – Pastor Pat Bryant, Travis Baptist Church

2. Pledge of Allegiance

CONSENT AGENDA

3. MOTION APPROVING THE FOLLOWING MINUTES:

3a. REGULAR SESSION OF JANUARY 25, 2022

3b. SPECIAL CITY COUNCIL MEETING OF JANUARY 26, 2022

3c. SPECIAL CITY COUNCIL MEETING OF JANUARY 27, 2022

4. 2022-017 – RESOLUTION AUTHORIZING THE PURCHASE OF VARIOUS VEHICLES FOR THE GENERAL SERVICES DEPARTMENT FOR A TOTAL COST OF $800,160.00 (DISTRICT: NONE) (GENERAL SERVICES)

5. 2022-018 – RESOLUTION AUTHORIZING THE EXECUTION OF A SOLE-SOURCE CONTRACT WITH HUBER TECHNOLOGY INC. FOR THE LABOR, MATERIALS, EQUIPMENT AND SUPERVISION NECESSARY FOR THE REPAIR OF SCREENS AT THE WATER RECLAMATION FACILITY FOR THE UTILITIES DEPARTMENT AT A TOTAL COST OF $238,881.31 AND APPROVING $23,894.69 FOR CONTINGENCIES (DISTRICT: ALL) (GENERAL SERVICES)

6. 2022-019 – RESOLUTION AUTHORIZING THE EXECUTION OF A PROFESSIONAL SERVICES AGREEMENT WITH ENPROTEC/HIBBS & TODD, INC., FOR VARIOUS DESIGN, BIDDING AND CONSTRUCTION PHASE SERVICES FOR WATER AND WASTEWATER PROJECTS FOR THE UTILITIES DEPARTMENT FOR AN ANNUAL COST OF $90,000.00 (DISTRICT: ALL) (GENERAL SERVICES)

7. 014-2022 – MOTION APPROVING PLANS AND SPECIFICATIONS FOR THE MIDLAND UTILITIES SERVICE CENTER PROJECT, SAID PLANS AND SPECIFICATIONS BEING ON FILE IN THE CITY SECRETARY'S OFFICE AND REFERENCED BY THE DATE AND NUMBER OF THIS MOTION, AND AUTHORIZING THE CITY MANAGER OR THE CITY MANAGER'S DESIGNEE TO ADVERTISE FOR COMPETITIVE BIDS FOR SAID PROJECT PURSUANT TO THE STATUTES OF THE STATE OF TEXAS FOR ACCOMPLISHING THE WORK SET FORTH IN SAID PLANS AND SPECIFICATIONS (DISTRICT 2) (GENERAL SERVICES)

8. 2022-020 – RESOLUTION AUTHORIZING THE EXECUTION OF THE SIXTH AMENDMENT TO THE INTERLOCAL MANAGEMENT SERVICES AGREEMENT BETWEEN THE CITY OF MIDLAND, TEXAS AND MIDLAND COUNTY HOSPITAL DISTRICT, DOING BUSINESS AS MIDLAND MEMORIAL HOSPITAL, FOR CERTAIN MEDICAL AND WELL-BEING SERVICES; SAID AMENDMENT ADJUSTING THE ANNUAL FEE AND PROVIDING FOR THE HOSTING OF INFLUENZA CLINICS; AND AUTHORIZING PAYMENT (DISTRICT: ALL) (ADMINISTRATIVE SERVICES)

9. 015-2022 – MOTION AUTHORIZING THE EXECUTION OF AMENDMENT NO. 2 TO THE PROFESSIONAL SERVICES AGREEMENT WITH PARKHILL, SMITH & COOPER, INC., DBA PARKHILL; SAID AMENDMENT PROVIDING FOR THE RECONSTRUCT ASPHALT AIR CARRIER APRON PAVEMENT WITH CONCRETE PROJECT, THE AIRFIELD WILDLIFE FENCE IMPROVEMENTS PROJECT, AND THE SPACEPORT BUSINESS PARK ENVIRONMENTAL PROJECT; AUTHORIZING THE APPROPRIATION OF $265,000.00 FROM THE AIRPORT FUND UNAPPROPRIATED FUND BALANCE TO THE RECONSTRUCT ASPHALT AIR CARRIER APRON PAVEMENT WITH CONCRETE

PROJECT IN FUND 505; AUTHORIZING THE APPROPRIATION OF $290,000.00 FROM THE AIRPORT FUND UNAPPROPRIATED FUND BALANCE TO PROJECT 900345, MAF AIRFIELD WILDLIFE FENCE IMPROVEMENTS PROJECT IN FUND 506; AND AUTHORIZING THE APPROPRIATION OF $180,650.00 FROM THE AIRPORT FUND UNAPPROPRIATED FUND BALANCE TO PROJECT 900111, DEVELOPMENT PARK PROGRAMMATIC EA (DISTRICT 4) (AIRPORTS)

10. 2022-021 – RESOLUTION AUTHORIZING THE CITY MANAGER TO NEGOTIATE AND EXECUTE AGREEMENTS FOR TRAFFIC MANAGEMENT-RELATED DONATIONS TO THE CITY OF MIDLAND; AND AUTHORIZING THE CITY MANAGER TO ACCEPT SAID DONATIONS ON BEHALF OF THE CITY (DISTRICT: NONE) (ENGINEERING SERVICES)

SECOND READINGS

11. 10284 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOT 12, BLOCK 50, EAST MIDLAND ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS, FROM HI, HEAVY INDUSTRIAL DISTRICT TO SF-3, SINGLE-FAMILY DWELLING DISTRICT (GENERALLY LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION OF TYLER STREET AND ORCHARD LANE); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 25, 2022)

12. 10285 – AN ORDINANCE GRANTING A SPECIAL EXCEPTION FOR LOT 8, BLOCK 6, ELMWOOD ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE NORTHEAST CORNER OF STOREY AVENUE AND PECOS STREET), BY PERMITTING A REDUCED MINIMUM SIDE YARD SETBACK ON THE WEST SIDE OF THE LOT; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); ORDERING RECORDATION BY THE CITY SECRETARY IN THE DEED RECORDS OF MIDLAND COUNTY, TEXAS; AND ORDERING PUBLICATION (DISTRICT 3) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 25, 2022)

13. 10286 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 3,627-SQUARE FOOT PORTION OF LOT 1, BLOCK 6, BANKHEAD ADDITION, SECTION 7, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF WEST FRONT STREET AND BANKHEAD HIGHWAY), WHICH IS PRESENTLY ZONED C, COMMERCIAL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN AN AXE BAR FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

(DISTRICT 2) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 25, 2022)

14. 10287 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 4,011-SQUARE FOOT PORTION OF LOT 6A, BLOCK 62, BELMONT ADDITION, SECTION 23, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED ON THE NORTH SIDE OF EAST INTERSTATE 20, APPROXIMATELY 615 FEET NORTH OF WEST TERRELL STREET), WHICH IS PRESENTLY ZONED BP, I-20 BUSINESS PARK DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 25, 2022)

PUBLIC HEARINGS

The City Council will hold public hearings on the following items:

15. 016-2022 – THE PROPOSED GRANTING OF AN OIL AND GAS WELL PERMIT TO PERMIAN DEEP ROCK OIL CO., LLC FOR THE DRILLING OF THE OIL AND GAS WELL MUSTANG 110 MIPA UNIT #H110WA; SAID WELL BEING GENERALLY LOCATED 2,395 FEET EAST OF RANKIN HIGHWAY AND 170 FEET SOUTH OF I-20 (DISTRICT 2) (DEVELOPMENT SERVICES)

16. 017-2022 – THE PROPOSED GRANTING OF AN OIL AND GAS WELL PERMIT TO PIONEER NATURAL RESOURCES, USA, INC. FOR THE DRILLING OF THE OIL AND GAS WELL NAIL C 3; SAID WELL BEING GENERALLY LOCATED 4,098 FEET NORTH OF OCCIDENTAL PARKWAY AND 7,385 FEET EAST OF NORTH STATE HIGHWAY 349 (DISTRICT 1) (DEVELOPMENT SERVICES)

17. 018-2022 – THE PROPOSED GRANTING OF AN OIL AND GAS WELL PERMIT TO PIONEER NATURAL RESOURCES, USA, INC. FOR THE DRILLING OF THE OIL AND GAS WELL NAIL E 4; SAID WELL BEING GENERALLY LOCATED 3,172 FEET NORTH OF OCCIDENTAL PARKWAY AND 2,135 FEET EAST OF NORTH STATE HIGHWAY 349 (DISTRICT 1) (DEVELOPMENT SERVICES)

18. 019-2022 – THE PROPOSED GRANTING OF AN OIL AND GAS WELL PERMIT TO PIONEER NATURAL RESOURCES, USA, INC. FOR THE DRILLING OF THE OIL AND GAS WELL STIMSON BURLEY D 5; SAID WELL BEING GENERALLY LOCATED 2,220 FEET NORTH OF OCCIDENTAL PARKWAY EXTENSION AND 5,945 FEET WEST OF NORTH ELKINS ROAD (DISTRICT 1) (DEVELOPMENT SERVICES)

19. 10288 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOT 6, BLOCK 50, EAST MIDLAND ADDITION, CITY AND

COUNTY OF MIDLAND, TEXAS, FROM HI, HEAVY INDUSTRIAL DISTRICT TO SF-3, SINGLE-FAMILY DWELLING DISTRICT (GENERALLY LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF NORTH MADISON STREET AND SOUTH STREET); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES)

20. 10289 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE A 4.97-ACRE TRACT OF LAND OUT OF LOT 2, BLOCK 2, GREEN HILL TERRACE, CITY AND COUNTY OF MIDLAND, TEXAS, FROM AE, AGRICULTURAL ESTATE DISTRICT TO CE, COUNTRY ESTATE DISTRICT (GENERALLY LOCATED ON THE NORTH SIDE OF PIMLICO DRIVE, APPROXIMATELY 170 FEET EAST OF HOLIDAY HILL ROAD); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 1) (DEVELOPMENT SERVICES)

21. 10290 – AN ORDINANCE GRANTING A SPECIAL EXCEPTION FOR LOT 1, BLOCK 43, PERMIAN ESTATES, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF THOMASON DRIVE AND RUBY DRIVE), BY PERMITTING A REDUCED MINIMUM FRONT YARD SETBACK AND A REDUCED MINIMUM SIDE YARD SETBACK ON THE NORTH SIDE OF THE LOT; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); ORDERING RECORDATION BY THE CITY SECRETARY IN THE DEED RECORDS OF MIDLAND COUNTY, TEXAS; AND ORDERING PUBLICATION (DISTRICT 4) (DEVELOPMENT SERVICES)

PUBLIC COMMENT

22. Receive public comments where individuals may address the City Council on City related issues and projects not on the present agenda. Any deliberation of or decision by the City Council regarding the item being discussed shall be limited to a motion to place the item on the agenda for a subsequent meeting. (Please limit comments to three minutes or less.)

Respectfully Submitted,

Robert Patrick
City Manager

MEETING ASSISTANCE INFORMATION: The Midland City Hall and Council Chamber are

wheelchair accessible. If you need special assistance to participate in this meeting, please contact the City Secretary's Office at (432) 685-7430. Notification 48 hours prior to the meeting will enable the City to make reasonable arrangements to ensure accessibility to this meeting.

MIDLAND CITY COUNCIL
MINUTES
January 25, 2022

The City Council convened in regular session in the Council Chamber, City Hall, Midland, Texas, at 10:00 a.m., January 25, 2022.

Council Members present:	Dan Corrales, Robin Poole, Lori Blong, Patrick Payton, Scott Dufford, Jack Ladd, John Norman
Council Members absent:	None
Staff members present:	City Manager Robert Patrick, City Attorney John Ohnemiller, Deputy City Manager Morris Williams Jr

The meeting was called to order at 10:00 a.m.

OPENING ITEMS

1. Invocation – Pastor Moe Bomer, First Baptist Church

2. Pledge of Allegiance

CONSENT AGENDA

Lori Blong moved to approve the Consent Agenda items 3-15, excluding item(s) 4, 5, 6, 7, 8, 10; seconded by John Norman.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

3. MOTION APPROVING THE FOLLOWING MINUTES:

   3a. REGULAR SESSION OF JANUARY 10, 2022

   3b. REGULAR SESSION OF JANUARY 11, 2022

9. 010-2022 – MOTION APPROVING A PROMOTIONAL AGREEMENT BETWEEN THE

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MIDLAND DEVELOPMENT CORPORATION AND DINI SPHERIS, INC., TO ADVERTISE AND PUBLICIZE THE CITY OF MIDLAND, TEXAS, FOR THE PURPOSE OF DEVELOPING NEW AND EXPANDED BUSINESS ENTERPRISES (DISTRICT 2) (CITY MANAGER)

11. 2022-014 – RESOLUTION RATIFYING AND APPROVING THE SENDING OF A LETTER CONCERNING THE DENIAL OF A SPECIFIC USE DESIGNATION WITHOUT TERM FOR A 200-SQUARE FOOT PORTION OF LOT 3, BLOCK 1, POLO CLUB ADDITION, SECTION 3, CITY AND COUNTY OF MIDLAND, TEXAS, WHICH WOULD HAVE ALLOWED SAID PROPERTYTO BE USED FOR WIRELESS COMMUNICATION SYSTEMS (DEVELOPMENT SERVICES)

12. 2022-015 – RESOLUTION AUTHORIZING THE ISSUANCE OF AN OPERATING CERTIFICATE FOR MOORE'S LIMO SERVICE, LLC; SETTING FORTH CONDITIONS ACCOMPANYING THE CERTIFICATE; AND ESTABLISHING THE TERMS OF THE CERTIFICATE (DISTRICT: ALL) (POLICE)

13. 2022-016 – RESOLUTION AUTHORIZING THE SUBMISSION OF AN APPLICATION TO THE OFFICE OF THE GOVERNOR, HOMELAND SECURITY GRANTS DIVISION, FOR THE FISCAL YEAR 2022 OPERATION LONE STAR GRANT PROGRAM; AUTHORIZING THE ACCEPTANCE OF GRANT FUNDS FROM SAID PROGRAM FOR THE PURPOSE OF PURCHASING NARCAN AND NIGHT VISION SYSTEMS; AND PROVIDING FOR THE APPROPRIATION OF SAID GRANT FUNDS UPON RECEIPT (DISTRICT: ALL) (POLICE)

14. 012-2022 – MOTION AUTHORIZING THE EXECUTION OF A RIGHT-OF-WAY LICENSE (22-329-006) WITH ENDEAVOR ENERGY RESOURCES, L.P., REGARDING CITY-OWNED PROPERTY DESCRIBED AS SECTIONS 19 AND 30, BLOCK 36, T-3-S, T&P RR CO. SURVEY, MIDLAND COUNTY, TEXAS (DISTRICT: NONE) (UTILITIES)

15. 013-2022 – MOTION AUTHORIZING THE EXECUTION OF A RIGHT-OF-WAY LICENSE (22-329-001) WITH PINNACLE DOS PICOS LLC REGARDING CITY-OWNED PROPERTY DESCRIBED AS SECTION 20, BLOCK 37, T-3-S, T&P RR CO. SURVEY, MIDLAND COUNTY, TEXAS (DISTRICT: NONE) (UTILITIES)

The following item(s) were pulled from consent agenda and considered individually.

4. 2022-011 – RESOLUTION AUTHORIZING THE EXECUTION OF A PROFESSIONAL SERVICES AGREEMENT WITH PARKHILL, SMITH & COOPER, INC., D/B/A PARKHILL FOR THE DESIGN, SURVEY AND CONSTRUCTION ADMINISTRATION SERVICES FOR SEWER IMPROVEMENTS NORTH OF SH-191 AND WEST OF TX-158 TO THE EASTERN PROPERTY BOUNDARY OF THE MIDLAND DEVELOPMENT CORPORATION FOR THE UTILITIES DEPARTMENT FOR A COST OF $253,000.00; APPROVING $37,950.00 FOR CONTINGENCIES; AND APPROPRIATING FUNDS (DISTRICT 4) (GENERAL SERVICES)

Council Member Corrales asked what is planned for the development along State Highway 191. Utilities Director Carl Craigo reported they are updating the design from about 12

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years ago. They will grab a sewer line that was already through 158 on the west side just north of Sinclair toward 191 to where the MDC property is. Council Member Corrales asked how they expect to spend the contingency for $37,950.00. Utilities Director Carl Craigo reported that the contingency can be used for unforeseen design changes.

Dan Corrales moved to approve Resolution No. 2022-011; seconded by Lori Blong.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

5. 2022-012 – RESOLUTION AWARDING A CONTRACT FOR THE SOLOMON LANE WATER BOND PROJECT TO TEC EXCAVATION, INC. OF MIDLAND, TEXAS, AT A TOTAL COST NOT TO EXCEED $1,693,185.00; APPROPRIATING FUNDS; AND AUTHORIZING PAYMENT (DISTRICT 1) (GENERAL SERVICES)

Council Member Corrales asked if there are any issues with the supply for these projects. Josh Ferguson reported they communicate regularly with contractors and do not expect supply issues.

Dan Corrales moved to approve Resolution No. 2022-012; seconded by John Norman.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

6. 008-2022 – MOTION AUTHORIZING THE EXECUTION OF A CHANGE ORDER WITH GARNEY CONSTRUCTION REGARDING THE MIDLAND NORTHEAST WATER SYSTEMS IMPROVEMENTS-PUMP STATION, TRANSMISSION AND DISTRIBUTION PIPELINES (PACKET A); SAID CHANGE ORDER TO BE IN THE AMOUNT OF $2,919,785.11 AND TO PROVIDE FOR CERTAIN UTILITY IMPROVEMENTS FOR PUMP STATION FOR THE UTILITIES DEPARTMENT; AND APPROPRIATING FUNDS FROM THE ROAD/UTILITY BOND FUND THEREFORE (DISTRICT 1) (GENERAL SERVICES)

Council Member Corrales asked why we need the additional money. Utilities Director Carl Craigo reported there was damage after the freeze but there were also issues with this street prior to the freeze. Midland Drive fell apart faster than other streets.

Dan Corrales moved to approve Motion No. 008-2022; seconded by Robin Poole.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

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7. 2022-013 – RESOLUTION AWARDING A CONTRACT FOR THE MIDLAND T-BAR WELL FIELD REMEDIATION PLAN TO PARKHILL, SMITH & COOPER, INC., D/B/A PARKHILL FOR A TOTAL COST NOT TO EXCEED $3,500,000.00 AND APPROPRIATING FUNDS (DISTRICT: NONE) (GENERAL SERVICES)

Council Member Corrales had questions regarding the water source out at Tbar noting as we draw down water, we pull it out and the plume continues to come in. Utilities Director Carl Craigo confirmed that was correct. They have three recovery wells to replace the affected wells. The total remediation plan of $9.6 million was approved and covers the whole project. Only $3.5 million needs to be awarded today. The $9.6 million is the worse case scenario.

Dan Corrales moved to approve Resolution No. 2022-013; seconded by Jack Ladd.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

8. 009-2022 – MOTION APPROVING A PURCHASE AND SALE AGREEMENT BETWEEN THE MIDLAND DEVELOPMENT CORPORATION AND THE ESTATE OF J.L. DAVIS REGARDING CERTAIN REAL PROPERTY DESCRIBED AS LOTS 1A AND 9-12, BLOCK 35, ORIGINAL TOWN OF MIDLAND, CITY OF MIDLAND, MIDLAND COUNTY, TEXAS (DISTRICT 2) (CITY MANAGER)

Council Member Corrales reported parking seems to be the biggest hindrance at the Western United Life building. Midland Development Corporation's Executive Director Sara Harris stated the motivation behind this purchase is two-fold. First, the previous redevelopment opportunities for current MDC and City owned properties were either limited or negated by unavailability of parking for the properties. This additional purchase will ensure that parking will be available. Second, the other factor is that if the Western United Life Building is demolished, the ability to take all of the structures on the block down simultaneously results in a net savings of $1.25 million.

Dan Corrales moved to approve Motion No. 009-2022; seconded by John Norman.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

10. 011-2022 – MOTION AUTHORIZING THE INTENT OF THE COMMUNITY DEVELOPMENT DEPARTMENT TO ESTABLISH THE SCHEDULE FOR 2022 CDBG GRANT APPLICATION CYCLE (DISTRICT: ALL) (DEVELOPMENT SERVICES)

Community Development Block Grant Manager Isaac Garnett provided the community development schedule for the upcoming application cycle. Council Member Corrales asked

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for a brief overview of what a Community Development Block Grant is. Mr. Garnett explained that these funds are used within target areas in the City of Midland for such things as road improvements, community projects and meal programs at senior centers just to name a few.

Questions ensued from other Council Members regarding the Treasury Department and federal funding.

Dan Corrales moved to approve Motion No. 011-2022; seconded by John Norman.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

SECOND READINGS

16. 10272 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 1,674-SQUARE FOOT PORTION OF LOT 1-H, BLOCK 5, COLONY PLACE ADDITION, SECTION 5, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION OF WEST WADLEY AVENUE AND NORTH GARFIELD STREET), WHICH IS PRESENTLY ZONED RR, REGIONAL RETAIL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A BREWERY FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 3) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 11, 2022)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10272.

Jack Ladd moved to approve the second and final reading of Ordinance No. 10272; seconded by John Norman.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

17. 10273 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOT 15, BLOCK 10, KIMBER-LEA ADDITION, SECTION 2, CITY AND COUNTY OF MIDLAND, TEXAS, FROM PD, PLANNED DEVELOPMENT DISTRICT FOR A SHOPPING CENTER TO RR, REGIONAL RETAIL DISTRICT (GENERALLY LOCATED ON THE NORTH SIDE OF WEST WADLEY AVENUE,

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APPROXIMATELY 210 FEET EAST OF NORTH MIDKIFF ROAD); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 3) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 11, 2022)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10273.

Lori Blong moved to approve the second and final reading of Ordinance No. 10273; seconded by Robin Poole.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

18. 10274 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITHOUT TERM FOR LOTS 9-12, BLOCK 37, COLLEGE HEIGHTS ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF WEST FRONT STREET AND CARLTON STREET), WHICH IS PRESENTLY ZONED C, COMMERCIAL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR AUTOMOBILE OR OTHER MOTORIZED VEHICLE SALES AND SERVICE; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 11, 2022)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10274.

Jack Ladd moved to approve the second and final reading of Ordinance No. 10274; seconded by Scott Dufford.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

19. 10275 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOTS 1-28 AND THE WEST 28 FEET OF LOT 29, BLOCK 168, WILSHIRE PARK ADDITION, SECTION 11, CITY AND COUNTY OF MIDLAND, TEXAS, FROM O-2, OFFICE DISTRICT TO PD, PLANNED DEVELOPMENT DISTRICT FOR AN OFFICE CENTER (GENERALLY LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION OF SOUTH LOOP 250 AND GRACELAND DRIVE); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE;

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PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 4) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 11, 2022)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10275.

Lori Blong moved to approve the second and final reading of Ordinance No. 10275; seconded by Jack Ladd.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

20. 10276 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 3,241-SQUARE FOOT PORTION OF LOT 18, BLOCK 1, PROVIDENCE PARK ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED ON THE WEST SIDE OF NORTH MIDKIFF ROAD, APPROXIMATELY 605 FEET NORTH OF WEST WADLEY AVENUE), WHICH IS PRESENTLY ZONED RR, REGIONAL RETAIL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 1) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 11, 2022)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10276.

Jack Ladd moved to approve the second and final reading of Ordinance No. 10276; seconded by John Norman.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

21. 10277 – AN ORDINANCE VACATING AND ABANDONING A 0.08-ACRE PORTION OF ALLEY RIGHT-OF-WAY LOCATED ADJACENT TO LOTS 1 AND 2, BLOCK 1, OVERSTREET ADDITION, AND LOTS 6, 23, 24, AND 25, BLOCK 33, UNRECORDED CAROL CREST ADDITION, SECTION 1, BLOCK 39, T-2-S, T&P RR CO. SURVEY, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED APPROXIMATELY 255 FEET SOUTH OF GARDEN CITY HIGHWAY AND APPROXIMATELY 261 FEET EAST OF HENDERSON BOULEVARD); ADOPTING THE APPRAISAL BY THE CITY MANAGER OF $8,712.00; AND ORDERING RECORDATION BY THE CITY SECRETARY

DRAFT

(DISTRICT 2) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 11, 2022)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10277.

John Norman moved to approve the second and final reading of Ordinance No. 10277; seconded by Jack Ladd.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

22. 10278 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOTS 19 AND 20, BLOCK 64, PARK AVENUE HEIGHTS, SECOND SECTION, CITY AND COUNTY OF MIDLAND, TEXAS, FROM MF-22, MULTIPLE-FAMILY DWELLING DISTRICT TO SF-3, SINGLE-FAMILY DWELLING DISTRICT (GENERALLY LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION OF EAST CALIFORNIA AVENUE AND SOUTH BUNCHE STREET); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 11, 2022)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10278.

Dan Corrales moved to approve the second and final reading of Ordinance No. 10278; seconded by John Norman.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

23. 10279 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 2,150-SQUARE FOOT PORTION OF LOT 10, BLOCK 56, PERMIAN ESTATES, SECTION 1, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED ON THE NORTH SIDE OF WEST ILLINOIS AVENUE, APPROXIMATELY 670 FEET EAST OF NORTH MIDLAND DRIVE), WHICH IS PRESENTLY ZONED RR, REGIONAL RETAIL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 1) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 11,

DRAFT

2022)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10279.

Dan Corrales moved to approve the second and final reading of Ordinance No. 10279; seconded by Jack Ladd.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

24. 10281 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 5,000-SQUARE FOOT PORTION OF LOT 1A, BLOCK 29, HOMESTEAD ADDITION, SECTION 8, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED SOUTHWEST OF THE INTERSECTION OF NORTH COLORADO STREET AND WEST LOUISIANA AVENUE), WHICH IS PRESENTLY ZONED CB, CENTRAL BUSINESS DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES) (FIRST READING HELD JANUARY 11, 2022)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10281.

Dan Corrales moved to approve the second and final reading of Ordinance No. 10281; seconded by Jack Ladd.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

25. 10282 – AN ORDINANCE AMENDING TITLE XI, “PLANNING AND DEVELOPMENT”, CHAPTER 3, “FLOOD DAMAGE PREVENTION CODE”, SO AS TO REVISE CERTAIN STANDARDS FOR CONSTRUCTION IN FLOOD HAZARD AREAS WITHIN THE CITY OF MIDLAND; SETTING FORTH VARIANCE AND APPEAL PROCEDURES; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; AND ORDERING PUBLICATION (DISTRICT: ALL) (ENGINEERING SERVICES) (FIRST READING HELD JANUARY 11, 2022)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10282.

DRAFT

Lori Blong moved to approve the second and final reading of Ordinance No. 10282; seconded by Jack Ladd.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

26. 10283 – AN ORDINANCE ALTERING PRIMA FACIE SPEED LIMITS ALONG CERTAIN STREETS IN THE CITY; AUTHORIZING INSTALLATION OF APPROPRIATE SIGNS AND MARKINGS; REPEALING ORDINANCE NO. 10223; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO HUNDRED DOLLARS ($200.00); AND ORDERING PUBLICATION (DISTRICT 4) (ENGINEERING SERVICES) (FIRST READING HELD JANUARY 11, 2022)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10283.

Lori Blong moved to approve the second and final reading of Ordinance No. 10283; seconded by Robin Poole.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

PUBLIC HEARINGS

The City Council will hold public hearings on the following items:

27. 10284 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOT 12, BLOCK 50, EAST MIDLAND ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS, FROM HI, HEAVY INDUSTRIAL DISTRICT TO SF-3, SINGLE-FAMILY DWELLING DISTRICT (GENERALLY LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION OF TYLER STREET AND ORCHARD LANE); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10284.

Development Services Director Chuck Harrington gave a brief overview of the item noting that the area is industrial but people are coming in wanting to redevelop for single family. Council Member Norman asked if it's possible to change an entire area. Development Services Director Chuck Harrington reported that is an intense process and would cost the City a lot of money.

DRAFT

Lori Blong moved to approve the first of two readings of Ordinance No. 10284; seconded by Dan Corrales.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

28. 10285 – AN ORDINANCE GRANTING A SPECIAL EXCEPTION FOR LOT 8, BLOCK 6, ELMWOOD ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE NORTHEAST CORNER OF STOREY AVENUE AND PECOS STREET), BY PERMITTING A REDUCED MINIMUM SIDE YARD SETBACK ON THE WEST SIDE OF THE LOT; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); ORDERING RECORDATION BY THE CITY SECRETARY IN THE DEED RECORDS OF MIDLAND COUNTY, TEXAS; AND ORDERING PUBLICATION (DISTRICT 3) (DEVELOPMENT SERVICES)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10285.

Development Services Director Chuck Harrington gave a brief overview of the item noting the structure that existed on the side burned down back in 2018. A non-conforming structure needs to be rebuilt within one year; this request exceeded that timeframe. He wants to build on same slab as previously built. The issue is with the side yard setback. The property owners in the neighborhood are excited about the rebuild.

Robin Poole moved to approve the first of two readings of Ordinance No. 10285; seconded by Jack Ladd.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

29. 10286 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 3,627-SQUARE FOOT PORTION OF LOT 1, BLOCK 6, BANKHEAD ADDITION, SECTION 7, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF WEST FRONT STREET AND BANKHEAD HIGHWAY), WHICH IS PRESENTLY ZONED C, COMMERCIAL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN AN AXE BAR FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES)

DRAFT

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10286.

Development Services Director Chuck Harrington gave a brief overview of the item explaining the request is for the sale of alcoholic beverages at an axe bar, noting they take extra steps for safety. The person playing is only allowed two drinks. He reviewed the hours they will be open.

Blaine Henderson, Big Spring, reported that everyone who enters the facility signs a waiver. There are people there who will be certified in axe throwing. They will have special hours that children will be allowed on the premises.

John Norman moved to approve the first of two readings of Ordinance No. 10286; seconded by Dan Corrales.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

30. 10287 – AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 4,011-SQUARE FOOT PORTION OF LOT 6A, BLOCK 62, BELMONT ADDITION, SECTION 23, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED ON THE NORTH SIDE OF EAST INTERSTATE 20, APPROXIMATELY 615 FEET NORTH OF WEST TERRELL STREET), WHICH IS PRESENTLY ZONED BP, I-20 BUSINESS PARK DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES)

Deputy City Secretary Jan Hamilton read the caption of Ordinance No. 10287.

Development Services Director Chuck Harrington gave a brief overview of the item noting the customer is asking for the sale of alcohol for on-premises consumption.

John Norman moved to approve the first of two readings of Ordinance No. 10287; seconded by Lori Blong.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

MISCELLANEOUS

DRAFT

31. MOTION MAKING APPOINTMENTS TO VARIOUS BOARDS AND COMMISSIONS (CITY SECRETARY'S OFFICE)

A motion was made to defer appointments until after interviews were conducted.

Midland Development Corporation Executive Director Sara Harris reported that if we defer there may be an issue with a quorum on their board. Council Member Blong withdrew her motion to defer.

Lori Blong moved moved to reappoint Chase Gardaphe and Berry Simpton to the Midland Development Corporation Board.; seconded by Robin Poole.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

Lori Blong moved to defer the remaining appointment to the Midland Development Corporation Board.; seconded by Scott Dufford.

The motion passed by the following vote:
AYE: Corrales, Poole, Blong, Payton, Dufford, Ladd, Norman
NAY: None
ABSTAIN: None
ABSENT: None

PUBLIC COMMENT

32. Receive public comments where individuals may address the City Council on City related issues and projects not on the present agenda. Any deliberation of or decision by the City Council regarding the item being discussed shall be limited to a motion to place the item on the agenda for a subsequent meeting. (Please limit comments to three minutes or less.)

Karen Paterson, 4921 N. CR 1147, President of Fix West Texas, provided an overview of the impact they had in the community in 2021, noting they completed 6,702 spay and neuter surgery's, 1,892 microchips, 7,933 vaccination packages, distributed 30 pallets of pet food that was donated by Chewy.com and provided 150 winter dog homes and 100 winter cat homes stuffed with straw to help people get in compliance with the new law. They gave $150,000 back to the community in free services to help people in need.

She shared they are promoting a save-a-cat program in 2022 by taking all cats off City of Midland death row and spaying, neutering and re-homing them. The animals behavior is assessed and some will be placed in barns, shops and warehouses as rodent control or in homes as pets.

Ms. Patterson reported they would like to hear any ideas from Council Members and asked them to advocate on social media for the pets.

DRAFT

Mayor Payton asked Council to promote Keep Midland Beautiful to clean up Midland. He noticed lots of trash and un-mowed areas around the City, especially on Big Spring. He is working with Deputy City Manager Morris Williams on this issue and encourages teams to go out and help.

EXECUTIVE SESSION

Mayor Payton recessed meeting to go to Executive Session at 10:50 a.m.

33. Pursuant to Texas Government Code § 551.101, the City Council will hold an Executive Session, which is closed to the public, to discuss the following matters as permitted under the following sections of the Texas Government Code:

    a. Section 551.071, Consultation with the City Attorney

    a.1. Discuss pending or contemplated litigation

All the business at hand having been completed, the meeting adjourned at 11:23 a.m.

PASSED AND APPROVED February 8, 2022.

_____

Patrick Payton, Mayor

ATTEST:

_____

Amy M. Turner, City Secretary

DRAFT

CITY OF MIDLAND, TEXAS
MIDLAND CITY COUNCIL
SPECIAL MINUTES
January 26, 2022

The City Council convened in **Special** Session in the Midland County Horseshoe, Midland, Texas, at 11:00 AM, Wednesday, January 26, 2022.

Council Members present:	Robin Poole, Lori Blong, Patrick Payton, Jack Ladd, John Norman
Council Members absent:	Dan Corrales, Scott Dufford
Staff members present:	City Manager Robert Patrick, Deputy City Manager Morris Williams Jr, Chief Deputy City Secretary Marcia Bentley-German, Development Services Director Charles Harrington, Police Chief Seth Herman, Oil & Gas Coordinator Ron Jenkins, Administrative Services Director Mark Widmann, Manager, Communications and Marketing Karisa Danely

The meeting was called to order at 11:40 a.m.

SPECIAL SESSION

1. Attend the Midland Chamber of Commerce 2022 State of Oil & Gas luncheon.

All the business at hand having been completed, the meeting adjourned at 12:31 p.m.

PASSED AND APPROVED February 8, 2022.

Patrick Payton, Mayor

ATTEST:

Amy M. Turner, City Secretary

DRAFT

CITY OF MIDLAND, TEXAS
MIDLAND CITY COUNCIL
SPECIAL MINUTES
January 27, 2022

The City Council convened in **Special** Session in the Bush Convention Center, Midland, Texas, at 8:00 AM, Thursday, January 27, 2022.

Council Members present:	Dan Corrales, Robin Poole, Lori Blong, Patrick Payton, Scott Dufford, Jack Ladd, John Norman
Council Members absent:	None
Staff members present:	City Manager Robert Patrick, City Attorney John Ohnemiller, Deputy City Manager Morris Williams Jr, Assistant City Manager Tina Jauz, City Secretary Amy Turner, Chief Deputy City Secretary Marcia Bentley-German, Solid Waste Director Jeffery Ahrlett, Fire Chief Charles Blumenauer, Utilities Director Carl Craigo, Chief Information Officer Jennifer Frescaz, Development Services Director Charles Harrington, Police Chief Seth Herman, Oil & Gas Coordinator Ron Jenkins, Presiding Judge Tim Meek, Director of Community Services Cristina Odenborg Burns, Engineering Services Director Jose Ortiz, Airports Director Justine Ruff, General Services Director Regina Stephenson, Director of Finance Christy Weakland, Administrative Services Director Mark Widmann, Manager, Communications and Marketing Karisa Danely

The meeting was called to order at 8:00 a.m.

SPECIAL SESSION

Mayor Payton did a presentation on Mind Styles, instructed everyone on taking a test and reviewed the results.

City Manager Robert Patrick reviewed the 2021 priorities and provided updates on the progress of those priorities. He reviewed the items completed in 2021 including, but not limited to, the Animal Shelter, two new fire stations, lobbyist RFP's and procurement of the Davis property. Projects in progress include Mockingbird alignments, sports agreements, Scarborough Lineberry House, long-term water solutions, Airbnb Occupancy Tax, Vaughn Building and TABC control for alcoholic beverage permits.

Department Directors presented their 2021 Accomplishments and gave an overview of their 2022 Priorities.

DRAFT

Midland Development Corporation Executive Director Sara Harris shared their 2022 Budget, reviewed their 2021 accomplishments and shared their 2022 goals.

Mayor Payton led a discussion with Council regarding setting Council priorities.

1. The City Council will meet with Council appointees, City department managers, City staff and others in a workshop to discuss and consider City policy, management, operational, and budgeting issues for the current fiscal year and future fiscal years, including, but not limited to: streets, roads, and water and sewer infrastructure; water supply and resources; parks and recreation; community services; public health and safety; land use and development; economic development; personnel; airports; technology; solid waste management; real property acquisition and disposition; and oil and gas development and regulation. The Council may develop and prioritize projects and goals in connection with the foregoing matters.

EXECUTIVE SESSION

2. Pursuant to Texas Government Code § 551.101, the City Council will hold an Executive Session, which is closed to the public, to discuss the following matters as permitted under the following sections of the Texas Government Code:

    a. Section 551.087, Deliberate Economic Development Negotiations

    a.1. Discuss business prospects that the City seeks to have locate, stay, or expand in or near the City of Midland, Texas, and discuss possible incentives.

All the business at hand having been completed, the meeting adjourned at 3:55 p.m.

PASSED AND APPROVED February 8, 2022.

_____

Patrick Payton, Mayor

ATTEST:

_____

Amy M. Turner, City Secretary

DRAFT

City Council Meeting

Item Number: 4

Meeting Date: February 8, 2022

To: City Council / City Manager

From: Erika Martinez, Manager, Purchasing

Subject: RESOLUTION AUTHORIZING THE PURCHASE OF VARIOUS VEHICLES FOR THE GENERAL SERVICES DEPARTMENT FOR A TOTAL COST OF $800,160.00 (DISTRICT: NONE) (GENERAL SERVICES)

Purpose:

Resolution approving the purchase of Cars and Light trucks.

Recommended City Council Action:

Approve

Fiscal Impact:

Financing is available in the FY22 Garage Fund operating budget.

Discussion:

The City Manager approved specifications and authorized advertisement for bids for eleven (11) administrative cars, four (4) Full Size 1/2 Ton Regular Cab Pickups, five (5) Full Size 1/2 Ton Extended Cab Pickup, one (1) Full Size 1/2 Ton Crew Cab Pickup, one (1) Full Size 3/4 Ton Crew Cab 4x4, one (1) Full Size 3/4 ton Extended 4x4, two (2) Full size 1 ton Regular Cab and Chassis, one (1) Full Size 3/4 Ton Regular Cab and Chassis, and one (1) Full Size 1 1/2 ton Cab and Chassis 4x4. On December 1, 2021 we opened bids for the cars and light trucks and received a sole bid for four (4) of the nine (9) requested vehicles. The single bid was rejected at the December 14, 2021 Council Meeting by Motion 155-2021. The request for bids was re-advertised and thirty-four (34) bid requests were issued. On January 19, 2022 we received two (2) bids for 2023 model vehicles.

Staff recommends purchasing item one (1), and items five (5) through nine (9) from the apparent low bidder, Caldwell Country Chevrolet and items two (2) through four (4) from Caldwell Country

Ford the low bidder meeting specifications. Please see the attached memo from Manuel Salinas, Garage Superintendent for additional information.

Therefore, please consider a resolution approving the purchase of the vehicles as shown below:

Item	Dealership	Total Cost
1	Caldwell Country Chevrolet of Caldwell, Texas	$228,525.00
2	Caldwell Country Ford of Rockdale, Texas	$126,000.00
3	Caldwell Country Ford of Rockdale, Texas	$168,875.00
4	Caldwell Country Ford of Rockdale, Texas	$37,110.00
5	Caldwell Country Chevrolet of Caldwell, Texas	$40,575.00
6	Caldwell Country Chevrolet of Caldwell, Texas	$39,900.00
7	Caldwell Country Chevrolet of Caldwell, Texas	$71,700.00
8	Caldwell Country Chevrolet of Caldwell, Texas	$34,975.00
9	Caldwell Country Chevrolet of Caldwell, Texas	$52,500.00
	Total Cost for all vehicles	**$800,160.00**

Tina Gauz

City Manager's Office

Fleet Services Division

INTEROFFICE MEMORANDUM

TO: Regina Stephenson

FROM: Manuel Eloy Salinas

SUBJECT: Bid # 22000603R for the administrative cars, light trucks

DATE: January 26, 2022

Item 1: Fleet services is requesting the purchase of (11) eleven administrative cars that will be replacing units that are beyond their useful service life. Budgeted amount for FY 2022 is $ 286,000 for (11) eleven administrative cars. Caldwell Country Chevrolet from Caldwell, Texas has submitted a bid proposal of $228,525.00 for the purchase of (11) eleven administrative cars. Fleet services will accept the bid submitted by Caldwell Country Chevrolet which meets our specifications.

Item 2: Fleet services is requesting the purchase of (4) four full size ½ ton regular cab trucks to be replacements for trucks that have gone beyond their useful service life. Budgeted amount for FY 2022 is $126,400 for (4) four full size ½ ton regular cab trucks. Caldwell Country Ford from Rockdale, Texas has submitted a bid proposal of $126,000 for the purchase of (4) four full size ½ regular cab trucks. Fleet services will accept the bid submitted by Caldwell Country Ford which meets the V-6 engine size requirement in the specifications.

Item 3: Fleet services is requesting the purchase of (5) five full size ½ ton extended cab trucks to be replacements for trucks that have gone beyond their useful service life. Budgeted amount for FY 2022 is $180,500 for (5) five full size ½ ton extended cab trucks. Caldwell Country Ford from Rockdale, Texas has submitted a bid proposal of $168,875 for the purchase of (5) five full size ½ ton extended cab trucks. Fleet services will accept the bid submitted by Caldwell Country Ford which meets the V-6 engine size requirement in the specifications.

Item 4: Fleet services is requesting the purchase of (1) one full size ½ ton crew cab truck to be a replacement for a truck that has gone beyond its useful serviceable life. Budgeted amount for FY 2022 is $37,050 for (1) one full size ½ ton crew cab truck. Caldwell Country Ford from Rockdale, Texas has submitted a bid proposal of $ 37,110 for the purchase of (1) one full size ½ ton crew cab truck. Fleet services will accept the bid submitted by Caldwell Country Ford which meets the V-6 engine size requirement in the specifications.

Item 5: Fleet services is requesting the purchase of (1) one full size ¾ ton crew cab 4x4 truck to be a replacement truck that has gone beyond its serviceable life. Budgeted amount for FY 2022 is $45,690 for (1) one full size ¾ ton crew cab 4x4 truck. Caldwell Country Chevrolet from Caldwell, Texas has submitted a bid proposal of $40,575 for the purchase of (1) one full size ¾ ton crew cab 4x4 truck. Fleet services will accept the bid submitted by Caldwell Country Chevrolet which meets our specifications.

Item 6: Fleet services is requesting the purchase of (1) one 3/4-ton full size extended cab 4x4 truck that will be replacements for a truck that have gone beyond its serviceable life. Budgeted amount for FY 2022 is $44,650 for (1) one ¾ ton full size extended cab 4x4 truck. Caldwell Country Chevrolet from Caldwell, Texas has submitted a bid proposal of $39,900 for the purchase of (1) one ¾ ton full size extended cab 4x4 truck. Fleet services will accept the bid submitted by Caldwell Country Chevrolet which meets our specifications.

Item 7: Fleet services is requesting the purchase of (2) two 1 ton cab and chassis trucks that will be replacements for trucks that have gone beyond their serviceable life. Budgeted amount for FY 2022 is $66,000 for (2) two 1 ton cab and chassis trucks. Caldwell Country Chevrolet from Caldwell, Texas has submitted a bid proposal of $71,700 for the purchase of (2) two 1 ton cab and chassis trucks. Fleet services will accept the bid submitted by Caldwell Country Chevrolet which meets our specifications.

Item 8: Fleet services is requesting the purchase of (1) one ¾ ton regular cab and chassis that will be a replacement for a truck that has gone beyond its serviceable life. Budgeted amount for FY 2022 for (1) one ¾ ton regular cab and chassis truck is $30,000. Caldwell Country Chevrolet has submitted a bid proposal of $34,975 for the purchase of (1) one ¾ ton regular cab and chassis truck. Fleet services will accept the bid submitted by Caldwell Country Chevrolet which meets our specifications.

Item 9: Fleet services is requesting the purchase of (1) one 1 ½ ton regular cab and chassis 4x4 diesel that will replace a truck that has gone beyond its serviceable life. Budgeted amount for FY 2022 for (1) one 1 ½ ton regular cab and chassis truck is $ 48,750. Caldwell Country Chevrolet has submitted a bid proposal of $52,500 for the purchase of (1) one 1 ½ ton regular cab and chassis truck. Fleet services will accept the bid submitted by Caldwell Country Chevrolet which meets our specifications.

Sincerely,

Manuel Eloy Salinas

City of Midland Garage Superintendent

RESOLUTION NO. _____

RESOLUTION AUTHORIZING THE PURCHASE OF VARIOUS VEHICLES FOR THE GENERAL SERVICES DEPARTMENT FOR A TOTAL COST OF $800,160.00

WHEREAS, the City Manager approved the specifications and authorized the advertisement for bids for the purchase of various vehicles for the General Services Department; and

WHEREAS, Bid No. 22000603R was opened on January 19, 2022, with the lowest and/or most advantageous bids being submitted by the following bidders, as shown on the bid tabulation attached hereto as Exhibit A and incorporated herein for all purposes:

Item	Dealership	Total Cost
1	Caldwell Country Chevrolet of Caldwell, Texas	$228,525.00
2	Caldwell Country Ford of Rockdale, Texas	$126,000.00
3	Caldwell Country Ford of Rockdale, Texas	$168,875.00
4	Caldwell Country Ford of Rockdale, Texas	$37,110.00
5	Caldwell Country Chevrolet of Caldwell, Texas	$40,575.00
6	Caldwell Country Chevrolet of Caldwell, Texas	$39,900.00
7	Caldwell Country Chevrolet of Caldwell, Texas	$71,700.00
8	Caldwell Country Chevrolet of Caldwell, Texas	$34,975.00
9	Caldwell Country Chevrolet of Caldwell, Texas	$52,500.00
	Total Cost for all vehicles	**$800,160.00**

WHEREAS, the City Council finds the prices proposed by the respective bidders to be fair and reasonable; and

WHEREAS, the City Council finds it to be in the public interest to authorize the purchase of said vehicles from the respective bidders listed herein;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the City Manager is hereby authorized and directed to purchase the above-referenced vehicles from the respective bidders listed herein for a total cost of $800,160.00.

SECTION TWO. That the City Comptroller is hereby authorized and directed to pay the respective bidders for said vehicles from funds available in the FY22 Garage Fund operating budget upon receipt of proper invoice or statement approved by the City Manager.

On motion of Council member _____, seconded by Council member _____, the above and foregoing resolution was adopted by the City Council of the City of Midland at a regular meeting on the _____ day of _____, A.D., 2022, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

RECOMMENDED AND APPROVED:

_____
Robert Patrick, City Manager

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Regina Stephenson, General Services Director

APPROVED AS TO FORM ONLY:

_____
John Ohnemiller, City Attorney

City of Midland - Bid Tabulation

BID # 22000603R **Automobiles and Light Trucks** **OPENED** January 19, 2022			Caldwell Country Chevrolet PO BOX 27 Caldwell, TX 77836 979-567-1500		Caldwell Country Ford PO BOX 72 Rockdale, TX 76567 979-567-1500	
ITEM	QTY	DESCRIPTION	COST EACH	TOTAL	COST EACH	TOTAL
1	11	Administrative Cars	$20,775.00	$228,525.00	NO BID	NO BID
		Mileage/Make:	29-36	Chevy Malibu		
		Warranty/ Extended Warranty	3 yr/ 36,000 miles	5 yr/ 100,000 miles		
		Delivery:	360 Days			
2	4	Full Size 1/2 Ton Regular Cab Pickup	$29,970.00	$119,880.00	$31,500.00	$126,000.00
		Mileage/Make:	19-22	Chevy CC10903	17-21	F150R/ CFIC
		Warranty:	3 yr/ 36,000 miles	5 yr/ 100,000 miles	3 yr/ 36,000 miles	
		Delivery:	360 Days		480 Days	
3	5	Full Size 1/2 Ton Extended Cab Pickup	$32,975.00	$164,875.00	$33,775.00	$168,875.00
		Mileage/Make:	19-22	Chevy CC10753	17-21	F150S /CXIC
		Warranty/ Extended Warranty	3 yr/ 36,000 miles	5 yr/ 100,000 miles	3 yr/ 36,000 miles	
		Delivery:	360 Days		480 Days	
4	1	Full Size 1/2 Ton Crew Cab Pickup	$35,485.00	$35,485.00	$37,110.00	$37,110.00
		Mileage/Make:	19-22	Chevy CC10743	17-21	F150C/ CWIC
		Warranty/ Extended Warranty	3 yr/ 36,000 miles	5 yr/ 100,000 miles	3 yr/ 36,000 miles	
		Delivery:	360 Days		480 Days	
5	1	Full Size 3/4 Ton Crew Cab 4x4	$40,575.00	$40,575.00	$42,200.00	$42,200.00
		Mileage/Make:	NA	Chevy CK20943	NA	F250 W2B
		Warranty/ Extended Warranty	3 yr/ 36,000 miles	5 yr/ 100,000 miles	3 yr/ 36,000 miles	
		Delivery:	360 Days		480 Days	
6	1	Full Size 3/4 ton Extended 4x4	$39,900.00	$39,900.00	$41,075.00	$41,075.00
		Mileage/Make:	NA	Chevy CK20953	NA	F250 SCX2B
		Warranty/ Extended Warranty	3 yr/ 36,000 miles	5 yr/ 100,000 miles	3 yr/ 36,000 miles	
		Delivery:	360 Days		480 Days	
7	2	Full size 1 ton Regular Cab and Chassis	$35,850.00	$71,700.00	$37,250.00	$74,500.00
		Mileage/Make:	NA	Chevy CC31403	NA	F350 F3E
		Warranty/ Extended Warranty	3 yr/ 36,000 miles	5 yr/ 100,000 miles	3 yr/ 36,000 miles	
		Delivery:	360 Days		480 Days	
8	1	Full Size 3/4 Ton Regular Cab and Chassis	$34,975.00	$34,975.00	$36,100.00	$36,100.00
		Mileage/Make:	NA	Chevy CC20903	NA	F250 C2A
		Warranty/ Extended Warranty	3 yr/ 36,000 miles	5 yr/ 100,000 miles	3 yr/ 36,000 miles	
		Delivery:	360 Days		480 Days	
9	1	Full Size 1 1/2 ton Cab and Chassis 4x4	$52,500.00	$52,500.00	$58,000.00	$58,000.00
		Mileage/Make:	NA	Chevy CK56403	NA	F550 C5H
		Warranty/ Extended Warranty	3 yr/ 36,000 miles	5 yr/ 100,000 miles	3 yr/ 36,000 miles	
		Delivery:	360 Days		480 Days	
		TOTALS:		**$788,415.00**		**$583,860.00**

Bidding Summary:

34 Bid requests were issued.

2 Bids listed above

2 NO BIDS were received.

30 Bidders did not respond.

City of Midland - Bid Tabulation

BID # 22000603R **Automobiles and Light Trucks** **OPENED** January 19, 2022			Caldwell Country Chevrolet PO BOX 27 Caldwell, TX 77836 979-567-1500		Caldwell Country Ford PO BOX 72 Rockdale, TX 76567 979-567-1500	
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3	5	Full Size 1/2 Ton Extended Cab Pickup	$32,975.00	$164,875.00	$33,775.00	$168,875.00
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		Delivery:	360 Days		480 Days	
4	1	Full Size 1/2 Ton Crew Cab Pickup	$35,485.00	$35,485.00	$37,110.00	$37,110.00
		Mileage/Make:	19-22	Chevy CC10743	17-21	F150C/ CWIC
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		Delivery:	360 Days		480 Days	
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		Mileage/Make:	NA	Chevy CC20903	NA	F250 C2A
		Warranty/ Extended Warranty	3 yr/ 36,000 miles	5 yr/ 100,000 miles	3 yr/ 36,000 miles	
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		Mileage/Make:	NA	Chevy CK56403	NA	F550 C5H
		Warranty/ Extended Warranty	3 yr/ 36,000 miles	5 yr/ 100,000 miles	3 yr/ 36,000 miles	
		Delivery:	360 Days		480 Days	
		TOTALS:		**$788,415.00**		**$583,860.00**

Bidding Summary:

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City Council Meeting

Item Number: 5

Meeting Date: February 8, 2022

To: City Council / City Manager

From: Erika Martinez, Manager, Purchasing

Subject: **RESOLUTION AUTHORIZING THE EXECUTION OF A SOLE-SOURCE CONTRACT WITH HUBER TECHNOLOGY INC. FOR THE LABOR, MATERIALS, EQUIPMENT AND SUPERVISION NECESSARY FOR THE REPAIR OF SCREENS AT THE WATER RECLAMATION FACILITY FOR THE UTILITIES DEPARTMENT AT A TOTAL COST OF $238,881.31 AND APPROVING $23,894.69 FOR CONTINGENCIES (DISTRICT: ALL) (GENERAL SERVICES)**

Purpose:

Resolution awarding a sole source contract for labor, materials, equipment and supervision necessary for the repair of the screens at the Water Reclamation Facility from Huber Technology Inc.

Recommended City Council Action:

Approve

Fiscal Impact:

Funding is available in the FY22 Utilities Fund operating budget.

Discussion:

Staff recommends awarding a sole source contract for labor, materials, equipment and supervision necessary for the repair of the screens at the Water Reclamation Facility from Huber Technology. According to Texas Local Government Code 252.022 (a)(7)(A), competitive bidding requirements do not apply to items that are available from only one source because of patents, copyrights, secret processes, or natural monopolies. Please see the attached memo from Carl Craigo, Utilities Director, for additional information.

Therefore, please consider a resolution awarding a sole source contract for labor, materials, equipment and supervision necessary for the repair of the screens at the Reclamation Facility from Huber Technology Inc. of Denver, North Carolina for a cost of $238,881.31 plus $23,894.69 in contingencies for a total cost of $262,776.00.

Tina Gaug

City Manager's Office

INTEROFFICE MEMORANDUM

TO: Erika Munoz Martinez, Purchasing Manager

FROM: Carl Craigo, PE, Utilities Director

SUBJECT: Consider a resolution approving the sole source contract of labor, materials, equipment and supervision necessary for the repair of the screens at the Water Reclamation Facility for $238,881.31.

DATE: February 8, 2022

The rotating drum screens at the Water Reclamation Facility (WRF) were installed in 2011. In 2013, The City of Midland entered into a maintenance contract with Huber Technology, Inc. to help the City properly maintain and evaluate the condition of the screens as they stayed in operation. The drum screens are an essential part of the Water Reclamation Facility because they remove physical debris from the wastewater that hinders downstream processes including the newly operational secondary treatment facility installed by Pioneer Water Management. The screens are instrumental in helping the City achieve and maintain state and contractually obligated water quality requirements.

Huber Technology, Inc. is the sole source vendor for the materials necessary for the repair. Due to the special nature of the equipment, the repair services are best performed by factory-trained technicians. This will increase the effectiveness of the repair and prevent potential recurring failures due to improper rebuilding. The cost of labor for repair is included in the quote.

The cost for Huber Technology Inc. to repair the rotating drum screens is $238,881.31 with a 10% contingency for a total possible cost of $262,776. This will be paid for out of the WRF Operations budget.

RESOLUTION NO. _____

RESOLUTION AUTHORIZING THE EXECUTION OF A SOLE-SOURCE CONTRACT WITH HUBER TECHNOLOGY INC. FOR THE LABOR, MATERIALS, EQUIPMENT AND SUPERVISION NECESSARY FOR THE REPAIR OF SCREENS AT THE WATER RECLAMATION FACILITY FOR THE UTILITIES DEPARTMENT AT A TOTAL COST OF $238,881.31 AND APPROVING $23,894.69 FOR CONTINGENCIES

WHEREAS, the rotating drum screens at the Water Reclamation Facility are in need of repair; and

WHEREAS, Huber Technology Inc. is the sole source vendor for the materials necessary for the repair; and

WHEREAS, Huber Technology Inc. has agreed to provide the City of Midland with the labor, materials, equipment and supervision necessary for said repairs for a total cost of $238,881.31; and

WHEREAS, the City Council finds the price proposed for said repairs to be fair and reasonable; and

WHEREAS, the City Council finds it to be in the public interest to authorize the execution of a sole-source contract for said repairs; and

WHEREAS, the City Council finds it to be in the public interest to approve $23,894.69 for contingencies;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the City Manager and the City Secretary are hereby authorized and directed to execute and attest, respectively, on behalf of the City of Midland, a sole-source contract with Huber Technology Inc. for the labor, materials, equipment and supervision necessary for the repair of screens at the Water Reclamation Facility for the Utilities Department at a total cost of $238,881.31. Said contract being attached hereto as Exhibit A and incorporated herein for all purposes.

SECTION TWO. That the sum of $23,894.69 for contingencies is hereby approved for said agreement.

SECTION THREE. That the City Comptroller is hereby authorized and directed to pay Huber Technology Inc., in accordance with the terms of the above-referenced contract, from funding available in the FY22 Utilities Fund Operating Budget upon receipt of proper invoices or statements approved by the City Manager's Office.

On motion of Council member _____, seconded by Council member _____, the above and foregoing resolution was adopted by the City Council of the City of Midland at a regular meeting on the _____ day of _____, A.D., 2022, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

RECOMMENDED AND APPROVED:

_____
Robert Patrick, City Manager

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Regina Stephenson, General Services Director

APPROVED AS TO FORM ONLY:

_____
John Ohnemiller, City Attorney

THE CITY OF MIDLAND

CONTRACT

Contract No. 22001900

THIS CONTRACT, effective the 9 day of February, 2022, by and between the City of Midland, hereinafter referred to as "CITY", and Huber Technology Inc., hereinafter referred to as "COMPANY", is made for the following considerations:

1. **Cost:** Total Proposal: $ 238,881.31 DOLLARS

2. **Scope of Work:** COMPANY shall perform all work described of labor, materials, equipment and supervision necessary for the repair of the screens at the Water Reclamation Facility in the following documents, attached hereto and incorporated herein by reference for all legal purposes.

EXHIBIT A..... Specifications, Proposal or Cost Summary
EXHIBIT B.....Intentionally Omitted
EXHIBIT C..... Bonding instructions for Public Works Contract of $50,000 and more
EXHIBIT D..... Wage Scale

3. **City:** The words "CITY's Representative" or "representative" shall mean Carl Craigo or the designee under whose supervision these contract documents, including the plans and specifications, were prepared, or who may inspect work performed under this Contract; or such other representative, supervisor, or inspector as may be authorized by CITY to act in any particular capacity under this Contract.

4. **City's Representative:** CITY's Representative may make periodic visits to the site to observe the progress and quality of the executed work and to determine, in general, if the work is proceeding in accordance with the contract documents. CITY's representative will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work, nor will such representative be responsible for the construction means, methods, techniques, sequences or procedures, or the safety precautions incident thereto. CITY's representative will not be responsible for COMPANY's failure to perform the work in accordance with the contract.

5. **Company:** Unless otherwise stipulated, COMPANY shall provide and pay for all materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and all water, light, power, fuel,

transportation and all other facilities necessary for the execution and completion of the work covered by the contract documents. Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of a good quality. COMPANY shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

5.1. COMPANY shall, at its expense, obtain all permits and licenses necessary for the performance of this contract and pay all fees and taxes required by law, and comply with all laws, ordinances, rules and regulations governing COMPANY's performance of the contract, including all environmental laws and regulations, whether state or federal.

5.2. All work shall be done and all materials furnished in strict conformity with the contract and specifications.

6. **Minor Work Not Mentioned:** All minor detail of the work not specifically mentioned in the Specifications but obviously necessary for the proper completion of the work, such as the proper connection of new work to old, shall be considered as incidental to and a part of the work for which the prices are named in the contract. COMPANY will not be entitled to any additional compensation therefor unless specifically stated otherwise. Otherwise the term "extra work" as used in this contract shall mean and include all work that may be required by CITY to be done by COMPANY to accomplish any alteration or addition to the work as shown on the Specifications.

6.1. COMPANY shall perform all extra work under the direction of CITY's Representative when presented with a written work order signed by CITY's Representative, subject, however, to the right of the COMPANY to require written confirmation of such extra work order by CITY. Payment for extra work shall be as agreed in the work order.

7. **Safety:** COMPANY shall at all times exercise reasonable precaution for the safety of employees and others on or near the work and shall comply with all applicable provisions of federal, state and municipal laws. All machinery and equipment and other physical hazards shall be guarded in accordance with federal, state or municipal laws or regulations.

8. **INDEMNITY: COMPANY SHALL INDEMNIFY AND HOLD HARMLESS AND DEFEND CITY AND ALL OF CITY'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, PERSONAL INJURIES, ACCIDENTAL DEATH, LOSSES, PROPERTY DAMAGE AND EXPENSES OF ANY CHARACTER WHATSOEVER, INCLUDING ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR**

PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF COMPANY, THEIR AGENTS OR EMPLOYEES, OR ANY SUBCONTRACTOR, IN THE EXECUTION, SUPERVISION AND OPERATIONS GROWING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF THIS CONTRACT, AND COMPANY WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS OR EMPLOYEES, INCLUDING ATTORNEY'S FEES. THE OBLIGATIONS CONTAINED IN THIS SECTION 8 SHALL SURVIVE THE TERMINATION OF THIS CONTRACT.

8.1. **COMPANY SHALL INDEMNIFY AND HOLD HARMLESS AND DEFEND CITY AND ALL OF CITY'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, PERSONAL INJURIES, ACCIDENTAL DEATH, PROPERTY DAMAGE, LOSSES, AND EXPENSES OF ANY CHARACTER WHATSOEVER INCLUDING ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF CITY, CITY'S OFFICERS, AGENTS AND EMPLOYEES, WHETHER SUCH NEGLIGENT ACT WAS THE SOLE PROXIMATE CAUSE OF THE INJURY OR DAMAGE OR A PROXIMATE CAUSE JOINTLY AND CONCURRENTLY WITH COMPANY OR COMPANY'S EMPLOYEES, AGENTS OR SUBCONTRACTORS NEGLIGENCE IN THE EXECUTION, SUPERVISION AND OPERATIONS GROWING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF THIS CONTRACT, AND COMPANY WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS OR EMPLOYEES, INCLUDING ATTORNEY'S FEES. THE OBLIGATIONS CONTAINED IN THIS SECTION 8.1 SHALL SURVIVE THE TERMINATION OF THIS CONTRACT.**

8.2. **COMPANY AGREES THAT IT WILL INDEMNIFY AND SAVE CITY HARMLESS FROM ALL CLAIMS GROWING OUT OF ANY DEMANDS OF SUBCONTRACTORS, LABORERS, WORKMEN, MECHANICS, MATERIALMEN, AND FURNISHERS OF MACHINERY AND PARTS THEREOF, EQUIPMENT, POWER TOOLS AND ALL SUPPLIES, INCURRED IN THE FURTHERANCE OF THE PERFORMANCE OF THIS CONTRACT. WHEN CITY SO DESIRES, COMPANY SHALL FURNISH SATISFACTORY EVIDENCE THAT ALL OBLIGATIONS OF THE NATURE HEREINABOVE DESIGNATED HAVE BEEN PAID, DISCHARGED OR WAIVED. COMPANY, ITS SURETIES AND INSURANCE CARRIERS SHALL DEFEND, INDEMNIFY AND SAVE HARMLESS CITY AND**

ALL OF ITS OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, OR CLAIMS OF ANY CHARACTER WHATSOEVER, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ARISING FROM ANY ACT OF COMPANY OR ANY SUBCONTRACTOR, THEIR AGENTS OR EMPLOYEES, IN THE EXECUTION AND SUPERVISION OF THIS CONTRACT, AND WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS, OR EMPLOYEES INCLUDING ATTORNEY'S FEES. THE OBLIGATIONS CONTAINED IN THIS SECTION 8.2 SHALL SURVIVE THE TERMINATION OF THIS CONTRACT.

9. **Start of Work:** COMPANY shall commence work no later than ten (10) days after receipt of the execution of this document or other written release to proceed and shall complete such work no later than 25 calendar days after release to proceed.

10. **Clean Up:** COMPANY shall promptly remove from CITY's premises all materials condemned by CITY's Representative on account of failure to conform to the contract, whether actually incorporated in the work or not, and COMPANY shall at its own expense promptly replace such condemned materials with other materials conforming to the requirements of the contract. COMPANY shall also bear the expense of restoring all work of other contractors damaged by any such removal or replacement. If COMPANY does not remove and replace any such condemned materials within a reasonable time after a written notice by CITY, CITY may remove and replace such at COMPANY's expense.

11. **Warranty:** Neither the final payment nor any provision in this contract shall relieve COMPANY of responsibility for faulty materials or workmanship, and he shall remedy any defects due thereto and pay for any damage to other work resulting therefrom, which shall appear within a period of one (1) year from the date of substantial completion. CITY shall give notice of observed defects with reasonable promptness.

12. **Remedy:** CITY may, on account of subsequently discovered evidence, withhold whole or part of any payment to such extent as may be necessary to protect itself from loss on account of:

12.1. Defective work not remedied; or

12.2. Claims filed or reasonable evidence indicating possible filing of claims; or

12.3. Failure of COMPANY to make payments promptly to subcontractors or for material or labor which CITY may pay as an agent for the COMPANY; or

12.4. Damages to another contractor or subcontractor.

When the above grounds to withhold payment are removed, or COMPANY provides a surety bond satisfactory to CITY, which will protect CITY in the amount withheld, payment may be released.

13. **Funding Out:** In the event no funds or insufficient funds are appropriated and budgeted or are otherwise unavailable in any fiscal period for contract payments due under the contract, then this contract shall terminate on the last day of the fiscal period for which full appropriations were made, without penalty or expense to CITY of any kind whatsoever.

14. **Wage Scale:** COMPANY agrees to pay all workmen in his employ no less than the generally prevailing wage rate for employees of similar category in the Permian Basin Area, as is depicted in the wage rate scale attached hereto as EXHIBIT D, and incorporated herein by reference for all legal purposes.

14.1. If applicable, the Davis-Bacon Act, 29 CFR 5.5, and any related acts or regulations are hereby incorporated by reference and made a part of this Contract, and all terms and requirements under said laws, by such incorporation, are made terms and requirements of this Contract, to which the parties to this Contract have agreed to be bound.

15. **Prompt Pay Act:** CITY and COMPANY agree that Texas Government Code, Chapter 2251, Payment for Goods and Services (the "Prompt Pay Act") does not waive governmental immunity.

16. **Payment; Retainage:** After all work is completed by COMPANY, including all Change Orders altering the original scope and amount of the contract are completed, and the CITY has inspected and approved that the work is completed and in compliance with the contract and all subsequent Change Orders, the CITY may thereafter issue payment to COMPANY in the amount of the contract and all Change Orders. The CITY shall be the final judge of when the work is completed by COMPANY. The CITY, in its sole discretion, shall determine if the work under the contract and under any Change Orders has been done to the CITY's requirements.

16.1. The CITY may make periodic payments to COMPANY; provided, however, such periodic payments may only be made pursuant to this section, and only after all work and all Change Orders are completed by COMPANY and approved by the CITY. The approval shall be in the CITY's sole discretion. Requests for progress payments may be made to the extent of the materials and labor completed at the end of each month. Upon approval by the CITY or the CITY's representative, the request and invoice shall be forwarded for payment less 5% retainage. The total of these payments shall not exceed 95% of the total contract amount.

17. **Late Completion; Liquidated Damages:** It is hereby understood and mutually agreed, by and between COMPANY and the CITY, that the date of beginning and the time for completion as specified in the contract of the work to be done hereunder are ESSENTIAL CONDITIONS of this contract; and it is further mutually understood and agreed that the work embraced in this contract shall be commenced on a date to be specified in the "Notice to Proceed." COMPANY agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between COMPANY and the CITY, that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

17.1. In the event COMPANY shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the CITY, then COMPANY and COMPANY's surety, if any, shall be liable for and does hereby agree, as a part consideration for the awarding of this contract, to pay to the CITY $500.00, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every day that COMPANY shall be in default after the time stipulated in the contract for completing the work. Further, the CITY shall have the right to cancel this contract for such delay. In the event the CITY cancels this contract pursuant to the terms of this section, the CITY shall pay to COMPANY only those monies deemed appropriate by the CITY, in its sole discretion, to compensate COMPANY for any work actually performed, less any liquidated damages COMPANY owes the CITY.

17.2. The said amount is fixed and agreed upon by and between COMPANY and the CITY because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the CITY would in such event sustain, and said amount is agreed to be the amount of damages which the CITY would sustain and said amount shall be retained from time to time by the CITY from current periodical estimates.

17.3. It is further agreed that time is of the essence of each and every portion of this contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this contract. Provided, that COMPANY shall not be charged with liquidated damages or any excess cost when the CITY determines, in its sole discretion, that COMPANY is without fault and COMPANY's reasons for the time extension are acceptable to the CITY. Provided, further, that COMPANY shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

a. To any preference, priority or allocation order duly issued by the Government;

b. To unforeseeable cause beyond the control and without the fault or negligence of COMPANY, including, but not restricted to, acts of God, or of the public enemy, acts of the CITY, acts of another contractor in the performance of a contract with the CITY, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather; and

c. To any delays of subcontractors or suppliers occasioned by any of the causes specified in subsections (a) and (b) of this article.

17.4. Provided, further, that COMPANY shall, within ten (10) days from the beginning of such delay, unless the CITY shall, in its sole discretion grant a further period of time prior to the date of final settlement of the contract, notify the CITY, in writing, of the causes of the delay, who shall ascertain the facts and extent of the delay and notify COMPANY within a reasonable time of its decision in the matter.

17.5. **COMPANY AGREES THAT THE PAYMENT OF SUCH LIQUIDATED DAMAGES MAY BE RECOVERED BY THE CITY FROM RETAINAGE HELD BY THE CITY. NOTWITHSTANDING ANY OTHER PROVISION HEREOF, COMPANY HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES CITY, CITY'S EMPLOYEES AND OFFICERS FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES, OR CAUSES OF ACTION OF ANY KIND WHATSOEVER ARISING FROM THE CITY WITHHOLDING PAYMENT FROM COMPANY AS LIQUIDATED DAMAGES FOR COMPANY'S FAILURE TO COMPLETE THE WORK WITHIN THE TIME SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR CITY'S NEGLIGENCE.**

17.6. **COMPANY SHALL RECEIVE NO FINANCIAL COMPENSATION FOR DELAY OR HINDRANCE TO THE WORK. IN NO EVENT SHALL THE CITY BE LIABLE TO COMPANY OR ANY SUBCONTRACTOR OR SUPPLIER, ANY OTHER PERSON OR ANY SURETY FOR OR ANY EMPLOYEE OR AGENT OF ANY OF THEM, FOR ANY DAMAGES ARISING OUT OF OR ASSOCIATED WITH ANY DELAY OR HINDRANCE TO THE WORK, REGARDLESS OF THE SOURCE OF THE DELAY OR HINDRANCE, INCLUDING EVENTS OF FORCE MAJEURE, AND EVEN IF SUCH DELAY OR HINDRANCE RESULTS FROM, ARISES OUT OF OR IS DUE, IN WHOLE OR IN PART, TO THE NEGLIGENCE OF THE CITY. COMPANY'S SOLE REMEDY IN ANY SUCH CASE SHALL BE AN EXTENSION OF TIME.**

18. **No Third Party Beneficiary:** CITY's approval of this contract does not create a third party

beneficiary. There is no third party beneficiary to this contract. No person or entity who is not a party to this contract shall have any third party beneficiary or other rights hereunder.

19. WAIVER OF ATTORNEY FEES: BY EXECUTING THIS CONTRACT, COMPANY AGREES TO WAIVE AND DOES HEREBY KNOWINGLY, CONCLUSIVELY, VOLUNTARILY AND INTENTIONALLY WAIVE ANY CLAIM IT HAS OR MAY HAVE IN THE FUTURE AGAINST CITY REGARDING THE AWARD OR ATTORNEY'S FEES, WHICH ARE IN ANY WAY RELATED TO THIS CONTRACT, OR THE CONSTRUCTION, INTERPRETATION OR BREACH OF THIS CONTRACT. COMPANY SPECIFICALLY AGREES THAT IF COMPANY BRINGS OR COMMENCES ANY LEGAL ACTION OR PROCEEDING RELATED TO THIS CONTRACT, THE CONSTRUCTION, INTERPRETATION, VALIDITY OR BREACH OF THIS CONTRACT, INCLUDING, BUT NOT LIMITED TO, ANY ACTION PURSUANT TO THE PROVISIONS OF THE TEXAS UNIFORM DECLARATORY JUDGMENTS ACT (TEXAS CIVIL PRACTICE AND REMEDIES CODE SECTION 37.001, ET SEQ., AS AMENDED), OR CHAPTER 271 OF THE TEXAS LOCAL GOVERNMENT CODE, COMPANY AGREES TO ABANDON, WAIVE AND RELINQUISH ANY AND ALL RIGHTS TO THE RECOVERY OF ATTORNEY'S FEES TO WHICH COMPANY MIGHT OTHERWISE BE ENTITLED.

COMPANY AGREES THAT THIS IS THE VOLUNTARY AND INTENTIONAL RELINQUISHMENT AND ABANDONMENT OF A PRESENTLY-EXISTING KNOWN RIGHT. COMPANY ACKNOWLEDGES THAT IT UNDERSTANDS ALL TERMS AND CONDITIONS OF THIS CONTRACT. COMPANY FURTHER ACKNOWLEDGES AND AGREES THAT THERE WAS AND IS NO DISPARITY OF BARGAINING POWER BETWEEN CITY AND COMPANY. THIS SECTION SHALL NOT BE CONSTRUED OR INTERPRETED AS A WAIVER OR GOVERNMENTAL IMMUNITY AND SHALL SURVIVE THE TERMINATION OF THIS CONTRACT.

COMPANY IS RELYING ON ITS OWN JUDGMENT. COMPANY HAD THE OPPORTUNITY TO DISCUSS THIS CONTRACT WITH COMPETENT LEGAL COUNSEL PRIOR TO ITS EXECUTION. THE OBLIGATIONS CONTAINED IN THIS SECTION 18 SHALL SURVIVE THE TERMINATION OF THIS CONTRACT.

20. **Governmental Immunity:** By executing this contract CITY is not waiving its right of governmental immunity. CITY is retaining its immunity from suit. CITY is not granting consent to be sued by legislative resolution or action.

THERE IS NO WAIVER OF GOVERNMENTAL IMMUNITY.

21. **Insurance:**

COMPANY shall at all times during the term of this Contract maintain and keep in full force and effect insurance in the following types and minimum amounts with companies authorized to do business in the State of Texas:

Commercial General Liability (including Contractual liability):	
-Personal Injury:	$1,000,000.00 per person
	$1,000,000.00 per occurrence
-Property Damage:	$500,000.00 per occurrence
Business Automobile Liability:	$250,000.00 combined single limit - Personal Injury and Property Damage
Workers' Compensation:	Statutory limits
Employers' Liability:	$500,000.00 per accident or occurrence

The Commercial General Liability shall be on a per project aggregate, including completed operations, and shall be on a claims-occurred basis. This insurance shall name CITY as an additional insured and waive subrogation in favor of CITY.

The Business Automobile Liability insurance provided by COMPANY shall cover any auto for bodily injury and property damage, including owned vehicles, hired and non-city vehicles, and employee non-ownership, and the amount of such policy shall be a minimum of $250,000.00 covering any vehicle used for the execution of the work that is the subject of this Contract. This insurance shall name CITY as an additional insured and waive subrogation in favor of CITY.

The Workers' Compensation coverage provided by COMPANY shall inure to the benefit of employees injured during the course and scope of their employment by COMPANY pursuant to this Contract. The Workers' Compensation shall waive all rights of subrogation in favor of CITY.

All insurance required pursuant to this Contract shall provide for a waiver of subrogation in favor of CITY. All insurance required pursuant to this Contract, except for Workers' Compensation Insurance, shall name CITY as an additional insured on a claims occurred basis. CITY shall be provided the notice by COMPANY's insurance provider not later than thirty (30) days prior to any reduction or termination of such coverage.

COMPANY shall contractually require all contractors, subcontractors, and sub-subcontractors that work on any portion of the work that is the subject of this Contract to obtain insurance coverage that meets or exceeds the policy requirements and minimum amounts specified herein. All contractors, subcontractors, and sub-subcontractors shall obtain insurance policies that provide blanket waivers of

subrogation in favor of the City of Midland and policies that name the City of Midland as an additional insured on a claims occurred basis (except workers' compensation).

The parties agree that, prior to the execution of the Contract, COMPANY shall provide one or more certificates of insurance specifically stating that these requirements have been met and subject to the approval of CITY. CITY shall not be required to provide any insurance whatsoever pursuant to this Contract.

COMPANY certifies that the certificate of insurance provided as required herein complies with the requirements of Chapter 1811 of the Texas Insurance Code. COMPANY shall not use an unapproved certificate of insurance or insert inappropriate language on a certificate. Compliance with state law is the sole responsibility of COMPANY.

22. **Assignment**: COMPANY shall not, either directly or indirectly, assign all or any part of this Contract or any interest, right or privilege herein, without the prior written consent of CITY. The issue on whether or not to grant consent to an assignment is in the sole discretion of CITY.

23. **RELEASE: NOTWITHSTANDING ANY OTHER PROVISION CONTAINED HEREIN, COMPANY HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES CITY AND CITY'S COUNCIL MEMBERS, EMPLOYEES, AND OFFICERS FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES OR CAUSES OF ACTION OF ANY KIND WHATSOEVER THAT COMPANY HAS OR MIGHT HAVE IN THE FUTURE, INCLUDING, BUT NOT LIMITED TO, BREACH OF CONTRACT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR CITY'S NEGLIGENCE. THE OBLIGATIONS CONTAINED IN THIS SECTION SHALL SURVIVE THE TERMINATION OF THIS CONTRACT**.

24. **Governing Law and Venue:** This contract shall be governed by the laws of the State of Texas. All performance and payment made pursuant to this contract shall be deemed to have occurred in Midland County, Texas. The obligations and undertakings of each of the parties to this Agreement shall be deemed to have occurred in Midland County, Texas. Exclusive venue for any claims, suits or any other action arising from or connected in any way to this contract or the performance of this contract shall be in Midland County, Texas.

25. **Independent Contractor:** COMPANY shall perform all work and services described herein as an independent contractor and not as an officer, agent, servant, or employee of CITY. COMPANY shall have exclusive control of, and the exclusive right to control the details of the services and work to be

performed hereunder, and all persons performing the same. COMPANY shall be solely responsible for the acts and omissions of its officers, agents, employees, contractors and subcontractors and the doctrine of respondeat superior shall not apply as between CITY and COMPANY, its officers, agents, employees, contractors and subcontractors. Nothing in this Contract shall be construed as creating a partnership or joint enterprise between CITY and COMPANY. No person performing any of the work and services described hereunder by COMPANY shall be considered an officer, agent, servant or employee of CITY. Further, it is specifically understood and agreed that nothing in this contract is intended or construed as creating a "Community of Pecuniary Interest" or an "Equal Right of Control" which would give rise to vicarious liability.

COMPANY shall be an independent contractor under this Contract and shall assume all of the rights, obligations and liabilities, applicable to it as such independent contractor hereunder. CITY does not have the power to direct the order in which the work is done. CITY shall not have the right to control the means, methods or details of COMPANY's work. COMPANY shall assume exclusive responsibility for the work. COMPANY is entirely free to do the work in its own way.

26. **Notice of Alleged Breach; Statutory Prerequisites:** As a condition precedent to filing suit for alleged damages incurred by an alleged breach of an express or implied provision of this Contract, COMPANY or its legal representative, shall give the City Manager, or any other reasonable official of CITY, notice in writing (consisting of one (1) original and seven (7) copies of notice attached to a copy of this Contract) of such damages, duly verified, within one hundred twenty (120) days after the same has been sustained. The discovery rule does not apply to the giving of this notice. The notice shall include when, where and how the damages occurred, the apparent extent thereof, the amount of damages sustained, the amount for which COMPANY shall settle, the physical and mailing addresses of COMPANY at the time and date the claim was presented and the physical and mailing addresses of COMPANY for the six (6) months immediately preceding the occurrence of such damages, and the names and addresses of the witnesses upon whom COMPANY relies to establish its claim; and a failure to provide such written notification within the time and manner provided herein shall exonerate, excuse and except CITY from any liability whatsoever. CITY is under no obligation to provide notice to COMPANY that COMPANY's notice is insufficient. CITY reserves the right to request additional information regarding the claim. Said additional information shall be supplied within thirty (30) days after receipt of notice.

The statutory prerequisites outlined herein constitute jurisdictional requirements pursuant to Section 271.154 of the Texas Local Government Code and Section 311.034 of the Texas Government Code. Notwithstanding any other provision to the contrary, COMPANY's failure to comply with the

requirements of this Section shall perpetually bar COMPANY's claim for damages under Chapter 271 of the Texas Local Government Code, and Section 311.034 of the Texas Government Code, regardless if CITY has actual or constructive notice or knowledge of said claim or alleged damages. COMPANY agrees that the requirements of this entire Contract are reasonable. The provisions and obligations of this Section shall survive the termination of this Contract.

27. **Consideration:** The terms of this Contract are supported by good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the parties named herein.

28. **Termination At Will:** CITY may terminate this Contract at will for no or any reason upon giving at least one hundred eighty (180) days written notice to COMPANY. The parties to this Contract understand and agree that it is in CITY's sole discretion to cancel the Contract during the term of the Contract without penalty to CITY. COMPANY has no expectation and has received no guarantees that this Contract will not be terminated before the end of the Contract term. The parties have bargained for the flexibility of terminating this Contract upon tender of the requisite notice at any time during the term of the Contract. All work and services under the Contract shall be suspended upon termination of the Contract becoming effective.

29. **Compliance:** COMPANY agrees that it shall comply with Texas Government Code Section 2252.908, *et seq.*, as amended. COMPANY agrees that it shall comply with Texas Local Government Code Section 176.006, *et seq.*, as amended.

30. To the extent that Sections 2271.002 and 2274.002 of the Texas Government Code (collectively, the "Anti-Boycott Statutes") apply to this Contract, Company hereby verifies:

- that Company does not boycott Israel and will not boycott Israel during the term of this Contract;
- that Company does not boycott energy companies and will not boycott energy companies during the term of this Contract; and
- that Company does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association and will not discriminate during the term of this Contract against a firearm entity or firearm trade association.

To the extent that the Anti-Boycott Statutes do not apply to this Contract, such verification is not required, and Company shall be deemed to have not made such verification.

31. **Records Retention and Production of Information.** To the extent that this Contract constitutes a contract described by Section 552.371 of the Texas Government Code, COMPANY shall: (i) preserve all contracting information related to this Contract as provided by the records retention requirements

applicable to CITY for the duration of this Contract; (ii) promptly provide to CITY any contracting information related to the Contract that is in the custody or possession of COMPANY on request of CITY; and (iii) on completion of the Contract, either: (a) provide at no cost to CITY all contracting information related to the Contract that is in the custody or possession of COMPANY; or (b) preserve the contracting information related to the Contract as provided by the records retention requirements applicable to CITY.

32. **Public Information.** To the extent that this Contract is a contract described by Section 552.371 of the Texas Government Code, COMPANY agrees as follows in accordance with Section 552.372(b) of the Texas Government Code: The requirements of Subchapter J, Chapter 552, Government Code, may apply to this Contract, and COMPANY agrees that the contract can be terminated if COMPANY knowingly or intentionally fails to comply with a requirement of that subchapter.

33. **Conflict of Terms.** If a conflict of terms or language exists between: (i) any of the provisions of this Contract and (ii) any of the provisions contained in any exhibit(s) attached to this Contract, precedence shall be given to the provisions of this Contract. For the avoidance of any doubt, the provisions contained in this Contract shall supersede any and all conflicting provisions contained in any exhibit(s) attached hereto. Furthermore, the parties acknowledge and agree that any provision contained in an exhibit(s) attached to this Contract that imposes an additional express or implied obligation on CITY is hereby made void and of no force or effect. CITY's sole and exclusive obligations under this Contract are contained in the provisions of this Contract that precede the signature page(s), which evidences the parties' execution.

34. Company agrees that all iron or steel products produced through a manufacturing process and used in the project that is the subject of this Contract shall be produced in the United States in accordance with Government Code § 2252.202, et seq., as amended.

EXECUTED IN DUPLICATE the day and year first above mentioned.

THE CITY OF MIDLAND, TEXAS

By: _____
Robert Patrick, City Manager

ATTEST

_____
Amy M. Turner, City Secretary

APPROVED ONLYAS TO FORM

_____
John Ohnemiller, City Attorney

COMPANY:

By: _____

Name:_____

Title: _____

STATE OF _____ §

§

COUNTY OF_____ §

BEFORE ME, the undersigned authority, on this ____ day of _____, 20____ personally appeared, _____, an officer of Huber Technology Inc., known to me to be the person and official whose name is subscribed to the forgoing instrument, and acknowledged to me that he executed the same as the act and deed of said corporation, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the ____day of _____, 20____.

_____

Notary Public, State of _____

Billing Address
City of Midland
PO Box 1152
Midland, TX 79702-1152
UNITED STATES

Delivery Address
City of Midland
3600 East I-20
Midland, TX 79706
UNITED STATES

OFFER: **71010570 / V1**
Project: Midland, TX (291362)

Your Reference:

Date printed: 1/7/22
Our Reference: Mike Suddreth
Phone: +1-704-990-2410
Email: mike.suddreth@hhusa.net

Customer No.: 114304

Pos	Quantity	Unit	Item Description	Price USD Discount (%)	Total USD Tax (%)
			—Parts for 1 x RPPS 2200—		
10/1	1.00	pcs	291362-598302 Perforated Screen 6mm	30,920.60 5%	**29,374.57** 0%
20/1	1.00	pcs	401079 bearing seat screen basket Ro2 2200 d124/216 D2150 L269	45,709.95 5%	**43,424.45** 0%
21/1	2.00	pcs	504015 flange 154/ 206x 6 BC192 6xbo6,5	255.09 5%	**484.67** 0%
22/1	12.00	pcs	706563 countersunk screw DIN 7991 M 6x 20	0.76 5%	**8.66** 0%
23/1	2.00	pcs	711159 grooved ring 150/174x12	402.46 5%	**764.67** 0%
24/1	2.00	pcs	700148 slide bearing 150/ 155x 40,5	419.16 5%	**796.40** 0%
25/1	1.00	pcs	502085 sleeve 134H7/150h8x155	1,667.54 5%	**1,584.16** 0%
26/1	1.00	pcs	706289 feather key DIN 6885 A25x14x125	237.60 5%	**225.72** 0%

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Pos	Quantity	Unit	Item Description	Price USD Discount (%)	Total USD Tax (%)
			—Parts for 2 x RPPS 2200—		
100/1	2.00	pcs	10000001 504007 Bearing Shell	3,000.00 5%	**5,700.00** 0%
105/1	2.00	pcs	10000001 BK70ZX Gearbox w/ Motor	10,581.39 5%	**20,104.64** 0%
110/1	12.00	pcs	508603 roller D100 d30 L 40 800kg	289.31 5%	**3,298.13** 0%
120/1	24.00	pcs	711198 Nilos sealing ring 6206 ZAV/CrNi d 30 D 56,2 h2,5 s0,3	16.72 5%	**381.22** 0%
131/1	4.00	pcs	504015 flange 154/ 206x 6 BC192 6xbo6,5	255.09 5%	**969.34** 0%
131/2	24.00	pcs	706563 countersunk screw DIN 7991 M 6x 20	0.76 5%	**17.33** 0%
131/3	4.00	pcs	711159 grooved ring 150/174x12	402.46 5%	**1,529.35** 0%
131/4	4.00	pcs	700148 slide bearing 150/ 155x 40,5	419.16 5%	**1,592.81** 0%
131/5	2.00	pcs	502085 sleeve 134H7/150h8x155	1,667.54 5%	**3,168.33** 0%
131/6	2.00	pcs	706289 feather key DIN 6885 A25x14x125	237.60 5%	**451.44** 0%
140/1	4.00	pcs	509240 brush L1998 6D 40/65 0,6	633.60 5%	**2,407.68** 0%
150/1	2.00	pcs	509402 brush L5062 6D 40/65 0,6	633.60 5%	**1,203.84** 0%
150/2	44.00	pcs	702644 hexagon bolt DIN 933 M 6x 12	0.80 5%	**33.44** 0%
150/3	44.00	pcs	703106 washer DIN 9021 A 6,4	0.77 5%	**32.19** 0%
160/1	2.00	pcs	291362-598325 brush	313.50 5%	**595.65** 0%
160/2	12.00	pcs	702751 hexagon bolt DIN 933 M 8x 20	1.33 5%	**15.16** 0%
160/3	12.00	pcs	503235 holding plate 49/25/3 1xsh9x22	4.26 5%	**48.56** 0%
160/4	12.00	pcs	702424 washer DIN 125 A 8,4	0.32 5%	**3.65** 0%
170/1	6.00	pcs	509437 brush L 706 6D 40/65 0,6	250.80 5%	**1,429.56** 0%

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WASTE WATER Solutions

Offer: **71010570**
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Pos	Quantity	Unit	Item Description	Price USD Discount (%)	Total USD Tax (%)
170/2	30.00	pcs	702751 hexagon bolt DIN 933 M 8x 20	1.33 5%	**37.90** 0%
170/3	30.00	pcs	703101 washer DIN 9021 A 8,4	0.63 5%	**17.95** 0%
180/1	42.00	pcs	702013 flat jet nozzle JAQ1490 1/8" 60° 3 bar: 4,9 l/min	29.57 5%	**1,179.84** 0%
			—Service—		
200/1	1.00	pcs	10000002 1st Trip Consists of: - 2 techs x 1 week - Travel, Hotel, Per Diem, Flight - Crane and Lull Rental	24,000.00	**24,000.00** 0%
300/1	1.00	pcs	10000002 2nd Trip Consists of: - 3 techs x 2 week - Travel, Hotel, Per Diem, Flight - Crane and Lull Rental	38,000.00	**38,000.00** 0%
400/1	1.00	pcs	10000002 3rd Trip Consists of: - 2 techs x 1 week w/ overtime - Travel, Hotel, Per Diem, Flight - Crane and Lull Rental	26,000.00	**26,000.00** 0%
500/1	1.00	pcs	10000002 Freight (Ocean, jobbox) - Est.	10,000.00	**10,000.00** 0%
600/1	1.00	pcs	10000003 3rd Party Metal work - Estimated	20,000.00	**20,000.00** 0%

Total net **USD** **238,881.31**

The quotation is subject to national or international export control regulations and embargoes or any other export restrictions.

Valid for: 90 days
Delivery: prepaid and add
Payment terms: Net 30 days

Best regards

Mike Suddreth

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HUBER TECHNOLOGY
WASTE WATER Solutions

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Aftermarket Sales & Service Rates 2022

Field Service Base Rates

Continental U.S., Mexico and Canada	**$150.00 per hour**
Outside Continental U.S., Mexico and Canada	**$226.00 per hour**

Training

Product Training	**$150.00 per hour**

Travel

Travel (time)	**$140.00 per hour**
Mileage	**$0.58 per mile**

Manufacturing/Engineering Services in house

Services include failure analysis of returned hardware	**$145.00 per hour**

Premium Rates

Overtime rate (in excess of 8 hours per day	**$249.00 per hour**
Standby rate	**Applicable base rate**
Double time rate (Sunday, Holiday, or in excess of 12 hours)	**$300.00 per hour**

Expenses

Travel and accommodations	**Actual cost**
Per Diem ....Business Rate Plan 1..	**$60.00 per day**
High Cost Area Rate 2..	**$70.00 per day**
Service Truck Rate	**$80.00 per day**
Materials, Equipment Rental, Supplies	**Actual cost plus 20%**
Laboratory testing	**Actual cost plus 20%**

Fees

Visa, work permits, taxes, user fees or special assessments, etc	**Actual cost**

Cancellation Charges

Prior to departure for travel expenses incurred (i.e. airline / change fees)	**Actual cost**

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Aftermarket Sales & Service Rates 2022

Field service Base Rate. Rates are calculated from the day the Service Specialist departs Huber Technology, Huntersville, North Carolina until the day the Service Specialist returns to Huber Technology, Inc., Huntersville, North Carolina. Rates include weekends and holidays. If a Service Specialist is required to travel from any other location, including, Germany the rates are calculated from when the Service Specialist departs the home office until the day the Service Specialist returns to the home office.

Travel. Time includes transportation to and from the airport, security clearance, time between flight changes, driving time and local travel to and from worksite. Travel time in excess of eight (8) hours may be billed at the premium rate.

Double Time. Any Sunday or **Recognized Huber Technology, Inc. Holiday.**

Transportation. The customer is responsible for reimbursing Huber Technology, Inc. for all transportation charges associated with service work. Flights will be booked as coach-tourist class unless it is unavailable. Rental car, gas, taxis, airport / hotel limousines, company or personal vehicles will be used when necessary.

Standby rate. Applies to the time a Service Specialist is available for work and is located at or near the job site but unable to work due to circumstances beyond his control. Time shall be considered time worked and will be charged at the applicable base or premium rate.

Accommodations and Meals. Meals are charged at $60.00 per day or $70.00 per day depending on the area (See Business Rate Plan 1 and 2). If an overnight stay is required, the customer is required to reimburse Huber Technology, Inc. for lodging charges. Hotel rooms will be booked on a business executive, single occupancy basis.

Visa, Work Permits & Local Taxes. The customer is responsible to pay any and all taxes, user fees or special assessments. If a visa or work permit is required before departing for an international assignment, the fee will be charged to the customer at actual cost (including any expediting charges).

Warranties. Per Huber Technology, Inc.'s Terms and Conditions of Sale, Huber Technology, Inc. warrants Field Service work performed at site. "Breach of Warranty" claims do not entitle the customer to refuse payment for field service work. HUBER TECHNOLOGY, INC. MAKES NO OTHER WARRANTY, EXPRESS OR IMPLIED, WITH REGARD TO THE DESIGN, SALE, MERCHANTABILITY OR FITNESS OF THE GOODS FOR A PARTICULAR PURPOSE OR USE EXCEPT AS EXPRESSLY SET FORTH IN HUBER TECHNOLOGY, INC.'S TERMS AND CONDITIONS. HUBER TECHNOLOGY, INC. IS NOT SUBJECT TO ANY OTHER OBLIGATIONS OR LIABILITIES ARISING OUT OF BREACH OF CONTRACT OR WARRANTY, TORT CLAIMS INCLUDING NEGLIGENCE AND STRICT LIABILITY, OR ANY OTHER THEORIES OF LAW. HUBER TECHNOLOGY, INC. IS UNDER NO EVENT LIABLE FOR ANY SPECIFIC, INDIRECT, INCIDENTAL OR CONSEQUENTIAL LOSS, DAMAGES, EXPENSE, INJURY, DISMEMBERMENT, OR DEATH OF ANY KIND WHATSOEVER.

SCHEDULING – 10 Working Days Notice. Request for field service should be made in writing (letter, fax or e-mail) to Huber Technology, Inc. at least ten (10) working days prior to the date for which services are requested. Confirmation of the service will be conveyed verbally by Huber Technology, Inc.

Insurance. All Huber Technology, Inc. Service Specialists are insured. Liability insurance certificates may be provided upon request by the customer in order to allow for sufficient time for document processing, the request must be made at least seven (7) working days prior to the date of services.

Hazardous Locations.
Huber Technology, Inc. reserves the right to recall its personnel if the worksite does not meet governmental health and safety standards.

Minimum Daily Charge. For all Field Service Base Rates or combinations of Base Rates, the minimum fee will be for eight (8) hours. If services are performed on the same day as travel, travel time will be billed in addition to service time.

Overtime. The overtime rate applies to work or travel in excess of eight (8) hours per day (weekdays) and all Saturday work. Workdays in excess of (16) hours are prohibited. Service specialist are NOT required to perform, and may decline, work in excess of twelve (12) hours. The overtime charge shall be at the base rate plus a one hundred percent (100%) premium.

Recognized Huber Technology, Inc. Holidays New Year's Day, Good Friday, Memorial Day, Independence Day, Labor Day, Thanksgiving Day, the Friday after Thanksgiving Day, Christmas Eve and Christmas Day.

Expenses. The customer is responsible for ALL expenses associated with service work. All travel expenses including airfare, taxi, mileage for personal or company owned vehicles or any other chauffeured vehicle, living accommodations and meals will be invoiced. Invoices will include a cost break-down. Copies of receipts will not be furnished unless specifically requested. Original receipts cannot be provided. Receipts for under $25.00 cannot be provided. Use of personal or company owned vehicles will be invoice at the rate set by IRS mileage regulations.

Payment. All field service invoices are in U.S. Currency and all payments must be in U.S. Dollars. Payment is due NET 30 DAYS from the date of invoice.

Purchase Orders. A purchase order is required BEFORE any field service arrangements will be made. The purchase order is to be made out to Huber Technology, Inc. and must contain the following information: 1) Customer's name, 2) company, 3) billing address, 4) dates of service, 5) type of service requested (i.e. installation, commissioning, troubleshooting, training, etc.), 6) serial number / model number, 7) equipment purchase order number, and 8) equipment tag numbers. A "confirming-copy" purchase order must follow any preliminary arrangements. Equipment location including city, state, plant site, directions to the site, a local contact and telephone number must also be included.
2) Amended Purchase Orders. An amended PO is required if services are extended beyond the cost of the original PO. If the Service Specialist is on site and an amendment is required, the PO must be completed and submitted to Huber Technology, Inc. before the Service Specialist can continue working.

Applicable law. Any purchase order accepted by Huber Technology, Inc. in conjunction with Field Service work, shall be deemed to have been executed, delivered and accepted in the State of North Carolina, USA and shall be governed, construed and enforced pursuant to the laws of the State of North Carolina, USA

Huber Technology, Inc. can not offer fixed lump sum contracts for Field Service activities. The duration of site visitation is neither under our direct control nor influence, and as such we can only provide estimates of time on-site to affect the required service actions. Field service published rates and terms are valid through December 2022

HUBER Technology, Inc.
1009 Airlie Parkway • Denver, NC 28037
Phone (704) 949-1010 • Fax (704) 949-1020 • huber@hhusa.net • www.huber-technology.com

Warranty and Returns Policy & Instructions

Huber Technology, Inc. (“Huber”) warranties any **original** Huber part (mechanical or electrical) for a period of:
A. Twelve (12) months from the date of purchase and only when part(s) are installed by a Huber factory trained technician. Should the part(s) fail within the warranty period, a replacement shall be supplied at no cost to the owner (“Replacement Part”)
1. Only valid if the product is operated in accordance with the manufacturer’s instructions.
2. The replacement part(s) must not be modified or changed in anyway.
3. The replacement part(s) must be installed by a qualified person to the manufacturer’s specifications
Or
B. Three (3) months from the date of purchase and/or installed by a non-Huber factory trained technician.
1. Only valid if the product is operated in accordance with the manufacturer’s instructions
2. The replacement part(s) must not be modified or changed in anyway.
3. The replacement part(s) must be installed by a qualified person to the manufacturer’s specifications

This warranty does not apply to any damage or defect arising out of any of the following circumstances:

• Part(s) needing repair or replacement due to events or circumstances outside of normal use and operation of the equipment.
• Part(s) or components damaged due to power surges, short circuits, loss of power, lightning strikes, fire or water damage, vandalism, theft, or any other causes outside of normal use and operation of the equipment or that would normally be covered by casualty insurance on the equipment.
• Damage or defects caused by neglect, incorrect application, abuse, or by accidental damage of the parts or components.
• Repair or replacement of part(s) or components due to improper or negligent operation of the equipment.
• Damage or defects to the part(s), component(s), or equipment caused by the attempted repair by an unauthorized or unqualified person.

All Huber parts warranties are non- transferable, and cannot be sold, assigned or transferred in any other way.

This warranty of **original** Huber Service parts does not include the labor to remove the defective part nor the labor to install the new part. **All labor costs associated with the replacement of the part is the responsibility of the owner.** The request for assistance of a certified Huber technician is available upon the issuance of a purchase order by the owner. The fee for the assistance of a Huber technician includes labor (billed at prevailing Huber Field Service Base Rates) plus associated expenses for travel to and from the jobsite.

Return of New Wear or Spare Parts:

• Any original Huber part(s) returned to Huber after a purchase order has been submitted is subject to a flat twenty percent (20%) restocking fee for each part returned.
• The customer has up to thirty (30) days to return a part from the purchase order submittal date to Huber. **Returns will not be accepted past thirty (30) days.**
• Part(s) must be new and never installed. Any indication of wear or installation, at Huber’s sole discretion, may result in the part(s) being shipped back to owner, at the owner’s cost, and no credit shall be issued.
• **Exception:**
The owner may exchange, without a restocking fee, if the incorrect part(s) is delivered and/or sold to the

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owner by a Huber team member. Huber will ship the correct part(s) to the owner expeditiously. A refund will be issued to the owner upon Huber´s receipt of the incorrect part(s).
warehouse.
The customer may return, without a restocking fee, any original Huber part(s) if said part(s) was sold as part of a complete rebuild and the Huber technician concluded the part(s) were not needed. The customer has thirty (30) days from the date the service was completed. After thirty (30) days have expired, the normal Huber restocking fee shall apply.

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Warranty and Returns Policy & Instructions

Return of Damaged / Defective Items

• In the event of a damaged or defective part, the return process can often be expedited by providing a digital image of the damage or defect (along with a clear description of the problem) in an email to the Huber Aftermarket Team ("Aftermarket Team") at the following email address: returns@hhusa.net. The phone and fax numbers for Aftermarket Team are: 704.990.2045; Fax: 704.896.2830. Huber reserves the right to inspect in person even if a digital image is provided as outlined above.
• If the damage or defect **cannot be verified over the phone or via email** contact, the item may be required to be returned to Huber Technology, Inc. for inspection before a determination can be made as to the state of the product.
• The Aftermarket Team will validate the warranty claim for the defective part.
• If the Aftermarket Team determines that the part is under warranty and should be replaced, the Aftermarket Team will provide a Return Merchandise Authorization ("RMA") number and a shipping address to the Customer for the return of the defective part.
• The Customer shall ship the part to the specified address with the RMA number listed on the outside of the package.
• When the warranty part has been repaired (or replaced) by Huber, the part will be shipped to the "ship-to" address included in the RMA information provided by the Customer.

Return shipping cost

• ONLY in the event that an incorrect part is sold to the Customer by a Huber team member, will Huber pay for shipping. The Customer will be provided with a prepaid return shipping label.
• UNDER ALL OTHER CIRCUMSTANCES, the Customer returning the part(s) is responsible for any freight costs incurred for returning the part(s).
• UNDER NO CIRCUMSTANCE will Huber reimburse (or provide credit) for return shipping costs incurred by the Customer.

How to Request an RMA (Return Merchandise Authorization)

Contact the Huber Technology Aftermarket Sales Team and request a Return Merchandise Authorization ("RMA") number.
• Completely fill out the RMA form.
• Include the completed RMA form in the package along with the item(s) to be returned.
• Write the RMA number conspicuously on the outside of the package to ensure proper routing upon receipt by the Aftermarket Team.
• Ship the package to:

o o Huber Technology, Inc.
Aftermarket Sales and Service
1009 Airlie Parkway
Denver, NC 28037
Phone: 704.874.8237 Fax 704.896.2830 Email: service@hhusa.net

HUBER Technology, Inc.
1009 Airlie Parkway • Denver, NC 28037
Phone (704) 949-1010 • Fax (704) 949-1020 • huber@hhusa.net • www.huber-technology.com

A member of the HUBER Group

EXHIBIT C

Bonding Requirements

The successful bidder shall be required to furnish a Performance & Payment Bond* for bids in excess of $50,000.00, in an amount equal to one hundred percent (100%) of the total contract price, such bond to be executed in five (5) original counterparts by a Corporate Surety authorized to do business in the State of Texas and acceptable to the City of Midland. All bonds must be executed on forms contained in these contract documents. The form of agreement which the successful bidder, as contractor, will be required to execute is also included herewith. The form of agreement and the form of the bonds should be carefully examined by the bidder.

A certified check, cashier's check, bank money order, or irrevocable letter of credit issued by a bank satisfactory to the City, or a bidder's bond on the form provided, in the amount of five percent (5%) of the largest possible lump sum bid submitted, payable without recourse to the City, must accompany the bidder's proposal, as a guaranty that the bidder will enter a contract and execute the required payment bond and guaranty in the forms provided within fifteen (15) days after notice of award of contract to him. Bids or proposals without the required bid guaranty will not be considered. All bid sureties and payment bonds shall name the City of Midland as Obligee.

*A cash security such as a cashier's check or irrevocable letter of credit issued by a bank satisfactory to the City for 100 % of the contract amount may be supplied in lieu of the Performance and Payment Bonds. The check will be returned un-cashed upon satisfactory completion of the work and evidence of payment of all obligations due for the contract.

PAYMENT BOND

THE STATE OF TEXAS §

COUNTY OF MIDLAND § SURETY NO _____

KNOW ALL MEN BY THESE PRESENTS, THAT _____ of the City of _____ of the County of _____ and State of Texas as Principal, and _____, as Surety, are held and firmly bound unto the City of Midland, Texas, as Obligee, in the amount of _____ DOLLARS ($ _____) for the payment whereof the said Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____ day of _____, 20__, for the furnishing of materials, equipment to perform all labor and work necessary for _____, hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, the condition of the obligation is that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the work provided for in said contract, then this obligation shall be null and void; otherwise, it is to remain in full force and effect.

Surety, for value received, stipulates and agrees that no change, extension of time alteration or addition to the terms of the contract, or to the work performed there under, or the plans, specifications of drawings accompanying the same, or any assignment of the contract as may be provided for in the instructions to bidders, shall in anywise affect its obligation on this Bond, and it does waive notice of any such change, extension of

time, alteration or addition to the terms of the contract, assignment thereof, or to the work to be performed there under.

IN WITNESS WHEREOF the said Principal and Surety have signed and sealed this instrument, this _____ day of _____ , 20__ .

_____	_____
Principal	Surety
By _____	By _____
Address _____	Address _____
_____	_____
_____	_____

APPROVED AS TO FORM:

_____

City Attorney

NOTE: Attach Power of Attorney

Form Revised August 2012

PERFORMANCE BOND

THE STATE OF TEXAS §

COUNTY OF MIDLAND § SURETY NO _____

KNOW ALL MEN BY THESE PRESENTS, THAT _____ (Hereinafter called the Principal[s]), as Principal(s), and _____ (Hereinafter called the Surety), as Surety, are held and firmly bound unto the City of Midland, Texas a home rule municipal corporation of Midland County, Texas, (hereinafter called the Obligee), in the amount of _____ DOLLARS ($ _____) for the payment whereof the said Principal and surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____day of _____ , 20___ , for the furnishing of materials and equipment to perform all labor and work necessary for the construction of _____ , specifically including in the scope of this work and bond, the additional maintenance guaranty provisions set forth in the contract conditions, which contract is hereby referred to and made a part hereof as fully and to the same extent as if copies at length herein, as well as the Principal's primary obligation to perform according to plans and specifications.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform the work in accordance with the plans, specifications, instructions to bidder, general and special conditions and other contract documents, including any addendum thereto, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED further that if any legal action be filed upon this Bond venue shall lie in Midland County, State of Texas.

Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract, or to the work performed thereunder, or the plans, specifications or drawings accompanying the same, or any assignment of the contract as may be provided for in the instructions to bidders, shall in anywise affect its obligation on this Bond, and it does waive notice of any such change, extension of time, alteration or addition to the terms of the contract, assignment thereof, or the work to be performed thereunder.

IN WITNESS WHEREOF, the said Principal and surety do sign and seal this instrument, this _____ day of _____ , 20___.

_____	_____
Principal	Surety
By _____	By _____
Address _____	Address _____
_____	_____
_____	_____

APPROVED AS TO FORM:

_____

City Attorney

NOTE: Attach Power of Attorney

Form Revised August 2012

EXHIBIT D – BUILDING WAGE RATES rev 01-01-21

General Decision Number: TX20210261 01/01/2021

Superseded General Decision Number: TX20200261

State: Texas

Construction Type: Building

County: Midland County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/01/2021

BOIL0074-003 01/01/2017

	Rates	Fringes
BOILERMAKER	$ 28.00	22.35

ENGI0178-005 06/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
(1) Tower Crane	$ 32.85	13.10
(2) Cranes with Pile Driving or Caisson Attachment and Hydraulic Crane 60 tons and above	$ 28.75	10.60
(3) Hydraulic cranes 59 Tons and under	$ 32.35	13.10

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* IRON0084-011 06/01/2020

	Rates	Fringes
IRONWORKER, ORNAMENTAL	$ 25.26	7.13

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* PLUM0404-001 09/01/2020

	Rates	Fringes
PLUMBER	$ 26.05	8.81

SUTX2014-037 07/21/2014

	Rates	Fringes
BRICKLAYER	$ 20.00	0.00
CARPENTER	$ 13.82	0.00
CEMENT MASON/CONCRETE FINISHER	$ 13.76	0.00
ELECTRICIAN	$ 23.18	6.31
INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation)	$ 19.77	7.13
IRONWORKER, REINFORCING	$ 12.27	0.00

IRONWORKER, STRUCTURAL	$ 22.16	5.26
LABORER: Common or General	$ 11.80	0.00
LABORER: Mason Tender - Brick	$ 11.38	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.58	0.00
LABORER: Pipelayer	$ 12.49	2.13
LABORER: Roof Tearoff	$ 11.28	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 14.25	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93	0.00
OPERATOR: Bulldozer	$ 18.29	1.31
OPERATOR: Drill	$ 16.22	0.34
OPERATOR: Forklift	$ 14.83	0.00
OPERATOR: Grader/Blade	$ 13.37	0.00
OPERATOR: Loader	$ 13.55	0.94
OPERATOR: Mechanic	$ 17.52	3.33
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 16.03	0.00
OPERATOR: Roller	$ 12.70	0.00
PAINTER (Brush, Roller, and Spray)	$ 15.00	0.73
PIPEFITTER	$ 25.80	8.55
ROOFER	$ 14.75	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 22.73	7.52
SHEET METAL WORKER, Excludes HVAC Duct Installation	$ 19.50	0.00

TILE FINISHER.....$ 11.22 0.00

TILE SETTER.....$ 14.74 0.00

TRUCK DRIVER: Dump Truck.....$ 12.39 1.18

TRUCK DRIVER: Flatbed Truck.....$ 19.65 8.57

TRUCK DRIVER: Semi-Trailer Truck.....$ 12.50 0.00

TRUCK DRIVER: Water Truck.....$ 12.00 4.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts. Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses

(29CFR 5.5 (a) (1) (ii)).

EXHIBIT D – Heavy and Highway Wage Rates rev 01-01-21

"General Decision Number: TX20210002 01/01/2021

Superseded General Decision Number: TX20200002

State: Texas

Construction Types: Heavy and Highway

Counties: Armstrong, Carson, Crosby, Ector, Irion, Lubbock, Midland, Potter, Randall, Taylor and Tom Green Counties in Texas.

HEAVY & HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/gov contracts.

Modification Number	Publication Date
0	01/01/2021

* SUTX2011-002 08/02/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving & Structures)……..	$ 13.55	
ELECTRICIAN.....	$ 20.96	
FORM BUILDER/FORM SETTER		
Paving & Curb.....	$ 12.36	

Structures.....$ 13.52

LABORER
- Asphalt Raker.....$ 12.28
- Flagger.....$ 9.30
- Laborer, Common.....$ 10.30
- Laborer, Utility.....$ 11.80
- Work Zone Barricade Servicer.....$ 10.30

POWER EQUIPMENT OPERATOR:
- Asphalt Distributer.....$ 14.87
- Asphalt Paving Machine.....$ 13.40
- Broom and Sweeper.....$ 11.21
- Crane, Lattice Boom 80 Tons or Less.....$ 16.82
- Crawler Tractor Operator……...$ 13.96
- Excavator, 50,000 lbs or less.....$ 13.46
- Front End Loader Operator, Over 3 CY.....$ 12.77
- Front End Loader, 3CY or less.....$ 12.28
- Loader/Backhoe.....$ 14.18
- Mechanic.....$ 20.14
- Milling Machine.....$ 15.54
- Motor Grader, Rough.....$ 16.15
- Motor Grader, Fine.....$ 17.49
- Pavement Marking Machine…….....$ 16.42
- Reclaimer/Pulverizer…….....$ 12.85
- Roller, Asphalt.....$ 10.95
- Roller, Other.....$ 10.36
- Scraper.....$ 10.61
- Spreader Box.....$ 12.60

Servicer.....$ 13.98

Steel Worker (Reinforcing).....$ 13.50

TRUCK DRIVER
- Lowboy-Float.....$ 14.46
- Single Axle.....$ 12.74
- Single or Tandem Axle Dump……$ 11.33
- Tandem Axle Tractor with Semi.....$ 12.49

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts. Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses

(29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate

includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

HUBER TECHNOLOGY
WASTE WATER Solutions

January 25, 2022

City of Midland
3600 East I-20
Midland, TX 79706

Subject: Sole Source Letter

City of Midland, TX (Cory Moose):

This letter serves as a sole source document for products manufactured by Huber SE, HydroPress Huber AB and Huber Picatech AG.

Huber Technology, Inc. based in Denver, NC is the only vendor of ROTOMAT® Perforated Plate Screen and parts for the ROTOMAT® Perforated Plate Screen.

Replacements parts for the ROTOMAT® Perforated Plate Screen manufactured by Huber SE are unique in design based on more than 20 years of application experience. Material selection is critical for the life expectancy of these parts and your ROTOMAT® Perforated Plate Screen. The proper parts design and parts manufacture ensures the lowest possible life-cycle cost for your ROTOMAT ®.

Huber Technology Inc. is a subsidiary of the original manufacturer, Huber SE and the only source for the parts in the United States and Canada. Any warranty on your ROTOMAT® Perforated Plate Screen is void if non-factory parts are used.

To the best of our knowledge, no other vendor manufactures and distributes these or similar items. In addition to supplying spare parts for your ROTOMAT® Perforated Plate Screen, Huber Technology, Inc. also offers full service and repair services for your ROTOMAT® Perforated Plate Screen.

Please let me know should you need further details.

Yours faithfully,

Mike Suddreth
Aftermarket Sales Manager

HUBER Technology, Inc.
1009 Airlie Parkway, Denver, NC 28037
(704) 949-1010 - Fax (704) 949-1020 - huber@hhusa.net
www.huber-technology.com
A member of the HUBER Group

City Council Meeting

Item Number: 6

Meeting Date: February 8, 2022

To: City Council / City Manager

From: Erika Martinez, Manager, Purchasing

Subject: RESOLUTION AUTHORIZING THE EXECUTION OF A PROFESSIONAL SERVICES AGREEMENT WITH ENPROTEC/HIBBS & TODD, INC., FOR VARIOUS DESIGN, BIDDING AND CONSTRUCTION PHASE SERVICES FOR WATER AND WASTEWATER PROJECTS FOR THE UTILITIES DEPARTMENT FOR AN ANNUAL COST OF $90,000.00 (DISTRICT: ALL) (GENERAL SERVICES)

Purpose:

Resolution authorizing the execution of a Professional Services Agreement with Enprotec/Hibbs & Todd, Inc., for various design, bidding, and construction phase service for water and wastewater projects as directed by City Staff.

Recommended City Council Action:

Approve

Fiscal Impact:

Funding is available in the FY22 Utilities Fund operating budget.

Discussion:

Resolution 2020-091 approved the selection of Enprotec/Hibbs & Todd, Inc., for performance of on-call engineering support services for the Utilities Department over the next five years. Any agreement exceeding $100,000.00 shall not become effective until approved by City Council. Please see the attached memo from Carl Craigo, Utilities Director, for additional information.

Therefore, please consider a resolution authorizing the execution of a professional services agreement with Enprotec/Hibbs & Todd, Inc. of Abilene, Texas for various design, bidding, and construction phase service for water and wastewater projects as directed by City Staff for a cost

of $90,000 with two (2) renewals for a total cost of $270,000.00.

Tina Jaug

City Manager's Office

INTEROFFICE MEMORANDUM

TO: Erika Munoz Martinez, Purchasing Manager

FROM: Carl Craigo, PE, Utilities Director

SUBJECT: Consider a Resolution approving a contract with eHT engineering for continued Water and Wastewater engineering services.

DATE: February 8, 2022

eHT is the Utilities water and wastewater hydraulic modeling and water treatment engineer. This PSA will be for quarterly hydraulic modeling updates and water purification plant upgrades. The tasks for the first year of the project is:

Task 1 – Water & Wastewater Hydraulic Modeling Services

o Deliverables

- ♣ Analyze the City's hydraulic models to support proposed improvements to the system as requested by the City.
- ♣ Provide review of potential system expansion projects o Compensation

Task 2 – Planning Phase Services for WPP Solids Handling Improvements

o Deliverables

- ♣ Review the Record Drawings for the Solids Handling Building to evaluate Modifications required based on the dewatering options evaluated.
- ♣ Develop preliminary layouts for the dewatering options evaluated.
- ♣ Develop a Technical Memorandum summarizing the findings of the evaluation including a cost analysis for the options evaluated.

eHT is an approved on-call engineer (Resolution 2020-137). The scope of services is on a task fee bases with an amount of $90,000. This will be paid for with Utilities FY22 Operating Fund.

RESOLUTION NO. _____

RESOLUTION AUTHORIZING THE EXECUTION OF A PROFESSIONAL SERVICES AGREEMENT WITH ENPROTEC/HIBBS & TODD, INC., FOR VARIOUS DESIGN, BIDDING AND CONSTRUCTION PHASE SERVICES FOR WATER AND WASTEWATER PROJECTS FOR THE UTILITIES DEPARTMENT FOR AN ANNUAL COST OF $90,000.00

WHEREAS, the City Council approved Resolution No. 2020-091 selecting six engineering firms to provide professional services for engineering designs and studies on an as-needed basis; and

WHEREAS, the Utilities Department has selected Enprotec/Hibbs & Todd, Inc., to provide various design, bidding and construction services for water and wastewater projects for the Utilities Department; and

WHEREAS, Enprotec/Hibbs & Todd, Inc., has agreed to perform said professional services for an annual cost of $90,000.00; and

WHEREAS, the City Council finds that Enprotec/Hibbs & Todd, Inc., is qualified to perform said professional services; and

WHEREAS, the City Council finds that the professional fees proposed by Enprotec/Hibbs & Todd, Inc., are consistent with and not higher than the recommended practices and fees published by the applicable professional associations and do not exceed any maximum provided by law; and

WHEREAS, the City Council finds that Enprotec/Hibbs & Todd, Inc., provides professional services for a fair and reasonable price; and

WHEREAS, the City Council finds it to be in the public interest to execute a professional services agreement with Enprotec/Hibbs & Todd, Inc., as the most highly qualified provider of said professional services based on demonstrated competence, knowledge, and qualifications and on the reasonableness of the proposed fee for the services;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Interim City Manager and City Secretary are hereby authorized and directed to execute and attest, respectively, on behalf of the City of Midland, a professional services agreement with Enprotec/Hibbs & Todd, Inc., for said professional services. A copy said agreement is attached hereto as Exhibit "1" and incorporated herein for all purposes.

SECTION TWO. That the City Comptroller is hereby authorized and directed to pay Enprotec/Hibbs & Todd, Inc., for said professional services from funds available in the FY22 Utilities Fund operating budget upon receipt of proper invoices or statements approved by the City Manager.

On motion of Council member _____, seconded by Council member _____, the above and foregoing resolution was adopted by the City Council of the City of Midland at a regular meeting on the _____ day of _____, A.D., 2022, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

RECOMMENDED AND APPROVED:

_____
Robert Patrick, City Manager

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Carl Craigo, Utilities Director

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

PROFESSIONAL SERVICES AGREEMENT
#22001936

THIS AGREEMENT is made and effective the 9 day of February 2022, by and between the CITY OF MIDLAND, TEXAS ("*CITY*"), a home-rule municipal corporation, and Enprotec/Hibbs & Todd, Inc. ("*COMPANY*"). CITY and COMPANY are at times individually referred to as a "*Party*" and collectively referred to as the "*Parties*."

ARTICLE I. PURPOSE

The purpose of this Agreement is to state the terms and conditions under which COMPANY shall perform various design, bidding, and construction phase service for water and wastewater projects as directed by City Staff services (the "*Services*") for CITY. The Services are more specifically set forth in **Exhibit A**, which is attached hereto and incorporated herein for all purposes.

ARTICLE II. SERVICES TO BE PERFORMED

COMPANY shall provide the Services in a manner consistent with the same level of skill and care as other professionals that perform similar services for similar projects in approximately the same region and at approximately the same point in time. COMPANY represents that any employee who performs the Services shall be fully qualified and competent to perform the Services.

ARTICLE III. FINANCIAL CONSIDERATIONS

CITY agrees to pay COMPANY an amount not to exceed $90,000.00 (with an annual renewal) for the performance of the Services. CITY agrees to pay COMPANY according to the schedule set forth in **Exhibit A** upon presentation of a monthly invoice. The monthly invoice shall set forth all service fees for the month and those expenses described in **Exhibit A** that COMPANY incurs during the previous month for which COMPANY receives advanced written approval from the City Manager. All additional and/or reimbursable expenses must be approved by the City Manager prior to incurring such expenses.

Within thirty (30) days of the date COMPANY's invoice is received by CITY, CITY shall pay the full amount of such invoice; provided, however, that if CITY objects to any portion of an invoice, CITY shall notify COMPANY of CITY's objection and the grounds therefor within

fifteen (15) days of the date of receipt of the invoice, and the Parties shall immediately make every effort to settle the disputed portion of the invoice. Notwithstanding the foregoing, CITY shall pay every portion of the invoice that is not in dispute within the 30-day period for payment.

ARTICLE IV. TERM

The term of this Agreement shall be from February 1, 2022 until December 31, 2022, unless the Services are completed sooner or the Agreement is terminated as provided below. This agreement shall be renewed annually on January 1st for a period not to exceed the duration of the existing On-Call Engineering Services Contract or May 26, 2025. Should either party desire for the agreement to not be renewed, written notification shall be provided to the other party a minimum of 30-days prior to the renewal date of the Contract.

ARTICLE V. TERMINATION AT WILL

CITY may terminate this Agreement at will, for any or no reason, upon giving COMPANY at least one hundred eighty (180) days' written notice. The Parties understand and agree that it is in CITY'S sole and absolute discretion to cancel this Agreement during the term set forth in Article IV without penalty to CITY. COMPANY has no expectation and has received no guarantees that this Agreement will not be terminated during the Agreement's term. The Parties have bargained for the flexibility of terminating this Agreement upon tender of the requisite notice at any time during this Agreement's term. All work and services under the Agreement shall be suspended upon termination of the Agreement becoming effective.

ARTICLE VI. ASSIGNMENT

COMPANY shall not, either directly or indirectly, assign all or any part of this Agreement, or any interest, right or privilege herein, without obtaining CITY's prior written consent. The issue of whether to grant such consent shall be in the sole and absolute discretion of CITY.

ARTICLE VII. OWNERSHIP AND CONFIDENTIALITY OF DOCUMENTS AND OTHER WORK PRODUCT

All reports, information and other data ("*Instruments of Service*") given to, prepared or assembled by COMPANY under this Agreement, and any other related document or item shall become the sole and exclusive property of CITY. The Instruments of Service shall be promptly

delivered, without restriction, to CITY and such other persons or entities as CITY may designate; provided, however, that COMPANY may make copies of the Instruments of Service for its files.

ARTICLE VIII. INDEPENDENT CONTRACTOR

COMPANY shall perform the Services as an independent contractor and not as an officer, agent, servant or employee of CITY. COMPANY shall have exclusive control of and the exclusive right to control the details of the Services and all persons performing the same. COMPANY shall be solely responsible for the acts and omissions of its officers, agents, employees, contractors and subcontractors. The Parties acknowledge and agree that the doctrine of *respondeat superior* shall not apply as between CITY and COMPANY, its officers, agents, employees, contractors and subcontractors. Nothing in this Agreement shall be construed as creating a partnership or joint enterprise between CITY and COMPANY. No person performing the Services shall be considered an officer, agent, servant or employee of CITY. Further, it is specifically understood and agreed that nothing in this Agreement is intended nor shall be construed as creating a "Community of Pecuniary Interest" or "An Equal Right of Control" that would give rise to vicarious liability. COMPANY is an independent contractor under this Agreement and shall assume all rights, obligations, and liabilities applicable to it as an independent contractor. CITY does not have the power to direct the order in which the services are performed. CITY shall not have the right to control the means, methods or details of COMPANY'S work. COMPANY shall assume exclusive responsibility for performing the Services, and is entirely free to perorm the Services in its own way.

ARTICLE IX. INSURANCE

During the term of this Agreement, COMPANY shall maintain and keep in full force and effect insurance in the following types and minimum amounts with companies authorized to do business in the State of Texas:

Commercial General Liability (including Contractual liability):

-Personal Injury:	$1,000,000.00 per person
	$1,000,000.00 per occurrence
-Property Damage:	$500,000.00 per occurrence
Business Automobile Liability:	$250,000.00 combined single limit - Personal Injury and Property Damage

Workers' Compensation:	Statutory limits
Employers' Liability:	$500,000.00 per accident or occurrence

The Commercial General Liability policy shall be on a per project aggregate, including completed operations, and shall be on a claims-occurred basis. This policy shall name CITY as an additional insured and waive subrogation in favor of CITY.

The Business Automobile Liability policy shall cover any vehicle for bodily injury and property damage, including owned vehicles, hired and non-city vehicles, and employee non-ownership, and the amount of such policy shall be a minimum of $250,000.00 covering any vehicle used for the execution of the Services. This policy shall name CITY as an additional insured and waive subrogation in favor of CITY.

The Workers' Compensation policy shall inure to the benefit of employees injured during the course and scope of their employment by COMPANY pursuant to this Agreement. The Workers' Compensation policy shall waive all rights of subrogation in favor of CITY.

All insurance policies required by this Agreement shall (i) provide for a waiver of subrogation in favor of CITY, and (ii) name CITY as an additional insured on a claims-occurred basis (except for the Workers' Compensation policy). Prior to any reduction or termination of the insurance policies referenced herein, COMPANY shall ensure that its insurance provider submits written notice to CITY no later than thirty (30) days prior to the reduction or termination of such coverage.

COMPANY shall contractually require all contractors, subcontractors, and sub-subcontractors that perform the Services to obtain insurance coverage that meets or exceeds the policy requirements and minimum amounts specified herein. All contractors, subcontractors, and sub-subcontractors shall obtain insurance policies that provide blanket waivers of subrogation in favor of the City of Midland and that name the City of Midland as an additional insured on a claims-occurred basis (except Workers' Compensation).

Prior to the execution of the Agreement, COMPANY shall provide one or more certificates of insurance specifically stating that requirements of this Article have been met, which shall be subject to the approval of CITY. CITY shall not be required to provide any insurance pursuant to this Agreement.

By executing this Agreement, COMPANY certifies that the certificate of insurance provided pursuant to this Article complies with the requirements of Chapter 1811 of the Texas

Insurance Code. COMPANY shall not use an unapproved certificate of insurance or insert inappropriate language on a certificate. Compliance with state law and this Agreement is the sole and exclusive responsibility of COMPANY.

Notwithstanding any contrary provision contained herein, the City Manager, in his/her sole and absolute discretion, modify the insurance requirements contained in this Article.

ARTICLE X. ATTORNEY FEES

BY EXECUTING THIS AGREEMENT, COMPANY AGREES TO WAIVE AND DOES HEREBY KNOWINGLY, CONCLUSIVELY, VOLUNTARILY AND INTENTIONALLY WAIVE ANY CLAIM IT HAS OR MAY HAVE IN THE FUTURE AGAINST CITY, REGARDING THE AWARD OF ATTORNEY FEES, WHICH ARE IN ANY WAY RELATED TO THIS AGREEMENT OR THE CONSTRUCTION, INTERPRETATION, OR BREACH OF THIS AGREEMENT. COMPANY SPECIFICALLY AGREES THAT IF COMPANY BRINGS OR COMMENCES ANY LEGAL ACTION OR PROCEEDING RELATED TO THIS AGREEMENT, THE CONSTRUCTION, INTERPRETATION, VALIDITY OR BREACH OF THIS AGREEMENT (INCLUDING, BUT NOT LIMITED TO, ANY ACTION PURSUANT TO THE PROVISIONS OF THE TEXAS UNIFORM DECLARATORY JUDGMENTS ACT (TEXAS CIVIL PRACTICE AND REMEDIES CODE SECTION 37.001, ET SEQ., AS AMENDED) OR CHAPTER 271 OF THE TEXAS LOCAL GOVERNMENT CODE), COMPANY AGREES TO ABANDON, WAIVE AND RELINQUISH ANY AND ALL RIGHTS TO THE RECOVERY OF ATTORNEY FEES TO WHICH COMPANY MIGHT OTHERWISE BE ENTITLED.

COMPANY AGREES THAT THIS IS A VOLUNTARY AND INTENTIONAL RELINQUISHMENT AND ABANDONMENT OF A PRESENTLY-EXISTING KNOWN RIGHT. COMPANY ACKNOWLEDGES THAT IT UNDERSTANDS ALL TERMS AND CONDITIONS OF THIS AGREEMENT. COMPANY FURTHER ACKNOWLEDGES AND AGREES THAT THERE WAS AND IS NO DISPARITY OF BARGAINING POWER BETWEEN CITY AND COMPANY. THIS SECTION SHALL NOT BE CONSTRUED OR INTERPRETED AS A WAIVER OF GOVERNMENTAL IMMUNITY.

COMPANY IS RELYING ON ITS OWN JUDGMENT AND HAD THE OPPORTUNITY TO DISCUSS THIS AGREEMENT WITH COMPETENT LEGAL COUNSEL PRIOR TO ITS EXECUTION. THE PROVISIONS OF THIS ARTICLE SHALL SURVIVE THE TERMINATION OF THIS AGREEMENT.

ARTICLE XI. GOVERNMENTAL IMMUNITY

By executing this Agreement, CITY is not waiving its right of governmental immunity. CITY is retaining its immunity from suit. CITY is not granting consent to be sued by legislative resolution or action. **THERE IS NO WAIVER OF GOVERNMENTAL IMMUNITY.**

ARTICLE XII. NO THIRD-PARTY BENEFICIARY

CITY's approval of this Agreement does not create a third-party beneficiary. There is no third-party beneficiary to this Agreement. No person or entity who is not a party to this Agreement shall have any third-party beneficiary or other rights hereunder.

ARTICLE XIII. RELEASE

NOTWITHSTANDING ANY CONTRARY PROVISION CONTAINED HEREIN, COMPANY HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES CITY AND ITS AGENTS, COUNCIL MEMBERS, EMPLOYEES, AND OFFICERS FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES, OR CAUSES OF ACTION OF ANY KIND WHATSOEVER WHICH COMPANY HAS OR MIGHT HAVE IN THE FUTURE, INCLUDING BUT NOT LIMITED TO BREACH OF AGREEMENT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR CITY'S NEGLIGENCE. THE PROVISIONS OF THIS ARTICLE SHALL SURVIVE THE TERMINATION OF THIS AGREEMENT.

ARTICLE XIV. GENERAL PROVISIONS

A. Waiver. No waiver by CITY of a breach of any covenant, condition, or restriction of this Agreement shall be construed or held to be a waiver of any succeeding or preceding breach of the same or any other covenant, condition, or restriction contained in this Agreement.

B. Governing Law and Venue. The laws of the State of Texas shall govern, construe and enforce all rights and duties of the Parties, including, but not limited to, tort claims and any

contractual claims or disputes arising from or relating in any way to the subject matter of this Agreement, without regard to conflict of laws and rules that would direct application of the laws of another jurisdiction. All performance and payment made pursuant to this Agreement shall be deemed to have occurred in Midland County, Texas. The obligations and undertakings of the Parties shall be deemed to have occurred in Midland County, Texas. Exclusive venue for any claim, suit, or other action arising from or connected in any way to this Agreement shall be in Midland County, Texas.

C. Notice. Any notice or demand made regarding this Agreement shall be made in writing and delivered, either in person or by certified or registered mail, at the addresses provided below. Notice by mail shall be complete upon deposit of the paper, postage prepaid, in a post office or official depository under the care and custody of the United States Postal Service.

If to CITY: City Manager's Office
P.O. Box 1152
Midland, Texas 79702

If to COMPANY: Enprotec/Hibbs & Todd, Inc.
Sage Diller, PE
402 Cedar
Abilene, Texas 79601

The parties hereto may change the above-designated addresses by giving notice pursuant to the terms of this Section.

D. Severability. If one or more of the provisions contained in this Agreement are held to be invalid, illegal, or unenforceable in any respect, such invalidity, illegality, or unenforceability shall not affect any other provision of this Agreement, and this Agreement shall be construed as if the invalid, illegal, or unenforceable provision were never contained herein.

E. Use of Language. Words in the singular shall be held to include the plural, unless the context otherwise requires.

F. Amendments, Modifications, Alterations. No amendment, modification, or alteration of this Agreement shall be binding unless such is evidenced in writing, dated subsequent to the date of this Agreement, and duly executed by the Parties.

G. Counterparts. This Agreement may be executed in multiple counterparts, each of which shall be deemed as original, and all of which shall constitute one and the same instrument.

H. Federal Wage Requirements. If applicable, the Davis-Bacon Act, 29 CFR 5.5, and any related acts or regulations are hereby incorporated by reference and made a part of this Agreement, and all terms and requirements under said statutes and regulations are made terms and conditions of this Agreement, to which the Parties have agreed to be bound.

I. Notice of Alleged Breach; Statutory Prerequisites. As a condition precedent to filing suit for alleged damages incurred by an alleged breach of an express or implied provision of this Agreement, COMPANY or its legal representative shall give the City Manager, or any other reasonable official of CITY, written notice (consisting of one (1) original and seven (7) copies of such notice attached to a copy of this Agreement) of such duly-verified damages within one hundred fifty (150) days after the same has been sustained. The discovery rule does not apply to the giving of such notice. The notice shall include when, where, and how the damages occurred, the apparent extent thereof, the amount of damages sustained, the amount for which COMPANY will settle, the physical and mailing addresses of COMPANY at the time and date the claim was presented, the physical and mailing addresses of COMPANY for the six (6) months immediately preceding the occurrence of such damages, and the names and addresses of the witnesses upon whom COMPANY relies to establish its claim. COMPANY's failure to so notify the City Manager within the time and manner provided herein shall exonerate, excuse and except CITY from any liability whatsoever. CITY is under no obligation to provide notice to COMPANY that COMPANY'S notice is insufficient. CITY reserves the right to request additional information regarding the claim. Said additional information shall be supplied within thirty (30) days after COMPANY's receipt of such notice.

The statutory prerequisites outlined herein constitute jurisdictional requirements pursuant to Section 271.154 of the Texas Local Government Code and Section 311.034 of the Texas Government Code. Notwithstanding any contrary provision contained herein, COMPANY's failure to comply with the requirements herein shall perpetually bar COMPANY's claim for damages under Chapter 271 of the Texas Local Government Code, and Section 311.034 of the Texas Government Code, regardless of whether CITY has actual or constructive notice or knowledge of said claim or alleged damages. COMPANY agrees that the requirements of this entire Agreement are reasonable.

J. Prompt Pay Act. The Parties agree that Texas Government Code, Chapter 2251, Payment for Goods and Services does not waive the CITY's governmental immunity.

K. Compliance. COMPANY shall comply with Texas Government Code § 2252.908, *et seq.*, as amended, and Texas Local Government Code § 176.006, *et seq.*, as amended.

L. Anti-Boycott Statutes. To the extent that Tex. Gov't Code §§ 2271.002 and 2274.002 apply to this Agreement, COMPANY hereby verifies that:

- COMPANY does not boycott Israel and will not boycott Israel during the term of this Agreement;
- COMPANY does not boycott energy companies and will not boycott energy companies during the term of this Agreement; and
- COMPANY does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association and will not discriminate during the term of this Agreement against any firearm entity or firearm trade association.

If Tex. Gov't Code § 2270.002 does not apply to this Agreement, such verification is not required, and COMPANY shall be deemed to have not made such verification.

M. Records Retention and Production of Information. To the extent that this Agreement is a contract described by Tex. Gov't Code § 552.371, COMPANY shall: (i) preserve all contracting information related to the Agreement as provided by the records retention requirements applicable to CITY for the duration of the contract; (ii) promptly provide to CITY any contracting information related to the Agreement that is in the custody or possession of COMPANY on request of CITY; and (iii) on completion of the Agreement, either (a) provide at no cost to CITY all contracting information related to the Agreement that is in the custody or possession of COMPANY, or (b) preserve the contracting information related to the Agreement as provided by the records retention requirements applicable to CITY.

N. Public Information. To the extent that this Agreement is a contract described by Tex. Gov't Code § 552.371, COMPANY agrees as follows in accordance with Tex. Gov't Code § 552.372(b): The requirements of Subchapter J, Chapter 552, Government Code, may apply to this contract, and the contractor or vendor agrees that the contract can be terminated if the contractor or vendor knowingly or intentionally fails to comply with a requirement of that subchapter.

O. Conflict of Terms. If a conflict of terms or language exists between: (i) any of the provisions of this Agreement; and (ii) any of the provisions contained in any exhibit(s) attached to this Agreement, precedence shall be given to the provisions of this Agreement. For the avoidance

of any doubt, the provisions contained in this Agreement shall supersede any and all conflicting provisions contained in any exhibit(s) attached hereto. Furthermore, the Parties acknowledge and agree that any provision contained in an exhibit(s) attached to this Agreement that imposes an additional express or implied obligation on CITY is hereby made void and of no force or effect. CITY's sole and exclusive obligations under this Agreement are contained in the provisions of this Agreement that precede the signature page(s), which evidences the Parties' execution and acceptance hereof.

P. Iron or Steel Products Statute. Company agrees that all iron or steel products produced through a manufacturing process and used in the project that is the subject of this Agreement shall be produced in the United States in accordance with Government Code § 2252.202, *et seq*., as amended.

Q. Interpretation. By executing this Agreement, the Parties acknowledge and agree that this Agreement shall not be interpreted or construed against any Party solely because such Party or its legal counsel drafted this Agreement. The Parties have read, understood, and approve of the language and terms set forth herein.

[Signature Page(s) Follows]

EXECUTED IN DUPLICATE the day and year first above mentioned.

THE CITY OF MIDLAND, TEXAS

_____
Robert Patrick, City Manager

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO FORM ONLY:

_____
John Ohnemiller, City Attorney

COMPANY:

By: _____

Name:_____

Title: _____

STATE OF _____ §
§
COUNTY OF _____§

BEFORE ME, the undersigned authority, on this ____ day of _____, 20____ personally appeared, _____, an officer of Enprotec/Hibbs & Todd, Inc., known to me to be the person and official whose name is subscribed to the forgoing instrument, and acknowledged to me that he executed the same as the act and deed of said corporation, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the __day of _____, 20____.

_____
Notary Public, State of Texas

EXHIBIT "A"

WATER AND WASTEWATER ENGINEERING SERVICES

Scope of Services

Company shall provide engineering support services for the City which may include but not necessarily include the evaluation of existing facilities or proposed improvements, design of the proposed improvements, bidding, and construction support for water and wastewater system improvements. The initial tasks associated with this agreement are anticipated to include the following:

- Task 1 – Water & Wastewater Hydraulic Modeling Services
  - Deliverables
    - Analyze the City's hydraulic models to support proposed improvements to the system when requested by the City.
    - Provide review of potential system expansion projects
  - Compensation
    - Estimated Total: $50,000 (based upon hourly rates)

- Task 2 – Planning Phase Services for WPP Solids Handling Improvements
  - Deliverables
    - Review the Record Drawings for the Solids Handling Building to evaluate modifications required based on the dewatering options evaluated.
    - Develop preliminary layouts for the dewatering options evaluated.
    - Develop a Technical Memorandum summarizing the findings of the evaluation including a cost analysis for the options evaluated.
  - Compensation
    - Estimated Total: $40,000 (based upon hourly rates)

Other activities performed under this agreement will be initiated at the direction of City Staff in support of future water and wastewater system improvements. A supplemental Exhibit "A" will be developed by the Company and submitted to the City for review and approval prior to performing any Engineering Services.

Compensation for Annual Renewal

Compensation is on a time and materials basis, not to exceed $90,000.00, in accordance with the attached Schedule of Charges. The Schedule of Charges is subject to adjustment annually beginning in January. Adjustments shall be limited to a maximum increase of 5%.

Schedule

The schedule for engineering support services provided will vary based upon tasks.

City Council Meeting

Item Number: 7

Meeting Date: February 8, 2022

To: City Council / City Manager

From: Erika Martinez, Manager, Purchasing

Subject: **Motion approving plans and specifications for the Midland Utilities Service Center Project, said plans and specifications being on file in the City Secretary's office and referenced by the date and number of this Motion, and authorizing the City Manager or the City Manager's designee to advertise for competitive bids for said project pursuant to the statutes of the State of Texas for accomplishing the work set forth in said plans and specifications. (DISTRICT 2) (GENERAL SERVICES)**

Purpose:

Motion to approve plans and specifications and authorize advertisement for bids for the Midland Utilities Service Center Project.

Recommended City Council Action:

Approve

Fiscal Impact:

Funding is not necessary at this time.

Discussion:

Resolution 2019-019 approved the selection of Parkhill, Smith & Cooper, Inc. dba Parkhill to assist the General Services Department by providing professional architectural services and services provided in connection therewith on an as-needed basis. Resolution 2021-037 authorized the execution of a task order with Parkhill to provide design, building and architectural services for the Midland Utilities Service Center. Staff recommends approving the plans and specifications provided by Parkhill for the construction of a new Midland Utilities Service Center Complex. The opinion of probable cost is $16,963,397.00.

The Vehicle Services, Solid Waste and Water & Wastewater buildings located on Carver Street

in Midland, Texas need to be replaced. Below are a few reasons why these buildings need to be replaced:

• The Solid Waste Office Building is insufficient in size for the amount of staff. The refuse container shop is sinking.
• Water & Wastewater's current buildings are in horrific shape and some are considered condemned.
• Vehicle Services does not have enough bays to complete preventative maintenance services efficiently and does not have enough storage for tires.
• There is no wash bay for City owned vehicles in this area of the City.

Please see the attached memo from Carl Craigo, Utilities Director, Jeffery Ahrlett, Solid Waste Director, and Regina Stephenson, General Services Director for additional information.

Therefore, please consider a motion approving plans and specifications and authorizing advertisement for bids for the Midland Utilities Service Center Project.

Tina Gaug
City Manager's Office

INTEROFFICE MEMORANDUM

TO: Erika Munoz Martinez, Purchasing Manager

FROM: Carl Craigo, Utilities Director

SUBJECT: Consider a Resolution approving to advertise to bid the Solid Waste, Water & Wastewater, and Vehicle Services Complex.

DATE: February 8, 2022

I recommend the approval of plans and specifications to bid the Midland Utilities Service Center Project.

The W&WW maintenance, Sanitation and Vehicle Services facilities located at Carter and South Street have reach the end of their useful life. The facilities constructed over an old dumping ground are no longer safe for use by the City and are a danger to all that work around them. Sanitation's facility has shifted to the point there are 8" separations in the walls. Utilities is requesting that Parkhill engineering design new facilities on land the City owns in the same area. The new facilities will allow for modernization of the City departments and provide a safe work environment for our employees.

Funds for Utilities portion of the project will come out of Utilities Unallocated funds.

INTEROFFICE MEMORANDUM

TO: **Regina Stephenson, General Services Director**

FROM: **Jeffery Ahrlett, Director of Solid Waste**

SUBJECT: **Solid Waste, Water & Wastewater, Vehicle Services Complex**

DATE: **January 26, 2022**

I recommend the approval of plans and specifications for bids for the Midland Utilities Service Center Project.

The Solid Waste office building is insufficient in size for the current staff. Solid Waste does not currently have enough office space for all the employees. The Solid Waste Supervisors and Environmental Officer are having to office on makeshift tables or countertops in the break room. There is also inadequate meeting and training space for employees; Solid Waste staff must meet outside in a parking lot or utilize another departments space. The office building also has multiple maintenance issues such as leaks and faulty plumbing.

Container shop maintenance building has been a health and safety hazard for some time, as shown in some of the photos provided. The wood exterior of the building has deteriorated to where it can no longer keep the birds from entering the shop area, and staff must continually sweep bird excrement from the shop area. The building is continually sinking causing severe damage to the structure making it extremely unsafe. Due to the severe damage, maintenance companies will no longer repair damages, so we are having to make band-aid repairs to get by. The overhead bay doors consistently fall out of the tracks due to the amount of space caused by the building shift.

INTEROFFICE MEMORANDUM

TO: Tina Jauz, Assistant City Manager

FROM: Regina Stephenson, General Services Director

SUBJECT: Midland Utilities Service Center Construction Project

DATE: January 26, 2022

Resolution 2019-019 approved the selection of Parkhill, Smith & Cooper, Inc. dba Parkhill to assist the General Services Department by providing professional architectural services and services provided in connection therewith on an as-needed basis. Resolution 2021-037 authorized the execution of a task order with Parkhill to provide design, building and architectural services for the Midland Utilities Service Center. I recommend approving the plans and specifications provided by Parkhill for the construction of a new Midland Utilities Service Center Complex.

The Vehicle Services, Solid Waste and Water & Wastewater buildings are located on Carver Street and need to be replaced. As shown in the photos below, the buildings are deteriorating. Listed below are a few reasons why the current buildings should be replaced:

- Solid Waste Office Building is insufficient in size for the amount of staff. The refuse container shop is sinking.
- Water & Wastewater's current buildings are in horrific shape and some are considered condemned. In this modern world the Water & Wastewater Division does not have the room to fulfill the basic functions for the crews and visiting customers. In the new building there will be drive through bays for crew and equipment quicker load out and room for the entire group to be able to meet for training, meetings, etc. There will be a technology area for today's online conference and class world.
- Vehicle Services does not have enough bays to complete preventive maintenance services efficiently, not enough storage for tires, and no space for showers and lockers.
- This area of the City does not have a wash bay.

The photos below depict the current condition of the Solid Waste container shop:

The current Solid Waste, Water & Wastewater and Vehicle Services buildings shown below are located on the east side of Carver Street.

Below is the proposed conceptual design for new construction. The new building complex will be located directly across the street from the current building locations on the west side of Carver Street.

The programming and design have been completed for the building complex. The opinion of probable cost is based on an approximate cost of $450.00 per square foot for a 37,850 square foot complex as allocated below:

$3,972,351 Vehicle Services Facility (750)
$7,168,819 Solid Waste Facility (400)
$5,822,227 Water & Wastewater Facility (300)
$16,963,397 Total Estimated Cost

Cost for Architectural and Engineering Fees Only - approved by Resolution 2021-037:

$324,948 Vehicle Services Facility (750)
$584,906 Solid Waste Facility (400)
$389,938 Water & Wastewater Facility (300)
$1,299,792 Total Estimated Fee (plus $129,979 in contingencies)

Therefore, please consider a motion approving plans and specifications and authorizing advertisement for bids for the Midland Utilities Service Center Project.

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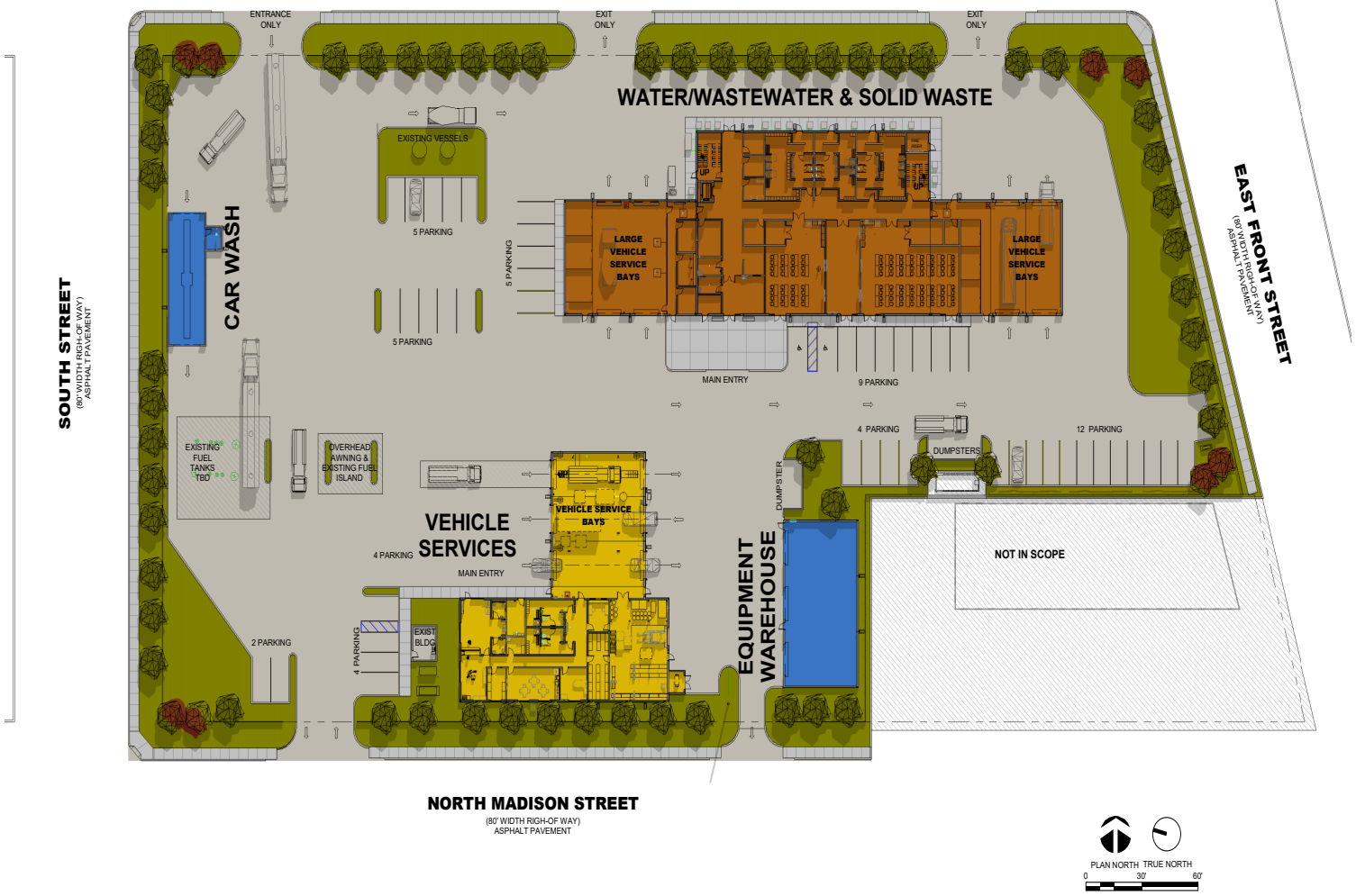

Architectural Site Plan

Parkhill

PROJECT MANUAL

OWNER REVIEW

CITY OF MIDLAND

Midland Utility Service Center

Midland, Texas

January | 2022

Parkhill Project # 03607721

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09 65 66 Resilient Athletic Flooring
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Not Used

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26 24 16	Panelboards
26 27 26	Wiring Devices
26 28 16.16	Enclosed Switches
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32 31 13 Chain Link Fences and Gates
32 84 00 Planting Irrigation
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32 93 00 Plants

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33 30 00 Sanitary Sewer Utilities

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Not Used

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DESIGN PROFESSIONAL RESPONSIBILITY

The Specification Sections authenticated by my seal and signature are limited to the following:

DIVISION 01 - GENERAL REQUIREMENTS

01 50 01	Erosion and Sediment Control During Construction

DIVISION 31 - EARTHWORK

31 10 00	Site Clearing
31 20 00	Earth Moving
31 23 33	Trenching and Backfilling

DIVISION 32 - EXTERIOR IMPROVEMENTS

32 11 23	Aggregate Base Course
32 13 13	Concrete Paving
32 13 14	Structural Portland Cement Concrete for Site Work
32 16 12	Concrete Sidewalks, Curbs, and Gutters
32 17 23	Pavement Markings

DIVISION 33 - UTILITIES

33 10 00	Water Utilities
33 13 00	Disinfecting of Water Utility Distribution
33 30 00	Sanitary Sewer Utilities

1/25/2022

DESIGN PROFESSIONAL RESPONSIBILITY

The Specification Sections authenticated by my seal and signature are limited to the following:

DIVISION 3 – CONCRETE

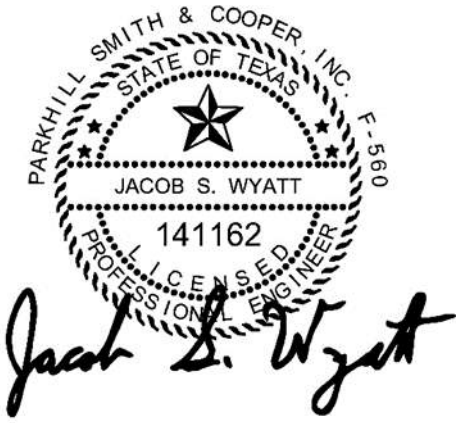
03 10 00 Concrete Forming and Accessories
03 20 00 Concrete Reinforcing
03 30 00 Cast-In-Place Concrete

DIVISION 05 – METALS

05 12 00 Structural Steel Framing
05 21 00 Steel Joist Framing

DIVISION 31 – EARTHWORK

31 20 00.10 Earth Moving for Facility



1/25/2022

DESIGN PROFESSIONAL RESPONSIBILITY

The Specification Sections authenticated by my seal and signature are limited to the following:

DIVISION 6 – WOOD, PLASTICS, AND COMPOSITES

06 05 00 Reclaimed Wood Wall Paneling

DIVISION 9 - FINISHES

09 30 13 Ceramic Tiling
09 65 13 Resilient Base and Accessories
09 65 19 Resilient Tile Flooring
09 65 66 Resilient Athletic Flooring
09 67 23 Resinous Flooring
09 68 13 Tile Carpeting
09 72 20 Decorative Fiberglass Reinforced Wall Panels
09 91 23 Interior Painting
09 96 00 High-Performance Coatings

DIVISION 10 – SPECIALTIES

10 26 00 Wall and Door Protection

DIVISION 12 – FURNISHINGS

12 24 13 Roller Window Shades
12 36 61.16 Solid Surfacing Countertops

1/25/2022

DESIGN PROFESSIONAL RESPONSIBILITY

The Specification Sections authenticated by my seal and signature are limited to the following:

DIVISION 21- FIRE SUPPRESION

21 05 00	Common Work Results for Fire Suppression
21 13 13	Wet-Pipe Sprinkler Systems

DIVISION 22 – PLUMBING

22 05 29	Hangers and Supports
22 11 00	Facility Water Distribution
22 13 16	Sanitary Waste and Vent Piping
22 15 00	General Service Compressed Air System
22 30 05	Domestic Water Heaters
22 40 00	Plumbing Fixtures

DIVISION 23 - HEATING, VENTILATING, AND AIR-CONDITIONING (HVAC)

23 05 00	General Mechanical Requirements
23 05 00.20	Basic Mechanical Materials and Methods
23 05 53	Identification for HVAC and Plumbing Piping and Equipment
23 05 93	Testing, Adjusting, and Balancing
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23 33 00	Air Duct Accessories
23 34 00	HVAC Fans
23 55 00	Fuel-Fired Heaters
23 74 33.13	100% Dedicated Outside Air Unit
23 76 00	Evaporative Cooling Systems
23 81 26	Split System Air Conditioners
23 81 26.10	Ductless Split System Air Conditioners
23 81 26.20	Split System Heat Pumps
23 82 39	Unit Heaters

1/25/2022

DESIGN PROFESSIONAL RESPONSIBILITY

The Specification Sections authenticated by my seal and signature are limited to the following:

DIVISION 26 - ELECTRICAL

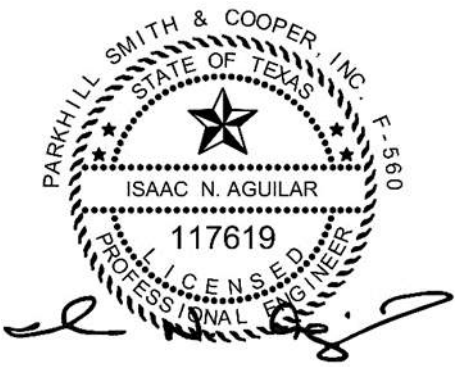
26 05 00	Basic Electrical Methods
26 05 13	Building Wire and Cable
26 05 19	Equipment Wiring Systems
26 05 26	Grounding and Bonding
26 05 29	Supporting Devices
26 05 33	Conduit
26 05 33.16	Boxes
26 05 53	Electrical Identification
26 05 73	Power System Studies
26 09 43	Network Lighting Controls
26 18 39	Enclosed Motor Controllers
26 24 16	Panelboards
26 27 26	Wiring Devices
26 28 16.16	Enclosed Switches
26 36 13	Enclosed Transfer Switches
26 51 00	Interior Lighting

DIVISION 27 - COMMUNICATIONS

27 13 43	Telephone Communications Cabling

DIVISION 28 – ELECTRONIC SAFETY AND SECURITY

28 31 00	Fire Alarm Systems
28 35 00	Emergency Radio Communication Enhancement Systems
28 61 29.10	Two-Way Communication System



1/25/22

DESIGN PROFESSIONAL RESPONSIBILITY

The specification sections authenticated by my seal and signature are limited in the following:

DIVISION 32 – EXTERIOR IMPROVEMENTS

32 31 13	Chain Link Fences and Gates
32 84 00	Planting Irrigation
32 91 15	Soil Preparation (Performance Specification)
32 93 00	Plants

1/25/2022

DOCUMENT 00 01 15 - LIST OF DRAWING SHEETS

1.1 LIST OF DRAWINGS

A. Drawings: Drawings consist of the Contract Drawings and other Drawings listed on the Table of Contents page of the separately bound Drawing set titled Midland Utilities Service Center, dated 01-25-2022, as modified by subsequent Addenda and Contract modifications.

END OF DOCUMENT

DOCUMENT 00 11 20 - REQUEST FOR PROPOSALS

1.1 OWNER

City of Midland
300 North Loraine Street
Midland, Texas 79701

1.2 PROJECT

Midland Utilities Service Center

1.3 ARCHITECT

Parkhill
1700 W. Wall, Suite 100
Midland, Texas 79701
432.697.1447
Attn: R. Ashley Coco, AIA

1.4 DESCRIPTION

A. You are invited to submit a stipulated sum proposal on the attached forms for General Construction Work including mechanical, plumbing, electrical, Work and for furnishing of all labor, materials, services and equipment necessary for and incidental to the Work as called for on the Drawings and in the Project Manual.
B. Proposers may submit a proposal for the Work either individually or combined as indicated on the Proposal Form.
C. A contract will be awarded based on the proposal offering the best value to the Owner for the Project.

1.5 BASIS OF PROPOSALs

A. Owner will be utilizing the competitive sealed proposal procurement method as authorized by Texas Government Code, Title 10, Subtitle F., Chapter 2269, Subchapter D. The selection criteria used to evaluate each proposer's proposal is stipulated below in paragraph "D. Selection Criteria and Points."
B. The construction cost budget for this Project is approximately $16,963,000.00.
C. Proposals shall be made on a stipulated sum basis on the attached Proposal Forms.
D. Selection Criteria and Points.
    1. (0-10 points) Construction Price - Base Proposal.
    2. (0-10 points) Construction Time.
    3. (0-10 points) Resume of Project manager.
    4. (0-10 points) Resume of job superintendent.
    5. (0-10 points) Past and current experience on Projects of similar scope, size, complexity and location. Include the following information: Owner, Project Name, Date Completed, Project Duration, Proposal Cost, Final Cost, Project Manager and Job Superintendent. If a current employee constructed the Project while working for a different employer clearly delineate that relationship.
    6. (0-10 points) Identify and describe any phasing options which may shorten construction time or minimize disruptions to operations without increasing proposal amount.

7. (0-10 points) Description and example of your methodology and process to keep and enforce sub-contractors, material suppliers and vendors to maintain the Project schedule. How do you monitor schedules, what do you do when a schedule gets behind and how do you get it back on schedule without extending the completion date? Provide a real example.
8. (0-10 points) List of all litigation, claims, or lawsuits made against your company, an Owner or Architect in which you were the contractor, including any Projects that your company failed to fulfill the terms of the contract with an Owner in the last five years. Provide status of each.
9. (0-10 points) Safety Record: Provide information related to your company's accident frequency rate for the last three calendar years, including any OSHA citations and deaths that have occurred on your Projects; annual OSHA Recordable Incident Rates (RIR) for all Work performed; annual OSHA Lost Workday Care Incident Rates (LWCIR) for all Work performed; and describe how your company manages construction safety risks and the safety resources that are provided for each Project's safety program. Additionally, complete the Safety Record Table below.

SAFETY RECORD TABLE						
Year	Total Hours Worked	Number of Recordable Injuries	Incidence Rate for Recordable Injuries	Number Lost Time Injuries	Incident Rate L/T, R/D, Transfer Injuries	Incident Rate Other Recordables
20xx						
20xx						
20xx						

10. (0-10 points) Any other relevant factor or additional information that you feel is important for the evaluation committee to know and not addressed in Items listed above.
11. (0 - 10 points) List of all subcontractors and major material suppliers (turned into Owner within 24 hours of Proposal opening.
12. Letter of Intent to issue Performance and Payment Bonds from proposer's bonding company listing availability of current bonding capacity and amount of Work currently under bond.
13. Ranking and selection of the proposers will be based on the scoring and evaluation of the listed selection criteria determined to provide the best value to the Owner.

E. Additional Requirements
   1. For the Project Manager and Job Superintendent, provide the following for each:
      a. Daily responsibilities for the Project.
      b. Formal education level.
      c. History of Work experience.
      d. Personal references including name, position, owner, current telephone number and email address.

2. In addition to requirements of the proposal documents, Owner may require additional information to establish responsibility of Proposer. Owner may further require identification of proposed subcontractors, suppliers and/or other persons and/or organizations proposed for portions of the Work and substantial data to determine their qualifications and experience. If requested, Proposer must submit all data to the Owner. Owner may also consider and use as part of the evaluation the operating costs, maintenance requirements, performance data and guarantees of major items of material and equipment proposed for incorporation in the Work when such data is required to be submitted in the proposal documents or prior to the award of the contract.
3. Owner may conduct such investigations as Owner deems necessary to assist in the evaluation of any proposal and to establish the responsibility, qualifications, and financial ability of Proposer, proposed subcontractors, suppliers and other persons and organizations to perform and furnish the Work in accordance with the proposal documents to Owner's satisfaction within the prescribed time.

1.6 SUBMISSION OF PROPOSALS

A. Address to: City of Midland
Attn: City Secretary's Office
300 North Loraine Street
Midland, TX 79701
or Mail to:

B. Location: City of Midland
Attn: City Secretary's Office
P.O. Box 1152
Midland, TX 79702

C. Date: March 16, 2022

D. Time: 2:00 p.m., local time.

E. Proposals received after the submission time on the due date will not be accepted and will be returned unopened to Proposer.

1.7 PROPOSAL DOCUMENTS

A. Proposal Documents may be examined at the Architect's office and at the following plan rooms:

1. Associated General Contractors
1707 W. 8th Street
Amarillo, Texas 79105
806.374.1954
sandy@agcamarillo.com
2. Dodge Data & Analytics
806.794.2722
Kim.mccallon@construction.com
3. AGC Plan Room
4500 W Illinois, Suite 201
Midland, Texas 79703
432.520.2220
midland@wtagc.org

4. Odessa Plan Room
   2706 Henderson
   Odessa, Texas 79764
   432.337.0912
   Odessaplanroom@gmail.com
5. AGC Plan Room
   4625 Ripley Drive
   El Paso, Texas 79922
   915.585.1533
   apacheco@agcelpaso.org
6. McGraw Hill Dodge Plan Room
   1615 University Blvd. NE
   Albuquerque, New Mexico 87120
   866.730.6155
7. AGC-Abilene
   3125 S. 27th
   Abilene, Texas 79605
   325.676.7447
   wtagc@sbcglobal.net
8. AGC Austin
   609 S. Lamar Blvd.
   Austin, Texas 78704
   512.804.2796
   gwood@agcaustin.org
9. AGC Waco
   4500 W. Waco Drive
   Waco, Texas 76710
   254.772.5400
   Ginger@centexagc.org
10. AGC Wichita Falls
    3100 Seymour Hwy, Suite 214
    Wichita Falls, Texas 76301
    940.322.0100
    wfagc@nts-online.net

B. Proposers may secure copies of Proposal Documents as follows:
   1. By contacting Elizabeth Hollenbeck at ehollenbeck@parkhill.com. Additional information can be found at https://parkhill.com/projects-for-bid.
   2. Download documents (.PDF file extension format) from Parkhill's Info Exchange web site after registering as a plan holder with issuing Parkhill office. There is no cost or deposit required for this option.

C. Only Proposers who obtain Proposal Documents through Parkhill will be registered as a document holder (plan holder) and will therefore automatically receive addenda if/when issued.

1.8 ADDENDA

A. Addenda will be issued to document holders by 1 of the 2 following methods:
   1. E-mail notification to document holder with link to download addenda from Parkhill's Info Exchange web site.
   2. For document holders not having e-mail address, addenda may be picked up at the issuing Parkhill office or mailed via the United States Postal Service (USPS).

B. Addenda will not be faxed to document holders.

1.9 PRE-PROPOSAL CONFERENCE

A. A pre-proposal conference will be held on Tuesday, March 1, 2022 at the Project site at 2:00 p.m. local time. Attendance by Proposers is not mandatory.

1.10 PROPOSAL SECURITY

A. Proposal security in the sum of 5 percent of the total proposal amount and in the form of a cashier's check, certified check, or Surety Proposal Bond, shall accompany all proposals as stipulated in the Instructions to Proposers.

1.11 OPENING OF PROPOSALS

A. Proposals will be publicly opened in the City Council Chambers immediately after closing of proposal time to identify the names of the proposer and their respective proposed contract amount. Other contents of the proposals will be afforded security sufficient to preclude disclosure of contents prior to award or rejection action.

B. After opening the Proposals, the Owner will evaluate and rank each Proposal with respect to the published selection criteria described in section titled BASIS OF PROPOSALS. After opening and ranking, an award may be made on the basis of the initially submitted Proposal, without discussion, clarification or modification, or the Owner may discuss with the selected proposer, offers for cost adjustment and other elements of the Proposal. Other than the data read at the Proposal opening, the Owner shall not disclose any information derived from the Proposals submitted by competing firms in conducting such discussions.

C. If the Owner determines that it is unable to reach a satisfactory agreement with the first ranked proposer, the Owner will terminate discussions with that proposer. The Owner will then proceed with negotiations with each successive proposer as they appear in the order of ranking until an agreement is reached, or until the Owner has rejected all Proposals. After termination of discussions with any proposer, Owner will not resume discussions with that proposer.

D. The Owner reserves the right to accept or reject any or all alternates or to accept any combination of alternates considered advantageous to the Owner.

E. The award or rejection action regarding this Proposal is at the sole discretion of the Owner and the Owner makes no warranty regarding this Proposal that a contract will be awarded to any proposer.

F. The Owner agrees that if the Contract is awarded, it will be awarded to the proposer offering the best value to the Owner. The Owner is not bound to accept the lowest priced Proposal if that Proposal is judged not to be the best value for the Owner, as determined by the Owner.

1.12 FORMALITIES

A. The City of Midland reserves the right to waive irregularities and to reject all proposals.

1.13 APPLICABLE GOVERNING LAWS AND REGULATIONS

A. In accordance with the Instruction to Proposers, all proposers shall comply with State Labor Laws concerning wage rates Texas Family Code concerning affidavit of eligibility to submit proposals non-discrimination in employment and employment of historically underutilized businesses.

END OF SECTION

DOCUMENT 00 21 16 - INSTRUCTIONS TO PROPOSERS

ARTICLE 1 - DEFINITIONS

1.1 Proposal Documents include the Proposal Requirements and the proposed Contract Documents. The Proposal Requirements consist of the Request for Proposals, Instructions to Proposers, the proposal form, and other sample proposal and contract forms. The proposed Contract Documents consist of the form of Agreement between the Owner and Contractor, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications and all Addenda issued prior to execution of the Contract.

1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Contract Documents are applicable to the Proposal Documents.

1.3 Addenda are written, or graphic instruments issued by the Architect prior to the execution of the Contract which modify or interpret the Proposal Documents by additions, deletions, clarifications or corrections.

1.4 A Proposal is a complete and properly signed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Proposal Documents.

1.5 The Base Proposal is the sum stated in the Proposal for which the Proposer offers to perform the Work described in the Proposal Documents as the base, to which Work may be added or from which Work may be deleted for sums stated in Alternate Proposals.

1.6 An Alternate Proposal (or Alternate) is an amount stated in the Proposal to be added to or deducted from the amount of the Base Proposal if the corresponding change in the Work, as described in the Proposal Documents, is accepted.

1.8 A Proposer is a person or entity who submits a Proposal.

1.9 A Sub-proposer is a person or entity who submits a proposal to a Proposer for materials, equipment or labor for a portion of the Work.

ARTICLE 2 - PROPOSER'S REPRESENTATIONS

2.1 The Proposer, by making a Proposal, represents that:

2.1.1 The Proposer has read and understands the Proposal Documents and the Proposal is made in accordance therewith.

2.1.2 The Proposer has read and understands the Proposal Documents or contract documents, to the extent that such documentation relates to the Work for which the Proposal is submitted.

2.1.3 The Proposer has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Proposer's personal observations with the requirements of the proposed Contract Documents.

2.1.4 The Proposal is based upon the materials, equipment and systems required by the Proposal Documents without exception.

2.1.5 By submitting proposal, each proposer agrees to waive any claim it has or may have against the Owner, the Architect, the Engineer and their respective employees and offices, arising out of or in connection with the administration, evaluation, or recommendation of any proposal; waiver of any requirements under the Proposal Documents; or the Contract Documents; acceptance or rejection of any proposals; and award of the Contract.

ARTICLE 3 - PROPOSAL DOCUMENTS

3.1 COPIES

3.1.1 Proposers may obtain complete sets of the Proposal Documents from Parkhill as stated in the Request for Proposals.

3.1.2 Proposal Documents will be issued directly to Subproposers or others unless specifically offered in Request for Proposals.

3.1.3 Proposers shall use complete sets of Proposal Documents in preparing Proposals; neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Proposal Documents.

3.1.4 In making copies of the Proposal Documents available on the above terms, the Owner and the Architect do so only for the purpose of obtaining Proposals on the Work and do not confer a license or grant permission for any other use of the Proposal Documents.

3.2 INTERPRETATION OR CORRECTION OF PROPOSAL DOCUMENTS

3.2.1 The Proposer shall carefully study and compare the Proposal Documents with each other, and with other work being proposal concurrently or presently under construction to the extent that it relates to the Work for which the Proposal is submitted, shall examine the site and local conditions, and shall at once report to the Architect errors, inconsistencies or ambiguities discovered.

3.2.2 Proposers and Sub-proposers requiring clarification or interpretation of the Proposal Documents shall make a written request which shall reach the Architect at least seven days prior to the date for receipt of Proposals.

3.2.3 Interpretations, corrections and changes of the Proposal Documents will be made by Addendum. Interpretations, corrections and changes of the Proposal Documents made in another manner will not be binding, and Proposers shall not rely upon them.

3.3 SUBSTITUTIONS

3.3.1 The materials, products and equipment described in the Proposal Documents establish a standard of required function, dimension, appearance and quality to be met by any proposed substitution.

3.3.2 No substitution will be considered prior to receipt of Proposals unless written request for approval has been received by the Architect at least 7 days prior to the date for receipt of Proposals. Such requests shall include the name of the material or equipment for which it is to be substituted and a complete description of the proposed substitution including Drawings, performance and test data, and other information necessary for an evaluation. An item by item (line by line) comparison of each item listed in the specification shall be compiled and submitted comparing specified material/product with proposed substitution. A statement setting forth changes in other material, equipment or other portions of the Work including changes in the work of other contracts that incorporation of the proposed substitution would require shall be included. The burden of proof of the merit of the proposed substitution is upon the proposer. Architect's approval is for manufacturer only, and not specific material, system or equipment. Approved manufacturer's material, system or equipment is subject to additional and final review after award of contract and submitted for Architect's approval during Construction Administration submittal/shop drawing review process. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

3.3.3 If the Architect approves a proposed substitution prior to receipt of Proposals, such approval will be set forth in an Addendum. Proposers shall not rely upon approvals made in any other manner.

3.4 ADDENDA

3.4.1 Addenda will be issued via the Architect's Newforma Info Exchange website or via mail (if internet service is not available) to all who are known by the issuing office to have received a complete set of Proposal Documents.

3.4.2 Copies of Addenda will be made available for inspection wherever Proposal Documents are on file for that purpose.

3.4.3 No Addenda will be issued later than 2 days prior to the date for receipt of Proposals except an Addendum withdrawing the request for Proposals or one which includes postponement of the date for receipt of Proposals.

3.4.4 Only Proposers who obtain Proposal Documents through Parkhill will be registered as a document holder (plan holder) and will therefore automatically receive addenda if/when issued.

3.4.5 Each Proposer shall ascertain, prior to submitting a Proposal, that the Proposer has received all Addenda issued, and the Proposer shall acknowledge their receipt in the Proposal.

ARTICLE 4 - PROPOSAL PROCEDURES

4.1 FORM AND STYLE OF PROPOSALS

4.1.1 Proposals shall be submitted on forms identical to the form included with the Proposal Documents.

4.1.2 All blanks on the proposal form shall be filled in by typewriter or manually, in ink.

4.1.3 Where so indicated by the makeup of the proposal form, sums shall be expressed in both words and figures, and in case of discrepancy between the two, the amount written in words shall govern.

4.1.4 Interlineations, alterations and erasures must be initialed by the signer of the Proposal.

4.1.5 All requested Alternates shall be proposed. If no change in cost to the Base Proposal is required, mark "No Change."

4.1.6 Where two or more Proposals for designated portions of the Work have been requested, the Proposer may, without forfeiture of the proposal security, state the Proposer's refusal to accept award of less than the combination of Proposals stipulated by the Proposer. The Proposer shall make no additional stipulations on the proposal form nor qualify the Proposal in any other manner.

4.1.7 Each copy of the Proposal shall include the legal name of the Proposer and a statement that the Proposer is a sole proprietor, partnership, corporation or other legal entity. Each copy shall be signed by the person or persons legally authorized to bind the Proposer to a contract. A Proposal by a corporation shall further give the state of incorporation and have the corporate seal affixed. A Proposal submitted by an agent shall have a current power of attorney attached certifying the agent's authority to bind the Proposer.

4.1.8 All costs associated with the preparation, submission and delivery of Proposal is the sole responsibility of the Proposer.

4.2 PROPOSAL SECURITY

4.2.1 Each Proposal shall be accompanied by a proposal security as stipulated in the Request for Proposals, in the form and amount required, pledging that the Proposer will enter into a Contract with the Owner on the terms stated in the Proposal and will furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Proposer refuse to enter into such Contract or fail to furnish such bonds, the amount of the proposal security shall be forfeited to the Owner as liquidated damages, not as a penalty. The amount of the proposal security shall not be forfeited to the Owner in the event the Owner fails to comply with Subparagraph 6.2.1.

4.2.2 The surety bond shall be written on AIA Document A310, Proposal Bond, or a similar standard form of the Surety, and the attorney-in-fact who executes the bond on behalf of the Surety, shall affix to the bond a certified and current copy of the power of attorney.

4.2.3 The Owner will have the right to retain the proposal security of Proposers to whom an award is being considered until either (a) the Contract has been executed and bonds have been furnished, or (b) the specified time has elapsed so that Proposals may be withdrawn, or (c) all Proposals have been rejected.

4.3 SUBMISSION OF PROPOSALS

4.3.1 All copies of the Proposal, the proposal security and other documents required to be submitted with the Proposal shall be enclosed in a sealed opaque envelope. The envelope shall be addressed as indicated in the Request for Proposals and shall be identified with the Project name, the Proposer's name, and address and, if applicable, the designated portion of the Work for which the Proposal is submitted. If the Proposal is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED PROPOSAL ENCLOSED" on the face thereof.

4.3.2 Proposals shall be deposited at the designated location prior to the time and date for receipt of Proposals. Proposals received after the time and date for receipt of Proposals will be returned unopened.

4.3.3 The Proposer shall assume full responsibility for timely delivery at the location designated for receipt of Proposals.

4.3.4 Oral, telephonic or telegraphic Proposals are invalid and will not receive consideration.

4.3.5 The Proposer shall be responsible for all costs associated with preparing the Proposal Document response. The Owner and Architect shall not incur any costs associated with the production and printing of the Proposal Document and post proposal information.

4.3.6 The Proposer shall prepare 6hard copies and 1 copy in pdf. on a USB flash drive of his proposal information which will be sealed in an opaque envelope.

4.4 MODIFICATION OR WITHDRAWAL OF PROPOSAL

4.4.1 A Proposal may not be modified, withdrawn, or canceled by the Proposer during the stipulated time period following the time and date designated for the receipt of Proposals, and each Proposer so agrees in submitting a Proposal.

4.4.2 Prior to the time and date designated for receipt of Proposals, a Proposal submitted may be modified or withdrawn by notice to the party receiving Proposals at the place designated for receipt of Proposals. Such notice shall be in writing over the signature of the Proposer or by telegram; if by telegram, written confirmation over the signature of the Proposer shall be mailed and postmarked on or before the date and time set for receipt of Proposals. A change shall be so worded as not to reveal the amount of the original Proposal.

4.4.3 Withdrawn Proposals may be resubmitted up to the date and time designated for the receipt of Proposals provided that they are then fully in conformance with these Instructions to Proposers.

PACKET 7.32 February 8, 2022

ARTICLE 5 - CONSIDERATION OF PROPOSALS

5.1 OPENING OF PROPOSALS

5.1.1 As stated in the Request for Proposals, the properly identified Proposals, received on time, will be opened publicly and will be read aloud. An abstract of the same information may, at the discretion of the Owner, be made available to the Proposers within a reasonable time.

5.2 REJECTION OF PROPOSALS

5.2.1 The Owner shall have the right to reject any, or all Proposals, reject a Proposal not accompanied by a required proposal security, or by other data required by the Proposal Documents, or reject a Proposal which is in any way incomplete or irregular.

5.3 ACCEPTANCE OF PROPOSAL (AWARD)

5.3.1 It is the intent of the Owner to award a Contract to the lowest responsible Proposer provided the Proposal has been submitted in accordance with the requirements of the Proposal Documents and does not exceed the funds available. The Owner shall have the right to waive informalities or irregularities in a Proposal received and to accept the Proposal which, in the Owner's judgment, is in the Owner's own best interests. The issuance of this request for proposals does not obligate the Owner to enter into a contract.

5.3.2 The Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Proposal Documents, and to determine the low Proposer on the basis of the sum of the Base Proposal and Alternates accepted.

5.3.3 Each proposer agrees to waive any claim it has or may have against the Owner, the Architect, and their respective employees, arising out of or in connection with the administration, evaluation, or recommendation of any proposal.

ARTICLE 6 - POST-PROPOSAL INFORMATION

6.1 CONTRACTOR'S QUALIFICATION STATEMENT

6.1.1 Proposers to whom award of a Contract is under consideration shall submit to the Architect, upon request, a properly executed AIA Document A305-2020, Contractor's Qualification Statement, Exhibit A, Exhibit B (except for paragraph B.1) and Exhibit C (except for paragraph C.2). Exhibits D and E are not required.

6.2 OWNER'S FINANCIAL CAPABILITY

6.2.1 The Owner shall, at the request of the Proposer to whom an award of a Contract is under consideration and no later than seven days prior to the expiration of the time for withdrawal of Proposals, furnish to the Proposer reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. Unless such reasonable evidence is furnished, the Proposer will not be required to execute the Agreement between the Owner and Contractor.

6.3 SUBMITTALS

6.3.1 The Proposer shall, as soon as practicable, after notification of selection for the award of a Contract, furnish to the Owner through the Architect in writing:

6.3.1.1 a designation of the Work to be performed with the Proposer's own forces:

6.3.1.2 names of the manufacturers, products and the suppliers of principal items or systems of materials and equipment proposed for the Work; and

6.3.1.3 names of subcontractors, persons, or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

6.3.2 The Proposer will be required to establish, to the satisfaction of the Architect and Owner, the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Proposal Documents.

6.3.3 Prior to the award of the Contract, the Architect will notify the Proposer in writing if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Proposer. If the Owner or Architect has reasonable objection to a proposed person or entity, the Proposer may, at the Proposer's option, (1) withdraw the Proposal, or (2) submit an acceptable substitute person or entity, with an adjustment in the Base Proposal or Alternate Proposal to cover the difference in cost occasioned by such substitution. The Owner may, accept the adjusted proposal price or disqualify, the Proposer. In the event of either withdrawal or disqualification, proposal security will not be forfeited.

6.3.4 Persons and entities proposed by the Proposer and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 - PERFORMANCE BOND AND PAYMENT BOND

7.1 BOND REQUIREMENTS

7.1.1 The Proposer shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

7.1.2 The cost shall be included in the Proposal.

7.2 TIME OF DELIVERY AND FORM OF BONDS

7.2.1 The Proposer shall deliver the required bonds to the Owner prior to the execution of the Contract.

7.2.2 The bonds shall be written on AIA Document A312, Performance Bond and Payment Bond or the Bonding Company's standard bond forms. Both bonds shall be written in the amount of the Contract Sum.

7.2.3 The bonds shall be dated on or after the date of the Contract.

7.2.4 The Proposer shall require the attorney-in-fact who executes the required bonds on behalf of the surety, to affix thereto a certified and current copy of the power of attorney.

ARTICLE 8 - INSURANCE

8.1 INSURANCE REQUIREMENTS

8.1.1 The Proposer shall furnish insurance in the types and amount of coverage required, and shall be secured from sources as defined in the Owner/Contractor Agreement.

8.1.2 The cost shall be included in the Proposal.

8.2 TIME OF DELIVERY AND FORM OF INSURANCE

8.2.1 The Proposer shall deliver the required certificates of insurance coverage to the Owner upon its execution of the Contract.

8.2.2 The insurance certificate shall be written on a form acceptable to the Owner. Insurance shall be written in the amount required by the Contract.

8.2.3 The insurance certificates shall be dated on or before the date of the Contract.

ARTICLE 9 - FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR

9.1 FORM TO BE USED

9.1.1 The Agreement for the Work will be written on Owner provided document.

ARTICLE 10 - APPLICABLE GOVERNING LAWS AND REGULATIONS

10.1 WAGE RATES

10.1.1 All Contractors must comply with State Labor Laws as required by current amended provisions of Section 2 of Article 5159a, Texas Civil Statutes. Contractor is required to pay not less than the specified minimum wage rates of the various applicable classes of labor.

10.1.2 The Contractor shall forfeit as a penalty to the State, sixty dollars ($60.00) for each laborer, workman or mechanic employed for each calendar day or portion thereof, if such laborer, workman or mechanic is paid less than the said stipulated rates for any work done under said contract, by Contractor or by their subcontractor.

10.4 NON-DISCRIMINATION

10.4.2 During the proposal and performance of this Contract, the Contractor agrees as follows:

10.4.2.1 The Contractor shall not discriminate against any employee or applicant for employment because of race, color, religion, sex, age, or national origin. The Contractor shall take affirmative action to ensure that applicants are employed, and that employees are treated during employment without regard to their race, color, sex, religion, age, or national origin. Such action shall include, but not be limited to, the following: Employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The Contractor agrees to post in conspicuous places, available to employees or applicants for employment, notices to be provided setting forth the provisions of this non-discrimination article.

10.5 HISTORICALLY UNDERUTILIZED BUSINESS

10.5.2 The Contractor shall include a "Historically Underutilized Business Policy Statement" in all subcontracts pertaining to the Work as follows:

City of Midland is committed to make efforts to assist Historically Underutilized Businesses (HUBs) to receive at least thirty percent (30%) of the total value of all contract awards issued by the state. Therefore, HUBs qualified to do so are encouraged to propose; and all business that propose are encouraged to give particular attention in preparing their proposals to include HUBs as subcontractors and material suppliers at any tier for a total value of at least 30% of the amount of their proposal. **Each proposer is required to state in its proposal (HUB Proposal Supplement) the percentage of the proposal amount represented by women owned HUBs, the percentage represented by minority-owned HUBs, and the combined total of each.**

HUB Subcontracting Program Reporting Policy, Responsibilities at the time of award:

The State of Texas operates under the basic principles of free and vigorous competition. In accordance with House Bill 2626, 73rd Legislature, all state agencies are to give a good faith effort to award at least thirty percent (30%) of the total value of all contracts to certified HUBs. Achievement of the goal may be reached by the state contracting directly with HUB vendors or by the state's general contractors establishing contracts with HUB vendors as subcontractors, suppliers or material providers.

All contractors are required to prepare the reporting forms within the designated time period stated on each form to assist City of Midland's efforts to document HUB vendor usage. Contractors that have demonstrated past HUB participation are still expected to provide documentation at the prescribed times.

General Services Commission (GSC) will assist contractors in identifying HUB businesses, call 512.463.3612. If contractors have difficulty in obtaining HUB vendors or meeting the goal targeted, contractor will be required to provide City of Midland with information under the good faith effort criteria listed below:

Delivery of a written notice to all HUB Subcontractors or Suppliers identified on the GSC HUB Certification Directory, contractor group listings, State Agency listings, other government agencies listings, and to any local HUB who requested information on the job. The notice will contain (1) adequate information about the plans, specifications, and requirements of the Contract and Subcontract work, and (2) a contact person within the Contractor's office to answer questions.

Provide documentation on the type of solicitations made for HUB participation, include records, and submit evidence of correspondence and responses from HUBs. In accordance with normal industry practices, divide contract into small, economically feasible segments which could be performed by HUBs, include dollar amount offered to HUB.

Evidence of the steps taken to assist in financing, bonding, and technical assistance services for HUBs where HUBs are otherwise qualified and information as to the Contractors bonding requirements, the procedure for obtaining any needed bond, and the telephone number of one or more acceptable surety companies contacted. Provide an explanation for rejection to any HUB whose proposal is rejected, unless another HUB is accepted for the same work, as follows: (1) where price competitiveness is not the reason, a written rejection notice will include the reason for rejection, and (2) where price competitiveness is the reason, a meeting will be held, if requested, with the price-rejected HUB to discuss the rejection.

10.5.3 City of Midland will review and evaluate the above documentation on the basis of demonstrated "good faith effort". Additional positive efforts or technical assistance may be provided and/or suggested by GSC. GSC will assist contractors in affirmative action plans to achieve the state's HUB contracting goal, call .512.463.3612.

10.5.4 An Historically Underutilized Business is defined by stature as (a) a corporation formed for profit in which at least 51 percent of the equity is owned by one or more women or Black, Hispanic, Asian Pacific, or Indian Americans, (b) a sole proprietorship 100 percent owned, operated, and controlled by such person(s), (c) a partnership in which such person(s) own at least 51 percent of its assets and interest and have proportionate control of partnership affairs, (d) a joint venture of HUBs, or (e) a supplier contract between an HUB and a prime contractor under which the HUB manufactures, distributes, or warehouses and ships the supplies.

10.5.5 **The proposer shall indicate in the appropriate space on the HUB Proposal Supplement whether or not the proposer meets the definition of an Historically Underutilized Business.**

10.5.6 **The proposer shall also indicate in the appropriate space on the HUB Proposal Supplement whether or not the proposer meets the following definition of a small business:**

A Small Business is a corporation, partnership, sole proprietorship or other legal entity formed for the purpose of making a profit which is independently owned and operated and has either fewer than 100 employees or less than $1,000,000 in gross annual receipts during the past calendar or fiscal year.

END OF SECTION

DOCUMENT 00 26 00 - PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.

B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 01 25 00 "Substitution Procedures" for conditions under which substitution requests will be considered following Contract award.

1.2 QUALITY ASSURANCE

A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.

B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:
   1. Extensive revisions to the Contract Documents are not required.
   2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
   3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing in compliance with the following requirements:
   1. Requests for substitution of materials and equipment will be considered if received no later than 7 days prior to date of bid opening.
   2. Submittal Format: Submit 3 copies or 1 PDF copy of each written Procurement Substitution Request, using CSI Substitution Request Form 1.5C. All copies must be legible.

B. Architect's Action:
   1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.

C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required Shop Drawings and to comply with all other requirements of the Contract Documents.

END OF DOCUMENT

SECTION 00 31 00 – AVAILABLE PROJECT INFORMATION

PART 1 - GENERAL

1.1 SUMMARY

A. Related Sections:
1. Division 01 Specification Sections apply to Work of this Section.

1.2 INFORMATION

A. Geotechnical Data:
1. An investigation of subsurface soil conditions at the building site was authorized by the Owner, and these investigations were made by:
W. C. Hamilton Engineering
PO Box 61307
Midland, TX 79711
(432) 550-5866
2. Logs of test borings are bound at the end of this Section.
3. Log of borings is available for Contractor's information but is not a warranty of subsurface conditions.
4. Entire report is available for Proposer's review at Architect's office.

B. Property Survey:
1. A survey of the property was authorized by the Owner, and the survey was made by:
Parkhill
1700 W Wall Street
Midland, TX 79701
(432) 697-1447
2. Site layout, Drawings and boundary traverse and closure information included in the Drawings.
3. Property survey and site improvement layout is available for Contractor's information.

1.3 RESPONSIBILITY

A. Proposers are expected to examine the geotechnical data report and site survey information then determine for themselves the validity of the information contained there-in as it relates to this Project.
B. Architect and Owner do not guarantee continuity of conditions indicated at boring locations and assume no responsibility for variations of subsoil quality or conditions.
C. Architect and Owner assume no responsibility for variations of site survey information.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

DOCUMENT 00 31 43 - PERMIT APPLICATION

1.1 PERMIT APPLICATION INFORMATION

A. This Document with its referenced attachments is part of the Procurement and Contracting Requirements for Project. They provide Owner's information for Bidders' convenience and are intended to supplement rather than serve in lieu of the Bidders' own investigations. This Document and its attachments are not part of the Contract Documents.

B. Permit Application: The building permit for Project has been applied for by Architect. A copy of the Permit Application is available on request from Architect's office.

END OF DOCUMENT

DOCUMENT 00 42 00 - PROPOSAL FORM

Date: _____ 20___

City of Midland
300 North Loraine Street
Midland, Texas 79701

City Secretary:

The undersigned, having carefully examined the specifications, drawings, and related documents entitled:

MIDLAND UTILITY SERVICE CENTER
MIDLAND, TEXAS

all as prepared by Parkhill 1700 West Wall Street, Suite 100, Midland, Texas 79701; 432.697.1447, as well as having attended a pre-proposal conference and made an on-site inspection of the premises and all other conditions affecting the cost and/or execution of the Work, proposes to furnish all materials, labor, and equipment necessary to complete the Work in accordance with said documents, of which this bid is a part, for the following sum:

I. BASE PROPOSAL:_____ Dollars ($_____)

ALTERNATE #1 PROPOSAL:_____ Dollars ($_____)

TOTAL PROPOSAL INCLUDING BASE AND ALTERNATES:
_____ Dollars ($_____)

(**Note:** All amounts shall be shown in both written and figure form. In case of discrepancy between the written amount and the figure, the written amount will govern. For alternates, check whether it is an add, deduct or no change.)

The undersigned acknowledges receipt of ___addenda to the Drawings and Project Manual as follows:

No. Date No. Date No. Date

No. Date No. Date No. Date

(The Proposer is to fill in I.D. Number and date of each thereby acknowledging receipt of Addenda).
If awarded the contract, the undersigned agrees to commence work under this contract on or before a date to be specified in Written Notice to Proceed, but not later than April 4, 2022, and to substantially complete the project within 420 calendar days from said date on May 26, 2023 unless modified by change order.

Proposer agrees to pay the Owner $250.00 per day, as liquidated damages, for each day the substantial completion of this Project extends beyond the stipulated substantial completion date.

If notified of the acceptance of this bid within 30 days of the time set for the opening of proposals, Proposer agrees within 10 days of notification, to execute a contract in the form of the on the Owner provided form for the above Work, for the above stated compensation.

PROPOSAL SECURITY, as defined in the Request For Proposals and Instructions to Proposers, which the Undersigned agrees to disposition of, is attached to this Proposal.

Upon acceptance of this Proposal by Owner, Contractor shall furnish, at the time of the signing of the contract, a PERFORMANCE BOND AND LABOR/MATERIAL PAYMENT BOND, in the amount of 100 percent of the Contract Price. Surety shall meet requirements specified in the Owner/Contractor Agreement.

It is understood that the Owner reserves the right to accept or reject any and all Proposals and to waive all formalities in accordance with State law.

ATTACHMENTS

In accordance with Instructions to Proposers, complete the attached forms and submit with the Proposal Form.

Respectfully Submitted,

By:_____

Title:_____

Business Address with Zip Code

(SEAL: If Proposal is by Corporation)

_____

_____

_____

Telephone Number with Area Code _____

Fill in the applicable information:

A Corporation, chartered in the State of _____.

Authorized to do business in the State of Texas.

A Partnership, composed of _____, and

_____and _____.

An Individual operating under the name of _____

_____.

Corporate Seal:

END PROPOSAL FORM

DOCUMENT 00 43 00 - PROCUREMENT FORM SUPPLEMENTS

To: City of Midland

Project: Midland Utilities Service Center

Date: _____

Submitted by: _____
(full name)

(full address) _____

_____

In accordance with Instructions to Proposers and the - Proposal Form, we include the following Appendices listed below. The information provided shall be considered an integral part of the Proposal Form.
The following Appendices are attached to this document:

Appendix A - List of Subcontractors: Include names of all Subcontractors and portions of the Work each Subcontractor will perform.

Appendix B - Resident Bidder Certification.

Appendix C - List of Separate Prices: Include listing of separate prices as specifically requested in Contract Documents by Specification Sections.

PROPOSAL FORM SUPPLEMENTS SIGNATURES

The Corporate Seal of

.....
(Proposer - print the full name of your firm)

was hereunto affixed in the presence of:

.....
(Authorized signing officer Title)

(Seal)

.....
(Authorized signing officer Title)

(Seal)

APPENDIX A - LIST OF SUBCONTRACTORS AND MAJOR MATERIAL SUPPLIERS

Herewith is the list of subcontractors and major material suppliers referenced in the proposal submitted by:

Proposer) _____

To (Owner) City of Midland

Dated _____ and which is an integral part of the Proposal Form.

The following work will be performed (or provided) by subcontractors and coordinated by us:

WORK SUBJECT/MATERIAL SUPPLIER	NAME

APPENDIX B - RESIDENT BIDDER CERTIFICATION

RESIDENT BIDDER CERTIFICATION

In order for the proposal to be considered, the following information must be provided. **Failure to complete may result in rejection of the proposal:**

As defined by Texas Government Code Section 2252.01 et seq., a "nonresident bidder" means a bidder whose principal place of business is not in Texas but excludes a contractor whose ultimate parent company or majority owner has its principal place of business in Texas.

I certify that my company is a "resident bidder":

Signature: _____ Date:_____

If you qualify as a "nonresident bidder," you must furnish the following information:
What is your resident state? (The state your principal place of business is located.)

City:___ State:_____ Zip:_____

Company Name:_____ Address:_____

(A) Does your "residence state" require bidders whose principal place of business is in Texas to underbid bidders whose residence state is in the same as yours by a prescribed amount or percentage to receive a comparable contract? "Residence state" means the state in which the principal place of business is located. YES_____ NO_____

(B) What is the amount or percentage? _____%

I certify that the above information is correct.

_____

Typed Name/Position Company Name

Appendix C- LIST OF SEPARATE PRICES

The following is the list of separate prices referenced in the Proposal submitted by:

(Proposer) _____

To (Owner) City of Midland

Dated _____ and which is an integral part of the Proposal Form.

ITEM VALUE
by Specification Sections.

Separate Price # 1:
_____ $ _____

Separate Price # 2:
_____ $ _____

END OF DOCUMENT

SECTION 00 52 00 – AGREEMENT FORM

PART 1 - GENERAL

1.1 APPLICABLE DOCUMENT

A. The Agreement for the Work will be written on the Owner provided form and that follows Section 00 80 10 Owner Documents."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used

END OF SECTION

DOCUMENT 00 54 10 - WEATHER TABLE
(MIDLAND, TX)

The number of calendar days indicated on the Bid Form –Proposal Form - Document 00 10 00 "Proposal" is the contract time allowed to complete the project from Notice to Proceed to Substantial Completion, taking into account the normal weather occurrence as shown in the Table below. Weather occurrences exceeding those listed in the table will be taken into consideration when evaluating a request for extension in contract time.

MONTH	MEAN NUMBER DAYS PRECIPITATION (0.01" OR MORE)	NORMAL PRECIPITATION (WATER EQUIVALENT) (INCHES)	MEAN NUMBER DAYS SNOWFALL (INCLUDING ICE PELLETS/SLEET) (1.0" OR MORE)	AVERAGE NUMBER OF DAYS THAT MIN. TEMP IS < 40
JANUARY	2.8	1.28	0	25.6
FEBRUARY	2.6	1.02	0.2	16.8
MARCH	4	1.95	0	4.8
APRIL	3	1.42	0	2
MAY	4.6	2.00	0	0
JUNE	5.2	2.01	0	0
JULY	4	1.47	0	0
AUGUST	5.6	2.06	0	0
SEPTEMBER	6.6	2.38	0	0
OCTOBER	3.8	1.58	0	3.4
NOVEMBER	2	0.89	0	8.6
DECEMBER	3.6	1.16	0	19.8
ANNUALLY	42.5	15.68	1.9	107.4

This table is based on information from NOAA and measured at the Midland International Airport, Midland, Texas.

Means, normals and averages are based on records covering a period of 5 years from 2016-2020.

SECTION 00 80 10 – OWNER DOCUMENTS

PART 1 - GENERAL

1.1 APPLICABLE DOCUMENT

A. Owner provided documents are as indicated below and that follows this Section.

1. Notice to Bidders.
2. Bid Bond.
3. Contract.
4. Exhibit C- Bonding Requirements.
5. Performance Bond.
6. Payment Bond.
7. Exhibit D- Building Wage Rate.
8. Exhibit D- Heavy & Highway Wage Rate.
9. Conflict of Interest Reporting Requirements.
10. Conflict of Interest Questionnaire.
11. Affidavit of Eligibility.
12. General Conditions of Bidding.
13. Standard Purchase Terms and Conditions.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used

END OF SECTION

NOTICE TO BIDDERS

IF THIS PURCHASE REQUIRES A CONTRACT, THE ATTACHED **CONTRACT AND INSURANCE REQUIREMENTS ARE NON-NEGOTIABLE**. MODIFICATIONS BY BIDDER/COMPANY OF ANY MATERIAL TERM(S) TO THE CONTRACT DOCUMENTS WILL BE DEEMED A NON-RESPONSIVE BID. NON-RESPONSIVE BIDS WILL BE REJECTED. BIDDER/COMPANY MUST BE WILLING TO SIGN THE CONTRACT AS IS AND WITHOUT MODIFICATIONS, PROVIDE PROPERLY EXECUTED BONDS (IF APPLICABLE) AND PROVIDE INSURANCE SPECIFICALLY AS REQUIRED WITHIN THE CONTRACT DOCUMENTS **WITHIN 21 DAYS** OF THE DATE OF THE TRANSMITTAL LETTER.

IF THE SELECTED BIDDER/COMPANY CANNOT MEET THE ABOVE REQUIREMENTS, THEN **THE CITY RESERVES THE RIGHT TO AWARD THIS PURCHASE TO ANOTHER BIDDER**.

IMPORTANT NOTICE – IF THE CONTRACT DOCUMENTS REQUIRE WORKER'S COMPENSATION INSURANCE, BIDDER/COMPANY MUST CARRY WORKER'S COMPENSATION INSURANCE TO BE ELIGIBLE FOR THIS CONTRACT. IF YOU CANNOT PROVIDE WORKER'S COMPENSATION INSURANCE AS REQUIRED BY STATE OF TEXAS STATUTE, WE RESPECTFULLY REQUEST THAT YOU "NO BID" THIS WORK.

COMPLIANCE: Company agrees that it shall comply with Texas Government Code Section 2252.908, *et seq.*, as amended. Company agrees that it shall comply with Texas Local Government Code Section 176.006, *et seq.*, as amended. For further instructions on how to comply with Texas Government Code Section 2252.908 and Texas Local Government Code Section 176.006,

please go to https://www.ethics.state.tx.us/whatsnew/elf_info_form1295.htm and https://www.ethics.state.tx.us/filinginfo/conflict_forms.htm.

ANY VENDOR WHO FAILS TO COMPLY WITH THE TERMS OF THE AWARD **MAY BE DECLARED AN IRRESPONSIBLE VENDOR**. BIDS SUBMITTED BY SAID VENDOR SHALL NOT BE CONSIDERED AGAIN FOR A MINIMUM PERIOD OF SIX MONTHS AS DETERMINED BY THE CITY MANAGER.

BID BOND

THE STATE OF TEXAS §

SURETY NO. _____

COUNTY OF MIDLAND §

KNOW ALL MEN BY THESE PRESENTS, THAT _____

_____

_____

(hereinafter called the Principal), as Principal, and _____

_____

_____

(hereinafter called the Surety), as Surety, are held and firmly bound unto the City of Midland, Texas a home rule municipal corporation of Midland County, Texas, (hereinafter called the Obligee), in the amount of _____

_____DOLLARS

($_____), for the payment whereof the said Principal and Surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a Bid or Proposal to enter into a certain written Contract with the obligee to_____

_____.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully enter into such written Contract, then this obligation shall be void; otherwise to remain in full force and effect.

IT IS EXPRESSLY UNDERSTOOD AND AGREED that if said Principal should withdraw its Bid anytime after such Bid is opened and before official rejection to such Bid or, if successful in securing the award thereof, said Principal should fail to enter into the Contract and furnish satisfactory Performance Bond and Payment Bond, the Obligee, in either such events, shall be entitled and is hereby given the right to collect the full amount of this Bid Bond as liquidated damages.

PROVIDED, further that if any legal action be filed upon this Bond venue shall lie in Midland County, Texas

IN WITNESS THEREOF, THE SAID PRINCIPAL AND SURETY do sign and seal this instrument, this _____day of_____, 20____.

_____	_____
Principal	Surety
By _____	By _____
Address _____	Address _____
_____	_____

APPROVED AS TO FORM:

_____

City Attorney

NOTE: ATTACH POWER OF ATTORNEY

THE CITY OF MIDLAND

CONTRACT

Contract No.

THIS CONTRACT, effective the ___ day of _____, 20__, by and between the City of Midland, hereinafter referred to as "CITY", and _____, hereinafter referred to as "COMPANY", is made for the following considerations:

1. **Cost:** Total Proposal: $ _____ DOLLARS

2. **Scope of Work:** COMPANY shall perform all work described for _____ in the following documents, attached hereto and incorporated herein by reference for all legal purposes.

EXHIBIT A..... Specifications, Proposal or Cost Summary
EXHIBIT B.....Intentionally Omitted
EXHIBIT C..... Bonding instructions for Public Works Contract of $50,000 and more
EXHIBIT D..... Wage Scale

3. **City:** The words "CITY's Representative" or "representative" shall mean _____ or the designee under whose supervision these contract documents, including the plans and specifications, were prepared, or who may inspect work performed under this Contract; or such other representative, supervisor, or inspector as may be authorized by CITY to act in any particular capacity under this Contract.

4. **City's Representative:** CITY's Representative may make periodic visits to the site to observe the progress and quality of the executed work and to determine, in general, if the work is proceeding in accordance with the contract documents. CITY's representative will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the work, nor will such representative be responsible for the construction means, methods, techniques, sequences or procedures, or the safety precautions incident thereto. CITY's representative will not be responsible for COMPANY's failure to perform the work in accordance with the contract.

5. **Company:** Unless otherwise stipulated, COMPANY shall provide and pay for all materials, supplies, machinery, equipment, tools, superintendence, labor, insurance, and all water, light, power, fuel, transportation and all other facilities necessary for the execution and completion of the work covered by

the contract documents. Unless otherwise specified, all materials shall be new, and both workmanship and materials shall be of a good quality. COMPANY shall, if required, furnish satisfactory evidence as to the kind and quality of materials.

5.1. COMPANY shall, at its expense, obtain all permits and licenses necessary for the performance of this contract and pay all fees and taxes required by law, and comply with all laws, ordinances, rules and regulations governing COMPANY's performance of the contract, including all environmental laws and regulations, whether state or federal.

5.2. All work shall be done and all materials furnished in strict conformity with the contract and specifications.

6. **Minor Work Not Mentioned:** All minor detail of the work not specifically mentioned in the Specifications but obviously necessary for the proper completion of the work, such as the proper connection of new work to old, shall be considered as incidental to and a part of the work for which the prices are named in the contract. COMPANY will not be entitled to any additional compensation therefor unless specifically stated otherwise. Otherwise the term "extra work" as used in this contract shall mean and include all work that may be required by CITY to be done by COMPANY to accomplish any alteration or addition to the work as shown on the Specifications.

6.1. COMPANY shall perform all extra work under the direction of CITY's Representative when presented with a written work order signed by CITY's Representative, subject, however, to the right of the COMPANY to require written confirmation of such extra work order by CITY. Payment for extra work shall be as agreed in the work order.

7. **Safety:** COMPANY shall at all times exercise reasonable precaution for the safety of employees and others on or near the work and shall comply with all applicable provisions of federal, state and municipal laws. All machinery and equipment and other physical hazards shall be guarded in accordance with federal, state or municipal laws or regulations.

8. **INDEMNITY: COMPANY SHALL INDEMNIFY AND HOLD HARMLESS AND DEFEND CITY AND ALL OF CITY'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, PERSONAL INJURIES, ACCIDENTAL DEATH, LOSSES, PROPERTY DAMAGE AND EXPENSES OF ANY CHARACTER WHATSOEVER, INCLUDING ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF COMPANY, THEIR AGENTS OR**

EMPLOYEES, OR ANY SUBCONTRACTOR, IN THE EXECUTION, SUPERVISION AND OPERATIONS GROWING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF THIS CONTRACT, AND COMPANY WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS OR EMPLOYEES, INCLUDING ATTORNEY'S FEES. THE OBLIGATIONS CONTAINED IN THIS SECTION 8 SHALL SURVIVE THE TERMINATION OF THIS CONTRACT.

8.1. **COMPANY SHALL INDEMNIFY AND HOLD HARMLESS AND DEFEND CITY AND ALL OF CITY'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, PERSONAL INJURIES, ACCIDENTAL DEATH, PROPERTY DAMAGE, LOSSES, AND EXPENSES OF ANY CHARACTER WHATSOEVER INCLUDING ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF CITY, CITY'S OFFICERS, AGENTS AND EMPLOYEES, WHETHER SUCH NEGLIGENT ACT WAS THE SOLE PROXIMATE CAUSE OF THE INJURY OR DAMAGE OR A PROXIMATE CAUSE JOINTLY AND CONCURRENTLY WITH COMPANY OR COMPANY'S EMPLOYEES, AGENTS OR SUBCONTRACTORS NEGLIGENCE IN THE EXECUTION, SUPERVISION AND OPERATIONS GROWING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF THIS CONTRACT, AND COMPANY WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS OR EMPLOYEES, INCLUDING ATTORNEY'S FEES. THE OBLIGATIONS CONTAINED IN THIS SECTION 8.1 SHALL SURVIVE THE TERMINATION OF THIS CONTRACT.**

8.2. **COMPANY AGREES THAT IT WILL INDEMNIFY AND SAVE CITY HARMLESS FROM ALL CLAIMS GROWING OUT OF ANY DEMANDS OF SUBCONTRACTORS, LABORERS, WORKMEN, MECHANICS, MATERIALMEN, AND FURNISHERS OF MACHINERY AND PARTS THEREOF, EQUIPMENT, POWER TOOLS AND ALL SUPPLIES, INCURRED IN THE FURTHERANCE OF THE PERFORMANCE OF THIS CONTRACT. WHEN CITY SO DESIRES, COMPANY SHALL FURNISH SATISFACTORY EVIDENCE THAT ALL OBLIGATIONS OF THE NATURE HEREINABOVE DESIGNATED HAVE BEEN PAID, DISCHARGED OR WAIVED. COMPANY, ITS SURETIES AND INSURANCE CARRIERS SHALL DEFEND, INDEMNIFY AND SAVE HARMLESS CITY AND ALL OF ITS OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, OR**

CLAIMS OF ANY CHARACTER WHATSOEVER, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ARISING FROM ANY ACT OF COMPANY OR ANY SUBCONTRACTOR, THEIR AGENTS OR EMPLOYEES, IN THE EXECUTION AND SUPERVISION OF THIS CONTRACT, AND WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST CITY OR ANY OF ITS OFFICERS, AGENTS, OR EMPLOYEES INCLUDING ATTORNEY'S FEES. THE OBLIGATIONS CONTAINED IN THIS SECTION 8.2 SHALL SURVIVE THE TERMINATION OF THIS CONTRACT.

9. **Start of Work:** COMPANY shall commence work no later than ten (10) days after receipt of the execution of this document or other written release to proceed and shall complete such work no later than calendar days after release to proceed.

10. **Clean Up:** COMPANY shall promptly remove from CITY's premises all materials condemned by CITY's Representative on account of failure to conform to the contract, whether actually incorporated in the work or not, and COMPANY shall at its own expense promptly replace such condemned materials with other materials conforming to the requirements of the contract. COMPANY shall also bear the expense of restoring all work of other contractors damaged by any such removal or replacement. If COMPANY does not remove and replace any such condemned materials within a reasonable time after a written notice by CITY, CITY may remove and replace such at COMPANY's expense.

11. **Warranty:** Neither the final payment nor any provision in this contract shall relieve COMPANY of responsibility for faulty materials or workmanship, and he shall remedy any defects due thereto and pay for any damage to other work resulting therefrom, which shall appear within a period of one (1) year from the date of substantial completion. CITY shall give notice of observed defects with reasonable promptness.

12. **Remedy:** CITY may, on account of subsequently discovered evidence, withhold whole or part of any payment to such extent as may be necessary to protect itself from loss on account of:

12.1. Defective work not remedied; or

12.2. Claims filed or reasonable evidence indicating possible filing of claims; or

12.3. Failure of COMPANY to make payments promptly to subcontractors or for material or labor which CITY may pay as an agent for the COMPANY; or

12.4. Damages to another contractor or subcontractor.

When the above grounds to withhold payment are removed, or COMPANY provides a surety bond satisfactory to CITY, which will protect CITY in the amount withheld, payment may be released.

13. **Funding Out:** In the event no funds or insufficient funds are appropriated and budgeted or are otherwise unavailable in any fiscal period for contract payments due under the contract, then this contract shall terminate on the last day of the fiscal period for which full appropriations were made, without penalty or expense to CITY of any kind whatsoever.

14. **Wage Scale:** COMPANY agrees to pay all workmen in his employ no less than the generally prevailing wage rate for employees of similar category in the Permian Basin Area, as is depicted in the wage rate scale attached hereto as EXHIBIT D, and incorporated herein by reference for all legal purposes.

14.1. If applicable, the Davis-Bacon Act, 29 CFR 5.5, and any related acts or regulations are hereby incorporated by reference and made a part of this Contract, and all terms and requirements under said laws, by such incorporation, are made terms and requirements of this Contract, to which the parties to this Contract have agreed to be bound.

15. **Prompt Pay Act:** CITY and COMPANY agree that Texas Government Code, Chapter 2251, Payment for Goods and Services (the "Prompt Pay Act") does not waive governmental immunity.

16. **Payment; Retainage:** After all work is completed by COMPANY, including all Change Orders altering the original scope and amount of the contract are completed, and the CITY has inspected and approved that the work is completed and in compliance with the contract and all subsequent Change Orders, the CITY may thereafter issue payment to COMPANY in the amount of the contract and all Change Orders. The CITY shall be the final judge of when the work is completed by COMPANY. The CITY, in its sole discretion, shall determine if the work under the contract and under any Change Orders has been done to the CITY's requirements.

16.1. The CITY may make periodic payments to COMPANY; provided, however, such periodic payments may only be made pursuant to this section, and only after all work and all Change Orders are completed by COMPANY and approved by the CITY. The approval shall be in the CITY's sole discretion. Requests for progress payments may be made to the extent of the materials and labor completed at the end of each month. Upon approval by the CITY or the CITY's representative, the request and invoice shall be forwarded for payment less 5% retainage. The total of these payments shall not exceed 95% of the total contract amount.

17. **Late Completion; Liquidated Damages:** It is hereby understood and mutually agreed, by and between COMPANY and the CITY, that the date of beginning and the time for completion as specified

in the contract of the work to be done hereunder are ESSENTIAL CONDITIONS of this contract; and it is further mutually understood and agreed that the work embraced in this contract shall be commenced on a date to be specified in the "Notice to Proceed." COMPANY agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between COMPANY and the CITY, that the time for the completion of the work described herein is a reasonable time for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.

17.1. In the event COMPANY shall neglect, fail or refuse to complete the work within the time herein specified, or any proper extension thereof granted by the CITY, then COMPANY and COMPANY's surety, if any, shall be liable for and does hereby agree, as a part consideration for the awarding of this contract, to pay to the CITY $500.00, not as a penalty but as liquidated damages for such breach of contract as hereinafter set forth, for each and every day that COMPANY shall be in default after the time stipulated in the contract for completing the work. Further, the CITY shall have the right to cancel this contract for such delay. In the event the CITY cancels this contract pursuant to the terms of this section, the CITY shall pay to COMPANY only those monies deemed appropriate by the CITY, in its sole discretion, to compensate COMPANY for any work actually performed, less any liquidated damages COMPANY owes the CITY.

17.2. The said amount is fixed and agreed upon by and between COMPANY and the CITY because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the CITY would in such event sustain, and said amount is agreed to be the amount of damages which the CITY would sustain and said amount shall be retained from time to time by the CITY from current periodical estimates.

17.3. It is further agreed that time is of the essence of each and every portion of this contract and of the specifications wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the contract an additional time is allowed for the completion of any work, the new time limit fixed by such extension shall be of the essence of this contract. Provided, that COMPANY shall not be charged with liquidated damages or any excess cost when the CITY determines, in its sole discretion, that COMPANY is without fault and COMPANY's reasons for the time extension are acceptable to the CITY. Provided, further, that COMPANY shall not be charged with liquidated damages of any excess cost when the delay in completion of the work is due:

a. To any preference, priority or allocation order duly issued by the Government;

b. To unforeseeable cause beyond the control and without the fault or negligence of COMPANY, including, but not restricted to, acts of God, or of the public enemy, acts of the CITY, acts of another contractor in the performance of a contract with the CITY, fires, floods, epidemics, quarantine restrictions, strikes, freight embargoes, and severe weather; and

c. To any delays of subcontractors or suppliers occasioned by any of the causes specified in subsections (a) and (b) of this article.

17.4. Provided, further, that COMPANY shall, within ten (10) days from the beginning of such delay, unless the CITY shall, in its sole discretion grant a further period of time prior to the date of final settlement of the contract, notify the CITY, in writing, of the causes of the delay, who shall ascertain the facts and extent of the delay and notify COMPANY within a reasonable time of its decision in the matter.

17.5. **COMPANY AGREES THAT THE PAYMENT OF SUCH LIQUIDATED DAMAGES MAY BE RECOVERED BY THE CITY FROM RETAINAGE HELD BY THE CITY. NOTWITHSTANDING ANY OTHER PROVISION HEREOF, COMPANY HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES CITY, CITY'S EMPLOYEES AND OFFICERS FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES, OR CAUSES OF ACTION OF ANY KIND WHATSOEVER ARISING FROM THE CITY WITHHOLDING PAYMENT FROM COMPANY AS LIQUIDATED DAMAGES FOR COMPANY'S FAILURE TO COMPLETE THE WORK WITHIN THE TIME SPECIFIED HEREIN, INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR CITY'S NEGLIGENCE.**

17.6. **COMPANY SHALL RECEIVE NO FINANCIAL COMPENSATION FOR DELAY OR HINDRANCE TO THE WORK. IN NO EVENT SHALL THE CITY BE LIABLE TO COMPANY OR ANY SUBCONTRACTOR OR SUPPLIER, ANY OTHER PERSON OR ANY SURETY FOR OR ANY EMPLOYEE OR AGENT OF ANY OF THEM, FOR ANY DAMAGES ARISING OUT OF OR ASSOCIATED WITH ANY DELAY OR HINDRANCE TO THE WORK, REGARDLESS OF THE SOURCE OF THE DELAY OR HINDRANCE, INCLUDING EVENTS OF FORCE MAJEURE, AND EVEN IF SUCH DELAY OR HINDRANCE RESULTS FROM, ARISES OUT OF OR IS DUE, IN WHOLE OR IN PART, TO THE NEGLIGENCE OF THE CITY. COMPANY'S SOLE REMEDY IN ANY SUCH CASE SHALL BE AN EXTENSION OF TIME.**

18. **No Third Party Beneficiary:** CITY's approval of this contract does not create a third party beneficiary. There is no third party beneficiary to this contract. No person or entity who is not a party to

this contract shall have any third party beneficiary or other rights hereunder.

19. WAIVER OF ATTORNEY FEES: BY EXECUTING THIS CONTRACT, COMPANY AGREES TO WAIVE AND DOES HEREBY KNOWINGLY, CONCLUSIVELY, VOLUNTARILY AND INTENTIONALLY WAIVE ANY CLAIM IT HAS OR MAY HAVE IN THE FUTURE AGAINST CITY REGARDING THE AWARD OR ATTORNEY'S FEES, WHICH ARE IN ANY WAY RELATED TO THIS CONTRACT, OR THE CONSTRUCTION, INTERPRETATION OR BREACH OF THIS CONTRACT. COMPANY SPECIFICALLY AGREES THAT IF COMPANY BRINGS OR COMMENCES ANY LEGAL ACTION OR PROCEEDING RELATED TO THIS CONTRACT, THE CONSTRUCTION, INTERPRETATION, VALIDITY OR BREACH OF THIS CONTRACT, INCLUDING, BUT NOT LIMITED TO, ANY ACTION PURSUANT TO THE PROVISIONS OF THE TEXAS UNIFORM DECLARATORY JUDGMENTS ACT (TEXAS CIVIL PRACTICE AND REMEDIES CODE SECTION 37.001, ET SEQ., AS AMENDED), OR CHAPTER 271 OF THE TEXAS LOCAL GOVERNMENT CODE, COMPANY AGREES TO ABANDON, WAIVE AND RELINQUISH ANY AND ALL RIGHTS TO THE RECOVERY OF ATTORNEY'S FEES TO WHICH COMPANY MIGHT OTHERWISE BE ENTITLED.

COMPANY AGREES THAT THIS IS THE VOLUNTARY AND INTENTIONAL RELINQUISHMENT AND ABANDONMENT OF A PRESENTLY-EXISTING KNOWN RIGHT. COMPANY ACKNOWLEDGES THAT IT UNDERSTANDS ALL TERMS AND CONDITIONS OF THIS CONTRACT. COMPANY FURTHER ACKNOWLEDGES AND AGREES THAT THERE WAS AND IS NO DISPARITY OF BARGAINING POWER BETWEEN CITY AND COMPANY. THIS SECTION SHALL NOT BE CONSTRUED OR INTERPRETED AS A WAIVER OR GOVERNMENTAL IMMUNITY AND SHALL SURVIVE THE TERMINATION OF THIS CONTRACT.

COMPANY IS RELYING ON ITS OWN JUDGMENT. COMPANY HAD THE OPPORTUNITY TO DISCUSS THIS CONTRACT WITH COMPETENT LEGAL COUNSEL PRIOR TO ITS EXECUTION. THE OBLIGATIONS CONTAINED IN THIS SECTION 18 SHALL SURVIVE THE TERMINATION OF THIS CONTRACT.

20. **Governmental Immunity:** By executing this contract CITY is not waiving its right of governmental immunity. CITY is retaining its immunity from suit. CITY is not granting consent to be sued by legislative resolution or action.

THERE IS NO WAIVER OF GOVERNMENTAL IMMUNITY.

21. **Insurance:**

COMPANY shall at all times during the term of this Contract maintain and keep in full force and effect insurance in the following types and minimum amounts with companies authorized to do business in the State of Texas:

Commercial General Liability (including Contractual liability):	
-Personal Injury:	$1,000,000.00 per person
	$1,000,000.00 per occurrence
-Property Damage:	$500,000.00 per occurrence
Business Automobile Liability:	$250,000.00 combined single limit - Personal Injury and Property Damage
Workers' Compensation:	Statutory limits
Employers' Liability:	$500,000.00 per accident or occurrence

The Commercial General Liability shall be on a per project aggregate, including completed operations, and shall be on a claims-occurred basis. This insurance shall name CITY as an additional insured and waive subrogation in favor of CITY.

The Business Automobile Liability insurance provided by COMPANY shall cover any auto for bodily injury and property damage, including owned vehicles, hired and non-city vehicles, and employee non-ownership, and the amount of such policy shall be a minimum of $250,000.00 covering any vehicle used for the execution of the work that is the subject of this Contract. This insurance shall name CITY as an additional insured and waive subrogation in favor of CITY.

The Workers' Compensation coverage provided by COMPANY shall inure to the benefit of employees injured during the course and scope of their employment by COMPANY pursuant to this Contract. The Workers' Compensation shall waive all rights of subrogation in favor of CITY.

All insurance required pursuant to this Contract shall provide for a waiver of subrogation in favor of CITY. All insurance required pursuant to this Contract, except for Workers' Compensation Insurance, shall name CITY as an additional insured on a claims occurred basis. CITY shall be provided the notice by COMPANY's insurance provider not later than thirty (30) days prior to any reduction or termination of such coverage.

COMPANY shall contractually require all contractors, subcontractors, and sub-subcontractors that work on any portion of the work that is the subject of this Contract to obtain insurance coverage that meets or exceeds the policy requirements and minimum amounts specified herein. All contractors, subcontractors, and sub-subcontractors shall obtain insurance policies that provide blanket waivers of subrogation in favor of the City of Midland and policies that name the City of Midland as an additional insured on a claims occurred basis (except workers' compensation).

The parties agree that, prior to the execution of the Contract, COMPANY shall provide one or more certificates of insurance specifically stating that these requirements have been met and subject to the approval of CITY. CITY shall not be required to provide any insurance whatsoever pursuant to this Contract.

COMPANY certifies that the certificate of insurance provided as required herein complies with the requirements of Chapter 1811 of the Texas Insurance Code. COMPANY shall not use an unapproved certificate of insurance or insert inappropriate language on a certificate. Compliance with state law is the sole responsibility of COMPANY.

22. **Assignment**: COMPANY shall not, either directly or indirectly, assign all or any part of this Contract or any interest, right or privilege herein, without the prior written consent of CITY. The issue on whether or not to grant consent to an assignment is in the sole discretion of CITY.

23. **RELEASE: NOTWITHSTANDING ANY OTHER PROVISION CONTAINED HEREIN, COMPANY HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES CITY AND CITY'S COUNCIL MEMBERS, EMPLOYEES, AND OFFICERS FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES OR CAUSES OF ACTION OF ANY KIND WHATSOEVER THAT COMPANY HAS OR MIGHT HAVE IN THE FUTURE, INCLUDING, BUT NOT LIMITED TO, BREACH OF CONTRACT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR CITY'S NEGLIGENCE. THE OBLIGATIONS CONTAINED IN THIS SECTION SHALL SURVIVE THE TERMINATION OF THIS CONTRACT**.

24. **Governing Law and Venue:** This contract shall be governed by the laws of the State of Texas. All performance and payment made pursuant to this contract shall be deemed to have occurred in Midland County, Texas. The obligations and undertakings of each of the parties to this Agreement shall be deemed to have occurred in Midland County, Texas. Exclusive venue for any claims, suits or any other action arising from or connected in any way to this contract or the performance of this contract shall be in Midland County, Texas.

25. **Independent Contractor:** COMPANY shall perform all work and services described herein as an independent contractor and not as an officer, agent, servant, or employee of CITY. COMPANY shall have exclusive control of, and the exclusive right to control the details of the services and work to be performed hereunder, and all persons performing the same. COMPANY shall be solely responsible for the acts and omissions of its officers, agents, employees, contractors and subcontractors and the doctrine

of respondeat superior shall not apply as between CITY and COMPANY, its officers, agents, employees, contractors and subcontractors. Nothing in this Contract shall be construed as creating a partnership or joint enterprise between CITY and COMPANY. No person performing any of the work and services described hereunder by COMPANY shall be considered an officer, agent, servant or employee of CITY. Further, it is specifically understood and agreed that nothing in this contract is intended or construed as creating a "Community of Pecuniary Interest" or an "Equal Right of Control" which would give rise to vicarious liability.

COMPANY shall be an independent contractor under this Contract and shall assume all of the rights, obligations and liabilities, applicable to it as such independent contractor hereunder. CITY does not have the power to direct the order in which the work is done. CITY shall not have the right to control the means, methods or details of COMPANY's work. COMPANY shall assume exclusive responsibility for the work. COMPANY is entirely free to do the work in its own way.

26. **Notice of Alleged Breach; Statutory Prerequisites:** As a condition precedent to filing suit for alleged damages incurred by an alleged breach of an express or implied provision of this Contract, COMPANY or its legal representative, shall give the City Manager, or any other reasonable official of CITY, notice in writing (consisting of one (1) original and seven (7) copies of notice attached to a copy of this Contract) of such damages, duly verified, within one hundred twenty (120) days after the same has been sustained. The discovery rule does not apply to the giving of this notice. The notice shall include when, where and how the damages occurred, the apparent extent thereof, the amount of damages sustained, the amount for which COMPANY shall settle, the physical and mailing addresses of COMPANY at the time and date the claim was presented and the physical and mailing addresses of COMPANY for the six (6) months immediately preceding the occurrence of such damages, and the names and addresses of the witnesses upon whom COMPANY relies to establish its claim; and a failure to provide such written notification within the time and manner provided herein shall exonerate, excuse and except CITY from any liability whatsoever. CITY is under no obligation to provide notice to COMPANY that COMPANY's notice is insufficient. CITY reserves the right to request additional information regarding the claim. Said additional information shall be supplied within thirty (30) days after receipt of notice.

The statutory prerequisites outlined herein constitute jurisdictional requirements pursuant to Section 271.154 of the Texas Local Government Code and Section 311.034 of the Texas Government Code. Notwithstanding any other provision to the contrary, COMPANY's failure to comply with the requirements of this Section shall perpetually bar COMPANY's claim for damages under Chapter 271 of the Texas Local Government Code, and Section 311.034 of the Texas Government Code, regardless if

CITY has actual or constructive notice or knowledge of said claim or alleged damages. COMPANY agrees that the requirements of this entire Contract are reasonable. The provisions and obligations of this Section shall survive the termination of this Contract.

27. **Consideration:** The terms of this Contract are supported by good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the parties named herein.

28. **Termination At Will:** CITY may terminate this Contract at will for no or any reason upon giving at least one hundred eighty (180) days written notice to COMPANY. The parties to this Contract understand and agree that it is in CITY's sole discretion to cancel the Contract during the term of the Contract without penalty to CITY. COMPANY has no expectation and has received no guarantees that this Contract will not be terminated before the end of the Contract term. The parties have bargained for the flexibility of terminating this Contract upon tender of the requisite notice at any time during the term of the Contract. All work and services under the Contract shall be suspended upon termination of the Contract becoming effective.

29. **Compliance:** COMPANY agrees that it shall comply with Texas Government Code Section 2252.908, *et seq.*, as amended. COMPANY agrees that it shall comply with Texas Local Government Code Section 176.006, *et seq.*, as amended.

30. To the extent that Sections 2271.002 and 2274.002 of the Texas Government Code (collectively, the "Anti-Boycott Statutes") apply to this Contract, Company hereby verifies:

- that Company does not boycott Israel and will not boycott Israel during the term of this Contract;
- that Company does not boycott energy companies and will not boycott energy companies during the term of this Contract; and
- that Company does not have a practice, policy, guidance, or directive that discriminates against a firearm entity or firearm trade association and will not discriminate during the term of this Contract against a firearm entity or firearm trade association.

To the extent that the Anti-Boycott Statutes do not apply to this Contract, such verification is not required, and Company shall be deemed to have not made such verification.

31. **Records Retention and Production of Information.** To the extent that this Contract constitutes a contract described by Section 552.371 of the Texas Government Code, COMPANY shall: (i) preserve all contracting information related to this Contract as provided by the records retention requirements applicable to CITY for the duration of this Contract; (ii) promptly provide to CITY any contracting information related to the Contract that is in the custody or possession of COMPANY on request of CITY;

and (iii) on completion of the Contract, either: (a) provide at no cost to CITY all contracting information related to the Contract that is in the custody or possession of COMPANY; or (b) preserve the contracting information related to the Contract as provided by the records retention requirements applicable to CITY.

32. **Public Information.** To the extent that this Contract is a contract described by Section 552.371 of the Texas Government Code, COMPANY agrees as follows in accordance with Section 552.372(b) of the Texas Government Code: The requirements of Subchapter J, Chapter 552, Government Code, may apply to this Contract, and COMPANY agrees that the contract can be terminated if COMPANY knowingly or intentionally fails to comply with a requirement of that subchapter.

33. **Conflict of Terms.** If a conflict of terms or language exists between: (i) any of the provisions of this Contract and (ii) any of the provisions contained in any exhibit(s) attached to this Contract, precedence shall be given to the provisions of this Contract. For the avoidance of any doubt, the provisions contained in this Contract shall supersede any and all conflicting provisions contained in any exhibit(s) attached hereto. Furthermore, the parties acknowledge and agree that any provision contained in an exhibit(s) attached to this Contract that imposes an additional express or implied obligation on CITY is hereby made void and of no force or effect. CITY's sole and exclusive obligations under this Contract are contained in the provisions of this Contract that precede the signature page(s), which evidences the parties' execution.

34. Company agrees that all iron or steel products produced through a manufacturing process and used in the project that is the subject of this Contract shall be produced in the United States in accordance with Government Code § 2252.202, et seq., as amended.

EXECUTED IN DUPLICATE the day and year first above mentioned.

THE CITY OF MIDLAND, TEXAS

By: _____
Robert Patrick, City Manager

ATTEST

_____
Amy M. Turner, City Secretary

APPROVED ONLYAS TO FORM

_____
John Ohnemiller, City Attorney

COMPANY:

By: _____

Name:_____

Title: _____

STATE OF _____ §

§

COUNTY OF_____ §

BEFORE ME, the undersigned authority, on this ____ day of _____, 20____ personally appeared, _____, an officer of _____, known to me to be the person and official whose name is subscribed to the forgoing instrument, and acknowledged to me that he executed the same as the act and deed of said corporation, for the purposes and consideration therein expressed, and in the capacity therein stated.

GIVEN UNDER MY HAND AND SEAL OF OFFICE this the ____day of _____, 20____.

_____

Notary Public, State of _____

EXHIBIT C

Bonding Requirements

The successful bidder shall be required to furnish a Performance & Payment Bond* for bids in excess of $50,000.00, in an amount equal to one hundred percent (100%) of the total contract price, such bond to be executed in five (5) original counterparts by a Corporate Surety authorized to do business in the State of Texas and acceptable to the City of Midland. All bonds must be executed on forms contained in these contract documents. The form of agreement which the successful bidder, as contractor, will be required to execute is also included herewith. The form of agreement and the form of the bonds should be carefully examined by the bidder.

A certified check, cashier's check, bank money order, or irrevocable letter of credit issued by a bank satisfactory to the City, or a bidder's bond on the form provided, in the amount of five percent (5%) of the largest possible lump sum bid submitted, payable without recourse to the City, must accompany the bidder's proposal, as a guaranty that the bidder will enter a contract and execute the required payment bond and guaranty in the forms provided within fifteen (15) days after notice of award of contract to him. Bids or proposals without the required bid guaranty will not be considered. All bid sureties and payment bonds shall name the City of Midland as Obligee.

*A cash security such as a cashier's check or irrevocable letter of credit issued by a bank satisfactory to the City for 100 % of the contract amount may be supplied in lieu of the Performance and Payment Bonds. The check will be returned un-cashed upon satisfactory completion of the work and evidence of payment of all obligations due for the contract.

PERFORMANCE BOND

THE STATE OF TEXAS §

COUNTY OF MIDLAND § SURETY NO _____

KNOW ALL MEN BY THESE PRESENTS, THAT _____ (Hereinafter called the Principal[s]), as Principal(s), and _____ (Hereinafter called the Surety), as Surety, are held and firmly bound unto the City of Midland, Texas a home rule municipal corporation of Midland County, Texas, (hereinafter called the Obligee), in the amount of _____ DOLLARS ($ _____) for the payment whereof the said Principal and surety bind themselves, and their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____day of _____ , 20___ , for the furnishing of materials and equipment to perform all labor and work necessary for the construction of _____ , specifically including in the scope of this work and bond, the additional maintenance guaranty provisions set forth in the contract conditions, which contract is hereby referred to and made a part hereof as fully and to the same extent as if copies at length herein, as well as the Principal's primary obligation to perform according to plans and specifications.

NOW, THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH, that if the said Principal shall faithfully perform the work in accordance with the plans, specifications, instructions to bidder, general and special conditions and other contract documents, including any addendum thereto, then this obligation shall be void; otherwise to remain in full force and effect.

PROVIDED further that if any legal action be filed upon this Bond venue shall lie in Midland County, State of Texas.

Surety, for value received, stipulates and agrees that no change, extension of time, alteration or addition to the terms of the contract, or to the work performed thereunder, or the plans, specifications or drawings accompanying the same, or any assignment of the contract as may be provided for in the instructions to bidders, shall in anywise affect its obligation on this Bond, and it does waive notice of any such change, extension of time, alteration or addition to the terms of the contract, assignment thereof, or the work to be performed thereunder.

IN WITNESS WHEREOF, the said Principal and surety do sign and seal this instrument, this _____ day of _____ , 20___.

_____	_____
Principal	Surety
By _____	By _____
Address _____	Address _____
_____	_____
_____	_____

APPROVED AS TO FORM:

_____

City Attorney

NOTE: Attach Power of Attorney

Form Revised August 2012

PAYMENT BOND

THE STATE OF TEXAS §

COUNTY OF MIDLAND § SURETY NO _____

KNOW ALL MEN BY THESE PRESENTS, THAT _____ of the City of _____ of the County of _____ and State of Texas as Principal, and _____, as Surety, are held and firmly bound unto the City of Midland, Texas, as Obligee, in the amount of _____ DOLLARS ($ _____) for the payment whereof the said Principal and Surety bind themselves, their heirs, administrators, executors, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has entered into a certain written contract with the Obligee, dated the _____ day of _____, 20__, for the furnishing of materials, equipment to perform all labor and work necessary for _____, hereof as fully and to the same extent as if copied at length herein.

NOW, THEREFORE, the condition of the obligation is that if the said Principal shall pay all claimants supplying labor and material to him or a subcontractor in the prosecution of the work provided for in said contract, then this obligation shall be null and void; otherwise, it is to remain in full force and effect.

Surety, for value received, stipulates and agrees that no change, extension of time alteration or addition to the terms of the contract, or to the work performed there under, or the plans, specifications of drawings accompanying the same, or any assignment of the contract as may be provided for in the instructions to bidders, shall in anywise affect its obligation on this Bond, and it does waive notice of any such change, extension of

time, alteration or addition to the terms of the contract, assignment thereof, or to the work to be performed there under.

IN WITNESS WHEREOF the said Principal and Surety have signed and sealed this instrument, this _____ day of _____ , 20__ .

_____	_____
Principal	Surety
By _____	By _____
Address _____	Address _____
_____	_____
_____	_____

APPROVED AS TO FORM:

_____

City Attorney

NOTE: Attach Power of Attorney

Form Revised August 2012

EXHIBIT D – BUILDING WAGE RATES rev 01-01-21

General Decision Number: TX20210261 01/01/2021

Superseded General Decision Number: TX20200261

State: Texas

Construction Type: Building

County: Midland County in Texas.

BUILDING CONSTRUCTION PROJECTS (does not include single family homes or apartments up to and including 4 stories).

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/01/2021

BOIL0074-003 01/01/2017

	Rates	Fringes
BOILERMAKER	$ 28.00	22.35

ENGI0178-005 06/01/2020

	Rates	Fringes
POWER EQUIPMENT OPERATOR		
(1) Tower Crane	$ 32.85	13.10
(2) Cranes with Pile Driving or Caisson Attachment and Hydraulic Crane 60 tons and above	$ 28.75	10.60
(3) Hydraulic cranes 59 Tons and under	$ 32.35	13.10

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* IRON0084-011 06/01/2020

	Rates	Fringes
IRONWORKER, ORNAMENTAL	$ 25.26	7.13

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* PLUM0404-001 09/01/2020

	Rates	Fringes
PLUMBER	$ 26.05	8.81

SUTX2014-037 07/21/2014

	Rates	Fringes
BRICKLAYER	$ 20.00	0.00
CARPENTER	$ 13.82	0.00
CEMENT MASON/CONCRETE FINISHER	$ 13.76	0.00
ELECTRICIAN	$ 23.18	6.31
INSULATOR - MECHANICAL (Duct, Pipe & Mechanical System Insulation)	$ 19.77	7.13
IRONWORKER, REINFORCING	$ 12.27	0.00

IRONWORKER, STRUCTURAL	$ 22.16	5.26
LABORER: Common or General	$ 11.80	0.00
LABORER: Mason Tender - Brick	$ 11.38	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.58	0.00
LABORER: Pipelayer	$ 12.49	2.13
LABORER: Roof Tearoff	$ 11.28	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 14.25	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93	0.00
OPERATOR: Bulldozer	$ 18.29	1.31
OPERATOR: Drill	$ 16.22	0.34
OPERATOR: Forklift	$ 14.83	0.00
OPERATOR: Grader/Blade	$ 13.37	0.00
OPERATOR: Loader	$ 13.55	0.94
OPERATOR: Mechanic	$ 17.52	3.33
OPERATOR: Paver (Asphalt, Aggregate, and Concrete)	$ 16.03	0.00
OPERATOR: Roller	$ 12.70	0.00
PAINTER (Brush, Roller, and Spray)	$ 15.00	0.73
PIPEFITTER	$ 25.80	8.55
ROOFER	$ 14.75	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 22.73	7.52
SHEET METAL WORKER, Excludes HVAC Duct Installation	$ 19.50	0.00

TILE FINISHER.....$ 11.22 0.00

TILE SETTER.....$ 14.74 0.00

TRUCK DRIVER: Dump Truck.....$ 12.39 1.18

TRUCK DRIVER: Flatbed Truck.....$ 19.65 8.57

TRUCK DRIVER: Semi-Trailer Truck.....$ 12.50 0.00

TRUCK DRIVER: Water Truck.....$ 12.00 4.11

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

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Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts. Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses

(29CFR 5.5 (a) (1) (ii)).

EXHIBIT D – Heavy and Highway Wage Rates rev 01-01-21

"General Decision Number: TX20210002 01/01/2021

Superseded General Decision Number: TX20200002

State: Texas

Construction Types: Heavy and Highway

Counties: Armstrong, Carson, Crosby, Ector, Irion, Lubbock, Midland, Potter, Randall, Taylor and Tom Green Counties in Texas.

HEAVY & HIGHWAY CONSTRUCTION PROJECTS

Note: Under Executive Order (EO) 13658, an hourly minimum wage of $10.95 for calendar year 2021 applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2015. If this contract is covered by the EO, the contractor must pay all workers in any classification listed on this wage determination at least $10.95 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on the contract in calendar year 2021. If this contract is covered by the EO and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must pay workers in that classification at least the wage rate determined through the conformance process set forth in 29 CFR 5.5(a)(1)(ii) (or the EO minimum wage rate, if it is higher than the conformed wage rate). The EO minimum wage rate will be adjusted annually. Please note that this EO applies to the above-mentioned types of contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but it does not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(2)-(60). Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/gov contracts.

Modification Number	Publication Date
0	01/01/2021

* SUTX2011-002 08/02/2011

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER (Paving & Structures)……..	$ 13.55	
ELECTRICIAN.....	$ 20.96	
FORM BUILDER/FORM SETTER		
Paving & Curb.....	$ 12.36	

Structures.....$ 13.52

LABORER
- Asphalt Raker.....$ 12.28
- Flagger.....$ 9.30
- Laborer, Common.....$ 10.30
- Laborer, Utility.....$ 11.80
- Work Zone Barricade Servicer.....$ 10.30

POWER EQUIPMENT OPERATOR:
- Asphalt Distributer.....$ 14.87
- Asphalt Paving Machine.....$ 13.40
- Broom and Sweeper.....$ 11.21
- Crane, Lattice Boom 80 Tons or Less.....$ 16.82
- Crawler Tractor Operator……...$ 13.96
- Excavator, 50,000 lbs or less.....$ 13.46
- Front End Loader Operator, Over 3 CY.....$ 12.77
- Front End Loader, 3CY or less.....$ 12.28
- Loader/Backhoe.....$ 14.18
- Mechanic.....$ 20.14
- Milling Machine.....$ 15.54
- Motor Grader, Rough.....$ 16.15
- Motor Grader, Fine.....$ 17.49
- Pavement Marking Machine…….....$ 16.42
- Reclaimer/Pulverizer…….....$ 12.85
- Roller, Asphalt.....$ 10.95
- Roller, Other.....$ 10.36
- Scraper.....$ 10.61
- Spreader Box.....$ 12.60

Servicer.....$ 13.98

Steel Worker (Reinforcing).....$ 13.50

TRUCK DRIVER
- Lowboy-Float.....$ 14.46
- Single Axle.....$ 12.74
- Single or Tandem Axle Dump……$ 11.33
- Tandem Axle Tractor with Semi.....$ 12.49

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.

==========

Note: Executive Order (EO) 13706, Establishing Paid Sick Leave for Federal Contractors applies to all contracts subject to the Davis-Bacon Act for which the contract is awarded (and any solicitation was issued) on or after January 1, 2017. If this contract is covered by the EO, the contractor must provide employees with 1 hour of paid sick leave for every 30 hours they work, up to 56 hours of paid sick leave each year. Employees must be permitted to use paid sick leave for their own illness, injury or other health-related needs, including preventive care; to assist a family member (or person who is like family to the employee) who is ill, injured, or has other health-related needs, including preventive care; or for reasons resulting from, or to assist a family member (or person who is like family to the employee) who is a victim of, domestic violence, sexual assault, or stalking. Additional information on contractor requirements and worker protections under the EO is available at www.dol.gov/whd/govcontracts. Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses

(29CFR 5.5 (a) (1) (ii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the cited type(s) of construction in the area covered by the wage determination. The classifications are listed in alphabetical order of ""identifiers"" that indicate whether the particular rate is a union rate (current union negotiated rate for local), a survey rate (weighted average rate) or a union average rate (weighted union average rate).

Union Rate Identifiers

A four letter classification abbreviation identifier enclosed in dotted lines beginning with characters other than ""SU"" or ""UAVG"" denotes that the union classification and rate were prevailing for that classification in the survey. Example: PLUM0198-005 07/01/2014. PLUM is an abbreviation identifier of the union which prevailed in the survey for this classification, which in this example would be Plumbers. 0198 indicates the local union number or district council number where applicable, i.e., Plumbers Local 0198. The next number, 005 in the example, is an internal number used in processing the wage determination. 07/01/2014 is the effective date of the most current negotiated rate, which in this example is July 1, 2014.

Union prevailing wage rates are updated to reflect all rate changes in the collective bargaining agreement (CBA) governing this classification and rate.

Survey Rate Identifiers

Classifications listed under the ""SU"" identifier indicate that no one rate prevailed for this classification in the survey and the published rate is derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As this weighted average rate

includes all rates reported in the survey, it may include both union and non-union rates. Example: SULA2012-007 5/13/2014. SU indicates the rates are survey rates based on a weighted average calculation of rates and are not majority rates. LA indicates the State of Louisiana. 2012 is the year of survey on which these classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. 5/13/2014 indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates are not updated and remain in effect until a new survey is conducted.

Union Average Rate Identifiers

Classification(s) listed under the UAVG identifier indicate that no single majority rate prevailed for those classifications; however, 100% of the data reported for the classifications was union data. EXAMPLE: UAVG-OH-0010 08/29/2014. UAVG indicates that the rate is a weighted union average rate. OH indicates the state. The next number, 0010 in the example, is an internal number used in producing the wage determination. 08/29/2014 indicates the survey completion date for the classifications and rates under that identifier.

A UAVG rate will be updated once a year, usually in January of each year, to reflect a weighted average of the current negotiated/CBA rate of the union locals from which the rate is based.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

* an existing published wage determination
* a survey underlying a wage determination
* a Wage and Hour Division letter setting forth a position on a wage determination matter
* a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION

IMPORTANT NOTICE

Conflict Of Interest Reporting Requirements

Compliance with LOCAL GOVERNMENT CODE TITLE 5. MATTERS AFFECTING PUBLIC OFFICERS AND EMPLOYEES SUBTITLE C. MATTERS AFFECTING PUBLIC OFFICERS AND EMPLOYEES OF MORE THAN ONE TYPE OF LOCAL GOVERNMENT CHAPTER 176. DISCLOSURE OF CERTAIN RELATIONSHIPS WITH LOCAL GOVERNMENT OFFICERS; PROVIDING PUBLIC ACCESS TO CERTAIN INFORMATION.

Form CIQ: This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session. This questionnaire shall be filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a). By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. See Section 176.006(a-1), Local Government Code. A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

Bidders are responsible for filing Conflict of Interest form "CIQ" in accordance with the above referenced statute. Failure to do so is a class C Misdemeanor. Contracts or Purchase Orders awarded to a vendor that has violated this law is subject to termination at such time that the violation is discovered with no recourse to the City of Midland. The bidder will be subsequently removed from the bidders list for a minimum of one year.

When there is no known conflict of interest as defined by the statute, it is not necessary to file/submit the Form CIQ. The form must be submitted if a conflict is subsequently discovered.

By submitting a response to this request, vendor represents that it complies with the requirements of Chapter 176 of the Texas Local Government Code.

For a current list of the local government officers go to: http://www.midlandtexas.gov/

Upon completion of the form, sign and submit with bid or mail to:

City of Midland
Attn: City Secretary
PO Box 1152
Midland, Texas 79702

CONFLICT OF INTEREST QUESTIONNAIRE

FORM CIQ

For vendor doing business with local governmental entity

This questionnaire reflects changes made to the law by H.B. 23, 84th Leg., Regular Session.

This questionnaire is being filed in accordance with Chapter 176, Local Government Code, by a vendor who has a business relationship as defined by Section 176.001(1-a) with a local governmental entity and the vendor meets requirements under Section 176.006(a).

By law this questionnaire must be filed with the records administrator of the local governmental entity not later than the 7th business day after the date the vendor becomes aware of facts that require the statement to be filed. *See* Section 176.006(a-1), Local Government Code.

A vendor commits an offense if the vendor knowingly violates Section 176.006, Local Government Code. An offense under this section is a misdemeanor.

OFFICE USE ONLY

Date Received

1 **Name of vendor who has a business relationship with local governmental entity.**

2 ☐ **Check this box if you are filing an update to a previously filed questionnaire.** (The law requires that you file an updated completed questionnaire with the appropriate filing authority not later than the 7th business day after the date on which you became aware that the originally filed questionnaire was incomplete or inaccurate.)

3 **Name of local government officer about whom the information is being disclosed.**

_____

Name of Officer

4 **Describe each employment or other business relationship with the local government officer, or a family member of the officer, as described by Section 176.003(a)(2)(A). Also describe any family relationship with the local government officer. Complete subparts A and B for each employment or business relationship described. Attach additional pages to this Form CIQ as necessary.**

A. Is the local government officer or a family member of the officer receiving or likely to receive taxable income, other than investment income, from the vendor?

☐ Yes ☐ No

B. Is the vendor receiving or likely to receive taxable income, other than investment income, from or at the direction of the local government officer or a family member of the officer AND the taxable income is not received from the local governmental entity?

☐ Yes ☐ No

5 **Describe each employment or business relationship that the vendor named in Section 1 maintains with a corporation or other business entity with respect to which the local government officer serves as an officer or director, or holds an ownership interest of one percent or more.**

6 ☐ Check this box if the vendor has given the local government officer or a family member of the officer one or more gifts as described in Section 176.003(a)(2)(B), excluding gifts described in Section 176.003(a-1).

7

_____ _____

Signature of vendor doing business with the governmental entity Date

CONFLICT OF INTEREST QUESTIONNAIRE
For vendor doing business with local governmental entity

A complete copy of Chapter 176 of the Local Government Code may be found at http://www.statutes.legis.state.tx.us/Docs/LG/htm/LG.176.htm. For easy reference, below are some of the sections cited on this form.

Local Government Code § 176.001(1-a): "Business relationship" means a connection between two or more parties based on commercial activity of one of the parties. The term does not include a connection based on:

(A) a transaction that is subject to rate or fee regulation by a federal, state, or local governmental entity or an agency of a federal, state, or local governmental entity;

(B) a transaction conducted at a price and subject to terms available to the public; or

(C) a purchase or lease of goods or services from a person that is chartered by a state or federal agency and that is subject to regular examination by, and reporting to, that agency.

Local Government Code § 176.003(a)(2)(A) and (B):

(a) A local government officer shall file a conflicts disclosure statement with respect to a vendor if:

***

(2) the vendor:

(A) has an employment or other business relationship with the local government officer or a family member of the officer that results in the officer or family member receiving taxable income, other than investment income, that exceeds $2,500 during the 12-month period preceding the date that the officer becomes aware that

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor;

(B) has given to the local government officer or a family member of the officer one or more gifts that have an aggregate value of more than $100 in the 12-month period preceding the date the officer becomes aware that:

(i) a contract between the local governmental entity and vendor has been executed; or

(ii) the local governmental entity is considering entering into a contract with the vendor.

Local Government Code § 176.006(a) and (a-1)

(a) A vendor shall file a completed conflict of interest questionnaire if the vendor has a business relationship with a local governmental entity and:

(1) has an employment or other business relationship with a local government officer of that local governmental entity, or a family member of the officer, described by Section 176.003(a)(2)(A);

(2) has given a local government officer of that local governmental entity, or a family member of the officer, one or more gifts with the aggregate value specified by Section 176.003(a)(2)(B), excluding any gift described by Section 176.003(a-1); or

(3) has a family relationship with a local government officer of that local governmental entity.

(a-1) The completed conflict of interest questionnaire must be filed with the appropriate records administrator not later than the seventh business day after the later of:

(1) the date that the vendor:

(A) begins discussions or negotiations to enter into a contract with the local governmental entity; or

(B) submits to the local governmental entity an application, response to a request for proposals or bids, correspondence, or another writing related to a potential contract with the local governmental entity; or

(2) the date the vendor becomes aware:

(A) of an employment or other business relationship with a local government officer, or a family member of the officer, described by Subsection (a);

(B) that the vendor has given one or more gifts described by Subsection (a); or

(C) of a family relationship with a local government officer.

Consideration of Location of Bidder's Principal Place of Business
For Bids of $50,000 up to $100,000 for Services and $500,000 for Commodities
Affidavit of Eligibility

Pursuant to Texas Local Government Code 271.9051, in purchasing real property, personal property that is not affixed to real property, or services, if the City receives one or more bids from a bidder whose principal place of business is in the City of Midland and whose bid is within five percent (5%) of the lowest bid price received by the City from a bidder who is not a resident of the City of Midland, the City may enter into a contract with:

(1) the lowest bidder; or

(2) the bidder whose principal place of business is in the City of Midland if the City Council determines, in writing, that the local bidder offers the City the best combination of contract price and additional economic development opportunities for the City of Midland created by the contract award, including the employment of residents of the City of Midland and increased tax revenues to the City of Midland.

In order to receive consideration, bidders must submit this affidavit to:

Erika Martinez
Purchasing Manager
City of Midland
300 N. Loraine St.,
PO BOX 1152
Midland, TX 79702-1152

Complete all areas below. Incomplete affidavits may be rejected.

Local Business Name: _____

Local Address (must be within the City limits): _____

1. Is the above address the principal place of business for the business named above? ☐ Yes ☐ No
2. How many residents of the City of Midland are employed at the above business location? _____
3. Year your business was established in the City of Midland: _____
4. If you collect sales tax for ANY class of customer, provide the following Reseller information:

   Reseller Permit Number: _____

   Company Name and Address (as it appears on permit):

   _____

   _____

   _____

5. Does your business have more than one office in the State of Texas? ☐ Yes ☐ No
   If Yes, identify the office location considered as the point-of sale for the purpose of sales tax calculation:

   _____

   _____

6. Was the local business required to pay business and/or real property tax for the most recent tax year?

   ☐ Yes ☐ No

   If Yes, did the local business pay any of this tax to the City of Midland? ☐ Yes ☐ No

Under penalty of perjury, the undersigned states that the foregoing statements are true and correct. It is further acknowledged that any person, firm, corporation or entity intentionally submitting false information to the City in an attempt to qualify for eligibility shall be prohibited from bidding on City of Midland products and services for a period of one (1) year.

Authorized Signature: _____ Date: _____

Printed Name and Title: _____

IMPORTANT: READ CAREFULLY BEFORE MAKING BID
GENERAL CONDITIONS OF BIDDING

1. All bids are to be submitted as specified in the procurement document(s).

2. Each Bidder is requested to provide: Descriptive literature clearly marked to show each item on this bid. Any catalog or manufacturer's reference in this proposal is descriptive, but not restrictive, and is used only to indicate type and quality. If, however, the bidder proposes similar but not identical terms, he must furnish all particulars. If no mention is made of any exceptions, it is assumed that he is bidding on the article specified and not on an approved equal and he will be required to deliver exact article specified.

3. Prices should be itemized. (Indicate unit price and extend to show total price.) In case of discrepancy between the unit price and the extension, the unit price shall govern.

4. Unit price for each item offered shall include all discounts; e.g., trade, seasonal, etc. with net 30 days payment terms. Discounts shall not be shown as such but shall be incorporated in the base bid price. Any bid showing discounts will be considered an alternate bid. The City of Midland will not be responsible for any goods delivered without a purchase order number.

5. If the Contract is awarded, it will be awarded to either the lowest responsible bidder, or to the bidder who provides goods or services at the best value for the City of Midland. In determining the best value for the City of Midland, the City of Midland may consider the criteria enumerated in Section 252.043 of the Texas Local Government Code. The City of Midland reserves the right to award by item or by total bid, or to reject any or all bids or parts of bids. Further, the City of Midland reserves all rights granted by Section 271.027 of the Texas Local Government Code. The City of Midland reserves the right to award the bid to the lowest responsible bidder.

6. Time of proposed delivery shall be stated in number of calendar days.

7. NOTE: The City of Midland, Texas is exempt from all Federal, State and City tax. Please do not include these taxes in your bid price or invoice. Taxable items must be so designated, and the City will supply vendor with a Tax Exemption Certificate, properly executed.

8. All items are to be delivered, unloaded and stacked at the location indicated on the Bid Request and Purchase Order.

9. All items are to be delivered F.O.B. to the City of Midland, Texas with freight prepaid and included in the bid.

10. Detailed specifications rule over General specifications (headings, etc.)

11. The City of Midland reserves the right to remove a company from the bid list for (1) continued failure to respond to request for bids, (2) failure to deliver merchandise within promised time, or (3) delivery of substandard merchandise.

12. No officer or employee of the City shall have a financial interest, direct or indirect, in any contract with the City, or be financially interested, directly or indirectly, in the sale to the City of any lands, materials, supplies or services except as allowed under chapter 176 of the Local Government Code. Form CIQ shall be submitted and placed on file with the City of Midland.

13. The City shall determine the most advantageous bid for the City and accept the proposal of the responsible party submitting the lowest and/or most advantageous bid or reject any and all bids.

14. The City of Midland, Texas may consider as informal any bid not prepared and submitted in accordance with the provisions hereof, and may waive, in its sole discretion, any informalities.

STANDARD PURCHASE TERMS AND CONDITIONS
PURCHASING DIVISION, CITY OF MIDLAND, TEXAS

"Seller", as used herein, has the same meaning as "Company". "Buyer", as used herein, has the same meaning as "City".

Seller and Buyer agree as follows:

1. SELLER TO PACKAGE GOODS - Seller will package goods in accordance with good commercial practice. Each shipping container shall be clearly and permanently marked as follows; (a) Seller's name and address, (b) Consignee's name, and address, and purchase order number, (c) Container number and total number of containers, e.g. box 1 of 4 boxes, and (d) the number of the container bearing the packing slip. Seller shall bear cost of packaging unless otherwise provided. Goods shall be suitably packed to secure lowest transportation costs and to conform with requirements of common carriers and any applicable specifications. Buyer's count or weight shall be final and conclusive on shipments not accompanied by packing lists.

2. SHIPMENT UNDER RESERVATION PROHIBITED - Seller is not authorized to ship the goods under reservation and no tender of a bill of lading will serve as a tender of goods.

3. TITLE & RISK OF LOSS - The title and risk of loss of the goods shall not pass to Buyer until Buyer actually receives and takes possession of the goods at the point or points of delivery in Midland, Texas.

4. NO REPLACEMENT OF DEFECTIVE TENDER - Every tender or delivery of goods must fully comply with all provisions of this contract as to time of delivery, quality and the like. If a tender is made which does not fully conform, this shall constitute a breach and Seller shall not have the right to substitute a conforming tender, provided, where the time for performance has yet expired, the Seller may reasonably notify Buyer of his intention to cure and may then make a conforming tender within the contract time but not afterward.

5. PLACE OF DELIVERY - The place of delivery shall be that set forth in the block of the purchase order entitled "deliver to".

6. INVOICES - Seller shall submit separate ORIGINAL invoices, on each purchase order. Invoices shall indicate the purchase order number. All invoices must be mailed to City of Midland, Accounts Payable, P.O. Box 1152, Midland, TX 79702-1152. Payment will be made within 30 days from the date the invoice and properly executed receiving documents are received by City of Midland, Accounts Payable at the above address. Invoices sent to any other address will delay payment.

7. GRATUITIES - The buyer may, by written notice to the seller, cancel this contract without liability to Seller, if it is determined by Buyer that gratuities, in the form of entertainment, gifts, or otherwise, were offered or given by the seller, or any agent or representative of the Seller, to any officer or employee of the City of Midland with a view toward securing a contract or securing favorable treatment with respect to performing of such a contract. In the event this contract is cancelled by Buyer pursuant to this provision, Buyer shall be entitled, in addition to any other rights and remedies, to recover or withhold the amount of the cost incurred by Seller in providing such gratuities.

8. WARRANTY - PRICE -

a. The price to be paid by the Buyer shall be that contained in Seller's bid which Seller warrants to be no higher than Seller's current prices on order by others for products of the kind and specifications covered by this agreement for similar quantities under similar or like conditions and methods of purchase. In the event Seller breaches this warranty, the prices of the items shall be reduced to the Seller's current prices on order by others, or in the alternative, Buyer may cancel this contract without liability to Seller for breach or Seller's actual expense.

b. The Seller warrants that no person or selling agency has been employed or retained to solicit or secure this contract upon an agreement or understanding for commission, percentage, brokerage, or contingent fee excepting bona fide employees or bona fide established commercial or selling agencies maintained by the Seller for the purpose of securing business. For breach or violation of this warranty the Buyer shall have the right or rights to cancel this contract without liability and to deduct from the contract price, or otherwise recover the full amount of such commission, percentage, brokerage or contingent fee.

9. WARRANTY - PRODUCT - Seller shall not limit or exclude any implied warranties and any attempt to do so shall render this contract voidable at the option of the Buyer. Seller warrants that the goods furnished will conform to the specification, drawings, and description listed in the bid invitation, and to the sample(s) furnished by Seller, if any. In the event of a conflict between the specifications, drawings and descriptions, the specifications shall govern.

10. SAFETY WARRANTY - Seller warrants that the product sold to Buyer shall conform to the standards promulgated by the U.S. Department of Labor under the Occupational Safety and Health Act of 1970. In the event the product does not conform to OSHA standards, Buyer may return the product for correction or replacement at the Seller's expense. In the event Seller fails to make the appropriate correction within a reasonable time, correction made by buyer will be at Seller's expense.

11. RIGHT OF INSPECTION - Buyer shall have the right to inspect the goods at delivery before accepting them.

12. CANCELLATION - Buyer shall have the right to cancel for default all or any part of the undelivered portion of this order if Seller breached any of the terms hereof including warranties of Seller if the Seller becomes insolvent or commits acts of bankruptcy. Such right of cancellation is in addition to and not in lieu of any other remedies which Buyer may have in law or equity.

13. TERMINATION - The performance of work under this order may be terminated in whole, or in part by the Buyer in accordance with this provision. Termination of work hereunder shall be effected by the delivery to Seller of a "Notice of Termination" specifying the extent to which performance of work under the order is terminated and the date upon which such termination becomes effective. Such right of termination is in addition to and not in lieu of the rights of Buyer set forth in Clause 13, herein.

14. FORCE MAJEURE - Neither party shall be held responsible for losses, resulting if the fulfillment of any terms or provisions of this contract is delayed or prevented by any cause not within the control of the party whose performance is interfered with, and which by the exercise of reasonable diligence said party is unable to prevent.

15. ASSIGNMENT - DELEGATION - No right or interest in this contract shall be assigned or delegation of any obligation made by Seller without the written permission of the Buyer. Any attempted assignment or delegation by the Seller shall be wholly void and totally ineffective for all purposes unless made in conformity with this paragraph.

16. MODIFICATIONS - This contract can be modified or rescinded only by a writing signed by both of the parties or their duly authorized agents.

17. INTERPRETATION - PAROL EVIDENCE - This writing, plus any specifications for bids and performance provided by Buyer in its advertisement for bids, is intended by the parties as a final expression of this agreement. No course of prior dealings between the parties and no usage of the trade shall be relevant to supplement or explain any term used in this agreement. Acceptance or acquiescence in a course of performance rendered under this agreement shall not be relevant to determine the meaning of this agreement even though the accepting or acquiescing party has knowledge of the performance and opportunity for objection. Whenever a term defined by the Uniform Commercial Code is used in this agreement, the definition contained in the Code is to control.

18. ADVERTISING - Seller shall not advertise or publish without Buyer's prior consent the fact that Buyer has entered into the contract, except to the extent necessary to comply with proper requests for information from an authorized representative of the federal, state or local government.

19. RIGHT TO ASSURANCE - Whenever one party to the contract in good faith has reason to question the other party's intent to perform he may demand that the other party give written assurance of this intent to perform. In the event that a demand is made and no assurance is given within five (5) days, the demanding party may treat this failure as an anticipatory repudiation of the contract.

20. PROTECTION AGAINST ROYALTIES OR PATENT INFRINGEMENT - The Seller shall pay all royalties and license fees, and shall provide for the use of any design, device, material or process covered by letters patent or copyright by suitable legal agreement with Patentee or Owner thereof. The Seller shall defend all suits or claims for infringement of any patent or copyrights and shall indemnify and save the Buyer harmless from any loss on account thereof, except that Buyer shall defend all such suits and claims and shall be responsible for all such loss when a particular design, device, material or process is allowed to the Seller, the Seller shall indemnify and save Buyer harmless from any loss on account thereof. If the material or process specified or required by Buyer is an infringement, the Seller shall be responsible for such loss unless he promptly gives written notice to the buyer of such infringement.

21. TIME - It is hereby expressly agreed and understood that time is of the essence for the performance of this contract, and any failure by contract to meet the time specifications of this agreement will cause Seller to be in default of this agreement.

22. TAX - The City of Midland is exempt from all Federal, State and City tax. Please do not include these taxes in your bid price or invoice. Taxable items must be so designated, and the City will supply vendor with a Tax Exemption Certificate, properly executed.

23. **INSURANCE –**

The following provisions apply unless the agreement is for the supply of goods only:

Seller shall at all times during the term of this agreement maintain and keep in full force and effect insurance in the following types and minimum amounts with companies authorized to do business in the State of Texas:

Commercial General Liability (including Contractual liability):	
-Personal Injury:	$1,000,000.00 per person
	$1,000,000.00 per occurrence
-Property Damage:	$500,000.00 per occurrence
Business Automobile Liability:	$250,000.00 combined single limit - Personal Injury and Property Damage
Worker's Compensation:	Statutory limits
Employers' Liability:	$500,000.00 per accident or occurrence

The Commercial General Liability shall be on a per project or policy aggregate, including completed operations, and shall be on an occurrence basis.

The Workers' Compensation coverage provided by Seller shall inure to the benefit of employees injured during the course and scope of their employment by Seller pursuant to this agreement.

The Business Automobile Liability insurance provided by Seller shall cover any auto for bodily injury and property damage, including owned vehicles, hired and non-owner vehicles, and employee non-ownership, and the amount of such policy shall be a minimum of $250,000.00 covering any vehicle used for the execution of the work that is the subject of this agreement.

All insurance required pursuant to this agreement, except for Worker's Compensation Insurance, shall name the Buyer as an additional insured on a claims occurred basis. All insurance required pursuant to this agreement, including Worker's Compensation Insurance, shall provide for a waiver of subrogation as to the Buyer.

The parties agree that, prior to the execution of the agreement, Seller shall provide one or more certificates of insurance showing that the requirements of this article have been met, and specifically containing, without limitations, the following endorsement:

"The City of Midland is included as an additional insured, on a claims occurred basis, on all policies except for Worker's Compensation. The Seller and Insurer hereby waive all rights of subrogation with respect to claims against the City of Midland, its agents, employees and officers, on all policies of insurance."

Buyer shall be provided the notice by Seller's insurance provider not later than thirty (30) days prior to any reduction or termination of such coverage. Buyer shall not be required to provide any insurance whatsoever pursuant to this agreement.

Seller shall contractually require all contractors, subcontractors, and sub-subcontractors that work on any portion of the work that is the subject of this agreement to obtain insurance coverage that meets or exceeds the policy requirements and minimum amounts specified herein. All contractors, subcontractors, and sub-subcontractors shall obtain insurance policies that provide blanket waivers of subrogation in favor of the City of Midland and policies that name the City of Midland as an additional insured on a claims occurred basis (except workers compensation).

24. ASSIGNMENT - Seller shall not, either directly or indirectly, assign all or any part of this agreement or any interest, right or privilege herein, without the prior written consent of the Buyer. The issue on whether or not to grant consent to an assignment is in the sole discretion of the Buyer.

25. RELEASE - NOTWITHSTANDING ANY OTHER PROVISIONS, SELLER HEREBY RELEASES, ACQUITS, RELINQUISHES AND FOREVER DISCHARGES BUYER, BUYER'S EMPLOYEES AND OFFICERS, FROM ANY AND ALL DEMANDS, CLAIMS, DAMAGES, OR CAUSES OF ACTION OF ANY KIND WHATSOEVER WHICH SELLER HAS OR MIGHT HAVE IN THE FUTURE, INCLUDING BUT NOT LIMITED TO BREACH OF CONTRACT, QUANTUM MERUIT, CLAIMS UNDER THE DUE PROCESS AND TAKINGS CLAUSES OF THE TEXAS AND UNITED STATES CONSTITUTIONS, TORT CLAIMS, OR BUYER'S NEGLIGENCE.

26. GOVERNING LAW AND VENUE - This agreement shall be governed by the laws of the State of Texas. All performance and payment made pursuant to this agreement shall be deemed to have occurred in Midland County, Texas. Exclusive venue for any claims, suits or any other action arising from or connected in any way to this agreement or the performance of this agreement shall be in Midland County, Texas. The obligations and undertakings of each of the parties to this agreement shall be deemed to have occurred in Midland County, Texas.

27. INDEPENDENT CONTRACTOR - It is expressly understood and agreed that Seller shall perform all work and services described herein as an independent contractor and not as an officer, agent, servant or employee of the Buyer; that Seller shall have exclusive control of and the exclusive right to control the details of the services and work performed hereunder, and all persons performing the same; and shall be solely responsible for the acts and omissions of its officers, agents, employees, contractors and subcontractors; that the doctrine of respondeat superior shall not apply as between Buyer and Seller, its officers, agents, employees, contractors and subcontractors; and that nothing herein shall be construed as creating a partnership or joint enterprise between Buyer and Seller. No person performing any of the work and services described hereunder by Seller shall be considered an officer, agent, servant or employee of the Buyer. Further, it is specifically understood and agreed that nothing in this agreement is intended or shall be construed as creating a "Community of Pecuniary Interest" or "An Equal Right of Control" which would give rise to vicarious liability. Seller shall be an independent contractor under this agreement and shall assume all of the rights, obligations and liabilities, applicable to it as such independent contractor hereunder. The Buyer does not have the power to direct the order in which the work is done. The Buyer shall not have the right to control the means, methods or details of the Seller's work. Seller shall assume exclusive responsibility for the work. Seller is entirely free to do the work in its own way.

28. NOTICE OF ALLEGED BREACH; STATUTORY PREREQUISITES - As a condition precedent to filing suit for alleged damages incurred by an alleged breach of an express or implied provision of this agreement, Seller or his legal representative, shall give the City Manager, or any other reasonable official of the Buyer, notice in writing (consisting of one original and seven copies of notice attached to a copy of this agreement) of such damages, duly verified, within one-hundred-twenty (120) days after the same has been sustained. The discovery rule does not apply to the giving of this notice. The notice shall include when, where and how the damages occurred, the apparent extent thereof, the amount of damages sustained, the amount for which the Seller will settle, the physical and mailing addresses of Seller at the time and date the claim was presented and the physical and mailing addresses of Seller for the six months immediately preceding the occurrence of such damages, and the names and addresses of the witnesses upon whom the Seller relies to establish its claim; and a failure to so notify the City Manager within the time and manner provided herein shall exonerate, excuse and except the Buyer from any liability whatsoever. The Buyer is under no obligation to provide notice to Seller that Seller's notice is insufficient. Buyer reserves the right to request reasonable additional information regarding the claim. Said additional information shall be supplied within thirty (30) days after receipt of notice.

The statutory prerequisites outlined herein constitute jurisdictional requirements pursuant to Section 271.154 of the Texas Local Government Code and Section 311.034 of the Texas Government Code. Notwithstanding any other provision, Seller's failure to comply with the requirements herein shall perpetually bar Seller's claim for damages under Chapter 271 of the Texas Local Government Code, and Section 311.034 of the Texas Government Code, regardless if Buyer has actual or constructive notice or knowledge of said claim or alleged damages. Seller agrees that the requirements of this entire agreement are reasonable.

29. INDEMNITY (NOT APPLICABLE TO PURCHASE AGREEMENTS) - SELLER WILL INDEMNIFY AND HOLD HARMLESS AND DEFEND BUYER AND ALL OF BUYER'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, PERSONAL INJURIES, LOSSES, PROPERTY DAMAGE AND EXPENSES OF ANY CHARACTER WHATSOEVER, INCLUDING REASONABLE ATTORNEY'S FEES,

BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF SELLER, its agents or employees, or any subcontractor, arising out of, or resulting from, Seller's use of, or activities on, the agreement premises, and Seller will be required to pay any judgment with costs which may be obtained against Buyer or any of its officers, agents or employees, including reasonable attorney's fees.

SELLER SHALL INDEMNIFY AND HOLD HARMLESS AND DEFEND BUYER AND ALL OF BUYER'S OFFICERS, AGENTS AND EMPLOYEES FROM ALL SUITS, ACTIONS, CLAIMS, DAMAGES, ACCIDENTAL DEATH, PERSONAL INJURIES, PROPERTY DAMAGE, LOSSES, AND EXPENSE OF ANY CHARACTER WHATSOEVER INCLUDING REASONABLE ATTORNEY'S FEES, BROUGHT FOR OR ON ACCOUNT OF ANY INJURIES OR DAMAGES RECEIVED OR SUSTAINED BY ANY PERSON OR PERSONS OR PROPERTY, ON ACCOUNT OF ANY NEGLIGENT ACT OF BUYER, BUYER'S OFFICERS, AGENTS AND EMPLOYEES, WHETHER SUCH NEGLIGENT ACT WAS THE SOLE PROXIMATE CAUSE OF THE INJURY OR DAMAGE OR A PROXIMATE CAUSE JOINTLY AND CONCURRENTLY WITH SELLER OR SELLER'S EMPLOYEES, AGENTS OR SUBCONTRACTORS NEGLIGENCE, IN THE EXECUTION, SUPERVISION AND OPERATIONS GROWING OUT OF OR IN ANY WAY CONNECTED WITH THE PERFORMANCE OF THIS AGREEMENT AND SELLER WILL BE REQUIRED TO PAY ANY JUDGMENT WITH COSTS WHICH MAY BE OBTAINED AGAINST BUYER OR ANY OF BUYER'S OFFICERS, AGENTS OR EMPLOYEES, INCLUDING ATTORNEY'S FEES.

30. SOVEREIGN IMMUNITY - By executing this agreement the Buyer is not waiving its right of sovereign immunity. The Buyer is retaining its immunity from suit. The Buyer is not granting consent to be sued by legislative resolution or action. **THERE IS NO WAIVER OF SOVEREIGN IMMUNITY**.

31. THIRD PARTY BENEFICIARY - The Buyer's approval of this agreement does not create a third party beneficiary. There is no third party beneficiary to this agreement. No person or entity who is not a party to this agreement shall have any third party beneficiary or other rights hereunder.

32. <u>ATTORNEY FEES</u> - BY EXECUTING THIS AGREEMENT, SELLER AGREES TO WAIVE AND DOES HEREBY KNOWINGLY, CONCLUSIVELY, VOLUNTARILY AND INTENTIONALLY WAIVE ANY CLAIM IT HAS OR MAY HAVE IN THE FUTURE AGAINST THE BUYER, REGARDING THE AWARD OF ATTORNEY'S FEES, WHICH ARE IN ANY WAY RELATED TO THE AGREEMENT, OR THE CONSTRUCTION, INTERPRETATION OR BREACH OF THE AGREEMENT. THE SELLER SPECIFICALLY AGREES THAT IF THE SELLER BRINGS OR COMMENCES ANY LEGAL ACTION OR PROCEEDING RELATED TO THIS AGREEMENT, THE CONSTRUCTION, INTERPRETATION, VALIDITY OR BREACH OF THIS AGREEMENT, INCLUDING BUT NOT LIMITED TO ANY ACTION PURSUANT TO THE PROVISIONS OF THE TEXAS UNIFORM DECLARATORY JUDGMENTS ACT (TEXAS CIVIL PRACTICE AND REMEDIES CODE SECTION 37.001, ET. SEQ., AS AMENDED), OR CHAPTER 271 OF THE TEXAS LOCAL GOVERNMENT CODE, THE SELLER AGREES TO ABANDON, WAIVE AND RELINQUISH ANY AND ALL RIGHTS TO THE RECOVERY OF ATTORNEY'S FEES TO WHICH SELLER MIGHT OTHERWISE BE ENTITLED.

SELLER AGREES THAT THIS IS THE VOLUNTARY AND INTENTIONAL RELINQUISHMENT AND ABANDONMENT OF A PRESENTLY EXISTING KNOWN RIGHT. SELLER ACKNOWLEDGES THAT IT UNDERSTANDS ALL TERMS AND CONDITIONS OF THE AGREEMENT. THE SELLER FURTHER ACKNOWLEDGES AND AGREES THAT THERE WAS AND IS NO DISPARITY OF BARGAINING POWER BETWEEN THE BUYER AND THE SELLER. THIS SECTION SHALL NOT BE CONSTRUED OR INTERPRETED AS A WAIVER OF SOVEREIGN IMMUNITY.

THE SELLER AND BUYER ARE RELYING ON THEIR OWN JUDGMENT. EACH PARTY HAD THE OPPORTUNITY TO DISCUSS THIS AGREEMENT WITH LEGAL COUNSEL PRIOR TO ITS EXECUTION.

33. CONSIDERATION - The terms of this agreement are supported by good and valuable consideration, the receipt and sufficiency of which is hereby acknowledged by the parties named herein.

34. CERTIFICATION - In accordance with the Texas Local Government Code, the City of Midland Department of Facilities and Fleet Management does hereby certify that the City of Midland is in compliance with Sections 252, 271 and all applicable sections of the Texas Local Government Code and other state law as it applies to procurement and contracting issues.

35. FEDERAL WAGE REQUIREMENTS - If applicable, the Davis-Bacon Act, 29 CFR 5.5, and any related acts or regulations are hereby incorporated by reference and made a part of this agreement and all terms and requirements under said laws, by such incorporation, are made terms and requirements of this agreement, to which the parties to this agreement have agreed to be bound.

36. COMPLIANCE WITH FEDERAL, STATE AND LOCAL LAWS - Seller shall at all times during the term of this agreement comply with applicable federal, state, and local laws regarding Seller's activities pursuant to this agreement, including but not limited to all applicable sections of the Municipal Code of Midland, Texas, as may be amended, said sections being hereby incorporated by reference and made a part of this agreement for all legal purposes. Failure to abide by any such law mentioned herein constitutes grounds for the immediate termination of this agreement.

SECTION 01 10 00 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Work covered by Contract Documents.
2. Owner furnished products.
3. Contractor's use of site and premises.

B. Related Requirements:
1. Other Division 01 Specifications apply to Work of this Section.
2. Section 01 30 00 "Administrative Requirements" for Project information management.

1.2 WORK COVERED BY CONTRACT DOCUMENTS

A. Identifiaction: Midland Utilites Service Center.
B. Location: Midland, Texas.
C. Without force or effect, Work of Project consists of 3 new pre-engineered metal buildings; a 28,130 SF, 2-story office and shop building, a 8,665-SF vehicle service shop and office and a 3,029-SF storage building and a free-standing 1358-SF drive-through vehicle wash bay with load-bearing CMU walls.

1.3 WORK BY OWNER

A. Following Items will be furnished and installed by Owner after date of Substantial Completion:
1. Items noted 'NIC' (Not in Contract).
2. Moveable cabinets.
3. Furnishings.
4. Minor Equipment.

1.4 OWNER FURNISHED PRODUCTS

A. Owner's equipment to be reloacted by Contractor:
1. Indicated by OFCI in the Drawings.

B. Owner's Responsibilities:
1. On delivery, inspect products jointly with Contractor.

C. Contractor's Responsibilities:
1. Review Owner's equipment and product data.
2. Pick-up Owner's shop equipment and deliver to site. Inspect for completeness or damage, jointly with Owner.
3. Handle, store, install and provide final utility hook-up to equipment.
4. Repair or replace items damaged.

1.5 CONTRACTOR USE OF SITE AND PREMISES

A. Limits on Use of Site and premises to allow:
1. Owner occupancy. Fueling station will remain in operation.

1.6 OWNER OCCUPANCY

A. Owner's fueling station will remain operational during construction. Hours of operation: 24 hours per day 7 days per week.
B. Cooperate with Owner to minimize conflict, and facilitate Owner's operations.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 20 00 - PRICE AND PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Material allowances.
   2. Contingency allowance.
   3. Inspection and testing allowances.
   4. Schedule of Values.
   5. Application for Payment.
   6. Change Procedures.
   7. Alternates.

B. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 30 00 "Administrative Requirements" for Project information management.
   3. Section 01 33 00 "Submittal Procedures" for Schedule of Values.
   4. Section 01 60 00 "Product Requirements" for product substitutions.

1.2 MATERIAL ALLOWANCES

A. Costs Included in Material Allowances: Cost of product (materials and equipment) to Contractor or subcontractor, less applicable trade discounts, delivery to site, and applicable taxes.

B. Costs Not Included in Material Allowance, but included in Contract Sum/Price: Handling at site, including unloading, uncrating, and storage; protection of products from elements and from damage, labor, payroll (including taxes, benefits, pensions, insurance and other employee wage costs) installation and finishing costs, bonds, project insurance (workers comp, auto, general liability, builders risk and other insurance required by the Owner/Contractor agreement overhead, profit, and other expenses contemplated for stated allowance amounts.

C. Architect Responsibilities:
   1. Consult with Contractor in consideration and selection of product, suppliers.
   2. Select products in consultation with Owner and transmit decision to Contractor.
   3. Prepare Change Order.

D. Contractor Responsibilities:
   1. Assist Architect in selection of product and suppliers.
   2. Obtain proposals from suppliers and offer recommendations.
   3. On notification of selection by Architect, execute purchase agreement with designated supplier.
   4. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
   5. Promptly inspect products upon delivery for completeness, damage, and defects. Submit claims for transportation damage.

E. Funds will be drawn from Cash Allowances only by Change Order.

F. At closeout of Contract, funds remaining in Cash Allowances will be credited to Owner by Change Order.

1.3 CONTINGENCY ALLOWANCE

A. Include stipulated sum of $640,000.00 for use upon Owner's instruction.
B. Costs Included in Contingency Allowance: Contractor's costs for products, equipment, delivery, installation, labor, payroll (including taxes, benefits, pensions, insurance and other employee wage costs), applicable taxes, and equipment rental; handling at site, including unloading, uncrating, and storage; protection of products from elements and from damage; finishing costs.
C. Costs Not Included in Contingency Allowance, but included in Contract Sum/Price: Bonds, project insurance (workers comp, auto, general liability, builders risk and other insurances required by the Owner/Contractor agreement), overhead, profit, and other expenses contemplated for stated allowance amounts.
D. Funds will be drawn from Contingency Allowance only by Change Order.
E. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.4 INSPECTION AND TESTING ALLOWANCES

A. Costs Included in Allowances: Cost of engaging an inspection or testing firm, execution of inspection or tests, and reporting results.
B. Costs Not Included in Allowance but Included in Contract Sum/Price:
    1. Incidental labor and facilities required to assist inspection or testing firm.
    2. Costs of testing laboratory services required by Contractor separate from Contract Document requirements.
    3. Costs of retesting upon failure of previous tests as determined by Architect.
C. Payment Procedures:
    1. Submit inspection or testing firm's invoice with next application for payment.
    2. Pay invoice on approval by Architect.
D. Inspection and Testing Allowances: Include stipulated sum of $2,500.00 for payment of testing laboratory services.
E. Funds will be drawn from Inspection and Testing Allowances only by Change Order.
F. At closeout of Contract, funds remaining in Inspection and Testing Allowances will be credited to Owner by Change Order.

1.5 SCHEDULE OF VALUES

A. Submit typed schedule on AIA Form G703 - Application and Certificate for Payment Continuation Sheet.
B. Submit Schedule of Values in duplicate within 15 days after date established in Notice to Proceed or of Owner-Contractor Agreement, whichever is sooner.
C. Format: Utilize Table of Contents of this Project Manual. Identify each line item with number and title of major specification Section, separating labor and material for each line item. Identify site mobilization, general conditions, testing, bonds, and insurance as separate line items.
D. Include in each line item amount of Allowances specified in this Section.
E. Include within each line item, a directly proportional amount of Contractor's overhead and profit.
F. Revise schedule to list approved Change Orders, with each Application for Payment.

1.6 APPLICATIONS FOR PAYMENT

A. Submit notarized application on AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet.
B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.
C. Deposits on Material, Equipment or Products:
   1. Material/Equipment Deposits: Owner will not pay for deposits for material, equipment or products that may be required of the Contractor in order to start the fabrication process of work that will eventually be incorporated into the Project but are not actually on the Project site. All material, equipment or products must be on the Project site and properly stored before the Owner will make payment to the Contractor.
   2. The Owner will make payment for materials, equipment or products that are properly delivered and stored on the Project site for subsequent incorporation into the Project as authorized in the Owner-Contractor Agreement.
   3. Owner may consider payment of materials, equipment or products that are properly stored, secured and insured in a third party warehouse within a 50 mile radius of the Project site that are in accordance with the requirements and authorized in the Owner-Contractor Agreement.
D. Payment Period: As defined in Owner-Contractor agreement.
E. A complete application for payment includes 1 copy of waiver of liens from each subcontractor, Construction progress schedule, and submittal schedule, all which are required to process the Application for Payment.

1.7 CHANGE PROCEDURES

A. Architect will advise of minor changes in Work not involving an adjustment to Contract Sum/Price or Contract Time as authorized by Owner/Contractor Agreement by issuing Architect's Supplemental Instructions on Architect's Standard Supplemental Instruction form.
B. Architect may issue a Construction Change Request which includes a detailed description of a proposed change with supplementary or revised Drawings and Specifications and a change in Contract Time for executing change. Contractor will prepare and submit an estimate within 7 days.
C. Contractor may propose a change by submitting request for change to Architect. Include reason for change and effect on Contract Sum/Price, Contract Time, and subcontractors. Document requested substitutions in accordance with Section 01 60 00 "Product Requirements."
D. Stipulated Sum/Price Change Order: Based on Proposal Request and Contractor's fixed price quotation or Contractor's request for a Change Order as approved by Architect.
E. Construction Change Directive: Architect may issue a directive, on AIA Form G713 Construction Change Directive signed by Owner, instructing Contractor to proceed with a change in Work, for subsequent inclusion in a Change Order. Document will describe changes in Work, and designate method of determining any change in Contract Sum/Price or Contract Time. Promptly execute change.
F. Time and Material Change Order:
   1. Submit itemized account and supporting data after completion of change, within time limits indicated in Conditions of the Contract.
   2. Architect will determine change allowable in Contract Sum/Price and Contract Time as provided in Contract Documents.

3. Maintain detailed records of work done on Time and Material basis.
4. Provide full information required for evaluation of proposed changes, and to substantiate costs for changes in Work.

G. Change Order Forms: AIA G701 Change Order.

H. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in Conditions of the Contract.

I. Change Order: Furnish an itemized breakdown, in form acceptable to Architect of costs and supporting information including but not limited to quantities and material prices. Tier subcontracted work performed at labor rates, employer payments, and rental rates. Itemize breakdown detail shall be same for subcontractor work. Provide complete supporting information for profit and overhead or markups used when requested. Consider the following items a part of overhead or Contractor¢s and subcontractor¢s mark-up and do not include as separate cost item: Labor for Superintendents, Assistant Superintendents, home office personnel, timekeepers, and maintenance mechanics at any level of contracting; individual pieces of equipment, hand tools or instruments having a new value of $500.00 or less, whether or not consumed by use; on site and main offices; modification to record Contract Documents; nor guarantee period costs.

1.8 MEASUREMENT AND PAYMENT - UNIT PRICES

A. Authority: Measurement methods are delineated in individual Specification Sections.

B. Take measurements and compute quantities. Architect will verify measurements and quantities.

C. Architect will take measurements and compute quantities accordingly. Provide and assist in taking measurements.

D. Payment Includes: Full compensation for required labor, products, tools, equipment, plant, transportation, services, and incidentals; erection, application or installation of an item of Work; insurance, overhead, and profit.

E. Defect Assessment: Replace Work, or portions of Work, not conforming to specified requirements. If Owner agrees that it is not practical to remove and replace Work, Architect will direct an appropriate remedy or adjust payment.

1.9 ALTERNATES

A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected by Owner. Accepted Alternates will be identified in Owner-Contractor Agreement.

B. Coordinate related Work and modify surrounding Work as required.

C. Schedule of Alternates:
1. Alternate No. 1: Mezzanine. As shown on Sheets A-113, E-104 and specified in Section 13 44 00 "Mezzanine Systems."

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 30 00 - ADMINISTRATIVE REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Electronic drawing file (digital data) request.
   2. Submittal schedule.

B. Related Sections:
   1. Other Division 01 Specification Sections apply to Work of this Section.

1.2 ELECTRONIC DRAWING FILE (DIGITAL DATA) REQUEST

A. During Procurement Phase:
   1. Bidders and Proposers may purchase a Digital Data file. Digital Data file will be provided in software release currently used by Primary Designer. File will be provided via Primary Designer's Project website.
   2. AutoCAD drawing files (.dwg) are available for purchase from Primary Designer upon request. Cost of files are indicated below plus applicable tax.
      a. 1 - 3 Sheets: $100.00 per sheet.
      b. 4 - 6 Sheets: $400.00 per sheet.
      c. 7 - 9 Sheets: $500.00 per sheet.
   3. Revit® BIM Model files (.rvt) are available for purchase from Primary Designer upon request. Cost of model files are $150.00 for each model plus applicable tax. All details, detail annotation, and references are omitted and not part of the Model file.
   4. Prior to delivery of file(s), purchaser shall sign a Digital Data Licensing Agreement. Payment for Digital Data file(s) shall occur upon delivery of file to purchaser.
   5. Digital Data file(s) shall be used only for preparing Bids and Proposals required by this Project and shall not be used in any other form, in whole or in part.

B. Upon Award of Contract:
   1. At the pre-construction meeting, Contractor shall bring the executed Digital Data Licensing Agreement (AIA C106-2013) at the end of this Sectionfor the release of electronic files. Upon Contractor submitting the executed Agreement to the Primary Designer, the Primary Designer will provide the Contractor 1 electronic copy of the Revit®BIM Model file(s), AutoCAD (.dwg) file(s), when Revit®BIM Model file is not available, and Portable Document Format (.pdf) file(s) **at no charge** within 5 working days. **Note that CAD files associated with the work can be accessed and exported from the Revit®BIM Model provided to the Contractor through the use of Revit®software; therefore, individual CAD files will not be provided by the Primary Designer.** Files and Formats to be as follows:
      a. Civil: Overall master file in AutoCAD format.
         1) Overall Site Plan with utility and grading information.
         2) All details, detail annotation and references are omitted and not part of the AutoCAD file.
      b. Landscape: Overall master file in AutoCAD format.
         1) Overall Site Plan with grading, flatwork, irrigation, and planting plans.
         2) All details, detail annotation and references are omitted and not part of the AutoCAD file.

c. Structural: Revit®BIM Model and associated working plan views.
   1) Overall Site Plan with utility and grading information.
   2) All details, detail annotation and references are omitted and not part of the AutoCAD file.

d. Architectural/Interior: Revit®BIM Model and associated working plan views.
   1) Plan views contain overall and enlarged section plan view set-up of floor plan, floor patterns, reflected ceiling and roof plans only. All plan views contain grids, dimensions, room names, and general annotation.
   2) Reflected Ceiling Plans contain ceiling grids and types only. Lighting and Mechanical are provided as part of the MEP Model.
   3) Roof Plans contain grids and general annotation only. Mechanical is provided as part of the MEP Model.
   4) Interior and exterior elevations and schedules.
   5) Finish plans and finish schedules.
   6) All details, detail annotation and references are omitted and not part of the model file.

e. Mechanical, Electrical, and Plumbing: Revit®BIM Model and associated working plan views.
   1) Plan views contain overall and enlarged plan section view set-up of mechanical, electrical lighting, electrical power, and plumbing plans only.
   2) All details, detail annotation and references are omitted and not part of the model file.

f. Other Disciplines: Revit®BIM Model and associated working plan views.
   1) Plan views contain overall and enlarged plan section view set-up showing all device locations and general annotation.
   2) All details, detail annotation and references are omitted and not part of the model file.

2. The Revit®BIM Model file provided to the Contractor is NOT FOR CONSTRUCTION PURPOSES, but for convenience only. This BIM Model will consist of the original model utilized for base bid. It is the responsibility of the Contracor to coordinate all accepted alternates, addenda, Request for Information, Porposal Requests, and any other changes realized during the procurement and construction phases. The Primary Designer will not provide up-to-date Contract Documents or updated BIM Models to the Contractor unless otherwise stated within the Owner/Primary Designer Agreement.

3. Conformed Construction Documents: If Conformed Construction Documents are required by the Owner/Primary Designer Agreement, they will be provided in PDF. Conformed Construction Documents are the Drawings and Specifications modified to include any Addenda issued before execution of the Contract.
    a. To the extent Conformed Construction Documents are provided to the Contractor, the following provisions shall apply:
        1) The Conformed Construction Documents and related information contained therein, are provided for Contractor's convenience only, and does not relieve the Contractor from the requirements of the Contract Documents. Specifically, to the extent that any discrepancy or conflict exists between the Issue for Bid documents, including any Addenda issued prior to execution of the Contact or Modifications issued after the execution of the Contact on the one hand, and the Conformed Construction Documents on the other; the Issue for Bid documents, Addenda, and Modifications shall control unless otherwise specified in writing by the Primary Designer.
        2) Contractor shall not use such drawings, documents, or other data, in whole or in part, for any purpose or project other than this Project in the preparation of Shop Drawings and other submittals.
        3) Contractor acknowledges that such drawings, documents, and other data are subject to change or modification. Contractor shall be responsible for updating any drawings, documents, or other data obtained prior to use by them for any purpose.
        4) Any Conformed Construction Documents, including any Drawings, Specifications, documents, or other data related thereto are provided "as is" without representation or warranty by Primary Designer, either expressed or implied.
        5) Contractor acknowledges that Conformed Construction Documents provided by Primary Designer are as a courtesy to Contractor, at their specific request, and accordingly, CONTRACTOR HEREBY AGREES TO RELEASE, HOLD HARMLESS, DEFEND AND INDEMNIFY PRIMARY DESIGNER AND OWNER FROM ANY AND ALL CLAIMS, DEMANDS, OR CAUSES OF ACTION, WHICH CONTRACTOR OR ANY THIRD PARTY MAY HAVE BY REASON OF ANY INJURY OR DAMAGE SUSTAINED BY CONTRACTOR OR THIRD PARTY ARISING OUT OF OR IN ANY WAY RELATED TO THE USE OF SUCH CONFORMED CONSTRUCTION DOCUMENTS.

1.3 SUBMITTAL SCHEDULE

A. Prepare submittal schedule in accordance with General Conditions of the Contract for Construction.
B. Include in submittal schedule all submittals and samples required by all section of this Project Manual and any additional submittals required by the Contractor to construct the Project.
C. Submit submittal schedule for Architect's review within 15 days after date established in Notice to Proceed or with the first Application for Payment, whichever is sooner. Failure to submit submittal schedule with the first Application for Payment will be cause for not processing Application for Payment.

PART 2 - PRODUCTS

2.1 EQUIPMENT ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Motors: Specific motor type is specified in individual Specification Sections.
B. Wiring Terminations: Provide terminal lugs to match branch circuit conductor quantities, sizes, and materials indicated. Size terminal lugs to NFPA 70, include lugs for terminal box.
C. Cord and Plug: Provide minimum 6-foot cord and plug including grounding connector for connection to electric wiring system. Cord of longer length is specified in individual Specification Sections.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
B. Examine and verify specific conditions described in individual Specification Sections.
C. Verify that utility services are available, of correct characteristics, and in correct location.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.
B. Seal cracks or openings of substrate prior to applying next material or substance.
C. Apply any manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

END OF SECTION

AIA® Document C106™ – 2013

Digital Data Licensing Agreement

AGREEMENT made as of the day of in the year
(In words, indicate day, month and year.)

BETWEEN the Party transmitting Digital Data ("Transmitting Party"):
(Name, address and contact information, including electronic addresses)

Parkhill.

and the Party receiving the Digital Data ("Receiving Party"):
(Name, address and contact information, including electronic addresses)

for the following Project:
(Name and location or address)

The Transmitting Party and Receiving Party agree as follows.

TABLE OF ARTICLES

1 GENERAL PROVISIONS

2 TRANSMISSION OF DIGITAL DATA

3 LICENSE CONDITIONS

4 LICENSING FEE OR OTHER COMPENSATION

5 DIGITAL DATA

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 The purpose of this Agreement is to grant a license from the Transmitting Party to the Receiving Party for the Receiving Party's use of Digital Data on the Project, and to set forth the license terms.

§ 1.2 This Agreement is the entire and integrated agreement between the parties. Except as specifically set forth herein, this Agreement does not create any other contractual relationship between the parties.

ADDITIONS AND DELETIONS:
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

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§ 1.3 For purposes of this Agreement, the term Digital Data is defined to include only those items identified in Article 5 below.

§ 1.3.1 Confidential Digital Data is defined as Digital Data containing confidential or business proprietary information that the Transmitting Party designates and clearly marks as "confidential."

ARTICLE 2 TRANSMISSION OF DIGITAL DATA

§ 2.1 The Transmitting Party grants to the Receiving Party a nonexclusive limited license to use the Digital Data identified in Article 5 solely and exclusively to perform services for, or construction of, the Project in accordance with the terms and conditions set forth in this Agreement.

§ 2.2 The transmission of Digital Data constitutes a warranty by the Transmitting Party to the Receiving Party that the Transmitting Party is the copyright owner of the Digital Data, or otherwise has permission to transmit the Digital Data to the Receiving Party for its use on the Project in accordance with the terms and conditions of this Agreement.

§ 2.3 If the Transmitting Party transmits Confidential Digital Data, the transmission of such Confidential Digital Data constitutes a warranty to the Receiving Party that the Transmitting Party is authorized to transmit the Confidential Digital Data. If the Receiving Party receives Confidential Digital Data, the Receiving Party shall keep the Confidential Digital Data strictly confidential and shall not disclose it to any other person or entity except as set forth in Section 2.3.1.

§ 2.3.1 The Receiving Party may disclose the Confidential Digital Data as required by law or court order, including a subpoena or other form of compulsory legal process issued by a court or governmental entity. The Receiving Party may also disclose the Confidential Digital Data to its employees, consultants or contractors in order to perform services or work solely and exclusively for the Project, provided those employees, consultants and contractors are subject to the restrictions on the disclosure and use of Confidential Digital Data as set forth in this Agreement.

§ 2.4 The Transmitting Party retains its rights in the Digital Data. By transmitting the Digital Data, the Transmitting Party does not grant to the Receiving Party an assignment of those rights; nor does the Transmitting Party convey to the Receiving Party any right in the software used to generate the Digital Data.

§ 2.5 To the fullest extent permitted by law, the Receiving Party shall indemnify and defend the Transmitting Party from and against all claims arising from or related to the Receiving Party's modification to, or unlicensed use of, the Digital Data.

ARTICLE 3 LICENSE CONDITIONS

The parties agree to the following conditions on the limited license granted in Section 2.1:
(State below rights or restrictions applicable to the Receiving Party's use of the Digital Data, requirements for data format, transmission method or other conditions on data to be transmitted.)

This Digital Data is part of the Transmitting Party's Instruments of Service and shall not be used by Receiving Party or anyone else receiving this data through or from the Receiving Party for any purpose other than as a convenience in the preparation of bid submittals, shop drawings, coordination drawings, construction phase submittals, and field layout and staking required by the Owner for the exclusive use of the referenced Project. Any use or reuse by the Receiving Party or by others will be at the Receiving Party's sole risk and without liability or legal exposure to Transmitting Party. The Receiving Party agrees to make no claim and hereby waive, to the fullest extent permitted by law, any claim or cause of action of any nature against Transmitting Party, its officers, directors, employees, or subconsultants that may arise out of or in connection with Receiving Party's use of this Digital Data.
Receiving party or any third party, to the fullest extent permitted by law, shall indemnify and hold harmless the Transmitting Party against all damages, liabilities or costs, including reasonable attorney's fees and defense costs arising out of or resulting from Receiving Party or any third parties use of this Digital Data.

No representation as to the compatibility of this Digital Data with Receiving Party's hardware or software is provided.

This Digital Data is not a Construction Document. Differences may exist between this Digital Data and corresponding two-dimensional hard-copy Construction Document. The Transmitting Party makes no representation regarding the

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User Notes: (862876232)

accuracy or completeness of the Digital Data the Receiving Party receives. In the event that a conflict arises between the signed/sealed two-dimensional hard-copy Construction Document prepared by Transmitting Party and the Digital Data, the signed/sealed two-dimensional hard-copy Construction Document shall govern. The Receiving Party is responsible for determining if any conflict exists. By the Receiving Party's use of this Digital Data, Receiving Party is not relieved of their duty to fully comply with the Contract Documents, including, and without limitation, the need to check, confirm and coordinate all dimensions and details, field measurements, verify field conditions and coordination of work with that of other contractors for the Project.

Because information presented in the Digital Data can be modified, unintentionally or otherwise, the Transmitting Party reserves the right to remove all indicia of ownership and/or involvement from each Digital Data.

Under no circumstances shall delivery of this Digital Data for use by the Receiving Party be deemed a sale of document ownership by Transmitting Party, and no warranties, either express or implied, of merchantability or fitness for any particular purpose is made. In no event shall the Transmitting Party be liable for any loss of profit or any consequential damages as a result of the Receiving Party's use or reuse of this Digital Data.

The Digital Data file does not necessarily contain all the information that is required to produce finished Construction Documents. Because of this, there may be data within the Digital Data that is missing, incomplete or even contradictory to the information provided in the final two dimensional Construction Documents.

Professional judgment will need to be used by the Receiving Party, along with reasonable expectations and interpretations in order to use the Digital Data for its intended purpose. Should the Transmitting Party provide revised and updated copies of the Digital Data to the Receiving Party throughout the Project, all terms and conditions of this agreement will be applicable and unchanged for all subsequent transmissions of the Digital Data.

ARTICLE 4 LICENSING FEE OR OTHER COMPENSATION

The Receiving Party agrees to pay the Transmitting Party the following fee for the Receiving Party's use of the Digital Data:
(State the fee, in dollars, or other method by which the Receiving Party will compensate the Transmitting Party for the Receiving Party's use of the Digital Data.)

DURING PROCUREMENT PHASE

.dwg Files
1-3 Sheets $125.00 per sheet plus applicable tax
4-6 Sheets $500.00 flat fee plus applicable tax
7-9 Sheets $700 flat fee plus applicable tax

.rvt Files
Revit Models are $300.00 per model plus applicable tax

UPON AWARD OF CONTRACT:
No service fee will be required for delivery of the electronic file(s).

ARTICLE 5 DIGITAL DATA

The Parties agree that the following items constitute the Digital Data subject to the license granted in Section 2.1:
(Identify below, in detail, the information created or stored in digital form the parties intend to be subject to this Agreement.)

[Revit Models (.rvt files)]
[AutoCAD (.dwg files)]
[Portable Document Format (.pdf)]

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This Agreement is entered into as of the day and year first written above and will terminate upon Substantial Completion of the Project, as that term is defined in AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise agreed by the parties and set forth below.
(Indicate when this Agreement will terminate, if other than the date of Substantial Completion.)

None

PARKHILL

TRANSMITTING PARTY *(Signature)*

(Printed name and title)

RECEIVING PARTY *(Signature)*

(Printed name and title)

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SECTION 01 33 00 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Submittal procedures.
   2. Resubmittal requirements.
   3. Construction progress schedules.
   4. Proposed products list.
   5. Shop drawings.
   6. Product data.
   7. Samples.
   8. Design data.
   9. Test reports.
   10. Certificates.
   11. Manufacturers' instructions.
   12. Manufacturers' field reports.
   13. Erection drawings.

B. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 20 00 "Price and Payment Procedures" for Schedule of Values; Inspecting and Testing Allowances.
   3. Section 01 30 00 "Administrative Requirements" for Project information management.
   4. Section 01 40 00 "Quality Requirements" for manufacturers' field services and reports; Testing Laboratory Services.
   5. Section 01 70 00 "Execution and Closeout Requirements" for Contract warranty, manufacturer's certificates, and closeout submittals.

1.2 SUBMITTAL PROCEDURES

A. Submit to Architect for review for limited purpose of checking for conformance with information given and design concept expressed in Contract Documents.

B. Produce copies and distribute in accordance with this Article.

C. Use Project website to submit record documents as described in Section 01 70 00 "Execution and Closeout Requirements."

D. Transmit each submittal separately with Contractor's standard transmittal letter including Contractor's name, address, and phone number. Each submittal shall contain only 1 Specification Section.

E. Sequentially number transmittal forms using Section number or Contractors other sequential numbering system.

F. Identify Project, Contractor, subcontractor, or supplier; pertinent drawing sheet and detail number(s), and Specification Section number appropriate to submittal.

G. Apply Contractor's stamp, signed or initialed certifying that review, verification of products required, field dimensions, adjacent construction Work, and coordination of information, is in accordance with requirements of Work and Contract Documents.

H. Schedule submittals to expedite Project, and deliver to Architect. Coordinate submission of related items.

I. For each submittal for review, allow 15 days excluding delivery time to and from Contractor.
J. Identify variations from Contract Documents and product or system limitations which may be detrimental to successful performance of completed Work. Information, comments, field verifications, responses, or other notations marked on submittals by Contractor shall be done in blue or green colors only.
K. Allow space on submittals for Contractor and Architect's review stamps.
L. Distribute copies of reviewed submittals to concerned parties. Instruct parties to promptly report any inability to comply with provisions.
M. Submittals not requested will not be recognized or processed.
N. Format:
    1. Submit all submittals digitally using .PDF file extension. Each submittal shall be a single .PDF file including transmittal letter. Multiple files for same submittal will not be accepted.
    2. Submittals in any other format, including .ZIP files, will be rejected.
    3. Hard copies will not be accepted.
    4. To ensure each page is legible, .PDF pages of drawings shall be same size/scale as a hard copy. Where applicable, scale symbols should be provided to indicate scale. Illegible submittals will be rejected.
    5. Uploaded submittals to Project website.
O. Submittal procedures described in this Article applies to construction progress schedule, products list, shop drawings, product data, samples (actual samples and digital files of same), design data, test reports, certificates, manufacturer's instructions and field reports, erection drawings, and any other type of submittal submitted to Architect.

1.3 RESUBMITTAL REQUIREMENTS

A. Revise and resubmit submittals, as required, and resubmit to meet requirements as specified and as noted on submittal reviews.
B. Mark as RESUBMITTAL.
C. Re-use original transmittal number and supplement with sequential alphabetical or numeric suffix for each re-submittal.

1.4 CONSTRUCTION PROGRESS SCHEDULES

A. Submit initial progress schedule for Architect's review within 15 days after date established in Notice to Proceed or with the first Application for Payment, whichever is sooner.
B. Revise and resubmit as required.
C. Submit revised schedule with each Application for Payment, identifying changes since previous version.
D. Submit a horizontal bar chart with separate line for each section of Work, identifying first work day of each week.
E. Indicate product/material manufacturer's lead-time for delivery to site. Include as a separate line for each product/material.
F. Show complete sequence of construction by activity, identifying Work of separate stages and other logically grouped activities. Indicate early and late start, early and late finish, float dates, and duration.
G. Indicate estimated percentage of completion for each item of Work at each submission.
H. Dates reviewed submittals will be required from Architect. Indicate decision dates for selection of finishes. Submit separate schedule of submittal dates for following:
    1. Shop Drawings.
    2. Product data.

3. Samples.
4. Owner furnished products.
5. Products identified under Allowances.

I. Determine appropriate lead times to allow for manufacturing and delivery of products/material for incorporation into Work. Indicate product/material manufacturer's lead-time for manufacturing and delivery to site. Include as a separate line for each product/material. Failure to timely submit and process submittals, and ordering of products/materials for delivery to site will not be grounds for approval of substitutions for other products/materials.

J. Revisions to Schedules:
1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
3. Prepare narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect including effect of changes on schedules of separate contractors.

1.5 PROPOSED PRODUCTS LIST

A. Within 15 days after date of Notice to Proceed, submit complete list of major products proposed for use, with name of manufacturer, trade name, and model number of each product.

B. For products specified only by reference standards, give manufacturer, trade name, model or catalog designation, and reference standards.

1.6 SHOP DRAWINGS

A. Indicate special utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

B. Printable Image Size: Minimum 8-1/2 by 11 inches and maximum 30 by42 inches.

C. Draw details to a minimum scale of 1/2-inch equal to 1-foot.

D. Draw site plans to same scale indicated on Contract Drawings.

E. Draw other plans to a minimum scale of 1/8-inch equal to 1-foot.

F. Construction Documents (electronic or paper format) issued by Architect cannot be used in any shape, form, or fashion in creation and development of shop Drawings, except that electronic files containing floor plans or site plans which have been acquired from Architect may be used as backgrounds for Contractor, subcontractors, sub-subcontractors, and material suppliers in shop Drawing process.

G. In creation and publication of shop Drawings, under no circumstances shall Design Professional's seal or title block of Drawing be reproduced. Shop Drawings must be original Works from Contractor, subcontractors, sub-subcontractors, and material suppliers.

1.7 PRODUCT DATA

A. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information unique to this Project.

B. Include recommendations for application and use, and reference to compliance with specified standards of trade associations and testing agencies.

C. Include notation of special coordination requirements for interfacing with adjacent work and building utilities where applicable.

D. After review, distribute in accordance with "Submittal Procedures" Article above and provide copies for Record Documents described in Section 01 70 00 "Execution and Closeout Requirements."

1.8 SAMPLES

A. Submit samples to illustrate functional and aesthetic characteristics of product, with integral parts and attachment devices. Accompany physical sample with color digital image (photo or scanned .PDF) of sample. Coordinate sample submittals for interfacing work.
B. Unless otherwise specified, submit samples of finishes from manufacturers' full range of standard colors, textures, and patterns, for Architect's selection.
C. Where variations in color, pattern, or texture are inherent in material or product, submit multiple samples to indicate approximate range or variations.
D. Include full Project information and identification of manufacturer, model number, type, style and color on each sample.
E. Submit number of samples specified in individual Specification Sections; 2 of which will be retained by Architect.
F. Reviewed samples which may remain as part of Work are indicated in individual Specification Sections.
G. Samples will not be used for testing purposes unless specifically stated in individual Specification Sections.

1.9 DESIGN DATA

A. Submit for Architect's knowledge as Contract Administrator or for Owner.
B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.10 TEST REPORTS

A. Submit for Architect's knowledge as Contract Administrator or for Owner.
B. Submit test reports for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.11 CERTIFICATES

A. When specified in individual Specification Sections, submit certification by manufacturer, installation/application subcontractor, or Contractor to Architect.
B. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
C. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

1.12 MANUFACTURER'S INSTRUCTIONS

A. When specified in individual Specification Sections, submit manufacturers' printed instructions for delivery, storage, assembly, installation, startup, adjusting, and finishing.
B. Identify conflicts between manufacturers' instructions and Contract Documents.
C. Indicate special procedures, conditions requiring special attention and special environmental criteria required for application or installation.

1.13 MANUFACTURER'S FIELD REPORTS

A. Submit reports for Architect's benefit as Contract Administrator or for Owner.
B. Submit report within 30 days of observation to Architect for information.
C. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.

1.14 ERECTION DRAWINGS

A. Submit drawings for Architect's benefit as Contract Administrator or for Owner.
B. Submit for information for limited purpose of assessing conformance with information given and design concept expressed in Contract Documents.
C. Data indicating inappropriate or unacceptable Work may be subject to action by Architect or Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 40 00 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Quality control and control of installation.
   2. Tolerances.
   3. References.
   4. Mockup requirements.
   5. Testing and Inspection services.
   6. Manufacturers' field services.
   7. Examination.
   8. Preparation.

B. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 30 00 "Administrative Requirements" for Project information management.
   3. Section 01 33 00 "Submittal Procedures" for submission of manufacturers' instructions and certificates.
   4. Section 01 60 00 "Product Requirements" for requirements for material and product quality.

1.2 QUALITY CONTROL AND CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.
B. Comply with manufacturers' instructions, including each step in sequence.
C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
D. Comply with specified standards as a minimum quality for Work except when more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
E. Perform Work by persons qualified to produce workmanship of specified quality.
F. Verify field measurements are as indicated on shop drawings or as instructed by manufacturer.
G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 TOLERANCES

A. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
B. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Architect before proceeding.
C. Adjust products to appropriate dimensions; position before securing in place.

1.4 REFERENCES

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of standard, except when more rigid requirements are specified or are required by applicable codes.
B. Conform to reference standard by date of issue current on date of Contract Documents, except where a specific date is established by Code.
C. Obtain copy of standards when required by Specification Section.
D. Neither contractual relationship, duties, nor responsibilities of parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

1.5 MOCKUP REQUIREMENTS

A. Tests will be performed under provisions identified in this Section and identified in respective product Specification Sections.
B. Assemble and erect specified items, with specified attachment and anchorage devices, flashings, seals, and finishes.
C. Accepted mockups shall be comparison standard for quality level for Work.
D. Where mockup has been accepted by Architect and is specified in individual Specification Sections to be removed, remove mockup and clear area.

1.6 TESTING AND INSPECTION SERVICES

A. Owner will appoint, employ, and pay for specified services of an independent firm to perform inspection and testing.
B. Owner will appoint and employ services of an independent firm to perform inspection and testing. Contractor shall pay for services from cash allowance(s) specified in Section 01 20 00 "Price and Payment Procedures."
C. Employ and pay for services of an independent testing agency or laboratory meeting requirements specified in Section 01 43 26 "Testing Laboratory Services."

D. The independent firm will perform inspections, tests, and other services specified in individual Specification Sections and as required by Architect or Owner.
E. Testing, inspections and source quality control may occur on or off Project site. Perform off-site testing as required by Architect or Owner.
F. Submit independent testing laboratory firms reports to Architect. Reports to include observations and results of tests and will indicate compliance or non-compliance with Contract Documents.
G. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, provide safe access to Project site, and provide assistance by incidental labor as requested.
    1. Notify Owner, Architect and independent firm 48 hours prior to expected time for operations requiring services.
    2. Pay for additional samples and tests required for Contractor's use.
H. Employment of independent testing agency or laboratory does not relieve Contractor from performing Work to Contract requirements.
I. Re-testing and/or re-inspection required because of non-conformance to specified requirements will be charged to Contractor by deducting re-testing and/or re-inspection charges from Contract Sum/Price.

1.7 MANUFACTURERS' FIELD SERVICES

A. When specified in individual Specification Sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, and startup of equipment, test, adjust, and balance of equipment as applicable, and to initiate instructions when necessary.
B. Submit qualifications of observer to Architect 30 days in advance of required observations. Observer subject to approval of Architect.
C. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.
D. Refer to Section 01 33 00 "Submittal Procedures," "Manufacturer's Field Reports" Article.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
B. Verify existing substrate is capable of structural support or attachment of new Work being applied or attached.
C. Examine and verify specific conditions described in individual Specification Sections.
D. Verify utility services are available, of correct characteristics, and in correct locations.

3.2 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.
B. Seal cracks or openings of substrate prior to applying next material or substance.
C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying new material or substance in contact or bond.

END OF SECTION

SECTION 01 42 00 - REFERENCES

PART 1 - GENERAL

1.1 SUMMARY

A. Related Requirements: Other Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.
B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
H. "Provide": Furnish and install, complete and ready for the intended use.
I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.3 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
    1. For standards referenced by applicable building codes, comply with dates of standards as listed in building codes.
C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
    1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.4 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Abbreviations and acronyms not included in this list shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States." The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. ANSI - American National Standards Institute; www.ansi.org.
21. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
22. APA - APA - The Engineered Wood Association; www.apawood.org.
23. APA - Architectural Precast Association; www.archprecast.org.
24. API - American Petroleum Institute; www.api.org.
25. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
26. ARI - American Refrigeration Institute; (See AHRI).
27. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
28. ASCE - American Society of Civil Engineers; www.asce.org.
29. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
30. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
31. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.

32. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
33. ASSP - American Society of Safety Professionals (The); www.assp.org.
34. ASTM - ASTM International; www.astm.org.
35. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
36. AVIXA - Audiovisual and Integrated Experience Association; (Formerly: Infocomm International); www.soundandcommunications.com.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CE - Conformite Europeenne; www.ec.europa.eu/growth/single-market/ce-marking.
51. CEA - Canadian Electricity Association; www.electricity.ca.
52. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
53. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
54. CGA - Compressed Gas Association; www.cganet.com.
55. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
56. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
57. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
58. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
59. CPA - Composite Panel Association; www.compositepanel.org.
60. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
61. CRRC - Cool Roof Rating Council; www.coolroofs.org.
62. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
63. CSA - CSA Group; www.csa-group.org.
64. CSI - Construction Specifications Institute (The); www.csiresources.org.
65. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
66. CTA - Consumer Technology Association; www.cta.tech.
67. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.coolingtechnology.org.
68. CWC - Composite Wood Council; (See CPA).
69. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
70. DHA - Decorative Hardwoods Association; (Formerly: Hardwood Plywood & Veneer Association); www.decorativehardwoods.org.
71. DHI - Door and Hardware Institute; www.dhi.org.
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).

74. ECIA - Electronic Components Industry Association; www.ecianow.org.
75. EIA - Electronic Industries Alliance; (See TIA).
76. EIMA - EIFS Industry Members Association; www.eima.com.
77. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
78. EOS/ESD Association; (Electrostatic Discharge Association); www.esda.org.
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); www.intertek.com.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
85. FM Approvals - FM Approvals LLC; www.fmglobal.com.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
87. FRSA - Florida Roofing, Sheet Metal Contractors Association, Inc.; www.floridaroof.com.
88. FSA - Fluid Sealing Association; www.fluidsealing.com.
89. FSC - Forest Stewardship Council U.S.; www.fscus.org.
90. GA - Gypsum Association; www.gypsum.org.
91. GANA - Glass Association of North America; (See NGA).
92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; (See DHA).
97. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
98. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
99. IAS - International Accreditation Service; www.iasonline.org.
100. ICBO - International Conference of Building Officials; (See ICC).
101. ICC - International Code Council; www.iccsafe.org.
102. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
103. ICPA - International Cast Polymer Association; www.theicpa.com.
104. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
105. IEC - International Electrotechnical Commission; www.iec.ch.
106. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
107. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
108. IESNA - Illuminating Engineering Society of North America; (See IES).
109. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
110. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.
111. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.org.
112. II - Infocomm International; (See AVIXA).
113. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
114. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
115. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
116. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).

117. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
118. ISO - International Organization for Standardization; www.iso.org.
119. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
120. ITU - International Telecommunication Union; www.itu.int.
121. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
122. LMA - Laminating Materials Association; (See CPA).
123. LPI - Lightning Protection Institute; www.lightning.org.
124. MBMA - Metal Building Manufacturers Association; www.mbma.com.
125. MCA - Metal Construction Association; www.metalconstruction.org.
126. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
127. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
128. MHIA - Material Handling Industry of America; www.mhia.org.
129. MIA - Marble Institute of America; (See NSI).
130. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
131. MPI - Master Painters Institute; www.paintinfo.com.
132. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
133. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
134. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
135. NADCA - National Air Duct Cleaners Association; www.nadca.com.
136. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
137. NALP - National Association of Landscape Professionals; www.landscapeprofessionals.org.
138. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
139. NBI - New Buildings Institute; www.newbuildings.org.
140. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
141. NCMA - National Concrete Masonry Association; www.ncma.org.
142. NEBB - National Environmental Balancing Bureau; www.nebb.org.
143. NECA - National Electrical Contractors Association; www.necanet.org.
144. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
145. NEMA - National Electrical Manufacturers Association; www.nema.org.
146. NETA - InterNational Electrical Testing Association; www.netaworld.org.
147. NFHS - National Federation of State High School Associations; www.nfhs.org.
148. NFPA - National Fire Protection Association; www.nfpa.org.
149. NFPA - NFPA International; (See NFPA).
150. NFRC - National Fenestration Rating Council; www.nfrc.org.
151. NGA - National Glass Association (The); (Formerly: Glass Association of North America); www.glass.org.
152. NHLA - National Hardwood Lumber Association; www.nhla.com.
153. NLGA - National Lumber Grades Authority; www.nlga.org.
154. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).
155. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
156. NRCA - National Roofing Contractors Association; www.nrca.net.
157. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
158. NSF - NSF International; www.nsf.org.

159. NSI - National Stone Institute; (Formerly: Marble Institute of America); www.naturalstoneinstitute.org.
160. NSPE - National Society of Professional Engineers; www.nspe.org.
161. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
162. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
163. NWFA - National Wood Flooring Association; www.nwfa.org.
164. NWRA - National Waste & Recycling Association; www.wasterecycling.org
165. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
166. PDI - Plumbing & Drainage Institute; www.pdionline.org.
167. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
168. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
169. RFCI - Resilient Floor Covering Institute; www.rfci.com.
170. RIS - Redwood Inspection Service; www.redwoodinspection.com.
171. SAE - SAE International; www.sae.org.
172. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
173. SDI - Steel Deck Institute; www.sdi.org.
174. SDI - Steel Door Institute; www.steeldoor.org.
175. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
176. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
177. SIA - Security Industry Association; www.siaonline.org.
178. SJI - Steel Joist Institute; www.steeljoist.org.
179. SMA - Screen Manufacturers Association; www.smainfo.org.
180. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
181. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
182. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
183. SPIB - Southern Pine Inspection Bureau; www.spib.org.
184. SPRI - Single Ply Roofing Industry; www.spri.org.
185. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
186. SSINA - Specialty Steel Industry of North America; www.ssina.com.
187. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
188. STI - Steel Tank Institute; www.steeltank.com.
189. SWI - Steel Window Institute; www.steelwindows.com.
190. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
191. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
192. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
193. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
194. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
195. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
196. TMS - The Masonry Society; www.masonrysociety.org.
197. TPI - Truss Plate Institute; www.tpinst.org.
198. TPI - Turfgrass Producers International; www.turfgrasssod.org.
199. TRI - Tile Roofing Institute; www.tileroofing.org.
200. UL - Underwriters Laboratories Inc.; www.ul.com.
201. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
202. USAV - USA Volleyball; www.usavolleyball.org.

203. USGBC - U.S. Green Building Council; www.usgbc.org.
204. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
205. WA - Wallcoverings Association; www.wallcoverings.org.
206. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
207. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
208. WDMA - Window & Door Manufacturers Association; www.wdma.com.
209. WI - Woodwork Institute; www.wicnet.org.
210. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.
1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.
1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.
16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.govinfo.gov.

2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.
    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.
6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.
1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program;www.cdph.ca.gov/Programs/CCDPHP/DEODC/EHLB/IAQ/Pages/Main-Page.aspx.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TAS; Architectural Barriers Texas Accessibility Standards; www.tdlr.texas.gov/ab/abtas.htm.
8. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 50 00 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Temporary Utilities:
      a. Electricity.
      b. Lighting.
      c. Heating.
      d. Cooling.
      e. Ventilation.
      f. Communication services.
      g. Water.
      h. Sanitary.
   2. Construction Facilities:
      a. Field offices and sheds.
      b. Vehicular access.
      c. Parking.
      d. Progress cleaning.
      e. Project identification.
      f. Traffic regulation.
   3. Temporary Controls:
      a. Barriers.
      b. Fencing.
      c. Enclosures.
      d. Security.
      e. Water control.
      f. Dust control.
      g. Erosion and sediment control.
      h. Noise control.
      i. Pest and rodent control.
      j. Pollution control.
      k. Protection of Work.
   4. Removal of utilities, facilities, and controls.

B. Related Requirements:
   1. Other Divisions 01 Specification Sections apply to Work of this Section.
   2. Section 01 70 00 "Execution and Closeout Requirements" for final cleaning.

1.2 TEMPORARY ELECTRICITY

A. Connect to existing power service. Power consumption shall not disrupt Owner's need for continuous service.
B. Provide separate metering and pay utility provider or reimburse Owner for cost of energy used.
C. Power Service Characteristics: As indicated on Drawings.
D. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor as required.
E. Provide flexible power cords as required.

F. Provide main temporary service disconnect and overcurrent protection at convenient location in conformance with National Electric Code.
G. Permanent convenience receptacles may be utilized during construction.
H. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.
   1. Provide 20 ampere duplex outlets, single phase circuits for power tools for every 2,000 sq. ft. of active work area and at specific locations as required.
   2. Provide 20 ampere, single phase branch circuits for lighting.

1.3 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES

A. Permanent building lighting may be utilized during construction.
B. Provide and maintain 0.25 watt/sq. ft. H.I.D. lighting to interior work areas after dark for security purposes.
C. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
D. Maintain lighting and provide routine repairs.

1.4 TEMPORARY HEAT

A. Provide and pay for heat devices as required to maintain specified conditions for construction operations until new heating system is installed.
B. Existing facilities shall not be used.
C. Utilize Owner's new heat plant, extend and supplement with Contractor provided temporary heat devices as required to maintain specified conditions for construction operations.
D. Provide separate metering and pay utility provider for cost of energy used.
E. Enclose building prior to activating temporary heat in accordance with "Exterior Enclosure" Article in this Section.
F. Prior to operation of permanent equipment for temporary heating purposes, verify that installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
G. Maintain minimum ambient temperature of 50 degrees Fahrenheit in areas where construction is in progress, unless indicated otherwise in Specifications.

1.5 TEMPORARY COOLING

A. Provide and pay for temporary cooling devices as required to maintain specified conditions for construction operations until new cooling system is installed.
B. Existing facilities shall not be used.
C. Utilize Owner's new cooling plant, extend and supplement with Contractor provided temporary cooling devices as required to maintain specified conditions for construction operations.
D. Provide separate metering and pay utility provider or reimburse Owner for cost of energy used.
E. Enclose building prior to activating temporary cooling in accordance with "Enclosures" Article in this Section.

F. Prior to operation of permanent equipment for temporary cooling purposes, verify installation is approved for operation, equipment is lubricated and filters are in place. Provide and pay for operation, maintenance, and regular replacement of filters and worn or consumed parts.
G. Maintain maximum ambient temperature of 80 degrees Fahrenheit in areas where construction is in progress, unless indicated otherwise in Specifications.

1.6 TEMPORARY VENTILATION

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.
B. Utilize new fan units as required to maintain clean air for construction operations.
C. Provide separate metering and pay utility provider or reimburse Owner for cost of energy used.

1.7 TEMPORARY COMMUNICATION SERVICES

A. Provide, maintain, and pay for telephone service to field office at time of Project mobilization.
B. As a minimum, provide cellular mobile telephone service for on-site superintendent and home office telephone service.
C. Provide field office with the following computer equipment and service:
    1. Hewlett Packard All-In-One or equivalent scanner, printer and facsimile.
    2. DSL or Cable Modem Service: Business DSL or Cable modem service with all required equipment (modems, filters, etc.). 1.5Mbps downstream/384Kbps upstream. Service shall utilize a DHCP IP address for connection. Contractor shall pay all costs associated with this service including any ISP fees.

1.8 TEMPORARY WATER SERVICE

A. Provide, maintain and pay for suitable quality water service. Extend branch piping with outlets located so water is available by hoses with threaded connections.
B. Connect to existing water source for construction operations. Extend and supplement with temporary devices as needed to maintain specified conditions for construction operations.
C. Owner will pay cost of water used.
D. Provide separate metering and reimburse Owner for cost of water used.
E. Exercise measures to conserve water.
F. Provide temporary pipe insulation to prevent freezing.

1.9 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required temporary facilities and enclosures and shall remove same at competion of the Work.
B. New facilities shall not be used.

1.10 FIELD OFFICES AND SHEDS

A. Office:
   1. Weathertight, with lighting, electrical outlets, heating, cooling, and ventilatingequipment.
   2. Equip with sturdy furniture including drawing rack, and drawing display table, and conference table and chairs to accommodate 6 persons.
   3. Provide temporary communications services specified in this Section.
   4. Locate offices and sheds a minimum distance of 30 feet from existing and new structures.

B. Office:
   1. Construction:
      a. Portable or mobile building or buildings, or buildings constructed with floors raised above ground, securely fixed to foundations with steps and landings at entrance doors.
      b. Structurally sound, secure, weathertight enclosure capable of maintaining environmental conditions specified.
      c. Maintain during progress of Work.
      d. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy and storage requirements.
      e. Exterior Materials: Weather resistant, finished in 1 color acceptable to Architect.
      f. Interior Materials in Offices: Sheet type materials for walls and ceilings, pre-finished or painted; resilient floors and bases.
   2. Lighting: 50 ft C at desk top height, exterior lighting at entrance doors.
   3. Fire Extinguishers: Provide appropriate type fire extinguisher at each building.
   4. Environmental Control:
      a. Heating, Cooling, and Ventilating for Offices: Automatic equipment to maintain 68 degrees Fahrenheit ahrenheit heating and 76 degrees Fahrenheit cooling.

C. When permanent facilities are enclosed with operable utilities, relocate offices and storage into building, with written agreement of Owner, and remove temporary buildings.

D. Storage Areas and Sheds:
   1. Size storage to requirements for products of individual Sections, allowing for access and orderly provision for maintenance and for inspection of products to requirements of Section 01 60 00 "Product Requirements."
   2. Fire Extinguishers: Appropriate type fire extinguisher at each storage area.
   3. Interior Materials in Storage Sheds: As required to provide specified environmental conditions for storage of products.
   4. Heating and Ventilation: As required to maintain products in accordance with Contract Documents.
   5. Lighting: As required for maintenance and inspection of products.

E. Preparation: Fill and grade sites for temporary structures sloped for drainage away from buildings.

F. Installation: Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.

G. Maintenance and Cleaning:
   1. Weekly janitorial services for offices; periodic cleaning and maintenance for office and storage areas.
   2. Maintain approach walks free of mud, water, and snow.
H. Removal: At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

1.11 EMPLOYEE RESIDENTIAL OCCUPANCY

A. Not allowed on Owner's property.

1.12 VEHICULAR ACCESS

A. Construct temporary access roads from public thoroughfares as needed to serve construction area, of width and load bearing capacity to accommodate unimpeded traffic for construction purposes.
B. Construct temporary bridges and culverts to span low areas and allow unimpeded drainage.
C. Extend and relocate vehicular access as Work progress requires, provide detours as necessary for unimpeded traffic flow.
D. Provide unimpeded access for emergency vehicles. Maintain 20-foot-wide driveways with turning space between and around combustible materials.
E. Provide and maintain access to fire hydrants and control valves free of obstructions.
F. Provide means of removing mud from vehicle wheels before entering on site paved areas and public streets.
G. Do not use existing on-site roads for construction traffic.

1.13 PARKING

A. Arrange for temporary surface parking areas to accommodate construction personnel.
B. Locate as approved by Architect.
C. When site space is not adequate, provide additional off-site parking.
D. Use of existing on-site streets and driveways for construction traffic is not permitted.
E. Do not allow heavy or tracked vehicles or construction equipment in parking areas.
F. Do not allow vehicle parking on existing pavement.
G. Permanent Pavements and Parking Facilities:
   1. Prior to Substantial Completion, bases for permanent roads and parking areas may be used for construction traffic.
   2. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.
H. Maintenance:
   1. Maintain traffic and parking areas in sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
   2. Maintain existing and permanent paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.
I. Removal, Repair:
   1. Remove temporary materials and construction when permanent paving is usable at Substantial Completion.
   2. Remove underground work and compacted materials to depth of 2 feet; fill and grade site as specified.
   3. Repair permanent facilities damaged by use, to specified condition.
J. Mud from Site Vehicles: Provide means of removing mud from vehicle wheels before entering streets.

1.14 PROGRESS CLEANING

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing space.
C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
D. Remove waste materials, debris, and rubbish from site and dispose off-site at intervals as required to maintain clean site.

1.15 PROJECT IDENTIFICATION

A. Project Identification Sign:
    1. Size: Provide 8-foot wide by 4-foot high.
    2. Materials: 3/4-inch thick exterior grade plywood and solid wood frame.
    3. Background Paint: Exterior quality, coats; sign background of color as selected.
    4. Lettering: Exterior paint of quality adequate to withstand weathering, fading, and chipping for duration of construction, contrasting colors as selected with exhibit lettering by professional sign painter.
    5. Lettering: Pre-cut vinyl self-adhesive products, white.
    6. Design: Design indicated in Drawings.
    7. Content:
        a. Project title, as indicated on Contract Documents.
        b. Owners name and logo.
        c. Council members.
        d. Names and titles of Architect and Consultants.
        e. Name of Prime Contractor.
        f. Name of major subcontractors.
    8. Lettering: Series C of Standard Alphabet for Highway Signs, Public Roads Administration, Federal Works Agency.
B. Project Informational Signs:
    1. If required by other Documents or Sections of Project Manual, provide weather-protected signs for site safety procedures, wage rates, and Storm Water Pollution Prevention Plan.
    2. Erect sign on or adjacent to field office, if required.
C. Design sign and structure to withstand 90 miles/hr wind velocity.
D. Installation:
    1. Install Project identification sign within 15 days after date fixed by Notice to Proceed.
    2. Erect at designated location.
    3. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
    4. Install sign surface plumb and level, with butt joints. Anchor securely.
    5. Paint exposed surfaces of sign supports and framing.
E. No other signs are allowed without Owner's permission except those required by law.
F. Maintenance: Maintain signs and supports clean, repair deterioration and damage.
G. Removal: Remove signs, framing, supports, and foundations at completion of Project and restore area.

1.16 TRAFFIC REGULATION

A. Signs, Signals, and Devices:
   1. Post Mounted and Wall Mounted Traffic Control and Informational Signs: As approved by authority having jurisdiction.
   2. Traffic Cones and Drums: As approved by authority having jurisdiction.
   3. Flares and Lights: As approved by authority having jurisdiction.
   4. Flag Person Equipment: As required by authority having jurisdiction.

B. Flag Persons: Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

C. Flares and Lights: Use flares and lights during hours of low visibility to delineate traffic lanes and to guide traffic.

D. Haul Routes:
   1. Consult with authority having jurisdiction, establish public thoroughfares to be used for haul routes and site access.
   2. Drawings indicate haul routes designated by authorities having jurisdiction for use of construction traffic.
   3. Confine construction traffic to designated haul routes.
   4. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

E. Traffic Signs and Signals:
   1. Provide signs at approaches to site and on site, at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.
   2. Relocate as Work progresses, to maintain effective traffic control.

F. Removal:
   1. Remove equipment and devices at Substantial Completion.
   2. Repair damage caused by installation.
   3. Remove post settings to depth of 2 feet.

1.17 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas and to protect existing facilities and adjacent properties from damage from construction operations and demolition.
   1. Allow for Owner's use of site.

B. Protect site improvements including but not limited to pavements, walkways, and drainage structures from damage. Replace damaged site improvements to original condition.

C. Protect non-owned vehicular traffic and stored materials from damage.

1.18 TEMPORARY FENCING

A. Construction: Commercial grade chain link fence.

B. Provide 6-foot high fence around construction site and temporary materials storage area; equip with vehicular and pedestrian gates with locks.

1.19 TEMPORARY ENCLOSURES

A. Exterior Enclosures: Provide temporary weathertight closure of exterior openings to accommodate acceptable working conditions and protection for products, to allow for temporary heating, cooling, ventilation, and maintenance of required ambient temperatures identified in individual Specification Sections, and to prevent entry of unauthorized persons. Provide access doors with self-closing hardware and locks.

1.20 SECURITY

A. Security Program:
   1. Protect Work and existing premises from theft, vandalism, and unauthorized entry.
   2. Initiate program in coordination with Owner's existing security system at Project mobilization.
   3. Maintain program throughout construction period until Owner occupancy.
B. Entry Control:
   1. Restrict entrance of persons and vehicles into Project site.
   2. Allow entrance only to authorized persons with proper identification.
   3. Maintain log of workers and visitors, make available to Owner on request.
   4. Coordinate access of Owner's personnel to site in coordination with Owner's security forces.
C. Personnel Identification:
   1. Provide identification badge to each person authorized to enter premises.
   2. Badge to Include:
      a. Personal photograph.
      b. Name.
      c. Assigned number.
      d. Expiration date.
      e. Employer.
   3. Maintain list of accredited persons, submit to Owner on request.
   4. Require return of badges at expiration of their employment on Work.
D. Restrictions:
   1. Do not allow cameras on site or photographs taken except by written approval of Owner.
   2. Do no work on days indicated in Owner-Contractor Agreement.

1.21 WATER CONTROL

A. Grade site to drain.
B. Maintain excavations free of water.
C. Provide, operate, and maintain pumping equipment.
D. Protect site from puddling and running water. Provide water barriers as required to protect site from soil erosion.
E. Provide water barriers as required to protect existing buildings from puddling, ponding or other water accumulation that may damage foundations or other sub-surface construction.

1.22 DUST CONTROL

A. Execute Work by methods to minimize raising dust from construction operations.
B. Provide positive means to prevent air-borne dust from dispersing into atmosphere.

1.23 EROSION AND SEDIMENT CONTROL

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.
B. Minimize surface area of bare soil exposed at 1 time.
C. Provide temporary measures including berms, dikes, and drains, and other devices to prevent water flow that would result in erosion.
D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.
E. Periodically inspect earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.24 PEST AND RODENT CONTROL

A. Provide methods, means, and facilities to prevent the following from damaging Work:
   1. Pests.
   2. Insects.
   3. Rodents.

1.25 POLLUTION CONTROL

A. Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations.
B. Comply with pollution and environmental control requirements of authorities having jurisdiction.

1.26 PROTECTION OF INSTALLED WORK

A. Protect installed Work and provide special protection where specified in individual Specification Sections.
B. Provide temporary and removable protection for installed products. Control activity in immediate work area to minimize damage.
C. Provide protective coverings at openings in walls, roof, and soffits.
D. Protect finished walkways, drives, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
E. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
F. Prohibit traffic from landscaped areas.

1.27 REMOVAL OF UTILITIES, FACILITIES, AND CONTROLS

A. Remove temporary above grade utilities, equipment, facilities, and materials as soon as permanent facilities can be utilized.
B. Remove risers for underground utilities to a minimum depth of 2 feet and cap.
C. Remove buried equipment, facilities, and materials completely to a minimum depth of 2 feet and cap.
D. Backfill excavations as specified in other sections and grade site as indicated.
E. Clean and repair damage caused by installation or use of temporary work.

F. Restore existing facilities used during construction to original condition. Restore permanent facilities used during construction to specified condition.

G. Remove the following when no longer needed at completion of Work:
   1. Office.
   2. Storage sheds.
   3. Enclosures.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 50 01 - EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Obtain permits and furnish labor, materials, equipment, and incidentals necessary to provide erosion and sediment control during construction including furnishing, installing, and maintaining erosion and sediment control structures and procedures and the proper removal when no longer required.
   2. This Section addresses TPDES Construction General Permit and City of Midland Erosion Control provisions.

B. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.

1.2 SUBMITTALS

A. Submittals shall be in accordance with Project requirements and shall include copies of submitted forms and copies of inspection reports as the Project progresses.

1.3 TPDES PERMIT

A. Permit Provisions:
   1. In accordance with the TPDES Construction General Permit (TXR 150000) for Storm Water Discharge associated with construction activity, Contractor shall prepare a Stormwater Pollution Prevention Plan (SWPPP).
   2. Install and maintain the physical measures detailed in the Plan, and provide administrative oversight of the plan, as operator of the SWPPP.
   3. Therefore, Contractor shall:
      a. If required by the General Permit, prepare and submit a Notice of Intent (NOI) to TCEQ with a copy to Owner.
      b. If required by the General Permit, sign and post on-site the completed NOI, and provide copy to the operator of any separate municipal storm sewer system per permit requirements.
      c. Install the Best Management Practices (BMPs) noted on Contractor's SWPPP Site Plan.
      d. Maintain the BMPs during the construction.
      e. Periodically inspect the BMPs, monitor the Plan, and file reports and other items required by the TPDES Construction General Permit. Maintain a Master Copy of the SWPPP plan at the jobsite and insert copies of required periodic inspection reports into the Master Copy of the SWPPP.
      f. Make revisions to the BMPs if needed as construction progresses or make revisions in the event that the BMPs shown do not adequately limit sediments leaving the site.
      g. If required by the General Permit, prepare and submit a Notice of Termination (NOT) to TCEQ with a copy to Owner.
      h. Remove BMPs from the Project site.
   4. The requirements of the General Permit shall supersede the above items in the event of a conflict.

5. For assistance in filling out the NOI or NOT, access the TCEQ website at www.tceq.state.tx.us.

1.4 CITY OF MIDLAND EROSION CONTROL

A. Temporary Drainage Provisions:
   1. Install and maintain, the Best Management Practices (BMPs) noted on Plan Sheet "Erosion Control Plan."
   2. Provide for the drainage of storm water and such water as may be applied or discharged on the site in performance of the Work. Drainage facilities shall be adequate to prevent damage to the work, the site, and adjacent property.
   3. Clean, enlarge, or supplement existing drainage channels and conduits necessary to carry all increased runoff attributable to Contractor's operations. Construct dikes as necessary to divert increased runoff from entering adjacent property (except in natural channels), to protect Owner's facilities and the Work, and to direct water to drainage channels or conduits. Provide ponding as necessary to prevent downstream flooding.

B. Dust Control:
   1. No construction activity shall take place without applying such reasonable measures as may be required to prevent particulate matter from becoming airborne, so it remains visible beyond the limits of construction. Reasonable measures may include the application of water or chemical dust suppressants, paving, frequent road cleaning, and planting vegetative ground cover. Utilize methods and practices of construction to eliminate blowing dust in full observance of state and federal regulations. If dust complaints are received by the local municipality or Owner, apply reasonable control measures.

1.5 JOB CONDITIONS; CODES AND ORDINANCES

A. Comply with the local codes and ordinances. If local codes and ordinances require more stringent or additional erosion and sediment control measures during construction, provide such measures.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 60 00 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Products.
   2. Product delivery, storage, and handling.
   3. Product options.
   4. Substitutions.

B. Related Requirements:
   1. Document 00 00 50 "Information to Proposers" for product options and substitution procedures.
   2. Other Division 01 Specification Sections apply to Work of this Section.
   3. Section 01 30 00 "Administrative Requirements" for Project information management.
   4. Section 01 40 00 "Quality Requirements" for product quality monitoring. Testing Laboratory Services.
   5. Section 01 42 00 "References."

1.2 PRODUCTS

A. Products: Means new material, machinery, components, equipment, fixtures, and systems forming Work and does not include machinery and equipment used for preparation, fabrication, conveying and erection of Work. When allowed by Contract Documents, products may include used and/or existing materials or components.

B. Hazardous Materials: Products or material containing hazardous materials or substances, including but not limited to asbestos or polychlorinated biphenylshall (PCB), shall not be included in Work.

C. Do not use materials and equipment removed from existing premises, except as specifically permitted by Contract Documents.

D. Provide interchangeable components of same manufacturer, for similar components.

E. Materials required to match existing work and not otherwise specified, shall be equal to existing Work in quality, color, and finish. Workmanship and installation shall be comparable to adjacent existing Work. Architect shall be authority in determination of acceptable Work.

1.3 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Delivery:
   1. Deliver materials, products, and equipment to site in manufacturer's original, unopened containers or packaging, with identifying labels intact and legible.
   2. Promptly inspect shipments to assure that products comply with requirements, quantities are correct, and products are undamaged.
   3. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage.
   4. Arrange deliveries in accord with construction schedule and in ample time to facilitate inspection prior to installation to avoid unnecessary delays in construction process.

B. Storage:
   1. Store and protect products in accordance with manufacturer's instructions, with seals and labels intact and legible.
   2. Store sensitive products in weathertight, climate-controlled enclosures.
   3. For exterior storage of fabricated products, place on supports, above ground, sloped to drain water.
   4. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to avoid condensation or potential degradation of products.
   5. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.
   6. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
   7. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.
   8. Materials, products, and equipment may be stored off site in a bonded and insured warehouse approved by Architect and Owner. Pay all costs incurred for off-site storage facilities. Products properly stored in off-site storage facilities may be included in progress pay requests with written approval of Architect.

C. Handling: Handle materials, products, and equipment in a manner prescribed by manufacturer or specified to protect from damage during storage and installation.

1.4 PRODUCT OPTIONS

A. Products Specified by Reference Standards or by Description Only: Any product meeting those standards or description.
B. Products Specified by Naming 1 or More Manufacturers: Products of manufacturers named and meeting specifications, no options or substitutions allowed.
C. Products Specified by Naming 1 or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with this Section.

1.5 SUBSTITUTIONS

A. Instructions to Proposers specify time restrictions for submitting requests for Substitutions during proposal period to requirements specified in this Section.
B. Architect will consider requests for substitutions within 15 days after date established in Notice to Proceed.
C. Substitutions (after proposal period) may be considered when a product becomes unavailable through no fault of Contractor.
D. Document each request with complete data substantiating compliance of proposed Substitution with Contract Documents.
E. A request constitutes a representation that Proposer:
   1. Has investigated proposed product and determined that it meets or exceeds quality level of specified product.
   2. Will provide same warranty for Substitution as for specified product.
   3. Will coordinate installation and make changes to other Work which may be required for Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

F. Substitutions will not be considered when they are indicated or implied on Shop Drawing or product data submittals, without separate written request, or when acceptance will require revision to Contract Documents.

G. Substitution Submittal Procedure:

1. Submit request for Substitution for consideration. Limit each request to 1 proposed Substitution.
2. Requests shall include name of material or equipment to be substituted and a description of proposed substitution including Drawings, performance and test data, and other information necessary for an evaluation.
3. Submit item-by-item (line-by-line) comparison of each item listed in Specification compiled and submitted comparing specified material/product with proposed substitution and specifically noting all differences between the compared products and/or systems.
4. Submit statement setting forth changes in other material, equipment or other portions of Work including changes in Work of other contracts that incorporation of proposed substitution would require shall be included.
5. Submit Shop Drawings, product data, and certified test results for proposed product equivalence.
6. Architect will notify Contractor, in writing, of decision to accept or reject request.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 01 70 00 - EXECUTION AND CLOSEOUT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Closeout procedures.
   2. Final cleaning.
   3. Starting of systems.
   4. Demonstration and instructions.
   5. Testing, adjusting, and balancing.
   6. Protecting installed construction.
   7. Hazardous materials affidavits.
   8. Project record documents.
   9. Operation and maintenance data.
   10. Manual for materials and finishes.
   11. Manual for equipment and systems.
   12. Spare parts and maintenance products.
   13. Product warranties and product bonds.

B. Related Requirements:
   1. Other Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 30 00 "Administrative Requirements" for Project information management.
   3. Section 23 05 93 "Testing, Adjusting, and Balancing" for testing, adjusting and balancing services.

1.2 CLOSEOUT PROCEDURES

A. Submit written certification that Contract Documents have been reviewed, Work has been inspected, and that Work is complete in accordance with Contract Documents and ready for Architect's review.
B. Provide submittals to Architect required by authority having jurisdiction.
C. Submit final Application for Payment identifying total adjusted Contract sum, previous payments, and sum remaining due.
D. Closeout documents will be submitted electronically in OCR (Optical Character Recognition)/PDF format.
E. At Owner's request, Contractor shall provide a hard copy of Closeout Documents in 3-ring binders.
F. Owner will occupy all portions of building as specified in Section 01 10 00 "Summary."

1.3 FINAL CLEANING

A. Owner will provide final cleaning after Final Acceptance.
B. Execute final cleaning prior to final Project assessment.
C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains, and foreign substances; polish transparent and glossy surfaces; and vacuum carpeted and soft surfaces.
D. Clean equipment and fixtures to sanitary condition with cleaning materials appropriate to surface and material being cleaned.

E. Replace filters of operating equipment.
F. Clean debris from roofs, gutters, downspouts, and drainage systems.
G. Clean site; sweep paved areas, rake clean landscaped surfaces.
H. Remove waste and surplus materials, rubbish, and construction facilities from site.

1.4 STARTING OF SYSTEMS

A. Coordinate schedule for startup of various equipment and systems.
B. Notify Primary Designer days prior to startup of each item.
C. Verify each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions which may cause damage.
D. Verify tests, meter readings, and specified electrical characteristics agree with those required by equipment or system manufacturer.
E. Verify wiring and support components for equipment are complete and tested.
F. Execute startup under supervision of applicable manufacturer's representative or Contractors' personnel in accordance with manufacturers' instructions.
G. When specified in individual Specification Sections, require manufacturer to provide authorized representative to be present at site to inspect, check, and approve equipment or system installation prior to startup, and to supervise placing equipment or system in operation.
H. Submit a written report in accordance with Section 01 33 00 "Submittal Procedures" that equipment or system has been properly installed and is functioning correctly.

1.5 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate operation and maintenance of products to Owner's personnel 2 weeks prior to date of final inspection.
B. For equipment or systems requiring seasonal operation, perform demonstration for other season within 6 months.
C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner's personnel in detail to explain aspects of operation and maintenance.
D. Demonstrate startup, operation, control, adjustment, troubleshooting, servicing, maintenance, and shutdown of each item of equipment at agreed time, at designated location.
E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.
F. Required instruction time for each item of equipment and system is specified in individual Sections.

1.6 TESTING, ADJUSTING, AND BALANCING

A. Testing, adjusting, and balancing will be performed in accordance with requirements specified in Section 23 05 93 "Testing, Adjusting, and Balancing."
B. Owner will appoint, employ, and pay for services of independent firm to perform testing, adjusting, and balancing.
C. Owner will appoint and employ services of independent firm to perform testing, adjusting, and balancing. Contractor shall pay for services from cash allowance specified in Section 01 20 00 "Price and Payment Procedures."

D. Independent firm will perform services specified in Section 23 05 93 "Testing, Adjusting, and Balancing."
E. Reports will be submitted by independent firm to Architect indicating observations and results of tests and indicating compliance or non-compliance with requirements of Contract Documents.

1.7 PROTECTING INSTALLED CONSTRUCTION

A. Protect installed Work and provide special protection where specified in individual Specification Sections.
B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
E. Prohibit traffic or storage upon waterproofed or roofed surfaces. When traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
F. Prohibit traffic from landscaped areas.

1.8 HAZARDOUS MATERIALS AFFIDAVITS

A. Provide notarized affidavits declaring that hazardous materials were not incorporated into or delivered to site.
B. Hazardous materials include asbestos, lead polychlorinated biphenyl (PCB), prohibited termite eradication chemicals or any substance of any proportion determined or suspected by an agency of federal or state government to create a health hazard.
C. Provide table of contents listing affidavits in alphabetical order.
D. Prepare cover page with printed title "AFFIDAVITS OF NON-INCORPORATED HAZARDOUS MATERIALS," Title of Project, Project Address, Owner's Name, Address and Phone, and Date of Construction Completion.
E. Provide 1 complete set of aforementioned information in OCR (Optical Character Recognition)/PDF format.
F. Submit prior to Application for Final Payment.

1.9 PROJECT RECORD DOCUMENTS

A. Maintain on site 1 set of record documents; record actual revisions to Work:
    1. Drawings.
    2. Specifications.
    3. Addenda.
    4. Change Orders and other modifications to Contract.
    5. Reviewed Shop Drawings, Product Data, and Samples.
    6. Complete set of MSDS sheets for materials.
    7. Manufacturer's instruction for assembly, installation, and adjusting.
B. Ensure entries are complete and accurate, enabling future reference by Owner.
C. Store record documents separate from documents used for construction.
D. Record information concurrent with construction progress, not less than weekly.

E. Specifications: Legibly mark and record at each product Section description of products installed, including following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda, Change Orders, RFI responses, and other modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:
   1. Measured depths of foundations in relation to finish first floor datum.
   2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
   3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of Work.
   4. Field changes of dimension and detail.
   5. Details not on original Contract Drawings.
   6. Changes made by Addenda, Change Order, RFI responses, and other modifications.
   7. Submit in OCR (Optical Character Recognition)/PDF format.
   8. Comply with most current requirements of Department of State Health Services, Texas Asbestos Health Protection Rules (TAHPR), Title 25., HEALTH SERVICES, Part I, Chapter 295-Occupational Health, §295.34-Asbestos Management in Facilities and Public Buildings, paragraph (i) as a minimum and as outlined below.
   9. Submit MSDS on products used in construction of Project.
   10. Submit MSDS electronically in 8-1/2- by 11-inch format text pages.
   11. Prepare cover page with printed title "MATERIAL SAFETY DATA SHEETS (MSDS)," Title of Project, Project Address, Owner's Name, Address and Phone, and Date of Construction Completion.
   12. Internally subdivide contents with page dividers, organized into CSI format shown in Project Manual.
   13. Prepare a table of contents, listing each of Division headings and listing each material/product under each heading by manufacturer and material/product name.
   14. Submit complete set of aforementioned information in OCR (Optical Character Recognition)/PDF format.
   15. Submit information with Application for Final Payment and include MSDS for materials/products delivered or installed in Project.
   16. Failure to submit updated electronic MSDS documents will cause Application for Final Payment to be held by Architect (not submitted to Owner for processing) until such time updated electronic MSDS documents are received and reviewed for compliance by Architect.

G. Submit documents to Architect with claim for final Application for Payment.

1.10 OPERATION AND MAINTENANCE DATA

A. Submit data electronically in 8-1/2- by 11-inch text pages, OCR (Optical Character Recognition)/PDF format.
B. Prepare cover page with printed title "OPERATION AND MAINTENANCE INSTRUCTIONS," title of Project.
C. Internally subdivide contents with page dividers, logically organized as described below:
    1. Drawings: Provide in OCR (Optical Character Recognition)/PDF format.
    2. Contents: Prepare Table of Contents for each file (if multiple files), with each product or system description identified, in 3 parts as follows:
        a. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, subcontractors, and major equipment suppliers.
        b. Part 2: Operation and maintenance instructions, arranged by system and subdivided by Specification Section**.** For each category, identify names, addresses, and telephone numbers of subcontractors and suppliers. Identify:
            1) Significant design criteria.
            2) List of equipment.
            3) Parts list for each component.
            4) Operating instructions.
            5) Maintenance instructions for equipment and systems.
            6) Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
        c. Part 3: Project documents and certificates, including:
            1) Shop Drawings and product data.
            2) Air and water balance reports.
            3) Certificates.
            4) Scanned copies of warranties and bonds in OCR (Optical Character Recognition)/PDF format.
D. Submit 1 complete set of aforementioned information in OCR (Optical Character Recognition)/PDF format.
E. Submit documents with Application for Final Payment.

1.11 MANUAL FOR MATERIALS AND FINISHES

A. Submit in OCR (Optical Character Recognition)/PDF format of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return electronic file with comments.
B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit documents within 10 days after acceptance.
C. Submit 1 electronic copy of completed volumes 15 days prior to final inspection. Draft copy to be reviewed and returned after final inspection, with Architect comments. Revise content of electronic document set as required prior to final submission.
D. Submit electronic documents of revised final volumes in final form within 10 days after final inspection.
E. Building Products, Applied Materials, and Finishes: Include product data, with catalog number, size, composition, and color and texture designations. Include information for re-ordering custom manufactured products.
F. Instructions for Care and Maintenance: Include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.

G. Moisture Protection and Weather Exposed Products: Include product data listing applicable reference standards, chemical composition, and details of installation. Include recommendations for inspections, maintenance, and repair.
H. Additional Requirements: As specified in individual product Specification Sections.
I. Include listing in Table of Contents for design data, with fly sheet.

1.12 MANUAL FOR EQUIPMENT AND SYSTEMS

A. Submit in OCR (Optical Character Recognition)/PDF format of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return with comments.
B. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit electronic documents within 10 days after acceptance.
C. Submit electronic copy of completed volume(s) 15 days prior to final inspection. Draft copy to be reviewed and returned after final inspection, with Architect comments. Revise content of electronic document set as required prior to final submission.
D. Submit electronic documents in OCR (Optical Character Recognition)/PDF format of revised final volumes in final form within 10 days after final inspection.
E. Each Item of Equipment and Each System: Include description of unit or system, and component parts. Identify function, normal operating characteristics, and limiting conditions. Include performance curves, with engineering data and tests, and complete nomenclature and model number of replaceable parts.
F. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; by label machine.
G. Include color coded wiring diagrams as installed.
H. Operating Procedures: Include startup, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shutdown, and emergency instructions. Include summer, winter, and special operating instructions.
I. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and troubleshooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
J. Include servicing and lubrication schedule, and list of lubricants required.
K. Include manufacturer's printed operation and maintenance instructions.
L. Include sequence of operation by controls manufacturer.
M. Include original manufacturer's parts list, illustrations, assembly Drawings, and diagrams required for maintenance.
N. Include control diagrams by controls manufacturer as installed.
O. Include Contractor's coordination Drawings, with color coded piping diagrams as installed.
P. Include charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.
Q. Include list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
R. Include test and balancing reports as specified in Section 01 40 00 "Quality Requirements."
S. Additional Requirements: As specified in individual product Specification Sections.
T. Include listing in Table of Contents for design data, with dividers.

1.13 SPARE PARTS AND MAINTENANCE PRODUCTS

A. Furnish spare parts, maintenance, and extra products in quantities specified in individual Specification Sections.
B. Deliver to Project site and place in location as directed by Owner; obtain receipt prior to final payment.
C. Submit receipts signed by Owner or letter stating Contractor has delivered extra products to Owner.

1.14 PRODUCT WARRANTIES AND PRODUCT BONDS

A. Obtain warranties and bonds executed by responsible subcontractors, suppliers, and manufacturers, within 10 days after completion of applicable item of Work.
B. Execute and assemble transferable warranty documents and bonds from subcontractors, suppliers, and manufacturers.
C. Verify documents are in proper form, contain full information, and are notarized.
D. Co-execute submittals when required.
E. Include Table of Contents.
F. Submit 1 complete set of aforementioned information in OCR (Optical Character Recognition)/PDF format for review.
G. Submit prior to Application for Final Payment.
H. Time of Submittals:
    1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
    2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
    3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing date of acceptance as beginning of warranty or bond period.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 03 10 00 - CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Form-facing material for cast-in-place concrete.
   2. Shoring, bracing, and anchoring.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.

B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review the following:
      a. Special inspection and testing and inspecting agency procedures for field quality control.
      b. Construction, expansion, contraction, and isolation joints.
      c. Forms and form-removal limitations.
      d. Shoring and reshoring procedures.
      e. Anchor rod and anchorage device installation tolerances.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following:
   1. Exposed surface form-facing material.
   2. Form-release agent.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Form Liners: Store form liners under cover to protect from sunlight.

B. Insulating Concrete Forms: Store forms off ground and under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

C. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.
   1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
   2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

2.2 FORM-FACING MATERIALS

A. As-Cast Surface Form-Facing Material:
   1. Provide continuous, true, and smooth concrete surfaces.
   2. Furnish in largest practicable sizes to minimize number of joints.
   3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 03 30 00 "Cast-In-Place Concrete," and as follows:
      a. Plywood, metal, or other approved panel materials.

B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.
   1. Provide lumber dressed on at least two edges and one side for tight fit.

2.3 RELATED MATERIALS

A. Reglets: Fabricate reglets of not less than 0.022-inch thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034-inch thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4- by 3/4-inch, minimum.

D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

E. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
   2. Form release agent for form liners shall be acceptable to form liner manufacturer.

F. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   1. Furnish units that leave no corrodible metal closer than 1-inch to the plane of exposed concrete surface.
   2. Furnish ties that, when removed, leave holes no larger than 1-inch in diameter in concrete surface.
   3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

A. Comply with ACI 301.
B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 and to comply with the Surface Finish designations specified in Section 03 30 00 "Cast-In-Place Concrete" for as-cast finishes .
C. Limit concrete surface irregularities as follows:
    1. Surface Finish-1.0: ACI 117 Class D, 1-inch.
    2. Surface Finish-2.0: ACI 117 Class B, 1/4-inch.
    3. Surface Finish-3.0: ACI 117 Class A, 1/8-inch.
D. Construct forms tight enough to prevent loss of concrete mortar.
    1. Minimize joints.
    2. Exposed Concrete: Symmetrically align joints in forms.
E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
    1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
    2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
    3. Install keyways, reglets, recesses, and other accessories, for easy removal.
F. Do not use rust-stained, steel, form-facing material.
G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
    1. Provide and secure units to support screed strips.
    2. Use strike-off templates or compacting-type screeds.
H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
    1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
    2. Locate temporary openings in forms at inconspicuous locations.
I. Chamfer exterior corners and edges of permanently exposed concrete.
J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches.
K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
    1. Determine sizes and locations from trades providing such items.
    2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
L. Construction and Expansion Joints:
    1. Construct joints true to line with faces perpendicular to surface plane of concrete.
    2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
    3. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
    4. Space vertical joints in walls as indicated on Drawings.
        a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
   1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
   2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.
   1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
   3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
   4. Install dovetail anchor slots in concrete structures, as indicated on Drawings.
   5. Clean embedded items immediately prior to concrete placement.

3.3 INSTALLATION OF WATERSTOPS

A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.
   1. Install in longest lengths practicable.
   2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
   3. Protect exposed waterstops during progress of the Work.

3.4 REMOVING AND REUSING FORMS

A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 degrees Fahrenheit for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

B. Clean and repair surfaces of forms to be reused in the Work.
   1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
   2. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.
   1. Align and secure joints to avoid offsets.
   2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.5 SHORING AND RESHORING INSTALLATION

A. Comply with ACI 318 and ACI 301 for design, installation, and removal of shoring and reshoring.
   1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
B. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.6 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
B. Inspections:
   1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.

END OF SECTION

SECTION 03 20 00 - CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Steel reinforcement bars.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 32 13 13 "Concrete Paving" for reinforcing related to concrete pavement and walks.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review the following:
      a. Special inspection and testing and inspecting agency procedures for field quality control.
      b. Construction, contraction and expansion joints.
      c. Steel-reinforcement installation.

1.3 ACTION SUBMITTALS

A. Product Data: For the following:
   1. Each type of steel reinforcement.
   2. Bar supports.
B. Shop Drawings: Comply with ACI SP-066:
   1. Include placing Drawings that detail fabrication, bending, and placement.
   2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
   1. Location of construction joints is subject to approval of the Architect.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
   1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.

2.2 REINFORCEMENT ACCESSORIES

A. Diamond Dowel System or equivalent, tapered plate dowels for formed construction joints.
B. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
    1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete.
C. Mechanical Splice Couplers: ACI 318 , same material of reinforcing bar being spliced.
D. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508-inch in diameter.
    1. Finish: Plain.

2.3 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

A. Protection of In-Place Conditions:
    1. Do not cut or puncture vapor retarder.
    2. Repair damage and reseal vapor retarder before placing concrete.
B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
B. Accurately position, support, and secure reinforcement against displacement.
    1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
    2. Do not tack weld crossing reinforcing bars.
C. Preserve clearance between bars of not less than 1-inch, not less than 1 bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
D. Provide concrete coverage in accordance with ACI 318.
E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
F. Splices: Lap splices as indicated on Drawings.
    1. Stagger splices in accordance with ACI 318.
    2. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.

3.3 JOINTS

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
    1. Do not continue reinforcement through sides of strip placements of floors and slabs.
B. Doweled Joints: Install Diamond Dowel System or equivalent in accordance with the manufacturer's instructions.

3.4 INSTALLATION TOLERANCES

A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
B. Inspections:
   1. Steel-reinforcement placement.
   2. Steel-reinforcement mechanical splice couplers.

END OF SECTION

SECTION 03 30 00 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 03 10 00 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
   3. Section 03 20 00 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
   4. Section 31 20 00.10 "Earth Moving for Facility" for drainage fill under slabs-on-ground.
   5. Section 32 13 13 "Concrete Paving" for concrete pavement and walks.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
      a. Contractor's superintendent.
      b. Independent testing agency responsible for concrete design mixtures.
      c. Ready-mix concrete manufacturer.
      d. Concrete Subcontractor.
      e. Special concrete finish Subcontractor.
   2. Review the following:
      a. Special inspection and testing and inspecting agency procedures for field quality control.
      b. Construction joints, control joints, isolation joints, and joint-filler strips.
      c. Semirigid joint fillers.
      d. Vapor-retarder installation.
      e. Anchor rod and anchorage device installation tolerances.
      f. Cold and hot weather concreting procedures.
      g. Concrete finishes and finishing.
      h. Curing procedures.
      i. Forms and form-removal limitations.
      j. Shoring and reshoring procedures.
      k. Methods for achieving specified floor and slab flatness and levelness.
      l. Floor and slab flatness and levelness measurements.

m. Concrete repair procedures.
n. Concrete protection.
o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)
p. Protection of field cured field test cylinders.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Design Mixtures: For each concrete mixture, include the following:
1. Mixture identification.
2. Minimum 28-day compressive strength.
3. Durability exposure class.
4. Maximum w/cm.
5. Slump limit.
6. Air content.
7. Nominal maximum aggregate size.
8. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
9. Include manufacturer's certification that permeability-reducing admixture is compatible with mix design.
10. Include certification that dosage rate for permeability-reducing admixture matches dosage rate used in performance compliance test.
11. Intended placement method.
12. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
C. Shop Drawings:
1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
a. Location of construction joints is subject to approval of the Architect.

1.5 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
2. Admixtures.
3. Curing compounds.
4. Floor and slab treatments.
5. Bonding agents.
6. Adhesives.
7. Vapor retarders.
8. Semirigid joint filler.
9. Joint-filler strips.
10. Repair materials.
B. Preconstruction Test Reports: For each mix design.
C. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician.
1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
   1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
   1. Include the following information in each test report:
      a. Admixture dosage rates.
      b. Slump.
      c. Air content.
      d. 7-day compressive strength.
      e. 28-day compressive strength.
      f. Permeability.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94 and ACI 301.

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1 and as follows.
   1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   2. When average high and low temperature is expected to fall below 40 degrees Fahrenheit for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
   3. Do not use frozen materials or materials containing ice or snow.
   4. Do not place concrete in contact with surfaces less than 35 degrees Fahrenheit, other than reinforcing steel.
   5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1, and as follows:
   1. Maintain concrete temperature at time of discharge to not exceed 95 degrees Fahrenheit.
   2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Cementitious Materials:
   1. Portland Cement: ASTM C150/C150M, Type I, Type II, Type I/II, or Type III, gray.
   2. Fly Ash: ASTM C618, Class C or F.

B. Normal-Weight Aggregates: ASTM C33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.
   1. Alkali-Silica Reaction: Comply with one of the following:
      a. Expansion Result of Aggregate: Not more than 0.04 percent at 1-year when tested in accordance with ASTM C1293.
      b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
      c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
   2. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
   3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Air-Entraining Admixture: ASTM C260/C260M.

D. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
   1. Water-Reducing Admixture: ASTM C494, Type A.
   2. High-Range, Water-Reducing Admixture: ASTM C494, Type F.

E. Water and Water Used to Make Ice: ASTM C94, potable.

2.3 VAPOR RETARDERS

A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A; not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Raven Industries, Inc.
      b. Reef Industries, Inc.
      c. Stego Industries, LLC.

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd.when dry.

B. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
   1. Color:
      a. Ambient Temperature Below 50 degrees Fahrenheit: Black.
      b. Ambient Temperature between 50 degrees F (10 deg C)ahrenheit and 85 degrees F (10 deg C)ahrenheit: Any color.
      c. Ambient Temperature Above 85 degrees F (10 deg C)ahrenheit: White.

C. Water: Potable or complying with ASTM C1602/C1602M.

D. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Dayton Superior.
      b. Euclid Chemical Company (The); an RPM company.

2.5 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.
B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, aromatic polyurea with a Type A shore durometer hardness range of 90 to 95 in accordance with ASTM D2240.

2.6 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8-inch and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C150 portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
   2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8- to 1/4-inch or coarse sand, as recommended by underlayment manufacturer.
   4. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C109.
B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4-inch and that can be filled in over a scarified surface to match adjacent floor elevations.
   1. Cement Binder: ASTM C150 portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
   2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8- to 1/4-inch or coarse sand as recommended by topping manufacturer.
   4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109.

2.7 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
   1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash or Other Pozzolans: 25 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
   1. Use admixture in concrete, as required, for placement and workability.
   2. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.8 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Footings: Proportion normal-weight concrete mix as follows:
   1. Compressive Strength (28 Days): 3,000 psi.
   2. Minimum Slump: 3 inches.
   3. Maximum Slump: 5 inches.
   4. 4. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches after admixture is added to concrete with 2- to 4-inch slump.
   5. Maximum water-cementitious material ratio: 0.45.
   6. Cementitious material shall be 15 percent fly ash by weight.

B. Slab-on-Grade: Proportion normal-weight concrete mix as follows:
   1. Compressive Strength (28 Days): 3,000 psi minimum.
   2. Minimum Slump: 3 inches
   3. Maximum Slump: 6 inches.
   4. Maximum water-cementitious material ratio: 0.45.
   5. Cementitious material shall be 15 percent fly ash by weight.

C. Pit Walls: Proportion normal-weight concrete as follows:
   1. Compressive Strength (28 days): 3,000 psi.
   2. Minimum Slump: 3 inches.
   3. Maximum Slump 6 inches.
   4. Maximum water-cementitious material ratio: 0.45.
   5. Cementitious material shall be 15 percent fly ash by weight.

D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash: 20 percent.

E. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content as follows within a tolerance of plus 1 or minus 1.5 percent, unless otherwise indicated:
   1. Air Content: 5.5 percent for 1-1/2-inch-nominal maximum aggregate size.
   2. Air Content: 6 percent for 1-inch-nominal maximum aggregate size.
   3. Air Content: 6 percent for 3/4-inch-nominal maximum aggregate size.

F. Do not air entrain concrete to trowel-finished interior floors and suspended slabs. Do not allow entrapped air content to exceed 3 percent.

G. Admixtures with chloride-ions are prohibited.

H. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer's recommended rate, but not less than 1.5 lb./cu. yd.

I. Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizer) in concrete, as required, for placement and workability.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
   3. Use water-reducing admixture in pumped concrete and concrete with a water-cementitious material ratio below 0.50.

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/, and furnish batch ticket information.
   1. When air temperature is between 85 and 90 degrees Fahrenheit, reduce mixing and delivery time to 75 minutes; when air temperature is above 90 degrees Fahrenheit, reduce mixing and delivery time to 60 minutes.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:
   1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
   2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
   1. Daily access to the Work.
   2. Incidental labor and facilities necessary to facilitate tests and inspections.
   3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
   4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
   1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3.4 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
   1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
   2. Face laps away from exposed direction of concrete pour.
   3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
   4. Lap joints 6 inches and seal with manufacturer's recommended tape.

5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
7. Protect vapor retarder during placement of reinforcement and concrete.
    a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

3.5 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
    1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
    2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
    3. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
C. Contraction Joints in Slabs-on-Ground: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least 1/4 of concrete thickness as follows:
    1. Grooved Joints: Form contractionjoints after initial floating by grooving and finishing each edge of joint to a radius of 1/8-inch. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
    2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
D. Doweled Joints:
    1. Install Diamond Dowel System or equivalent, tapered plated dowels at slab-on-ground construction joints.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
    1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
    2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
    1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
D. Deposit concrete continuously in 1 layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
    1. If a section cannot be placed continuously, provide construction joints as indicated.
    2. Deposit concrete to avoid segregation.

3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
    a. Do not use vibrators to transport concrete inside forms.
    b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
    c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
    d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Do not place concrete floors and slabs in a checkerboard sequence.
2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
3. Maintain reinforcement in position on chairs during concrete placement.
4. Screed slab surfaces with a straightedge and strike off to correct elevations.
5. Level concrete, cut high areas, and fill low areas.
6. Slope surfaces uniformly to drains where required.
7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:
1. ACI 301 Surface Finish SF-1.0: As-cast concrete texture imparted by form-facing material.
    a. Patch voids larger than 1-1/2 inches wide or 1/2-inch deep.
    b. Remove projections larger than 1-inch.
    c. Tie holes do not require patching.
    d. Surface Tolerance: ACI 117 Class D.
    e. Apply to concrete surfaces not exposed to public view.
2. ACI 301 Surface Finish SF-3.0:
    a. Patch voids larger than 3/4-inch wide or 1/2-inch deep.
    b. Remove projections larger than 1/8-inch.
    c. Patch tie holes.
    d. Surface Tolerance: ACI 117 Class A.
    e. Locations: Apply to concrete surfaces exposed to public view.

B. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:
1. Smooth-Rubbed Finish:
    a. Perform no later than one day after form removal.
    b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.
    c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.
    d. Maintain required patterns or variances as shown on Drawings.

2. Grout-Cleaned Rubbed Finish:
    a. Clean concrete surfaces after contiguous surfaces are completed and accessible.
    b. Do not clean concrete surfaces as Work progresses.
    c. Mix 1 part portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.
    d. Wet concrete surfaces.
    e. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.
    f. Maintain required patterns or variances as shown on Drawings.

C. Abrasive-Blast Finish: Apply the following to as-cast surface finishes where indicated on Drawings:
1. Perform abrasive blasting after compressive strength of concrete exceeds 2000 psi.
2. Coordinate with formwork removal to ensure that surfaces to be abrasive blasted are treated at the same age.
3. Surface Continuity:
    a. Perform abrasive-blast finishing as continuous operation, maintaining continuity of finish on each surface or area of Work.
    b. Maintain required patterns or variances in depths of blast to match.

3.8 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
B. Scratch Finish:
1. While still plastic, texture concrete surface that has been screeded and bull-floated or darbied.
2. Use stiff brushes, brooms, or rakes to produce a profile depth of 1/4-inch in 1 direction.
C. Float Finish:
1. When bleedwater sheen has disappeared and concrete surface has stiffened sufficiently to permit operation of specific float apparatus, consolidate concrete surface with power-driven floats or by hand floating if area is small or inaccessible to power-driven floats.
2. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture and complies with ACI 117 tolerances for conventional concrete.
3. Apply float finish to surfaces to receive trowel finish.
D. Trowel Finish:
1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
4. Do not add water to concrete surface.
5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
6. Apply a trowel finish to surfaces of all slabs-on-ground.

7. Finish surfaces to the following tolerances, in accordance with ASTM E1155, for a randomly trafficked floor surface:
    a. Slabs on Ground:
        1) Specified overall values of flatness, FF 35; and of levelness, FL 25; with minimum local values of flatness, FF 24; and of levelness, FL 17.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:
    1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
    2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
    3. Provide other miscellaneous concrete filling indicated or required to complete the Work.
B. Equipment Bases and Foundations:
    1. Coordinate sizes and locations of concrete bases with actual equipment provided.
    2. Construct concrete bases 6 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
    3. Minimum Compressive Strength: 3000 psi at 28 days.
    4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 12-inch centers around the full perimeter of concrete base.
    5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
    6. Prior to pouring concrete, place and secure anchorage devices.
        a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
        b. Cast anchor-bolt insert into bases.
        c. Install anchor bolts to elevations required for proper attachment to supported equipment.
C. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.
    1. Cast-in inserts and accessories, as shown on Drawings.
    2. Screed, tamp, and trowel finish concrete surfaces.

3.10 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
    1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
    2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
    3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h, calculated in accordance with ACI 305.1, before and during finishing operations.
B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
    1. Cure all formed concrete surfaces.
    2. If forms remain during curing period, moist cure after loosening forms.

3. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
    a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
    b. Continuous Sprinkling: Maintain concrete surface continuously wet.
    c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
    d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
    e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
        1) Recoat areas subject to heavy rainfall within three hours after initial application.
        2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
1. Begin curing immediately after finishing concrete.
2. Interior Concrete Floors:
    a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
        1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
            a) Lap edges and ends of absorptive cover not less than 12 inches.
            b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than 7 days.
        2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
            a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
            b) Cure for not less than 7 days.
        3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than 7 days, utilizing 1, or a combination of, the following:
            a) Water.
            b) Continuous water-fog spray.
    b. Floors to Receive Curing Compound:
        1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
        2) Recoat areas subjected to heavy rainfall within three hours after initial application.
        3) Maintain continuity of coating, and repair damage during curing period.
        4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

c. Floors to Receive Curing and Sealing Compound:
   1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
   2) Recoat areas subjected to heavy rainfall within three hours after initial application.
   3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES

A. Conform to ACI 117.

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.
   1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
   2. Do not apply to concrete that is less than 7 days' old.
   3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.
   4. Rinse with water; remove excess material until surface is dry.
   5. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least 1 month and HVAC has been in operation for at least 2 weeks.
   2. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.

D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete:
   1. Repair and patch defective areas when approved by Architect.
   2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
   1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2-inch in any dimension to solid concrete.
      a. Limit cut depth to 3/4-inch.
      b. Make edges of cuts perpendicular to concrete surface.
      c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
      d. Fill and compact with patching mortar before bonding agent has dried.
      e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
   2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.
      a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
      b. Compact mortar in place and strike off slightly higher than surrounding surface.
   3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces:
   1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
      a. Correct low and high areas.
      b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01-inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   3. After concrete has cured at least 14 days, correct high areas by grinding.
   4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
      a. Finish repaired areas to blend into adjacent concrete.
   5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
      a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
      b. Feather edges to match adjacent floor elevations.
   6. Correct other low areas scheduled to remain exposed with repair topping.
      a. Cut out low areas to ensure a minimum repair topping depth of 1/4-inch to match adjacent floor elevations.
      b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.

7. Repair defective areas, except random cracks and single holes 1-inch or less in diameter, by cutting out and replacing with fresh concrete.
    a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
    b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
    c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
    d. Place, compact, and finish to blend with adjacent finished concrete.
    e. Cure in same manner as adjacent concrete.
8. Repair random cracks and single holes 1-inch or less in diameter with patching mortar.
    a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
    b. Dampen cleaned concrete surfaces and apply bonding agent.
    c. Place patching mortar before bonding agent has dried.
    d. Compact patching mortar and finish to match adjacent concrete.
    e. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
1. Testing agency shall be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
2. Testing agency shall immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
    a. Test reports shall include reporting requirements of ASTM C31, ASTM C39, and ACI 301, including the following as applicable to each test and inspection:
        1) Project name.
        2) Name of testing agency.
        3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
        4) Name of concrete manufacturer.
        5) Date and time of inspection, sampling, and field testing.
        6) Date and time of concrete placement.
        7) Location in Work of concrete represented by samples.
        8) Date and time sample was obtained.
        9) Truck and batch ticket numbers.
        10) Design compressive strength at 28 days.

11) Concrete mixture designation, proportions, and materials.
12) Field test results.
13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
14) Type of fracture and compressive break strengths at 7 days and 28 days.

B. Batch Tickets: For each load delivered, submit 3 copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

C. Inspections:
1. Headed bolts and studs.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from walls.

D. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:
1. Testing Frequency: Obtain 1 composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus 1 set for each additional 50 cu. yd. or fraction thereof.
a. When frequency of testing provides fewer than 5 compressive-strength tests for each concrete mixture, testing shall be conducted from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
2. Slump: ASTM C143/C143M:
a. 1 test at point of placement for each composite sample, but not less than 1 test for each day's pour of each concrete mixture.
b. Perform additional tests when concrete consistency appears to change.
3. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.
a. 1 test for each composite sample, but not less than 1 test for each day's pour of each concrete mixture.
4. Concrete Temperature: ASTM C1064/C1064M:
a. 1 test hourly when air temperature is 40 degrees Fahrenheit and below or 80 degrees Fahrenheit and above, and 1 test for each composite sample.
5. Compression Test Specimens: ASTM C31/C31M:
a. Cast and laboratory cure 2 sets of 3 6-inch by 12-inch or 4-inch by 8-inch cylinder specimens for each composite sample.
6. Compressive-Strength Tests: ASTM C39/C39M.
a. Test 1 set of 3 laboratory-cured specimens at 7 days and 1 set of 2 specimens at 28 days.
b. Test 1 set of 3 field-cured specimens at 7 days and 1 set of 2 specimens at 28 days.
c. A compressive-strength test shall be the average compressive strength from a set of 3 specimens obtained from same composite sample and tested at age indicated.
7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
9. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
10. Additional Tests:
    a. Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
        1) Acceptance criteria for concrete strength shall be in accordance with ACI 301 section 1.6.6.3.
11. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
12. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

E. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.16 PROTECTION

A. Protect concrete surfaces as follows:
1. Protect from petroleum stains.
2. Diaper hydraulic equipment used over concrete surfaces.
3. Prohibit vehicles from interior concrete slabs.
4. Prohibit use of pipe-cutting machinery over concrete surfaces.
5. Prohibit placement of steel items on concrete surfaces.
6. Prohibit use of acids or acidic detergents over concrete surfaces.
7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

END OF SECTION

SECTION 04 22 00 - CONCRETE UNIT MASONRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Concrete masonry units.
   2. Mortar and grout.
   3. Steel reinforcing bars.
   4. Masonry-joint reinforcement.
   5. Miscellaneous masonry accessories.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 05 12 00 "Structural Steel Framing" for installing anchor sections of adjustable masonry anchors for connecting to structural steel frame.

1.2 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).
B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Shop Drawings: For the following:
   1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
   2. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315.
   3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For testing agency.
B. Material Certificates: For each type and size of the following:
   1. Masonry units.
      a. Include material test reports substantiating compliance with requirements.
   2. Integral water repellant used in CMUs.
   3. Cementitious materials. Include name of manufacturer, brand name, and type.
   4. Mortar admixtures.
   5. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
   6. Grout mixes. Include description of type and proportions of ingredients.
   7. Reinforcing bars.
   8. Joint reinforcement.
   9. Anchors, ties, and metal accessories.

C. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.
   1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91/C 91M for air content.
   2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

D. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.

E. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM C 1093 for testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.

E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 FIELD CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
   1. Extend cover a minimum of 24 inches down both sides of walls, and hold cover securely in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
   1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.
   2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

D. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 degrees Fahrenheit and higher and will remain so until masonry has dried, but not less than 7 days after completing cleaning.

E. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 PERFORMANCE REQUIREMENTS

A. Provide structural unit masonry that develops indicated net-area compressive strengths at 28 days.
1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to TMS 602/ACI 530.1/ASCE 6.
2. Determine net-area compressive strength of masonry by testing masonry prisms according to ASTM C 1314.

2.3 UNIT MASONRY, GENERAL

A. Masonry Standard: Comply with TMS 602/ACI 530.1/ASCE 6 except as modified by requirements in the Contract Documents.

B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet vertically and horizontally of a walking surface. See BIA Technical Notes 16B and NCMA TEK 7-3 for information on determining fire-resistance ratings of masonry walls.

2.4 CONCRETE MASONRY UNITS

A. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
   1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
   2. Provide bullnose units for outside corners unless otherwise indicated.

B. Integral Water Repellent: Provide units made with integral water repellent.
   1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E 514/E 514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
      a. Products: Subject to compliance with requirements:
         1) ACM Chemistries; RainBloc.
         2) BASF Construction Chemicals - Building Systems; Rheopel Plus.
         3) Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block.

C. CMUs: ASTM C 90.
   1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2,150 psi.
   2. Density Classification: Medium weight.
   3. Size (Width): Manufactured to dimensions 3/8-inch less-than-nominal dimensions.
   4. Exposed Faces: Provide color and texture matching the range represented by Architect's sample.
   5. Faces to Receive Plaster: Where units are indicated to receive a direct application of plaster, provide textured-face units made with gap-graded aggregates.

2.5 MASONRY LINTELS

A. Masonry Lintels: Prefabricated or built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Cure precast lintels before handling and installing. Temporarily support built-in-place lintels until cured.

2.6 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
   1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Aggregate for Mortar: ASTM C 144.
   1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.

E. Aggregate for Grout: ASTM C 404.

F. Cold-Weather Admixture: Non-chloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. BASF Corporation Chemicals - Building Systems; Trimix-NCA.
      b. Euclid Chemical Company (The); an RPM company; Accelguard 80.
      c. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.

G. Water: Potable.

2.7 REINFORCEMENT

A. Uncoated Steel Reinforcing Bars: ASTM A 615/A 615M or ASTM A 996/A 996M, Grade 60.

B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
      b. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
      c. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

C. Masonry-Joint Reinforcement, General: Ladder type complying with ASTM A 951/A 951M.
   1. Interior Walls: Hot-dip galvanized carbon steel.
   2. Exterior Walls: Hot-dip galvanized carbon steel.
   3. Wire Size for Side Rods: 0.148-inch diameter.
   4. Wire Size for Cross Rods: 0.148-inch diameter.
   5. Spacing of Cross Rods: Not more than 16 inches o.c.
   6. Provide in lengths of not less than 10 feet, with prefabricated corner and tee units.

2.8 TIES AND ANCHORS

A. General: Ties and anchors shall extend at least 1-1/2 inches into masonry but with at least a 5/8-inch cover on outside face.

B. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated:
   1. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M, with ASTM A 153/A 153M, Class B-2 coating.
   2. Galvanized-Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 zinc coating.
   3. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
   4. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene, urethane or PVC.
B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805 or PVC, complying with ASTM D 2287, Type PVC-65406 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

2.10 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
   1. Do not use calcium chloride in mortar or grout.
   2. Use portland cement-lime mortar unless otherwise indicated.
   3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
B. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
   1. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
C. Grout for Unit Masonry: Comply with ASTM C 476.
   1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 602/ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.
   2. Proportion grout in accordance with ASTM C 476, Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2,000 psi.
   3. Provide grout with a slump of 8 to 11 inches as measured according to ASTM C 143.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
   2. Verify that foundations are within tolerances specified.
   3. Verify that reinforcing dowels are properly placed.
   4. Verify that substrates are free of substances that would impair mortar bond.
B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Build chases and recesses to accommodate items specified in this and other Sections.
B. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
C. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:
   1. For dimensions in cross section or elevation, do not vary by more than plus 1/2-inch or minus 1/4-inch.
   2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2-inch.
   3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4-inch in a story height or 1/2-inch total.
B. Lines and Levels:
   1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4-inch in 10 feet, or 1/2-inch maximum.
   2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8-inch in 10 feet, 1/4-inch in 20 feet, or 1/2-inch maximum.
   3. For vertical lines and surfaces do not vary from plumb by more than 1/4-inch in 10 feet, 3/8-inch in 20 feet, or 1/2-inch maximum.
   4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8-inch in 10 feet, 1/4-inch in 20 feet, or 1/2-inch maximum.
   5. For lines and surfaces, do not vary from straight by more than 1/4-inch in 10 feet, 3/8-inch in 20 feet, or 1/2-inch maximum.
   6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4-inch in 10 feet, or 1/2-inch maximum.
   7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16-inch.
C. Joints:
   1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8-inch, with a maximum thickness limited to 1/2-inch.
   2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8-inch.
   3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8-inch or minus 1/4-inch.
   4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8-inch.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch horizontal face dimensions at corners or jambs.
C. Stopping and Resuming Work: Stop Work by stepping back units in each course from those in course below; do not tooth. When resuming Work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
D. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
E. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
F. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
G. Fill cores in hollow CMUs with grout 24 inches under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
H. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

3.5 MORTAR BEDDING AND JOINTING

A. Lay CMUs as follows:
    1. Bed face shells in mortar and make head joints of depth equal to bed joints.
    2. Bed webs in mortar in all courses of piers, columns, and pilasters.
    3. Bed webs in mortar in grouted masonry, including starting course on footings.
    4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
B. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8-inch on exterior side of walls, 1/2-inch elsewhere. Lap reinforcement a minimum of 6 inches.
    1. Space reinforcement not more than 16 inches o.c.
    2. Space reinforcement not more than 8 inches o.c. in foundation walls and parapet walls.
    3. Provide reinforcement not more than 8 inches above and below wall openings and extending 12 inches beyond openings in addition to continuous reinforcement.
B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
C. Provide continuity at wall intersections by using prefabricated T-shaped units.
D. Provide continuity at corners by using prefabricated L-shaped units.
E. Cut and bend reinforcing units as directed by manufacturer for continuity at corners, returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.7 CONTROL AND EXPANSION JOINTS

A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.
B. Form control joints in concrete masonry using 1 of the following methods:
   1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
   2. Install preformed control-joint gaskets designed to fit standard sash block.
   3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
   4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

3.8 LINTELS

A. Provide masonry lintels where shown and where openings of more than 12 inches for brick-size units and 24 inches for block-size units are shown without structural steel or other supporting lintels.
B. Provide minimum bearing of 8 inches at each jamb unless otherwise indicated.
C. Install steel lintels where indicated.

3.9 REINFORCED UNIT MASONRY INSTALLATION

A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
   1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
   2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other loads that may be placed on them during construction.
B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
   1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
   2. Limit height of vertical grout pours to not more than 60 inches.

3.10 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Special inspections according to Level B in TMS 402/ACI 530/ASCE 5.
   1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
   2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
   3. Place grout only after inspectors have verified proportions of site-prepared grout.
C. Testing Prior to Construction: 1 set of tests.
D. Testing Frequency: 1 set of tests for each 5,000 sq. ft. of wall area or portion thereof.
E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C 140 for compressive strength.
F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.
G. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.
H. Grout Test (Compressive Strength): For each mix provided, according to ASTM C 1019.

3.11 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
C. In-Progress Cleaning: Clean unit masonry as Work progresses by dry brushing to remove mortar fins and smears before tooling joints.
D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:
   1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
   2. Test cleaning methods on sample wall panel; leave 1/2 of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
   3. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
   4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
   5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

END OF SECTION

SECTION 05 12 00 - STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Structural steel.
   2. Shrinkage-resistant grout.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting" and Section 09 96 00 "High-Performance Coatings" for painting requirements.

1.2 DEFINITIONS

A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

1.3 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.5 ACTION SUBMITTALS

A. Product Data:
   1. Structural-steel materials.
   2. Threaded rods.
   3. Shop primer.
   4. Shrinkage-resistant grout.

B. Shop Drawings: Show fabrication of structural-steel components.
   1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
   2. Include embedment Drawings.
   3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars that are to be removed and supplemental fillet welds where backing bars are to remain.
   4. Identify members not to be shop primed.

1.6 INFORMATIONAL SUBMITTALS

A. Welding certificates.
B. Mill test reports for structural-steel materials, including chemical and physical properties.

1.7 QUALITY ASSURANCE

A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).
B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.
C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
   1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
   1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
   2. Clean and relubricate bolts and nuts that become dry or rusty before use.
   3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with applicable provisions of the following specifications and documents:
   1. ANSI/AISC 303.
   2. ANSI/AISC 360.
B. Connection Design Information:
   1. Option 1: Connection designs have been completed and connections indicated on the Drawings.

2.2 STRUCTURAL-STEEL MATERIALS

A. Channels, Angles: ASTM A36.
B. Plate and Bar: ASTM A36 .
C. Welding Electrodes: Comply with AWS requirements.

2.3 RODS

A. Unheaded Anchor Rods: ASTM F1554, Grade 36.
   1. Configuration: Straight.
   2. Nuts: ASTM A563 heavy-hex carbon steel.
   3. Plate Washers: ASTM A36 carbon steel.
   4. Washers: ASTM F436, Type 1, hardened carbon steel.
   5. Finish: Plain.

B. Headed Anchor Rods: ASTM F1554, Grade 36, straight.
   1. Nuts: ASTM A563 heavy-hex carbon steel.
   2. Plate Washers: ASTM A36 carbon steel.
   3. Washers: ASTM F436, Type 1, hardened carbon steel.
   4. Finish: Plain.

C. Threaded Rods: ASTM A36.
   1. Nuts: ASTM A63 heavy-hex carbon steel.
   2. Washers: ASTM F436, Type 1, hardened carbon steel.
   3. Finish: Plain.

2.4 PRIMER

A. Steel Primer: Tnemec Series V10 or approved equal.
   1. Comply with Section 09 91 13 "Exterior Painting," Section 09 91 23 "Interior Painting," and Section 09 96 00 "High-Performance Coatings."

2.5 SHRINKAGE-RESISTANT GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.6 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
   1. Fabricate beams with rolling camber up.
   2. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
   3. Mark and match-mark materials for field assembly.
   4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
   1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.

C. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

D. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 3.

E. Holes: Provide holes required for securing other Work to structural steel and for other Work to pass through steel members.
   1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
   2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

2.7 SHOP CONNECTIONS

A. Weld Connections: Comply with AWS D1.1 for tolerances, appearances, welding procedure Specifications, weld quality, and methods used in correcting welding work.

2.8 SHOP PRIMING

A. Shop prime steel surfaces, except the following:
   1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
   2. Surfaces to be field welded.

B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
   1. SSPC-SP 3.

C. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
   1. Apply 2 coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
B. Baseplates, Bearing Plates, and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
    1. Set plates for structural members on wedges, shims, or setting nuts as required.
    2. Weld plate washers to top of baseplate where diagonal bracing is present.
    3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
    4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
C. Maintain erection tolerances of structural steel within ANSI/AISC 303.
D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
    1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
    2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
E. Splice members only where indicated.
F. Do not use thermal cutting during erection.
G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
    1. Joint Type: Snug tightened.
B. Weld Connections: Comply with AWS D1.1 for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
    1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.

3.5 REPAIR

A. Touchup Painting:
    1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
        a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.

3.6 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:
   1. Verify structural-steel materials and inspect steel frame joint details.
   2. Verify weld materials and inspect welds.

B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
   1. Welded Connections: Visually inspect field welds in accordance with AWS D1.1.
      a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1 and the following inspection procedures, at testing agency's option:
         1) Liquid Penetrant Inspection: ASTM E165.
         2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
         3) Ultrasonic Inspection: ASTM E164.
         4) Radiographic Inspection: ASTM E94.

END OF SECTION

SECTION 05 21 00 - STEEL JOIST FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. K-series steel joists.
   2. Steel joist accessories.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 04 20 00 "Unit Masonry" for installing bearing plates in unit masonry.
   3. Section 05 12 00 "Structural Steel Framing" for field-welded shear connectors.

1.2 DEFINITIONS

A. SJI's "Specifications": Steel Joist Institute's "Standard Specifications, Load Tables and Weight Tables for Steel Joists and Joist Girders."

B. Special Joists: Steel joists or joist girders requiring modification by manufacturer to support nonuniform, unequal, or special loading conditions that invalidate load tables in SJI's "Specifications."

1.3 ACTION SUBMITTALS

A. Product Data: For each type of joist, accessory, and product.

B. Shop Drawings:
   1. Include layout, designation, number, type, location, and spacing of joists.
   2. Include joining and anchorage details; bracing, bridging, and joist accessories; splice and connection locations and details; and attachments to other construction.
   3. Indicate locations and details of bearing plates to be embedded in other construction.

1.4 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Comprehensive engineering analysis of special joists signed and sealed by the qualified professional engineer responsible for its preparation.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A manufacturer certified by SJI to manufacture joists complying with applicable standard Specifications and load tables in SJI's "Specifications."

B. Welding Qualifications: Qualify field-welding procedures and personnel according to AWS D1.1, "Structural Welding Code - Steel."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle joists as recommended in SJI's "Specifications."

B. Protect joists from corrosion, deformation, and other damage during delivery, storage, and handling.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Canam Steel Corporation; Canam Group, Inc.
   2. CMC Joist & Deck.
   3. Gooder-Henrichsen Co.
   4. New Millennium Building Systems, LLC.
   5. Structures of U.S.A., Inc.
   6. Vulcraft; Nucor Vulcraft Group.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide special joists and connections capable of withstanding design loads indicated on Drawings.
   1. Use LRFD; data are given at factored-load level.
   2. Design special joists to withstand design loads with live-load deflections no greater than the following:
      a. Roof Joists: Vertical deflection of 1/240 of the span.

2.3 STEEL JOISTS

A. K-Series Steel Joist: Manufactured steel joists of type indicated according to "Standard Specification for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle top- and bottom-chord members, underslung ends, and parallel top chord.
   1. Joist Type: K-series steel joists.
   2. K-Series Steel Joist Substitutes: Manufacture according to "Standard Specifications for Open Web Steel Joists, K-Series" in SJI's "Specifications," with steel-angle or -channel members.
   3. Extended Ends: Extend bearing ends of joists with SJI's Type R extended ends where indicated on Drawings, complying with SJI's "Specifications."
   4. Camber joists according to SJI's "Specifications."
   5. Equip bearing ends of joists with manufacturer's standard beveled ends or sloped shoes if joist slope exceeds 1/4-inch per 12 inches.

2.4 PRIMERS

A. Primer:
   1. SSPC-Paint 15, or manufacturer's standard shop primer complying with performance requirements in SSPC-Paint 15.

2.5 STEEL JOIST ACCESSORIES

A. Bridging:
   1. Provide bridging anchors and number of rows of horizontal or diagonal bridging of material, size, and type required by SJI's "Specifications" for type of joist, chord size, spacing, and span. Furnish additional erection bridging if required for stability.

B. Fabricate steel bearing plates from ASTM A36/A36M steel with integral anchorages of sizes and thicknesses indicated on Drawings. Shop prime paint.
C. Welding Electrodes: Comply with AWS standards.
D. Furnish miscellaneous accessories including splice plates and bolts required by joist manufacturer to complete joist assembly.

2.6 CLEANING AND SHOP PAINTING

A. Clean and remove loose scale, heavy rust, and other foreign materials from fabricated joists and accessories by power-tool cleaning, SSPC-SP 3.
B. Apply 1 coat of shop primer to joists and joist accessories to be primed to provide a continuous, dry paint film not less than 1 mil thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates, embedded bearing plates, and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Do not install joists until supporting construction is in place and secured.
B. Install joists and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Specifications," joist manufacturer's written instructions, and requirements in this Section.
    1. Before installation, splice joists delivered to Project site in more than 1 piece.
    2. Space, adjust, and align joists accurately in location before permanently fastening.
    3. Install temporary bracing and erection bridging, connections, and anchors to ensure that joists are stabilized during construction.
    4. Do not rigidly connect bottom-chord extensions to columns or supports.
C. Field weld joists to supporting steel bearing plates. Coordinate welding sequence and procedure with placement of joists. Comply with AWS requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
D. Install and connect bridging concurrently with joist erection, before construction loads are applied. Anchor ends of bridging lines at top and bottom chords if terminating at walls or beams.

3.3 REPAIRS

A. Touchup Painting:
    1. Immediately after installation, clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists, bearing plates, abutting structural steel, and accessories.
        a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
        b. Apply a compatible primer of same type as primer used on adjacent surfaces.

3.4 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
B. Visually inspect field welds according to AWS D1.1.
    1. In addition to visual inspection, test field welds according to AWS D1.1 and the following procedures, at testing agency's option:
        a. Liquid Penetrant Inspection: ASTM E165.
        b. Magnetic Particle Inspection: ASTM E709.
        c. Ultrasonic Testing: ASTM E164.
        d. Radiographic Testing: ASTM E94.
C. Visually inspect bolted connections.
D. Prepare test and inspection reports.

END OF SECTION

SECTION 05 50 00 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Miscellaneous steel framing and supports.
   2. Metal bollards.

B. Products furnished, but not installed, under this Section include the following:
   1. Loose steel lintels.
   2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.
   3. Steel weld plates and angles for casting into concrete for applications where they are not specified in other Sections.

C. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:
   1. Shop primers.
   2. Shrinkage-resisting grout.
   3. Slotted channel framing.
   4. Metal bollards.

B. Shop Drawings: Show fabrication and installation details. Include Plans, elevations, Sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

PART 2 - PRODUCTS

2.1 METALS

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

B. Steel Plates, Shapes, and Bars: ASTM A36/A36M.

C. Stainless-Steel Sheet, Strip, and Plate: ASTM A240/A240M or ASTM A666, Type 304.

D. Steel Pipe: ASTM A53/A53M, Standard Weight (Schedule 40) unless otherwise indicated.

E. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.
   1. Size of Channels:1-5/8 by 1-5/8 inches.
   2. Material: Galvanized steel, ASTM A653/A653M, commercial steel, Type B structural steel, Grade 33, with G90 coating; 0.079-inch nominal thickness.

F. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.

G. Aluminum Extrusions: ASTM B221, Alloy 6063-T6.

H. Aluminum-Alloy Rolled Tread Plate: ASTM B632/B632M, Alloy 6061-T6.

I. Aluminum Castings: ASTM B26/B26M, Alloy 443.0-F.

J. Bronze Extrusions: ASTM B455, Alloy UNS No. C38500 (extruded architectural bronze).
K. Bronze Castings: ASTM B584, Alloy UNS No. C83600 (leaded red brass) or UNS No. C84400 (leaded semired brass).
L. Nickel Silver Castings: ASTM B584, Alloy UNS No. C97600 (20 percent leaded nickel bronze).

2.2 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B633 or ASTM F1941, Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.
   1. Provide stainless-steel fasteners for fastening aluminum or stainless-steel.
   2. Provide bronze fasteners for fastening bronze.
B. Cast-in-Place Anchors in Concrete: Either threaded or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A47/A47M malleable iron or ASTM A27/A27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F2329/F2329M.
C. Post-Installed Anchors: Torque-controlled expansion anchors or chemical anchors.
   1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941/F1941M, Class Fe/Zn 5, unless otherwise indicated.
   2. Material for Exterior Locations and Where Stainless-Steel Is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F593, and nuts, ASTM F594.

2.3 MISCELLANEOUS MATERIALS

A. Shop Primers: Provide primers that comply with Section 09 91 13 "Exterior Painting" and Section 09 91 23 "Interior Painting."
B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.
   1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.
C. Epoxy Zinc-Rich Primer: Complying with MPI#20 and compatible with topcoat.
D. Shop Primer for Galvanized Steel: Primer formulated for exterior use over zinc-coated metal and compatible with finish paint systems indicated.
E. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.
F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D1187/D1187M.
G. Shrinkage-Resistant Grout: Factory-packaged, nonmetallic, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.
H. Concrete: Comply with requirements in Section 03 30 00 "Cast-in-Place Concrete" for normal-weight, air-entrained concrete with a minimum 28-day compressive strength of 3000 psi.

2.4 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.
B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32-inch unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.
C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
D. Form exposed work with accurate angles and surfaces and straight edges.
E. Weld corners and seams continuously to comply with the following:
    1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
    2. Obtain fusion without undercut or overlap.
    3. Remove welding flux immediately.
    4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.
F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.
G. Fabricate seams and other connections that are exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.
H. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, not less than 8 inches from ends and corners of units and 24 inches o.c., unless otherwise indicated.

2.5 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 40 steel pipe 1/4-inch wall-thickness rectangular steel tubing steel shapes, as indicated.
    1. Cap bollards with 1/4-inch thick steel.
B. Prime steel bollards with primer specified in Section 09 96 00 "High-Performance Coatings."

2.6 GENERAL FINISH REQUIREMENTS

A. Finish metal fabrications after assembly.

2.7 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.
    1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete, sprayed-on fireproofing, or masonry, or unless otherwise indicated.
   1. Shop prime with primers specified in Section 09 91 13 "Exterior Painting" and primers specified in Section 09 91 23 "Interior Painting" unless zinc-rich primer is specified in Section 09 96 00 "High-Performance Coatings" are indicated.

C. Preparation for Shop Priming: Prepare surfaces to comply with SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning" and SSPC-SP 3, "Power Tool Cleaning" requirements indicated below:
   1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
   2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:
   1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
   2. Obtain fusion without undercut or overlap.
   3. Remove welding flux immediately.
   4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

3.2 INSTALLATION OF MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

B. Anchor supports for ceiling hung toilet partitions, operable partitions, overhead doors, and overhead grilles securely to, and rigidly brace from, building structure.

3.3 INSTALLATION OF METAL BOLLARDS

A. Anchor bollards in place with concrete footings. Center and align bollards in holes 3 inches above bottom of excavation. Place concrete and vibrate or tamp for consolidation. Support and brace bollards in position until concrete has cured.
B. Fill bollards solidly with concrete, mounding top surface to shed water.

3.4 REPAIRS

A. Touch-up Painting:
   1. Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A780/A780M.

END OF SECTION

SECTION 05 73 00 - DECORATIVE METAL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Steel and iron decorative railings.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data:
   1. Manufacturer's product lines of decorative metal railings assembled from standard components.
   2. Metal finishes.
B. Shop Drawings: Include Plans, elevations, Sections, and attachment details.
C. Samples: For each type of exposed finish required.
D. Delegated-Design Submittal: For railings, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.3 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel in accordance with the following:
   1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
   2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
   3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless-Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design railings, including attachment to building construction.
B. Structural Performance: Railings, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:
   1. Handrails and Top Rails of Guards:
      a. Uniform load of 50 lbf/ft. applied in any direction.
      b. Concentrated load of 200 lbf applied in any direction.
      c. Uniform and concentrated loads need not be assumed to act concurrently.
   2. Infill of Guards:
      a. Concentrated load of 50 lbf applied horizontally on an area of 1 sq. ft.
      b. Infill load and other loads need not be assumed to act concurrently.

2.2 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.
B. Brackets, Flanges, and Anchors: Same metal and finish as supported rails unless otherwise indicated.

2.3 STEEL AND IRON DECORATIVE RAILINGS

A. Basis-of-Design Product: Gridguard Mesh Railing- Flat Bar Frame Series manufactured by Trex Commerical Products, Minneapolis, MN 55428 or subject to compliance with requirements, a comparable product by 1 of the following manufacturers:
   1. Architectural Iron Designs, Inc.
   2. Architectural Metal Works.
   3. Greco, a CSW Industrials Company.
   4. Indital USA.
   5. Lawler Foundry Corporation.
   6. Livers Bronze Co.
   7. Olin Wrought Iron.
   8. R & B Wagner, Inc.
   9. Regency Railings.
   10. Tri Tech, Inc.
   11. VIVA Railings, LLC.
   12. Wiemann Metalcraft.
B. Tubing: ASTM A500/A500M (cold formed) or ASTM A513/A513M, Type 5.
C. Bars: Hot-rolled, carbon steel complying with ASTM A29/A29M, Grade 1010.
D. Plates, Shapes, and Bars: ASTM A36/A36M.
E. Cast Iron: Either gray iron, ASTM A48/A48M, or malleable iron, ASTM A47/A47M, unless otherwise indicated.
F. Expanded Metal Infill Panels: ASTM F1267, Type I (expanded), Class 1 (uncoated).
   1. Style Designation: 3/4 number 13.

2.4 FASTENERS

A. Anchors: Select fasteners of type, grade and class required to produce connections suitable for anchoring system to other types of construction indicated.
B. Component Hardware: Type best suited to application, stainless-steel. Do not use metals that are corrosive or incompatible with materials joined.
   1. Provide concealed fasteners for interconnecting components and for attaching them to other Work, unless exposed fasteners are unavoidable or are a standard fastening method for products indicated.

2.5 FABRICATION

A. Assemble railing in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.
B. Connections: Fabricate railings with manufacturer's standard concealed fasteners and fittings connections unless otherwise indicated.
C. Mechanical Connections: Connect members with concealed mechanical fasteners and fittings.
D. Form changes in direction as follows:
   1. By bending.
E. Bend members in jigs to produce uniform curvature for each configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
F. Close exposed ends of hollow railing members with prefabricated cap and end fittings of same metal and finish as railings.
G. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, handrail brackets, miscellaneous fittings, and anchors to interconnect railing members to other Work unless otherwise indicated.
H. Expanded-Metal Infill Panels: Fabricate infill panels from steel expanded-metal sheet.
   1. Edge panels with U-shaped channels made from same metal as infill; not less than 0.043-inch thick.
I. Toe Boards: Where indicated on Drawings, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.6 STEEL AND IRON FINISHES

A. Powder Coat Finish: AAMA 2604- Polyester powder coating, 3 mil average thickness.
   1. Color: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Perform cutting, drilling, and fitting required for installing railings.
   1. Fit exposed connections together to form tight, hairline joints.
   2. Install railings level, plumb, square, true to line; without distortion, warp, or rack.
   3. Set railings accurately in location, alignment, and elevation; measured from established lines and levels.
   4. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
   5. Set posts plumb within a tolerance of 1/16-inch in 3 feet.
   6. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4-inch in 12 feet.

B. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.
C. Mounting Style: Top mount directly to walking surface.
D. Mounting Method: Base plate with concrete anchors.

3.2 CLEANING

A. Clean by washing thoroughly with clean water and soap, rinsing with clean water, and wiping dry.

END OF SECTION

SECTION 06 05 00 - RECLAIMED WOOD WALL PANELING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes prefinished lightweight, real wood plank with a peel+stik adhesive tape back.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 SUBMITTALS

A. Shop Drawings including wall elevations, dimensions, locations of openings and trim profiles and locations.
B. Samples: For each product specified, one 12-inch sample to illustrate product shade, design, and finish. Samples shall be used as a standard for material to be installed.

1.3 QUALITY ASSURANCE

A. Preinstallation Conference: Conduct conference at Project site to comply with requirements of Division 01.
B. Mockup: Provide a mockup for evaluation of installed appearance and workmanship. Installed in designated area for approval of Architect. Approved mockup may remain as part of Work.
C. C. Installer qualification minimum of 3 years in Division 06 work.

1.4 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Materials.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Conditions on site for acclimation and installation shall be maintained for 7 days prior, during, and 7 days after installation between 60 and 72 degrees Fahrenheit with relative humidity between 25 and 55 percent.
B. Store panels on site for a minimum of 48 hours prior to installation and allow wood to acclimate to prevailing ambient conditions.

1.6 LIMITED WARRANTY

A. Limited Warranty: Provide 10-year warranty against manufacturing defects.

PART 2 - PRODUCTS

2.1 WOOD PANELING SYSTEM

A. Acceptable Manufacturer: Stikwood.
B. Substitutions: Per Division requirements. Must have prior approval.
C. Materials: Reclaimed wood, species and color per Interior Material Legend.
D. Physical Properties/Dimensions:
    1. Species: Douglas Fir.
    2. Molding: 0.55-inch by 1-1/4 inches by 90 inches long.
    3. Grade: Douglas Fir, smooth face with vertical grain.
    4. Finish: European Plant Based oil.
    5. Flame Spread Rating: ASTM E 84, Class C.
    6. Standard Milling: Flush cut, NO tongue and groove, butt joint.
    7. Installation: Peel and stick.
    8. Certifications: Indoor advantage gold.
    9. Thickness: 1/8-inch.
    10. Width: 5-inch.
    11. Lengths: Random 12-inch to 48-inch.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Installer shall be experienced and competent in the installation of wood products.
B. Prior to installation condition product to average humidity that will prevail after installation.
C. Install to accordance with manufacturer’s instructions and approved Shop Drawings.
D. Set paneling plumb, rigid, and level.
E. Install planks using manufacturer recommend adhesive and fasteners.
F. Install molding, install factory molding on all external corners.
G. Cut trim to fit around penetrations and at perimeter with maximum 1/8-inch gaps.

3.2 CURING, CLEANING, AND PROTECTION

A. Protect the panel surface against scratching and gouging with material suited to the type of traffic it shall be submitted to during the completion of construction/renovation.
B. After completion of construction, the material shall be cleaned according to manufacturer's instructions.
C. Provide manufacturer's detailed post-installation maintenance instructions to those responsible for post-installation maintenance.

END OF SECTION

SECTION 06 10 00 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wood blocking and nailers.
   2. Wood furring.
   3. Utility shelving.
   4. Plywood backing panels.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 31 31 16 "Termite Control" for site application of borate treatment to wood framing.

1.2 DEFINITIONS

A. Boards or Strips: Lumber of less than 2 inches nominal size in least dimension.

B. Dimension Lumber: Lumber of 2 inches nominal size or greater but less than 5 inches nominal size in least dimension.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.

B. Sustainable Design Submittals:
   1. Product Data: For composite wood products, indicating compliance with requirements for formaldehyde emissions.
   2. Laboratory Test Reports: For installation adhesives, indicating compliance with requirements for low-emitting materials.

C. Fastener Patterns: Full-size templates for fasteners in exposed framing.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
   1. Factory mark each piece of lumber with grade stamp of grading agency.
   2. Dress lumber, S4S, unless otherwise indicated.

B. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal thickness or less; no limit for more than 2-inch nominal thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED LUMBER

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2.
   1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or that does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat all rough carpentry unless otherwise indicated.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
   1. Blocking.
   2. Nailers.
   3. Furring.

B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:
   1. Mixed southern pine or southern pine; SPIB.
   2. Spruce-pine-fir; NLGA.

C. Utility Shelving: Lumber with 19 percent maximum moisture content of any of the following species and grades:
   1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
   2. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. Concealed Boards: 19 percent maximum moisture content and any of the following species and grades:
   1. Mixed southern pine or southern pine; No. 2 grade; SPIB.
   2. Spruce-pine-fir (south) or spruce-pine-fir; Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

F. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: Plywood, DOC PS 1, Exterior, A-C , in thickness indicated or, if not indicated, not less than 3/4-inch nominal thickness.

2.5 FASTENERS

A. General: Fasteners shall be of size and type indicated and shall comply with requirements specified in this article for material and manufacture.
B. Nails, Brads, and Staples: ASTM F1667.
C. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
D. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 ICC-ES AC58 ICC-ES AC193 or ICC-ES AC308 as appropriate for the substrate.
   1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.
   2. Material: Stainless-steel with bolts and nuts complying with ASTM F593 and ASTM F594, Alloy Group 1 or 2.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Framing Standard: Comply with AF&PA's WCD 1, "Details for Conventional Wood Frame Construction," unless otherwise indicated.
B. Framing with Engineered Wood Products: Install engineered wood products to comply with manufacturer's written instructions.
C. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry accurately to other construction. Locate furring, nailers, blocking, and similar supports to comply with requirements for attaching other construction.
D. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.
E. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
F. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
   1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.
G. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

H. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
   1. Use inorganic boron for items that are continuously protected from liquid water.
   2. Use copper naphthenate for items not continuously protected from liquid water.

I. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

J. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
   1. Table 2304.10.1, "Fastening Schedule," in ICC's International Building Code (IBC).

K. Use steel common nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.

L. For exposed work, arrange fasteners in straight rows parallel with edges of members, with fasteners evenly spaced, and with adjacent rows staggered.
   1. Comply with approved fastener patterns where applicable. Before fastening, mark fastener locations, using a template made of sheet metal, plastic, or cardboard.
   2. Use finishing nails unless otherwise indicated. Countersink nail heads and fill holes with wood filler.

3.2 INSTALLATION OF WOOD BLOCKING AND NAILERS

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.

3.3 INSTALLATION OF WOOD FURRING

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

B. Furring to Receive Plywood or Hardboard Paneling: Install 1-by-3-inch nominal size furring vertically at 24 inches o.c.

C. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal size furring vertically at 16 inches o.c.

END OF SECTION

SECTION 06 41 16 - PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Plastic-laminate-clad architectural cabinets.
   2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-clad architectural cabinets that are not concealed within other construction.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 12 36 61.16 "Solid Surfacing Countertops."

1.2 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to support loads imposed by installed and fully loaded cabinets.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Sustainable Design Submittals:
   1. Product Data: For adhesives, indicating that product contains no urea formaldehyde.
   2. Product Data: For composite wood products, indicating that product contains no urea formaldehyde.

C. Shop Drawings:
   1. Include plans, elevations, Sections, and attachment details.
   2. Show large-scale details.
   3. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
   4. Show locations and sizes of cutouts and holes for items installed in plastic-laminate architectural cabinets.
   5. Apply AWI Quality Certification Program label to Shop Drawings.

D. Samples for Verification: For the following:
   1. Plastic Laminates: 8 by 10 inches, for each type, color, pattern, and surface finish required.
   2. Exposed Cabinet Hardware and Accessories: 1 full-size unit for each type and finish.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar finish operations that might damage architectural cabinets have been completed in installation areas. Store cabinets in installation areas or in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 degrees Fahrenheit and relative humidity between 25 and 55 percent during the remainder of the construction period.
B. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed/concealed by construction, and indicate measurements on Shop Drawings.
C. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the Architectural Woodwork Standards for grades of cabinets indicated for construction, finishes, installation, and other requirements.
   1. Provide labels and certificates from AWI certification program indicating that woodwork and installation complies with requirements of grades specified.
   2. The Contract Documents contain requirements that are more stringent than the referenced quality standard. Comply with requirements of Contract Documents in addition to those of the referenced quality standard.
B. Architectural Woodwork Standards Grade: Custom.
C. Type of Construction: Frameless.
D. Door and Drawer-Front Style: Flush overlay.
E. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by quality standard.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Formica Corporation.
      b. Wilsonart LLC.
F. Laminate Cladding for Exposed Surfaces:
   1. Horizontal Surfaces: Grade HGS.
   2. Postformed Surfaces: Grade HGP.
   3. Vertical Surfaces: Grade HGS.
   4. Edges: Grade HGS.
   5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.

G. Materials for Semiexposed Surfaces:
   1. Surfaces Other Than Drawer Bodies: High-pressure decorative laminate, NEMA LD 3, Grade VGS.
   2. Edges of Plastic-Laminate Shelves: PVC T-mold matching laminate in color, pattern, and finish.
      a. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade VGS.
   3. Drawer Sides and Backs: Solid-hardwood lumber.
   4. Drawer Bottoms: Hardwood plywood.

H. Dust Panels: 1/4-inch plywood or tempered hardboard above compartments and drawers unless located directly under tops.

I. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

J. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.
   1. Join subfronts, backs, and sides with glued dovetail joints.

K. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
   1. As selected by Architect from laminate manufacturer's full range in the following categories and as scheduled on the Interior Material Legend in the Drawings.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
   1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of architectural cabinet and quality grade specified unless otherwise indicated.
   1. Composite Wood Products: Products shall be made without urea formaldehyde.
   2. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue.
   3. Softwood Plywood: DOC PS 1, medium-density overlay.
   4. Thermoset Decorative Panels: Particleboard or MDF finished with thermally fused, melamine-impregnated decorative paper and complying with requirements of NEMA LD 3, Grade VGL, for Test Methods 3.3, 3.4, 3.6, 3.8, and 3.10.

2.3 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 08 71 00 "Door Hardware."
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Accuride International.
      b. Blum, Julius & Co., Inc.
      c. CompX International, Inc.
      d. Grass America Inc.
      e. Hettich America L.P.
      f. Knape & Vogt Manufacturing Company.

B. Concealed Hinges: Grass 1200 DTS2 x Base Plate 1000 DT2x US10B.

C. Back-Mounted Pulls: Stanley #4478 x US10B.
D. Catches: Magnetic catches, ANSI/BHMA A156.9, B03141.
E. Adjustable Shelf Standards and Supports: KV-182.
F. Shelf Rests: ANSI/BHMA A156.9, B04013; metal.
G. Drawer Slides: ANSI/BHMA A156.9.
    1. Knape & Vogt Series # 1600, 1 pair per drawer.
H. Door Locks: ANSI/BHMA A156.11, E07121.
I. Drawer Locks: ANSI/BHMA A156.11, E07041.
J. Door and Drawer Silencers: ANSI/BHMA A156.16, L03011.
K. Grommets for Cable Passage: 2-inch OD, molded-plastic grommets and matching plastic caps with slot for wire passage.
    1. Color: Black.
L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with ANSI/BHMA A156.18 for ANSI/BHMA finish number indicated.
    1. Dark, Oxidized, Satin Bronze, Oil Rubbed: ANSI/BHMA 613 for bronze base; ANSI/BHMA 640 for steel base; match Architect's sample.
M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in ANSI/BHMA A156.9.

2.4 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Softwood or hardwood lumber, kiln-dried to less than 15 percent moisture content.
B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.
C. Adhesives: Do not use adhesives that contain urea formaldehyde.
D. Adhesive for Bonding Plastic Laminate: Contact cement.
    1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.

2.5 FABRICATION

A. Fabricate architectural cabinets to dimensions, profiles, and details indicated.
B. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
    1. Notify Architect 7 days in advance of the dates and times architectural cabinet fabrication will be complete.
    2. Trial fit assemblies at manufacturer's shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.
C. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to humidity conditions in installation areas for not less than 72 hours.

3.2 INSTALLATION

A. Architectural Woodwork Standards Grade: Install cabinets to comply with quality standard grade of item to be installed.
B. Assemble cabinets and complete fabrication at Project site to extent that it was not completed in the shop.
C. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with wafer-head cabinet installation screws.
D. Install cabinets level, plumb, and true in line to a tolerance of 1/8-inch in 96 inches using concealed shims.
    1. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
    2. Install cabinets without distortion so doors and drawers fit openings and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
    3. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch penetration into wood framing, blocking, or hanging strips, No. 10 wafer-head sheet metal screws through metal backing or metal framing behind wall finish or toggle bolts through metal backing or metal framing behind wall finish.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects. Where not possible to repair, replace architectural cabinets. Adjust joinery for uniform appearance.
B. Clean, lubricate, and adjust hardware.
C. Clean cabinets on exposed and semi exposed surfaces.

END OF SECTION

SECTION 07 21 00 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Glass-fiber blanket insulation.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For the following:
   1. Glass-fiber blanket insulation.

1.3 INFORMATIONAL SUBMITTALS

A. Product Test Reports.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

A. Glass-Fiber Blanket Insulation, Unfaced: ASTM C665, Type I; passing ASTM E136 for combustion characteristics.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. CertainTeed Corporation.
      b. Johns Manville; a Berkshire Hathaway company.
      c. Knauf Insulation.
      d. Owens Corning.
   2. Flame-Spread Index: Not more than 25 when tested in accordance with ASTM E84.
   3. Smoke-Developed Index: Not more than 50 when tested in accordance with ASTM E84.
   4. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.

2.2 ACCESSORIES

A. Insulation for Miscellaneous Voids:
   1. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
   2. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.

B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates.
   1. Adhesives shall have a VOC content of 70 g/L or less.

C. Eave Ventilation Troughs: Preformed, rigid fiberboard or plastic sheets designed and sized to fit between roof framing members and to provide ventilation between insulated attic spaces and vented eaves.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.

3.2 INSTALLATION OF INSULATION IN FRAMED CONSTRUCTION

A. Blanket Insulation: Install in cavities formed by framing members according to the following requirements:
   1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than 1 length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
   2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
   3. Maintain 3-inch clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.
   4. For metal-framed wall cavities where cavity heights exceed 96 inches, support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
   1. Glass-Fiber Insulation: Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.
   2. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

END OF SECTION

SECTION 07 84 13 - PENETRATION FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Penetration firestopping systems for the following applications:
      a. Penetrations in fire-resistance-rated walls.
      b. Penetrations in horizontal assemblies.
      c. Penetrations in smoke barriers.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 07 84 43 "Joint Firestopping" for joints in or between fire-resistance-rated construction, at exterior curtain-wall/floor intersections, and in smoke barriers.
   3. Section 09 91 23 "Interior Painting" for fire and smoke assembly identification.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:
   1. Product Data: For sealants, indicating VOC content.
   2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Product Schedule: For each penetration firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing and inspecting agency.
   1. Engineering Judgments: Where Project conditions require modification to a qualified testing and inspecting agency's illustration for a particular penetration firestopping system, submit illustration, with modifications marked, approved by penetration firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly. Obtain approval of authorities having jurisdiction prior to submittal.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each penetration firestopping system, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that penetration firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Approval according to FM Approval 4991, "Approval Standard for Firestop Contractors," or been evaluated by UL and found to comply with its "Qualified Firestop Contractor Program Requirements."

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping system when ambient or substrate temperatures are outside limits permitted by penetration firestopping system manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.
B. Install and cure penetration firestopping materials per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping systems can be installed according to specified firestopping system design.
B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:
    1. Perform penetration firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
    2. Test per testing standards referenced in "Penetration Firestopping Systems" Article. Provide rated systems complying with the following requirements:
        a. Penetration firestopping systems shall bear classification marking of a qualified testing agency.
            1) UL in its "Fire Resistance Directory."
            2) FM Approval in its "Approval Guide."

2.2 PENETRATION FIRESTOPPING SYSTEMS

A. Penetration Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.
B. Penetrations in Fire-Resistance-Rated Walls: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
    1. F-Rating: Not less than the fire-resistance rating of constructions penetrated.
C. Penetrations in Horizontal Assemblies: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
    1. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
    2. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
    3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.

D. Penetrations in Smoke Barriers: Penetration firestopping systems with ratings determined per UL 1479, based on testing at a positive pressure differential of 0.30-inch wg.
   1. L-Rating: Not exceeding 5.0 cfm/sq. ft. of penetration opening at and no more than 50-cfm cumulative total for any 100 sq. ft. at both ambient and elevated temperatures.

E. Exposed Penetration Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, per ASTM E84.
   1. Sealant shall have a VOC content of 250 g/L or less.
   2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

F. Manufactured Piping Penetration Firestopping System: Penetration firestopping systems with ratings determined per ASTM E814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg.
   1. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
   2. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.
   3. W-Rating: Provide penetration firestopping systems showing no evidence of water leakage when tested according to UL 1479.
   4. Sleeve: Molded-PVC plastic, of length to match slab thickness and with integral nailing flange on 1 end for installation in cast-in-place concrete slabs.
   5. Stack Fitting: ASTM A48/A48M, gray-iron, hubless-pattern wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
   6. Special Coating: Corrosion resistant on interior of fittings.

G. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping system manufacturer and approved by qualified testing and inspecting agency for conditions indicated.
   1. Permanent forming/damming/backing materials.
   2. Substrate primers.
   3. Collars.
   4. Steel sleeves.

2.3 FILL MATERIALS

A. Cast-in-Place Firestop Devices: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer sleeve lined with an intumescent strip, a flange attached to 1 end of the sleeve for fastening to concrete formwork, and a neoprene gasket.

B. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

C. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

D. Intumescent Composite Sheets: Rigid panels consisting of aluminum-foil-faced intumescent elastomeric sheet bonded to galvanized-steel sheet.

E. Intumescent Putties: Nonhardening, water-resistant, intumescent putties containing no solvents or inorganic fibers.

F. Intumescent Wrap Strips: Single-component intumescent elastomeric sheets with aluminum foil on 1 side.

G. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.
H. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.
I. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.
J. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants.

2.4 MIXING

A. Penetration Firestopping Materials: For those products requiring mixing before application, comply with penetration firestopping system manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing penetration firestopping systems, clean out openings immediately to comply with manufacturer's written instructions and with the following requirements:
   1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping materials.
   2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping materials. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form-release agents from concrete.
B. Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install penetration firestopping systems to comply with manufacturer's written installation instructions and published Drawings for products and applications.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings.
   1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not forming permanent components of firestopping.

C. Install fill materials by proven techniques to produce the following results:
   1. Fill voids and cavities formed by openings, forming materials, accessories and penetrating items to achieve required fire-resistance ratings.
   2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
   3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Fire and Smoke Assembly Identification: Where assembly types are identified in Drawings, provide stenciled identification in accessible concealed spaces.
   1. Assembly Types Requiring Identification: Fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions.
   2. Accessible concealed spaces include below accessible floors, above ceilings, and attic spaces.
   3. Locate within 15 feet of partition ends and at intervals not exceeding 30 feet measured horizontally.
   4. Lettering not less than 3 inches in height with a minimum 3/8-inch stroke in a contrasting color.
   5. Wording: "Fire and/or smoke barrier - Protect all openings."

B. Penetration Identification: Identify each penetration firestopping system with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of penetration firestopping system edge so labels are visible to anyone seeking to remove penetrating items or firestopping systems. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
   1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
   2. Contractor's name, address, and phone number.
   3. Designation of applicable testing and inspecting agency.
   4. Date of installation.
   5. Manufacturer's name.
   6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2174.
B. Where deficiencies are found or penetration firestopping system is damaged or removed because of testing, repair or replace penetration firestopping system to comply with requirements.
C. Proceed with enclosing penetration firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping system manufacturers and that do not damage materials in which openings occur.
B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping systems are without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping material and install new materials to produce systems complying with specified requirements.

END OF SECTION

SECTION 07 84 43 - JOINT FIRESTOPPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Joints in or between fire-resistance-rated constructions.
   2. Joints at exterior curtain-wall/floor intersections.
   3. Joints in smoke barriers.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 07 84 13 "Penetration Firestopping" for penetrations in fire-resistance-rated walls, horizontal assemblies, and smoke barriers and for fire and smoke assembly identification.
   3. Section 09 22 16 "Non-Structural Metal Framing" for firestop tracks for metal-framed partition heads.
   4. Section 09 91 23 "Interior Painting" for fire and smoke assembly identification.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:
   1. Product Data: For sealants, indicating VOC content.
   2. Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.

C. Product Schedule: For each joint firestopping system. Include location, illustration of firestopping system, and design designation of qualified testing agency.
   1. Engineering Judgments: Where Project conditions require modification to a qualified testing agency's illustration for a particular joint firestopping system condition, submit illustration, with modifications marked, approved by joint firestopping system manufacturer's fire-protection engineer as an engineering judgment or equivalent fire-resistance-rated assembly.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For each joint firestopping system, for tests performed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

A. Installer Certificates: From Installer indicating that joint firestopping systems have been installed in compliance with requirements and manufacturer's written instructions.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A firm that has been approved by FM Approvals according to FM Approvals 4991, "Approval of Firestop Contractors," or been evaluated by UL and found to comply with UL's "Qualified Firestop Contractor Program Requirements."

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install joint firestopping systems when ambient or substrate temperatures are outside limits permitted by joint firestopping system manufacturers or when substrates are wet due to rain, frost, condensation, or other causes.
B. Install and cure joint firestopping systems per manufacturer's written instructions using natural means of ventilation or, where this is inadequate, forced-air circulation.

1.8 COORDINATION

A. Coordinate construction of joints to ensure that joint firestopping systems can be installed according to specified firestopping system design.
B. Coordinate sizing of joints to accommodate joint firestopping systems.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics:
1. Perform joint firestopping system tests by a qualified testing agency acceptable to authorities having jurisdiction.
2. Test per testing standards referenced in "Joint Firestopping Systems" Article. Provide rated systems complying with the following requirements:
a. Joint firestopping systems shall bear classification marking of a qualified testing agency.
1) UL in its "Fire Resistance Directory."
2) Intertek Group in its "Directory of Listed Building Products."

2.2 JOINT FIRESTOPPING SYSTEMS

A. Joint Firestopping Systems: Systems that resist spread of fire, passage of smoke and other gases, and maintain original fire-resistance rating of assemblies in or between which joint firestopping systems are installed. Joint firestopping systems shall accommodate building movements without impairing their ability to resist the passage of fire and hot gases.
B. Joints in or between Fire-Resistance-Rated Construction: Provide joint firestopping systems with ratings determined per ASTM E1966 or UL 2079.
1. Fire-Resistance Rating: Equal to or exceeding the fire-resistance rating of the wall, floor, or roof in or between which it is installed.
C. Joints in Smoke Barriers: Provide joint firestopping systems with ratings determined per UL 2079 based on testing at a positive pressure differential of 0.30-inch wg.

D. Exposed Joint Firestopping Systems: Flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E84.
   1. Sealant shall have a VOC content of 250 g/L or less.
   2. Sealant shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

E. Accessories: Provide components of joint firestopping systems, including primers and forming materials, that are needed to install elastomeric fill materials and to maintain ratings required. Use only components specified by joint firestopping system manufacturer and approved by the qualified testing agency for conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for joint configurations, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Before installing joint firestopping systems, clean joints immediately to comply with fire-resistive joint system manufacturer's written instructions and the following requirements:
   1. Remove from surfaces of joint substrates foreign materials that could interfere with adhesion of elastomeric fill materials or compromise fire-resistive rating.
   2. Clean joint substrates to produce clean, sound surfaces capable of developing optimum bond with elastomeric fill materials. Remove loose particles remaining from cleaning operation.
   3. Remove laitance and form-release agents from concrete.

B. Prime substrates where recommended in writing by joint firestopping system manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

3.3 INSTALLATION

A. General: Install joint firestopping systems to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support elastomeric fill materials during their application and in position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.
   1. After installing elastomeric fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of fire-resistive joint system.

C. Install elastomeric fill materials for joint firestopping systems by proven techniques to produce the following results:
   1. Elastomeric fill voids and cavities formed by joints and forming materials as required to achieve fire-resistance ratings indicated.
   2. Apply elastomeric fill materials so they contact and adhere to substrates formed by joints.
   3. For elastomeric fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Joint Identification: Identify joint firestopping systems with legible metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches of joint edge so labels are visible to anyone seeking to remove or joint firestopping system. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:
   1. The words "Warning - Joint Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
   2. Contractor's name, address, and phone number.
   3. Designation of applicable testing agency.
   4. Date of installation.
   5. Manufacturer's name.
   6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Inspecting Agency: Owner will engage a qualified testing agency to perform tests and inspections according to ASTM E2393.
B. Where deficiencies are found or joint firestopping systems are damaged or removed due to testing, repair or replace joint firestopping systems so they comply with requirements.
C. Proceed with enclosing joint firestopping systems with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess elastomeric fill materials adjacent to joints as the Work progresses by methods and with cleaning materials that are approved in writing by joint firestopping system manufacturers and that do not damage materials in which joints occur.
B. Provide final protection and maintain conditions during and after installation that ensure joint firestopping systems are without damage or deterioration at time of Substantial Completion. If damage or deterioration occurs despite such protection, cut out and remove damaged or deteriorated joint firestopping systems immediately and install new materials to produce joint firestopping systems complying with specified requirements.

END OF SECTION

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Silicone joint sealants.
   2. Nonstaining silicone joint sealants.
   3. Urethane joint sealants.
   4. Mildew-resistant joint sealants.
   5. Butyl joint sealants.
   6. Latex joint sealants.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each joint-sealant product.

B. LEED Submittals:
   1. Product Data for Credit IEQ 4.1: For sealants and sealant primers used inside the weatherproofing system, documentation including printed statement of VOC content.
   2. Laboratory Test Reports for Credit IEQ 4.1: For sealants and sealant primers used inside the weatherproofing system, documentation indicating that products comply with the testing and product requirements of the California Department of Public Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

D. Joint-Sealant Schedule: Include the following information:
   1. Joint-sealant application, joint location, and designation.
   2. Joint-sealant manufacturer and product name.
   3. Joint-sealant formulation.
   4. Joint-sealant color.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

B. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.5 PRECONSTRUCTION TESTING

A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
   1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
   2. Conduct field tests for each kind of sealant and joint substrate.
   3. Notify Architect 7 days in advance of dates and times when test joints will be erected.
   4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
      a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.
         1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along 1 side, verifying adhesion to opposite side. Repeat procedure for opposite side.
   5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
   6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.6 FIELD CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 degrees Fahrenheit.
   2. When joint substrates are wet.
   3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
   4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: 2 years from date of Substantial Completion.
B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
   1. Warranty Period: 5 years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
   1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written Specifications for sealant elongation and compression.
   2. Disintegration of joint substrates from causes exceeding design Specifications.
   3. Mechanical damage caused by individuals, tools, or other outside agents.
   4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 JOINT SEALANTS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.

B. Low-Emitting Interior Sealants: Sealants and sealant primers shall comply with the testing and product requirements of the California Department of Health's (formerly, the California Department of Health Services') "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's premium range. Unless noted otherwise, do not paint sealants to achieve color.

2.2 NONSTAINING SILICONE JOINT SEALANTS

A. Nonstaining Joint Sealants: No staining of substrates when tested according to ASTM C 1248.

B. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, non-sag, plus 50 percent and minus 50 percent movement capability, non-traffic-use, neutral-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 50, Use NT.
   1. Products: Subject to compliance with requirements, provide the following:
      a. Dow Corning Corporation; 756 SMS.

2.3 URETHANE JOINT SEALANTS

A. Urethane, S, P, 25, T, NT: Single-component, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and non-traffic-use, urethane joint sealant; ASTM C 920, Type S, Grade P, Class 25, Uses T and NT.
   1. Products: Subject to compliance with requirements, provide one of the following:
      a. BASF Construction Chemicals - Building Systems; Sonolastic SL 1.
      b. Pecora Corporation; NR-201.
      c. Polymeric Systems, Inc.; Flexiprene 952.
      d. Schnee-Morehead, Inc.; an ITW company; Permathane SM7101.
      e. Sherwin-Williams Company (The); Stampede 1SL.

2.4 MILDEW-RESISTANT JOINT SEALANTS

A. Mildew-Resistant Joint Sealants: Formulated for prolonged exposure to humidity with fungicide to prevent mold and mildew growth.

B. Silicone, Mildew Resistant, Acid Curing, S, NS, 25, NT: Mildew-resistant, single-component, non-sag, plus 25 percent and minus 25 percent movement capability, non-traffic-use, acid-curing silicone joint sealant; ASTM C 920, Type S, Grade NS, Class 25, Use NT.

1. Products: Subject to compliance with requirements, provide 1 of the following:
   a. Dow Corning Corporation; 786-M White.
   b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS1700 Sanitary.
   c. Sika Corporation U.S.; Sikasil-GP.
   d. Soudal USA; RTV GP.
   e. Tremco Incorporated; Tremsil 200.

2.5 BUTYL JOINT SEALANTS

A. Butyl-Rubber-Based Joint Sealants: ASTM C 1311.

1. Products: Subject to compliance with requirements, provide 1 of the following:
   a. Bostik, Inc.; Chem-Calk 300.
   b. Pecora Corporation; BC-158.

2.6 LATEX JOINT SEALANTS

A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, provide 1 of the following:
   a. BASF Construction Chemicals - Building Systems; Sonolac.
   b. Pecora Corporation; AC-20.
   c. Sherwin-Williams Company (The); 850A, 950A, or PowerHouse.
   d. Sika Corporation U.S.; Sikacryl-20 FC.
   e. Tremco Incorporated; Tremflex 834.

2.7 JOINT-SEALANT BACKING

A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
   a. BASF Construction Chemicals - Building Systems.
   b. Construction Foam Products, a division of Nomaco, Inc.

B. Cylindrical Sealant Backings: ASTM C 1330, any of the following types; as approved in writing by joint-sealant manufacturer for joint application indicated. Size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
   1. Type C (closed-cell material with a surface skin).
   2. Type O (open-cell material).
   3. Type B (bicellular material with a surface skin).

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.8 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
   1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
   2. Clean porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
      a. Concrete.
      b. Masonry.
      c. Unglazed surfaces of ceramic tile.
   3. Remove laitance and form-release agents from concrete.

4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
    a. Metal.
    b. Glass.
    c. Porcelain enamel.
    d. Glazed surfaces of ceramic tile.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
    1. Do not leave gaps between ends of sealant backings.
    2. Do not stretch, twist, puncture, or tear sealant backings.
    3. Remove absorbent sealant backings that have become wet before sealant application, and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
    1. Place sealants so they directly contact and fully wet joint substrates.
    2. Completely fill recesses in each joint configuration.
    3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Non-sag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
    1. Remove excess sealant from surfaces adjacent to joints.
    2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
    3. Provide concave joint profile per Figure 8A in ASTM C 1193 unless otherwise indicated.

3.4 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.5 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

3.6 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.
   1. Joint Locations:
      a. Isolation and contraction joints in cast-in-place concrete slabs.
      b. Tile control and expansion joints.
      c. Joints between different materials listed above.
      d. Other joints as indicated on Drawings.
   2. Joint Sealant:
      a. Urethane, S, P, 25, T, NT.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

B. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal non-traffic surfaces.
   1. Joint Locations:
      a. Construction joints in cast-in-place concrete.
      b. Control and expansion joints in unit masonry.
      c. Joints between metal panels.
      d. Joints between different materials listed above.
      e. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
      f. Control and expansion joints in ceilings and other overhead surfaces.
      g. Other joints as indicated on Drawings.
   2. Joint Sealant:
      a. Silicone, nonstaining, S, NS, 50, NT.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Interior joints in horizontal traffic surfaces JS04.
   1. Joint Locations:
      a. Isolation joints in cast-in-place concrete slabs.
      b. Other joints as indicated on Drawings.
   2. Joint Sealant:
      a. Urethane, S, P, 25, T, NT.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal non-traffic surfaces.
   1. Joint Locations:
      a. Control and expansion joints on exposed interior surfaces of exterior walls.
      b. Tile control and expansion joints.
      c. Vertical joints on exposed surfaces of partitions, unit masonry, concrete, walls, and partitions.
      d. Joints on underside of plant-precast structural concrete beams and planks.
      e. Other joints as indicated on Drawings.
   2. Joint Sealant:
      a. Acrylic Latex.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

E. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal non-traffic surfaces.
   1. Joint Locations:
      a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
      b. Tile control and expansion joints where indicated.
      c. Other joints as indicated on Drawings.
   2. Joint Sealant:
      a. Silicone, mildew resistant, acid curing, S, NS, 25, NT.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

F. Joint-Sealant Application: Concealed mastics JS08.
   1. Joint Locations:
      a. Thresholds.
      b. Sill plates.
      c. Other joints as indicated on Drawings.
   2. Joint Sealant: Butyl-rubber based.
   3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Standard and custom hollow metal doors and frames.
2. Steel sidelight borrowed lite and transom frames.
3. Louvers installed in hollow metal doors.
4. Light frames and glazing installed in hollow metal doors.

B. Related Sections:
1. Division 01 Specification Sections apply to Work of this Section.
2. Section 04 22 00 " Concrete Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
3. Section 08 14 13 “Flush Wood Doors.”
4. Section 08 71 00 "Door Hardware.”
5. Section 08 80 00 "Glazing" for glass view panels in hollow metal doors.
6. Sections 09 91 13 "Exterior Painting" and 09 91 23"Interior Painting" for field painting hollow metal doors and frames.

C. Codes and References: Comply with the version year adopted by the Authority having jurisdiction.
1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
6. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
7. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
8. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
9. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
10. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
11. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
12. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
13. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
14. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
15. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
16. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.
B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.
C. Shop Drawings: Include the following:
    1. Elevations of each door design.
    2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
    3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
    4. Locations of reinforcement and preparations for hardware.
    5. Details of anchorages, joints, field splices, and connections.
    6. Details of accessories.
    7. Details of moldings, removable stops, and glazing.
    8. Details of conduit and preparations for power, signal, and control systems.
D. Samples for Verification:
    1. Samples are only required by request of the Architect and for manufacturers that are not current members of the Steel Door Institute.

1.3 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.
B. Quality Standard: In addition to requirements specified, furnish SDI-Certified manufacturer products that comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".
C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to UL10C (neutral pressure at 40-inch above sill) or UL 10C.
    1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
    2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 degrees Fahrenheit above ambient after 30 minutes of standard fire-test exposure.
    3. Smoke Control Door Assemblies: Comply with NFPA 105.
        a. Smoke "S" Label: Doors to bear “S” label and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.
D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Energy Efficient Exterior Openings: Comply with minimum thermal ratings, based on ASTM C1363. Openings to be fabricated and tested as fully operable, thermal insulating door and frame assemblies.
   1. Thermal Performance (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM C1363 and meet or exceed the following requirements:
      a. Door Assembly Operable U-Factor and R-Value Ratings: U-Factor 0.37, R-Value 2.7, including insulated door, thermal-break frame and threshold.
   2. Air Infiltration (Exterior Openings): Independent testing laboratory certification for exterior door assemblies being tested in accordance with ASTM E283 to meet or exceed the following requirements:
      a. Rate of leakage of the door assembly shall not exceed 0.25 cfm per square foot of static differential air pressure of 1.567 psf (equivalent to 25 mph wind velocity).

F. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 with attendance by representatives of supplier, installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with 2 removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of 5 units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
   1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.6 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting Drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

B. Building Information Modeling (BIM) Support: Utilize designated BIM software tools and obtain training needed to successfully participate in the Project BIM processes. All technical disciplines are responsible for the product data integration and data reliability of their Work into the coordinated BIM applications.

1.7 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.
B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide steel doors and frames from a SDI Certified manufacturer:
   1. CECO Door Products (C).
   2. Curries Company (CU).

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.
C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

2.3 HOLLOW METAL DOORS

A. General: Provide 1-3/4-inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8 and ANSI/NAAMM HMMA 867.
B. Exterior Doors (Energy Efficient): Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A924 A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model, ANSI/SDI A250.4 for physical performance level, and HMMA 867 for door construction.
   1. Design: Flush panel.
   2. Core Construction: Foamed in place polyurethane and steel stiffened laminated core with no stiffener face welds, in compliance with HMMA 867 “Laminated Core”.
      a. Provide 22 gauge steel stiffeners at 6 inches on-center internally welded at 5-inch on-center to integral core assembly, foamed in place polyurethane core chemically bonded to all interior surfaces. No stiffener face welding is permitted.
      b. Thermal properties to rate at a fully operable minimum U-Factor 0.37 and R-Value 2.7, including insulated door, thermal-break frame and threshold.
      c. Kerf Type Frames: Thermal properties to rate at a fully operable minimum U-Factor 0.38 and R-Value 2.6, including insulated door, kerf type frame, and threshold.
   3. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch) thick steel, Model 2.
   4. Vertical Edges: Vertical edges to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8-inch in 2 inches.

5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 7 gauge (3/16-inch) plate 1-1/4-inch x 9-inch.
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. Exterior Doors: Face sheets fabricated of commercial quality hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Design: Flush panel.
2. Level/Model: Level 3 and Physical Performance Level A (Extra Heavy Duty), Minimum 16 gauge (0.053-inch) thick steel, Model 2.
3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
4. Hinge Reinforcement: Minimum 7 gauge (3/16-inch) plate 1-1/4-inch x 9-inch or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Interior Doors (Energy Efficient): Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A366 or 620. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
1. Design: Flush panel.
2. Core Construction: Steel stiffened laminated core with fiberglass filler with no stiffener face welds, in compliance with HMMA 867 “Laminated Core.”
   a. Provide 22 gauge steel-stiffeners at 6 inches on-center internally welded at 5-inch on-center to integral core assembly, no stiffener face welding is permitted.
   b. Acoustical sound transmission rating shall be no less than STC 38 complying with ASTM E 90 and must be visible on factory applied labels.
3. Level/Model: Level 2 and Physical Performance Level A (Heavy Duty), Minimum 18 gauge (0.042 inch) thick steel, Model 2.
4. Vertical Edges: Vertical edges–to be mechanically interlocked with hairline seam. Beveled Lock Edge, 1/8-inch in 2 inches.
5. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
6. Hinge Reinforcement: Minimum 7 gauge (3/16-inch) plate 1-1/4-inch x 9-inch.
7. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

E. Interior Doors: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
   1. Design: Flush panel.
      a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.
   2. Level/Model: Level 2 and Physical Performance Level B (Heavy Duty), Minimum 18 gauge (0.042-inch) thick steel, Model 2.
   3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
   4. Hinge Reinforcement: Minimum 7 gauge (3/16-inch) plate 1-1/4-inch x 9-inch or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
   5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

F. Manufacturers Basis of Design:
   1. CECO Door Products (C) Honeycomb Core - Regent Series.
   2. Curries Company (CU) - Polystyrene Core - 707 Series.
   3. Curries Company (CU) - Energy Efficient - 777 Trio-E Series.

2.4 HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
   1. Fabricate frames with mitered or coped corners. Profile as indicated on Drawings.
   2. Manufacturers Basis of Design:
      a. CECO Door Products (C) – SU SR Series.
      b. Curries Company (CU) – M CM Series.

C. Interior Frames: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
   1. Fabricate frames with mitered or coped corners. Profile as indicated on Drawings.
   2. Manufacturers Basis of Design:
      a. CECO Door Products (C) - BU DU Series.
      b. CECO Door Products (C) - SU Series.
      c. Curries Company (CU) - M Series.

D. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:
   1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042-inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177-inch thick.

2. Stud Wall Type: Designed to engage stud and not less than 0.042-inch thick.
3. Compression Type for Drywall Slip-on (Knock-Down) Frames: Adjustable compression anchors.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042-inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.6 LOUVERS

A. Metal Louvers: Unless otherwise indicated provide louvers to meet the following requirements.
1. Blade Type: Vision proof inverted V or inverted Y.
2. Metal and Finish: Galvanized steel, 0.040-inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed, and labeled for use in doors with fire protection rating of 1-1/2 hours and less.
1. Manufacturers: Subject to compliance with requirements, provide louvers to meet rating indicated.
2. Metal and Finish: Galvanized steel, 0.040-inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

2.7 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator’s shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8-inch high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames.

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

2.9 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:

1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
3. Astragals: Provide overlapping astragals as noted in door hardware sets in Section 08 71 00 "Door Hardware" on 1 leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4-inch beyond edge of door on which astragal is mounted.
4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Section 08 71 00 "Door Hardware."

D. Hollow Metal Frames:

1. Shipping Limitations: Where frames are fabricated in Sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
    a. Welded frames are to be provided with 2 steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48 inches and wider with mortise butt type hinges at top hinge locations.
5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Section 08 71 00 "Door Hardware."
6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.
8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least 4 spot welds per anchor.

9. Jamb Anchors: Provide number and spacing of anchors as follows:
    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) 2 anchors per jamb up to 60 inches high.
        2) 3 anchors per jamb from 60 to 90 inches high.
        3) 4 anchors per jamb from 90 to 120 inches high.
        4) 4 anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) 3 anchors per jamb up to 60 inches high.
        2) 4 anchors per jamb from 60 to 90 inches high.
        3) 5 anchors per jamb from 90 to 96 inches high.
        4) 5 anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
        5) 2 anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless of if specified in Section 08 71 00 "Door Hardware".
11. Bituminous Coating: Where frames are fully grouted with an approved Portland Cement based grout or mortar, coat inside of frame throat with a water based bituminous or asphaltic emulsion coating to a minimum thickness of 3 mils DFT, tested in accordance with UL 10C and applied to the frame under a third party independent follow-up service procedure.

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Section 08 71 00 "Door Hardware."
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

2.10 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.
B. Prior to installation, adjust and securely brace welded hollow metal frames for square, level, twist, and plumb condition.
C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."
D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal Work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.
B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
    1. Set frames accurately in position, plumbed, leveled, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
    2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
    3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
    4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.
C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
    1. Non-Fire-Rated Standard Steel Doors:
        a. Jambs and Head: 1/8-inch plus or minus 1/16-inch.
        b. Between Edges of Pairs of Doors: 1/8-inch plus or minus 1/16-inch.
        c. Between Bottom of Door and Top of Threshold: Maximum 3/8-inch.
        d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4-inch.
    2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
D. Field Glazing: Comply with installation requirements in Section 08 80 00 "Glazing" and with hollow metal manufacturer's written instructions.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave Work in complete and proper operating condition. Remove and replace defective Work, including hollow metal work that is warped, bowed, or otherwise unacceptable.
B. Remove grout and other bonding material from hollow metal work immediately after installation.
C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

3.5 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Sections 01 70 00 “Execution and Closeout Requirements”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating, and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
    1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

END OF SECTION

SECTION 08 14 16 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Solid-core flush wood doors with plastic-laminate-faces.
2. Factory fitting flush wood doors to frames and factory machining for hardware.

B. Related Requirements:
1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product, including the following:
1. Door core materials and construction.
2. Door edge construction
3. Door face type and characteristics.
4. Factory-machining criteria.

1.3 CLOSEOUT SUBMITTALS

A. Quality Standard Compliance Certificates: AWI Quality Certification Program certificates.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Wood Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated on Drawings, based on testing at positive pressure in accordance with UL 10C orNFPA 252.
1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.
2. Temperature-Rise Limit: At vertical exit enclosures and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 degrees Fahrenheit above ambient after 30 minutes of standard fire-test exposure.

B. Smoke- and Draft-Control Door Assemblies: Listed and labeled for smoke and draft control by a qualified testing agency acceptable to authorities having jurisdiction, based on testing in accordance with UL 1784 and installed in compliance with NFPA 105.

2.2 FLUSH WOOD DOORS, GENERAL

A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.

2.3 SOLID-CORE FLUSH WOOD DOORS WITH PLASTIC-LAMINATE FACES

A. Interior Doors:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   a. ABS-American Building Supply, Inc.
   b. ASSA ABLOY.
   c. Eggers Industries.
   d. General Veneer Manufacturing Co.
   e. Haley Brothers, Inc.
   f. Lambton Doors.
   g. Marshfield DoorSystems, Inc.
   h. Mohawk Flush Doors, Inc.
   i. Oregon Door.
   j. Oshkosh Door Company.
   k. Poncraft Door Company.
   l. Vancouver Door Company.
   m. VT Industries Inc.
2. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.
3. ANSI/WDMA I.S. 1A Grade: Premium.
4. Plastic-Laminate Faces: High-pressure decorative laminates complying with NEMA LD 3, Grade HGS.
5. Colors, Patterns, and Finishes: As indicated.
6. Exposed Vertical Edges: Hardwood edges for staining to match faces or hardwood edges for painting.
   a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
   b. Fire-Rated Pairs of Doors: Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
   c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.
      1) Screw-Holding Capability: 550lbf in accordance with WDMA T.M. 10.
7. Core for Non-Fire-Rated Doors:
   a. Glued wood stave.
   b. WDMA I.S. 10 structural composite lumber.
8. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
   a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as needed to eliminate through-bolting hardware.
9. Construction: 5 plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before faces and crossbands are applied.

2.4 LIGHT FRAMES AND LOUVERS

A. Metal Frames for Light Openings in Fire-Rated Doors: Manufacturer's standard frame formed of 0.048-inch thick, cold-rolled steel sheet; with baked-enamel- or powder-coated finish; and approved for use in doors of fire-protection rating indicated on Drawings.

2.5 FABRICATION

A. Factory fit doors to suit frame-opening sizes indicated.
   1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
   2. Comply with NFPA 80 requirements for fire-rated doors.
B. Factory machine doors for hardware that is not surface applied.
   1. Locate hardware to comply with DHI-WDHS-3.
   2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
   3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
   4. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
   5. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
C. Openings: Factory cut and trim openings through doors.
   1. Light Openings: Trim openings with moldings of material and profile indicated.
   2. Louvers: Factory install louvers in prepared openings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Hardware: For installation, see Section 08 71 00 "Door Hardware."
B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
C. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
D. Factory-Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.2 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.
B. Finished Doors: Replace doors that are damaged or that do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION

SECTION 08 31 13 - ACCESS DOORS AND FRAMES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes access doors and frames for walls and ceilings.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Samples: For each type of access door and frame and for each finish specified.
C. Product Schedule: For access doors and frames.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Rated Access Doors and Frames: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, according to NFPA 252 or UL 10B.

2.2 ACCESS DOORS AND FRAMES

A. Flush Access Doors with Exposed Flanges:
   1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
      a. Activar Construction Products Group, Inc. - JL Industries.
      b. ACUDOR Products, Inc.
      c. Babcock-Davis.
      d. Cendrex Inc.
      e. Elmdor/Stoneman Manufacturing Company; a division of Acorn Engineering Company.
      f. Karp Associates, Inc.
      g. Lane-Aire Manufacturing Corp.
      h. Larsens Manufacturing Company.
      i. Maxam Metal Products Limited.
      j. Metropolitan Door Industries Corp.
      k. MIFAB, Inc.
      l. Milcor; a division of Hart & Cooley, Inc.
      m. Nystrom.
      n. Williams Bros. Corporation of America (The).
   2. Description: Face of door flush with frame, with exposed flange and concealed hinge.
   3. Locations: Wall and ceiling.
   4. Uncoated Steel Sheet for Door: Nominal 0.060-inch, 16-gauge, factory primed.
   5. Frame Material: Same material, thickness, and finish as door.

6. Latch and Lock: Cam latch, key operated.

2.3 FIRE-RATED ACCESS DOORS AND FRAMES

A. Fire-Rated, Flush Access Doors with Exposed Flanges:
   1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
      a. Activar Construction Products Group, Inc. - JL Industries.
      b. ACUDOR Products, Inc.
      c. Babcock-Davis.
      d. Cendrex Inc.
      e. Karp Associates, Inc.
      f. Lane-Aire Manufacturing Corp.
      g. Larsens Manufacturing Company.
      h. Maxam Metal Products Limited.
      i. Metropolitan Door Industries Corp.
      j. MIFAB, Inc.
      k. Milcor; a division of Hart & Cooley, Inc.
      l. Nystrom.
      m. Williams Bros. Corporation of America (The).
   2. Description: Door face flush with frame, uninsulated; with exposed flange, self-closing door, and concealed hinge.
   3. Locations: Wall and ceiling.
   4. Fire-Resistance Rating: Not less than that of adjacent construction.
   5. Uncoated Steel Sheet for Door: Nominal 0.036-inch, 20 gauge, factory primed.
   6. Frame Material: Same material, thickness, and finish as door.
   7. Latch and Lock: Self-latching door hardware, operated by key.

2.4 MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
B. Steel Sheet: Uncoated or electrolytic zinc coated, ASTM A879/A879M, with cold-rolled steel sheet substrate complying with ASTM A1008/A1008M, Commercial Steel (CS), exposed.
C. Frame Anchors: Same material as door face.
D. Inserts, Bolts, and Anchor Fasteners: Hot-dip galvanized steel according to ASTM A153/A153M or ASTM F2329.

2.5 FABRICATION

A. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.
B. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish mounting holes, attachment devices and fasteners of type required to secure access doors to types of supports indicated.
C. Latch and Lock Hardware:
   1. Quantity: Furnish number of latches and locks required to hold doors tightly closed.
   2. Keys: Furnish 2 keys per lock and key all locks alike.

2.6 FINISHES

A. Painted Finishes: Comply with coating manufacturer's written instructions for cleaning, conversion coating, and applying and baking finish.
   1. Factory Primed: Apply manufacturer's standard, lead- and chromate-free, universal primer immediately after surface preparation and pretreatment.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

3.2 ADJUSTING

A. Adjust doors and hardware, after installation, for proper operation.

END OF SECTION

SECTION 08 32 13 - SLIDING ALUMINUM-FRAMED GLASS DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes sliding aluminum-framed glass doors for exterior locations.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work in this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Shop Drawings: For sliding aluminum-framed glass doors.
C. Sample: For each exposed product and for each color specified, 12-inch long track Section with factory-applied finish.

1.3 INFORMATION SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance data.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Sharyn Model 11M0216 Frameless Glass Pass-Thru Window by C. R. Laurence Co., Inc. Subject to compliance with requirements, provide or comparable product by 1 of the following:
   1. Arcadia Architectural Products, Inc.
   2. Boyd Aluminum Manufacturing Co.
   3. EFCO Corporation.
   4. Fleetwood Windows & DoorsAluminum Products, Inc.
   5. Graham Architectural Products Corporation.
   6. International Impact Building Products, LLC.
   7. Jeld-Wen, Inc.
   8. Kawneer North America, an Arconic company.
   9. Milgard Manufacturing, Inc.
   10. Northern Building Products, Inc.
   11. PGT Industries, Inc.
   12. Solar Innovations, Inc.
   13. Thermal Windows, Inc.
   14. Wausau Window and Doors: Apogee Wausau Group, Inc.
   15. WinDoor Incorporated.
   16. Wojan Window and Door Corporation.
   17. YKK AP America Inc.

2.2 SLIDING ALUMINUM-FRAMED GLASS DOORS

A. Frames and Door Panels: Fabricated from aluminum extrusions complying with AAMA/WDMA/CSA 101/I.S.2/A440.
   1. Thermally Improved Construction: Fabricate frames and door panels with an intergral, concealed, low-conductance thermal barrier located between exterior and interior surfaces in a manner that eliminates direct metal-to-metal contact.

B. Sill Cap/Track: Provide extruded-aluminum track of thickness, dimensions, and profile indicated; designed to comply with performance requirements indicated; with manufacturer's standard finish.

2.3 GLAZING

A. Glass and Glazing: Manufacturer's standard glazing system that produces weather-tight seal. Comply with requirements in Section 08 80 00 "Glazing."
   1. Glass: ASTM C 1036, Type 1, q3, Category II safety glass complying with test requirements in 16 CFR 1201.

2.4 HARDWARE

A. General: Provide manufacturer's standard hardware, fabricated from a corrision-resistant material compatible and designed to smoothly operate, tightly close, and securely lock sliding aluminum-framed glass doors.

B. Lock: Install manufacturer's standard locking device on each movable panel, lockable from the inside only. Adjust locking device to allow unobstructed movement of the panel across adjacent panel in the direction indicated.

2.5 ACCESSORIES

A. Anchors, Clips, and Accessories: Provide anchors, clips, and accessories of aluminum, nonmagnetic stainless-steel, or zinc-coatedsteel or iron for sliding aluminum-framed glass doors, complying with ASTM B 456 or ASTM B 633 for SC 3 severe service conditions; provide sufficient strength to withstand design pressure indicated.

2.6 FABRICATION

A. Fabricate sliding aluminum-framed galss doors in sizes indicated. Include a complete system for assembling components and anchoring doors.

B. Factory-Glazed Fabrication: Glaze sliding aluminum-framed glass doors in the factory where practical and possible for applications indicated. Comply with requirements in Section 08 80 00 "Glazing" and with AAMA/ WDMA/CSA 101/I.S.2/A440.

2.7 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, Satin AA-M12C22A31, Class II, 0.010 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with Drawings, Shop Drawings, and manufacturer's written instructions for installing glazing, hardware, accessories, and other components.
B. Install sliding aluminum-framed glass doors level, plumb, square, true to line, without distortion, without warp or rack of frames and panels, without impeding thermal movement; anchored securely in place to structural support; and in proper relation to adjacent construction.
C. Separate aluminum and other corrodible surfaces from sources of corrosion of electrolytic action at points of contact with other materials.
D. Adjust operating panels and screens to provide a tight fit at contact points for smooth operation without binding. Adjust hardware for proper alignment, smooth operation, and proper latching without unnecessary force or excessive clearance.

END OF SECTION

SECTION 08 33 23 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Insulated service doors.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 05 50 00 "Metal Fabrications" for miscellaneous steel supports, door-opening framing, corner guards, and bollards.

1.2 ACTION SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory.
B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.
   1. Include points of attachment and their corresponding static and dynamic loads imposed on structure.
   2. Show locations of controls, locking devices, detectors or replaceable fusible links, and other accessories.
   3. Include diagrams for power, signal, and control wiring.
C. Samples: For each exposed product and for each color and texture specified.

1.3 INFORMATIONAL SUBMITTALS

A. Sample warranty.

1.4 CLOSEOUT SUBMITTALS

A. Special warranty.
B. Maintenance Data.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of doors that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.
B. Structural Performance, Exterior Doors: Capable of withstanding the following design wind loads:
   1. Design Wind Load: As indicated on Drawings.
C. Seismic Performance: Overhead coiling doors are to withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 DOOR ASSEMBLY

A. Insulated Service Door: Overhead coiling door formed with curtain of interlocking metal slats.
   1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
      a. Alpine Overhead Doors, Inc.
      b. Alumatec Pacific Products.
      c. C.H.I. Overhead Doors, Inc.
      d. Clopay Building Products.
      e. Cookson; a CornellCookson company.
      f. Cornell; a CornellCookson company.
      g. McKeon Rolling Steel Door Company, Inc.
      h. Overhead Door Corporation.
      i. Raynor Garage Doors.
      j. Wayne-Dalton Corp.
B. Operation Cycles: Door components and operators capable of operating for not less than 20,000.
C. Curtain R-Value: R-7.71 (minimum).
D. Door Curtain Material: Galvanized steel.
E. Door Curtain Slats: Flat profile slats of 2-5/8-inch center-to-center height.
F. Bottom Bar: Two angles, each not less than 1-1/2- by 1-1/2- by 1/8-inch thick; fabricated from hot-dip galvanized steel and finished to match door.
G. Curtain Jamb Guides: Galvanized steel with exposed finish matching curtain slats.
H. Hood: Match curtain material and finish.
   1. Mounting: Face of wall.
I. Locking Devices: Equip door with locking device assembly .
   1. Locking Device Assembly: Single-jamb side locking bars, operable from inside with thumb turn.
J. Electric Door Operator:
   1. Usage Classification: Standard duty, up to 25 cycles per hour and up to 90 cycles per day.
   2. Safety: Listed according to UL 325 by a qualified testing agency for commercial or industrial use.
   3. Motor Exposure: Interior.
   4. Motor Electrical Characteristics:
      a. Horsepower: 1/2 hp.
      b. Voltage: 120 V ac, single phase, 60 Hz.
   5. Emergency Manual Operation: Chain type.

6. Obstruction-Detection Device: Automatic photoelectric sensor.
7. Control Station(s): Interior mounted.

K. Curtain Accessories: Equip door with weatherseals.

L. Door Finish:
1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.
2. Interior Curtain-Slat Facing: Finish matching Architect's sample.

2.3 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate overhead coiling-door curtain of interlocking metal slats, designed to withstand wind loading indicated, in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:
1. Insulation: Fill slats for insulated doors with manufacturer's standard thermal insulation complying with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, according to ASTM E84 or UL 723. Enclose insulation completely within slat faces.
2. Metal Interior Curtain-Slat Facing: Match metal of exterior curtain-slat face, with minimum steel thickness of 0.010-inch and minimum aluminum thickness of 0.032-inch.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.5 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.
1. Include automatic drop baffle on fire-rated doors to guard against passage of smoke or flame.
2. Exterior-Mounted Doors: Fabricate hood to act as weather protection and with a perimeter sealant-joint-bead profile for applying joint sealant.

2.6 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

B. Chain Lock Keeper: Suitable for padlock.

C. Safety Interlock Switch: Equip power-operated doors with safety interlock switch to disengage power supply when door is locked.

2.7 CURTAIN ACCESSORIES

A. Smoke Seals: Equip each fire-rated door with replaceable smoke-seal perimeter gaskets or brushes for smoke and draft control as required for door listing and labeling by a qualified testing agency.
B. Weatherseals for Exterior Doors: Equip each exterior door with weather-stripping gaskets fitted to entire exterior perimeter of door for a weather-resistant installation unless otherwise indicated.

2.8 COUNTERBALANCE MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.
B. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 ELECTRIC DOOR OPERATORS

A. General: Electric door operator assembly of size and capacity recommended and provided by door manufacturer for door and operation-cycles requirement specified, with electric motor and factory-prewired motor controls, starter, gear-reduction unit, solenoid-operated brake, clutch, control stations, control devices, integral gearing for locking door, and accessories required for proper operation.
    1. Comply with NFPA 70.
    2. Control equipment complying with NEMA ICS 1, NEMA ICS 2, and NEMA ICS 6, with NFPA 70 Class 2 control circuit, maximum 24-V ac or dc.
B. Usage Classification: Electric operator and components capable of operating for not less than number of cycles per hour indicated for each door.
C. Motors: Reversible-type motor with controller (disconnect switch) for motor exposure indicated for each door assembly.
    1. Electrical Characteristics: Minimum as indicated for each door assembly. If not indicated, large enough to start, accelerate, and operate door in either direction from any position, at a speed not less than 8 inches/second and not more than 12 inches/second, without exceeding nameplate ratings or service factor.
    2. Operating Controls, Controllers, Disconnect Switches, Wiring Devices, and Wiring: Manufacturer's standard unless otherwise indicated.
D. Obstruction-Detection Devices: External entrapment protection consisting of indicated automatic safety sensor capable of protecting full width of door opening. For non-fire-rated doors, activation of device immediately stops and reverses downward door travel.
    1. Photoelectric Sensor: Manufacturer's standard system designed to detect an obstruction in door opening without contact between door and obstruction.
        a. Self-Monitoring Type: Designed to interface with door operator control circuit to detect damage to or disconnection of sensing device. When self-monitoring feature is activated, door closes only with sustained or constant pressure on close button.

E. Control Station: Three-button control station in fixed location with momentary-contact push-button controls labeled "Open" and "Stop" and sustained- or constant-pressure push-button control labeled "Close."
   1. Interior-Mounted Units: Full-guarded, surface-mounted, heavy-duty type, with general-purpose NEMA ICS 6, Type 1 enclosure.
   2. Exterior-Mounted Units: Full-guarded, standard-duty, surface-mounted, weatherproof type, NEMA ICS 6, Type 4 enclosure, key operated.

F. Emergency Manual Operation: Equip each electrically powered door with capability for emergency manual operation. Design manual mechanism so required force for door operation does not exceed 25 lbf.

G. Emergency Operation Disconnect Device: Equip operator with hand-operated disconnect mechanism for automatically engaging manual operator and releasing brake for emergency manual operation while disconnecting motor without affecting timing of limit switch. Mount mechanism so it is accessible from floor level. Include interlock device to automatically prevent motor from operating when emergency operator is engaged.

H. Motor Removal: Design operator so motor may be removed without disturbing limit-switch adjustment and without affecting emergency manual operation.

I. Audible and Visual Signals: Audible alarm and visual indicator lights in compliance with the accessibility standard.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install overhead coiling doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

3.2 FIELD QUALITY CONTROL

A. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
   1. Test door release, closing, and alarm operations when activated by smoke detector or building's fire-alarm system. Test manual operation of closed door. Reset door-closing mechanism after successful test.

B. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.

C. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.3 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain overhead coiling doors.

END OF SECTION

SECTION 08 41 13 - ALUMINUM-FRAMED ENTRANCES AND STOREFRONTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Aluminum-framed storefront systems.
   2. Aluminum-framed entrance door systems.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Sustainable Design Submittals:
   1. Include construction details, materials descriptions, dimensions and profiles of individual components and finishes.
   2. Product Data: For sealants, indicating VOC content.

C. Shop Drawings: For aluminum-framed entrances and storefronts. Include plans, elevations, sections, full-size details, and attachments to other Work.
   1. Show connection to and continuity with adjacent thermal, weather, and air.
   2. Include point-to-point wiring diagrams:
      a. Power requirements for each electrically operated device.
      b. Location and types of switches, signal device, conduit sizes, and number and size of wires.

D. Samples: For each type of exposed finish required.

E. Entrance Door Hardware Schedule: Prepared by or under supervision of supplier, detailing fabrication and assembly of entrance door hardware, as well as procedures and diagrams.

1.3 INFORMATIONAL SUBMITTALS

A. Energy Performance Certificates: NFRC-ceritified energy performance values from manufacturer.

B. Product Test Reports.

C. Field quality-control reports.

D. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data for Structural Sealant: For aluminum-framed entrances and storefronts to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.6 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of aluminum-framed entrances and storefronts that do not comply with requirements or that fail in materials or workmanship within specified warranty period.
   1. Warranty Period: 5 years from date of Substantial Completion.
B. Special Finish Warranty, Factory-Applied Finishes: Standard form in which manufacturer agrees to repair finishes or replace aluminum that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Warranty Period: 3 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Comply with performance requirements specified, as determined by testing of aluminum-framed entrances and storefronts representing those indicated for this Project without failure due to defective manufacture, fabrication, installation, or other defects in construction.
   1. Aluminum-framed entrances and storefronts shall withstand movements of supporting structure, including, but not limited to, twist, column shortening, long-term creep, and deflection from uniformly distributed and concentrated live loads.
   2. Failure also includes the following:
      a. Thermal stresses transferring to building structure.
      b. Glass breakage.
      c. Noise or vibration created by wind and thermal and structural movements.
      d. Loosening or weakening of fasteners, attachments, and other components.
      e. Failure of operating units.
B. Structural Loads:
   1. Wind Loads: As indicated on Drawings.
   2. Other Design Loads: As indicated on Drawings.
C. Deflection of Framing Members Supporting Glass: At design wind load, as follows:
   1. Deflection Normal to Wall Plane: Limited to edge of glass in a direction perpendicular to glass plane not exceeding 1/175 of the glass edge length for each individual glazing lite or an amount that restricts edge deflection of individual glazing lites to 3/4-inch whichever is less.
   2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8-inch, whichever is smaller.
D. Structural: Test in accordance with ASTM E330/E330M as follows:
   1. When tested at positive and negative wind-load design pressures, storefront assemblies, including entrance doors, do not evidence deflection exceeding specified limits.
   2. When tested at 150 percent of positive and negative wind-load design pressures, storefront assemblies, including entrance doors and anchorage, do not evidence material failures, structural distress, or permanent deformation of main framing members exceeding 0.2 percent of span.

E. Water Penetration under Static Pressure: Test in accordance with ASTM E331 as follows:
   1. No evidence of water penetration through fixed glazing and framing areas, including entrance doors, when tested in accordance with a minimum static-air-pressure differential of 20 percent of positive wind-load design pressure, but not less than 10 lbf/sq. ft.

F. Energy Performance: Certified and labeled by manufacturer for energy performance as follows:
   1. Thermal Transmittance (U-factor):
      a. Entrance Doors: U-factor of not more than 0.68 Btu/sq. ft. x h x degrees Fahrenheit as determined in accordance with NFRC 100.
   2. Solar Heat-Gain Coefficient (SHGC):
      a. Fixed Glazing and Framing Areas: SHGC for the system of not more than 0.40 as determined in accordance with NFRC 200.
      b. Entrance Doors: SHGC of not more than 0.40 as determined in accordance with NFRC 200.
   3. Air Leakage:
      a. Fixed Glazing and Framing Areas: Air leakage for the system of not more than 0.06 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft. when tested in accordance with ASTM E283.
      b. Entrance Doors: Air leakage of not more than 1.0 cfm/sq. ft. at a static-air-pressure differential of 1.57 lbf/sq. ft.
   4. Condensation Resistance Factor (CRF):
      a. Fixed Glazing and Framing Areas: CRF for the system of not less than 55 as determined in accordance with AAMA 1503.
      b. Entrance Doors: CRF of not less than 63 as determined in accordance with AAMA 1503.

G. Thermal Movements: Allow for thermal movements resulting from ambient and surface temperature changes.
   1. Temperature Change: 120 degrees Fahrenheit, ambient; 180 degrees Fahrenheit, material surfaces.

2.2 STOREFRONT SYSTEMS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Kawneer Trifab 401T (exterior) and Trifab 401 (interior) Framing System or comparable product by 1 of the following:
   1. Arcadia, Inc.
   2. Avanti Systems, Inc.
   3. CMI Architectural.
   4. Commercial Architectural Products, Inc.
   5. Coral Industries, Inc.
   6. EFCO Corporation.
   7. Kawneer North America, an Arconic company.
   8. Leed Himmel Industries, Inc.
   9. Manko Window Systems, Inc.
   10. Oldcastle BuildingEnvelope (OBE); CRH Americas.
   11. Pittco Architectural Metals, Inc.
   12. SAFTI FIRST Fire Rated Glazing Solutions.
   13. Trulite Glass & Aluminum Solutions, LLC.
   14. Tubelite Inc.
   15. U.S. Aluminum; a brand of C.R. Laurence.
   16. YKK AP America Inc.

B. Framing Members: Manufacturer's extruded- or formed-aluminum framing members of thickness required and reinforced as required to support imposed loads.
   1. Exterior Framing Construction: Thermally broken.
   2. Interior Vestibule Framing Construction: Nonthermal.
   3. Glazing System: Retained mechanically with gaskets on four sides.
   4. Glazing Plane: Centera.
   5. Finish: Clear anodic finish.
   6. Fabrication Method: Field-fabricated stick system.
   7. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.
   8. Steel Reinforcement: As required by manufacturer.

C. Backer Plates: Manufacturer's standard, continuous backer plates for framing members, if not integral, where framing abuts adjacent construction.

D. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

2.3 ENTRANCE DOOR SYSTEMS

A. Entrance Doors: Manufacturer's standard glazed entrance doors for manual-swing or automatic operation.
   1. Door Construction: 1-3/4-inch overall thickness, with minimum 0.125-inch thick, extruded-aluminum tubular rail and stile members. Mechanically fasten corners with reinforcing brackets that are deeply penetrated and fillet welded or that incorporate concealed tie rods.
      a. Thermal Construction: High-performance plastic connectors separate aluminum members exposed to the exterior from members exposed to the interior.
   2. Door Design: Medium stile; 3-1/2-inch nominal width.
   3. Glazing Stops and Gaskets: Square, snap-on, extruded-aluminum stops and preformed gaskets.
      a. Provide nonremovable glazing stops on outside of door.
   4. Finish: Match framing finish.

2.4 ENTRANCE DOOR HARDWARE

A. General:
   1. Door Hardware: Hardware not specified in this Section is specified in Section 08 71 00 "Door Hardware."
   2. Cylinders: As specified in Section 08 71 00 "Door Hardware."
   3. References to BHMA Standards A156.21, Provide products complying with these standards and requirements for description, quality, and function.

B. Hardware sets for aluminum doors located in Section 08 71 00 "Door Hardware."

C. Automatic and Self-Latching Flush Bolts: BHMA A156.3, Grade 1.

2.5 GLAZING

A. Glazing: Comply with Section 08 80 00 "Glazing."

B. Glazing Gaskets: Manufacturer's standard sealed-corner pressure-glazing system of black, resilient elastomeric glazing gaskets, setting blocks, and shims or spacers.

C. Glazing Sealants: As recommended by manufacturer.

2.6 MATERIALS

A. Sheet and Plate: ASTM B209.
B. Extruded Bars, Rods, Profiles, and Tubes: ASTM B221.
C. Extruded Structural Pipe and Tubes: ASTM B429/B429M.
D. Structural Profiles: ASTM B308/B308M.
E. Steel Reinforcement:
   1. Structural Shapes, Plates, and Bars: ASTM A36/A36M.
   2. Cold-Rolled Sheet and Strip: ASTM A1008/A1008M.
   3. Hot-Rolled Sheet and Strip: ASTM A1011/A1011M.
F. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

2.7 FABRICATION

A. Form or extrude aluminum shapes before finishing.
B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.
C. Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints with ends coped or mitered.
   3. Physical and thermal isolation of glazing from framing members.
   4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
   5. Provisions for field replacement of glazing from interior.
   6. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.
D. Mechanically Glazed Framing Members: Fabricate for flush glazing without projecting stops.
E. Entrance Door Frames: Reinforce as required to support loads imposed by door operation and for installing entrance door hardware.
F. Entrance Door Hardware Installation: Factory install entrance door hardware to the greatest extent possible. Cut, drill, and tap for factory-installed entrance door hardware before applying finishes.
G. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

2.8 ALUMINUM FINISHES

A. Clear Anodic Finish: AAMA 611, AA-M12C22A41, Class I, 0.018 mm or thicker.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with manufacturer's written instructions.
B. Do not install damaged components.

C. Fit joints to produce hairline joints free of burrs and distortion.
D. Rigidly secure nonmovement joints.
E. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration and to prevent impeding movement of moving joints.
F. Seal perimeter and other joints watertight unless otherwise indicated.
G. Metal Protection:
    1. Where aluminum is in contact with dissimilar metals, protect against galvanic action by painting contact surfaces with materials recommended by manufacturer for this purpose or by installing nonconductive spacers.
    2. Where aluminum is in contact with concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.
H. Set continuous sill members and flashing in full sealant bed, as specified in Section 07 92 00 "Joint Sealants," to produce weathertight installation.
I. Install joint filler behind sealant as recommended by sealant manufacturer.
J. Install components plumb and true in alignment with established lines and grades.

3.2 INSTALLATION OF GLAZING

A. Install glazing as specified in Section 08 80 00 "Glazing."

3.3 INSTALLATION OF ALUMINUM-FRAMED ENTRANCE DOORS

A. Install entrance doors to produce smooth operation and tight fit at contact points.
    1. Exterior Doors: Install to produce weathertight enclosure and tight fit at weather stripping.
    2. Field-Installed Entrance Door Hardware: Install surface-mounted entrance door hardware in accordance with entrance door hardware manufacturers' written instructions using concealed fasteners to greatest extent possible.

END OF SECTION

SECTION 08 71 00 - DOOR HARDWARE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes commercial door hardware for the following:
   1. Swinging doors.
   2. Sliding doors.
   3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:
   1. Mechanical door hardware.
   2. Electromechanical door hardware.
   3. Cylinders specified for doors in other sections.

C. Related Requirements:
   1. Division 01 Specification Sections apply to Work in this Section.
   2. Section 08 11 13 “Hollow Metal Doors and Frames.”
   3. Section 08 14 13 “Flush Wood Doors.”
   4. Section 08 41 13 “Aluminum-Framed Entrances and Storefronts.”

D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
   1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
   2. ICC/IBC - International Building Code.
   3. NFPA 70 - National Electrical Code.
   4. NFPA 80 - Fire Doors and Windows.
   5. NFPA 101 - Life Safety Code.
   6. NFPA 105 - Installation of Smoke Door Assemblies.
   7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
   1. ANSI/BHMA Certified Product Standards - A156 Series.
   2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
   3. ANSI/UL 294 - Access Control System Units.
   4. UL 305 - Panic Hardware.
   5. ANSI/UL 437- Key Locks.

1.2 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions, and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication, and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related Work to ensure proper size, thickness, hand, function, and finish of door hardware.
   1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
   2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
   3. Content: Include the following information:
      a. Type, style, function, size, label, hand, and finish of each door hardware item.
      b. Manufacturer of each item.
      c. Fastenings and other pertinent information.
      d. Location of door hardware set, cross-referenced to Drawings, both on floor Plans and in door and frame schedule.
      e. Explanation of abbreviations, symbols, and codes contained in schedule.
      f. Mounting locations for door hardware.
      g. Door and frame sizes and materials.
      h. Warranty information for each product.
   4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other Work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other Work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:
   1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
      a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
      b. Complete (risers, point-to-point) access control system block wiring diagrams.
      c. Wiring instructions for each electronic component scheduled herein.
   2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the Owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:
   1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer, and witnessed by a qualified independent testing agency.

F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Section 01 70 00 “Execution and Closeout Requirements.”

1.3 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose Work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Integrated Wiegand, Wireless, and IP-Enabled Access Control Products Supplier Qualifications: Integrated access control products and accessories are required to be supplied and installed through current members of the ASSA ABLOY "Authorized Channel Partner" (ACP) and "Certified Integrator" (CI) programs. Suppliers are to be factory trained, certified prior to project bid, and a direct purchaser of the specified product. Installers are to be factory trained, certified prior to project bid, and are responsible for commissioning, servicing, and warranting the installed equipment specified for the project.

F. Source Limitations: Obtain each type and variety of door hardware specified in this Section from a single source unless otherwise indicated.
   1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
   2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

G. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

H. Keying Conference: Conduct conference to comply with requirements in Section 01 60 00 "Product Requirements." Keying conference to incorporate the following criteria into the final keying schedule document:
   1. Function of building, purpose of each area and degree of security required.
   2. Plans for existing and future key system expansion.
   3. Requirements for key control storage and software.
   4. Installation of permanent keys, cylinder cores and software.
   5. Address and requirements for delivery of keys.

I. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Section 01 60 00 "Product Requirements" with attendance by representatives of supplier(s), installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
   1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal, and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
   2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory Work performed by other trades.
   3. Review sequence of operation narratives for each unique access controlled opening.
   4. Review and finalize construction schedule and verify availability of materials.
   5. Review the required inspecting, testing, commissioning, and demonstration procedures

J. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software, or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software, and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference."

1.5 COORDINATION

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other Work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other Work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.6 WARRANTY

A. General Warranty: Reference Section 01 30 00 “Administrative Requirements.” Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
   1. Structural failures including excessive deflection, cracking, or breakage.
   2. Faulty operation of the hardware.
   3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
   4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: 1 year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods:
   1. 10 years for mortise locks and latches.
   2. 5 years for exit hardware.
   3. 5 years for manual overhead door closer bodies.
   4. 10 years for manual overhead door closer bodies.
   5. 25 years for manual overhead door closer bodies.
   6. 5 years for motorized electric latch retraction exit devices.
   7. 2 years for electromechanical door hardware, unless noted otherwise.

1.7 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

A. General: Provide door hardware for each door to comply with requirements in Section 08 71 00 “Door Hardware” and each referenced Section that products are to be supplied under.

B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Section 08 71 00 “Door Hardware” at the end of Part 3. Products are identified by using door hardware designations, as follows:
   1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.

C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the Specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Section 01 33 00 “Substitution Procedures.” Approval of requests is at the discretion of the Architect, Owner, and their designated consultants.

2.2 HANGING DEVICES

A. Hinges: ANSI/BHMA A156.1 certified butt hinge with number of hinge knuckles and other options as specified in the 08 71 00 “Door Hardware” Section.
   1. Quantity: Provide the following hinge quantity:
      a. 2 Hinges: For doors with heights up to 60 inches.
      b. 3 Hinges: For doors with heights 61 to 90 inches.
      c. 4 Hinges: For doors with heights 91 to 120 inches.
      d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
   2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
      a. Widths up to 3-foot-0-inch: 4-1/2 inches standard or heavy weight as specified.
      b. Sizes from 3-foot-1-inch to 4-foot-0-inch: 5 inches standard or heavy weight as specified.
   3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
      a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
      b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
   4. Hinge Options: Comply with the following:
      a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
   5. Manufacturers:
      a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK).

B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 certified continuous geared hinge with minimum 0.120-inch thick extruded 6060 T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible, and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
   1. Manufacturers:
      a. Pemko (PE).

C. Pivots: ANSI/BHMA A156.4, Grade 1, certified. Space intermediate pivots equally not less than 25 inches on center apart or not more than 35 inches on center for doors over 121 inches high. Pivot hinges to have oil impregnated bronze bearing in the top pivot and a radial roller and thrust bearing in the bottom pivot with the bottom pivot designed to carry the full weight of the door. Pivots to be UL listed for windstorm where applicable.
   1. Manufacturers:
      a. Norton Rixson (RF).

2.3 POWER TRANSFER DEVICES

A. Electrified Quick Connect Continuous Geared Transfer Hinges: Provide electrified transfer continuous geared hinges with a removable service panel cutout accessible without de-mounting door from the frame. Furnish with Molex™ standardized plug connectors with sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
   1. Manufacturers:
      a. Pemko (PE) - SER-QC (# wires) Option.

B. Electrified Quick Connect Intermediate Transfer Pivots: Provide electrified offset intermediate transfer pivot hinges with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
   1. Manufacturers:
      a. Norton Rixson (RF) - E-M19-QC (# wires).

C. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to 12 wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of 2 per electrified opening.
   1. Provide 1 each of the following tools as part of the base bid contract:
      a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Electrical Connecting Kit: QC-R001.
      b. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - Connector Hand Tool: QC-R003.
   2. Manufacturers:
      a. McKinney Products; ASSA ABLOY Architectural Door Accessories (MK) - QC-C Series.

2.4 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: ANSI/BHMA A156.3 and A156.16, Grade 1, certified.
   1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately 6 feet from the floor.
   2. Furnish dust proof strikes for bottom bolts.
   3. Surface bolts to be minimum 8 inches in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
   4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
   5. Manufacturers:
      a. Rockwood (RO).

B. Coordinators: ANSI/BHMA A156.3 certified door coordinators consisting of active-leaf, hold-open lever, and inactive-leaf release trigger. Model as indicated in hardware sets.
   1. Manufacturers:
      a. Rockwood (RO).

C. Door Push Plates and Pulls: ANSI/BHMA A156.6 certified door pushes and pulls of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
   1. Push/Pull Plates: Minimum 1/2-inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
   2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
   3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2-1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
   4. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
   5. Manufacturers:
      a. Rockwood (RO).

2.5 CYLINDERS AND KEYING

A. General: Cylinder manufacturer to have minimum 10 years' experience designing secured master key systems and have on record a published security keying system policy.

B. Source Limitations: Obtain each type of keyed cylinder and keys from the same source manufacturer as locksets and exit devices, unless otherwise indicated.

C. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
   1. Threaded mortise cylinders with rings and cams to suit hardware application.
   2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
   3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
   4. Tubular deadlocks and other auxiliary locks.
   5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
   6. Keyway: Match Facility Standard.

D. Keying System: Each type of lock and cylinders to be factory keyed.
   1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
   2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
   3. Existing System: Field verify and key cylinders to match Owner's existing system.

E. Key Quantity: Provide the following minimum number of keys:
   1. Change Keys per Cylinder: 2.
   2. Master Keys (per Master Key Level/Group): 5.
   3. Construction Keys (where required): 10.

F. Construction Keying: Provide construction master keyed cylinders.

G. Key Registration List (Bitting List):
   1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
   2. Provide transcript list in writing or electronic file as directed by the Owner.

2.6 MECHANICAL LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed. Locksets are to be manufactured with a corrosion resistant steel case and be field-reversible for handing without disassembly of the lock body.
   1. Manufacturers:
      a. Yale Commercial (YA) - 8800FL Series.

2.7 INTEGRATED WIRED OUTPUT LOCKING DEVICES – MULTI-CLASS READER

A. Integrated Wired Output Multi-Class Mortise Locks: Wiegand or Open Supervised Device Protocol (OSDP) output ANSI A156.13, Grade 1, mortise lockset with integrated card reader with or without keypad option, request-to-exit signaling, door position status switch, and latch bolt monitoring in 1 complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle trim, 3/4-inch deadlocking anti-friction latch, and 1-inch case-hardened steel deadbolt. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.
   1. Open Architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand or OSDP compatible access control systems. Latch bolt monitoring and door position switch act in conjunction to report door-in-frame (DPS) and door latched (door closed and latched) conditions.
   2. Integrated reader supports the following credentials:
      a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.
      b. 13.56 MHz proximity credentials: HID Secure Identity Object™ (SIO) on iCLASS Seos, HID iCLASS, HID iCLASS SE/SR, MIFARE Classic, DESFire EV1 and EV2.
      c. 2.4 GHz credentials: Secure Identity Object™ (SIO) on Mobile IDs (Bluetooth Smart).
      d. ISO14443A/B (PIV-compatible Transparent FASC-N read) available with pivCLASS variant.
      e. NFC-enabled mobile phones.
      f. PIN code only or PIN + credential with keypad option.
   3. 12VDC external power supply required for reader and lock, with optional 24VDC lock solenoid. Fail safe or fail secure options.
   4. Energy Efficient Design: Provide lock bodies which have a holding current draw of 500mA maximum and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
   5. Support end-of-line resistors contained within the lock case.
   6. Installation requires only 1 cable run from the lock to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
   7. Installation to include manufacturer's access control panel interface board or module where required for Wiegand or OSDP output protocol.
   8. Manufacturers:
      a. Corbin Russwin (RU) – ML2000 SN Series.
      b. Sargent Manufacturing (SA) – SN200/SN210 8200 Series.

2.8 AUXILIARY LOCKS

A. Narrow Case Deadlocks and Deadlatches: ANSI/BHMA 156.13 Series 1000 Grade 1 certified narrow case deadlocks and deadlatches for swinging or sliding door applications. All functions shall be manufactured in a single sized case formed from 12 gauge minimum, corrosion resistant steel (option for fully stainless-steel case and components). Provide minimum 2 7/8-inch throw laminated stainless-steel bolt. Bottom rail deadlocks to have 3/8-inch diameter bolts.
   1. Manufacturers:
      a. Adams Rite Manufacturing (AD) - MS1850S / MS1950 Series.

2.9 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
   1. Flat-Lip Strikes: For locks with 3-piece antifriction latch bolts, as recommended by manufacturer.
   2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
   3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
   4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:
   1. Strikes for Mortise Locks and Latches: BHMA A156.13.
   2. Strikes for Bored Locks and Latches: BHMA A156.2.
   3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
   4. Dustproof Strikes: BHMA A156.16.

2.10 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
   1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
   2. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware." Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
   3. Except on fire rated doors, provide exit devices with hex key dogging device to hold the push bar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
   4. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

5. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
6. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
7. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2 inches wide stiles.
8. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
9. Rail Sizing: Provide exit device rails factory sized for proper door width application.
10. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be stainless-steel, pullman type, with deadlock feature.
    1. Manufacturers:
        a. Yale (YA) - 7000 Series.

C. Security Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed rim panic and fire exit hardware devices furnished in the functions specified in the Hardware Sets. Exit device latch to be constructed of high grade, heat treated, corrosion resistant nickel steel alloy, and have a full 3/4-inch throw projection with slide action positive deadlocking.
    1. Static Load Force Resistance: Minimum 3000lbs certified independent tested.
    2. Manufacturers:
        a. Corbin Russwin Hardware (RU) - ED4000S / ED5000S Series.
        b. Yale (YA) - 7050 Series.

2.11 ELECTROMECHANICAL EXIT DEVICES

A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.
    1. Energy Efficient Design: Provide devices which have a holding current draw of 15mA maximum and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
    2. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
    3. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
    4. Manufacturers:
        a. Yale (YA) - 7000 Series.

2.12 INTEGRATED WIRED OUTPUT EXIT DEVICES - MULTI-CLASS READER

A. Integrated Wired Output Multi-Class Exit Hardware: Wiegand output ANSI 156.3 Grade 1 rim, mortise, and vertical rod exit device hardware with integrated card reader with or without keypad option, latch bolt and touch bar monitoring, and request-to-exit signaling, in 1 complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle exit trim with 3/4-inch throw latch bolt. U.L listed and labeled for either panic or "fire exit hardware" for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.
   1. Open Architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand or OSDP compatible access control systems. Inside push bar (request-to-exit) signaling and door position (open/closed status) monitoring (via separately connected DPS).
   2. Integrated reader supports the following credentials:
      a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.
      b. 13.56 MHz proximity credentials: HID Secure Identity Object™ (SIO) on iCLASS Seos, HID iCLASS, HID iCLASS SE/SR, MIFARE Classic, DESFire EV1 and EV2.
      c. 2.4 GHz credentials: Secure Identity Object™ (SIO) on Mobile IDs (Bluetooth Smart).
      d. ISO14443A/B (PIV-compatible Transparent FASC-N read) available with pivCLASS variant.
      e. NFC-enabled mobile phones.
      f. PIN code only or PIN + credential with keypad option.
   3. 12VDC external power supply required for reader. 24VDC required for solenoid operated exit trim. Fail safe or fail secure options.
   4. Installation requires only 1 cable run from the exit hardware to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
   5. Competitor Alternates Allowed Option: Installation to include manufacturer's access control panel interface board or module where required for Wiegand or OSDP output protocol.
   6. Manufacturers:
      a. Corbin Russwin (RU) – ED5000 SN Series.
      b. Sargent Manufacturing (SA) – SN200/SN210 80 Series.

2.13 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:
   1. General: Door closers to be from 1 manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
   2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
   3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
   4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

5. Closers shall not be installed on exterior or corridor side of doors, where possible install closers on door for optimum aesthetics.
6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Unitrol): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted closers with door stop mechanism to absorb dead stop shock on arm and top hinge. Hold-open arms to have a spring loaded mechanism in addition to shock absorber assembly. Arms to be provided with rigid steel main arm and secondary arm lengths proportional to the door width.
1. Manufacturers:
a. Yale Commercial (YA) - Unitrol Series.

C. Door Closers, Surface Mounted (Commercial Duty): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, institutional grade door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, 1 piece cast iron or aluminum alloy body construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.
1. Manufacturers:
a. Yale Commercial (YA) - 3500 Series.
b. Yale Commercial (YA) - 5800 Series.

D. Door Closers, Overhead Concealed (Narrow Profile): ANSI/BHMA 156.4 Grade 1 Certified Products Directory (CPD) listed door closers designed for narrow profile frames and doors. Closers to have fully concealed body in the frame head for offset hung applications, with separate and independent valves for closing speed and backcheck adjustments and a decorative cover plate.
1. Manufacturers:
a. Norton Rixson (RF) - 91DCP Series.

2.14 ARCHITECTURAL TRIM

A. Door Protective Trim
1. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
2. Size: Fabricate protection plates (kick, armor, or mop) not more than 2 inches less than door width (LDW) on stop side of single doors and 1-inch LDW on stop side of pairs of doors, and not more than 1-inch less than door width on pull side. Coordinate and provide proper width and height as required where conflicting hardware dictates. Height to be as specified in the Hardware Sets.
3. Where plates are applied to fire rated doors with the top of the plate more than 16 inches above the bottom of the door, provide plates complying with NFPA 80. Consult manufacturer’s catalog and template book for specific requirements for size and applications.
4. Protection Plates: ANSI/BHMA A156.6 certified protection plates (kick, armor, or mop), fabricated from the following:
a. Stainless-Steel: 300 grade, 1/2-inch thick.
5. Options and fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets. Provide countersunk screw holes.
6. Manufacturers:
a. Rockwood (RO).

2.15 DOOR STOPS AND HOLDERS

A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 certified door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of doorstops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
   1. Manufacturers:
      a. Rockwood (RO).

C. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm, and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
   1. Manufacturers:
      a. Norton Rixson (RF).
      b. Rockwood (RO).

2.16 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
   1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
   1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:
   1. Pemko (PE).

2.17 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1-inch diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
   1. Manufacturers:
      a. Securitron (SU) - DPS Series.

B. Switching Power Supplies: Provide power supplies with either single or dual voltage configurations at 12 or 24VDC. Power supplies shall have battery backup function with an integrated battery charging circuit and shall provide capability for power distribution, direct lock control and Fire Alarm Interface (FAI) through add on modules. Power supplies shall be expandable up to 16 individually protected outputs. Output modules shall provide individually protected, continuous outputs and/or individually protected, relay controlled outputs.
   1. Manufacturers:
      a. Securitron (SU) - AQD Series.

2.18 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.19 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify Architect of any discrepancies or conflicts between the door schedule, door types, Drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to Specifications.
   1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including hanging devices; locking devices; closing devices; and seals.
B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
   1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
   2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
   3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
   4. Provide blocking in drywall partitions where wall stops, or other wall mounted hardware is located.
C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing Work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Section 07 92 00 "Joint Sealants."
E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the Work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

A. Field Inspection (Punch Report): Reference Section 01 70 00 “Execution and Closeout Requirements.” Produce Project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating, and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
   1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

3.6 CLEANING AND PROTECTION

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
B. Clean adjacent surfaces soiled by door hardware installation.
C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Owner occupancy.

3.7 DEMONSTRATION

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 DOOR HARDWARE SETS

A. The hardware sets represent the design intent and direction of the Owner and Architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware, and missing items should be brought to the attention of the Architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
   1. Quantities listed are for each pair of doors, or for each single door.
   2. The supplier is responsible for handing and sizing all products.
   3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
   4. At existing openings with new hardware, the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will Work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer’s Abbreviations:
   1. MK - McKinney
   2. PE - Pemko
   3. RF - Rixson
   4. RO - Rockwood
   5. AD - Adams Rite
   6. YA - Yale
   7. RU - Corbin Russwin
   8. OT - Other
   9. SU - Securitron

Hardware Sets

Set: 1.0

Doors: C100B, C112C, C113A, C115C, C115D
Description: EXTERIOR STOREFRONT PAIR CARD READER

2	Pivot Set	147	626	RF	087100	
1	Intermediate Pivot	M19	626	RF	087100	
1	Electrified Inter Pivot	EM19 QC-12	626	RF	087100	⚡
1	Surface Vert Rod Exit, Exit Only, LBR	ED5400 EO M55	630	RU	087100	
1	Access Control SVR, LBR	ED5400N K157 9S605ET-SN200 BIPS B0E M55 MELR	630	RU	087100	⚡
1	Mortise Cylinder	Match Facility Standard	630		087100	
2	Door Pull	RM7340-36	US32D	RO	087100	
2	Surface Closer w/ Stop	UNI4400	689	YA	087100	
1	Threshold	2715AK		PE	087100	
1	Rain Guard	346C + 4" ODW		PE	087100	
1	Perimeter Seals	By Storefront Mfr		OT		
2	Sweep	345CNB		PE	087100	
1	Astragal	By Storefront Mfr		OT		
1	ElectroLynx Harness	QC-C006P		MK	087100	⚡
1	ElectroLynx Harness	QC-C1500P		MK	087100	⚡
1	Position Switch	DPS-M-GY		SU	087100	⚡
1	Power Supply	AQD1		SU	087100	⚡

Set: 2.0

Doors: C107C
Description: EXTERIOR STOREFRONT PAIR

2	Pivot Set	147	626	RF	087100	
2	Intermediate Pivot	M19	626	RF	087100	
1	Concealed Vert Rod Exit, Exit Only	7160 EO	630	YA	087100	
1	Concealed Vert Rod Exit, Nightlatch	7160 121NL	630	YA	087100	
1	Mortise Cylinder	Match Facility Standard	630		087100	
2	Door Pull	RM7340-36	US32D	RO	087100	
2	Surface Closer w/ Stop	UNI4400	689	YA	087100	
1	Threshold	2715AK		PE	087100	
1	Rain Guard	346C + 4" ODW		PE	087100	
1	Perimeter Seals	By Storefront Mfr		OT		
2	Sweep	345CNB		PE	087100	
1	Astragal	By Storefront Mfr		OT		

Notes: PANIC DEVICES TO BE DOGGED DURING DESIGNATED HOURS, RENDERING TO PUSH/PULL.

Set: 3.0

Doors: F100B
Description: EXTERIOR STOREFRONT SGL CARD READER

1	Pivot Set	147	626	RF	087100	
1	Electrified Inter Pivot	EM19 QC-12	626	RF	087100	⚡
1	Access Control Rim Exit	ED5200SN K157 9605ET-SN200 BIPS B0E MELR	630	RU	087100	⚡
1	Rim Cylinder	Match Facility Standard	630		087100	
1	Door Pull	RM7340-36	US32D	RO	087100	
1	Surface Closer w/ Stop	UNI4400	689	YA	087100	
1	Threshold	2715AK		PE	087100	
1	Rain Guard	346C + 4" ODW		PE	087100	
1	Perimeter Seals	By Storefront Mfr		OT		
1	Sweep	345CNB		PE	087100	
1	ElectroLynx Harness	QC-C006P		MK	087100	⚡
1	ElectroLynx Harness	QC-C1500P		MK	087100	⚡
1	Power Supply	AQD1		SU	087100	⚡

Set: 4.0

Doors: F115A

Description: EXTERIOR HM PAIR CARD READER (LOCK)

1	Continuous Hinge	CFM x Height Req x HD1		PE	087100	
1	Continuous Hinge	CFM x Height Req x HD1 SER12		PE	087100	⚡
1	Flush Bolt Set	2842	US26D	RO	087100	
1	Dust Proof Strike	570	US26D	RO	087100	
1	Access Control Mort Lock	ML20606 x SN200-SEC 106X BIPS B0E	626	RU	087100	⚡
1	Mortise Cylinder	Match Facility Standard	626		087100	
1	Coordinator	2672	US28	RO	087100	
2	Surface Closer w/ Stop	UNI4400	689	YA	087100	
2	Kick Plate	K1050 10" x 1" LDW CSK BEV	US32D	RO	087100	
1	Threshold	2715AK		PE	087100	
1	Gasketing	2891AV		PE	087100	
1	Rain Guard	346C + 4" ODW		PE	087100	
2	Sweep	345CNB		PE	087100	
1	Astragal	18041CNB		PE	087100	
1	ElectroLynx Harness	QC-C1500P		MK	087100	⚡
1	ElectroLynx Harness	QC-C300P		MK	087100	⚡
1	Position Switch	DPS-M-GY		SU	087100	⚡
1	Power Supply	AQD1		SU	087100	⚡

Set: 5.0

Doors: B100A, B105G, C1B, C2A, D100A, D100C, E100B, E100E, F109B, F120B, F120C
Description: EXTERIOR HM SGL CARD READER (PANIC)

1	Continuous Hinge	CFM x Height Req x HD1 SER12		PE	087100	⚡
1	Access Control Rim Exit	ED5200SN K157 9605ET-SN200 BIPS B0E MELR	630	RU	087100	⚡
1	Rim Cylinder	Match Facility Standard	630		087100	
1	Door Pull	RM7340-36	US32D	RO	087100	
1	Surface Closer w/ Stop	UNI4400	689	YA	087100	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100	
1	Threshold	2715AK		PE	087100	
1	Gasketing	2891AV		PE	087100	
1	Rain Guard	346C + 4" ODW		PE	087100	
1	Sweep	345CNB		PE	087100	
1	ElectroLynx Harness	QC-C006P		MK	087100	⚡
1	ElectroLynx Harness	QC-C1500P		MK	087100	⚡
1	Power Supply	AQD1		SU	087100	⚡

Set: 6.0

Doors: C119A, C124A, C127A
Description: EXTERIOR HM SGL CARD READER (LOCK)

1	Continuous Hinge	CFM x Height Req x HD1 SER12		PE	087100	⚡
1	Access Control Mort Lock	ML20606 x SN200-SEC 106X BIPS B0E	626	RU	087100	⚡
1	Mortise Cylinder	Match Facility Standard	626		087100	
1	Surface Closer w/ Stop	UNI4400	689	YA	087100	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100	
1	Threshold	2715AK		PE	087100	
1	Gasketing	2891AV		PE	087100	
1	Rain Guard	346C + 4" ODW		PE	087100	
1	Sweep	345CNB		PE	087100	
1	ElectroLynx Harness	QC-C1500P		MK	087100	⚡
1	ElectroLynx Harness	QC-C300P		MK	087100	⚡
1	Power Supply	AQD1		SU	087100	⚡

Set: 7.0

Doors: C106A, C117A
Description: EXTERIOR HM SGL STOREROOM FUNCTION OUTSWING

1	Continuous Hinge	CFM x Height Req x HD1		PE	087100
1	Storeroom Lock	TSR6 8805RL	626	YA	087100
1	Mortise Cylinder	Match Facility Standard	626		087100
1	Surface Closer w/ Stop	5831	689	YA	087100
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100
1	Threshold	2715AK		PE	087100
1	Gasketing	2891AV		PE	087100
1	Rain Guard	346C + 4" ODW		PE	087100
1	Sweep	345CNB		PE	087100

Set: 8.0

Doors: F103A, F117
Description: EXTERIOR HM SGL STOREROOM FUNCTION INSWING

1	Continuous Hinge	CFM x Height Req x HD1		PE	087100
1	Storeroom Lock	TSR6 8805RL	626	YA	087100
1	Mortise Cylinder	Match Facility Standard	626		087100
1	Surface Closer	5801	689	YA	087100
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100
1	Threshold	2715AK		PE	087100
1	Gasketing	2891AV		PE	087100
1	Sweep	345CNB		PE	087100

Set: 9.0

Doors: A100A
Description: CARD READER INSWING X SEALS / THRESHOLD

1	Continuous Hinge	CFM x Height Req x HD1 SER12		PE	087100	⚡
1	Access Control Mort Lock	ML20606 x SN200-SEC 106X BIPS B0E	626	RU	087100	⚡
1	Mortise Cylinder	Match Facility Standard	626		087100	
1	Surface Closer	5801	689	YA	087100	
1	Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100	
1	Wall Stop	409	US32D	RO	087100	
1	Threshold	2715AK		PE	087100	
1	Gasketing	2891AV		PE	087100	
1	Sweep	345CNB		PE	087100	
1	ElectroLynx Harness	QC-C1500P		MK	087100	⚡
1	ElectroLynx Harness	QC-C300P		MK	087100	⚡
1	Power Supply	AQD1		SU	087100	⚡

Set: 10.0

Doors: C107B
Description: STOREFRONT PAIR CARD READER

2	Pivot Set	147	626	RF	087100	
1	Intermediate Pivot	M19	626	RF	087100	
1	Electrified Inter Pivot	EM19 QC-12	626	RF	087100	⚡
1	Surface Vert Rod Exit, Exit Only, LBR	ED5400 EO M55	630	RU	087100	
1	Access Control SVR, LBR	ED5400N K157 9S605ET-SN200 BIPS B0E M55 MELR	630	RU	087100	⚡
1	Mortise Cylinder	Match Facility Standard	630		087100	
2	Door Pull	RM7340-36	US32D	RO	087100	
2	Surface Closer w/ Stop	UNI4400	689	YA	087100	
1	Perimeter Seals	By Storefront Mfr		OT		
1	Astragal	By Storefront Mfr		OT		
1	ElectroLynx Harness	QC-C006P		MK	087100	⚡
1	ElectroLynx Harness	QC-C1500P		MK	087100	⚡
1	Position Switch	DPS-M-GY		SU	087100	⚡
1	Power Supply	AQD1		SU	087100	⚡

Set: 11.0

Doors: B101A, B102A, B103A, C103A, C131A, C132A, C133A, C211A, C212A, C216A, C217A, C218A, C219A, C220A, C221A, F107A, F111A

Description: OFFICE FUNCTION (NO CLOSER)

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1	Entry Lock	TSR6 8807RL	626	YA	087100
1	Mortise Cylinder	Match Facility Standard	626		087100
1	Wall Stop	409	US32D	RO	087100
3	Silencer	608-RKW		RO	087100

Set: 12.0

Doors: F108A

Description: OFFICE FUNCTION (NO CLOSER) SEALS / THRESHOLD

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1	Entry Lock	TSR6 8807RL	626	YA	087100
1	Mortise Cylinder	Match Facility Standard	626		087100
1	Wall Stop	409	US32D	RO	087100
1	Threshold	2715AK		PE	087100
1	Gasketing	2891AV		PE	087100
1	Sweep	345CNB		PE	087100

Set: 13.0

Doors: C113B

Description: STOREFRONT PAIR ENTRY FUNCTION INSWING

2	Pivot Set	147	626	RF	087100
2	Intermediate Pivot	M19	626	RF	087100
1	Header Bolt	4085	603	AD	087100
1	Mortise Deadlock	MS1850S	628	AD	087100
1	Cylinder (Thumbturn)	4066	130	AD	087100
1	Mortise Cylinder	Match Facility Standard	626		087100
4	Door Pull	RM7340-36 Mtg-Type 16	US32D	RO	087100
2	Concealed Closer w/ Stop	91NDCP 90N	689	RF	087100
1	Perimeter Seals	By Storefront Mfr		OT	
1	Astragal	By Storefront Mfr		OT	

Set: 14.0

Doors: C204A, C204B, C222A
Description: CLASSROOM FUNCTION (NO CLOSER)

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Classroom Lock	TSR6 8808RL	626	YA	087100
1 Mortise Cylinder	Match Facility Standard	626		087100
1 Wall Stop	409	US32D	RO	087100
3 Silencer	608-RKW		RO	087100

Set: 15.0

Doors: D101A
Description: CLASSROOM FUNCTION INSWING X SEALS / THRESHOLD

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Classroom Lock	TSR6 8808RL	626	YA	087100
1 Mortise Cylinder	Match Facility Standard	626		087100
1 Surface Closer	5801	689	YA	087100
1 Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100
1 Wall Stop	409	US32D	RO	087100
1 Threshold	2715AK		PE	087100
1 Gasketing	2891AV		PE	087100
1 Sweep	345CNB		PE	087100

Set: 16.0

Doors: C104A, C203B, C222B, F104A, F114A
Description: STOREROOM FUNCTION (NO CLOSER)

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Storeroom Lock	TSR6 8805RL	626	YA	087100
1 Mortise Cylinder	Match Facility Standard	626		087100
1 Wall Stop	409	US32D	RO	087100
3 Silencer	608-RKW		RO	087100

Set: 17.0

Doors: F110B
Description: STOREROOM FUNCTION (NO CLOSER) OH STOP

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1	Storeroom Lock	TSR6 8805RL	626	YA	087100
1	Mortise Cylinder	Match Facility Standard	626		087100
1	Surf Overhead Stop	9-336	689	RF	087100
3	Silencer	608-RKW		RO	087100

Set: 18.0

Doors: F110A
Description: STOREROOM FUNCTION (NO CLOSER) OH STOP X SEALS / THRESHOLD

3	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1	Storeroom Lock	TSR6 8805RL	626	YA	087100
1	Mortise Cylinder	Match Facility Standard	626		087100
1	Surf Overhead Stop	9-336	689	RF	087100
1	Threshold	2715AK		PE	087100
1	Gasketing	2891AV		PE	087100
1	Sweep	345CNB		PE	087100

Set: 19.0

Doors: C112A, C115B
Description: STOREROOM FUNCTION PAIR (NO CLOSER)

6	Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1	Flush Bolt (Top)	557	US26D	RO	087100
1	Storeroom Lock	TSR6 8805RL	626	YA	087100
1	Mortise Cylinder	Match Facility Standard	626		087100
2	Wall Stop	409	US32D	RO	087100
1	Astragal	18041CNB		PE	087100
2	Silencer	608-RKW		RO	087100

Set: 20.0

Doors: C109A, C215A
Description: STOREROOM FUNCTION INSWING

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Storeroom Lock	TSR6 8805RL	626	YA	087100
1 Mortise Cylinder	Match Facility Standard	626		087100
1 Surface Closer	3501	689	YA	087100
1 Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100
1 Wall Stop	409	US32D	RO	087100
3 Silencer	608-RKW		RO	087100

Set: 21.0

Doors: C107A, F101A, F102A
Description: PRIVACY FUNCTION INSWING

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Privacy Lock w/ Indicator	TSR6 8802RL IND	626	YA	087100
1 Surface Closer	3501	689	YA	087100
1 Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100
1 Mop Plate	K1050 6" x 1" LDW CSK BEV	US32D	RO	087100
1 Wall Stop	409	US32D	RO	087100
3 Silencer	608-RKW		RO	087100

Set: 22.0

Doors: F112A
Description: PASSAGE FUNCTION (NO CLOSER)

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Passage Latch	TSR6 8801RL	626	YA	087100
1 Wall Stop	409	US32D	RO	087100
3 Silencer	608-RKW		RO	087100

Set: 23.0

Doors: C115A
Description: PASSAGE FUNCTION PAIR (NO CLOSER)

6 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Flush Bolt (Top)	557	US26D	RO	087100
1 Passage Latch	TSR6 8801RL	626	YA	087100
2 Wall Stop	409	US32D	RO	087100
1 Astragal	305CN		PE	087100
2 Silencer	608-RKW		RO	087100

Set: 24.0

Doors: C112B
Description: PASSAGE FUNCTION CVR PAIR

6 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
2 Concealed Vert Rod Exit, Passage	7160 LBR TS628F	630	YA	087100
2 Surface Closer	3521	689	YA	087100
2 Kick Plate	K1050 10" x 1" LDW CSK BEV	US32D	RO	087100
2 Wall Stop	409	US32D	RO	087100
1 Astragal	305CN		PE	087100
2 Silencer	608-RKW		RO	087100

Set: 25.0

Doors: F108B
Description: PASSAGE FUNCTION CVR PAIR X THRESHOLD

6 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
2 Concealed Vert Rod Exit, Passage	7160 LBR TS628F	630	YA	087100
2 Surface Closer w/ Stop	5831	689	YA	087100
2 Kick Plate	K1050 10" x 1" LDW CSK BEV	US32D	RO	087100
1 Threshold	2715AK		PE	087100
2 Sweep	345CNB		PE	087100
1 Astragal	18041CNB		PE	087100
2 Silencer	608-RKW		RO	087100

Set: 26.0

Doors: B105E, B105F, D100E, F120A
Description: PASSAGE FUNCTION PANIC X SEALS / THRESHOLD

1 Continuous Hinge	CFM x Height Req x HD1		PE	087100
1 Rim Exit Device, Passage	7150 TS628F	630	YA	087100
1 Surface Closer	5801	689	YA	087100
1 Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100
1 Wall Stop	409	US32D	RO	087100
1 Threshold	2715AK		PE	087100
1 Gasketing	2891AV		PE	087100
1 Sweep	345CNB		PE	087100

Set: 27.0

Doors: C1A, C1C, C2B, C2C
Description: PASSAGE FUNCTION PANIC FIRE RATED

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Fire Rated Rim Exit, Passage	7150F TS628F	630	YA	087100
1 Surface Closer	3501	689	YA	087100
1 Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100
1 Wall Stop	409	US32D	RO	087100
1 Gasketing	S88D 17'		PE	087100

Set: 28.0

Doors: C100A, F100A
Description: PASSAGE FUNCTION PANIC

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Rim Exit Device, Passage	7150 TS628F	630	YA	087100
1 Surface Closer	3521	689	YA	087100
1 Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100
1 Wall Stop	409	US32D	RO	087100
3 Silencer	608-RKW		RO	087100

Set: 29.0

Doors: C205A, C206A, F105A, F106A
Description: PUSH / PULL INSWING

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Push Plate	70C-RKW	US32D	RO	087100
1 Door Pull	RM7310-12	US32D	RO	087100
1 Surface Closer	3501	689	YA	087100
1 Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100
1 Mop Plate	K1050 6" x 1" LDW CSK BEV	US32D	RO	087100
1 Wall Stop	409	US32D	RO	087100
3 Silencer	608-RKW		RO	087100

Set: 30.0

Doors: C126A, C129A
Description: PUSH / PULL OUTSWING

3 Hinge, Full Mortise	TA2714 4-1/2" x 4-1/2"	US26D	MK	087100
1 Push Plate	70C-RKW	US32D	RO	087100
1 Door Pull	RM7310-12	US32D	RO	087100
1 Surface Closer	3521	689	YA	087100
1 Kick Plate	K1050 10" x 2" LDW CSK BEV	US32D	RO	087100
1 Wall Stop	409	US32D	RO	087100
3 Silencer	608-RKW		RO	087100

Set: 31.0

Doors: B106, B107, B108, D100B, D100D, D107A
Description: SLIDING CHAIN LINK GATE

1 Padlock	PD416 x Match Facility Keyway		YA	087100
1 Balance of Hardware	By Assembly Mfr		OT	

Set: 32.0

Doors: B105A, B105B, B105C, B105D, D108A, D108B, D109A, D109B, E100A, E100C, E100D, F109A, F121A, F121B, F122A, F122B, F123A, F123B

Description: OVERHEAD DOOR

1	Balance of Hardware	By Assembly Mfr	OT

END OF SECTION

SECTION 08 80 00 - GLAZING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Glass products.
   2. Laminated glass.
   3. Insulating glass.
   4. Miscellaneous glazing materials.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters in accordance with ASTM C1036.

C. IBC: International Building Code.

D. Interspace: Space between lites of an insulating-glass unit.

1.3 COORDINATION

A. Coordinate glazing channel dimensions to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances to achieve proper safety margins for glazing retention under each design load case, load case combination, and service condition.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Glass Samples: For each type of glass product other than clear monolithic vision glass; 12 inches square.

C. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

D. Delegated Design Submittal: For glass indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by qualified professional engineer responsible for their preparation.

1.5 QUALITY ASSURANCE

A. Fabricated-Glass Manufacturer Qualifications: A qualified manufacturer of fabricated glass units who is approved and certified by primary glass manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials in accordance with manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.
B. Comply with insulating-glass manufacturer's written instructions for venting and sealing units to avoid hermetic seal ruptures due to altitude change.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.
   1. Do not install glazing sealants when ambient and substrate temperature conditions are outside limits permitted by sealant manufacturer or are below 40 degrees Fahrenheit.

1.8 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer agrees to replace coated-glass units that deteriorate within specified warranty period. Deterioration of coated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in coating.
   1. Warranty Period: 10 years from date of Substantial Completion.
B. Manufacturer's Special Warranty for Laminated Glass: Manufacturer agrees to replace laminated-glass units that deteriorate within specified warranty period. Deterioration of laminated glass is defined as defects developed from normal use that are not attributed to glass breakage or to maintaining and cleaning laminated glass contrary to manufacturer's written instructions. Defects include edge separation, delamination materially obstructing vision through glass, and blemishes exceeding those allowed by referenced laminated-glass standard.
   1. Warranty Period: 5 years from date of Substantial Completion.
C. Manufacturer's Special Warranty for Insulating Glass: Manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is obstruction of vision by dust, moisture, or film on interior surfaces of glass.
   1. Warranty Period: 10 years from date of Substantial Completion.
D. Manufacturer's Special Warranty for Heat-Soaked Tempered Glass: Manufacturer agrees to replace heat-soaked tempered glass units that spontaneously break due to nickel sulfide (NiS) inclusions at a rate exceeding 0.3 percent within specified warranty period. Coverage for any other cause is excluded.
   1. Warranty Period: 5years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. General Glass Manufactures: Unless specified otherwise and subject to compliance with requirements, provide products by the following:
   1. AGC Glass Company North America, Inc.
   2. Guardian Glass; SunGuard.
   3. Pilkington North America.
   4. Viracon, Inc.
   5. Vitro Architectural Glass.

B. Source Limitations for Glass: Obtain tinted and coated glass from single source from single manufacturer.

C. Source Limitations for Glazing Accessories: For each product and installation method, obtain from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. General: Installed glazing systems shall withstand normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to defective manufacture, fabrication, or installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Delegated Design: Engage a qualified professional engineer, as defined in Section 01 40 00 "Quality Requirements," to design glazing.

C. Structural Performance: Glazing shall withstand the following design loads within limits and under conditions indicated determined in accordance with the IBC and ASTM E1300:
   1. Design Wind Pressures: As indicated on Drawings.
      a. Wind Design Data: As indicated on Drawings.
   2. Thermal Loads: Design glazing to resist thermal stress breakage induced by differential temperature conditions and limited air circulation within individual glass lites and insulated glazing units.

D. Safety Glazing: Where safety glazing is indicated, provide glazing that complies with 16 CFR 1201, Category II.

E. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:
   1. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.

2.3 GLASS PRODUCTS, GENERAL

A. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below unless more stringent requirements are indicated. See these publications for glazing terms not otherwise defined in this Section or in referenced standards.
   1. NGA Publications: "Laminated Glazing Reference Manual" and "Glazing Manual."
   2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR A7, "Sloped Glazing Guidelines."

3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Guidelines for Sloped Glazing."
4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial and Residential Use."

B. Safety Glazing Labeling: Where safety glazing is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction or manufacturer. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

C. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least 1 component lite of units with appropriate certification label of the IGCC.

D. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass that complies with performance requirements and is not less than thickness indicated.
1. Thickness of Tinted Glass: Provide same thickness for each tint color indicated throughout Project.

E. Strength: Where annealed float glass is indicated, provide annealed float glass, heat-strengthened float glass, or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened float glass is indicated, provide heat-strengthened float glass or fully tempered float glass as needed to comply with "Performance Requirements" Article. Where fully tempered float glass is indicated, provide fully tempered float glass.

2.4 GLASS PRODUCTS

A. Clear Annealed Float Glass: ASTM C1036, Type I, Class 1 (clear), Quality-Q3.

B. Tinted Annealed Float Glass: ASTM C1036, Type I, Class 2 (tinted), Quality-Q3.

C. Fully Tempered Float Glass: ASTM C1048, Kind FT (fully tempered), Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

D. Heat-Strengthened Float Glass: ASTM C1048, Kind HS (heat strengthened), Type I, Condition A (uncoated) unless otherwise indicated, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3.
1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.

E. Reflective- and Low-E-Coated Vision Glass: ASTM C1376.

F. Ceramic-Coated Vision Glass: ASTM C1048, Condition C, Type I, Class 1 (clear) or Class 2 (tinted) as indicated, Quality-Q3; and complying with Specification No. 95-1-31 in NGA's "Engineering Standards Manual."

2.5 LAMINATED GLASS

A. Laminated Glass: ASTM C1172. Use materials that have a proven record of no tendency to bubble, discolor, or lose physical and mechanical properties after fabrication and installation.
1. Construction: Laminate glass with polyvinyl butyral interlayer to comply with interlayer manufacturer's written instructions.
2. Interlayer Thickness: Provide thickness not less than that indicated and as needed to comply with requirements.
3. Interlayer Color: Clear unless otherwise indicated.

2.6 INSULATING GLASS

A. Insulating-Glass Units: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, qualified in accordance with ASTM E2190.
   1. Sealing System: Dual seal, with manufacturer's standard primary and secondary sealants.

2.7 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.
   1. Allow for thermal movements from ambient and surface temperature changes acting on glass framing members and glazing components.
      a. Temperature Change: 120 degrees Fahrenheit, ambient; 180 degrees Fahrenheit, material surfaces.
B. Grind smooth and polish exposed glass edges and corners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:
   1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
   2. Presence and functioning of weep systems.
   3. Minimum required face and edge clearances.
   4. Effective sealing between joints of glass-framing members.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.
B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that leave visible marks in the completed Work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.
B. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass includes glass with edge damage or other imperfections that, when installed, could weaken glass, impair performance, or impair appearance.

C. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.
D. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.
E. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.
F. Provide spacers for glass lites where length plus width is larger than 50 inches.
    1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
    2. Provide 1/8-inch minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.
G. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and in accordance with requirements in referenced glazing publications.
H. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.
I. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

3.4 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.
B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.
C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.
D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks, and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended in writing by gasket manufacturer.
E. Install gaskets so they protrude past face of glazing stops.

3.5 CLEANING AND PROTECTION

A. Immediately after installation, remove nonpermanent labels and clean surfaces.
B. Protect glass from contact with contaminating substances resulting from construction operations. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains.
    1. If, despite such protection, contaminating substances do contact with glass, remove substances immediately as recommended in writing by glass manufacturer. Remove and replace glass that cannot be cleaned without damage to coatings.

C. Remove and replace glass that is damaged during construction period.
D. Wash glass on both exposed surfaces not more than 4 days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

3.6 MONOLITHIC GLASS SCHEDULE

A. Clear Glass Type G01: Annealed float glass, 6 mm minimum thickness.
B. Clear Glass Type G02: Fully tempered float glass.
   1. Minimum Thickness: 6 mm.
   2. Safety glazing required.
C. Tinted Glass Type G04: Fully tempered float glass.
   1. Tint Color: Gray.
   2. Minimum Thickness: 6 mm.

3.7 INSULATING GLASS SCHEDULE

A. Low-E-Coated, Clear Insulating Glass Type G10:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide PPG Solarban 70 XL Solar Control Low-E Glass or comparable product from a manufacture listed listed in Part 2.
   2. Overall Unit Thickness: 1-inch.
   3. Minimum Thickness of Each Glass Lite: 6 mm.
   4. Outdoor Lite: Fully tempered float glass.
   5. Interspace Content: Air.
   6. Indoor Lite: Fully tempered float glass.
   7. Low-E Coating: Sputtered on second surface.
   8. Summer Daytime U-Factor: 0.28 maximum.
   9. SGHC: 0.25 maximum.
   10. Safety glazing required.

END OF SECTION

SECTION 09 21 16.23 - GYPSUM BOARD SHAFT WALL ASSEMBLIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Gypsum board shaft wall assemblies.
B. Related Requirements:
   1. Division 01Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each component of gypsum board shaft wall assembly.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and support them on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

A. Environmental Limitations: Comply with gypsum-shaftliner-board manufacturer's written instructions.
B. Do not install finish panels until installation areas are enclosed and conditioned.
C. Do not install panels that are wet, moisture damaged, or mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, and irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E119 by an independent testing agency.
B. STC-Rated Assemblies: Provide materials and construction identical to those of assemblies tested according to ASTM E90 and classified according to ASTM E413 by a testing and inspecting agency.

2.2 GYPSUM BOARD SHAFT WALL ASSEMBLIES

A. Fire-Resistance Rating: 1 hour.
B. STC Rating: 51, minimum.

C. Gypsum Shaftliner Board:
   1. Type X: ASTM C1396; manufacturer's proprietary fire-resistive liner panels with paper faces, 1-inch thick, with double beveled long edges.
      a. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
         1) American Gypsum.
         2) CertainTeed Corporation.
         3) Continental Building Products, LLC.
         4) Georgia-Pacific Gypsum LLC.
         5) National Gypsum Company.
         6) PABCO Gypsum.
         7) USG Corporation.

D. Non-Load-Bearing Steel Framing, General: Complying with ASTM C645 requirements for metal unless otherwise indicated and complying with requirements for fire-resistance-rated assembly indicated.

E. Studs: Manufacturer's standard profile for repetitive, corner, and end members as follows:
   1. Depth: 2-1/2 inches.
   2. Minimum Base-Metal Thickness: 0.030 inches.

F. Runner Tracks: Manufacturer's standard J-profile track with manufacturer's standard long-leg length, but at least 2 inches long and matching studs in depth.
   1. Minimum Base-Metal Thickness: 0.033 inches.

2.3 AUXILIARY MATERIALS

A. Steel Drill Screws: ASTM C1002 unless otherwise indicated.

B. Track Fasteners: Power-driven fasteners of size and material required to withstand loading conditions imposed on shaft wall assemblies without exceeding allowable design stress of track, fasteners, or structural substrates in which anchors are embedded.

C. Acoustical Sealant: Section 07 92 00 "Joint Sealants."

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install gypsum board shaft wall assemblies to comply with requirements of fire-resistance-rated assemblies indicated and manufacturer's written installation instructions.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.

C. Install supplementary framing in gypsum board shaft wall assemblies around openings and as required for blocking, bracing, and support of gravity and pullout loads of fixtures, equipment, services, heavy trim, furnishings, wall-mounted door stops, and similar items that cannot be supported directly by shaft wall assembly framing.

D. Penetrations: At penetrations in shaft wall, maintain fire-resistance rating of shaft wall assembly by installing supplementary steel framing around perimeter of penetration and fire protection behind boxes containing wiring devices, elevator call buttons and floor indicators, and similar items.

E. Sound-Rated Shaft Wall Assemblies: Seal gypsum board shaft walls with acoustical sealant at perimeter of each assembly where it abuts other Work and at joints and penetrations within each assembly.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8-inch from the plane formed by faces of adjacent framing.

3.2 PROTECTION

A. Remove and replace panels that are wet, moisture damaged, or mold damaged.

END OF SECTION

SECTION 09 22 16 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Non-load-bearing steel framing systems for interior partitions.
2. Suspension systems for interior ceilings and soffits.
3. Grid suspension systems for gypsum board ceilings.

B. Related Requirements:
1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Studs and Runners: Provide documentation that framing members' certification is according to SIFA's "Code Compliance Certification Program for Cold-Formed Steel Structural and Non-Structural Framing Members."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. Horizontal Deflection: For wall assemblies, limited to following ratios of the wall height based on horizontal loading of 5 lbf/sq. ft. The ratios listed below are based on the scheduled finishes:
1. Ceramic Tile: 1/360.
2. Gypsum Board and Other Finishes: 1/240.

2.2 ACCEPTABLE MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following, unless noted otherwise in this Section:
1. AllSteel & Gypsum Products, Inc.
2. California Expanded Metal Products Company (CEMCO).
3. ClarkDietrich Building Systems.
4. Consolidated Fabricators Corp.; Building Products Division.
5. Craco Mfg., Inc.
6. Custom Stud Inc.
7. Design Shapes in Steel.
8. MarinoWARE.
9. MBA Building Supplies.
10. MRI Steel Framing, LLC.
11. Olmar Supply, Inc.

12. Phillips Manufacturing Co.
13. Quail Run Building Materials, Inc.
14. SCAFCO Corporation.
15. State Building Products, Inc.
16. Steel Construction Systems.
17. Steel Network, Inc. (The).
18. Super Stud Building Products, Inc.
19. Telling Industries.

2.3 FRAMING SYSTEMS

A. Framing Members, General: Comply with ASTM C 754 for conditions indicated.
   1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
   2. Protective Coating: ASTM A 653/A 653M, G40, hot-dip galvanized unless otherwise indicated.

B. Studs and Runners: ASTM C 645. Use either steel studs and runners or embossed steel studs and runners.
   1. Steel Studs and Runners:
      a. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
         1) CEMCO; California Expanded Metal Products Co.
         2) MBA Building Supplies.
         3) MRI Steel Framing, LLC.
         4) Phillips Manufacturing Co.
         5) Steel Network, Inc. (The).
         6) Telling Industries.
      b. Minimum Base-Metal Thickness: As required by performance requirements for horizontal deflection.
      c. Depth: As indicated on Drawings.
   2. Embossed Steel Studs and Runners:
      a. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
         1) CEMCO; California Expanded Metal Products Co.
         2) ClarkDietrich Building Systems.
         3) MarinoWARE.
         4) MBA Building Supplies.
         5) Phillips Manufacturing Co.
         6) Steel Network, Inc. (The).
         7) Telling Industries.
      b. Minimum Base-Metal Thickness: As required by horizontal deflection performance requirements.
      c. Depth: As indicated on Drawings.

C. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.
   1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      a. Blazeframe Industries; Intumescent Framing, Fire Stop System.
      b. CEMCO; California Expanded Metal Products Co.; FAS Track.
      c. Fire Trak Corp; Fire Trak System attached to studs with Fire Trak Posi Klip.

d. Metal-Lite; The System.
e. Perfect Wall, Inc.
f. Steel Network, Inc. (The).

D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.
E. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

2.4 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch diameter wire, or double strand of 0.048-inch diameter wire.
B. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16-inch in diameter.
C. Furring Channels (Furring Members):
1. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8-inch deep.
a. Minimum Base-Metal Thickness: 0.0179-inch.
D. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.
1. Products: Subject to compliance with requirements, provide 1 of the following:
a. Armstrong World Industries, Inc; Drywall Grid Systems.
b. Chicago Metallic Corporation; 640/660 Drywall Ceiling Suspension.
c. United State Gypsum Company; Drywall Suspension System or Wall-to-Wall Drywall Suspension System.

2.5 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.
1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.
1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

B. Coordination with Sprayed Fire-Resistive Materials:
   1. Before sprayed fire-resistive materials are applied, attach offset anchor plates or ceiling runners (tracks) to surfaces indicated to receive sprayed fire-resistive materials. Where offset anchor plates are required, provide continuous plates fastened to building structure not more than 24 inches o.c.
   2. After sprayed fire-resistive materials are applied, remove them only to extent necessary for installation of non-load-bearing steel framing. Do not reduce thickness of fire-resistive materials below that are required for fire-resistance ratings indicated. Protect adjacent fire-resistive materials from damage.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.
   1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.
B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
D. Install bracing at terminations in assemblies.
E. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.
C. Install studs so flanges within framing system point in same direction.
D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts that penetrate partitions above ceiling.
   1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
   2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
      a. Install 2 studs at each jamb unless otherwise indicated.
      b. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch clearance from jamb stud to allow for installation of control joint in finished assembly.
      c. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
   3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.

4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.
    a. Firestop Track: Where indicated, install to maintain continuity of fire-resistance-rated assembly indicated.
5. Sound-Rated Partitions: Install framing to comply with sound-rated assembly indicated.

E. Direct Furring:
1. Screw to wood framing.
2. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches o.c.

F. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8-inch from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.
1. Carrying Channels (Main Runners): 48 inches o.c.
2. Furring Channels (Furring Members): 16 inches o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:
1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.
    a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.
    a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.
3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Do not attach hangers to steel roof deck.
5. Do not attach hangers to permanent metal forms. Furnish cast-in-place hanger inserts that extend through forms.
6. Do not attach hangers to rolled-in hanger tabs of composite steel floor deck.
7. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

F. Installation Tolerances: Install suspension systems that are level to within 1/8-inch in 12 feet measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION

SECTION 09 29 00 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior gypsum board.
   2. Tile backing panels.
   3. Texture finishes.
   4. Moisture guard.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 30 13 "Ceramic Tiling" for cementitious backer units installed as substrates for ceramic tile.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 QUALITY ASSURANCE

A. Mockups: Build mockups of at least 100 sq. ft. in surface area to demonstrate aesthetic effects and to set quality standards for materials and execution.
   1. Build mockups for the following:
      a. Each level of gypsum board finish indicated for use in exposed locations.
      b. Each texture finish indicated.
   2. Simulate finished lighting conditions for review of mockups.
   3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written instructions, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.
B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.
C. Ceiling and wall materials shall comply with the requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C 1396/C 1396M.
    1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
        a. American Gypsum.
        b. CertainTeed Corporation.
        c. Continental Building Products, LLC.
        d. Georgia-Pacific Building Products.
        e. National Gypsum Company.
        f. PABCO Gypsum.
        g. Temple-Inland Building Products by Georgia-Pacific.
        h. USG.
    2. Thickness: 5/8-inch.
    3. Long Edges: Tapered.
B. Gypsum Ceiling Board: ASTM C 1396/C 1396M.
    1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
        a. American Gypsum.
        b. CertainTeed Corporation.
        c. Continental Building Products, LLC.
        d. Georgia-Pacific Building Products.
        e. National Gypsum Company.
        f. PABCO Gypsum.
        g. Temple-Inland Building Products by Georgia-Pacific.
        h. USG.
    2. Thickness: 1/2-inch.
    3. Long Edges: Tapered.

C. Abuse-Resistant Gypsum Board: ASTM C 1396/C 1396M gypsum board, tested according to ASTM C 1629/C 1629M.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. American Gypsum.
      b. CertainTeed Corporation.
      c. Continental Building Products, LLC.
      d. Georgia-Pacific Building Products.
      e. National Gypsum Company.
      f. PABCO Gypsum.
      g. Temple-Inland Building Products by Georgia-Pacific.
      h. USG.
   2. Core: 5/8-inch, Type X.
   3. Surface Abrasion: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.
   4. Indentation: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.
   5. Soft-Body Impact: ASTM C 1629/C 1629M, meets or exceeds Level 1 requirements.
   6. Long Edges: Tapered.
   7. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

D. Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. American Gypsum.
      b. CertainTeed Corporation.
      c. Continental Building Products, LLC.
      d. Georgia-Pacific Building Products.
      e. National Gypsum Company.
      f. PABCO Gypsum.
      g. Temple-Inland Building Products by Georgia-Pacific.
      h. USG.
   2. Core: 5/7-inch. Type X.
   3. Long Edges: Tapered.
   4. Mold Resistance: ASTM 3273, score of 10 as rated according to ASTM 3274.

2.4 TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers, provide products by 1 of the following:
      a. CertainTeed Corporation.
      b. Georgia-Pacific Building Products.
      c. United States Gypsum Company.
      d. Temple-Inland Building Products by Georgia-Pacific.
   2. Thickness: 1/2 inch, regular type.
   3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.
   1. Material: Galvanized or aluminum-coated steel sheet, rolled zinc, plastic, or paper-faced galvanized-steel sheet.
   2. Shapes:
      a. Cornerbead.
      b. LC-Bead: J-shaped; exposed long flange receives joint compound.
      c. L-Bead: L-shaped; exposed long flange receives joint compound.
      d. U-Bead: J-shaped; exposed short flange does not receive joint compound.
      e. Expansion (control) joint.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.
B. Joint Tape:
   1. Interior Gypsum Board: Paper.
   2. Exterior Gypsum Soffit Board: Paper.
   3. Tile Backing Panels: As recommended by panel manufacturer.
   4. Joint Compound for Interior Gypsum Board: For each coat, use formulation that is compatible with other compounds applied on previous or for successive coats.
   5. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
   6. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
      a. Use setting-type compound for installing paper-faced metal trim accessories.
   7. Fill Coat: For second coat, use drying-type, all-purpose compound.
   8. Finish Coat: For third coat, use drying-type, all-purpose compound.
C. Joint Compound for Tile Backing Panels:
   1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.
   1. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
C. Steel Drill Screws: ASTM C 1002 unless otherwise indicated.
   1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033- to 0.112-inch thick.
   2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound-Attenuation Blankets (Acoustical Batts): ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.
   1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

E. Acoustical Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Accumetric LLC.
      b. Grabber Construction Products.
      c. Hilti, Inc.
      d. Pecora Corporation.
      e. Specified Technologies, Inc.
      f. United States Gypsum Company.

F. Moisture Guard: Provide continuous 1/2-inch high guard where gypsum panels contact floors. Product: Waterguard; PVC GDW moisture guard. www.waterguard-usa.com At all walls in restrooms and other wet walls, provided sealant between the moisture guard and the floor.

2.8 TEXTURE FINISHES

A. Primer: As recommended by textured finish manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and support framing, with installer present, for compliance with requirements and other conditions affecting performance of the Work.
B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF SOUND ATTENUATION BLANKETS

A. Comply with manufacturer's installation instructions.
B. Friction-fit blanket insulation in place, until the interior finish is applied. Install batts to fill entire stud cavity, with no gaps, voids, or areas of compression. If stud cavity is less than 8 feet in height, cut lengths to friction fit against floor and ceiling tracks. Walls with penetrations require that insulation be carefully cut to fit around outlets, junction boxes, and other irregularities.
C. Where walls are not finished on both sides or where insulation does not fill the cavity depth, install supplementary support to hold product in place.
D. Where insulation must extend higher than 8 feet, provide temporary support to hold product in place, until finish material is applied.

3.3 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.
B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than 1 framing member.
C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16-inch of open space between panels. Do not force into place.
D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.
E. Form control and expansion joints with space between edges of adjoining gypsum panels.
F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally, unless indicated otherwise on the Drawings.
    1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. in area.
    2. Fit gypsum panels around ducts, pipes, and conduits.
    3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch wide joints to install sealant.
G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments. Provide 1/4- to 1/2-inch wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.
H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
I. STC-Rated Assemblies: Seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written instructions for locating edge trim and closing off sound-flanking paths around or through assemblies, including sealing partitions above acoustical ceilings.
J. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on 1 side.

3.4 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:
    1. Type X: Vertical surfaces unless otherwise indicated.
    2. Ceiling Type: Ceiling surfaces.
    3. Abuse-Resistant Type: As indicated on Drawings.
    4. Impact-Resistant Type: As indicated on Drawings.
    5. Mold-Resistant Type: As indicated on Drawings.

B. Single-Layer Application:
   1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
   2. On partitions/walls, apply gypsum panels in the most economical direction unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.
      a. Stagger abutting end joints not less than 1 framing member in alternate courses of panels.
      b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.
   3. On Z-shaped furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
   4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:
   1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints 1 framing member, 16 inches minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
   2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least 1 stud or furring member with base-layer joints unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
   3. On Z-shaped furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least 1 furring member. Locate edge joints of base layer over furring members.
   4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.

D. Laminating to Substrate: Where gypsum panels are indicated as directly adhered to a substrate (other than studs, joists, furring members, or base layer of gypsum board), comply with gypsum board manufacturer's written instructions and temporarily brace or fasten gypsum panels until fastening adhesive has set.

E. Moisture Guard: Install per manufacture's instructions or install gypsum panels 1/4-inch to 1/2-inch above floors. Do not damage the bottom of the panels.

3.5 APPLYING TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at showers, tubs, and where indicated. Install with 1/4-inch gap where panels abut other construction or penetrations.

B. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.6 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints at locations indicated on Drawings, according to ASTM C 840 and in specific locations approved by Architect for visual effect.

C. Interior Trim: Install in the following locations:
   1. Cornerbead: Use at outside corners unless otherwise indicated.
   2. LC-Bead: Use at exposed panel edges.
   3. L-Bead: Use where indicated.
   4. U-Bead: Use at exposed panel edges.

3.7 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
B. Prefill open joints, rounded or beveled edges, and damaged surface areas.
C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.
D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:
   1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
   2. Level 2: Panels that are substrate for tile.
   3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.
      a. Primer and its application to surfaces are specified in Section 09 91 23 "Interior Painting."

3.8 APPLYING TEXTURE FINISHES

A. Surface Preparation and Primer: Prepare and apply primer to gypsum panels and other surfaces receiving texture finishes. Apply primer to surfaces that are clean, dry, and smooth.
B. Texture Finish Application: Mix and apply finish using powered spray equipment, to produce a uniform texture matching approved mockup and free of starved spots or other evidence of thin application or of application patterns.
C. Prevent texture finishes from coming into contact with surfaces not indicated to receive texture finish by covering them with masking agents, polyethylene film, or other means. If, despite these precautions, texture finishes contact these surfaces, immediately remove droppings and overspray to prevent damage according to texture-finish manufacturer's written instructions.

3.9 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.
B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
C. Remove and replace panels that are wet, moisture damaged, and mold damaged.
   1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
   2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION

SECTION 09 30 13 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Porcelain tile.
   2. Glazed wall tile.
   3. Tile backing panels.
   4. Crack isolation membranes.

B. Related Requirements:
   1. Section 07 92 00 "Joint Sealants" for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
   2. Section 09 29 00 "Gypsum Board" for cementitious backer units.

1.2 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. Face Size: Actual tile size, excluding spacer lugs.

C. Module Size: Actual tile size plus joint width indicated.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.

C. Samples for Verification:
   1. Full-size units of each type and composition of tile and for each color and finish required.
   2. Metal edge strips in 3-inch lengths.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Tile and Trim Units: Furnish quantity of full-size units equal to 5 percent of amount installed for each type, composition, color, pattern, and size indicated.
   2. Grout: Furnish quantity of grout equal to 5 percent of amount installed for each type, composition, and color indicated.

1.7 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Installer is a Five-Star member of the National Tile Contractors Association or a Trowel of Excellence member of the Tile Contractors' Association of America.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.
D. Store liquid materials in unopened containers and protected from freezing.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Tile: Obtain tile of each type and color or finish from single source or producer.
   1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.
B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from single manufacturer and each aggregate from single source or producer.
   1. Obtain setting and grouting materials, except for unmodified Portland cement and aggregate, from single manufacturer.
   2. Obtain waterproof membrane and crack isolation membrane, except for sheet products, from manufacturer of setting and grouting materials.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer:
   1. Waterproof membrane.
   2. Crack isolation membrane.

2.2 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
   1. Provide tile complying with Standard grade requirements.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.

2.3 TILE PRODUCTS

A. Porcelain Tile Type : Unglazed.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Daltile.
         1) Face Size: 12 by 24 inches.
         2) Thickness: 5/16-inch.
      b. Design & Direct Source.
         1) Face Size: 12 by 24 inches
         2) Thickness: 3/8-inch.
   2. Dynamic Coefficient of Friction: Not less than 0.42.
   3. Tile Color, Glaze, and Pattern: As indicated by manufacturer's designations on Material Legend in Drawings.
   4. Grout Color: As indicated by manufacturer's designations on Material Legend in Drawings.

B. Glazed Wall Tile Type:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Daltile.
         1) Module Size: 3 by 6 inches.
         2) Retain "Face Size Variation" Subparagraph below if required for narrow joints. Rectified tiles have their edges ground to minimize face size variation. See the Evaluations.
         3) Thickness: 5/16-inch.
   2. Descriptions in "Finish" Subparagraph below are defined in ASTM C242. All glazes may not be available in or suitable for this tile type. If inserting another description, also include list of products meeting that description.
   3. Finish: Semi-Gloss glaze.
   4. Tile Color and Pattern: As indicated by manufacturer's designations on Material Legend in Drawings.
   5. Grout Color: As indicated by manufacturer's designations on Material Legend in Drawings.

2.4 TILE BACKING PANELS

A. Cementitious Backer Units: ANSI A118.9 or ASTM C1325, Type A, in maximum lengths available to minimize end-to-end butt joints.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Custom Building Products.
      b. USG Corporation.
   2. Thickness: 5/8-inch.

2.5 CRACK ISOLATION MEMBRANES

A. General: Manufacturer's standard product that complies with ANSI A118.12 for high performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
B. Crack Isolation Membrane, Fluid-Applied: Liquid-latex rubber or elastomeric polymer.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Bostik, Inc.
      b. Custom Building Products.
      c. Laticrete International, Inc.

2.6 SETTING MATERIALS

A. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. ARDEX Americas.
      b. Custom Building Products.
      c. Laticrete International, Inc.
      d. MAPEI Corporation.
   2. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
   3. Provide prepackaged, dry-mortar mix combined with acrylic resin or styrene-butadiene-rubber liquid-latex additive at Project site.
   4. For wall applications, provide mortar that complies with requirements for non-sagging mortar in addition to the other requirements in ANSI A118.15.

2.7 GROUT MATERIALS

A. Water-Cleanable Epoxy Grout: ANSI A118.3.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Bostik, Inc.
      b. Custom Building Products.
      c. Laticrete International, Inc.
      d. MAPEI Corporation.
   2. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 and 212 degrees Fahrenheit, respectively, and certified by manufacturer for intended use.

2.8 MISCELLANEOUS MATERIALS

A. Metal Edge Strips: Angle or L-shaped, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A276/A276M or ASTM A666, 300 Series exposed-edge material.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Schluter Systems L.P.
         1) Reference Interior Material Legend in Drawings profile and locations.

B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.9 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
B. Add materials, water, and additives in accurate proportions.
C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
   1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
   2. Verify that concrete substrates for tile floors installed with adhesives or thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
      a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
      b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
   3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
   4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with adhesives or thinset mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4-inch per foot toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from 1 package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.3 INSTALLATION OF CERAMIC TILE

A. Comply with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 series "Specifications for Installation of Ceramic Tile" that are referenced in TCNA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.
   1. For the following installations, follow procedures in the ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
      a. Tile floors in wet areas.
      b. Tile floors consisting of tiles 8 by 8 inches or larger.
      c. Tile floors consisting of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Provide manufacturer's standard trim shapes where necessary to eliminate exposed tile edges.

E. Where accent tile differs in thickness from field tile, vary setting-bed thickness so that tiles are flush.

F. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
2. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

G. Joint Widths: Unless otherwise indicated, install tile with the following joint widths:

1. Glazed Wall Tile: 1/16-inch.
2. Porcelain Tile: 3/16-inch.

H. Lay out tile wainscots to dimensions indicated.

I. Expansion Joints: Provide expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated. Form joints during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Where joints occur in concrete substrates, locate joints in tile surfaces directly above them, without disturbing tile pattern. Coordinate with required disciplines as needed.

J. Metal Edge Strips: Install at locations indicated and where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated. If the profile is not specified in the Drawings, request 1.

3.4 INSTALLATION OF TILE BACKING PANELS

A. Install panels and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.5 INSTALLATION OF CRACK ISOLATION MEMBRANES

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness that is bonded securely to substrate.

B. Allow crack isolation membrane to cure before installing tile or setting materials over it.

3.6 ADJUSTING AND CLEANING

A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

B. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.7 PROTECTION

A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

B. Prohibit foot and wheel traffic from tiled floors for at least 7 days after grouting is completed.

C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.8 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

A. Interior Floor Installations, Concrete Subfloor:

1. TCNA F125-Full: Thinset mortar on crack isolation membrane.
    a. Ceramic Tile Type.
    b. Thinset Mortar: Improved modified dry-setmortar.
    c. Grout: Water-cleanable epoxy grout.

B. Interior Wall Installations, Wood or Metal Studs or Furring:

1. TCNA W244C or TCNA W244F : Thinset mortar on cementitious backer units or fiber-cement backer board.
    a. Ceramic Tile Type.
    b. Thinset Mortar: Improved modified dry-set mortar.
    c. Grout: Water-cleanable epoxy grout.

END OF SECTION

SECTION 09 65 13 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Thermoplastic-rubber base.
   2. Vinyl molding accessories.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples for Verification: For each type of product indicated and for each color, texture, and pattern required in manufacturer's standard-size.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Furnish not less than 10 linear feet for every 500 linear feet or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 65 degrees Fahrenheit or more than 85 degrees Fahrenheit.

1.5 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees Fahrenheit or more than 95 degrees Fahrenheit, in spaces to receive resilient products during the following periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees Fahrenheit or more than 95 degrees Fahrenheit.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 THERMOPLASTIC-RUBBER BASE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Johnsonite; A Tarkett Company.
B. Product Standard: ASTM F 1861, Type TP (rubber, thermoplastic).
   1. Group: II (layered).
   2. Style and Location:
      a. Style B, Cove: Provide in areas with resilient floor coverings.
C. Thickness: 0.125-inch.
D. Height: 4 inches.
E. Lengths: Coils in manufacturer's standard length.
F. Outside Corners: Job formed.
G. Inside Corners: Job formed.
H. Colors: As indicated by manufacturer's designations.

2.2 VINYL MOLDING ACCESSORY

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Tarkett.
B. Profile and Dimensions: As indicated on Drawings.
C. Locations: Provide vinyl molding accessories in areas indicated on Drawings.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
B. Adhesives: Water-resistant type recommended by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
   1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
B. Proceed with installation only after unsatisfactory conditions have been corrected.
   1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
C. Do not install resilient products until materials are the same temperature as space where they are to be installed.
    1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.
D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.
B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.
C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.
D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.
E. Do not stretch resilient base during installation.
F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.
G. Preformed Corners: Install preformed corners before installing straight pieces.
H. Job-Formed Corners:
    1. Outside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
        a. Form without producing discoloration (whitening) at bends.
    2. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 6 inches in length.
        a. Miter or cope corners to minimize open joints.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.
B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting resilient products.
B. Perform the following operations immediately after completing resilient-product installation:
   1. Remove adhesive and other blemishes from surfaces.
   2. Sweep and vacuum horizontal surfaces thoroughly.
   3. Damp-mop horizontal surfaces to remove marks and soil.
C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
D. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION

SECTION 09 65 19 - RESILIENT TILE FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid vinyl floor tile.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Shop Drawings: For each type of resilient floor tile.
   1. Include floor tile layouts, edges, columns, doorways, enclosing partitions, built-in furniture, cabinets, and cutouts.
   2. Show details of special patterns.
C. Samples for Verification: Full-size units of each color and pattern of floor tile required.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Floor Tile: Furnish 1 box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.
   1. Engage an installer who employs workers for this Project who are trained or certified by floor tile manufacturer for installation techniques required.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 degrees Fahrenheit or more than 90 degrees Fahrenheit. Store floor tiles on flat surfaces.

1.7 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 degrees Fahrenheit or more than 95 degrees Fahrenheit, in spaces to receive floor tile during the following periods:
   1. 48 hours before installation.
   2. During installation.
   3. 48 hours after installation.
B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 degrees Fahrenheit or more than 95 degrees Fahrenheit.
C. Close spaces to traffic during floor tile installation.
D. Close spaces to traffic for 48 hours after floor tile installation.
E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient floor tile, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.
   1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 SOLID VINYL FLOOR TILE

A. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
B. Tile Standard: ASTM F 1700.
C. Class: Class III, Printed Film Vinyl Tile.
D. Type: B, Embossed Surface.
   1. J & J Flooring Group.
      a. Thickness: 0.196.
      b. Size: 9 by 48 inches.
   2. Armstrong.
      a. Thickness: 0.100-inch.
      b. Size: 6 by 36 inches.
E. Colors and Patterns: As indicated by manufacturer's designations on Material Legend in Drawings.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.
B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
   1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
   3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
   4. Moisture Testing: Perform tests so that each test area does not exceed 1000 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
      a. Relative Humidity Test: Using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until materials are the same temperature as space where they are to be installed.
   1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than 1/2 tile at perimeter.
   1. Lay tiles in pattern indicated.

C. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

D. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

E. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

F. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in installation areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

G. Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:
   1. Remove adhesive and other blemishes from surfaces.
   2. Sweep and vacuum surfaces thoroughly.
   3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover floor tile until Substantial Completion.

END OF SECTION

SECTION 09 65 66 - RESILIENT ATHLETIC FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interlocking, rubber floor tile.
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 65 13 "Resilient Base and Accessories" for wall base and accessories installed with flooring.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: Show installation details and locations of the following:
   1. Floor patterns and adjacent required accessible transitions.
C. Samples for Verification: For each type, color, and pattern of flooring indicated, 6-inch square Samples of same thickness and material indicated for the Work.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For flooring to include in maintenance manuals.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Floor Tile: Furnish no fewer than 1 box for each 50 boxes or fraction thereof, of each type, color, pattern, and size of floor tile installed.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storing.
B. Store materials to prevent deterioration. Store tiles on flat surfaces.

1.6 FIELD CONDITIONS

A. Adhesively Applied Products:
   1. Maintain temperatures during installation within range recommended in writing by manufacturer, but not less than 70 degrees Fahrenheit or more than 95 degrees Fahrenheit, in spaces to receive flooring 48 hours before installation, during installation, and 48 hours after installation unless longer period is recommended in writing by manufacturer.
   2. After postinstallation period, maintain temperatures within range recommended in writing by manufacturer, but not less than 55 degrees Fahrenheit or more than 95 degrees Fahrenheit.

3. Close spaces to traffic during flooring installation.
4. Close spaces to traffic for 48 hours after flooring installation unless manufacturer recommends longer period in writing.

B. Install flooring after other finishing operations, including painting, have been completed.

1.7 COORDINATION

A. Coordinate layout and installation of flooring with floor inserts for gymnasium equipment.

PART 2 - PRODUCTS

2.1 INTERLOCKING, RUBBER FLOOR TILE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the product specified in Drawings.
B. Description: Athletic flooring consisting of modular rubber tiles with precision cut, interlocking edges, for free-lay installation.
C. Material: Rubber.
D. Size: 25 inches square.
E. Thickness: 5/16-inch.
F. Color and Pattern: As indicated by manufacturer's designations on Interior Material Legend in Drawings.

2.2 ACCESSORIES

A. Trowelable Leveling and Patching Compound: Latex-modified, hydraulic-cement-based formulation approved by flooring manufacturer.
B. Adhesives: Water-resistant type recommended in writing by manufacturer for substrate and conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance of the Work.
1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written recommendations to ensure adhesion of flooring.
B. Concrete Substrates: Prepare according to ASTM F 710.
   1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
   2. Alkalinity Testing: Perform pH testing according to ASTM F 710. Proceed with installation only if pH readings are not less than 7.0 and not greater than 8.5.
   3. Moisture Testing:
      a. Perform relative humidity test using in-situ probes, ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended in writing by manufacturer. Do not use solvents.
D. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.
E. Move flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation unless manufacturer recommends a longer period in writing.
   1. Do not install flooring until they are same temperature as space where they are to be installed.
F. Sweep and vacuum clean substrates to be covered by flooring immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust.
G. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 FLOORING INSTALLATION, GENERAL

A. Comply with manufacturer's written installation instructions.
B. Scribe, cut, and fit flooring to butt neatly and tightly to vertical surfaces, equipment anchors, floor outlets, and other interruptions of floor surface.
C. Extend flooring into toe spaces, door reveals, closets, and similar openings unless otherwise indicated.
D. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating subfloor markings on flooring. Use nonpermanent, nonstaining marking device.

3.4 FLOOR TILE INSTALLATION

A. Lay out tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than 1/2 tile at perimeter.
   1. Lay tiles square with room axis in pattern indicated.
B. Discard broken, cracked, chipped, or deformed tiles.
C. Match tiles for color and pattern by selecting tiles from cartons in same sequence as manufactured and packaged if so numbered.
   1. Lay tiles in pattern of colors and sizes indicated in Interior Material Legend on Drawings.

D. Adhered Flooring: Adhere products to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times.
   1. Provide completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.5 CLEANING AND PROTECTING

A. Perform the following operations immediately after completing flooring installation:
   1. Remove adhesive and other blemishes from flooring surfaces.
   2. Sweep and vacuum flooring thoroughly.
   3. Damp-mop flooring to remove marks and soil after time period recommended in writing by manufacturer.

B. Protect flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period. Use protection methods recommended in writing by manufacturer.
   1. Do not move heavy and sharp objects directly over flooring. Protect flooring with plywood or hardboard panels to prevent damage from storing or moving objects over flooring.

END OF SECTION

SECTION 09 67 23 – RESINOUS FLOORING

Epoxy – Colored Vinyl Flake Broadcast Flooring System

PART 1 - GENERAL

1.1 SYSTEM DESCRIPTION

A. Resinous Flooring System: Abrasion-, impact-, and chemical-resistant, aggregate-filled, resin-based monolithic floor surfacing designed to produce a seamless floor and integral cove base.
B. This system shall be applied to the prepared substrate(s) as defined by the Plans strictly in accordance with the manufacturer's recommendations.

1.2 SUBMITTALS

A. Product Data:
   1. Current edition of manufacturer's product literature including physical data, chemical resistance, surface preparation, and application instructions.
B. Samples:
   1. A hard sample of the proposed system shall be submitted to represent the finished system.
C. Warranty:
   1. Manufacturer's standard warranty.
   2. Applicator's standard warranty.

1.3 QUALITY ASSURANCE

A. Qualifications:
   1. The manufacturer shall have a minimum of 10 years' experience in the production, sales, and technical support of polymer-based floor coatings.
   2. The applicator shall have a minimum of 3 years' documented experience in the application of polymer floor coatings to concrete floors.
   3. Proposed suppliers shall provide certification that they have 10 years' experience in the production of polymer floor coatings and be required to meet all provisions of this Specification as well as provide evidence for compatibility between components to the satisfaction of the Architect.
B. Pre-Installation Conference:
   1. A pre-installation conference should be held between applicators, general contractor, and Architect to review surface preparation, application, clean-up procedures, and design issues.
C. Packing and Shipping:
   1. All materials are to be delivered to the job site in the manufacturer's original packaging. The product code and other identification marks should be clearly marked and visible.

D. Storage and Protection:
1. All material is to be stored in a cool, dry place out of the direct sunlight and away from any ignition sources. The applicator should refer to the manufacturer's literature and material safety data sheets for more information.
2. Material Safety Data Sheets are to be kept on site and made readily available for all personnel.
3. Keep containers sealed and ready for use.

1.4 PROJECT CONDITIONS

A. Environmental Requirements:
1. Optimum air and substrate temperature for product application is between 55 degrees Fahrenheit and 95 degrees Fahrenheit. For temperatures outside of this range, consult the manufacturer for product application suggestions.
2. Verify the Work environment is properly equipped with vapor barriers and perimeter drains.
3. Maintain proper lighting throughout the Work environment; the lighting should be comparable to the final lighting level of the space.
4. Store and dispose of any waste in accordance with regulations of local authorities.

B. Safety Requirements:
1. "No Smoking" signs shall be posted throughout the Work area prior to application.
2. The owner shall be responsible for removing any foodstuffs from the Work area.
3. Open flames, spark producing tools/items, and ignition sources shall be removed from the Work area prior to application.
4. Only Work-related personnel shall be allowed within the Work area.

1.5 WARRANTY

A. Coordination:
1. The manufacturer offers a full, 1-year warranty against defects in materials. Warranties concerning the installation of the material are solely the responsibility of the applicator.

PART 2 - PRODUCTS

2.1 BASIS OF DESIGN

A. As indicated in Interior Materials Legend on Drawings.
B. Primer:
1. The primer shall be a 100 percent reactive, epoxy-based, penetrating primer that exhibits chemical resistance. Equal To: Florock Floropoxy 4700 Epoxy Primer.

C. Basecoats and Broadcast:
1. The basecoat shall consist of a chemical resistant, self-leveling, 100 percent solids. Equal To: Florock Floropoxy 4805.
2. Broadcast colored vinyl flakes to achieve the desired appearance.

D. Grout Coat(s):
   1. Grout with a 100 percent solids, chemical resistant, clear, Equal to: Florock 4805.
E. Topcoat(s)
   1. Apply 1 to 2 topcoat(s) of high performance, color-stable, chemical resistant urethanes, exhibiting excellent chemical and abrasion resistant properties.

2.2 INTEGRAL COVE BASE ACCESSORIES

A. Precast, Integral Cove Base: Impact-resistant, polymer-resin, cove base moldings with a grit profile to promote adhesion of resinous flooring and recommended in writing by resinous flooring manufacturer.
   1. Manufacturers: Subject to compliance with requirements, provide products by the following:
      a. Match manufacturer of resinous flooring.
   2. Radius Cove Base: 4-inch high base molding that provides approximately 1-inch radius cove at floor-to-wall joint; for adhesive installation as substrate for resinous flooring system to form an integral cove base.
B. Installation Adhesive: As recommended in writing be accessory manufacturer.

PART 3 - EXECUTION

3.1 INSPECTION

A. General:
   1. Examine the areas and conditions where epoxy vinyl flake flooring system is to be installed and notify the Architect of conditions detrimental to the proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected by the contractor in a manner acceptable to the Architect.

3.2 PREPARATION

A. General:
   1. Consult the manufacturer's recommendations for concrete substrate preparation before proceeding.
B. Patching and Joint Preparation:
   1. Before application, the floor shall be examined for spalls, pitting, holes, cracks, non-functional joints, etc. These must be treated after preparation and before application. Patch with 100 percent solids Florock Floropoxy 4700 or FloroGel. For functional or expansion joints, these shall be treated with 100 percent solids elastomeric resin having a minimum elongation of 150 percent, Equal to: Florock System 6500.
C. Concrete Surfaces:
   1. Shot-blast, diamond grind or power scarify as required to obtain clean, open porous concrete. Remove sufficient material to provide a sound surface, free of laitance, glaze, efflorescence, and any bond-inhibiting curing compounds or form release agents. Remove grease, oil, and other penetrating contaminants. Repair damaged and deteriorated concrete to acceptable condition; leave surface free of dust, dirt, laitance, and efflorescence.

D. Materials:
   1. Mix components when required and prepare materials according to flooring system manufacturer's instructions.

3.3 APPLICATION

A. General:
   1. The system shall be installed in the order described below:
      a. Substrate Preparation.
      b. Priming.
      c. Basecoat and Broadcast Applications.
      d. Grout Coat Applications.
      e. Optional Topcoat Applications.
   2. Concrete surfaces on grade shall have been constructed with a vapor barrier to protect against the effects of vapor transmission and possible delamination of the system. Refer to manufacturer's concrete preparation instructions for additional recommendations.
   3. The surface should be dry prior to application of any of the aforementioned steps. Furthermore, the substrate shall always be kept clean, dry, and free of any contaminants.
   4. The handling and mixture of any material associated with the installation of the system shall be in accordance with the manufacturer's recommendations and approved by the Architect.
   5. The system shall follow the contours of the substrate unless otherwise specified by the Architect.
   6. A neat finish with well-defined boundaries and straight edges shall be provided by the applicator.

B. Priming:
   1. All areas considered for the application shall be primed with the manufacturer's primer to seal and penetrate the substrate in preparation for applying the basecoat and grout coat.
   2. Porous concrete substrates may require additional applications of primer.

C. Basecoat & Broadcast:
   1. The basecoat shall consist of the manufacturer's approved epoxy resin with a broadcast of approved silica sand to resurface the floor, seal the surface, and give the floor impact and chemical resistance.
   2. Slip-resistant properties are provided through the broadcast of silica sand into the basecoat application.

D. Grout Coat(s):
   1. The grout coat(s) shall be consistent with the manufacturer's recommended epoxy grout coat for the system.

E. Topcoat(s):
   1. Topcoat(s) shall be consistent with the manufacturer's recommendation for the system.
   2. No traffic or equipment shall be permitted on the floor during the curing period.

F. Integral Cove Base: Accessories: Adhesively install before applying flooring coats and in accordance with manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

A. Tests & Inspection:
1. The following tests shall be performed by the applicator and recorded during application to submit to the Architect:
a. Temperature during installation
1) Air
2) Substrate
3) Dew Point

3.5 CLEANING

A. Disposal:
1. Properly remove and dispose of any excess materials.

END OF SECTION

SECTION 09 68 13 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Modular carpet tile.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 65 13 "Resilient Base and Accessories" for resilient wall base and accessories installed with carpet tile.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
   2. Include manufacturer's written installation recommendations for each type of substrate.
B. Shop Drawings: For carpet tile installation, plans showing the following:
   1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
   2. Carpet tile type, color, and dye lot.
   3. Type of subfloor.
   4. Type of installation.
   5. Pattern of installation.
   6. Pattern type, location, and direction.
   7. Pile direction.
   8. Type, color, and location of insets and borders.
   9. Type, color, and location of edge, transition, and other accessory strips.
   10. Transition details to other flooring materials.
C. Samples for Verification: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.
   1. Carpet Tile: Full-size Sample.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:
   1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
   2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Comply with the Carpet and Rug Institute's CRI 104.

1.8 FIELD CONDITIONS

A. Comply with the Carpet and Rug Institute's CRI 104 for temperature, humidity, and ventilation limitations.
B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended by carpet tile manufacturer.
D. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.9 WARRANTY

A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
   1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
   2. Failures include, but are not limited to, the following:
      a. More than 10 percent edge raveling, snags, and runs.
      b. Dimensional instability.
      c. Excess static discharge.
      d. Loss of tuft-bind strength.
      e. Loss of face fiber.
      f. Delamination.
   3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. J&J Invision; J&J Industries, Inc.
B. Color: As indicated by manufacturer's designations on Material Legend in Drawings.
C. Fiber Content: Solution Dyed Polyester.
D. Pile Thickness: 0.205 inches for finished carpet tile.
E. Total Weight: 4.5 - 5.2 oz./sq. yd. for finished carpet tile.
F. Primary Backing/Backcoating: Polyester Felt Cushion.
G. Size: As indicated in Material Legend on Drawings.
H. Applied Treatments:
   1. Soil-Resistance Treatment: Manufacturer's standard treatment.

2.2 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.
B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and are recommended by carpet tile manufacturer for releasable installation.
C. Metal Edge/Transition Strips: Reference 09 65 13 "Resilient Base and Accessories."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
B. Examine carpet tile for type, color, pattern, and potential defects.
C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 03 30 00 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
   1. Moisture Testing: Perform tests so that each test area does not exceed 200 sq. ft., and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
      a. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
      b. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with the Carpet and Rug Institute's CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile.
B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8-inch wide or wider, and protrusions more than 1/32-inch unless more stringent requirements are required by manufacturer's written instructions.
C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
D. Metal Substrates: Clean grease, oil, soil and rust, and prime if recommended in writing by adhesive manufacturer. Rough sand painted metal surfaces and remove loose paint. Sand aluminum surfaces, to remove metal oxides, immediately before applying adhesive.
E. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. General: Comply with the Carpet and Rug Institute's CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.
B. Installation Method: As recommended in writing by carpet tile manufacturer.
C. Maintain dye-lot integrity. Do not mix dye lots in same area.
D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet tile manufacturer.
F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
H. Install pattern parallel to walls and borders.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:
   1. Remove excess adhesive and other surface blemishes using cleaner recommended by carpet tile manufacturer.
   2. Remove yarns that protrude from carpet tile surface.
   3. Vacuum carpet tile using commercial machine with face-beater element.
B. Protect installed carpet tile to comply with the Carpet and Rug Institute's CRI 104, Section 13.7.
C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION

SECTION 09 72 20 – DECORATIVE FIBERGLASS REINFORCED WALL PANELS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes: Prefinished polyester glass reinforced plastic sheets and adhered to unfinished gypsum wallboard.
   1. PVC trim.
B. Products Not Furnished or Installed under this Section:
   1. Gypsum substrate board.
   2. Resilient Base.
C. Related Sections
   1. Division 01 Specification Sections, apply to Work of this Section.
   2. Section 09 29 00 “Gypsum Board.”
   3. Section 09 65 13 “Resilient Base and Accessories.”

1.2 REFERENCES

A. American Society for Testing and Materials: Standard Specifications (ASTM).
   1. ASTM D 256 - Izod Impact Strengths (ft #/in).
   2. ASTM D 570 - Water Absorption (%).
   3. ASTM D 638 - Tensile Strengths (psi) & Tensile Modulus (psi).
   4. ASTM D 790 - Flexural Strengths (psi) & Flexural Modulus (psi).
   5. ASTM D 2583- Barcol Hardness.
   6. ASTM D 5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels.
   7. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

1.3 SUBMITTALS

A. Product Data: Submit sufficient manufacturer's data to indicate compliance with these Specifications, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.
B. Shop Drawings: Submit elevations of each wall showing location of paneling and trim members with respect to all discontinuities in the wall elevation.
C. Selection Samples: Submit manufacturer’s standard color pattern selection samples representing manufacturer's full range of available colors and patterns.
D. Samples for Verification: Submit appropriate section of panel for each finish selected indicating the color, texture, and pattern required.
   1. Submit complete with specified applied finish.
   2. For selected patterns show complete pattern repeat.
   3. Exposed Molding and Trim: Provide samples of each type, finish, and color.
E. Manufacturers Material Safety Data Sheets (MSDS) for adhesives, sealants, and other pertinent materials prior to their delivery to the site.

1.4 QUALITY ASSURANCE

A. Conform to building code requirements for interior finish for smoke and flame spread requirements as tested in accordance with:
   1. ASTM E 84 (Method of test for surface burning characteristics of building Materials):
      a. Wall Required Rating – Class C.
B. Sanitary Standards: System components and finishes to comply with:
   1. United States Department of Agriculture (USDA) requirements for food preparation facilities, incidental contact.
   2. Food and Drug Administration (FDA) 1999 Food Code 6-101.11.
   3. Canadian Food Inspection Agency (CFIA) requirements.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver materials factory packaged on strong pallets.
B. Store panels and trim lying flat, under cover and protected from the elements. Allow panels to acclimate to room temperature (range of 60 to 75 degrees Fahrenheit) for 48 hours prior to installation.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Building are to be fully enclosed prior to installation with sufficient heat (70 degrees Fahrenheit) and ventilation consistent with good working conditions for finish Work.
B. During installation and for not less than 48 hours before, maintain an ambient temperature and relative humidity within limits required by type of adhesive used and recommendation of adhesive manufacturer.
   1. Provide ventilation to disperse fumes during application of adhesive as recommended by the adhesive manufacturer.

1.7 WARRANTY

A. Furnish 1-year guarantee against defects in material and workmanship.

PART 2 - PRODUCTS

2.1 MANUFACTURER

A. Basis of Design: Marlite; 1 Marlite Drive, Dover, OH 44622. PHONE: 800-377-1221, FAX 330-343-4668, Email: info@marlite.com www.marlite.com.
   1. Product:
      a. Symmetrix.
      b. Standard-Pebbled.

2.2 PANELS

A. Fiberglass reinforced thermosetting polyester resin panel sheets complying with ASTM D 5319.
   1. Coating: Multi-layer print, primer and finish coats or applied over-layer.
   2. Dimensions:
      a. Thickness – 0.090-inch nominal.
      b. Width – 4 feet - 0 inches nominal.
      c. Length –As indicated on Drawings nominal.
   3. Tolerance:
      a. Length and Width: +/-1/8-inch.
      b. Square - Not to exceed 1/8-inch for 8-foot panels or 5/32-inch for 10-foot panels.

B. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.
   1. Flexural Strength - 1.0×10^4 psi per ASTM D 790.
   2. Flexural Modulus - 3.1×10^5 psi per ASTM D 790.
   3. Tensile Strength - 7.0×10^3 psi per ASTM D 638.
   4. Tensile Modulus - 1.6×10^5 psi per ASTM D 638.
   5. Water Absorption - 0.72 percent per ASTM D 570.
   6. Barcol Hardness (scratch resistance) of 35 55 as per ASTM D 2583.
   7. Izod Impact Strength of 72 ft. lbs./in ASTM D 256.

C. Back Surface: Smooth. Imperfections which do not affect functional properties are not cause for rejection.

D. Front Finish: As Indicated on Drawings.
   1. Color: As Indicated on Drawings.
   2. Surface: As Indicated on Drawings.
   3. Fire Rating: Class C (III) Fire Rating.
   4. Size: As indicated on Drawings.

2.3 MOLDINGS

A. PVC Trim: Manufacturer’s Standard thin-wall semi-rigid extruded PVC for:
   1. Inside Corner.
   2. Outside Corner.
   3. Edge.
   4. 135 degrees Inside Corner.
   5. 135 degrees Outside Corner.
   6. Color: White.

2.4 ACCESSORIES

A. Fasteners: Non-staining nylon drive rivets.
   1. Match panel colors.
   2. Length to suit project conditions.

B. Adhesive: Either of the following construction adhesives complying with ASTM C 557.
   1. Manufacturer’s Standard FRP Adhesive - Water- resistant, non-flammable adhesive.

C. Sealant:
   1. Manufacturer’s Standard Color Match Sealant.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine backup surfaces to determine that corners are plumb and straight, surfaces are smooth, uniform, clean and free from foreign matter, nails countersunk, joints and cracks filled flush and smooth with the adjoining surface.
   1. Verify that stud spacing does not exceed 24 inches on-center.

B. Repair defects prior to installation.
   1. Level wall surfaces to panel manufacturer’s requirements. Remove protrusions and fill indentations.

3.2 INSTALLATION

A. Comply with manufacturer's recommended procedures and installation sequence.

B. Cut sheets to meet supports allowing 1/8-inch clearance for every 8 feet of panel.
   1. Cut and drill with carbide tipped saw blades or drill bits or cut with shears.
   2. Pre-drill fastener holes 1/8-inch oversize with high-speed drill bit.
      a. Space at 8 inches maximum on center at perimeter, approximately 1-inch from panel edge.
      b. Space at in field in rows 16 feet on center, with fasteners spaced at 12 inches maximum on center.

C. Apply panels to board substrate, above base, vertically oriented with seams plumb and pattern aligned with adjoining panels.
   1. Install panels with manufacturer's recommended gap for panel field and corner joints.
      a. Adhesive trowel and application method to conform to adhesive manufacturer’s recommendations.
      b. Drive fasteners for snug fit. Do not over-tighten.

D. Apply panel moldings to all panel edges using silicone sealant providing for required clearances.
   1. All moldings must provide for a minimum 1/8 inches of panel expansion at joints and edges, to insure proper installation.
   2. Apply sealant to all moldings, channels and joints between the system and different materials to assure watertight installation.

3.3 CLEANING

A. Remove excess sealant from panels and moldings. Wipe panel down using a damp cloth and mild soap solution or cleaner.

B. Refer to manufacturer's specific cleaning recommendations. Do not use abrasive cleaners.

END OF SECTION

SECTION 09 91 13 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and the application of paint systems on exterior substrates.
   1. Concrete.
   2. Concrete masonry units (CMU).
   3. Steel and iron.
   4. Galvanized metal.
   5. Aluminum (not anodized or otherwise coated).
   6. Stainless-steel flashing.
   7. Gypsum board.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
   1. Submit Samples on rigid backing, 8 inches square, minimum.
   2. Step coats on Samples to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.

C. Product List: For each product indicated, include cross-reference to paint system and locations of the application areas. Use the same designations indicated on Drawings and in schedules.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company products indicated or comparable product from 1 of the following:
   1. Benjamin Moore & Co.
   2. Dulux (formerly ICI Paints:) a brand AkzoNobel.
   3. Dunn-Edwards Corporation.
   4. Glidden Professional.
   5. Kelly-Moore Paint Company, Inc.
   6. Kwal Paint; Comex Group.

2.2 PAINT, GENERAL

A. Standards: Provide products that comply with Manufacture's Premium 1st Quality standards indicated and like VOC limits.
B. Material Compatibility:
   1. Materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
C. Colors: As indicated in a color schedule.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
   1. Concrete: 12 percent.
   2. Fiber-Cement Board: 12 percent.
   3. Masonry (Clay and CMU): 12 percent.
   4. Wood: 15 percent.
   5. Portland Cement Plaster: 12 percent.
   6. Gypsum Board: 12 percent.
C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
D. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."
B. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 CLEANING AND PROTECTION

A. Protect Work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
B. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.5 EXTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Nontraffic Surfaces:
   1. Latex System:
      a. Prime Coat: Primer, alkali resistant, water based: S-W Loxon Concrete & Masonry Primer Sealer, A24W8300, at 8.0 mils wet, 3.2 mils dry.
      b. Intermediate Coat: Latex, exterior, matching topcoat.
      c. Topcoat: Latex, exterior, low-sheen (Gloss Level 3-4): S-W Solo Acrylic Semi-Gloss, A-76 Series, at 4.0 mils wet, 1.5 mils dry, per coat.
B. CMU Substrates:
   1. Latex System:
      a. Primer Coat: Block filler, latex, interior/exterior: S-W PrepRite Block Filler, B25W25, at 75 to 125 sq. ft. per gallon.
      b. Intermediate Coat: Latex, exterior, matching topcoat.
      c. Topcoat: Latex, exterior, flat (Gloss Level 1): S-W A-100 Exterior Latex Flat, A6 Series, at 4.0 mils wet, 1.2 mils dry, per coat.
C. Ferrous Metal, Galvanized-Metal, and Aluminum Substrates (e.g.but not limited to, exposed lintels, miscellaneous metal, doors and frames,equipment and handrails):
   1. Water-Based Light Industrial Coating System:
      a. Prime Coat: Primer, water-based, anti-corrosive for metal: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, 5.0 to 10.0 mils wet, 2.0 to 4.0 mils dry.
      b. Intermediate Coat: Light industrial coating, exterior, water based, matching topcoat.
      c. Topcoat: Light industrial coating, exterior, water based, gloss (Gloss Level 6): S-W Pro Industrial Acrylic Gloss Coating, B66-600 Series, at 2.5 to 4.0 mils dry, per coat.

END OF SECTION

SECTION 09 91 23 - INTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Surface preparation and the application of paint systems on the following interior substrates:
      a. Concrete.
      b. Concrete masonry units (CMU).
      c. Steel and iron.
      d. Galvanized metal.
      e. Aluminum (not anodized or otherwise coated).
      f. Gypsum board.
      g. Spray-textured ceilings.
   2. Fire and smoke assembly identification.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 05 12 00 "Structural Steel Framing" for shop priming of metal substrates with primers specified in this Section.

1.2 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523, a matte flat finish.
B. Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, a high-side sheen flat, velvet-like finish.
C. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, an eggshell finish.
D. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523, a satin-like finish.
E. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523, a semi-gloss finish.
F. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523, a gloss finish.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.
B. Samples for Verification: For each type of paint system and in each color and gloss of topcoat.
   1. Submit Samples on rigid backing, 8 inches square.
   2. Step coats on Samples to show each coat required for system.
   3. Label each coat of each Sample.
   4. Label each Sample for location and application area.
C. Product List: For each product indicated, include the following:
   1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
   2. VOC content.

1.4 CLOSEOUT SUBMITTALS

A. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/color/finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Paint: 5 percent, but not less than 1 gallon of each material and color applied.

1.6 QUALITY ASSURANCE

A. Mockups: Apply mockups of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
   1. Architect will select 1 surface to represent surfaces and conditions for application of each paint system specified in Part 3.
      a. Vertical and Horizontal Surfaces: Provide samples of at least 100 sq. ft.
      b. Other Items: Architect will designate items or areas required.
   2. Final approval of color selections will be based on mockups.
      a. If preliminary color selections are not approved, apply additional mockups of additional colors selected by Architect at no added cost to Owner.
   3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
   4. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacturer's label with the following information:
   1. Product name and type (description).
   2. Batch date.
   3. Color number.
   4. VOC content.
   5. Environmental handling requirements.
   6. Surface preparation requirements.
   7. Application instructions.

B. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees Fahrenheit.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.8 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 degrees Fahrenheit.
B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 degrees Fahrenheit above the dew point; or to damp or wet surfaces.
C. Lead Paint: It is not expected that lead paint will be encountered in the Work.
   1. If suspected lead paint is encountered, do not disturb; immediately notify Architect and Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide Sherwin-Williams Company and ProCoat products indicated.
B. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
   1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 PAINT, GENERAL

A. Standards: Provide products that comply with Manufacture's Premium 1st Quality standards indicated and like VOC limits.
B. Material Compatibility:
   1. Provide materials for use within each paint system that are compatible with 1 another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
   2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.
C. Colors: As selected by Architect from manufacturer's full range and as indicated on Interior Material Legend in Drawings.

2.3 SOURCE QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure:
   1. Owner will engage the services of a qualified testing agency to sample paint materials. Contractor will be notified in advance and may be present when samples are taken. If paint materials have already been delivered to Project site, samples may be taken at Project site. Samples will be identified, sealed, and certified by testing agency.
   2. Testing agency will perform tests for compliance with product requirements.
   3. Owner may direct Contractor to stop applying coatings if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the 2 paints are incompatible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.
   1. Report, in writing, conditions that may affect application, appearance, or performance of paint.

B. Substrate Conditions:
   1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
      a. Concrete: 12 percent.
      b. Masonry (Clay and CMU): 12 percent.
      c. Gypsum Board: 12 percent.
   2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
   3. Spray-Textured Ceiling Substrates: Verify that surfaces are dry.

C. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
   1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.
   1. Concrete Floors: Remove oil, dust, grease, dirt, and other foreign materials. Comply with SSPC-SP-13/NACE 6 or ICRI 03732.

E. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces or mortar joints exceed that permitted in manufacturer's written instructions.

F. Steel Substrates: Remove rust, loose mill scale, and shop primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
   1. SSPC-SP 3, "Power Tool Cleaning."

G. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

H. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

I. Aluminum Substrates: Remove loose surface oxidation.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and to recommendations in "MPI Manual."
   1. Use applicators and techniques suited for paint and substrate indicated.
   2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
   3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
   4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
   5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

E. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:
   1. Paint the following Work where exposed in equipment rooms:
      a. Uninsulated metal piping.
      b. Uninsulated plastic piping.
      c. Pipe hangers and supports.
      d. Metal conduit.
      e. Plastic conduit.
      f. Tanks that do not have factory-applied final finishes.
   2. Paint the following Work where exposed in occupied spaces:
      a. Equipment, including panelboards.
      b. Uninsulated metal piping.
      c. Uninsulated plastic piping.
      d. Pipe hangers and supports.
      e. Metal conduit.
      f. Plastic conduit.
      g. Other items as directed by Architect.
   3. Paint portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets that are visible from occupied spaces.

F. Fire and Smoke Assembly Identification: Where assembly types are identified in Drawings, provide stenciled identification in accessible concealed spaces and where noted in Drawings.
   1. Assembly Types Requiring Identification: Fire walls, fire barriers, fire partitions, smoke barriers, and smoke partitions.
   2. Accessible concealed spaces include below accessible floors, above ceilings, and attic spaces.
   3. Locate within 15 feet of partition ends and at intervals not exceeding 30 feet measured horizontally.
   4. Lettering not less than 3 inches in height with a minimum 3/8-inch stroke in a contrasting color.
   5. Wording: "Fire and/or smoke barrier - Protect all openings."

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
   1. Contractor shall touch up and restore painted surfaces damaged by testing.
   2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
B. Protect Work of other trades against damage from paint application. Correct damage to Work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
C. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Concrete Substrates, Pedestrian Traffic Surfaces:
   1. Clear Epoxy System, Gloss Finish:
      a. First Coat: ProCoat, Penetrating Epoxy Sealer, at 100 to 200 sq. ft. per gal.
      b. Second Coat: ProCoat, Penetrating Epoxy Sealer, at 100 to 200 sq. ft. per gal.
B. CMU Substrates:
   1. Water-Based Light Industrial Coating System:
      a. Block Filler: Block filler, latex, interior/exterior: S-W PrepRite Block Filler, B25W25, at 100 to 200 sq. ft. per gal.
      b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
      c. Topcoat: Light industrial coating, interior, water based, eggshell (Gloss Level 3): S-W Pro Industrial Pre-Catalyzed Water Based Epoxy, K45-151 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

C. Metal Substrates (Aluminum, Steel, Galvanized Steel):
   1. Latex System:
      a. Prime Coat: Primer, rust-inhibitive, water based: S-W Pro Industrial Pro-Cryl Universal Primer, B66-310 Series, at 5.0 to 10 mils wet, 2.0 to 4.0 mils dry.
      b. Intermediate Coat: Water-based acrylic, interior, matching topcoat.
      c. Topcoat: Water-based acrylic, semi-gloss (Gloss Level 5): S-W Pro Industrial Acrylic Semi-Gloss Coating, B66-650 Series, at 2.5 to 4.0 mils dry, per coat.
   2. Water-Based Dry-Fall System- Exposed Ceilings:
      a. Top Coat: Dry-fall latex, flat: S-W Pro Industrial Waterborne Acrylic Dryfall Flat, B42-80 Series, at 6.0 mils wet, 1.7 mils dry.

D. Gypsum Board and Spray-Texture Ceiling Substrates:
   1. Latex System: (Unless noted otherwise)
      a. Prime Coat: Primer, latex, interior: S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.5 mils dry.
      b. Intermediate Coat: Latex, interior, matching topcoat.
      c. Topcoat: Latex, interior, eggshell (Gloss Level 3): S-W ProMar 200 Zero VOC Latex Eg-Shel, B20-2600 Series, at 4.0 mils wet, 1.7 mils dry, per coat.
   2. Water-Based Light Industrial Coating System: C100, C105, C107, C110, C112, C113, C115, C1, C2, F100, F101, F102, F113, F116.
      a. Prime Coat: Primer sealer, latex, interior: S-W ProMar 200 Zero VOC Latex Primer, B28W2600, at 4.0 mils wet, 1.5 mils dry.
      b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
      c. Topcoat: Light industrial coating, interior, water based, eggshell (Gloss Level 3): S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy, K45-151 Series, at 4.0 mils wet, 1.5 mils dry, per coat.

END OF SECTION

SECTION 09 96 00 - HIGH-PERFORMANCE COATINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes surface preparation and application of high-performance coating systems on the following substrates:
   1. Interior Substrates:
      a. Concrete, horizontal surfaces.
      b. Concrete masonry units (CMU).
      c. Steel.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 91 13 "Exterior Painting" for special-use coatings and general field painting.
   3. Section 09 91 23 "Interior Painting" for special-use coatings and general field painting.

1.2 DEFINITIONS

A. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523, an eggshell finish.
B. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523, a semi-gloss finish.
C. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523, a gloss finish.
D. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523, a high-gloss finish.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include preparation requirements and application instructions.
   1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawing and in schedules.

B. Coating Maintenance Manual: Provide coating maintenance manual including area summary with finish schedule, area detail designating location where each product/ color/ finish was used, product data pages, material safety data sheets, care and cleaning instructions, touch-up procedures, and color samples of each color and finish used.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Delivery and Handling: Deliver products to Project site in an undamaged condition in manufacturer's original sealed containers, complete with labels and instructions for handling, storing, unpacking, protecting, and installing. Packaging shall bear the manufacture's label with the following information:
   1. Product name and type (description).
   2. Batch date.
   3. Color number.
   4. VOC content.
   5. Environmental handling requirements.
   6. Surface preparation requirements.
   7. Application instructions.

C. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 degrees Fahrenheit.
   1. Maintain containers in clean condition, free of foreign materials and residue.
   2. Remove rags and waste from storage areas daily.

1.5 FIELD CONDITIONS

A. Apply coatings only when temperature of surfaces to be coated and surrounding air temperatures are between 50 and 95 degrees Fahrenheit.

B. Do not apply coatings when relative humidity exceeds 85 percent; at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

C. Do not apply exterior coatings in snow, rain, fog, or mist.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
   1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide The Sherwin-Williams Company; products indicated or comparable product from one of the following:
   1. Benjamin Moore & Co.
   2. PPG Architectural Finishes, Inc.
   3. Tnemec Inc.

B. Source Limitations: Obtain paint materials from single source from single listed manufacturer.
   1. Manufacturer's designations listed on a separate color schedule are for color reference only and do not indicate prior approval.

2.2 HIGH-PERFORMANCE COATINGS, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and are listed in "MPI Approved Products List."

B. Material Compatibility:
   1. For each coat in a coating system, provide products recommended in writing by manufacturers of topcoat for use in coating system and on substrate indicated.

C. Colors: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers. Where acceptability of substrate conditions is in question, apply samples and perform in-situ testing to verify compatibility, adhesion, and film integrity of new paint application.
   1. Report in writing conditions that may affect application, appearance, or performance of paint.

B. Substrate Conditions:
   1. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
      a. Concrete Masonry: 12 percent.
      b. Gypsum Board: 12 percent.
   2. Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
   3. Plaster Substrates: Verify that plaster is fully cured.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Proceed with coating application only after unsatisfactory conditions have been corrected; application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
   1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of coatings, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

D. Concrete Substrates: Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.

E. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections. Produce sharp glass lines and color breaks.

3.3 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner will engage the services of a qualified testing and inspecting agency to inspect and test coatings for dry film thickness.
   1. Contractor shall touch up and restore coated surfaces damaged by testing.
   2. If test results show that dry film thickness of applied coating does not comply with coating manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry film thickness that complies with coating manufacturer's written recommendations.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
C. Protect work of other trades against damage from coating operation. Correct damage by cleaning, repairing, replacing, and recoating, as approved by Architect, and leave in an undamaged condition.
D. At completion of construction activities of other trades, touch up and restore damaged or defaced coated surfaces.
E. CMU Substrates: A100, A101.
    1. Epoxy System:
        a. Block Filler: S-W Kem Cati-Coat HS Epoxy Block Filler B42 Series, at 10 to 20 mils dry, per coat.
        b. Intermediate Coat: Epoxy, matching topcoat.
        c. Topcoat: Epoxy, high-build, semi-gloss: S-W Macropoxy 646-100, B58-600 Series, at 5 to 10 mils dry, per coat.
F. Steel Substrates: A100, A101.
    1. Epoxy-Modified Latex System:
        a. Prime Coat: Primer, rust-inhibitive, solvent-based: S-W Keri-Bond Primer, B50-WZ4 Series, at 2.0 to 4.0 mils dry, per coat.
        b. Intermediate Coat: Epoxy-modified latex, interior, gloss matching topcoat.
        c. Topcoat: Epoxy-modified latex, interior, eggshell (Gloss Level 3): S-W Pro Industrial Waterbased Catalyzed Epoxy Eggshell, B73-300 Series, at 2.0 to 4.0 mils dry, per coat.

END OF SECTION

SECTION 10 21 13.19 - PLASTIC TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid-plastic toilet compartments configured as toilet enclosures and urinal screens.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 06 10 00 "Rough Carpentry" for concealed blocking support of compartments.
   3. Section 10 28 13 "Toilet Accessories" for toilet tissue dispensers, grab bars, purse shelves, and similar accessories mounted on toilet compartments.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

B. Shop Drawings: For toilet compartments.
   1. Include plans, elevations, sections, details, and attachment details.
   2. Show locations of centerlines of toilet fixtures.
   3. Show locations of floor drains.

C. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:
   1. Each type of material, color, and finish required for toilet compartments, prepared on 6-inch square samples of same thickness and material indicated for Work.
   2. Each type of hardware and accessory.

D. Product Schedule: For toilet compartments, prepared by or under the supervision of supplier, detailing location and selected colors for toilet compartment material.

1.3 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents and source.
   1. Door Hinges: 2 hinge(s) with associated fasteners.
   2. Latch and Keeper: 2 latch(es) and keeper(s) with associated fasteners.
   3. Coat Hooks: 2 bumper(s) with associated fasteners.
   4. Door Pull: 2 door pull(s) with associated fasteners.
   5. Fasteners: 10 fasteners of each size and type.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 200 or less.
   2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities and ICC A117.1 for toilet compartments designated as accessible.

2.2 SOLID-PLASTIC TOILET COMPARTMENTS

A. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
   1. Accurate Partitions Corporation.
   2. All American Metal Corp.
   3. American Sanitary Partition Corporation.
   4. Ampco, Inc.
   5. Bradley Corporation; Mills Partitions.
   6. General Partitions Mfg. Corp.
   7. Global Steel Products Corp.
   8. Hadrian Manufacturing Inc.
   9. Marlite.
   10. Metpar Corp.
   11. Partition Systems Incorporated of South Carolina; Columbia Partitions.
   12. Scranton Products.
   13. Weis-Robart Partitions, Inc.

B. Toilet-Enclosure Style: Overhead braced.

C. Urinal-Screen Style: Wall hung, 20 by 48 inches with bottom mounted 12 inches above floor finish.

D. Door, Panel, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1-inch thick, seamless, with eased edges, no-sightline system, and with homogenous color and pattern throughout thickness of material.
   1. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum or stainless-steel strip fastened to exposed bottom edges of solid-plastic components to hinder malicious combustion.
   2. Color and Pattern: 1 color and pattern in each room as scheduled on the Drawings.

E. Pilaster Shoes: Manufacturer's standard design; 304 stainless-steel with No. 4 finish, concealing floor fastenings. Provide adjustment for floor variations with screw jack through steel saddles integral with pilaster.

F. Brackets (Fittings):
   1. Full-Height (Continuous) Type: Manufacturer's standard design; extruded aluminum.

2.3 HARDWARE AND ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard operating hardware and accessories.
   1. Material: Chrome-plated brass.
   2. Hinges: Manufacturer's standard paired, self-closing type that can be adjusted to hold doors open at any angle up to 90 degrees, allowing emergency access by lifting door.
   3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
   4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
   5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors.
   6. Door Pull: Manufacturer's standard pull that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.

B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless-steel, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless-steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.4 FABRICATION

A. Fabrication, General: Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.

B. Overhead-Braced Units: Provide manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters to suit floor conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.

C. Door Size and Swings: Unless otherwise indicated, provide 24-inch wide, in-swinging doors for standard toilet compartments and 36-inch wide, out-swinging doors with a minimum 32-inch wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
   1. Confirm location and adequacy of blocking and supports required for installation.

B. Verify field measurements are as indicated on the Drawings.

C. Verify correct spacing of and between plumbing fixtures.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
   1. Maximum Clearances:
      a. Pilasters and Panels: 1/2-inch.
      b. Panels and Walls and between wall and end pilasters: 1/2-inch.
   2. Full-Height (Continuous) Brackets: Secure panels to walls and to pilasters with full-height brackets.
      a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
      b. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than 2 fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

3.3 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION

SECTION 10 22 13 - WIRE MESH PARTITIONS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Heavy-duty wire mesh partitions.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Shop Drawings:
   1. Include Plans, elevations, Sections, details, and attachments to other Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. Acorn Wire & Iron Works.
   2. American Woven Wire Corporation.
   3. Central Wire and Iron.
   4. Folding Guard Corporation.
   5. Indiana Wire Products, Inc.
   6. Jesco Industries, Inc.
   7. Kenco Wire & Iron Products Inc.
   8. Miller Wire Works, Inc.
   9. Newark Wire Works Inc.
   10. R. J. Donaldson, Inc.
   11. SpaceGuard Products.
   12. Standard Wire & Steel Works.
   13. WireCrafters, LLC.

2.2 HEAVY-DUTY WIRE MESH PARTITIONS

A. Mesh:
   1. 0.192-inch diameter, intermediate-crimp steel wire woven into 2-inch diamond mesh.
B. Vertical and Horizontal Panel Framing: Not less than 1-1/2- by 3/4- by 1/8-inch cold-rolled steel channels; with holes for 3/8-inch diameter bolts not more than 12 inches o.c.
C. Horizontal Panel Stiffeners: 2 cold-rolled steel channels, 1- by 1/2- by 1/8-inch, bolted or riveted toe to toe through mesh.
D. Top Capping Bars: 3- by 1-inch steel channels.

E. Posts for 90 Degree Corners: 1- or 2- by 2- by 0.075-inch cold-rolled steel angles or tubes, with holes for 3/8-inch diameter bolts aligning with bolt holes in vertical framing; with 1/4-inch steel base plates.
F. Adjustable Corner Posts: 2 1-1/2- by 3/4- by 1/8-inch cold-rolled, steel channels or 2- by-2- by-0.075-inch steel tubes connected by steel hinges at 36 inches o.c. attached to posts; with 1/4-inch diameter bolt holes aligning with bolt holes in vertical framing; with 1/4-inch steel base plates.
G. Line Posts: 3-inch by 4.1-lb or 3-1/2 by 1-1/4- by 1/8-inch steel channels; with 1/4-inch steel base plates.
H. 3-Way Intersection Posts: 2- by 2- by 0.075-inch steel tubes, with holes for 3/8-inch diameter bolts aligned for bolting to adjacent panels; with 1/4-inch steel base plates.
I. Floor Shoes: Metal, not less than 2 inches high; sized to suit vertical framing, drilled for attachment to floor, and with setscrews for leveling adjustment.
J. Sliding Doors: Fabricated from same mesh as partitions, with framing fabricated from 1-1/2- by 3/4- by 1/8-inch steel channels, banded with 1-1/2- by 1/8-inch flat steel bar cover plates on 4 sides.
    1. Hardware: 2, 4-wheel roller-bearing carriers; box track; and bottom guide channel for each door.
    2. Cylinder Lock: Mortise type with cylinder specified in Section 08 71 00 "Door Hardware"; operated by key outside and lever inside; mounted in lower section of door.
K. Accessories:
    1. Adjustable Filler Panels: 0.060-inch thick, steel sheet; capable of filling openings from 2 to 12 inches.
L. Finish: Hot-dip galvanized unless otherwise indicated.

2.3 MATERIALS

A. Steel Wire: ASTM A510/A510M.
B. Steel Plates, Channels, Angles, and Bars: ASTM A36/A36M.
C. Steel Sheet: Cold-rolled steel sheet, ASTM A1008/A1008M, Commercial Steel (CS), Type B.
D. Steel Pipe: ASTM A53/A53M, Schedule 40, unless another weight is indicated or required by structural loads.
E. Steel Tubing: ASTM A500/A500M, cold-formed structural-steel tubing or ASTM A513/A513M, Type 5, mandrel-drawn mechanical tubing.
F. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B; with G60 zinc (galvanized) or A60 zinc-iron-alloy (galvannealed) coating designation.
G. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

2.4 FABRICATION

A. General: Fabricate wire mesh items from components of sizes not less than those indicated. Use larger-sized components as recommended by wire mesh item manufacturer. Furnish bolts, hardware, and accessories required for complete installation with manufacturer's standard finishes.
    1. Fabricate wire mesh items to be readily disassembled.
    2. Welding: Weld corner joints of framing and grind smooth, leaving no evidence of joint.

B. Heavy-Duty Wire Mesh Partitions: Fabricate wire mesh partitions with cutouts for pipes, ducts, beams, and other items indicated. Finish edges of cutouts to provide a neat, protective edge.
   1. Mesh: Securely clinch mesh to framing.
   2. Framing: Fabricate framing with mortise-and-tenon corner construction.
      a. Provide horizontal stiffeners as indicated or, if not indicated, as required by panel height and as recommended by wire mesh partition manufacturer. Weld horizontal stiffeners to vertical framing.
   3. Fabricate wire mesh partitions with 3 to 4 inches of clear space between finished floor and bottom horizontal framing.
   4. Doors: Align bottom of door with bottom of adjacent panels.
      a. For doors that do not extend full height of partition, provide transom over door, fabricated from same mesh and framing as partition panels.
   5. Hardware Preparation: Mortise, reinforce, drill, and tap doors and framing as required to install hardware.

2.5 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A153/A153M for steel and iron hardware and with ASTM A123/A123M for other steel and iron products.

PART 3 - EXECUTION

3.1 WIRE MESH PARTITIONS ERECTION

A. Anchor wire mesh partitions to floor with 3/8-inch diameter, postinstalled expansion anchors at 12 inches o.c. through anchor clips located at each post and corner. Shim anchor clips as required to achieve level and plumb installation.
B. Anchor wire mesh partitions to floor with 3/8-inch diameter, post-installed expansion anchors at 12 inches o.c. through floor shoes located at each post and corner. Adjust wire mesh partition posts in floor shoes to achieve level and plumb installation.
C. Anchor wire mesh partitions to walls at 12 inches o.c. through back corner panel framing.
D. Secure top capping bars to top framing channels with 1/4-inch diameter, "U" bolts spaced not more than 28 inches o.c.
E. Provide line posts at locations indicated.
F. Provide seismic supports and bracing as indicated or, if not indicated, as recommended by manufacturer and as required for stability, extending and fastening members to supporting structure.
G. Where standard-width wire mesh partition panels do not fill entire length of run, provide adjustable filler panels to fill openings.
H. Install doors complete with door hardware.
I. Install service windows complete with window hardware.
J. Weld or bolt sheet metal bases to doors.

3.2 ADJUSTING AND CLEANING

A. Adjust doors to operate smoothly and easily, without binding or warping. Adjust hardware to function smoothly. Verify that latches and locks engage accurately and securely without forcing or binding.
B. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas, and repair galvanizing to comply with ASTM A 780/A 780M.

END OF SECTION

SECTION 10 26 00 - WALL AND DOOR PROTECTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Corner guards.

B. Related Requirements:
1. Division 01 Specification Sections apply to Work of this Section.
2. Section 08 71 00 "Door Hardware" for metal protective trim units, according to BHMA A156.6, used for armor, kick, mop, and push plates.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
1. Include construction details, material descriptions, impact strength, dimensions of individual components and profiles, and finishes.
2. Include fire ratings of units recessed in fire-rated walls and listings for door-protection items attached to fire-rated doors.

B. Shop Drawings: For each type of wall and door protection showing locations and extent.
1. Include plans, elevations, sections, and attachment details.

C. Samples for Verification: For each type of exposed finish on the following products, prepared on samples of size indicated below:
1. Corner Guards: Manufacturer's standard sampling size for finish only.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of wall and door protection product to include in maintenance manuals.
1. Include recommended methods and frequency of maintenance for maintaining best condition of metal corner guards under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to finishes and performance.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Corner-Guard: Full-size corner guards of maximum length equal to 2 percent of each type, color, and texture of cover installed, but no fewer than 2, 48-inch- long units.
2. Mounting and Accessory Components: Amounts proportional to the quantities of extra materials. Package mounting and accessory components with each extra material.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store wall and door protection in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.
   1. Maintain room temperature within storage area at not less than 70 degrees Fahrenheit during the period plastic materials are stored.
   2. Keep materials out of direct sunlight.
   3. Store wall- and door-protection components for a minimum of 72 hours, or until material attains a minimum room temperature of 70 degrees Fahrenheit.
      a. Store corner-guard in a vertical position.

1.6 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of wall- and door-protection units that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Structural failures including detachment of components from each other or from the substrates, delamination, and permanent deformation beyond normal use.
      b. Deterioration of metals, metal finishes, plastics, and other materials beyond normal use.
   2. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain wall- and door-protection products of each type from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Surface Burning Characteristics: Comply with ASTM E 84 or UL 723; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Flame-Spread Index: 25 or less.
   2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines for Buildings and Facilities ICC A117.1.

2.3 CORNER GUARDS

A. Surface-Mounted, Metal Corner Guards : Fabricated as 1 piece from formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Construction Specialties, Inc.
      b. InPro Corporation (IPC).
   2. Material: Stainless-steel sheet, Type 304.
      a. Finish: Directional satin, No. 4.
   3. Wing Size: Nominal 2-1/2 by 2-1/2 inches.
   4. Mounting: Adhesive.

2.4 MATERIALS

A. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.
B. Adhesive: As recommended by protection product manufacturer.
   1. Adhesive shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.5 FABRICATION

A. Fabricate wall and door protection according to requirements indicated for design, performance, dimensions, and member sizes, including thicknesses of components.
B. Factory Assembly: Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.
C. Quality: Fabricate components with uniformly tight seams and joints and with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

2.6 FINISHES

A. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
B. Examine walls to which wall and door protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.
   1. For wall and door protection attached with adhesive, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing wall and door protection.
B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. Installation Quality: Install wall and door protection according to manufacturer's written instructions, level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

3.4 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard ammonia-based household cleaning agent.
B. Remove excess adhesive using methods and materials recommended in writing by manufacturer.

END OF SECTION

SECTION 10 28 13 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Public-use washroom accessories.
   2. Public-use shower room accessories.
   3. Underlavatory guards.
   4. Custodial accessories.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 09 30 13 "Ceramic Tiling" for ceramic toilet and bath accessories.

1.2 COORDINATION

A. Coordinate accessory locations with other Work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
   2. Include anchoring and mounting requirements, including requirements for cutouts in other Work and substrate preparation.
   3. Include electrical characteristics.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.
   1. Identify locations using room designations indicated.
   2. Identify accessories using designations indicated.

C. Delegated-Design Submittal: For grab bars and shower seats.
   1. Include structural design calculations indicating compliance with specified structural-performance requirements.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.6 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, visible silver spoilage defects.
   2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 OWNER-FURNISHED MATERIALS

A. Owner-Furnished Materials:
   1. Paper towel dispensers.
   2. Toilet tissue dispensers.
   3. Soap dispensers.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Design accessories and fasteners to comply with the following requirements:
   1. Grab Bars: Installed units are able to resist 250 lbf concentrated load applied in any direction and at any point.
   2. Shower Seats: Installed units are able to resist 250 lbf applied in any direction and at any point.

2.3 PUBLIC-USE WASHROOM ACCESSORIES

A. Source Limitations: Obtain public-use washroom accessories from single source from single manufacturer.
B. Toilet Tissue Dispenser (TTD):
   1. Manufacturer: Kimberly-Clark.
   2. Owner furnished. Owner installed.
   3. Mounting: Surface mounted.
C. Automatic Paper Towel Dispenser (PTD):
   1. Manufacturer: Kimberly-Clark.
   2. Owner furnished. Owner installed.
D. Waste Receptacle (WR):
   1. Manufacturers: Subject to compliance with requirements, provide Bradley Model 357 Waste Receptacle- Frameless or available manfacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. AJW Architectural Products.
      b. American Specialties, Inc.
      c. Bobrick Washroom Equipment, Inc.
      d. Bradley Corporation.
      e. GAMCO Specialty Accessories; a division of Bobrick.
      f. Tubular Specialties Manufacturing, Inc.
   2. Mounting: Surface mounted.
   3. Minimum Capacity: 12 gallon.
   4. Material and Finish: Stainless-steel, ASTM A480/A480M No. 4 finish (satin).
   5. Liner: Reusable vinyl liner.

E. Automatic Soap Dispenser (SD):
   1. Manufacturer: Kimberly-Clark.
   2. Owner furnished. Owner installed.
   3. Description: Automatic dispenser with infrared sensor to detect presence of hands; battery powered; designed for dispensing soap in liquid or lotion form.
   4. Mounting: Surface mounted.

F. Grab Bar (GB):
   1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
      a. AJW Architectural Products.
      b. American Specialties, Inc.
      c. Bobrick Washroom Equipment, Inc.
      d. Bradley Corporation.
      e. GAMCO Specialty Accessories; a division of Bobrick.
      f. Seachrome Corporation.
   2. Mounting: Flanges with concealed fasteners.
   3. Materials: Stainless-steel, 0.05-inch thick.
      a. Finish Smooth, ASTM A480 No. 4 finish (satin).
   4. Outside Diameter: 1-1/2 inches.
   5. Configuration and Length: As indicated on Drawings.

G. Sanitary-Napkin Disposal Unit (SND):
   1. Manufacturers: Subject to compliance with requirements, Bradley Model 4781-11 with 1 box disposal liners or provide products by 1 of the following:
      a. AJW Architectural Products.
      b. American Specialties, Inc.
      c. Bobrick Washroom Equipment, Inc.
      d. Bradley Corporation.
      e. GAMCO Specialty Accessories; a division of Bobrick.
   2. Mounting: Surface mounted.
   3. Door or Cover: Self-closing, disposal-opening cover.
   4. Receptacle: Removable.
   5. Material and Finish: Stainless-steel, ASTM A480/A480M No. 4 finish (satin).
   6. Basis-of-Design: Bradley Model 4781-11 with 1 box disposal liners.

H. Mirror Unit (MIR):
   1. Manufacturers: Subject to compliance with requirements, Bradley 780 Series or provide products by 1 of the following:
      a. AJW Architectural Products.
      b. American Specialties, Inc.
      c. Bobrick Washroom Equipment, Inc.
      d. Bradley Corporation.
      e. GAMCO Specialty Accessories; a division of Bobrick.
   2. Frame: Stainless-steel angle, 0.05-inch thick.
      a. Corners: Welded and ground smooth.
   3. Size: As indicated on Drawings.
   4. Hangers: Manufacturer's standard rigid, tamper and theft resistant.

2.4 PUBLIC-USE SHOWER ROOM ACCESSORIES

A. Source Limitations: Obtain public-use shower room accessories from single source from single manufacturer.

B. Shower Curtain Rod (SCR)I:
   1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
      a. AJW Architectural Products.
      b. American Specialties, Inc.
      c. Bobrick Washroom Equipment, Inc.
      d. Bradley Corporation.
      e. GAMCO Specialty Accessories; a division of Bobrick.
   2. Description: 1-inch(25.4-mm-) outside diameter, straight rod.
   3. Mounting Flanges: Concealed fasteners; in material and finish matching rod.
   4. Rod Material and Finish: Polished chrome-plated brass.

C. Shower Curtain (SC):
   1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
      a. AJW Architectural Products.
      b. American Specialties, Inc.
      c. Bobrick Washroom Equipment, Inc.
      d. Bradley Corporation.
      e. GAMCO Specialty Accessories; a division of Bobrick.
   2. Size: Minimum 6-inches wider than opening by 72 inches high.
   3. Material: Nylon-reinforced vinyl, minimum 9 oz. or 0.008-inch (0.2-mm-) thick vinyl, with integral antibacterial and flame-retardant agents.
   4. Color: White.
   5. Grommets: Corrosion resistant at minimum 6 inches o.c. through top hem.
   6. Shower Curtain Hooks: Chrome-plated or stainless-steel, spring wire curtain hooks with snap fasteners, sized to accommodate specified curtain rod. Provide 1 hook per curtain grommet.

D. Robe Hook (RH)I:
   1. Manufacturers: Subject to compliance with requirements, Bradley Model 9115 or provide products by 1 of the following:
      a. AJW Architectural Products.
      b. American Specialties, Inc.
      c. Bobrick Washroom Equipment, Inc.
      d. Bradley Corporation.
      e. GAMCO Specialty Accessories; a division of Bobrick.
   2. Description: Single-prong unit.
   3. Material and Finish: Stainless-steel, ASTM A480/A480M No. 7 finish (polished).

2.5 UNDERLAVATORY GUARDS

A. Underlavatory Guard:
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Buckaroos, Inc.
      b. Plumberex Specialty Products, Inc.
      c. Truebro by IPS Corporation.

2. Description: Insulating pipe covering for supply and drain piping assemblies that prevents direct contact with and burns from piping; allow service access without removing coverings.
3. Material and Finish: Antimicrobial, molded plastic, white.

2.6 CUSTODIAL ACCESSORIES

A. Custodial Mop and Broom Holder (JS):
1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
a. AJW Architectural Products.
b. American Specialties, Inc.
c. Bobrick Washroom Equipment, Inc.
d. Bradley Corporation.
e. GAMCO Specialty Accessories; a division of Bobrick.
2. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
3. Length: 36 inches.
4. Hooks: 3.
5. Mop/Broom Holders: 4, spring-loaded, rubber hat, cam type.
6. Material and Finish: Stainless-steel, ASTM A480/A480M No. 4 finish (satin).
a. Shelf: Not less than nominal 0.05-inch thick stainless-steel.
b. Rod: Approximately 1/4-inch diameter stainless-steel.

2.7 MATERIALS

A. Stainless-Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch minimum nominal thickness unless otherwise indicated.
B. Brass: ASTM B19, flat products; ASTM B16/B16M, rods, shapes, forgings, and flat products with finished edges; or ASTM B30, castings.
C. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.036-inch minimum nominal thickness.
D. Galvanized-Steel Sheet: ASTM A653/A653M, with G60 hot-dip zinc coating.
E. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
F. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.
G. Chrome Plating: ASTM B456, Service Condition Number SC 2 (moderate service).
H. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

2.8 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of 6 keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
   1. Remove temporary labels and protective coatings.
B. Grab Bars: Install to comply with specified structural-performance requirements.
C. Shower Seats: Install to comply with specified structural-performance requirements.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
B. Clean and polish exposed surfaces according to manufacturer's written instructions.

END OF SECTION

SECTION 10 44 13 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fire-protection cabinets for the following:
      a. Portable fire extinguisher.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 10 44 16 "Fire Extinguishers" for portable, hand-carried fire extinguishers accommodated by fire-protection cabinets.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semi-recessed-, or surface-mounting method and relationships of box and trim to surrounding construction.
B. Shop Drawings: For fire-protection cabinets.
   1. Include plans, elevations, sections, details, and attachments to other work.
C. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semi-recessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.3 COORDINATION

A. Coordinate size of fire-protection cabinets to ensure that type and capacity of indicated are accommodated.
B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.
B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.3 FIRE-PROTECTION CABINET (FEC)

A. Cabinet Type: Suitable for fire extinguisher.
   1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
      a. Activar Construction Products Group, Inc. - JL Industries.
      b. Guardian Fire Equipment, Inc.
      c. Larsens Manufacturing Company.
      d. Modern Metal Products, Division of Technico Inc.
      e. Potter Roemer LLC; a Division of Morris Group International.

B. Cabinet Construction: Nonrated.
   1. Fire-Rated Cabinets: Construct fire-rated cabinets with double walls fabricated from 0.043-inch thick cold-rolled steel sheet lined with minimum 5/8-inch thick fire-barrier material. Provide factory-drilled mounting holes.

C. Cabinet Material: Cold-rolled steel sheet.

D. Semi-recessed Cabinet: 1-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).
   1. Rolled-Edge Trim: 2-1/2-inch backbend depth.

E. Cabinet Trim Material: Steel sheet.

F. Door Material: Steel sheet.

G. Door Style: Full acrylic bubble with frame.

H. Door Glazing: Molded acrylic bubble.

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.
   1. Provide projecting door pull and friction latch.
   2. Provide continuous hinge, of same material and finish as trim,, permitting door to open 180 degrees.

J. Accessories:
   1. Mounting Bracket: Manufacturer's standard steel, designed to secure fire extinguisher to fire-protection cabinet, of sizes required for types and capacities of fire extinguishers indicated, with plated or baked-enamel finish.
   2. Door Lock: Cam lock that allows door to be opened during emergency by pulling sharply on door handle.
   3. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
      a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."
         1) Location: Applied to cabinet glazing.
         2) Application Process: Pressure-sensitive vinyl letters.
         3) Lettering Color: Red.
         4) Orientation: Vertical.

K. Materials:
   1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.
      a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
      b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
      c. Color: White.

2.4 FABRICATION

A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
   1. Weld joints and grind smooth.
   2. Miter corners and grind smooth.
   3. Provide factory-drilled mounting holes.
   4. Prepare doors and frames to receive locks.
   5. Install door locks at factory.
B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
   1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum 1/2-inch thick.
   2. Miter and weld perimeter door frames and grind smooth.
C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
C. Finish fire-protection cabinets after assembly.
D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where semi-recessed cabinets will be installed.

3.2 PREPARATION

A. Prepare recesses for semi-recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection cabinets in locations and at mounting heights indicated in Drawings. If not indicated in Drawings, at height indicated below:
   1. General Fire-Protection Cabinet Mounting Height: 42 inches above finished floor to top of fire extinguisher.
   2. Surface Fire-Protection Cabinet Mounting Height: In addition to general requirement above, bottom of surface cabinet no higher than 27-inches above finish floor.

B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.
   1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is inadequate for recessed cabinets, provide semi-recessed fire-protection cabinets.
   2. Provide inside latch and lock for break-glass panels.
   3. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Identification:
   1. Apply vinyl lettering at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.

B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.

C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.

D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.

E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 10 44 16 - FIRE EXTINGUISHERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes portable, hand-carried fire extinguishers and mounting brackets for fire extinguishers.
B. Related Requirements:
   1. Divisions 01 Specification Sections apply to Work of this Section.
   2. Section 10 44 13 "Fire Protection Cabinets."

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.
B. Product Schedule: For fire extinguishers. Coordinate final fire-extinguisher schedule with fire-protection cabinet schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.3 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire-protection cabinets to ensure fit and function.

1.4 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.
   1. Failures include, but are not limited to, the following:
      a. Failure of hydrostatic test according to NFPA 10.
      b. Faulty operation of valves or release levers.
   2. Warranty Period: 6 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."
B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

2.2 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire-protection cabinet (FEC) and mounting bracket (FEB) indicated.
   1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
      a. JL Industries, Inc.; a division of the Activar Construction Products Group.
      b. Larsens Manufacturing Company.
      c. Potter Roemer LLC.
   2. Valves: Manufacturer's standard.
   3. Handles and Levers: Manufacturer's standard.
   4. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B, and bar coding for documenting fire-extinguisher location, inspections, maintenance, and recharging.

B. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 4-A:60-B:C, 10-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.3 MOUNTING BRACKETS (FEB)

A. Mounting Brackets: Manufacturer's standard galvanized steel, designed to secure fire extinguisher to wall or structure, of sizes required for types and capacities of fire extinguishers indicated, with plated or black baked-enamel finish.
   1. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
      a. JL Industries, Inc.; a division of the Activar Construction Products Group.
      b. Larsens Manufacturing Company.
      c. Potter Roemer LLC.

B. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.
   1. Identify bracket-mounted fire extinguishers with the words "FIRE EXTINGUISHER" in red letter decals applied to mounting surface.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.
   1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguishers and mounting brackets in locations indicated and in compliance with requirements of authorities having jurisdiction.
   1. Mounting Brackets:
      a. Fire extinguishers weighing 40 pounds or less: 54 inches above finished floor to top of cabinet.
      b. Fire extinguishers weighing more than 40 pounds: 42 inches above finished floor to top of cabinet.

B. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

END OF SECTION

SECTION 10 51 13 - METAL LOCKERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Welded corridor lockers.
   2. Locker benches.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Shop Drawings: For metal lockers.
   1. Include plans, elevations, sections, and attachment details.
   2. Include locker identification system and numbering sequence.

1.3 INFORMATIONAL SUBMITTALS

A. Sample Warranty.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of metal lockers that fail in materials or workmanship, excluding finish, within specified warranty period.
   1. Warranty Period for Welded Metal Lockers: Lifetime from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Accessibility Standard: For lockers indicated to be accessible, comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" the ABA standards of the Federal agency having jurisdiction andICC A117.1.

2.2 WELDED CORRIDOR LOCKERS

A. Manufacturers: Subject to compliance with requirements, provide products by 1 of the following:
   1. AJW Architectural Products.
   2. Art Metal Products.
   3. ASI Storage Solutions; ASI Group.

4. DeBourgh Mfg. Co.
5. General Storage Systems Ltd.
6. List Industries Inc.
7. Lyon Workspace Products, LLC.
8. Olympus Lockers & Storage Products, Inc.
9. Penco Products, Inc.
10. Republic Storage Systems, LLC.
11. WEC Manufacturing LLC.

B. Doors: 1 piece; fabricated from 0.075-inch nominal-thickness steel sheet; formed into channel shape with double bend at vertical edges and with right-angle single bend at horizontal edges.
   1. Reinforcement: Manufacturer's standard reinforcing angles, channels, or stiffeners for doors more than 15 inches wide; welded to inner face of doors.
   2. Door Style: Vented panel as follows:
      a. Louvered Vents: No fewer than 6 louver openings at top and bottom for single-tierand 3 louver openings at top and bottom for double-tier lockers.

C. Body: Assembled by welding body components together. Fabricate from unperforated steel sheet with thicknesses as follows:
   1. Tops, Bottoms, and Sides: 0.060-inch nominal thickness.
   2. Backs: 0.048-inch nominal thickness.
   3. Shelves: 0.060-inch nominal thickness, with double bend at front and single bend at sides and back.

D. Frames: Channel formed; fabricated from 0.060-inch nominal-thickness steel sheet; lapped and factory welded at corners; with top and bottom main frames factory welded into vertical main frames. Form continuous, integral, full-height door strikes on vertical main frames.

E. Hinges:
   1. Continuous Hinges: Manufacturer's standard, steel, full height.

F. Recessed Door Handle and Latch: Stainless-steel cup with integral door pull, recessed so locking device does not protrude beyond door face; pry and vandal resistant.
   1. Multipoint Latching: Finger-lift latch control designed for use with built-in combination locks or padlocks; positive automatic latching and prelocking.
      a. Latch Hooks: Equip doors 48 inches and higher with three latch hooks and doors less than 48 inches high with two latch hooks; fabricated from 0.120-inch nominal-thickness steel sheet; welded to full-height door strikes; with resilient silencer on each latch hook.
      b. Latching Mechanism: Manufacturer's standard, rattle-free latching mechanism.
   2. Single-Point Latching: Nonmoving latch hook with steel padlock loop that projects through recessed cup and is finished to match metal locker body.
      a. Latch Hook: Equip each door with 1 latch hook.

G. Locks: Combination padlocks.

H. Identification Plates: Manufacturer's standard, etched, embossed, or stamped aluminum plates, with numbers and letters at least 3/8-inch high.

I. Hooks: Manufacturer's standard ball-pointed, aluminum or steel; zinc plated.

J. Coat Rods: Manufacturer's standard.

K. Continuous Sloping Tops: Fabricated from 0.048-inch nominal-thickness steel sheet, with a pitch of approximately 20 degrees.
   1. Closures: Vertical -end type.

L. Recess Trim: Fabricated from 0.048-inch nominal-thickness steel sheet.

M. Filler Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.

N. Boxed End Panels: Fabricated from 0.048-inch nominal-thickness steel sheet.
O. Finished End Panels: Fabricated from 0.024-inch nominal-thickness steel sheet to cover unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.
P. Materials:
    1. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B, suitable for exposed applications.
Q. Finish: Baked enamel or powder coat.
    1. Color: Black.

2.3 LOCKS

A. Combination Padlock: Provided by Owner.

2.4 LOCKER BENCHES

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    1. AJW Architectural Products.
    2. Art Metal Products.
    3. ASI Storage Solutions; ASI Group.
    4. Hadrian Manufacturing Inc.
    5. List Industries Inc.
    6. Lyon Workspace Products, LLC.
    7. Penco Products, Inc.
    8. Shanahan's Manufacturing Limited.
    9. Top Tier Storage Products.
B. Provide bench units with overall assembly height of 17-1/2 inches.
C. Bench Tops: Manufacturer's standard 1-piece units, with rounded corners and edges.
    1. Size: Minimum 9-1/2 inches wide by 1-1/4 inches thick provide 20- to 24-inch wide tops where accessible benches are indicated. Attached bench top to wall.
    2. Laminated clear hardwood with 1 coat of clear sealer on all surfaces and 1 coat of clear lacquer on top and sides.
D. Fixed-Bench Pedestals: Manufacturer's standard supports, with predrilled fastener holes for attaching bench top and anchoring to floor, complete with fasteners and anchors, and as follows:
    1. Color: Match metal lockers.
E. Materials:
    1. Stainless-Steel Plate, Sheet, and Strip: ASTM A240/A240M or ASTM A666, Type 304.
    2. Steel Tube: ASTM A500/A500M, cold rolled.

2.5 FABRICATION

A. Fabricate metal lockers square, rigid, without warp, and with metal faces flat and free of dents or distortion. Make exposed metal edges safe to touch and free of sharp edges and burrs.
    1. Form body panels, doors, shelves, and accessories from 1-piece steel sheet unless otherwise indicated.
    2. Provide fasteners, filler plates, supports, clips, and closures as required for complete installation.

B. Fabricate each metal locker with an individual door and frame; individual top, bottom, and back; and common intermediate uprights separating compartments.
C. Equipment: Provide each locker with an identification plate and the following equipment:
   1. Single-Tier Units: Shelf, 1 double-prong ceiling hook, and 2 single-prong wall hooks.
   2. Double-Tier Units: 1 double-prong ceiling hook and 2 single-prong wall hooks.
   3. Coat Rods: As indicated on Drawings, for each compartment of each locker, in lieu of ceiling hook for metal lockers 18 inches deep or more.
D. Welded Construction: Factory preassemble metal lockers by welding all joints, seams, and connections; with no bolts, nuts, screws, or rivets used in assembly of main locker groups. Factory weld main locker groups into one-piece structures. Grind exposed welds smooth and flush.
E. Accessible Lockers: Fabricate as follows:
   1. Locate bottom shelf no lower than 15 inches above the floor.
   2. Where hooks, coat rods, or additional shelves are provided, locate no higher than 48 inches above the floor.
F. Continuous Sloping Tops: Fabricated in lengths as long as practical, without visible fasteners at splice locations; finished to match lockers.
G. Recess Trim: Fabricated with minimum 2-1/2-inch face width and in lengths as long as practical; finished to match lockers.
H. Filler Panels: Fabricated in an unequal leg angle shape; finished to match lockers. Provide slip-joint filler angle formed to receive filler panel.
I. Finished End Panels: Fabricated to conceal unused penetrations and fasteners, except for perimeter fasteners, at exposed ends of nonrecessed metal lockers; finished to match lockers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install lockers level, plumb, and true; shim as required, using concealed shims.
   1. Anchor locker runs at ends and at intervals recommended by manufacturer, but not more than 36 inches o.c. Using concealed fasteners, install anchors through backup reinforcing plates, channels, or blocking as required to prevent metal distortion.
   2. Anchor single rows of metal lockers to walls near top of lockers and to floor.
   3. Anchor back-to-back metal lockers to floor.
B. Welded Lockers: Connect groups together with manufacturer's standard fasteners, with no exposed fasteners on face frames.
C. Trim: Fit exposed connections of trim, fillers, and closures accurately together to form tight, hairline joints, with concealed fasteners and splice plates.
   1. Attach recess trim to recessed metal lockers with concealed clips.
   2. Attach filler panels with concealed fasteners.
   3. Attach sloping-top units to metal lockers, with closures at exposed ends.
   4. Attach boxed end panels using concealed fasteners to conceal exposed ends of nonrecessed metal lockers.
   5. Attach finished end panels using fasteners only at perimeter to conceal exposed ends of nonrecessed metal lockers.
D. Fixed Benches: Provide no fewer than 2 pedestals for each bench, uniformly spaced not more than 72 inches apart. Securely fasten tops of pedestals to undersides of bench tops, and anchor bases to floor.

3.2 SCHEDULE

A. Type L1: 18 x 18 x 72 inches, single-tier units.
B. Type L2: 12 x 18 x 36 inches, double-tier units.

END OF SECTION

SECTION 12 24 13 - ROLLER WINDOW SHADES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manually operated roller shades with single double rollers.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 06 10 00 "Rough Carpentry" for wood blocking and grounds for mounting roller shades and accessories.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.
B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.
   1. Motor-Operated Shades: Include details of installation and diagrams for power, signal, and control wiring.
C. Samples for Verification: For each type of roller shade.
   1. Shadeband Material: Not less than 3 inches square. Mark interior face of material if applicable.
   2. Installation Accessories: Manufacturers standard sampling size for accessories finish only.
D. Product Schedule: For roller shades. Use same designations indicated on Drawings.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.
B. Product Certificates: For each type of shadeband material.
C. Product Test Reports: For each type of shadeband material, for tests performed by a qualified testing agency.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For roller shades to include in maintenance manuals.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than 2 units.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish Work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.
B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
    1. Draper Inc.
    2. MechoShade Systems, Inc.
B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
    1. Bead Chains: Stainless-steel.
        a. Loop Length: Full length of roller shade.
        b. Limit Stops: Provide upper and lower ball stops.
        c. Chain-Retainer Type: Chain tensioner, sill mounted.
    2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades.
        a. Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criterion is more stringent.

C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
   1. Roller Drive-End Location: Right side of interior face of shade.
   2. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
   3. Shadeband-to-Roller Attachment: Manufacturer's standard method.

D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to 3 inline rollers into a multiband shade that is operated by 1 roller drive-end assembly.

F. Shadebands:
   1. Shadeband Material: Light-filtering fabric Light-blocking fabric.
   2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
      a. Type: Enclosed in sealed pocket of shadeband material.
      b. Color and Finish: As indicated in Interior Material Legend on Drawings.

G. Installation Accessories:
   1. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as 1 piece, end plates, and removable bottom closure panel.
      a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than height indicated on Drawings.
      b. Provide pocket with lip at lower edge to support acoustical ceiling panel.
   2. Installation Accessories Color and Finish: As selected from manufacturer's full range.

2.3 MANUALLY OPERATED SHADES WITH DOUBLE ROLLERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
   1. Draper Inc.
   2. MechoShade Systems, Inc.

B. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.
   1. Bead Chains: Stainless-steel.
      a. Loop Length: Full length of roller shade.
      b. Limit Stops: Provide upper and lower ball stops.
      c. Chain-Retainer Type: Chain tensioner, sill mounted.
   2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller shade weight and for lifting heavy roller shades.
      a. Provide for shadebands that weigh more than 10 lb or for shades as recommended by manufacturer, whichever criterion is more stringent.

C. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.
   1. Double-Roller Mounting Configuration: Offset, outside roller over and inside roller under.
   2. Inside Roller:
      a. Drive-End Location: Right side of interior face of shade.
      b. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
   3. Outside Roller:
      a. Drive-End Location: Right side of interior face of shade.
      b. Direction of Shadeband Roll: Regular, from back (exterior face) of roller.
   4. Shadeband-to-Roller Attachment: Manufacturer's standard method.

D. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller mounting configuration, roller assemblies, operating mechanisms, installation accessories, and installation locations and conditions indicated.

E. Roller-Coupling Assemblies: Coordinated with operating mechanism and designed to join up to 3 inline rollers into a multiband shade that is operated by 1 roller drive-end assembly.

F. Inside Shadebands:
   1. Shadeband Material: Light-filtering fabric.
   2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
      a. Type: Enclosed in sealed pocket of shadeband material.
      b. Color and Finish: As indicated on Interior Material Legend in Drawings.

G. Outside Shadebands:
   1. Shadeband Material: Light-blocking fabric.
   2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.
      a. Type: Enclosed in sealed pocket of shadeband material.
      b. Color and Finish: As indicated on Interior Material Legend in Drawings.

H. Installation Accessories:
1. Recessed Shade Pocket: Rectangular, extruded-aluminum enclosure designed for recessed ceiling installation; with front, top, and back formed as 1 piece, end plates, and removable bottom closure panel.
a. Height: Manufacturer's standard height required to enclose roller and shadeband assembly when shade is fully open, but not less than height indicated on Drawings.
b. Provide pocket with lip at lower edge to support acoustical ceiling panel.

2.4 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
B. Light-Filtering Fabric: Woven fabric, stain and fade resistant.
1. Source: Roller shade manufacturer.
2. Type: PVC-coated fiberglass
3. Weave: Basketweave.
4. Thickness: 0.019 inches.
5. Weight: 11.50 oz./sq. yd.
6. Roll Width: 98 inches or 122 inches.
7. Orientation on Shadeband: Up the bolt.
8. Color: As indicated on Drawings.
C. Light-Blocking Fabric: Opaque fabric, stain and fade resistant.
1. Source: Roller shade manufacturer.
2. Type: Acrylic coated Polyester.
3. Thickness: 0.021 inches.
4. Weight: 14.75oz./sq. yd.
5. Roll Width: 126 inches.
6. Orientation on Shadeband: Up the bolt.
7. Color: As indicated on Drawings.

2.5 ROLLER SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.
B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 degrees Fahrenheit:
1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which shade is installed less 1/4-inch per side or 1/2-inch total, plus or minus 1/8-inch. Length equal to head-to-sill or -floor dimension of opening in which shade is installed less 1/4-inch, plus or minus 1/8-inch.
C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible, except as follows:
1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.
   1. Opaque Shadebands: Located so shadeband is not closer than 2 inches to interior face of glass. Allow clearances for window operation hardware.
B. Roller Shade Locations: As indicated on Drawings.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller shade surfaces, after installation, according to manufacturer's written instructions.
B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.
C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain motor-operated roller shades.

END OF SECTION

SECTION 12 36 61.16 - SOLID SURFACING COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Solid surface material countertops.
   2. Solid surface material apron fronts.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For countertop materials.

B. Shop Drawings: For countertops. Show materials, finishes, edge profiles, methods of joining, and cutouts for plumbing fixtures.
   1. Show locations and details of joints.
   2. Show direction of directional pattern, if any.

C. Samples for Verification: For the following products:
   1. Countertop material, 3 inches square.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For solid surface material countertops to include in maintenance manuals. Include Product Data for care products used or recommended by Installer and names, addresses, and telephone numbers of local sources for products.

1.4 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom-fabricate countertops similar to that required for this Project, and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of countertops.

1.5 FIELD CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.6 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops.

PART 2 - PRODUCTS

2.1 SOLID SURFACE COUNTERTOP MATERIALS

A. Solid Surface Material: Homogeneous-filled plastic resin complying with ISFA 2-01.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Living Stone.
   2. Type: Provide Standard type unless Special Purpose type is indicated.
   3. Colors and Patterns: As indicated by manufacturer's designations on Interior Material Legend in Drawings.

B. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

2.2 FABRICATION

A. Fabricate countertops according to solid surface material manufacturer's written instructions and to the AWI/AWMAC/WI's "Architectural Woodwork Standards."
   1. Grade: Custom.

B. Configuration:
   1. Front: Straight, slightly eased at top.
   2. Back and End Splash: None.

C. Countertops:
   1. 3/4-inch thick, solid surface material with front edge built up with same material.

D. Fabricate tops with shop-applied edges unless otherwise indicated. Comply with solid surface material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

E. Joints:
   1. Fabricate countertops in sections for joining in field.
      a. Joint Locations: Not within 18 inches of a sink or cooktop and not where a countertop section less than 36 inches long would result, unless unavoidable.

F. Cutouts and Holes:
   1. Drop-in Plumbing Fixtures: Make cutouts for fixtures in shop using template or pattern furnished by fixture manufacturer. Form cutouts to smooth, even curves.
      a. Provide vertical edges, slightly eased at juncture of cutout edges with top and bottom surfaces of countertop and projecting 3/16-inch into fixture opening.
      b. Provide vertical edges, rounded to 3/8-inch radius at juncture of cutout edges with top surface of countertop, slightly eased at bottom, and projecting 3/16- inch into fixture opening.
      c. Provide 3/4-inch full bullnose edges projecting 3/8-inch into fixture opening.

2.3 INSTALLATION MATERIALS

A. Adhesive: Product recommended by solid surface material manufacturer.

B. Sealant for Countertops: Comply with applicable requirements in Section 07 92 00 "Joint Sealants."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates to receive solid surface material countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install countertops level to a tolerance of 1/8-inch in 8 feet, 1/4-inch maximum. Do not exceed 1/64-inch difference between planes of adjacent units.
B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Predrill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
C. Fasten subtops to cabinets by screwing through subtops into cornerblocks of base cabinets. Shim as needed to align subtops in a level plane.
D. Secure countertops to subtops with adhesive according to solid surface material manufacturer's written instructions. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.
E. Bond joints with adhesive and draw tight as countertops are set. Mask areas of countertops adjacent to joints to prevent adhesive smears.
    1. Clamp units to temporary bracing, supports, or each other to ensure that countertops are properly aligned and joints are of specified width.
F. Complete cutouts not finished in shop. Mask areas of countertops adjacent to cutouts to prevent damage while cutting. Make cutouts to accurately fit items to be installed, and at right angles to finished surfaces unless beveling is required for clearance. Ease edges slightly to prevent snipping.
G. Apply sealant to gaps at walls; comply with Section 07 92 00 "Joint Sealants." Coordinate color selection with Architect.

END OF SECTION

SECTION 13 34 19 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Structural-steel framing.
   2. Metal roof panels.
   3. Concealed-fastener, lap-seam metal wall panels.
   4. Metal liner panels.
   5. Metal soffit panels.
   6. Thermal insulation.
   7. Accessories.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of metal building system component.

B. Shop Drawings: Indicate components by others. Include full building Plan, elevations, Sections, details and attachments to other Work.

C. Samples: For units with factory-applied finishes.

D. Delegated Design Submittals: For metal building systems.
   1. Include analysis data indicating compliance with performance requirements and design data signed and sealed by the qualified Professional Engineer responsible for their preparation.

1.3 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Letter of Design Certification: Signed and sealed by a qualified Professional Engineer. Include the following:
   1. Name and location of Project.
   2. Order number.
   3. Name of manufacturer.
   4. Name of Contractor.
   5. Building dimensions including width, length, height, and roof slope.
   6. Indicate compliance with AISC standards for hot-rolled steel and AISI standards for cold-rolled steel, including edition dates of each standard.
   7. Governing building code and year of edition.
   8. Design Loads: Include dead load, roof live load, collateral loads, roof snow load, deflection, wind loads/speeds and exposure, seismic design category or effective peak velocity-related acceleration/peak acceleration, and auxiliary loads (cranes).
   9. Load Combinations: Indicate that loads were applied acting simultaneously with concentrated loads, according to governing building code.
   10. Building-Use Category: Indicate category of building use and its effect on load importance factors.

C. Sample Warranties.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer.
   1. Accreditation: Manufacturer's facility accredited according to IAS AC472, "Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems."
   2. Engineering Responsibility: Preparation of comprehensive engineering analysis and Shop Drawings by a Professional Engineer who is legally qualified to practice in jurisdiction where Project is located.

B. Erector Qualifications: An experienced erector who specializes in erecting and installing Work similar in material, design, and extent to that indicated for this Project and who is acceptable to manufacturer.

C. Welding Qualifications: Qualify procedures and personnel according to the following:
   1. AWS D1.1, "Structural Welding Code - Steel."
   2. AWS D1.3, "Structural Welding Code - Sheet Steel."

1.6 WARRANTY

A. Special Warranty on Metal Panel Finishes: Manufacturer agrees to repair finish or replace metal panels that show evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Finish Warranty Period: 25 years from date of Substantial Completion.

B. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer agrees to repair or replace standing-seam metal roof panel assemblies that leak or otherwise fail to remain weathertight within specified warranty period.
   1. Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. A&S Building Systems, Inc.; a division of NCI.
   2. Butler Manufacturing Company; a division of BlueScope Buildings North America, Inc.
   3. Ceco Building Systems; an NCI company.
   4. Dean Steel Buildings, Inc.
   5. Red Dot Buildings.
   6. Robertson Building Systems; a division of NCI Building Systems, Inc.
   7. Star Building Systems; a division of NCI Building Systems, Inc.
   8. Varco-Pruden Buildings; a division of BlueScope Buildings North America, Inc.

2.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified Professional Engineer, as defined in Section 01 40 00 "Quality Requirements," to design metal building system.

B. Structural Performance: Metal building systems to withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated according to procedures in MBMA's "Metal Building Systems Manual."
   1. Design Loads: As indicated on Drawings.
   2. Deflection and Drift Limits:
      a. Design metal building system assemblies to withstand serviceability design loads without exceeding deflections and drift limits recommended in AISC Steel Design Guide No. 3 "Serviceability Design Considerations for Steel Buildings."
      b. No greater than the following:
         1) Purlins and Rafters: Vertical deflection of 1/240 of the span.
         2) Girts: Horizontal deflection of 1/240 of the span.
         3) Metal Roof Panels: Vertical deflection of 1/240 of the span.
         4) Metal Wall Panels: Horizontal deflection of 1/180 of the span.
         5) Design secondary-framing system to accommodate deflection of primary framing and construction tolerances, and to maintain clearances at openings.
         6) Lateral Drift: Maximum of 1/400 of the building height.

C. Seismic Performance: Metal building system to withstand the effects of earthquake motions determined according to ASCE/SEI 7.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change: 120 degrees Fahrenheit, ambient; 180 degrees Fahrenheit, material surfaces.

E. Fire-Resistance Ratings: Where assemblies are indicated to have a fire-resistance rating, provide metal panel assemblies identical to those of assemblies tested for fire resistance per ASTM E119 or ASTM E108 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
   1. Indicate design designations from UL's "Fire Resistance Directory," FM Global's "Approval Guide," or from the listings of another qualified testing agency.

F. Structural Performance for Metal Roof and Wall Panels: Provide metal panel systems capable of withstanding the effects of the following loads, based on testing according to ASTM E1592:
   1. Wind Loads: As indicated on Drawings.

G. Air Infiltration for Metal Roof Panels: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E1680 or ASTM E283 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

H. Air Infiltration for Metal Wall Panels: Air leakage of not more than 0.06 cfm/sq. ft. when tested according to ASTM E283 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

I. Water Penetration for Metal Roof Panels: No water penetration when tested according to ASTM E1646 or ASTM E331 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

J. Water Penetration for Metal Wall Panels: No water penetration when tested according to ASTM E331 at the following test-pressure difference:
   1. Test-Pressure Difference: 6.24 lbf/sq. ft.

K. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for wind-uplift-resistance class indicated.
   1. Uplift Rating: UL 90.

L. Solar Reflectance Index (SRI): 3-year-aged SRI not less than 32 or initial SRI not less than 39 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.

M. Thermal Performance for Opaque Elements: Provide the following maximum U-factors and minimum R-values when tested according to ASTM C1363 or ASTM C518:
   1. Roof:
      a. R-Value: R-19 + R-11LS.
   2. Walls:
      a. U-Factor: U-0.079 with thermal blocks.
      b. R-Value: R-13 + R-6.5ci.

2.3 STRUCTURAL-STEEL FRAMING

A. Structural Steel: Comply with AISC 360, "Specification for Structural Steel Buildings."

B. Bolted Connections: Comply with RCSC's "Specification for Structural Joints Using High-Strength Bolts."

C. Cold-Formed Steel: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" for design requirements and allowable stresses.

D. Primary Framing: Manufacturer's standard primary-framing system, designed to withstand required loads and specified requirements. Primary framing includes transverse and lean-to frames; rafters, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; and wind bracing.
   1. General: Provide frames with attachment plates, bearing plates, and splice members. Factory drill for field-bolted assembly. Provide frame span and spacing indicated.
      a. Slight variations in span and spacing may be acceptable if necessary to comply with manufacturer's standard, as approved by Architect.
   2. Frame Configuration: Single gable 1-directional, sloped lean-to, with high side connected to and supported by another structure and multistory.
   3. Exterior Column: Uniform depth.
   4. Rafter: Tapered.

E. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly.

F. Secondary Framing: Manufacturer's standard secondary framing, including purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members. Unless otherwise indicated, fabricate framing from either cold-formed, structural-steel sheet or roll-formed, metallic-coated steel sheet, prepainted with coil coating.

G. Anchor Rods: Headed anchor rods as indicated in Anchor Rod Plan for attachment of metal building to foundation.

2.4 METAL ROOF PANELS

A. Standing-Seam, Vertical-Rib, Metal Roof Panels : Formed with interlocking ribs at panel edges and intermediate stiffening ribs symmetrically spaced between ribs; designed for sequential installation by mechanically attaching panels to supports using concealed clips located under 1 side of panels and engaging opposite edge of adjacent panels.
   1. Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.024-inch nominal uncoated steel thickness. Prepainted by the coil-coating process to comply with ASTM A755.
      a. Exterior Finish: 3-coat fluoropolymer.
      b. Color: As selected by Architect from manufacturer's full range.
   2. Clips: 2-piece floating to accommodate thermal movement.
   3. Joint Type: Mechanically seamed.
   4. Panel Coverage: 16 inches.
   5. Panel Height: 2 inches.
   6. Basis-of-Design Product: MBCI, BattenLoc HS.

2.5 CONCEALED-FASTENER, LAP-SEAM METAL WALL PANELS

A. Provide factory-formed metal panels designed to be field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.

B. Ribbed-Profile, Concealed-Fastener Metal Wall Panels (TYPE A): Structural metal panels consisting of formed metal sheet with fastener leg for concealed attachement to wall framing.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Architectural Metal Systems.
      b. CENTRIA Architectural Systems.
      c. Flexospan Steel Buildings, Inc.
      d. Morin - A Kingspan Group Company.
      e. United Steel Deck, Inc.
      f. VICWEST.
   2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755.
      a. Thickness: 24 gauge.
      b. Surface: Smooth, flat finish.
      c. Exterior Finish: 2-coat fluoropolymer.
      d. Color: As selected by Architect from manufacturer's full range.
   3. Panel Coverage: 16 inches.
   4. Panel Height: 7/8 inches.
   5. Basis-of-Design Product: MBCI Masterline 16.

C. V-Groove Profile, Concealed-Fastener Metal Wall Panels (TYPE B): Tongue and groove panel formed with angled panel edges with a wide vee reveal centered in panel width.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Berridge Manufacturing Company.
      b. CENTRIA Architectural Systems.
      c. Metal Sales & Service, Inc.
      d. Metal Sales Manufacturing Corporation.
      e. Morin - A Kingspan Group Corporation.
      f. PAC-CLAD; Petersen Aluminum Corporation.
   2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A635, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755.
      a. Nominal Thickness: 24 gauge.
      b. Exterior Finish: 2-coat fluoropolymer.
      c. Color: As selected by Architect from manufacturer's full range.
      d. Surface: Smooth, flat finish.
   3. Panel Coverage: 6 inches.
   4. Panel Height: 5/8 inches.
   5. Basis-of-Design Product: Berridge B-6 Panel.

D. Flush-Profile, Concealed-Fastener Metal Wall Panels (TYPE C): Formed with vertical panel edges and intermediate stiffening ribs symmetrically spaced between panel edges: with flush joint between panels.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. AEP Span; A BlueScope Steel Company.
      b. Architectural Building Components.
      c. Architectural Metal Systems.
      d. Berridge Manufacturing Company.
      e. CENTRIA Architectural Systems.
      f. Dimensional Metals, Inc.
      g. Flexospan Steel Buildings, Inc.
      h. MBCI.
      i. Morin - A Kingspan Group Company.
      j. PAC-CLAD; Petersen Aluminnum Corporation.
   2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755.
      a. Nominal Thickness: 24 gauge.
      b. Exterior Finish: 2-coat fluoropolymer.
      c. Color: As selected by Architect from manufacturer's full range.
      d. Surface: Smooth, flat finish.
   3. Panel Coverage: 3-5/8 inches.
   4. Panel Height: 3/8 inches.
   5. Basis-of-Design Product: Berridge Thin-Line Panel.

E. Fluted-Rib-Profile, Concealed Fastener Metal Wall Panels (TYPE l): Structural metal panels consisting of formed metal sheet with vertical panel edges and 2 4-inch inverse batten flutes, with flush joints between panels, field assembled with nested lapped edges, and attached to supports using concealed fasteners.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Alcoa Architectural Products (USA).
      b. ATAS International, Inc.
      c. Morin - A Kingspan Group Company.
      d. PAC- CLAD; Petersen Aluminum Corporation.
   2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755.
      a. Nominal Thickness: 24 gauge.
      b. Exterior Finish: 2-coat fluoropolymer.
      c. Color: As selected bt Architect from manufacturer's full range.
   3. Panel Coverage: 16 inches.
   4. Panel Height: 1.75 inches.
   5. Basis-of-Design Product: MBCI Designer Series- Fluted.

2.6 METAL LINER PANELS

A. Provide factory-formed metal liner panels designed for interior side walls and field assembled by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners in side laps. Include accessories required for a complete installation.

B. Metal Liner Panels. Solid panels formed with intermediate stiffening ribs symmetrically spaced between panel edges; with a flush joint between panels.
   1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
      a. Alcoa Architectural Products (USA).
      b. Architectural Metal Systems.
      c. Berridge Manufacturing Company.
      d. CENTRIA Architectural Systems.
      e. MBCI.
      f. Metal Sales Manufacturing Corporation.
      g. Morin - A Kingspan Group Company.
      h. United Steel Deck, Inc.
   2. Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A653, G90 coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A792, Class AZ50 coating designation; structural quality. Prepainted by the coil-coating process to comply with ASTM A755.
      a. Nominal Thickness: 24 gauge.
      b. Exterior Finish: 2-coat fluoropolymer.
      c. Color: As selected by Architect from manufacturer's full range.
   3. Panel Coverage: 12 inches.
   4. Basis-of-Design Product: Berridge L-Panel.

2.7 METAL SOFFIT PANELS

A. General: Provide factory-formed metal soffit panels designed to be installed by lapping and interconnecting side edges of adjacent panels and mechanically attaching through panel to supports using concealed fasteners and factory-applied sealant in side laps. Include accessories required for weathertight installation.
B. Metal Soffit Panels: Match profile and material of metal liner panels.
   1. Finish: Match finish and color of metal wall panels.

2.8 THERMAL INSULATION

A. Faced Metal Building Insulation: ASTM C991, Type II, glass-fiber-blanket insulation; 0.5-lb/cu. ft. density; 2-inch wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.
B. Unfaced Metal Building Insulation: ASTM C991, Type I, or NAIMA 202, glass-fiber-blanket insulation; 0.5-lb/cu. ft. density; 2-inch wide, continuous, vapor-tight edge tabs; with a flame-spread index of 25 or less.
C. Retainer Strips: For securing insulation between supports, 0.025-inch nominal-thickness, formed, metallic-coated steel or PVC retainer clips colored to match insulation facing.
D. Vapor-Retarder Facing: ASTM C1136, with permeance not greater than 0.02 perm when tested according to ASTM E96, Desiccant Method.

2.9 ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Fabricate and finish accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes. Comply with indicated profiles and with dimensional and structural requirements.
   1. Form exposed sheet metal accessories that are without excessive oil-canning, buckling, and tool marks and that are true to line and levels indicated, with exposed edges folded back to form hems.
B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, ridge closures, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal roof panels unless otherwise indicated.
C. Wall Panel Accessories: Provide components required for a complete metal wall panel assembly including copings, fasciae, mullions, sills, corner units, clips, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels unless otherwise indicated.
D. Flashing and Trim: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil-coating; finished to match adjacent metal panels.
E. Gutters: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil-coating; finished to match roof fascia and rake trim. Match profile of gable trim, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch long sections, sized according to SMACNA's "Architectural Sheet Metal Manual."
   1. Gutter Supports: Fabricated from same material and finish as gutters.
   2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.

F. Downspouts: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.018-inch nominal uncoated steel thickness, prepainted with coil-coating; finished to match metal wall panels. Fabricate in minimum 10-foot long Sections, complete with formed elbows and offsets.

G. Roof Curbs: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet, 0.048-inch nominal uncoated steel thickness prepainted with coil-coating; finished to match metal roof panels; with welded top box and bottom skirt, and integral full-length cricket; capable of withstanding loads of size and height indicated.

H. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

2.10 FABRICATION

A. General: Design components and field connections required for erection to permit easy assembly.
   1. Mark each piece and part of the assembly to correspond with previously prepared erection Drawings, diagrams, and instruction manuals.
   2. Fabricate structural framing to produce clean, smooth cuts and bends. Punch holes of proper size, shape, and location. Members to be free of cracks, tears, and ruptures.

B. Tolerances: Comply with MBMA's "Metal Building Systems Manual" for fabrication and erection tolerances.

C. Primary Framing: Shop fabricate framing components to indicated size and Section, with baseplates, bearing plates, stiffeners, and other items required for erection welded into place. Cut, form, punch, drill, and weld framing for bolted field assembly.

D. Secondary Framing: Shop fabricate framing components to indicated size and Section by roll forming or break forming, with baseplates, bearing plates, stiffeners, and other plates required for erection welded into place. Cut, form, punch, drill, and weld secondary framing for bolted field connections to primary framing.

E. Metal Panels: Fabricate and finish metal panels at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.
   1. Provide panel profile, including major ribs and intermediate stiffening ribs, if any, for full length of metal panel.

2.11 SOURCE QUALITY CONTROL

A. Special Inspection: Owner will engage a qualified special inspector to perform source quality control inspections and to submit reports.
   1. Accredited Manufacturers: Special inspections will not be required if fabrication is performed by an IAS AC472-accredited manufacturer approved by authorities having jurisdiction to perform such Work without special inspection.

B. Product will be considered defective if it does not pass tests and inspections.

C. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 ERECTION OF STRUCTURAL FRAMING

A. Erect metal building system according to manufacturer's written instructions and Drawings.

B. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's Professional Engineer.

C. Set structural framing accurately in locations and to elevations indicated, according to AISC Specifications referenced in this Section. Maintain structural stability of frame during erection.

D. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
   1. Set plates for structural members on wedges, shims, or setting nuts as required.
   2. Tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
   3. Promptly pack grout solidly between bearing surfaces and plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for shrinkage-resistant grouts.

E. Align and adjust structural framing before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with framing. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure.
   2. Make allowances for difference between temperature at time of erection and mean temperature when structure will be completed and in service.

F. Primary Framing and End Walls: Erect framing level, plumb, rigid, secure, and true to line. Level baseplates to a true even plane with full bearing to supporting structures, set with double-nutted anchor bolts. Use grout to obtain uniform bearing and to maintain a level base-line elevation. Moist-cure grout for not less than 7 days after placement.
   1. Make field connections using high-strength bolts installed according to RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt type and joint type specified.
      a. Joint Type: Snug tightened or pretensioned as required by manufacturer.

G. Secondary Framing: Erect framing level, plumb, rigid, secure, and true to line. Field bolt secondary framing to clips attached to primary framing.
   1. Provide rake or gable purlins with tight-fitting closure channels and fasciae.
   2. Locate and space wall girts to suit openings such as doors and windows.
   3. Provide supplemental framing at entire perimeter of openings, including doors, windows, louvers, ventilators, and other penetrations of roof and walls.

H. Bracing: Install bracing in roof and sidewalls where indicated on erection Drawings.
   1. Tighten rod and cable bracing to avoid sag.
   2. Locate interior end-bay bracing only where indicated.

I. Framing for Openings: Provide shapes of proper design and size to reinforce openings and to carry loads and vibrations imposed, including equipment furnished under mechanical and electrical Work. Securely attach to structural framing.

J. Erection Tolerances: Maintain erection tolerances of structural framing within AISC 303.

3.2 METAL PANEL INSTALLATION, GENERAL

A. General: Anchor metal panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Field cut metal panels as required for doors, windows, and other openings. Cut openings as small as possible, neatly to size required, and without damage to adjacent metal panel finishes.
      a. Field cutting of metal panels by torch is not permitted unless approved in writing by manufacturer.
   2. Install metal panels perpendicular to structural supports unless otherwise indicated.
   3. Flash and seal metal panels with weather closures at perimeter of openings and similar elements. Fasten with self-tapping screws.
   4. Locate and space fastenings in uniform vertical and horizontal alignment.
   5. Locate metal panel splices over structural supports with end laps in alignment.
   6. Lap metal flashing over metal panels to allow moisture to run over and off the material.

B. Metal Protection: Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal roof panel manufacturer.

C. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal panel assemblies. Provide types of gaskets, fillers, and sealants indicated; or, if not indicated, provide types recommended by metal panel manufacturer.
   1. Seal metal panel end laps with double beads of tape or sealant the full width of panel. Seal side joints where recommended by metal panel manufacturer.
   2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 "Joint Sealants."

3.3 METAL ROOF PANEL INSTALLATION

A. General: Provide metal roof panels of full length from eave to ridge unless otherwise indicated or restricted by shipping limitations.
   1. Install ridge caps as metal roof panel Work proceeds.
   2. Flash and seal metal roof panels with weather closures at eaves and rakes. Fasten with self-tapping screws.

B. Standing-Seam Metal Roof Panels: Fasten metal roof panels to supports with concealed clips at each standing-seam joint, at location and spacing and with fasteners recommended by manufacturer.
   1. Install clips to supports with self-drilling or self-tapping fasteners.
   2. Install pressure plates at locations indicated in manufacturer's written installation instructions.
   3. Seamed Joint: Crimp standing seams with manufacturer-approved motorized seamer tool so that clip, metal roof panel, and factory-applied sealant are completely engaged.
   4. Rigidly fasten eave end of metal roof panels and allow ridge end free movement for thermal expansion and contraction. Predrill panels for fasteners.
   5. Provide metal closures at peaks rake edges rake walls and each side of ridge caps.

3.4 METAL WALL PANEL INSTALLATION

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to girts, extending full height of building, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.
   1. Unless otherwise indicated, begin metal panel installation at corners with center of rib lined up with line of framing.
   2. Shim or otherwise plumb substrates receiving metal wall panels.
   3. Rigidly fasten base end of metal wall panels and allow eave end free movement for thermal expansion and contraction. Predrill panels.
   4. Flash and seal metal wall panels with weather closures at eaves and rakes, and at perimeter of all openings. Fasten with self-tapping screws.
   5. Install screw fasteners in predrilled holes.
   6. Install flashing and trim as metal wall panel Work proceeds.
   7. Apply elastomeric sealant continuously between metal base channel (sill angle) and concrete, and elsewhere as indicated on Drawings; if not indicated, as necessary for waterproofing.
   8. Align bottom of metal wall panels and fasten with blind rivets, bolts, or self-drilling or self-tapping screws.
   9. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

B. Metal Wall Panels: Install metal wall panels on exterior side of girts. Attach metal wall panels to supports with fasteners as recommended by manufacturer. Provide thermal block between panel and framing.

3.5 METAL SOFFIT PANEL INSTALLATION

A. Provide metal soffit panels the full width of soffits. Install panels perpendicular to support framing.

B. Flash and seal metal soffit panels with weather closures where panels meet walls and at perimeter of all openings.

3.6 THERMAL INSULATION INSTALLATION

A. General: Install insulation concurrently with metal panel installation, in thickness indicated to cover entire surface, according to manufacturer's written instructions.
   1. Set vapor-retarder-faced units with vapor retarder toward warm side of construction unless otherwise indicated. Do not obstruct ventilation spaces except for firestopping.
   2. Tape joints and ruptures in vapor retarder, and seal each continuous area of insulation to the surrounding construction to ensure airtight installation.
   3. Install blankets straight and true in one-piece lengths. Install vapor retarder over insulation, with both sets of facing tabs sealed, to provide a complete vapor retarder.

B. Blanket Roof Insulation: Comply with the following installation method:
   1. 2-Layers-between-Purlin-with-Spacer-Block Installation: Extend insulation and vapor retarder between purlins. Carry vapor-retarder-facing tabs up and over purlin, overlapping adjoining facing of next insulation course and maintaining continuity of retarder. Install layer of filler insulation over first layer to fill space between purlins formed by thermal spacer blocks. Hold in place with bands and crossbands below insulation.
      a. Thermal Spacer Blocks: Where metal roof panels attach directly to purlins, install thermal spacer blocks.
   2. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

C. Blanket Wall Insulation: Extend insulation and vapor retarder over and perpendicular to top flange of secondary framing. Hold in place by metal wall panels fastened to secondary framing.
   1. Retainer Strips: Install retainer strips at each longitudinal insulation joint, straight and taut, nesting with secondary framing to hold insulation in place.

3.7 ACCESSORY INSTALLATION

A. General: Install accessories with positive anchorage to building and weathertight mounting, and provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal roof panel assembly, including trim, copings, ridge closures, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   2. Install components for a complete metal wall panel assembly, including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.
   3. Where dissimilar metals contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with corrosion-resistant coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, and set units true to line and level. Install Work with laps, joints, and seams that will be permanently watertight and weather resistant.
   1. Install exposed flashing and trim that is without excessive oil-canning, buckling, and tool marks and that is true to line and levels indicated, with exposed edges folded back to form hems. Install sheet metal flashing and trim to fit substrates and to result in waterproof and weather-resistant performance.
   2. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently weather resistant and waterproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch deep, filled with mastic sealant (concealed within joints).

C. Gutters: Join sections with riveted-and-soldered or lapped-and-sealed joints. Attach gutters to eave with gutter hangers spaced as required for gutter size, but not more than 36 inches o.c. using manufacturer's standard fasteners. Provide end closures and seal watertight with sealant. Provide for thermal expansion.

D. Downspouts: Join sections with 1-1/2-inch telescoping joints. Provide fasteners designed to hold downspouts securely 1-inch away from walls; locate fasteners at top and bottom and at approximately 60 inches o.c. in between.
   1. Provide elbows at base of downspouts to direct water away from building.
E. Roof Curbs: Install curbs at locations indicated on Drawings. Install flashing around bases where they meet metal roof panels.
F. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.8 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a qualified special inspector to perform field quality control special inspections and to submit reports.
B. Product will be considered defective if it does not pass tests and inspections.
C. Prepare test and inspection reports.

END OF SECTION

SECTION 13 44 00 – MEZZANINE SYSTEMS

Bid Alternate No. 1

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Prefabricated mezzanine system.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 03 30 00 “Cast-in-Place Concrete.”

1.2 SYSTEM DESCRIPTION

A. A pre-engineered free-standing steel mezzanine consisting, in general, of columns, framing, decking, hardware, accessories and finish. The mezzanine shall not require cross bracing in any direction.
B. Design Criteria:
   1. System shall be designed for 125 PSF live load or as indicated on Drawings.
   2. System shall be designed for 8-foot-0-inch clear height below platform structure.

1.3 REFERENCES

A. AISC- Specification for Design, Fabrication, and Erection of Structural Steel for Buildings.
B. ANSI MH28.3-2009 – Specification for Design, Manufacture, and Installation of Industrial Steel Work Platforms.
C. AISI- Specification for the Design of Cold-Formed Steel Structural Members.
D. ASTM A36/A36M-08 – Standard Specification for Carbon Structural Steel; or Shapes; or A992/A992M-06A, Grade 50- Standard Specification for High Strength Low-Alloy Columium-Valadium Structural Steel.
E. ASTM A307-07B – Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength.
F. ASTM A325-10 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength.
G. ASTM A653/A653M-09A – Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by Hot Dip Process.
H. ASTM A500/A500M-10 – Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
I. ASTM A1011/A1011m-10, Grade 50 – Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength.
J. ASTM A1008/A1008M-10 – Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardened.
K. AWS D1.1/D1.1M – Structural Welding Code.
L. NAAMM – Metal Bar Grating Manual.

1.4 QUALITY ASSURANCE

A. System Manufacturer: Established firm with a minimum of 5 years' experience in the design and fabrication of steel mezzanine systems.
B. System Design: Under direct supervision of Professional Engineer experienced in the design of mezzanines and in accordance with the AISC Specifications, and where applicable, AISI Specifications.
C. All welding performed by the mezzanine supplier shall be made certified by welders (Reference AWS D1.1/D1.1M Structural Welding Code).
D. Installation Contractor shall be a firm experienced in installing mezzanine systems of similar size and magnitude, approved by the manufacturer.
E. Regulatory Requirements: System (handrails, kickplate, stairways, etc.) shall conform to OSHA requirements.

1.5 SUBMITTALS

A. Shop Drawings: Include Plans, Sections, elevations, and connection details.
B. Type of Decking: Length and number of framing members; column location; orientation of base plates; and location and type of accessories.
C. Submit manufacturers' installation and erection manual.

1.6 WARRANTY

A. The supplier shall warrant the mezzanine materials to be free from manufacturing defects for a period of 25 years from the date of substantial completion with certified installation.

PART 2 - PRODUCTS

2.1 MANFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated in the Work include, but limited to, the following:
   1. A-Mezz Industrial Structures, Cleveland, OH.
   2. Halsten Corporation.
   3. Panel Built, Inc.
   4. Portafab Corporation.
   5. Wildeck, Inc., Waukesha, WI.

2.2 MATERIALS

A. Framing:
   1. "C" Section framing shall be 12 inches deep, 11 or 12 gauge, cold-formed steel, as shown on Drawings, with pre-punched holes, meeting the requirements of ASTM A1011, Grade 50.

B. Support columns shall be minimum 5-inch by 5-inch by 3/16-inch (square wall) structural steel tubing meeting requirements of ASTM A500, Grade B, Fy= 46 ksi.
   1. Column base plates shall be minimum 12-inch by 12-inch by 3/4-inch steel meeting the requirements of ASTM A36.
   2. Column base floor anchors shall be high tensile and shear strength steel, SAE Grade 5 or better, zinc plated, meeting the requirements of ASTM A325-10 type 3-B bolts. Anchors shall be 1/2-inch by 5-inch or 3/4-inch by 5-inch, (other sizes available based on design), as indicated on Drawings.

C. Framing Fasteners: Frame-to-column and frame-to-frame fasteners shall be 1/2-inch by 1-1/2-inch high strength zinc plated steel bolts meeting the requirements for ASTM A325-10. TECK SCREWS SHALL NOT BE ALLOWED.

D. Angle brackets shall be 1/4-inch thick steel with pre-punched holes meeting the requirements of ASTM A36.
   1. Frame-to-column brackets shall be 3-inch by 4-inch by 8-1/2-inch.
   2. Frame-to-frame brackets shall be 3-inch by 5-inch by 8-1/2-inch.

E. Decking (Bar Grating)
   1. Bar grating shall be welded steel, 19W4, 1-inch by 1/8-inch, designed in accordance with NAAMM.
   2. Bar grating fasteners:
      a. Steel saddle clips, zinc plated.
      b. Steel screws, 12-24 by 1-1/2-inch, HWH T/2, or 12-24 x 2-inch, HWH t/5, plated.
   3. Kickplates shall be 2-inch by 5-inch, 14 gauge formed steel angle.

F. Guard railing shall be steel (HSLA) tube, 1-1/2-inch O.D., ADA compliant horizontal rails with 2-1/2-inch by 2-1/2-inch by 1/8-inch HSS (Hollow Structural Section) uprights. Guard railing shall be attached directly to framing using 1/2-inch ASTM A325-10 bolts and externally attached so no usable square footage on mezzanine is lost.

G. There shall be 1 gate. Safety Gates (Reference: ANSI MH28.3-2009, paragraph 6.4.3) shall be either Overhead Safety Gate, Pivot Safety Gate, or Double-Drop Safety Gate.

H. Stairs:
   1. There shall be 1 stair system as shown on Drawings. The complete assembly shall include stairs, 48 inches wide; structural steel stringers meeting the requirements of ASTM A1011; (HSLA) 1-1/2-inch O.D. railing and all associated hardware.
   2. Stair system shall have 12 gauge diamond plate steel treads and risers.
   3. Stair platform(s) (when required) shall be 48 inches by 48 inches and have 12 gauge diamond plate steel over 1-1/2-inch deep, 20 gauge, wide rib roof deck.
   4. Stair and stair platform floor anchors shall be 3/8-inch by 3-inch high tensile and shear strength steel, SAE Grade 5 or better, zinc plated, meeting the requirements of ASTM A325-10 Type 3-B bolts.

I. Bridging shall be CRC 1-1/2-inch by 16 (16 gauge) galvanized steel.

J. Painting: Manufacturers standard high performance finish system. Color as selected from manufacturer's standard color options.

2.3 FABRICATION

A. Fabrication of materials will comply with dimensions, profiles, and gauges (thicknesses) shown on the approval Drawings.

PART 3 - EXECUTION

3.1 INSPECTION

A. Inspect Working areas to be sure concrete slab is cleaned of all debris so installers shall have adequate access to Work surface.
B. Inspect Working area for any embedded floor obstacles that may interfere with the installation of floor anchors.

3.2 PREPARATION

A. Field Inspection
   1. The mezzanine Contractor or a manufacturer's technician shall make an inspection of the job site prior to preparation of approval Drawings.
   2. Field measurements shall be made at this time. Any obstructions not indicated on the construction Drawings that may affect the design of the mezzanine shall be reports to the Architect.

3.3 INSTALLATION

A. Erection of the mezzanine and accessories shall be in accordance with the Specifications and instructions contained in the erection manual and approved Drawings provided by the manufacturer.
B. Erector shall clean up all unused materials and debris and remove same from the premises.

END OF SECTION

SECTION 14 21 23.16 - ELECTRIC TRACTION ELEVATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Electric traction passenger elevators.

1.2 ACTION SUBMITTALS

A. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information.
B. Shop Drawings:
   1. Include plans, elevations, sections, and large-scale details indicating service at each landing, coordination with building structure, relationships with other construction, and locations of equipment.
   2. Indicate maximum dynamic and static loads imposed on building structure at points of support, and maximum and average power demands.
C. Samples: For finishes involving color selection.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data.
B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
C. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard 2-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1.4 WARRANTY

A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.
   1. Warranty Period: 12 months from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: "Evolution 100," Machine Room-less Electric Traction Elevator manufactured by ThyssenKrupp Elevator or, Subject to compliance with requirements, a comparable product from 1 of the following:
   1. Fujitec America, Inc.
   2. KONE Inc.
   3. Minnesota Elevator, Inc.

4. Mitsubishi Electric Corporation.
5. Otis Elevator Co.
6. Schindler Elevator Corp.
7. Schumacher Elevator Co.

2.2 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.
B. Accessibility Requirements: Comply with requirements for accessible elevators in the United States Access Board's ADA-ABA Accessibility Guidelines and with ICC A117.1.
C. Seismic Performance: Elevator system shall withstand the effects of earthquake motions determined according to ASCE/SEI 7 and shall comply with elevator seismic requirements in ASME A17.1/CSA B44.

2.3 ELEVATORS

A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturer's standard components shall be used, as included in standard elevator systems and as required for complete system.
B. Elevator Description:
   1. Elevator Number(s): As indicated on Drawings.
   2. Machine Type: Gearless traction.
   3. Operation System: Selective-collective automatic operation.
   4. Auxiliary Operations:
      a. Standby power operation.
      b. Battery-powered automatic evacuation.
   5. Car Enclosures:
      a. Inside Width: Not less than 80 inches from side wall to side wall.
      b. Inside Depth: Not less than 51 inchesfrom back wall to front wall (return panels).
      c. Inside Height: Not less than 93 inchesto underside of ceiling.
      d. Front Walls (Return Panels): Satin stainless-steel, ASTM A480/480M, No. 4 finish.
      e. Car Fixtures: Satin stainless-steel, ASTM A480/480M, No. 4 finish.
      f. Side and Rear Wall Panels: Plastic laminate or Satin stainless-steel, ASTM A480/480M, No. 4 finish.
      g. Door Faces (Interior): Satin stainless-steel, ASTM A480/480M, No. 4 finish.
      h. Ceiling: Satin stainless-steel, ASTM A480/480M, No. 4 finish.
      i. Handrails: 1-1/2 inchesround satin stainless-steel, at sides and rear of car.
      j. Floor prepared to receive resilient flooring (specified in Section 09 65 19 "Resilient Tile Flooring").
   6. Hoistway Entrances:
      a. Width: 42 inches.
      b. Height: 84 inches.
      c. Type: Single-speed center opening.
      d. Frames at First Floor: Satin stainless-steel, ASTM A480/480M, No. 4 finish.
      e. Doors: Satin stainless-steel, ASTM A480/480M, No. 4 finish.
   7. Hall Fixtures at First Floor: Satin stainless-steel, ASTM A480/480M, No. 4 finish.

8. Additional Requirements:
    a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless-steel, ASTM A480/480M, No. 4 finish.
    b. Provide hooks for protective pads in service car and 1 complete set(s) of full-height protective pads.

2.4 TRACTION SYSTEMS

A. Elevator Machines: Permanent magnet, variable-voltage, variable-frequency, ac-type hoisting machines and solid-state power converters.
    1. Provide regenerative system that complies with the IgCC.
    2. Limit total harmonic distortion of regenerated power to 5 percent per IEEE 519.
    3. Provide means for absorbing regenerated power when elevator system is operating on standby power.
B. Machine Beams: Provide steel framing to support elevator hoisting machine and deflector sheaves from the building structure. Comply with Section 05 50 00 "Metal Fabrications" for materials and fabrication.
C. Guides: Roller guides or polymer-coated, nonlubricated sliding guides. Provide guides at top and bottom of car and counterweight frames.

2.5 OPERATION SYSTEMS

A. Provide manufacturer's standard microprocessor operation systems as required to provide type of operation indicated.
B. Auxiliary Operations:
    1. Single-Car Standby Power Operation: On activation of standby power, car is returned to a designated floor and parked with doors open. Car can be manually put in service on standby power, either for return operation or for regular operation, by switches in control panel located at main lobby. Manual operation causes automatic operation to cease.
    2. Single-Car Battery-Powered Automatic Evacuation: If power fails and car is at a floor, it remains at that floor, opens its doors, and shuts down. If car is between floors, it moves to the next floor above or below, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.
    3. Automatic Operation of Lights and Fan: When elevator is stopped and unoccupied with doors closed, lighting, ventilation fan, and cab displays are de-energized after 5 minutes and are re-energized before car doors open.

2.6 DOOR REOPENING DEVICES

A. Infrared Array: Provide door reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams shall cause doors to stop and reopen.
B. Nudging Feature: After car doors are prevented from closing for predetermined adjustable time, through activating door reopening device, a loud buzzer shall sound, and doors shall begin to close at reduced kinetic energy.

2.7 CAR ENCLOSURES

A. Provide enameled or powder-coated steel car enclosures to receive removable wall panels, with removable car roof, access doors, power door operators, and ventilation.
   1. Provide standard railings complying with ASME A17.1/CSA B44 on car tops where required by ASME A17.1/CSA B44.

B. Materials and Finishes: Manufacturer's standards, but not less than the following:
   1. Enameled or Powder-Coated Steel Wall Panels: Flush, formed-metal construction; fabricated from cold-rolled steel sheet. Provide with factory-applied enamel or powder-coat finish; colors as selected by Architect from manufacturer's full range.
   2. Stainless-Steel Wall Panels: Flush, formed-metal construction; fabricated from stainless-steel sheet.
   3. Plastic-Laminate Wall Panels: Plastic laminate adhesively applied to 1/2-inch fire-retardant-treated particleboard with plastic-laminate panel backing and manufacturer's standard protective edge trim. Panels shall have a flame-spread index of 25 or less, when tested according to ASTM E84. Plastic-laminate color, texture, and pattern as selected by Architect from plastic-laminate manufacturer's full range.
   4. Stainless-Steel Doors: Flush, hollow-metal construction; fabricated from stainless or by laminating stainless-steel sheet to exposed faces and edges of enameled or powder-coated steel doors using adhesive that fully bonds metal to metal without telegraphing or oil-canning.
   5. Sight Guards: Provide sight guards on car doors.
   6. Sills: Extruded or machined metal, with grooved surface, 1/4-inchthick.
   7. Metal Ceiling: Flush panels, with LED downlights.
   8. Light Fixture Efficiency: Not less than 35 lumens/W.
   9. Ventilation Fan Efficiency: Not less than 3.0 cfm/W.

2.8 HOISTWAY ENTRANCES

A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile shall accommodate hoistway wall construction.
   1. Where gypsum board wall construction is indicated, frames shall be self-supporting with reinforced head sections.

B. Fire-Rated Hoistway Entrance Assemblies: Door and frame assemblies shall comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing at as close-to-neutral pressure as possible according to NFPA 252 or UL 10B.
   1. Fire-Protection Rating: 1 hour with 30-minute temperature rise of 450 degrees Fahrenheit.

C. Materials and Fabrication: Manufacturer's standards, but not less than the following:
   1. Enameled or Powder-Coated Steel Frames: Formed from cold- or hot-rolled steel sheet. Provide with factory-applied enamel or powder-coat finish; colors as selected by Architect from manufacturer's full range.
   2. Stainless-Steel Frames: Formed from stainless-steel sheet.
   3. Star of Life Symbol: Identify emergency elevators with star of life symbol, not less than 3 incheshigh, on both jambs of hoistway door frames.
   4. Stainless-Steel Doors: Flush, hollow-metal construction; fabricated from stainless-steel sheet.

5. Sight Guards: Provide sight guards on doors matching door edges.
6. Sills: Extruded or machined metal, with grooved surface, 1/4-inchthick.
7. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M.

2.9 SIGNAL EQUIPMENT

A. Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Provide vandal-resistant buttons and lighted elements illuminated with LEDs.
B. Car-Control Stations: Provide manufacturer's standard recessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.
   1. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
C. Emergency Communication System: 2-way voice communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
D. Firefighters' 2-Way Telephone Communication Service: Provide flush-mounted cabinet in each car and required conductors in traveling cable for firefighters' 2-way telephone communication service specified in Section 28 35 00 "Emergency Radio Communication Enhancement Systems."
E. Hall Push-Button Stations: Provide 1 hall push-button station at each landing.
   1. Provide telephone jack in each unit for firefighters' 2-way telephone communication service specified in Section 28 35 00 "Emergency Radio Communication Enhancement Systems."
F. Standby Power Elevator Selector Switches: Provide switches, as required by ASME A17.1/CSA B44, where indicated. Adjacent to switches, provide illuminated signal that indicates when normal power supply has failed.
G. Fire-Command-Center Annunciator Panel: Provide panel containing illuminated position indicators for each elevator, clearly labeled with elevator designation; include illuminated signal that indicates when elevator is operational and when it is at the designated emergency return level with doors open. Provide standby power elevator selector switch(es), as required by ASME A17.1/CSA B44, adjacent to position indicators. Provide illuminated signal that indicates when normal power supply has failed.
H. Emergency Pictorial Signs: Fabricate from materials matching hall push-button stations, with text and graphics as required by authorities having jurisdiction, indicating that in case of fire, elevators are out of service and exits should be used instead. Provide 1 sign at each hall push-button station unless otherwise indicated.

2.10 FINISH MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, commercial steel, Type B, exposed, matte finish.
B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, commercial steel, Type B, pickled.
C. Stainless-Steel Sheet: ASTM A240/A240M, Type 304.
D. Stainless-Steel Bars: ASTM A276, Type 304.
E. Stainless-Steel Tubing: ASTM A554, Grade MT 304.
F. Aluminum Extrusions: ASTM B221, Alloy 6063.
G. Plastic Laminate: High-pressure type complying with NEMA LD 3, Type HGS or Type HGL.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Examine hoistways, hoistway openings, and pits as constructed; verify critical dimensions; and examine supporting structure and other conditions under which elevator work is to be installed.
B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions.
B. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.
C. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.
D. Lubricate operating parts of systems, including ropes, as recommended by manufacturers.
E. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
F. Leveling Tolerance: 1/8-inch, up or down, regardless of load and travel direction.
G. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.
H. Locate hall signal equipment for elevators as follows unless otherwise indicated:
    1. For groups of elevators, locate hall push-button stations between 2 elevators at center of group or at location most convenient for approaching passengers.
    2. Place hall lanterns either above or beside each hoistway entrance.
    3. Mount hall lanterns at a minimum of 72 inchesabove finished floor.

3.3 FIELD QUALITY CONTROL

A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.

3.4 PROTECTION

A. Temporary Use: Comply with the following requirements for elevator used for construction purposes:
    1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
    2. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.

3. Engage elevator Installer to provide full maintenance service.
4. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required, or provide new units as required.

3.5 MAINTENANCE SERVICE

A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of elevator Installer. Include monthly preventive maintenance, repair, or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation at rated speed and capacity.

END OF SECTION

SECTION 21 05 00 - COMMON WORK RESULTS FOR FIRE SUPPRESSION

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes pipe, fittings, valves, and connections for sprinkler systems
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 07 84 13 “Penetration Firestopping”: Product requirements for firestopping for placement by this Section.
   3. Section 09 91 13 “Exterior Painting”: Execution requirements for piping painting specified by this Section.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
   1. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
   2. ASME B16.11 - Forged Steel Fittings - Socket-Welding and Threaded.
   3. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
   4. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
   5. ASME B16.25 - Buttwelding Ends.
   6. ASME B16.3 - Malleable Iron Threaded Fittings.
   7. ASME B16.4 - Gray Iron Threaded Fittings.
   8. ASME B16.5 - Pipe Flanges and Flanged Fittings.
   9. ASME B16.9 - Factory-Made Wrought Steel Buttwelding Fittings.
   10. ASME B36.10M - Welded and Seamless Wrought Steel Pipe.
B. ASTM International:
   1. ASTM A53 - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   2. ASTM A135 - Standard Specification for Electric-Resistance-Welded Steel Pipe.
   3. ASTM A234 - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
   4. ASTM A795 - Standard Specification for Black and Hot-Dipped Zinc-Coated (Galvanized) Welded and Seamless Steel Pipe for Fire Protection Use.
   5. ASTM B32 - Standard Specification for Solder Metal.
   6. ASTM B75 - Standard Specification for Seamless Copper Tube.
   7. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
   8. ASTM B251 - Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube.
   9. ASTM D3309 - Standard Specification for Polybutylene (PB) Plastic Hot- and Cold-Water Distribution Systems.
   10. ASTM F438 - Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 40.
   11. ASTM F439 - Standard Specification for Socket-Type Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe Fittings, Schedule 80.
   12. ASTM F442 - Standard Specification for Chlorinated Poly (Vinyl Chloride) (CPVC) Plastic Pipe (SDR-PR).
   13. ASTM F493 - Standard Specification for Solvent Cements for Chlorinated Poly
   14. (Vinyl Chloride) (CPVC) Plastic Pipe and Fittings.

C. American Welding Society:
   1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
   2. AWS D1.1 - Structural Welding Code - Steel.
D. American Water Works Association:
   1. AWWA C110 - American National Standard for Ductile-Iron and Grey-Iron Fittings, 3 in. through 48 in. (75 mm through 1200 mm), for Water and Other Liquids.
   2. AWWA C111 - American National Standard for Rubber-Gasket Joints for Ductile-Iron Pressure Pipe and Fittings.
   3. AWWA C151 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water.
E. National Fire Protection Association:
   1. NFPA 13 - Installation of Sprinkler Systems.
   2. NFPA 14 - Standard for the Installation of Standpipe, Private Hydrants and Hose Systems.
   3. NFPA 24 - Installation of Private Fire Service Mains and Their Appurtenances.
F. Underwriter Laboratories, Inc.:
   1. UL 1887 - Fire Tests of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics.

1.3 SUBMITTALS

A. Refer to Division 01 and Section 23 05 00 “General Mechanical Requirements” - Submittal procedures.
B. Shop Drawings: Indicate pipe materials used, jointing methods, supports, floor and wall penetration seals. Indicate installation, layout, weights, mounting and support details, and piping connections.
C. Product Data:
   1. Submit manufacturers catalogue information. Indicate valve data and ratings.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of components and tag numbering.
B. Operation and Maintenance Data: Submit spare parts lists.

1.5 QUALITY ASSURANCE

A. Provide fire sprinkler piping located in plenums with peak optical density not greater than 0.5, average optical density not greater than 0.15, and flame spread not greater than 5 feet when tested in accordance with UL 1887.
B. Perform Work in accordance with NFPA 13, State, and local standard.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum 3 years’ experience.
B. Installer: Company specializing in performing Work of this section with minimum 3 years’ experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store valves in shipping containers, with labeling in place.
B. Furnish cast iron and steel valves with temporary protective coating.
C. Furnish temporary end caps and closures on piping and fittings. Maintain in place until installation.

1.8 WARRANTY

A. Refer to Section 23 05 00 “General Mechanical Requirements” for product warranties.
B. Furnish 5-year manufacturer warranty for basic fire suppression materials and methods.

PART 2 - PRODUCTS

2.1 VALVES

A. Gate Valves:
   1. Up to and including 2 inches: Bronze body and trim, rising stem, hand wheel, solid wedge or disc, threaded ends.
   2. Over 2 inches: Iron body, bronze trim, rising stem pre-grooved for mounting tamper switch, hand wheel, OS&Y, solid bronze or cast iron wedge, flanged, or grooved ends.
   3. Over 4 inches: Iron body, bronze trim, non-rising stem with bolted bonnet, solid bronze wedge, flanged ends, iron body indicator post assembly.
B. Globe Valves:
   1. Up to and including 2 inches: Bronze body, bronze trim, rising stem and hand wheel, inside screw, renewable rubber disc, threaded ends, with back seating capacity packable under pressure.
   2. Over 2 inches: Iron body, bronze trim, rising stem, hand wheel, OS&Y, plug-type disc, flanged ends, renewable seat, and disc.
C. Ball Valves:
   1. Up to and including 2 inches: Bronze 2-piece body, brass, chrome plated bronze, or stainless-steel ball, Teflon seats and stuffing box ring, lever handle, threaded ends with union.
   2. Over 2 inches: Manufacturers: Cast steel body, chrome plated steel ball, Teflon seat and stuffing box seals, lever handle or gear drive hand wheel for sizes 10 inches and over, flanged.
D. Butterfly Valves:
   1. Bronze Body: Stainless-steel disc, resilient replaceable seat, threaded or grooved ends, extended neck, hand wheel and gear drive and integral indicating device, and built-in tamper proof switch rated 10 amp at 115 volt AC.
   2. Cast or Ductile Iron Body: Cast or ductile iron, chrome or nickel plated ductile iron or aluminum bronze disc, resilient replaceable EPDM seat, wafer, lug, or grooved ends. With extended neck, hand wheel and gear drive and integral indicating device, and internal tamper switch rated 10 amp at 115 volt AC.

E. Check Valves:
   1. Up to and including 2 inches: Bronze body and swing disc, rubber seat, threaded ends.
   2. Over 2 inches: Iron body, bronze trim, swing check with rubber disc, renewable disc and seat, flanged ends with automatic ball check.
   3. 4 inches and Over: Iron body, bronze disc with stainless-steel spring, resilient seal, threaded, wafer, or flanged ends.

F. Drain Valves:
   1. Compression Stop: Bronze with hose thread nipple and cap.
   2. Ball Valve: Brass with cap and chain, 3/4-inch hose thread.

2.2 BURIED PIPING

A. Steel Pipe: ASTM A53, Grade B, ASTM A135/, ASTM A795, or ASME B36.10, Schedule 40 black, with ASME C105 polyethylene jacket, or double layer, half-lapped 10 mil polyethylene tape.
   1. Steel Fittings: ASME B16.9, wrought steel, butt welded; ASME B16.25, butt weld ends; ASTM A234, wrought carbon steel and alloy steel; ASME B16.5, steel flanges and fittings; ASME B16.11, forged steel socket welded and threaded; with double layer, half-lapped 10 mil polyethylene tape.
   2. Cast Iron Fittings: ASME B16.1, flanges, and flanged fittings.
   3. Joints: AWS D1.1, welded.
   4. Casing: Closed glass cell insulation or Polyurethane insulation with high density polyethylene jacket and heat shrink sleeves.

B. Cast Iron Pipe: AWWA C151.
   1. Fittings: AWWA C110, standard thickness.
   2. Joints: AWWA C111, rubber gasket.
   3. Mechanical Couplings: Shaped composition sealing gasket, steel bolts, nuts, and washers.

C. PVC Pipe: AWWA C900 Class 150, polyvinyl chloride (PVC) Material.
   1. Fittings: AWWA C110, ductile iron, standard thickness.
   2. Joints: ASTM D 3139 compression gasket ring.

2.3 ABOVE GROUND PIPING

A. Steel Pipe: ASTM A 53, Grade B; ASTM A 135; ASTM A 795 Schedule 40 black.
   1. Steel Fittings: ASME B 16.9, wrought steel, butt welded; ASME B 16.25, butt weld ends; ASTM A 234, wrought carbon steel and alloy steel; ASME B 16.5, steel flanges and fittings; ASME B 16.11, forged steel socket welded and threaded.
   2. Cast Iron Fittings: ASME B 16.4, threaded fittings.
   3. Malleable Iron Fittings: ASME B 16.3, threaded fittings.
   4. Mechanical Grooved Couplings: Malleable iron housing clamps to engage and lock, "C" shaped elastomeric sealing gasket, steel bolts, nuts, and washers; galvanized for galvanized pipe.
   5. Mechanical Formed Fittings: Carbon-steel housing with integral pipe stop and O-ring pocked and O-ring uniformly compressed into permanent mechanical engagement onto pipe.

2.4 PIPE HANGERS AND SUPPORTS

A. Conform to NFPA 13.
B. Hangers for Pipe Sizes 1/2- to 1-1/2-inch: Malleable iron, adjustable swivel, split ring.
C. Hangers for Pipe Sizes 2-inch and Over: Carbon steel, adjustable, clevis.
D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
E. Wall Support for Pipe Sizes to 3 inches: Cast iron hook.
F. Wall Support for Pipe Sizes 4 inches and Over: Welded steel bracket and wrought steel clamp.
G. Vertical Support: Steel riser clamp.
H. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
I. Copper Pipe Support: Carbon steel ring, adjustable, copper plated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify openings are ready to receive sleeves.
B. Verify openings are ready to receive firestopping.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
B. Remove scale and foreign material, from inside and outside, before assembly.
C. Prepare piping connections to equipment with flanges or unions.
D. Do not drill or cut structural members.
E. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.

3.3 INSTALLATION

A. Install piping in accordance with NFPA 13 for sprinkler systems and NFPA 24 for service mains.
B. Install Work in accordance with State and local standards.
C. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
D. Install piping to conserve building space, to not interfere with use of space and other work.
E. Group piping whenever practical at common elevations.
F. Install pipe sleeve at piping penetrations through footings partitions, walls, and floors. Seal pipe and sleeve penetrations to maintain fire resistance equivalent to fire separation.
G. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
H. Pipe Hangers and Supports:
    1. Install in accordance with NFPA 13.
    2. Install hangers to with minimum 1/2-inch space between finished covering and adjacent work.
    3. Place hangers within 12 inches of each horizontal elbow.
    4. Use hangers with 1-1/2-inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.

5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
6. Where installing several pipes in parallel and at same elevation, provide multiple or trapeze hangers.
7. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.

I. Slope piping and arrange systems to drain at low points. Install eccentric reducers to maintain top of pipe level.

J. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply 1 coat of zinc rich primer to welding. Refer to Section 09 91 13 “Exterior Painting.”

K. Do not penetrate building structural members unless indicated.

L. Where more than 1 piping system material is specified, install compatible system components and joints. Install flanges, union, and couplings at locations requiring servicing.

M. Die cut threaded joints with full cut standard taper pipe threads with red lead and linseed oil or other non-toxic joint compound applied to male threads only.

N. Install valves with stems upright or horizontal, not inverted. Remove protective coatings prior to installation.

O. Install ball or butterfly valves for shut-off or isolating service.

P. Install drain valves at main shut-off valves, low points of piping and apparatus.

Q. Where inserts are omitted, drill through concrete slab from below and install through-bolt with recessed square steel plate and nut above slab.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Inserts:
1. Install inserts for placement in concrete forms.
2. Install inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
3. Install hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

3.5 CLEANING

A. Clean entire system after other construction is complete.

B. Clean adjacent surfaces of firestopping materials.

END OF SECTION

SECTION 21 13 13 - WET-PIPE SPRINKLER SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes wet-pipe sprinkler system, system design, installation, and certification.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. National Fire Protection Association:
   1. NFPA 13 - Installation of Sprinkler Systems.

1.3 SYSTEM DESCRIPTION

A. System to provide coverage for building areas noted in Schedule.
B. Provide hydraulically designed system to NFPA 13 occupancy requirements.
C. Determine volume and pressure of incoming water supply from water flow test data. Do not design system based on computer modeling. Revise design when test data become available prior to submittals.
D. Interface system with building fire and smoke alarm system.
E. Provide fire department connections as indicated on Drawings.

1.4 SUBMITTALS

A. Shop Drawings: Indicate layout of finished ceiling areas indicating sprinkler locations coordinated with ceiling installation. Indicate detailed pipe layout, hangers and supports, sprinklers, components, and accessories. Indicate system controls.
B. Product Data: Submit data on sprinklers, valves, and specialties, including manufacturers catalog information. Submit performance ratings, rough-in details, weights, support requirements, and piping connections.
C. Design Data: Submit design calculations; signed and sealed by a certified fire protection engineer or designer. The engineer or designer shall be certified by the State of Texas.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of sprinklers and deviations of piping from Drawings. Indicate drain and test locations.
B. Operation and Maintenance Data: Submit components of system, servicing requirements, record Drawings, inspection data, replacement part numbers and availability, and location and numbers of service depot.

1.6 QUALITY ASSURANCE

A. Perform Work according to NFPA 13 and local Fire Marshal.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years' experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years' experience.
C. Design system under direct supervision of a certified fire protection Engineer or Designer experienced in design of this Work and licensed in State of Texas.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store products in shipping containers until installation.
B. Furnish piping with temporary inlet and outlet caps until installation.

1.9 WARRANTY

A. Refer to Section 23 05 00 “General Mechanical Requirements” for product warranties.

1.10 EXTRA MATERIALS

A. Furnish extra sprinklers under provisions of NFPA 13.
B. Furnish suitable wrenches for each sprinkler type.

PART 2 - PRODUCTS

2.1 SPRINKLERS

A. Manufacturers:
   1. Grinnell Corp.
   2. Reliable Sprinkler Corp.
   3. Viking Model
   4. Substitutions: Refer to Section 23 05 00 “General Mechanical Requirements.”
B. Suspended Ceiling Type:
   1. Type: Concealed pendant type with matching push on escutcheon plate.
   2. Finish: Brass
   3. Escutcheon Plate Finish: Enamel, color to be determined by Architect.
   4. Fusible Link: Fusible solder link type or Glass bulb type temperature rated for specific area hazard.
C. Exposed Area Type:
   1. Type: Standard upright type with guard.
   2. Finish: Brass.
   3. Fusible Link: Fusible-solder link type, or Glass bulb type temperature rated for specific area hazard.
D. Side Wall Type:
   1. Type: Semi-recessed horizontal side wall type with matching escutcheon plate and guard.
   2. Finish: Brass.
   3. Escutcheon Plate Finish: Chrome plated.
   4. Fusible Link: Fusible-solder link, or Glass bulb type temperature rated for specific area hazard.
E. Guards: Finish to match sprinkler finish.

2.2 Flexible Commercial Sprinkler Connection:

A. Manufacturers:
   1. Flexhead Industries.
   2. Substitutions: Refer to Section 23 05 00 “General Mechanical Requirements.”
B. Flexible stainless-steel hose assembly and bracketing system connects sprinkler heads to branch lines.
   1. Mounting bracket shall be compatible with any suspended or gypsum board ceiling system.
   2. Hose:
      a. Industrial grade, all welded, no O-ring construction, uses all 304 stainless-steel components.
      b. Rated up to 175 psi without the need for additional hangers.
      c. Approved for use in suspended ceiling system.
      d. True-bore 1-inch internal corrugated hose diameter.
      e. Fully braided hose shall provide protection against pressure surges.
      f. Shall be FM/UL approved.

2.3 PIPING SPECIALTIES

A. Wet Pipe Sprinkler Alarm Valve: Check type valve with divided seat ring, rubber faced clapper to automatically actuate electric alarm, with pressure retard chamber and variable pressure trim with test and drain valve.
B. Electric Alarm: Electrically operated red enameled gong with pressure alarm switch.
C. Water Flow Switch: Vane type switch for mounting horizontal or vertical, with 2 contacts; rated 10 A at 125 V ac and 2.5 A at 24 V dc.
D. Fire Department Connections:
   1. Type: Flush-mounted wall type with brass finish
   2. Outlets: 2-way with fire department thread size. Provide with Knox caps as required by AHJ.
   3. Label: SPRINKLER - FIRE DEPARTMENT CONNECTION.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install according to NFPA 13.
B. Install Work according to State and local standards.
C. Install buried shut-off valves in valve box. Furnish post indicator. If required by local AHJ.
D. Install approved double check back-flow preventer assembly at sprinkler system water source connection.
E. Locate fire department connection with sufficient clearance from walls, obstructions, or adjacent Siamese connectors to allow full swing of fire department wrench handle.
F. Locate outside alarm-gong on building wall as indicated on Drawings.
G. Place pipe runs to minimize obstruction to other Work.
H. Install piping in concealed spaces above finished ceilings.
I. Center sprinklers in 2 directions in ceiling tile and install piping offsets.
J. Install and connect to fire pump system according to NFPA 13.

K. Install guards on sprinklers.
L. Hydrostatically test entire system.
M. Require test be witnessed by Fire Marshal and Owner's insurance underwriter.

3.2 INTERFACE WITH OTHER PRODUCTS

A. Verify signal devices are installed and connected to fire alarm system.

3.3 CLEANING

A. Flush entire piping system of foreign matter.

3.4 PROTECTION OF INSTALLED CONSTRUCTION

A. Apply masking tape or paper cover to protect concealed sprinklers, cover plates, and sprinkler escutcheons not receiving field paint finish. Remove after painting. Replace painted sprinklers with new.

END OF SECTION

SECTION 22 05 29 - HANGERS AND SUPPORTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Pipe hangers and supports.
   2. Hanger rods.
   3. Equipment curbs.
   4. Formed steel channel.
   5. Equipment bases and supports.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
   1. ASME B31.1 - Power Piping.
   2. ASME B31.5 - Refrigeration Piping.
   3. ASME B31.9 - Building Services Piping.

B. ASTM International:
   1. ASTM E84 - Test Method for Surface Burning Characteristics of Building Materials.
   2. ASTM E119 - Method for Fire Tests of Building Construction and Materials.
   3. ASTM E814 - Test Method of Fire Tests of Through Penetration Firestops.
   4. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.

C. American Welding Society:
   1. AWS D1.1 - Structural Welding Code - Steel.

D. FM Global:
   1. FM - Approval Guide, A Guide to Equipment, Materials & Services Approved by Factory Mutual Research For Property Conservation.

E. Manufacturers Standardization Society of the Valve and Fittings Industry:
   1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
   2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
   3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.

1.3 SUBMITTALS

A. Division 01 and Section 23 05 00 "General Mechanical Requirements."

B. Shop Drawings: Indicate system layout with location including critical dimensions, sizes, and pipe hanger and support locations and detail of trapeze hangers.

C. Product Data:
   1. Hangers and Supports: Submit manufacturers catalog data including load capacity.

D. Design Data: Indicate load carrying capacity of trapeze, multiple pipe, and riser support hangers.

E. Manufacturer's Installation Instructions:
   1. Hangers and Supports: Submit special procedures and assembly of components.

F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with State and local standards.
B. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum 3 years' experience.
B. Installer: Company specializing in performing Work of this section with minimum 3 years' experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification.
B. Protect from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original packaging.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.8 WARRANTY

A. Section 23 05 00 "General Mechanical Requirements."

PART 2 - PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Plumbing Piping – DWV:
1. Conform to ASME B31.9, ASTM F708, MSS SP58, MSS SP69, or MSS SP89.
2. Hangers for Pipe Sizes 1/2- to 1-1/2-inch: Malleable iron or carbon steel, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hook.
6. Wall Support for Pipe Sizes 4 inches and Larger: Welded steel bracket and wrought steel clamp.
7. Vertical Support: Steel riser clamp.
8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Copper-plated, carbon-steel adjustable, ring.

B. Plumbing Piping - Water:
   1. Conform to ASME B31.9, ASTM F708, MSS SP58, MSS SP69, or MSS SP89.
   2. Hangers for Pipe Sizes 1/2- to 1-1/2-inch: Malleable iron or carbon steel, adjustable swivel, split ring.
   3. Hangers for Cold Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.
   4. Hangers for Hot Pipe Sizes 2 to 4 inches: Carbon steel, adjustable, clevis.
   5. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
   6. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hook.
   7. Wall Support for Pipe Sizes 4 inches and Larger: Welded steel bracket and wrought steel clamp.
   8. Vertical Support: Steel riser clamp.
   9. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
   10. Floor Support for Hot Pipe Sizes 4 inches and Smaller: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
   11. Copper Pipe Support: Copper-plated, Carbon-steel ring.

2.2 ACCESSORIES

A. Hanger Rods: Mild steel threaded both ends, threaded on 1 end, or continuous threaded.

2.3 EQUIPMENT CURBS

A. Fabrication: Unless otherwise noted, shall be welded 18 gauge galvanized steel shell and base, mitered 3-inch cant, variable step to match roof insulation, 1-1/2-inch thick insulation, factory installed wood nailer. Provide tapered curbs to match roof slope.

2.4 FORMED STEEL CHANNEL

A. Manufacturers:
   1. B-Line Systems.
   2. Unistrut Corp.
   3. Substitutions: See Section 23 05 00 “General Mechanical Requirements.”
B. Product Description: Galvanized (12 gauge) thick steel. With holes 1-1/2 inches on center.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify the existing conditions before starting Work.
B. Verify openings are ready to receive sleeves.

3.2 PREPARATION

A. Obtain permission from Architect before using powder-actuated anchors.
B. Do not drill or cut structural members without obtaining permission from Architect.

3.3 INSTALLATION - PIPE HANGERS AND SUPPORTS

A. Install in accordance with ASME B31.1, ASME B31.5, ASME 31.9, ASTM F708, MSS SP 58, MSS SP 69, or MSS SP 89.
B. Support horizontal piping as scheduled.
C. Install hangers with minimum 1/2-inch space between finished covering and adjacent Work.
D. Place hangers within 12 inches of each horizontal elbow.
E. Use hangers with 1-1/2-inch minimum vertical adjustment.
F. Support horizontal cast iron pipe adjacent to each hub, with 5 feet maximum spacing between hangers.
G. Support vertical piping at every floor. Support vertical cast iron pipe at each floor at hub.
H. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
I. Support riser piping independently of connected horizontal piping.
J. Provide copper plated hangers and supports for copper piping.
K. Design hangers for pipe movement without disengagement of supported pipe.
L. Prime coat exposed steel hangers and supports. Refer to Division 09. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
M. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Section 23 07 05 “HVAC and Plumbing Insulation.”

3.4 INSTALLATION - EQUIPMENT BASES AND SUPPORTS

A. Provide housekeeping pads of concrete, minimum 4 inches thick and extending 6 inches beyond supported equipment. Refer to Division 03.
B. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.
C. Construct supports of steel members, formed steel channel, or steel pipe and fittings. Brace and fasten with flanges bolted to structure.
D. Provide rigid anchors for pipes after vibration isolation components are installed.

3.5 INSTALLATION – FLASHING

A. Provide flexible flashing and metal Counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.
B. Flash vent and soil pipes projecting 3 inches minimum above finished roof surface with lead worked 1-inch minimum into hub, 8 inches minimum clear on sides with 24- by 24-inch sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counter-flash, and seal.
C. Flash floor drains in floors with topping over finished areas with lead, 10 inches clear on sides with minimum 36- by 36-inch sheet size. Fasten flashing to drain clamp device.
D. Seal floor drains watertight to adjacent materials.
E. Provide curbs for mechanical roof installations 10 inches minimum high above roofing surface. Flash and counter-flash with sheet metal; seal watertight. Attach counterflashing mechanical equipment and lap base flashing on roof curbs. Flatten and solder joints.
F. Adjust storm collars tight to pipe with bolts, caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

3.6 FIELD QUALITY CONTROL

A. Inspect installed firestopping for compliance with Specifications and submitted schedule.

3.7 CLEANING

A. Clean adjacent surfaces of firestopping materials.

3.8 PROTECTION OF FINISHED WORK

A. Protect adjacent surfaces from damage by material installation.

3.9 SCHEDULES

A. PIPE HANGER SPACING (OR AS REQUIRED BY LOCAL CODE)

PIPE SIZE	MAX. HANGER SPACING	HANGER ROD DIAMETER
Inches	Feet	Inches
1/2	6	3/8
3/4	6	3/8
1	6	3/8
1-1/4	6	3/8
1-1/2	10	3/8
2	10	3/8
2-1/2	10	1/2
3	10	1/2
4	10	5/8
5	10	5/8
6	10	3/4
8	10	3/4
PVC (All Sizes)	4	3/8
C.I. Bell and Spigot (or No-Hub) and at Joints	5	5/8

END OF SECTION

SECTION 22 11 00 - FACILITY WATER DISTRIBUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Domestic water piping, buried within 5 feet of building.
2. Domestic water piping, above grade.
3. Unions and flanges.
4. Valves.
5. Pressure gauges.
6. Pressure gauge taps.
7. Thermometers.
8. Relief valves.
9. Strainers.
10. Backflow preventers.
11. Water hammer arrestors.
12. Mixing valves.
13. Diaphragm-type compression tanks.
14. In-line circulator pumps.

B. Related Sections:

1. Division 01 Specification Sections apply to Work of this Section.
2. Section 03 30 00 “Cast-In-Place Concrete.” Execution requirements for placement of concrete housekeeping pads specified by this Section.
3. Section 07 84 13 “Penetration Firestopping.” Product requirements for firestopping for placement by this Section.
4. Section 08 31 13 “Access Doors and Frames.” Product requirements for access doors for placement by this Section.
5. Section 09 91 13 “ Exterior Painting” and 09 91 23 Interior Painting.” Product and execution requirements for painting specified by this Section.
6. Section 22 05 29 “Hangers and Supports.” Product requirements for pipe hangers and supports for placement by this Section.
7. Section 23 05 53 “Identification for HVAC and Plumbing Piping and Equipment.” Product requirements for pipe identification and valve tags for placement by this Section.
8. Section 23 07 05 “HVAC and Plumbing Insulation.” Product and execution requirements for pipe insulation.
9. Division 26 Specification Sections for execution requirements for electric connections to equipment specified by this Section.

1.2 REFERENCES

A. American National Standards Institute:

1. ANSI Z21.22 - Relief Valves for Hot Water Supply Systems.

B. American Society of Mechanical Engineers:

1. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
2. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
3. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
4. ASME B31.9 - Building Services Piping.
5. ASME B40.1 - Gauges - Pressure Indicating Dial Type - Elastic Element.

6. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
7. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.

C. American Society of Sanitary Engineering:
1. ASSE 1010 - Performance Requirements for Water Hammer Arresters.
2. ASSE 1012 - Performance Requirements for Backflow Preventer with Intermediate Atmospheric Vent.
3. ASSE 1013 - Performance Requirements for Reduced Pressure Principle Backflow Preventers and Reduced Pressure Fire Protection Principle Backflow Preventers.
4. ASSE 5013 - Performance Requirements for Reduced Pressure Principle Backflow Preventers (RP) and Reduced Pressure Fire Protection Principle Backflow Preventers (RFP).
5. ASSE 5015 - Performance Requirements for Testing Double Check Backflow Prevention Assemblies (DC) and Double Check Fire Protection Backflow Prevention Assemblies (RPDF).

D. ASTM International:
1. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
2. ASTM A536 - Standard Specification for Ductile Iron Castings.
3. ASTM B32 - Standard Specification for Solder Metal.
4. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes.
5. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
6. ASTM B584 - Standard Specification for Copper Alloy Sand Castings for General Applications.
7. ASTM E1 - Standard Specification for ASTM Thermometers.
8. ASTM E77 - Standard Test Method for Inspection and Verification of Thermometers.
9. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
10. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.

E. American Welding Society:
1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.

F. American Water Works Association:

G. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
2. MSS SP 67 - Butterfly Valves.
3. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
4. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
5. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
6. MSS SP 85 - Cast Iron Globe & Angle Valves, Flanged and Threaded.
7. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
8. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

H. National Electrical Manufacturers Association:
1. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

I. Plumbing and Drainage Institute:
1. PDI WH201 - Water Hammer Arrester Standard.

J. Underwriters Laboratories Inc.:
1. UL 393 - Indicating Pressure Gauges for Fire-Protection Service.
2. UL 404 - Gauges, Indicating Pressure, for Compressed Gas Service.

1.3 SUBMITTALS

A. Division 01 and Section 01 33 00 “Submittal Procedures.”
B. Product Data:
   1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturer's catalog information.
   2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
   3. Domestic Water Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.
   4. Pumps: Submit pump type, capacity, certified pump curves showing pump performance characteristics with pump and system operating point plotted. Include NPSH curve when applicable. Include electrical characteristics and connection requirements.
C. Manufacturer's Installation Instructions: Submit installation instructions for pumps, valves, and accessories.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of valves and equipment.
B. Operation and Maintenance Data: Submit spare parts list, exploded assembly views and recommended maintenance intervals.

1.5 QUALITY ASSURANCE

A. For drinking water service, provide valves complying with NSF 61.
B. Perform Work in accordance with State and local standard.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years’ experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years’ experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept valves and equipment on site in shipping containers with labeling in place. Inspect for damage.
B. Provide temporary protective coating on cast iron and steel valves.
C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
D. Protect piping systems from entry of foreign materials by temporary covers, completing Sections of the Work, and isolating parts of completed system.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.9 WARRANTY

A. Section 23 05 00 “General Mechanical Requirements.”

1.10 EXTRA MATERIALS

A. Furnish 2 packing kits for each size valve, 2 loose keys for outside hose bibs and hose end vacuum breakers for hose bibs for and 2 pump seals for each pump model.

PART 2 - PRODUCTS

2.1 DOMESTIC WATER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Copper Tubing: ASTM B88, Type K annealed.
   1. Fittings: ASME B16.18, cast copper, or ASME B16.22, wrought copper.
   2. Joints: Compression connection or Brazed, AWS A5.8 BCuP silver/phosphorus/copper alloy with melting range 1190 to 1480 degrees Fahrenheit.

2.2 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tubing: ASTM B88, Type L hard drawn.
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B32, Alloy Grade Sb5 tin-antimony, or Alloy Grade Sn95 tin-silver, lead free solder AWS A5.8 Classification BCuP-3 or BCuP-4 silver braze.
   3. Copper press Fittings:
      a. Manufacturers:
         1) Viega.
         2) Ridge Tool Company.
      b. Press fittings: Copper and copper alloy press fittings shall conform to material requirements of ASME B 16.18 or ASME B16.22 and performance criteria of IAPMO PS117. Sealing elements for press fittings shall be EPDM. Sealing elements shall be factory installed. Press ends shall have SC (Smart Connect™) feature design (leakage path). In ProPress 1/2-inch to 4-inch dimensions the Smart Connect Feature assures leakage of fluids and/or gases from inside the system past the sealing element of an upressed connection. The function of this feature is to provide the installer quick and easy identification of connections which have not been pressed prior to putting the system into operation.

B. RO Water Pipping:
   1. PEX Type A.
      a. Piping: ASTM F876 and F877
      b. Fittings: ASTM F1960 Cold expansion fittings.
   2. PEX Type B Viega Pureflow.
      a. Piping: PEX 5306, ASTM F876 and F877.
      b. Press Fittings: Pureflow made from bronze ASTMF877 and ASTM F3347.
      c. Crimp fittings: copper crimp rings ASTM F1807.

2.3 UNIONS AND FLANGES

A. Unions for Pipe 2 inches and Smaller:
   1. Copper Piping: Class 150, bronze unions with soldered.
   2. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

B. Flanges for Pipe 2-1/2 inches and Larger:
   1. Copper Piping: Class 150, slip-on bronze flanges.
   2. Gaskets: 1/16-inch thick preformed neoprene gaskets.

2.4 BALL VALVES

A. Manufacturers:
   1. Nibco Inc.
   2. Milwaukee Valve Company.
   3. Apollo Flow Controls.
   4. Watts.
   5. Substitutions: Division 01 and Section 23 05 00 "General Mechanical Requirements," substituted products.

B. 2 inches and Smaller: MSS SP 110, 600 psi WOG 2 piece bronze body, chrome plated brass ball, full port, Teflon seats, blow-out proof stem, solder or threaded ends with union, and lever handle.

2.5 BUTTERFLY VALVES

A. Manufacturers:
   1. Nibco Inc.
   2. Milwaukee Valve Company.
   3. Apollo Flow Controls.
   4. Watts.
   5. Substitutions: Division 01 and Section 23 05 00 "General Mechanical Requirements," substituted products.

B. 2-1/2 inches and Larger: MSS SP 67, Class 200.
   1. Body: Cast or ductile iron, wafer, or lug ends, stainless steel stem, extended neck.
   2. Disc: Aluminum bronze.
   3. Seat: Resilient replaceable EPDM.
   4. Handle and Operator: 10 position lever handle.

2.6 CHECK VALVES

A. Horizontal Swing Check Valves:
   1. Manufacturers:
      a. Nibco Inc.
      b. Milwaukee Valve Company.
      c. Apollo Flow Controls.
      d. Substitutions: Division 01 and Section 23 05 00 "General Mechanical Requirements," substituted products.
   2. 2 inches and Smaller: MSS SP 80, Class 125, bronze body and cap, bronze seat, Buna-N disc, solder or threaded ends.
   3. 2-1/2 inches and Larger: MSS SP 71, Class 125, cast iron body, bolted cap, bronze or cast iron disc, renewable disc seal and seat, flanged ends.

B. Spring Loaded Check Valves:
   1. Manufacturers:
      a. Nibco Inc.
      b. Milwaukee Valve Company.
      c. Substitutions: Division 01 and Section 23 05 00 “General Mechanical Requirements,” substituted products.
   2. 2 inches and Smaller: MSS SP 80, Class 250, bronze body, in-line spring lift check, silent closing, Buna-N disc, integral seat, solder, or threaded ends.
   3. 2-1/2 inches and Larger: MSS SP 71, Class 125, wafer, or globe style, cast iron body, bronze seat, center guided bronze disc, stainless steel spring and screws, flanged ends.

2.7 PRESSURE GAUGES

A. Manufacturers:
   1. Trerice.
   2. Weiss.
   3. Substitutions: Division 01 and and Section 23 05 00 “General Mechanical Requirements,” substituted products.

B. Gauge: ASME B40.1, UL 404with bourdon tube, rotary brass movement, brass socket, front calibration adjustment, black scale on white background.
   1. Case: Cast aluminum
   2. Bourdon Tube: Phosphor bronze.
   3. Dial Size: 4-1/2-inch diameter.
   4. Mid-Scale Accuracy: 1 percent.
   5. Scale: Psi.

2.8 PRESSURE GAUGE TAPS

A. Manufacturers:
   1. Trerice.
   2. Weiss.
   3. Substitutions: Division 01 and Section and Section 23 05 00 “General Mechanical Requirements,” substituted products.

B. Ball Valve: Brass 1/4-inch NPT for 250 psi.

2.9 STEM TYPE THERMOMETERS

A. Manufacturers:
   1. Trerice.
   2. Weiss.
   3. Substitutions: Division 01 and Section and Section 23 05 00 “General Mechanical Requirements,” substituted products.

B. Thermometer: ASTM E1, red appearing mercury, lens front tube, cast aluminum case with enamel finish.
   1. Size: 9-inch scale.
   2. Window: Clear Lexan.
   3. Stem: Brass, 3/4-inch NPT, 3-1/2-inch long.
   4. Accuracy: 2 percent.
   5. Calibration: Degrees Fahrenheit.

2.10 RELIEF VALVES

A. Pressure Relief:
   1. Bronze body, Teflon seat, steel stem and springs, automatic, direct pressure actuated at maximum 60 psi, UL listed for fuel oil, capacities ASME certified and labeled.
B. Temperature and Pressure Relief:
   1. ANSI Z21.22 certified, bronze body, Teflon seat, stainless steel stem and springs, automatic, direct pressure actuated, temperature relief maximum 210 degrees Fahrenheit, capacity ASME certified and labeled.

2.11 STRAINERS

A. Manufacturers:
   1. Watts.
   2. Zurn.
   3. Substitutions: Division 01 and Section 23 05 00 "General Mechanical Requirements," substituted products.
   4. 2-inch and Smaller: Threaded brass body for 175 psi CWP, Y pattern with 1/32-inch stainless-steel perforated screen.
B. 2-1/2-inch to 4-inch: Class 125, flanged iron body, Y pattern with 1/16-inch stainless-steel perforated screen.
C. 5-inch and Larger: Class 125, flanged iron body, basket pattern with 1/8-inch stainless-steel perforated screen.

2.12 BACKFLOW PREVENTERS

A. Manufacturers:
   1. Watts.
   2. Zurn.
   3. Substitutions: Division 01 and and Section 23 05 00 "General Mechanical Requirements," substituted products.
B. Reduced Pressure Backflow Preventers:
   1. Comply with ASSE 1013.
   2. Bronze body, with bronze internal parts and stainless-steel springs.
   3. 2 independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve opening under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with 2 gate valves, strainer, and 4 test cocks.

2.13 WATER HAMMER ARRESTORS

A. ASSE 1010; stainless steel, or copper construction, piston type sized in accordance with PDI WH-201.
B. Pre-charged suitable for operation in temperature range 34 to 250 degrees Fahrenheit and maximum 150 psi working pressure.

2.14 THERMOSTATIC MIXING VALVES

A. Valve: Chrome plated cast brass body, stainless steel or copper alloy bellows, integral temperature adjustment. Conform to ASSE 1070 to temper water to maximum 110 degrees Fahrenheit.

2.15 DIAPHRAGM-TYPE COMPRESSION TANKS

A. Manufacturers:
   1. Amtrol
   2. Elbi.
   3. Substitutions: Division 01 and and Section 23 05 00 “General Mechanical Requirements,” substituted products.
B. Construction: Welded steel, tested and stamped in accordance with ASME Section VIII; supplied with National Board Form U-1, rated for working pressure of 125 psig, with flexible diaphragm sealed into tank, and steel legs or saddles.
C. Accessories: Pressure gauge and air-charging fitting.

2.16 IN-LINE CIRCULATOR PUMPS

A. Manufacturers:
   1. Grundfos.
   2. Armstrong.
   3. Bell and Gossett.
   4. Substitutions: Division 01 and and Section 23 05 00 “General Mechanical Requirements,” substituted products.
B. Casing: Bronze or stainless-steel rated for 125 psig working pressure with stainless-steel rotor assembly.
C. Impeller: Bronze or stainless-steel.
D. Shaft: Alloy steel with integral thrust collar and 2, oil lubricated bronze sleeve bearings.
E. Seal: Carbon rotating against stationary ceramic seat.
F. Drive: Flexible coupling.
G. Electrical Characteristics and Components:
   1. Electrical Characteristics: In accordance with Division 26.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.
B. Remove scale and dirt, on inside and outside, before assembly.

3.3 INSTALLATION - THERMOMETERS AND GAUGES

A. Install 1 pressure gauge for each pump, locate taps before strainers and on suction and discharge of pump, pipe to gauge.
B. Install gauge taps in piping.
C. Install pressure gauges with pulsation dampers. Provide ball valve to isolate each gauge.
D. Install thermometers in piping systems in sockets in short couplings. Enlarge pipes smaller than 2-1/2 inches for installation of thermometer sockets. Allow clearance from insulation.
E. Provide instruments with scale ranges selected according to service with largest appropriate scale.

F. Install gauges and thermometers in locations where they are easily read from normal operating level. Install vertical to 45 degrees off vertical.
G. Adjust gauges and thermometers to final angle, clean windows, and lenses, and calibrate to zero.

3.4 INSTALLATION - BURIED PIPING SYSTEMS

A. Verify connection size, and location as indicated on Drawings.
B. Establish elevations of buried piping with not less than 2-foot of cover.
C. Establish minimum separation of water from sanitary sewer piping in accordance with local code.
D. Remove scale and dirt on inside of piping before assembly.
E. Excavate pipe trench in accordance with Section 23 05 00 “General Mechanical Requirements.”
F. Route pipe in straight line.
G. Install pipe to allow for expansion and contraction without stressing pipe or joints.
H. Install shutoff valves at locations indicated on Drawings in accordance with this Section.
I. Metallic Pipe: Install plastic ribbon tape continuous over top of pipe. buried 12 inches above pipeline; coordinate with Section 23 05 00 “General Mechanical Requirements.”
J. Non-metallic pipe: Install trace wire continuous over top of pipe. buried 12 inches above pipeline; coordinate with Section 23 05 00 “General Mechanical Requirements.”
K. Pipe Cover and Backfilling:
    1. Backfill trench in accordance with Section 23 05 00 “General Mechanical Requirements.”
    2. Maintain optimum moisture content of fill material to attain required compaction density.
    3. After hydrostatic test, evenly backfill entire trench in accordance with 23 05 00 “General Mechanical Requirements.”
    4. Evenly and continuously backfill remaining trench depth in uniform layers with backfill material.
    5. Do not use wheeled or tracked vehicles for tamping.

3.5 INSTALLATION - ABOVE GROUND PIPING

A. Install non-conducting dielectric connections wherever jointing dissimilar metals.
B. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
C. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.
D. Group piping whenever practical at common elevations.
E. Slope piping and arrange systems to drain at low points.
F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
G. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 22 05 29 “Hangers and Supports.”
H. Provide access where valves and fittings are not accessible.
I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
J. Provide support for utility meters in accordance with requirements of utility companies.

K. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Division 09.
L. Install domestic water piping in accordance with ASME B31.9.
M. Sleeve pipes passing through partitions, walls, and floors.
N. Install unions downstream of valves and at equipment or apparatus connections.
O. Install valves with stems upright or horizontal, not inverted.
P. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.
Q. Install ball or butterfly valves for shut-off and to isolate equipment, part of systems, or vertical risers.
R. Install ball or butterfly valves for throttling, bypass, or manual flow control services.
S. Provide lug end butterfly valves adjacent to equipment when functioning to isolate equipment.
T. Provide spring loaded check valves on discharge of water pumps.
U. Install potable water protection devices on plumbing lines where contamination of domestic water may occur, on boiler feed water lines, janitor rooms, fire sprinkler systems, premise isolation, irrigation systems, flush valves, interior and exterior hose bibs.
V. Pipe relief from valves, back-flow preventers and drains to nearest floor drain.
W. Test backflow preventers in accordance with ASSE.
X. Install water hammer arrestors complete with accessible isolation valve on hot and cold water supply piping as shown on Drawings.
Y. Press connections: Copper press fittings shall be made in accordance with the manufacturer's installation instructions. The tubing shall be fully inserted into the fitting and the tubing marked at the shoulder of the fitting. The fitting alignment shall be checked against the mark on the tubing to assure the tubing is fully engaged (inserted) in the fitting. The joint shall be pressed using the tool approved by the manufacturer.

3.6 INSTALLATION – PUMPS

A. Provide pumps to operate at specified system fluid temperatures without vapor binding and cavitation, are non-overloading in parallel or individual operation, and operate within 25 percent of midpoint of published maximum efficiency curve.
B. Install long radius reducing elbows or reducers between pump and piping. Support piping adjacent to pump so no weight is carried on pump casings. For close coupled or base mounted pumps, install supports under elbows on pump suction and discharge line sizes 4 inches and over.
C. Install pumps on vibration isolators.
D. Provide line sized shut-off valve on pump suction, and line sized soft seat check valve, and shut-off valve on pump discharge.

3.7 FIELD QUALITY CONTROL

A. Test domestic water piping system in accordance with applicable code.

3.8 CLEANING

A. Prior to starting Work, verify system is complete, flushed, and clean.
B. Verify pH of water to be treated is between 7.4 and 7.6 by adding alkali (caustic soda or soda ash) or acid (hydrochloric).
C. Inject disinfectant, free chlorine in liquid, powder and tablet or gas form, throughout system to obtain residual from 50 to 80 mg/L.

D. Bleed water from outlets to obtain distribution and test for disinfectant residual at minimum 15 percent of outlets.
E. Maintain disinfectant in system for 24 hours.
F. When final disinfectant residual tests less than 25 mg/L, repeat treatment.
G. Flush disinfectant from system until residual concentration is equal to incoming water or 1.0 mg/L.
H. Take samples no sooner than 24 hours after flushing from 10 percent of outlets and from water entry, and analyze in accordance with AWWA C651.

END OF SECTION

SECTION 22 13 16 - SANITARY WASTE AND VENT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Sanitary sewer piping buried within 5 feet of building.
   2. Sanitary sewer piping above grade.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
   1. ASME A112.14.1 - Backwater Valves.
   2. ASME A112.21.1 - Floor Drains.
   3. ASME B16.1 - Cast Iron Pipe Flanges and Flanged Fittings.
   4. ASME B16.3 - Malleable Iron Threaded Fittings.
   5. ASME B16.4 - Gray Iron Threaded Fittings.
   6. ASME B16.23 - Cast Copper Alloy Solder Joint Drainage Fittings (DWV).
   7. ASME B16.29 - Wrought Copper and Wrought Copper Alloy Solder Joint Drainage Fittings - DWV.
   8. ASME B31.9 - Building Services Piping.

B. ASTM International:
   1. ASTM A47/A47M - Standard Specification for Ferritic Malleable Iron Castings.
   2. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   3. ASTM A74 - Standard Specification for Cast Iron Soil Pipe and Fittings.
   4. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
   5. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
   6. ASTM A536 - Standard Specification for Ductile Iron Castings.
   7. ASTM A746 - Standard Specification for Ductile Iron Gravity Sewer Pipe.
   8. ASTM B32 - Standard Specification for Solder Metal.
   9. ASTM B42 - Standard Specification for Seamless Copper Pipe, Standard Sizes.
   10. ASTM B43 - Standard Specification for Seamless Red Brass Pipe, Standard Sizes.
   11. ASTM B75 - Standard Specification for Seamless Copper Tube.
   12. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
   13. ASTM B251 - Standard Specification for General Requirements for Wrought Seamless Copper and Copper-Alloy Tube.
   14. ASTM B302 - Standard Specification for Threadless Copper Pipe.
   15. ASTM B306 - Standard Specification for Copper Drainage Tube (DWV).
   16. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings.
   17. ASTM D1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
   18. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.

19. ASTM D2235 - Standard Specification for Solvent Cement for Acrylonitrile-Butadiene-Styrene (ABS) Plastic Pipe and Fittings.
20. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series).
21. ASTM D2464 - Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
22. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
23. ASTM D2467 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
24. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
25. ASTM D2665 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings.
26. ASTM D2729 - Standard Specification for Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
27. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
28. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.
29. ASTM F477 - Standard Specification for Elastomeric Seals (Gaskets) for Joining Plastic Pipe.
30. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
31. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.

C. Cast Iron Soil Pipe Institute:
1. CISPI 301 - Standard Specification for Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.
2. CISPI 310 - Specification for Coupling for Use in Connection with Hubless Cast Iron Soil Pipe and Fittings for Sanitary and Storm Drain, Waste, and Vent Piping Applications.

D. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
3. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
4. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
5. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
6. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
7. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

E. Plumbing and Drainage Institute:
1. PDI G101 - Standard - Testing and Rating Procedure for Grease Interceptors.

1.3 SUBMITTALS

A. Division 01 and Section 23 05 00 “General Mechanical Requirements.”
B. Product Data:
   1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
   2. Sanitary Drainage Specialties: Submit manufacturers catalog information, component sizes, rough-in requirements, service sizes, and finishes.
C. Manufacturer's Installation Instructions: Submit installation instructions for material and equipment.
D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of equipment and clean-outs.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with State and local standards.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum 3 years’ experience.
B. Installer: Company specializing in performing Work of this section with minimum 3 years’ experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the Work, and isolating parts of completed system.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not install underground piping when bedding is wet or frozen.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Section 23 05 00 “General Mechanical Requirements” for product warranties.

PART 2 - PRODUCTS

2.1 SANITARY SEWER PIPING, BURIED WITHIN 5 FEET OF BUILDING

A. Cast Iron Soil Pipe: ASTM A74, service weight, bell and spigot ends.
   1. Fittings: Cast iron, ASTM A74.
   2. Joints: Hub-and-spigot, CISPI HSN compression type with ASTM C564 neoprene gaskets or lead and oakum.

B. PVC Pipe: ASTM D2729, polyvinyl chloride (PVC) material, bell, and spigot solvent sealed ends.
   1. Fittings: PVC, ASTM D2729.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

C. PVC Pipe: ASTM D3034, Type PSM, polyvinyl chloride (PVC) material, bell, and spigot style rubber ring sealed gasket joint.
   1. Fittings: PVC, ASTM D3034.
   2. Joints: ASTM F477, elastomeric gaskets.

D. PVC Pipe: ASTM D1785, Schedule 40, polyvinyl chloride (PVC) material, bell and spigot style solvent sealed joint ends.
   1. Fittings: ASTM D2466, Schedule 40, PVC.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 Solvent cement.

E. Plastic Pipe: ASTM D2665, polyvinyl chloride (PVC) material.
   1. Fittings: PVC, ASTM D2665.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.2 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: ASTM A74, service weight.
   1. Fittings: Cast iron, ASTM A74.
   2. Joints: ASTM C564, rubber gasket joint devices or lead and oakum.

B. Cast Iron Pipe: CISPI 301, hub-less.
   1. Fittings: Cast iron, CISPI 301.
   2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

C. Copper Tube: ASTM B306, DWV Type L.
   1. Fittings: ASME B16.23, cast bronze, or ASME B16.29, wrought copper.
   2. Joints: Solder, lead free, ASTM B32, 95-5 tin-antimony, or tin and silver, with melting range 430 to 535 degrees Fahrenheit.

D. PVC Pipe: ASTM D2729, polyvinyl chloride (PVC) material.
   1. Fittings: ASTM D2729, PVC.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

E. PVC Pipe: ASTM D2665, polyvinyl chloride (PVC) material.
   1. Fittings: ASTM D2665, PVC.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

F. PVC Pipe: ASTM D1785 Schedule 40, polyvinyl chloride (PVC) material.
   1. Fittings: ASTM D2466, Schedule 40, PVC.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 Solvent cement.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.
B. Remove scale and dirt, on inside and outside, before assembly.
C. Prepare piping connections to equipment with flanges or unions.
D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.3 INSTALLATION – HANGERS AND SUPPORTS

A. Pipe Hangers and Supports.
   1. Install hangers in accordance with Section 22 05 29 “Hangers and Supports.”

3.4 INSTALLATION - BURIED PIPING SYSTEMS

A. Verify connection to existing piping system size, location, and invert are as indicated on Drawings.
B. Establish elevations of buried piping with not less than 2-foot of cover.
C. Establish minimum separation of sanitary sewer from other services piping in accordance with local code.
D. Remove scale and dirt on inside of piping before assembly.
E. Excavate pipe trench in accordance with Section 23 05 00 “General Mechanical Requirements.”
F. Install pipe to elevation as indicated on Drawings.
G. Route pipe in straight line.
H. Metallic Piping: Install plastic ribbon tape continuous over top of pipe. Refer to Section 23 05 53 “Identification for HVAC and Plumbing Piping and Equipment.”
I. Non-Metallic Piping: Install trace wire continuous over top of pipe. Refer to Section 23 05 53 “Identification for HVAC and Plumbing Piping and Equipment.”
J. Pipe Cover and Backfilling:
   1. Backfill trench in accordance with Section 23 05 00 “General Mechanical Requirements.”

3.5 INSTALLATION - ABOVE GROUND PIPING

A. Establish invert elevations, slope for drainage as required by local code. Maintain gradients.
B. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearances at cleanout for snaking drainage system.
C. Encase exterior cleanouts in concrete flush with grade.
D. Install floor cleanouts at elevation to accommodate finished floor.
E. Provide non-conducting dielectric connections wherever jointing dissimilar metals.

F. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
G. Install piping to maintain headroom. Do not spread piping, conserve space.
H. Group piping whenever practical at common elevations.
I. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
J. Provide clearance in hangers and from structure and other equipment for installation of insulation.
K. Provide access where valves and fittings are not accessible.
L. Install piping penetrating roofed areas to maintain integrity of roof assembly.
M. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply 1 coat of zinc rich primer to welding.
N. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Division 09 Finishes.
O. Install bell and spigot pipe with bell end upstream.
P. Sleeve pipes passing through partitions, walls, and floors.
Q. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping. Refer to Division 07.
R. Support cast iron drainage piping at every joint.

3.6 FIELD QUALITY CONTROL

A. Test sanitary waste and vent piping system in accordance with applicable code.

END OF SECTION

SECTION 22 15 00 - GENERAL SERVICE COMPRESSED AIR SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Compressed air piping.
   2. Unions and flanges.
   3. Valves.
   4. Pipe hangers and supports.
   5. Compressed air outlets.
   6. Air compressor.
   7. Air receiver.
   8. Air pressure reducing valve.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
   1. ASME B16.3 - Malleable Iron Threaded Fittings.
   2. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
   3. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
   4. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
   5. ASME B31.1 - Power Piping.
   6. ASME B31.9 - Building Services Piping.
   7. ASME B40.1 - Gauges - Pressure Indicating Dial Type - Elastic Element.
   8. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
   9. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.

B. ASTM International:
   1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   2. ASTM A167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   3. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
   4. ASTM A269 - Standard Specification for Seamless and Welded Austenitic Stainless-Steel Tubing for General Service.
   5. ASTM A395/A395M - Standard Specification for Ferritic Ductile Iron Pressure-Retaining Castings for Use at Elevated Temperatures.
   6. ASTM A403/A403M - Standard Specification for Wrought Austenitic Stainless-Steel Piping Fittings.
   7. ASTM A536 - Standard Specification for Ductile Iron Castings.
   8. ASTM B32 - Standard Specification for Solder Metal.
   9. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
   10. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.

11. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
12. ASTM D2464 - Standard Specification for Threaded Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 80.
13. ASTM D2466 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
14. ASTM D2513 - Standard Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.
15. ASTM D2564 - Standard Specification for Solvent Cements for Poly (Vinyl Chloride) (PVC) Plastic Piping Systems.
16. ASTM D2683 - Standard Specification for Socket-Type Polyethylene Fittings for Outside Diameter-Controlled Polyethylene Pipe and Tubing.
17. ASTM D2855 - Standard Practice for Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and Fittings.
18. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
19. ASTM F1281 - Standard Specification for Crosslinked Polyethylene/Aluminum/ Crosslinked Polyethylene (PEX-AL-PEX) Pressure Pipe.
20. ASTM F1282 - Standard Specification for Polyethylene/Aluminum/Polyethylene (PE-AL-PE) Composite Pressure Pipe.
21. ASTM F1476 - Standard Specification for Performance of Gasketed Mechanical Couplings for Use in Piping Applications.

C. American Welding Society:
1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
2. AWS D1.1 - Structural Welding Code - Steel.

D. Compressed Gas Association:
1. CGA 4.1 - Cleaning Equipment for Oxygen Service.
2. CGA G7 - Compressed Air for Human Respiration.
3. CGA P2.1 - Recommendations for Medical-Surgical Vacuum System.
4. CGA V5 - Diameter Index Safety System.

E. FM Global:
1. FM - Approval Guide, A Guide to Equipment, Materials & Services Approved by Factory Mutual Research For Property Conservation.

F. Military Standardization Documents:
1. MIL STD 105 - Regulator, Pressure, Medical Gas Administration Apparatus.

G. Manufacturers Standardization Society of the Valve and Fittings Industry:
1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
2. MSS SP 67 - Butterfly Valves.
3. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
4. MSS SP 70 - Cast Iron Gate Valves, Flanged and Threaded Ends.
5. MSS SP 71 - Cast Iron Swing Check Valves, Flanged and Threaded Ends.
6. MSS SP 72 - Ball Valves with Flanged or Butt-Welding Ends for General Service.
7. MSS SP 80 - Bronze Gate, Globe, Angle and Check Valves.
8. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
9. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

H. National Electrical Manufacturers Association:
1. NEMA 250 - Enclosures for Electrical Equipment (1,000 Volts Maximum).

I. National Fire Protection Association:
   1. NFPA 50 - Standard for Bulk Oxygen Systems at Consumer Sites.
   2. NFPA 99 - Health Care Facilities.

1.3 SUBMITTALS

A. Division 01 and Section 23 05 00 "General Mechanical Requirements."
B. Shop Drawings: Indicate piping system schematic with electrical and connection requirements general assembly of components, mounting and installation details.
C. Product Data:
   1. Piping: Submit data on pipe materials, fittings, and accessories.
   2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
   3. Hangers and Supports: Submit manufacturers catalog information including load capacity.
   4. System Components: Submit manufacturers catalog information including capacity, component sizes, rough-in requirements, and service sizes. When applicable, include electrical characteristics and connection requirements.
   5. Compressors: Submit type, capacity, and performance characteristics. Include electrical characteristics and connection requirements.
D. Product Data: Submit manufacturers catalog literature with capacity, weight, and electrical characteristics and connection requirements.
E. Manufacturer's Installation Instructions: Submit hoisting and setting requirements, starting procedures.
F. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of equipment piping, valves, outlets, and components.
B. Operation and Maintenance Data: Submit assembly views, lubrication instructions, replacement part numbers and availability.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ASME B31.1 or B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.
B. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years' experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years' experience approved by manufacturer.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept equipment on site in factory fabricated containers with shipping skids and plastic pipe end protectors in place. Inspect for damage.
B. Protect piping and equipment from weather and construction traffic. Maintain factory packaging and caps in place until installation.
C. Deliver each length of piping with manufacturer's plugged or capped ends and keep sealed until installation.
D. Deliver fittings, valves, and other components in sealed containers and keep sealed until installation.

1.8 WARRANTY

A. Furnish 5-year manufacturer warranty for pumps, compressors, refrigerated dryers and valves excluding packing.

1.9 MAINTENANCE MATERIALS

A. Furnish 2-quart containers of compressor oil.

PART 2 - PRODUCTS

2.1 COMPRESSED AIR PIPING

A. Steel Pipe: ASTM A53/A53M, Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M, forged steel welding type.
   2. Joints: Threaded for pipe 2-inch and smaller; welded for pipe 2-1/2 inches and larger.

2.2 UNIONS AND FLANGES

A. Unions for Pipe 2 inches and Smaller:
   1. Ferrous Piping: Class 150, malleable iron, threaded.
   2. Copper Piping: Class 150, bronze unions with brazed joints.
   3. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.3 BALL VALVES

A. Manufacturers:
   1. Crane Valve, North America.
   2. Hammond Valve.
   3. Milwaukee Valve Company.
   4. NIBCO, Inc.
   5. Stockham Valves & Fittings.
   6. Substitutions: Section 23 05 00 "General Mechanical Requirements."

B. 2 inches and Smaller: MSS SP 110, Class 150, bronze, 2-piece body, chrome plated bronze ball, full port, teflon seats, blow-out proof stem, solder or threaded ends with union, lever handle.

2.4 PIPE HANGERS AND SUPPORTS

A. Conform to ASME B31.9, ASTM F708, MSS SP58, MSS SP69, or MSS SP89.
B. Hangers for Pipe Sizes 1/2- to 1-1/2-inch: Carbon steel, adjustable swivel, split ring.
C. Hangers for Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.
D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
E. Wall Support for Pipe Sizes 3 inches and Smaller: Cast iron hooks.
F. Wall Support for Pipe Sizes 4 inches and Larger: Welded steel bracket and wrought steel clamp.
G. Vertical Support: Steel riser clamp.
H. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
I. Copper Pipe Support: Copper-plated, carbon steel ring.

2.5 COMPRESSED AIR OUTLETS

A. Product Description: Quick Connector: 3/8-inch or 1/2-inch brass, snap on connector with self-closing valve. Verify with Owner.

2.6 AIR COMPRESSOR

A. Air compressor shall be relocated from current facility. Relocate all Accessories associated to current compressor. Provide automatic drain valve for compressor if not currently installed.

2.7 AIR PRESSURE REDUCING VALVE

A. Pressure Reducing Station: Consisting of automatic reducing valve and bypass, and low pressure side relief valve and gauge.
B. Valve Capacity: Reduce pressure from 200 psi to 30 psi, adjustable upward from reduced pressure.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
B. Remove scale and dirt on inside and outside before assembly.
C. Prepare piping connections to equipment with flanges or unions.
D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.2 INSTALLATION - HANGERS AND SUPPORTS

A. Install in accordance with ASME B31.9, ASTM F708, and MSS SP 89.
B. Support horizontal piping as scheduled.
C. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent Work.
D. Place hangers within 12 inches of each horizontal elbow.
E. Use hangers with 1-1/2-inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
F. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
G. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
H. Prime coat exposed steel hangers and supports. Refer to Division 09. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.

3.3 INSTALLATION - ABOVE GROUND PIPING - COMPRESSED AIR SYSTEMS

A. Install drip connections with valves at low points of piping system.
B. Install take-off to outlets from top of main, with shut off valve after take-off. Slope take-off piping to outlets.
C. Install compressed air couplings, female quick connectors, and pressure gauges as indicated on Drawings.
D. Install tees instead of elbows at changes in direction of piping. Fit open end of each tee with plug.
E. Cut pipe and tubing accurately and install without springing or forcing.
F. Slope piping in direction of flow.
G. Install pipe sleeves where pipes and tubing pass through walls, floors, roofs, and partitions. Refer to Section 22 05 29 “Hangers and Supports.”
H. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping.
I. Install pipe identification in accordance with Section 23 05 53 “Identification for HVAC and Plumbing Piping and Equipment.”
J. Install strainers on inlet side of pressure reducing valves. Install pressure reducing valves with bypasses and isolation valves to allow maintenance without interruption of service.

3.4 INSTALLATION – EQUIPMENT

A. Install air compressor on concrete housekeeping pad, minimum 4 inches high and 6 inches larger than compressor base on each side. Refer to Section 23 05 00 “General Mechanical Requirements.”
B. Install air compressor unit on vibration isolators. Level and bolt in place.
C. Install air valve and drain connection on horizontal casing.
D. Install line size shut-off valve and check valve on compressor discharge.
E. Install replaceable cartridge type filter silencer for each compressor.
F. Route condensate drain piping thru exterior wall.

3.5

3.6 FIELD QUALITY CONTROL

A. Test for Compressed Air Piping Leak Test: Prior to initial operation, clean and test compressed air piping in accordance with ASME B31.1 or ASME B31.9.

3.7 SCHEDULES

PIPE HANGER SPACING		
PIPE SIZE Inches	MAXIMUM HANGER SPACING Feet	HANGER ROD DIAMETER Inches
1/2	7	3/8
3/4	7	3/8
1	7	3/8
1-1/4	7	3/8
1-1/2	9	3/8
2	10	3/8
2-1/2	11	1/2
3	12	1/2
4	14	5/8

END OF SECTION

SECTION 22 30 05 - DOMESTIC WATER HEATERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Tankless gas-fired water heaters.
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI Z21.10.1 - Gas Water Heaters Vol. I Storage Water Heaters with Input Ratings of 75,000 Btu per Hour or Less.
   2. ANSI Z21.10.3 - Gas Water Heaters - Vol. III Storage, with Input Ratings above 75,000 Btu per Hour, Circulating and Instantaneous Water Heaters.
B. American Society of Mechanical Engineers:
   1. ASME PTC 25 - Pressure Relief Devices.
   2. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.
C. National Fire Protection Association:
   1. NFPA 54 - National Fuel Gas Code.
   2.

1.3 SUBMITTALS

A. Division 01 and Section 23 05 00 “General Mechanical Requirements.”
B. Product Data: Submit dimensioned Drawings of water heaters indicating components and connections to other equipment and piping. Submit electrical characteristics and connection locations.
C. Manufacturer's Installation Instructions: Submit mounting and support requirements.
D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit replacement part numbers and availability.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with State and local standards.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3years’ experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years’ experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept water heaters on site in original labeled cartons. Inspect for damage.
B. Protect tanks with temporary inlet and outlet caps. Maintain caps in place until installation.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.9 WARRANTY

A. Gas Fired Water Heater: Furnish 15 year warranty for water heater and storage tank.

PART 2 - PRODUCTS

2.1 COMMERCIAL TANKLESS GAS FIRED WATER HEATERS

A. Manufacturers:
   1. Navien.
   2. Substitutions: Section 23 05 00 “General Mechanical Requirements.”
B. Compliance: ANSI Z21.10.3/CSA 4.3, NSF Standard 5.
C. Maximum Hot Water Capacity: Refer to schedule on Drawings.
D. Capacity Range: 0.5 to 9.8 gallons per minute.
E. Type:
   1. Installation: Indoor, wall hung.
   2. Air Supply/Exhaust: 3-inch/5-inch concentric direct vent, sealed combustion.
F. Ignition: Direct ignition.
G. Operating Water Pressure: 15 to 150 psi.
H. Gas Supply Pressure: Natural Gas: 4.0 to 10.5 inches.
I. Gas Consumption: Natural Gas: Maximum 199,900 Btu/h. Minimum 11,000 Btu/h.
J. Connection Size:
   1. Water Inlet: 3/4-inch.
   2. Hot Water Outlet: 3/4-inch.
   3. Gas Inlet: 3/4-inch.
K. Power:
   1. Supply: 120 VAC, 60 Hz.
L. Temperature Settings:
   1. Settings: 100 to 150 degrees Fahrenheit in 5-degree Fahrenheit intervals, 160, 170, 180 degrees Fahrenheit.
   2. Default Options: 120, 130, 140, 180 degrees Fahrenheit.
M. Material:
   1. Casing: Zincified steel plate with acryl coating.
   2. Flue Collar: Stainless-steel.
   3. Heat Exchanger: Copper sheeting, copper tubing.
N. Safety Devices: Flame rod, thermal fuse, lighting protection device (ZNR), overheat prevention device, and fan rotation detector.

O. Accessories:
   1. Tankless Gas Water Heater:
      a. Remote controller.
      b. Anchoring screws.
      c. Concentric vent kit.

P. Options:
   1. Tankless Gas Water Heater:
      a. Pipe cover.
      b. Quick-connect cable.
      c. System controller.
      d. Isolation valves.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Maintain manufacturer's recommended clearances around and over water heaters.
B. Connect domestic hot water and domestic cold water piping to supply and return water heater connections.
C. Install circulator and diaphragm expansion tank on water heater.
D. Install water heater trim and accessories furnished loose for field mounting.
E. Install electrical devices furnished loose for field mounting.
F. Install in accordance with manufacturer’s written instructions and referenced standards.

3.2 ADJUSTING

A. Adjust gas water heaters for proper operation in accordance with manufacturer instructions.
B. Adjust temperature setting as shown on Schedules.

END OF SECTION

SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Water closets.
   2. Urinals.
   3. Lavatories.
   4. Service sinks.
   5. Electric water coolers.
   6. Drains.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 SUBMITTALS

A. Division 01 and Section 23 05 00 “General Mechanical Requirements.”
B. Product Data: Submit catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
C. Manufacturer's Installation Instructions: Submit installation methods and procedures.
D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit fixture, trim, exploded view and replacement parts lists.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with State and local standards.
B. Provide products requiring electrical connections listed and classified by Underwriters Laboratories Inc., as suitable for purpose specified and indicated.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years’ experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years’ experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Accept fixtures on site in factory packaging. Inspect for damage.
B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

PART 2 - PRODUCTS

2.1 FIXTURES

A. Refer to the Drawings Plumbing Fixture Schedule for fixture make, model numbers, and type.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify walls and floor finishes are prepared and ready for installation of fixtures.
B. Verify electric power is available and of correct characteristics.
C. Confirm millwork is constructed with adequate provision for installation of countertop lavatories and sinks.

3.2 PREPARATION

A. Rough-in fixture piping connections in accordance with minimum sizes indicated in fixture rough-in schedule for particular fixtures.

3.3 INSTALLATION

A. Install Work in accordance with State and local standards.
B. Install each fixture with trap, easily removable for servicing and cleaning.
C. Provide chrome plated rigid or flexible supplies to fixtures with stops, reducers, and escutcheons.
D. Install components level and plumb.
E. Install and secure fixtures in place with wall supports or wall carriers and bolts.
F. Seal fixtures to wall and floor surfaces with sealant as specified in Division 07, color to match fixture.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Review millwork Shop Drawings. Confirm location and size of fixtures and openings before rough in and installation.

3.5 ADJUSTING

A. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

3.6 CLEANING

A. Clean plumbing fixtures and equipment.

3.7 PROTECTION OF INSTALLED CONSTRUCTION

A. Do not permit use of fixtures before final acceptance.

END OF SECTION

SECTION 23 05 00 - GENERAL MECHANICAL REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DESCRIPTION

A. Work covered by this Division shall consist of furnishing all labor, equipment, supplies, and materials and in performing all operations necessary for the installation of complete and operating mechanical systems as required by these Specifications and/or shown on the Drawings, subject to the terms and conditions of the contract. The Work shall also include the completion of such mechanical and electrical details not mentioned or shown which are necessary for the successful operation of all systems described on the Drawings or required by these Specifications; this includes the furnishing all materials for the filling the systems to make them operable, including water, refrigerant, oil, and grease. Prove satisfactory operation of all equipment and controls to the Architect on request.

B. Work Not Included: Certain labor, material and equipment may be furnished and/or installed under other divisions of these Specifications. This Contractor shall coordinate with other trades and arrange his Work to make the part fit together. The following items are to be accomplished under other divisions of these Specifications:
   1. Temporary Heat: Refer to paragraph in this Section.
   2. Temporary Water and Toilet: Refer to General Conditions.
   3. Roof Curbs: Refer to paragraph in this Section.
   4. Electrical Equipment and Wiring: Refer to paragraph in this Section.
   5. Concrete: Refer to paragraph in this Section.

C. Equipment Furnished by Owner: Rough-in services pipes to locations as required by Architectural and mechanical Drawings and equipment Shop Drawings. Provide service valves on all pipes except waste and vent pipes. Final Connection to equipment will be made by this Contractor.

1.3 BIDDING

A. All mechanical equipment shall be new unless specified otherwise in the Specifications or on the Drawings.

B. All bids must be based only on the equipment and materials as scheduled on the Drawings and as specified or on equivalent equipment and materials. Any Contractor who assumes equivalence of products and who bases his proposal on that assumption does so at his own risk.

C. A listing of approved alternative manufacturers does not mean that all products of a particular alternative manufacturer are acceptable alternative to the scheduled items. All fixtures and devices must still be submitted according to the prescribed procedures. In addition, some items that have an important visual affect, e.g. electric water coolers, may be required to receive Owner's or Architectural approval also.

1.4 EXISTING UTILITIES

A. The Drawings indicate the locations, type, and sizes of various utilities within the site where known. These utilities are indicated as accurately as possible. If the Contractor encounters any utilities during construction which are not shown on the Drawings, they shall ask for written instructions from the Architect. Any relocation or remodeling required will then be directed by a change order. This Contractor shall assume all responsibility for protection of all utilities, shown or not, and for repair required by this construction.
B. Contractor shall verify location, size, elevation, pressure, and any other pertinent data of the existing utilities. Additional costs incurred due to failure to verify such data and to coordinate associated Work with respective utility providers shall not be the Owner's responsibility but shall be borne by the Contractor.
C. All costs associated with providing utilities including, but not limited to, connection fees, boring under roads, etc., shall be included in the Contractor's proposal price whether such costs are incurred by Contractor or charged by the utility company.
D. Submission of a proposal by the Contractor shall be considered an acknowledgment by the contractor of his compliance with this section.

1.5 CODES, PERMITS AND FEES

A. Contractor shall comply with all local, state, and national codes and shall pay for all applicable costs, fees, permits, licenses and inspections for this division.

1.6 TEMPORARY HEAT

A. Temporary heat will be furnished by the General Contractor. Use of the permanent heating system will not be allowed without written authorization from the Architect and Owner. In case the permanent heating system is used for temporary heat, the General Contractor shall pay all the costs until acceptance by the Owner. Warranty of equipment shall not start until acceptance by the Owner.

1.7 DRAWINGS

A. Contract Drawings are diagrammatic only and are not intended to be scaled for dimensions. All dimensions shall be taken from Architectural Drawings, certified equipment Drawings and from the structure itself before fabricating and Work. All space requirements and equipment locations shall be verified, coordinated with other trades, as it is the various Contractor's responsibility to install the systems complete in the space provided without extra charges to the Owner.
B. It is intended that anything, whether labor and materials, which is usually furnished as part of any equipment specified and which is necessary for operation shall be furnished as part of the Contract without additional cost, whether or not shown or described.
C. All piping in finished areas of the building shall be concealed except where otherwise noted on the Drawings.
D. All equipment shall be installed in accordance with manufacturer's recommendations unless approval is given in writing by the Architect for deviation.

1.8 REQUIREMENTS OF REGULATORY AGENCIES

A. The mechanical Work shall be performed in strict accordance with the local and state codes, ordinances, and regulations governing the particular Work involved. Furnish, without extra charge, any additional material and labor when and where required to comply with these Rules and Regulations, though the Work is not mentioned in the Specifications or shown on the Drawings. When the Specifications or Drawings call for or describe materials or construction of a better quality or larger sizes than required by the above mentioned Rules and Regulations, the provisions of these Specifications and accompanying Drawings shall take precedence.

1.9 QUALIFICATIONS

A. All mechanics shall be capable journeymen, skilled in the Work assigned to them with licensing required by the inspecting authority. All welders must have been certified within the past 3 years to perform the Work, which they are doing.

1.10 WARRANTY

A. All materials and equipment shall be new unless otherwise specified.
B. Guarantee all workmanship, material and equipment and replace any found defective without cost to the Owner, for 1 year after final acceptance, as defined in General Conditions.
C. Each warranty for longer than 1 year as described above (that comes with equipment used on the job) shall be passed into the Owner in the Operation and Maintenance Manual, along with the dates of start and end of warranty.
D. Refer to General Conditions for additional information regarding specific warranty requirements.

1.11 PROJECT RECORD DOCUMENTS

A. Before final payment, provide the Architect with 1 clean set of Drawings and Specifications corrected up-to-date as job progress. These documents shall reflect the As-Built conditions. Refer to General Conditions for additional information.

1.12 SUBMITTALS

A. The intent of this section is to give general submittal information, refer to specific submittal information in the subsequent mechanical Sections.
B. Sale of Electronic CADD Files
   1. Refer to Architectural Specification Section 01 33 00 “Submittal Procedures” OR call the Parkhill, office issuing this Project and request the pricing for electronic files.
C. Within 30 days after award of the contract, and before orders are placed, Contractor shall submit specific information on list of equipment and principal materials specified. Contractor shall indicate and/or provide names of manufacturers, catalog, and model numbers, cut sheets, and such other supplementary information as necessary for evaluation. Submittal shall be electronic using .pdf file extension.

D. Requirements for Each Submittal:
   1. Bear a dated stamp or specific written indication that the Contractor has reviewed and approved all submittal prior to submission to Architect,
   2. Have all information deleted by Contractor that pertains to the means and methods of construction or to fabrication by Contractor that pertains to the means and methods of construction or to fabrication, assembly, installation, or erection (approval by Architect shall not extend to these areas unless specifically noted by Architect),
   3. Be clearly and SPECIFICALLY marked as to which specific piece of equipment is being submitted, bye use of a permanent marker, stamp, etc., so as to distinguish it from other pieces of equipment that may occur on the same page,
   4. Be clearly marked as to which available options are being submitted that are associated with a piece of equipment, and
   5. Be complete with respect to quantities, dimensions, specific performance, materials, and similar data to enable the Architect to review the proposed equipment.

E. Omission by Contractor of any of the above requirements or submittals will subject submittal to automatic rejection without review.

F. Any submittals received by Architect that were not requested shall be returned without review of any kind.

G. Installation Instructions - For certain products or systems as identified in subsequent Specifications sections or on the Drawings, the Contractor shall be required to provide copies of manufacturer's installation instructions with the submittal. When required as such, the installation instructions are considered part of the submittal and their omission may result in automatic rejection of the submittal. Where more than 1 identical device are scheduled, only 1 set of installation instructions needs to be submitted, e.g. if 7 5-ton split systems air conditions are scheduled, only 1 5-ton unit installation instruction needs to be submitted. Similarly, if 1 set of installation instructions is identified by the manufacturer and on the instructions to be applicable to more than 1 type or size of devices, e.g. if 1 set of air conditioner instructions is good for 3-, 4-, 5-ton units, then only 1 instruction set is required for these devices.

1.13 SUBSTITUTED PRODUCTS

A. Material or equipment specified by Manufacturer's name is being used as a basis of standard, unless otherwise noted. The Architect will be the sole judge on the equivalence of substituted equipment and materials.

B. It shall be the Contractor's responsibility to verify that submitted substitute equipment will fit in space available. The contractor's submittal for acceptance of the substitute shall include a written statement of whether or not such acceptance would require any subsequent or associated changes to the Drawings or Specifications. Any such changes shall be described in writing, briefly but complete.

C. The Contractor shall be responsible for the costs of any such modifications due to substitution of materials or equipment for that which was specified or scheduled. The cost shall be complete, that is, it shall include the cost affect of any and all other trades.

D. The Architect may request detailed Shop Drawing or Plan layouts of mechanical rooms or systems of the substituted equipment.

1.14 SAFETY

A. General: Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the Work, and Contractor shall comply with all laws governing safety, specifically the "Occupational Safety and Health Standards" and the "Safety and Health Regulations for Construction", state and federal.

B. According to OSHA, a hazardous chemical is any chemical, which is a physical hazard or a health hazard. This may include items such as paints, solvents, adhesives, sealants, cleaners, etc. If a contractor produces, uses, or stores hazardous chemicals at the workplace, then contractor shall develop, implement, and maintain a hazard communication program in compliance with the latest OSHA requirements. In Projects with multiple tenants in which the building is partially occupied during all or part of the Project, Contractor shall inform the building manager or Owner, according to OSHA guidelines, of any hazardous chemicals being produced, stored, or used in the building so that other tenants may be notified. Contractor shall employ required methods of training, information, handling, ventilation, labeling, storing, disposal, and removal of hazardous chemicals.

1.15 LABELING

A. Each device for which an independent testing authority has established a standard shall have affixed a label indicating its compliance and listing. Refer to General Conditions for list of such independent testing authorities.

1.16 SITE VISIT REPORTS

A. During the course of the job, the Architect will make site visits to observe Work in progress and will subsequently prepare a written site visit report, which will be sent to the Contractor and to whomever else the Architect desires. The Contractor shall prepare a written and typed response within 7 calendar days of his receiving the site visit report. The General Contractor shall include in his response the following information.
   1. Date of site visit by the Architect,
   2. Date of receipt of the site visit report,
   3. Name and title of the preparer of the response,
   4. An item number referenced to the site report,
   5. A brief 3 or 4 word description of the item,
   6. The Contractor or Subcontractor affected,
   7. The proposed course of action, and
   8. An expected time of completion of the action.

1.17 CUTTING AND PATCHING

A. No joists, beams, girders, columns, slabs, or other structural elements shall be cut, drilled, or altered in any way by the Contractor without first obtaining written permission and instructions from the Architect.

B. Where it is necessary to cut through any non-structural elements of walls, floors, or ceilings to permit the installation of any Work under this contract, or to repair any defects that may appear up to the expiration of the guarantee, such cutting shall be done by Contractor with as little damage as reasonably possible to the element being cut or to adjacent elements.

C. After the necessary Work has been completed, the damage shall be repaired by the respective Contractor, who shall pay all costs of such cutting, repairs, and patching. All patching or sealing of cuts, penetrations, etc., including final appearance of same, shall be done to the approval of the Architect.

PART 2 - PRODUCTS

2.1 MATERIALS

A. All materials shall be new and of specified quality, unless specifically noted otherwise. Materials shall be free from defects. Where manufacturer names are mentioned in the Specifications or on the Drawings, it has been done in order to establish a standard of quality and construction.

B. Contractor will be responsible for transportation of his material to and from the job site and will be responsible for the storage and protection of his materials and Work until the final acceptance of the job. At the end of each day of Work, each Contractor is responsible for covering or protecting his Work and/or materials that may be susceptible to damage even if such damage is the result of unforeseen causes, e.g., an overnight thunderstorm. Failure to do so will be sufficient cause for rejection of any item in question, and any such item shall be replaced by Contractor at no cost to the Owner.

C. Contractor shall verify that all pieces of equipment will fit through available openings in the building and that all equipment can be installed without modification of building structure.

2.2 EQUIPMENT SCHEDULE

A. All equipment major items are specified in the equipment schedules on the Drawings and shall be new and furnished complete with all accessories normally supplied with the catalog item listed and all other accessories necessary for a complete and satisfactory installation.

B. Equipment items so noted will require start-up by factory trained personnel. Equipment items so noted will require factory approved service personnel who shall provide all service, including all parts and all labor, as requested by the Owner, during the full period of equipment warranty.

2.3 EQUIPMENT RATINGS

A. Equipment capacities as scheduled on the Drawings are at Project site altitude. Capacities of submitted equipment must be corrected for Project site altitude unless otherwise noted.

2.4 WORKMANSHIP

A. The workmanship shall, in all respects, be of the highest grade, and all construction shall be done according to the best practices of the trade. Piping, ducting and conduit shall be concealed unless otherwise noted, and installed square to the building lines. Any Work not meeting this requirement shall be replaced or rebuilt without extra expense to the Owner.

2.5 V-BELT DRIVES

A. V-belt drives shall be of fabric and rubber construction of approved manufacture. Multiple belts shall be matched, and all belts shall be adjusted to drive the apparatus properly and to prevent slippage and undue wear in starting motor nameplate rating.

2.6 BELTGUARDS

A. The Contractor shall provide for each V-belt drive a painted steel belt guard, which shall be constructed around an angle iron frame, securely bolted to the floor or apparatus. The guard shall completely enclose drives and pulleys and be constructed to comply with all safety requirements. Hinged access doors not less than 6-inch by 6-inch shall be provided for access to motors and fan shaft for test purposes.

2.7 ELECTRICAL WIRING AND CONTROL EQUIPMENT

A. All disconnects, motor starters, relays, wiring, etc. shall comply with all requirements of Section 26 05 00 “Basic Electrical Methods” of the electrical Specifications.
B. The Mechanical Contractor must refer to the electrical control equipment and wiring shown on the Electrical Drawings. Any changes or additions required by specified or substituted equipment furnished shall be the complete responsibility of the Contractor furnishing the equipment.
C. All electrical equipment characteristics (voltage, etc.) must be **VERIFIED** by the Mechanical Contractor prior to ordering. It is imperative that voltage and phase characteristics are checked with the electrical Drawings.
D. All motors shall be built in accordance with the current applicable IEEE, ASA and NEMA standards. All general-purpose motors shall be open drip-proof machines for installation indoors and/or in protected locations. Totally enclosed fan cooled (TEFC) motors shall be used in all areas of exposure to weather or other environmental contamination. Motors shall be rated explosion-proof when located in hazardous atmospheres. Type II weather-protected motors may be used in lieu of TEFC motors on roof fan units and similar equipment. Motors mounted in direct sun shall be provided with a shield to forbid direct radiation from the sun when the sun is 45 degrees or greater above the horizon.
E. Unless indicated otherwise, motors shall be NEMA design B with a service factor of 1.15 with 40 degrees Celsius rise and total temperature rise of 65 degrees Celsius ambient and when powered from the system voltage feeding the motor. TEFC motors shall have a service factor of 1.00 with total temperature rise of 65 degrees Celsius in the above conditions. Single-phase motors shall be NEMA Type N split phase induction motors with built-in thermal protectors. Single-phase motors connected on loads requiring high starting torque shall be capacitor-start induction motors.
F. All motors shall be all copper wound, high power factor, high efficiency motors. Electric motors shall be an energy efficient type as defined in the latest edition of NEMA document no. MG1. Motor efficiency shall be made available to the Architect as required.
G. If there is not a separate “Controls Contractor” for this Project, the mechanical Contractor is responsible for providing and installing all control wiring. Wiring and conduit is to be provided and installed as directed under the Division 26 Specifications.

2.8 EQUIPMENT AND PIPING SUPPORTS

A. All supporting systems for piping, equipment, and materials supported by the building structure shall be submitted to the Architect for approval prior to purchase and installation.

B. Roof Supports:

1. Manufacturer's installation recommendations vary depending on roof types, but the Contractor is responsible for verifying the roof type and adhering strictly to the appropriate set of manufacturer's installation instructions.

2.9 ROOF PENETRATIONS

A. Piping

1. Penetration shall be accomplished with factory-made assemblies designed specifically for the purpose. The use of pitch pans or pitch pockets is not allowed. Contractor shall provide a factory-made penetration assembly as follows:
   a. For pipes, conduits, etc. up to 3 inches in diameter that can or are intended to be turned to horizontal after passing through the roof (e.g. small electrical conduit, gas piping, refrigerant lines, water pipes, etc.) the device shall consist of a curb assembly with a welded 18 gauge galvanized steel shell and base, 1-1/2 inches thick 3 pcf rigid insulation, 0.50-inch aluminum or 20 gauge galvanized cap with minimum 3-inch over hang and 1-inch rigid insulation, and 2-inch by 6-inch wood nailer. Product shall be Custom Curb Model CPC, ThyCurb Model RP-2 with TC-1, 2, or 3 curb, or approved equivalent.

B. Ductwork with Equipment

1. Each piece of roof mounted equipment such as exhaust or supply fans, relief or intake hoods, packaged rooftop air conditioners, air handlers, etc., shall be provided and installed with an insulated roof curb designed to mate with the equipment and provide a weatherproof enclosure. In the event that a preinsulated curb is not available, an uninsulated curb is acceptable if the Contractor provides and installs field insulation per the manufacturer’s instructions. Contractor shall provide the roof curb(s) to the Roofing Contractor for installation.

C. General

1. All roof flashing assemblies and roof curbs shall be closely coordinated with other Work through the Roofing Contractor to insure that the flashing, canting, insulation type and location, etc., is correct and appropriate for the particular roof construction type.
2. Each roof curb shall be selected and provided so that the top of the curb shall be level after installation. Provide tapered curb as required to match roof slope. The curb shall provide a minimum clearance of 10 inches between the top of the finished roof surface and the top of the wood nailer, continuous around the curb perimeter.
3. Each roof penetration location shown on the Drawing is approximate. Refer to the Architectural and Structural Drawing for the structural openings. Refer to CUTTING AND PATCHING Section of this Specification for more information.
4. Provide each roof curb with other options as scheduled on the Drawings.

2.10 ACCESSIBILITY

A. Access Panels
   1. Access panels shall be provided wherever necessary for possible future replacement, adjustment, or maintenance of operating devices such as machinery, valves, dampers, switches, relays, etc., or to other critical non-operating devices such as pull boxes, inspection parts, gauges, etc. Such access panels shall be provided and install by Contractor, whether or not shown on the Drawings, and shall be brought to the attention of the Architect for approval of type, color, etc. Where access is provided in rated members, the access panels shall be of a type that maintains the integrity of the member penetrated.

B. Access to Equipment
   1. All pipes, tubing, conduit, etc. including, but not limited to, draining piping of any type, electrical conduit, wiring not in conduit, and pneumatic control tubing shall be installed in such a way so as not to prevent and/or not to make necessary difficult the removal, operation, use, or maintenance of equipment, access panels or doors, pathways (especially in attics or crawlspaces), observation ports, measurement or balancing devices, junction boxes.
   2. If access for these purposes is prevented or made unreasonably difficult in the opinion of the Architect, then the Contractor shall make modifications or repairs at no cost to anyone except the Contractor. Such modifications or repairs shall be considered neither complete nor adequate until the Architect is satisfied that access for the above purpose is achieved.

2.11 PROTECTION OF PENETRATION

A. All penetrations of fire or smoke barriers shall be sealed, sleeves (if any), insulation (if any), and vibration isolation (if any) that maintain the fire or smoke resistance of the barrier in accordance with the latest edition of NFPA 101 Life Safety Code.

B. Contractor shall verify locations and type of all partitions penetrations from the Drawings. Sealing material and methods shall be per UL recommendations.

2.12 BEDDING COURSE

A. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

PART 3 - EXECUTION

3.1 STORAGE

A. Provide for proper storage of all materials and equipment and assume responsibility for losses due to any cause. All storage shall be within the contract limits of the building site or in a bonded warehouse. All equipment and materials must be covered and stored out of the elements; any item, which has become rusted, will not be permitted to be used.

B. Each Contractor shall provide temporary storage facilities suitable for equipment stored at the job site. Storage facilities shall be rainproof and lockable as required. Materials or equipment stored on site but not in a lockable rainproof storage facility shall be stored above ground or above slab. Contractor shall take necessary precautions to prevent entry of and/or damage from dirt, trash, water, or vermin. Equipment not properly stored and protected shall be, at the discretion of the Architect, replaces at no cost to the Owner. Roofs are not acceptable storage areas unless specifically allowed in writing by the Architect.

3.2 INSTALLATION AND ARRANGEMENT

A. Install all Work to permit removal (without damage to other parts) of coils, heat exchanger bundles, boiler tubes, fan shafts and wheels, filters, belt guards, sheaves and drives and all other parts which might require periodic replacement or maintenance. Arrange pipes, ducts and equipment to permit ready access to valves, traps, starters, motors, control components and to clear opens of doors and of access panels.
B. Offsets, transitions, and changes in direction in pipes and ducts shall be made as required to maintain proper head room and pitch of sloping pipes whether or not indicated on the Drawings. Furnish and install all traps, air vents, sanitary vents, etc., as required to affect these offsets, transitions, and changes in direction.
C. Duct transitions and offsets required to connect ductwork to equipment shall be made as required whether or not indicated on the Drawings.

3.3 PROTECTION OF WORK AND PROPERTY

A. Where there are existing facilities, be responsible for protection thereof, whether or not such facility is to be removed or relocated or remain as installed. Moving or removing any facility must be done so as not to cause interruption the Work or Owner's operation.
B. All pipe and duct openings shall be closed with caps or plugs during installation. All fixtures shall be covered and protected against injury. At final completion, all Work shall be cleaned and delivered in an unblemished condition or refinished and repainted at the discretion of the Architect.

3.4 CONCEALED AND EXPOSED WORK

A. "Concealed" is intended to mean within such spaces as pipe chases, pipe trenches, above plaster ceilings, in walls and buried pipe is inaccessible when building is completed. "Exposed" is intended to be within equipment rooms, unfinished spaces, above "pushup" ceilings, accessible pipe tunnels, etc., where pipe is accessible.

3.5 CONCRETE

A. Mechanical Contractor shall coordinate all requirements for concrete. All concrete shall be furnished under the Architectural Divisions of these Specifications.

3.6 FIELD MEASUREMENTS

A. The Contractor shall verify the dimensions and conditions governing Work at the Project site. He shall examine adjoining Work on which his Work is dependent, for perfect efficiency, and shall report any Work, which must be corrected.

3.7 LUBRICATION

A. The Contractor shall provide all oil and grease for the operating of all equipment until acceptance. The Contractor shall be held responsible for all damage to bearings while the equipment is being operated by him up to the date of acceptance of the equipment. The Contractor shall protect all bearings and shafts during installation and shall thoroughly grease the steel shafts to prevent corrosion.

3.8 MANUFACTURER'S DIRECTION

A. The Contractor shall install all equipment in strict accordance with all directions and recommendations furnished by the manufacturer. Where such directions are in conflict with the Plans and Specifications, the Contractor shall report such conflicts to the Architect who shall make changes deemed necessary and desirable.

3.9 FLUSHING, CLEANING, AND STERILIZING

A. Before final connections are made in the piping systems, all piping shall be blown out with air and then completely washed out with cleaning compounds. The systems shall be flushed for complete removal of all foreign materials. Furnish all temporary connections, valves, etc., required for this purpose.
B. After flushing, sterilize the domestic water systems with an approved chlorinating agent to provide a dosage on not less than 50 ppm. After minimum contact period of 8 hours, the system shall be flushed with clean water until the residual chlorine is no greater than the city water.

3.10 TESTS

A. Test all new storm drain, vent, and waste lines with either a 5 psi air test or a standing water test of 12 feet of head. Test to be held for a minimum of 2 hours, or as required by local code.
B. Test all new domestic cold, hot, and recirculating hot water service lines at 50 psig above operating pressure, without exceeding the pressure rating of the piping materials. Test to be held for a minimum of 2 hours, or as required by local code.
C. Test all new gas lines at 1-1/2 times the proposed maximum working pressure, but not less than 5 psig. Test to be held for a minimum of 2 hours, or as required by local code.
D. Repair leaks and defects with new materials and retest piping or portion thereof until satisfactory results are obtained.
E. All tests shall be witnessed and approved by the Architect and the local authority having jurisdiction before covering or insulating. The satisfactory operation of blowers, pumps and other equipment with moving parts shall be demonstrated to the Architect. Equipment without movable parts shall have pressure or other tests performed by the Contractor to demonstrate satisfactory operation.
F. Furnish all instruments, pumps, blowers, and equipment required for the testing.
G. Provide written copies of these test reports for inclusion on the Operations and Maintenance Manuals and submit 1 copy to Architect.

3.11 PAINTING

A. Surfaces of all equipment and material not provided with a factory finish coat shall be thoroughly cleaned, primed (if not factory primed) and finish coated with a high quality alkyd industrial enamel of a color chosen by the Owner.

3.12 SPECIAL OPENINGS

A. The contractor shall attempt to schedule delivery of all large equipment requiring special openings for installation prior to enclosing of area. Where this is not possible written notice of required openings which must be provided shall be listed by size and location and submitted to the General Contractor prior to enclosing of areas involved. Work required to construct openings and the associated cost of enclosing them shall be done at no additional cost to the Owner.

3.13 PLACING IN OPERATION

A. All ducts, pipes, equipment, controls, etc., shall be cleaned of plaster and other foreign debris.
B. Before final acceptance, all strainers shall be thoroughly cleaned or replaced, all bearings shall be oiled or greased, and all drains shall be cleaned out and primed. All permanent filters shall be cleaned; throwaway type filters shall be replaced with new filters.
C. The systems shall be placed in operation.
D. The contractor shall verify that all controls are set to meet operating conditions specified.
   1. Example: Boiler operating control set at 180 degrees Fahrenheit. Limit control set at 200 degrees Fahrenheit.
E. The Contractor shall verify that all pieces of equipment are operable and that all sequence of controls are being met.
F. Contractor to adjust seating through the first year as required by Architect.

3.14 BALANCING, TESTING AND ADJUSTING THE MECHANICAL SYSTEMS

A. The Contractor shall include in their proposal the cost of testing, adjusting, and balancing (TAB). The Mechanical Contractor shall coordinate with the TAB Contractor to correct deficiencies noted by the TAB Contractor during TAB testing.

3.15 OPERATION AND MAINTENANCE INSTRUCTIONS

A. Contractor shall prepare and provide electronic copies of operating and maintenance manuals. Contractor shall deliver the electronic sets to the Architect for approval. Each manual shall be in a ring binder and shall be indexed with dividers for each Section. Delivery of required documents is a condition of final acceptance.
B. Each manual shall contain, but not limited to, the following general Sections:
   1. Certificates of acceptance from the inspecting authorities,
   2. Waiver of all liens,
   3. Warranties with starting dates and end dates for each piece of equipment and/or for each system (warranties shall begin on date of substantial completion and acceptance by the Owner),
   4. Names, telephone, and fax numbers and addresses of all subcontractors, vendors, manufacturer's representatives, and warranties providers,

5. Certification letters from each Contractor that each system furnished and installed by that contractor and/or subcontractors is started-up, balanced, adjusted and checked for proper operation in accordance with the intent of the contract documents,
6. Spare parts lists for each piece of equipment,
7. Lubrication charts showing type of lubrication and application methods and frequencies,
8. Filter cleaning or replacement schedule (On Contractor's letterhead stationary),
9. Preventative maintenance schedule for checking all items such as belt drives, safety controls, oil and refrigerant charges, and seasonal changer over recommendations. Cleaning of all strainers, traps, coils, tower pans, tubes, sprays, etc. (on Contractor's letterhead stationary),
10. Normal operating instructions including a sequence of operations (on Contractor's letterhead stationary),
11. Instructions as to procedures to be followed for emergency situations, such as alarms or safety items being tripped, (on Contractor's letterhead stationary),
12. Instruction on who to call for service during guarantee period, (on Contractor's letterhead stationary),
13. Copies of As-Built Drawings on reproducible vellum as produced by a Xerox or photographic process and,
14. Copies of all approved shop Drawing submittals including nameplate date, design parameters, name, telephone and fax numbers, address of vendor, manufacturer's representative, and warrantee provider.

C. Approval will not be given for final payment until the tests, balancing and operating instruction portions have been completed.

3.16 INSTRUCTIONS TO THE OWNER

A. Contractor shall instruct the Owner's operating personnel in the operations and maintenance of all mechanical systems and equipment. There shall be a minimum of two hours of training. Contractor shall furnish any special servicing tools required for maintenance.

B. Contractor shall conduct a demonstration of the installation upon completion and final acceptance of the Work. There shall be a minimum two hour demonstration. Prior to this all Work shall have been completed, tested, balanced and placed in operation. Qualified personnel must be present at the demonstration to operate all the systems and prove the performance of the equipment. The schedule for this demonstration shall be coordinated with the Architect.

3.17 EXCAVATION FOR PIPE AND CONDUIT

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12-inch higher than top of pipe or conduit, unless otherwise indicated.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade. Level bottom of all trenches and cover all PVC pipe with processed chat.

1. For pipes and conduit less than 6-inch in nominal diameter and flat-bottomed, multiple-duct conduit units, hand excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.

2. For pipes and conduit 6-inch or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
3. Excavate trenches 4-inch deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

D. Place backfill and fill materials in layers not more than 8-inch in loose depth for material compacted by heavy compaction equipment, and not more than 4-inch in loose depth for material compacted by hand-operated tampers.

E. All piping and conduit trenches across pavement shall be backfilled with 2-sack concrete to within 12-inch of finished grade.

F. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12-inch of existing subgrade and each layer of backfill or fill material at 95 percent.
2. Under walkways, scarify and recompact top 6-inch below subgrade and compact each layer of backfill or fill material at 92 percent.
3. Under lawn or unpaved areas, scarify and recompact top 6-inch below subgrade and compact each layer of backfill or fill material at 85 percent.

G. Install detectable warning tape above conduits and pipe, 12-inch below finished grade, except 6-inch below subgrade under pavements and slabs.

H. Protection.
1. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
2. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
    a. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
3. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
    a. Restore appearance, quality, and condition of finished surfacing to match adjacent Work and eliminate evidence of restoration to the greatest extent possible.

I. Disposal of Surplus and Waste Materials.
1. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property unless otherwise directed by Owner.
2. Repair: Any damage to shrubs, grass or structures shall be repaired to previous condition by Contractor at no additional expense to Owner.

J. Bracing and Sheeting: Open cut trenches shall be sheeted and braced as required by OSHA and the requirements of the State of Texas as necessary for the safety of workmen or the protection of property.

END OF SECTION

SECTION 23 05 00.20 - BASIC MECHANICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. The following basic mechanical materials and methods to complement other Division 23 Sections.
      a. Piping materials and installation instructions common to most piping systems.
      b. Concrete equipment base construction requirements.
      c. Equipment nameplate data requirements.
      d. Labeling and identifying mechanical systems and equipment is specified in Section 23 05 53 "Identification for HVAC and Plumbing Piping and Equipment."
      e. Nonshrink grout for equipment installations.
      f. Field-fabricated metal and wood equipment supports.
      g. Installation requirements common to equipment Specification Sections.
      h. Cutting and patching.
      i. Touchup painting and finishing.
   2. Pipe and pipe fitting materials are specified in piping system Sections.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Pipe, pipe fittings, and piping include tube, tube fittings, and tubing.

B. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below the roof, spaces above ceilings, unexcavated spaces, crawl spaces, and tunnels.

C. Exposed Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.

D. Exposed Exterior Installations: Exposed to view outdoors, or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

E. Concealed Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.

F. Concealed Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants, but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

1.3 SUBMITTALS

A. General: Submit the following according to the Conditions of the Contract and Division 01 and Section 23 05 00 "General Mechanical Requirements" of the Specification.

B. Product data for following piping specialties:
   1. Mechanical sleeve seals.
   2. Dielectric Fittings.
   3. Access Doors.

1.4 QUALITY ASSURANCE

A. Qualify welding processes and operators for piping according to ASME "Boiler and Pressure Vessel Code," Section IX, "Welding and Brazing Qualifications."
   1. Comply with provisions of ASME B31 Series "Code for Pressure Piping."
   2. Certify that each welder has passed AWS qualification tests for the welding processes involved and that certification is current.
B. ASME A13.1 for lettering size, length of color field, colors, and viewing angles of identification devices.
C. Equipment Selection: Equipment of greater or larger power, dimensions, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are increased. No additional costs will be approved for these increases if larger equipment is approved. If minimum energy ratings or efficiencies of the equipment are specified, the equipment must meet the design requirements and commissioning requirements.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver pipes and tubes with factory-applied end-caps. Maintain end-caps through shipping, storage, and handling to prevent pipe-end damage and prevent entrance of dirt, debris, and moisture.
B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. When stored inside, do not exceed structural capacity of the floor.
C. Protect flanges, fittings, and piping specialties from moisture and dirt.
D. Protect stored plastic pipes from direct sunlight. Support to prevent sagging and bending.

1.6 SEQUENCING AND SCHEDULING

A. Coordinate mechanical equipment installation with other building components.
B. Arrange for chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.
C. Coordinate the installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components as they are constructed.
D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning prior to closing in the building.
E. Coordinate connection of electrical services.
F. Coordinate connection of mechanical systems with exterior underground and overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies.
G. Coordinate requirements for access panels and doors where mechanical items requiring access are concealed behind finished surfaces.
H. Coordinate installation of identifying devices after completing covering and painting where devices are applied to surfaces. Install identifying devices prior to installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 PIPE AND PIPE FITTINGS

A. Refer to individual piping system specification Sections for pipe and fitting materials and joining methods.
B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.2 JOINING MATERIALS

A. Refer to individual piping system specification Sections in Division 23 for special joining materials not listed below.
B. Pipe Flange Gasket Materials: Suitable for the chemical and thermal conditions of the piping system contents.
    1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness, except where thickness or specific material is indicated.
        a. Full-Face Type: For flat-face, Class 125 cast-iron and cast-bronze flanges.
        b. Narrow-Face Type: For raised-face, Class 250 cast-iron and steel flanges.
    2. ASME B16.20 for grooved, ring-joint, steel flanges.
    3. AWWA C110, rubber, flat face, 1/8-inch thick, except where other thickness is indicated; and full-face or ring type, except where type is indicated.
C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, except where other material is indicated.
D. Plastic Pipe Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, except where other type or material is indicated.
E. Solder Filler Metal: ASTM B 32.
    1. Alloy Sn95 or Alloy Sn94: Tin (approximately 95 percent) and silver (approximately 5 percent), having 0.10 percent lead content.
F. Brazing Filler Metals: AWS A5.8.
    1. BCuP Series: Copper-phosphorus alloys.
    2. BAg1: Silver alloy.
G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
H. Solvent Cements: Manufacturer's standard solvents complying with the following:
    1. Acrylonitrile-Butadiene-Styrene (ABS): ASTM D 2235.
    2. Chlorinated Poly (Vinyl Chloride) (CPVC): ASTM F 493.
    3. Poly (Vinyl Chloride) (PVC): ASTM D 2564.
    4. PVC to ABS Transition: Made to requirements of ASTM D 3138, color other than orange.
I. Plastic Pipe Seals: ASTM F 477, elastomeric gasket.
J. Flanged, Ductile-Iron Pipe Gasket, Bolts, and Nuts: AWWA C110, rubber gasket, carbon steel bolts and nuts.
K. Couplings: Iron body sleeve assembly, fabricated to match outside diameters of plain-end pressure pipes.
    1. Sleeve: ASTM A 126, Class B, gray iron.
    2. Followers: ASTM A 47 (ASTM A 47M), Grade 32510 or ASTM A 536 ductile iron.
    3. Gaskets: Rubber.
    4. Bolts and Nuts: AWWA C111.
    5. Finish: Enamel paint.

2.3 PIPING SPECIALTIES

A. Escutcheons: Manufactured wall, ceiling, and floor plates; deep-pattern type where required to conceal protruding fittings and sleeves.
   1. Inside Diameter: Closely fit around pipe, tube, and insulation.
   2. Outside Diameter: Completely cover opening.
   3. Cast Brass: 1-piece, with setscrew.
      a. Finish: Rough brass.
      b. Finish: Polished chrome plate.
   4. Cast Brass: Split casting, with concealed hinge and setscrew.
      a. Finish: Rough brass.
      b. Finish: Polished chrome plate.
   5. Stamped Steel: 1-piece, with setscrew and chrome-plated finish.
   6. Stamped Steel: 1-piece, with spring clips and chrome-plated finish.
   7. Stamped Steel: Split plate, with concealed hinge, setscrew, and chrome-plated finish.
   8. Stamped Steel: Split plate, with concealed hinge, spring clips, and chrome-plated finish.
   9. Stamped Steel: Split plate, with exposed-rivet hinge, setscrew, and chrome-plated finish.
   10. Stamped Steel: Split plate, with exposed-rivet hinge, spring clips, and chrome-plated finish.
   11. Cast-Iron Floor Plate: 1-piece casting.

B. Dielectric Fittings: Assembly or fitting having insulating material isolating joined dissimilar metals to prevent galvanic action and stop corrosion.
   1. Description: Combination of copper alloy and ferrous; threaded, solder, plain, and weld neck end types and matching piping system materials.
   2. Insulating Material: Suitable for system fluid, pressure, and temperature.
   3. Dielectric Unions: Factory-fabricated, union assembly for 250-psig minimum working pressure at a 180 degrees Fahrenheit temperature.
   4. Dielectric Flanges: Factory-fabricated, companion-flange assembly for 150- or 300-psig minimum pressure to suit system pressures.
   5. Dielectric-Flange Insulation Kits: Field-assembled, companion-flange assembly, full-face or ring type. Components include neoprene or phenolic gasket, phenolic or polyethylene bolt sleeves, phenolic washers, and steel backing washers.
      a. Provide separate companion flanges and steel bolts and nuts for 150- or 300-psig minimum working pressure to suit system pressures.
   6. Dielectric Couplings: Galvanized-steel coupling, having inert and noncorrosive, thermoplastic lining, with threaded ends and 300-psig minimum working pressure at 225 degrees Fahrenheit temperature.
   7. Dielectric Nipples: Electroplated steel nipple, having inert and noncorrosive thermoplastic lining, with combination of plain, threaded, or grooved end types and 300-psig working pressure at 225 degrees Fahrenheit temperature.

C. Mechanical Sleeve Seals: Modular, watertight mechanical type. Components include interlocking synthetic rubber links shaped to continuously fill annular space between pipe and sleeve. Connecting bolts and pressure plates cause rubber-sealing elements to expand when tightened.

D. Sleeves: The following materials are for wall, floor, slab, and roof penetrations:
   1. Steel Sheet Metal: 24-gauge or heavier galvanized sheet metal, round tube closed with welded longitudinal joint.
   2. Steel Pipe: ASTM A 53, Type E, Grade A, Schedule 40, galvanized, plain ends.

3. Cast-Iron: Cast or fabricated wall pipe equivalent to ductile-iron pressure pipe, having plain ends and integral water stop, except where other features are specified.
4. Wall Penetration Systems: Wall sleeve assembly, consisting of housing, gaskets, and pipe sleeve, with 1 mechanical-joint end conforming to AWWA C110 and 1 plain pipe-sleeve end.
    a. Penetrating Pipe Deflection: 5 percent without leakage.
    b. Housing: Ductile-iron casting having water stop and anchor ring, with ductile-iron gland, steel studs and nuts, and rubber gasket conforming to AWWA C111, of housing and gasket size as required to fit penetrating pipe.
    c. Pipe Sleeve: AWWA C151, ductile-iron pipe.
    d. Housing-to-Sleeve Gasket: Rubber or neoprene push-on type of manufacturer's design.
5. Cast-Iron Sleeve Fittings: Commercially made sleeve having an integral clamping flange, with clamping ring, bolts, and nuts for membrane flashing.
    a. Underdeck Clamp: Clamping ring with setscrews.

2.4 GROUT

A. Nonshrink, Nonmetallic Grout: ASTM C 1107, Grade B.
1. Characteristics: Post-hardening, volume-adjusting, dry, hydraulic-cement grout, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
2. Design Mix: 5000-psi 28-day compressive strength.
3. Packaging: Premixed and factory-packaged.

2.5 ACCESS DOORS

A. Flush mounted steel access doors with 16 gauge frame and 14 gauge Panel. Prime coat finish. Concealed spring hinges, screwdriver cam-lock. Doors in fire rated surfaces shall be U.L. listed and labeled. Doors to be Milcor or approved equivalent.

PART 3 - EXECUTION

3.1 PIPING SYSTEMS--COMMON REQUIREMENTS

A. General: Install piping as described below, except where system Sections specify otherwise. Individual piping system Specification Sections in Division 23 specify piping installation requirements unique to the piping system.
B. General Locations and Arrangements: Drawings (Plans, Schematics, and Diagrams) indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated, except where deviations to layout are approved on coordination Drawings.
C. Install piping at indicated slope.
D. Install components having pressure rating equal to or greater than system operating pressure.
E. Install piping in concealed interior and exterior locations, except in equipment rooms and service areas.
F. Install piping free of sags and bends.

G. Install exposed interior and exterior piping at right angles or parallel to building walls. Diagonal runs are prohibited, except where indicated.
H. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.
I. Install piping to allow application of insulation plus 1-inch clearance around insulation.
J. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
K. Install fittings for changes in direction and branch connections.
L. Install couplings according to manufacturer's printed instructions.
M. Install pipe escutcheons for pipe penetrations of concrete and masonry walls, wall board partitions, and suspended ceilings according to the following:
    1. Chrome-Plated Piping: Cast-brass, 1-piece, with setscrew, and polished chrome-plated finish. Use split-casting escutcheons, where required, for existing piping.
    2. Uninsulated Piping Wall Escutcheons: Cast-brass or stamped-steel, with setscrew.
    3. Uninsulated Piping Floor Plates in Utility Areas: Cast-iron floor plates.
    4. Insulated Piping: Cast-brass or stamped-steel, with concealed hinge, spring clips, and chrome-plated finish.
    5. Piping in Utility Areas: Cast-brass or stamped-steel, with setscrew or spring clips.
N. Sleeves are required for core drilled holes.
O. Install sleeves for pipes passing through concrete and masonry walls, concrete floor, and roof slabs, and where indicated.
P. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, concrete floor, and roof slabs, and where indicated.
    1. Cut sleeves to length for mounting flush with both surfaces.
        a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 4 inches above finished floor level. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring where specified.
    2. Build sleeves into new walls and slabs as work progresses.
    3. Install large enough sleeves to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
        a. Steel Pipe Sleeves: For pipes smaller than 6 inches.
        b. Steel Sheet-Metal Sleeves: For pipes 6 inches and larger that penetrate gypsum board partitions.
        c. Cast-Iron Sleeve Fittings: For floors having membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 4 inches above finished floor level. Flashing is specified in Division 07.
            1) Seal space outside of sleeve fittings with nonshrink, nonmetallic grout.
    4. Except for below-grade wall penetrations, seal annular space between sleeve and pipe or pipe insulation, using elastomeric joint sealants specified in Division 07.
Q. Above Grade, Exterior Wall, and Pipe Penetrations: Seal penetrations using sleeves and mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe and sleeve for installation of mechanical seals.
    1. Install steel pipe for sleeves smaller than 6 inches.
    2. Install cast-iron wall pipes for sleeves 6 inches and larger.
    3. Assemble and install mechanical seals according to manufacturer's printed instructions.
R. Below Grade, Exterior Wall, and Pipe Penetrations: Install cast-iron wall pipes for sleeves. Seal pipe penetrations using mechanical sleeve seals. Size sleeve for 1-inch annular clear space between pipe and sleeve for installation of mechanical seals.
    1. Below Grade, Exterior Wall, and Pipe Penetrations: Install ductile-iron wall penetration system sleeves according to manufacturer's printed installation instructions.

S. Fire Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestopping sealant material. Firestopping materials are specified in Division 07.
T. Verify final equipment locations for roughing in.
U. Refer to equipment specifications in other Sections for roughing-in requirements.
V. Piping Joint Construction: Join pipe and fittings as follows and as specifically required in individual piping system Sections.
    1. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
    2. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
    3. Soldered Joints: Construct joints according to AWS "Soldering Manual," in "The Soldering of Pipe and Tube" chapter.
    4. Brazed Joints: Construct joints according to AWS "Brazing Manual" in the "Pipe and Tube" chapter.
    5. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full inside diameter. Join pipe fittings and valves as follows:
        a. Note the internal length of threads in fittings or valve ends, and proximity of internal seat or wall, to determine how far pipe should be threaded into joint.
        b. Apply appropriate tape or thread compound to external pipe threads (except where dry seal threading is specified).
        c. Align threads at point of assembly.
        d. Tighten joint with wrench. Apply wrench to valve end into which pipe is being threaded.
        e. Damaged Threads: Do not use pipe or pipe fittings having threads that are corroded or damaged. Do not use pipe Sections that have cracked or open welds.
    6. Welded Joints: Construct joints according to AWS D10.12 "Recommended Practices and Procedures for Welding Low Carbon Steel Pipe" using qualified processes and welding operators according to the "Quality Assurance" Article.
    7. Flanged Joints: Align flange surfaces parallel. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Assemble joints by sequencing bolt tightening to make initial contact of flanges and gaskets as flat and parallel as possible. Use suitable lubricants on bolt threads. Tighten bolts gradually and uniformly using torque wrench.
    8. Plastic Pipe and Fitting Solvent-Cement Joints: Clean and dry joining surfaces by wiping with clean clothe or paper towels. Join pipe and fittings according to the following standards:
        a. Comply with ASTM F 402 for safe handling of solvent-cement and primers.
        b. Acrylonitrile-Butadiene-Styrene (ABS): ASTM D 2235 and ASTM D 2661.
        c. Chlorinated Poly (Vinyl Chloride) (CPVC): ASTM D 2846 and ASTM F 493.
        d. Poly (Vinyl Chloride) (PVC) Pressure Application: ASTM D 2672.
        e. Poly (Vinyl Chloride) (PVC) Non-Pressure Application: ASTM D 2855.
        f. PVC to ABS (Non-Pressure) Transition: Procedure and solvent cement described in ASTM D 3138.
    9. Plastic Pipe and Fitting Heat-Fusion Joints: Prepare pipe and fittings and join with heat-fusion equipment according to manufacturer's printed instructions.
        a. Plain-End Pipe and Fittings: Butt joining.
        b. Plain-End Pipe and Socket-Type Fittings: Socket joining.

W. Piping Connections: Except as otherwise indicated, make piping connections as specified below.
   1. Install unions in piping 2 inches and smaller adjacent to each valve and at final connection to each piece of equipment having a 2-inch or smaller threaded pipe connection.
   2. Install flanges in piping 2-1/2 inches and larger adjacent to flanged valves and at final connection to each piece of equipment having flanged pipe connection.
   3. Dry Piping Systems (Gas): Install dielectric unions and flanges to connect piping materials of dissimilar metals.
   4. Wet Piping Systems (Water): Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.2 EQUIPMENT INSTALLATION--COMMON REQUIREMENTS

A. Install equipment to provide the maximum possible headroom where mounting heights are not indicated.
B. Install equipment according to approved submittal data. Portions of the Work are shown only in diagrammatic form. Refer conflicts to the Architect.
C. Install equipment level and plumb, parallel, and perpendicular to other building systems and components in exposed interior spaces, except where otherwise indicated.
D. Install mechanical equipment to facilitate servicing, maintenance, and repair or replacement of equipment components. Connect equipment for ease of disconnecting, with minimum of interference with other installations. Extend grease fittings to an accessible location.
E. Install equipment giving right-of-way to piping systems installed at a required slope.

3.3 ACCESS DOORS

A. Furnish an access door for each pipe chase for each floor. This includes both toilet plumbing chases and pipe riser chases. Access doors assembly to be size 16-inch by 16-inch. Access doors are not shown on floor plans. Access door locations shall be field verified.
B. Also, furnish access doors in all non-removable ceiling and in partitions and walls where necessary access to plumbing cleanouts, shock absorbers, fire dampers, manual dampers, valves, and other mechanical devices requiring access. Size these as required for access with minimum size of 12-inch by 12-inch.
C. Any access doors furnished for installation in fire rated surfaces or assembly shall carry an approved fire rating for that use.
D. Any access doors furnished for installation in glued on acoustical surfaces or assembly shall have recessed door to allow installation of tiles.
E. Provide all access doors to the General Contractor for them to construct into the building.

3.4 PAINTING AND FINISHING

A. Refer to Division 09 for field painting requirements.
B. Damage and Touch Up: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

3.5 CONCRETE BASES

A. Construct concrete equipment bases of dimensions indicated, but not less than 4 inches larger than supported unit in both directions. Follow supported equipment manufacturer's setting templates for anchor bolt and tie locations. Use 3000-psi, 28-day compressive strength concrete and reinforcement use fibrillated, or monofilament polypropylene fibers engineered and designed for use in concrete, complying with ASTM C 1116, Type III, 1/2 to 1-1/2 inches long. Uniformly disperse in concrete mix at manufacturer’s recommended rate, but not less than 1.5 lb/cu. yd.

3.6 ERECTION OF METAL SUPPORTS AND ANCHORAGE

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
B. Field Welding: Comply with AWS D1.1 "Structural Welding Code-Steel."

3.7 ERECTION OF WOOD SUPPORTS AND ANCHORAGE

A. Cut, fit, and place wood grounds, nailers, blocking, and anchorage to support and anchor mechanical materials and equipment.
B. Select fastener sizes that will not penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood members.
C. Attach to substrates as required to support applied loads.

3.8 CUTTING AND PATCHING

A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces necessary for mechanical installations. Perform cutting by skilled mechanics of the trades involved.
B. Repair cut surfaces to match adjacent surfaces.

3.9 GROUTING

A. Install nonmetallic nonshrink grout for mechanical equipment base bearing surfaces, pump and other equipment base plates, and anchors. Mix grout according to manufacturer's printed instructions.
B. Clean surfaces that will come into contact with grout.
C. Provide forms for placement of grout, as required.
D. Avoid air entrapment when placing grout.
E. Place grout to completely fill equipment bases.
F. Place grout on concrete bases to provide a smooth bearing surface for equipment.
G. Place grout around anchors.
H. Cure placed grout according to manufacturer's printed instructions.

3.10 DEMOLITION

A. Disconnect, demolish, and remove work specified under Division 23 and as indicated.
B. Where pipe, ductwork, insulation, or equipment to remain is damaged or disturbed, remove damaged portions and install new products of equal capacity and quality.
C. Accessible Work: Remove indicated exposed pipe and ductwork in its entirety.
D. Abandoned Work: Cut and remove buried pipe abandoned in place, 2 inches beyond the face of adjacent construction. Cap and patch surface to match existing finish.
E. Removal: Remove indicated equipment from the Project site.
F. Temporary Disconnection: Remove, store, clean, reinstall, reconnect, and make operational equipment indicated for relocation.

END OF SECTION

SECTION 23 05 53 - MECHANICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Nameplates.
   2. Tags.
   3. Stencils.
   4. Pipe markers.
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
   1. ASME A13.1 - Scheme for the Identification of Piping Systems.

1.3 SUBMITTALS

A. Division 01 and Section 23 05 00 “General Mechanical Requirements.”
B. Product Data: Submit manufacturers catalog literature for each product required.
C. Manufacturer's Installation Instructions: Indicate installation instructions, special procedures, and installation.
D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

1.5 QUALITY ASSURANCE

A. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this section with minimum 3 years’ experience.
B. Installer: Company specializing in performing Work of this section with minimum 3 years’ experience.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 - PRODUCTS

2.1 NAMEPLATES

A. Manufacturers:
   1. Seton Identification Products.
   2. Substitutions: Section 23 05 00 “General Mechanical Requirements.”
B. Product Description: Laminated 3-layer plastic with engraved black letters on light contrasting background color.

2.2 TAGS

A. Metal Tags:
   1. Brass with stamped letters; tag size minimum 1-1/2 inches diameter with finished edges.
B. Tag Chart: Typewritten letter size list of applied tags and location in anodized aluminum frame.

2.3 STENCILS

A. Stencils: With clean cut symbols and letters of following size:
   1. Up to 2 inches Outside Diameter of Insulation or Pipe: 1/2-inch high letters.
   2. 2-1/2 to 6 inches Outside Diameter of Insulation or Pipe: 1-inch high letters.
   3. Over 6 inches Outside Diameter of Insulation or Pipe: 1-3/4 inches high letters.
   4. Equipment: 1-3/4 inches high letters.
B. Stencil Paint: As specified in Division 09, semi-gloss enamel, colors and lettering size conforming to ASME A13.1.

2.4 PIPE MARKERS

A. Color and Lettering: Conform to ASME A13.1.
B. Plastic Pipe Markers:
   1. Factory fabricated, flexible, semi-rigid plastic, preformed to fit around pipe or pipe covering. Larger sizes may have maximum sheet size with spring fastener.
C. Plastic Tape Pipe Markers:
   1. Flexible, vinyl film tape with pressure sensitive adhesive backing and printed markings.
D. Plastic Underground Pipe Markers:
   1. Bright colored continuously printed plastic ribbon tape, minimum 6 inches wide by 4 mil thick, manufactured for direct burial service. Markers used on nonmetallic pipe shall contain tracer wire.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.
B. Prepare surfaces in accordance with Division 09 for stencil painting.

3.2 INSTALLATION

A. Apply stencil painting in accordance with Division 09.
B. Install identifying devices after completion of coverings and painting.
C. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.
D. Install tags using corrosion resistant chain. Number tags consecutively by location.
E. Install underground plastic pipe markers 8 to 10 inches below finished grade, directly above buried pipe.
F. Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates or stencil painting. Identify in-line pumps and other small devices with tags.
G. Identify control panels and major control components outside panels with plastic nameplates.
H. Identify valves in main and branch piping with tags.
I. Identify air terminal units and radiator valves with numbered tags.
J. Tag automatic controls, instruments, and relays. Key to control schematic.
K. Identify piping, concealed or exposed, with plastic pipe markers, plastic tape pipe markers or stenciled painting. Use tags on piping 3/4-inch diameter and smaller. Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Testing, adjusting, and balancing of air systems.
   2. Measurement of final operating condition of HVAC systems.
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. Associated Air Balance Council:
   1. AABC MN-1 - National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems.
B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
   1. ASHRAE 111 - Practices for Measurement, Testing, Adjusting and Balancing of Building Heating, Ventilation, Air-Conditioning, and Refrigeration Systems.
C. Natural Environmental Balancing Bureau:
   1. NEBB - Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems.

1.3 SUBMITTALS

A. Division 01 and Section 23 05 00 “General Mechanical Requirements.”
B. Prior to commencing Work, submit proof of latest calibration date of each instrument.
C. Test Reports: Indicate data on AABC MN-1 National Standards for Total System Balance forms or NEBB Report forms.
D. Field Reports: Indicate deficiencies preventing proper testing, adjusting, and balancing of systems and equipment to achieve specified performance.
E. Prior to commencing Work, submit report forms or outlines indicating adjusting, balancing, and equipment data required. Include detailed procedures, agenda, sample report forms and copy of AABC National Project Performance Guaranty or NEBB Certificate of Conformance Certification.
F. Submit draft copies of report for review prior to final acceptance of Project.
G. Furnish reports in soft cover, letter size, 3-ring binder manuals, complete with table of contents page and indexing tabs, with cover identification at front and side. Include set of reduced drawings with air outlets and equipment identified to correspond with data sheets and indicating thermostat locations.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of balancing valves and rough setting.
B. Operation and Maintenance Data: Furnish final copy of testing, adjusting, and balancing report inclusion in operating and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with State and local standards.
B. Perform Work in accordance with AABC MN-1 National Standards for Field Measurement and Instrumentation, Total System Balance and NEBB Procedural Standards for Testing, Balancing and Adjusting of Environmental Systems.
C. Maintain 1 copy of each document on site.
D. Prior to commencing Work, calibrate each instrument to be used. Upon completing Work, recalibrate each instrument to assure reliability.

1.6 QUALIFICATIONS

A. Agency: Company specializing in testing, adjusting, and balancing of systems specified in this section with minimum 3 years' documented experience certified by AABC or NEBB.
B. Perform Work under supervision of AABC Certified Test and Balance Engineer or NEBB Certified Testing, Balancing and Adjusting Supervisor and a registered professional engineer experienced in performance of this Work and licensed in State of Texas.

1.7 SEQUENCING

A. Sequence balancing between completion of systems tested and Date of Substantial Completion.

1.8 SCHEDULING

A. Schedule and provide assistance in final adjustment.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify systems are complete and operable before commencing work. Verify the following:
   1. Systems are started and operating in safe and normal condition.
   2. Temperature control systems are installed complete and operable.
   3. Proper thermal overload protection is in place for electrical equipment.
   4. Final filters are clean and in place. If required, install temporary media in addition to final filters.
   5. Duct systems are clean of debris.
   6. Fans are rotating correctly.
   7. Fire and volume dampers are in place and open.
   8. Air coil fins are cleaned and combed.
   9. Access doors are closed and duct end caps are in place.

3.2 PREPARATION

A. Furnish instruments required for testing, adjusting, and balancing operations.
B. Make instruments available to Architect/Engineer to facilitate spot checks during testing.

3.3 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 10 percent of design.
B. Air Outlets and Inlets: Adjust total to within plus 10 percent and minus 5 percent of design to space. Adjust outlets and inlets in space to within plus or minus 10 percent of design.

3.4 ADJUSTING

A. Verify recorded data represents actual measured or observed conditions.
B. Permanently mark settings of dampers, and other adjustment devices allowing settings to be restored. Set and lock memory stops.
C. After adjustment, take measurements to verify balance has not been disrupted. If disrupted, verify correcting adjustments have been made.
D. Report defects and deficiencies noted during performance of services, preventing system balance.
E. Leave systems in proper working order, replacing belt guards, closing access doors, closing doors to electrical switch boxes, and restoring thermostats to specified settings.
F. At final inspection, recheck random selections of data recorded in report. Recheck points or areas as selected and witnessed by Owner.
G. Check and adjust systems approximately 6 months after final acceptance and submit report.

3.5 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to obtain required or design supply, return, and exhaust air quantities at site altitude.
B. Make air quantity measurements in main ducts by Pitot tube traverse of entire cross sectional area of duct.
C. Measure air quantities at air inlets and outlets.
D. Adjust distribution system to obtain uniform space temperatures free from objectionable drafts.
E. Use volume control devices to regulate air quantities only to extent adjustments do not create objectionable air motion or sound levels. Effect volume control by using volume dampers located in ducts.
F. Vary total system air quantities by adjustment of fan speeds. Provide sheave drive changes to vary fan speed. Vary branch air quantities by damper regulation.
G. Provide system schematic with required and actual air quantities recorded at each outlet or inlet.
H. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across fan. Make allowances for 50 percent loading of filters.
I. Adjust outside air automatic dampers, outside air, return air, and exhaust dampers for design conditions.
J. Measure temperature conditions across outside air, return air, and exhaust dampers to check leakage.
K. At modulating damper locations, take measurements and balance at extreme conditions.

3.6 SCHEDULES

A. Equipment Requiring Testing, Adjusting, and Balancing:
   1. Fans.

B. Report Forms
   1. Title Page:
      a. Name of Testing, Adjusting, and Balancing Agency.
      b. Address of Testing, Adjusting, and Balancing Agency.
      c. Telephone and facsimile numbers of Testing, Adjusting, and Balancing Agency.
      d. Project name.
      e. Project location.
      f. Project Architect.
      g. Project Engineer.
      h. Project Contractor.
      i. Project altitude.
      j. Report date.
   2. Summary Comments:
      a. Design versus final performance.
      b. Notable characteristics of system.
      c. Description of systems operation sequence.
      d. Summary of outdoor and exhaust flows to indicate building pressurization.
      e. Nomenclature used throughout report.
      f. Test conditions.
   3. Instrument List:
      a. Instrument.
      b. Manufacturer.
      c. Model number.
      d. Serial number.
      e. Range.
      f. Calibration date.
   4. Electric Motors:
      a. Manufacturer.
      b. Model/Frame.
      c. HP/BHP and kW.
      d. Phase, voltage, amperage; nameplate, actual, no load.
      e. RPM.
      f. Service factor.
      g. Starter size, rating, heater elements.
      h. Sheave Make/Size/Bore.
   5. V-Belt Drive:
      a. Identification/location.
      b. Required driven RPM.
      c. Driven sheave, diameter, and RPM.
      d. Belt, size, and quantity.
      e. Motor sheave diameter and RPM.
      f. Center to center distance, maximum, minimum, and actual.

6. Heating Data:
   a. Identification/number.
   b. Location.
   c. Service.
   d. Manufacturer.
   e. Air flow, design and actual.
   f. Entering air temperature, design and actual.
   g. Leaving air temperature, design and actual.
   h. Air pressure drop, design and actual.
7. Exhaust Fan Data:
   a. Location.
   b. Manufacturer.
   c. Model number.
   d. Serial number.
   e. Air flow, specified and actual.
   f. Total static pressure (total external), specified and actual.
   g. Inlet pressure.
   h. Discharge pressure.
   i. Sheave Make/Size/Bore.
   j. Number of Belts/Make/Size.
   k. Fan RPM.

END OF SECTION

SECTION 23 07 05 - HVAC AND PLUMBING INSULATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Ductwork insulation.
2. Duct liner.
3. Insulation jackets.
4. Piping system insulation.
5. Insulation accessories including vapor retarders, jackets, and accessories.

B. Related Requirements:
1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. ASTM International:
1. ASTM A 167 - Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
2. ASTM B 209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
3. ASTM C 177 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Guarded-Hot-Plate Apparatus.
4. ASTM C 195 - Standard Specification for Mineral Fiber Thermal Insulating Cement.
5. ASTM C 449/C 449M - Standard Specification for Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement.
6. ASTM C 518 - Standard Test Method for Steady-State Heat Flux Measurements and Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
7. ASTM C 533 - Standard Specification for Calcium Silicate Block and Pipe Thermal Insulation.
8. ASTM C 534 - Standard Specification for Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form.
9. ASTM C 547 - Standard Specification for Mineral Fiber Pipe Insulation.
10. ASTM C 552 - Standard Specification for Cellular Glass Thermal Insulation.
11. ASTM C 553 - Standard Specification for Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications.
12. ASTM C 591 - Standard Specification for Unfaced Preformed Rigid Cellular Polyisocyanurate Thermal Insulation.
13. ASTM C 592 - Standard Specification for Mineral Fiber Blanket Insulation and Blanket-Type Pipe Insulation (Metal-Mesh Covered) (Industrial Type).
14. ASTM C 610 - Standard Specification for Molded Expanded Perlite Block and Pipe Thermal Insulation.
15. ASTM C 612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation.
16. ASTM C 795 - Standard Specification for Thermal Insulation for Use in Contact with Austenitic Stainless Steel.
17. ASTM C 921 - Standard Practice for Determining the Properties of Jacketing Materials for Thermal Insulation.

18. ASTM C 1071 - Standard Specification for Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material).
19. ASTM C 1126 - Standard Specification for Faced or Unfaced Rigid Cellular Phenolic Thermal Insulation.
20. ASTM C 1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.
21. ASTM C 1290 - Standard Specification for Flexible Fibrous Glass Blanket Insulation Used to Externally Insulate HVAC Ducts.
22. ASTM D 1784 - Standard Specification for Rigid Poly (Vinyl Chloride) (PVC) Compounds and Chlorinated Poly (Vinyl Chloride) (CPVC) Compounds.
23. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
24. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
25. ASTM E 162 - Standard Test Method for Surface Flammability of Materials Using a Radiant Heat Energy Source.
26. ASTM G 21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.

B. Sheet Metal and Air Conditioning Contractors:
1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

1.3 SUBMITTALS

A. Refer to Division 01 and Section 23 05 00 "General Mechanical Requirements" for submittals.
B. Product Data: Submit product description, thermal characteristics and list of materials and thickness for each service, and location.
C. Manufacturer's Installation Instructions: Submit manufacturers published literature indicating proper installation procedures.
D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years’ experience.
B. Applicator: Company specializing in performing Work of this Section with minimum 3 years’ experience approved by manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.
B. Protect insulation from weather and construction traffic, dirt, water, chemical, and mechanical damage, by storing in original wrapping.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.
B. Maintain temperature during and after installation for minimum period of 24 hours.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.8 WARRANTY

A. Refer to Section 23 05 00 "General Mechanical Requirements" for product warranties.

PART 2 - PRODUCTS

2.1 MAN MADE MINERAL FIBER

A. Manufacturers:
   1. Johns Manville.
   2. Knauf.
   3. Owens Corning.
   4. Substitutions: Refer to Section 23 05 00 "General Mechanical Requirements" for substitutions.
B. Insulation: ASTM C 547 Mineral Fiber Pipe Insulation, Type I, 850 degrees Fahrenheit.
C. Vapor Retarder Jacket:
   1. ASTM C 921, White Kraft paper with glass fiber yarn, bonded to aluminized film.
   2. Moisture Vapor Transmission: ASTM E 96; 0.02 perm-inches.
D. Tie Wire: 0.048-inch stainless-steel with twisted ends on maximum 12-inch centers.
E. Vapor Retarder Lap Adhesive: Compatible with insulation.
F. Insulating Cement/Mastic: ASTM C 195; hydraulic setting on mineral wool.
G. Glass Fiber Fabric:
   1. Cloth: Untreated; 9 oz/sq yd weight.
   2. Blanket: 1.0 lb/cu ft density.
   3. Weave: 10 by 10.
H. Indoor Vapor Retarder Finish:
   1. Cloth: Untreated; 9 oz./sq. yd. weight.
   2. Vinyl emulsion type acrylic, compatible with insulation, white color.
I. Insulating Cement: ASTM C 449.

2.2 MINERAL FIBER, FLEXIBLE

A. Manufacturers:
   1. Johns Manville.
   2. Knauf.
   3. Owens Corning.
   4. Substitutions: Refer to Section 23 05 00 "General Mechanical Requirements" for substitutions.

B. Insulation: ASTM C 553 Mineral Fiber Blanket Thermal Insulation for Commercial and Industrial Applications, Type II.
   1. Density: 0.75 PCF.
C. Vapor Retarder Jacket:
   1. Kraft paper with glass fiber yarn and bonded to aluminized film.
   2. Moisture vapor transmission: ASTM E96; 0.02 perm.
   3. Secure with pressure sensitive tape.
D. Vapor Retarder Tape: Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber-based adhesive.
E. Tie Wire: Annealed steel, 16 gauge.

2.3 ELASTOMERIC CELLULAR FOAM

A. Manufacturers:
   1. Armaflex.
   2. Substitutions: Refer to Section 23 05 00 "General Mechanical Requirements" for substitutions.
B. Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular form: ASTM C 534; Type I, Tubular form
C. Elastomeric Foam Adhesive: Air dried, contact adhesive, compatible with insulation.

2.4 PIPE INSULATION AND EQUIPMENT JACKETS

A. PVC Plastic Pipe Jacket:
   1. Manufacturers:
      a. Johns Manville.
      b. Knauf.
      c. Owens Corning.
      d. Substitutions: Refer to Section 23 05 00 "General Mechanical Requirements" for substitutions.
   2. Product Description: ASTM D 1784, 1-piece molded type fitting covers and sheet material, off-white color.
   3. Thickness: 15 mil.
   4. Connections: Brush-on welding adhesive.
B. PVC Plastic Equipment Jacket:
   1. Manufacturers:
      a. Johns Manville.
      b. Knauf.
      c. Owens Corning.
      d. Substitutions: Refer to Section 23 05 00 "General Mechanical Requirements" for substitutions.
   2. Product Description: Sheet material, off-white color.
   3. Minimum Service Temperature: Minus 40 degrees Fahrenheit.
   4. Maximum Service Temperature: 150 degrees Fahrenheit.
   5. Moisture Vapor Transmission: ASTM E 96; 0.002 perm-inches.
   6. Thickness: 15 mil.
   7. Connections: Brush-on welding adhesive.
C. Covering Adhesive Mastic: Compatible with insulation.

D. Aluminum Pipe Jacket:
   1. ASTM B 209.
   2. Thickness: 0.020-inch thick
   3. Finish: Stucco embossed.
   4. Jointing: Longitudinal slip joints and 2-inch laps.
   5. Fittings: 0.016-inch thick die shaped fitting covers with factory attached protection liner.
   6. Metal Jacket Bands: 3/8-inch wide; 0.015-inch thick aluminum.

2.5 GLASS FIBER DUCT LINER, FLEXIBLE

A. Manufacturers:
   1. Johns Manville.
   2. Knauf.
   3. Owens Corning.
   4. Substitutions: Refer to Section 23 05 00 "General Mechanical Requirements" for substitutions.
B. Insulation: ASTM C 1071 Thermal and Acoustical Insulation (Glass Fiber, Duct Lining Material), Type I.
   1. Density: 1.5 PCF.
C. Adhesive: Waterproof, ASTM E 162 fire-retardant type.
D. Liner Fasteners: Galvanized steel, impact applied with press-on head.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify piping, equipment and ductwork has been tested before applying insulation materials.
B. Verify surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION

A. Exposed Piping: Locate insulation and cover seams in least visible locations. Provide PVC jacketing.
B. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
C. Man made mineral fiber insulated pipes conveying fluids below ambient temperature:
   1. Furnish factory-applied or field-applied vapor retarder jackets. Secure factory-applied jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips. Secure field-applied jackets with outward clinch expanding staples and seal staple penetrations with vapor retarder mastic.
   2. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor retarder adhesive or PVC fitting covers.
D. For hot piping conveying fluids over 140 degrees Fahrenheit, insulate flanges and unions at equipment.

E. Man made mineral fiber insulated pipes conveying fluids above ambient temperature:
   1. Furnish factory-applied or field-applied standard jackets. Secure with outward clinch expanding staples or pressure sensitive adhesive system on standard factory-applied jacket and butt strips or both.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.

F. Inserts and Shields:
   1. Application: Piping or Equipment 1-1/2 inches diameter or larger.
   2. Shields: Galvanized steel between pipe hangers or pipe hanger rolls and inserts.
   3. Insert location: Between support shield and piping and under finish jacket.
   4. Insert configuration: Minimum 6 inches long, of thickness and contour matching adjoining insulation; may be factory fabricated.
   5. Insert material: Compression resistant insulating material suitable for planned temperature range and service.

G. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of 1 hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Division 07 for penetrations of assemblies with fire resistance rating greater than 1 hour.

H. Factory Insulated Equipment: Do not insulate.

I. Exposed Equipment: Locate insulation and cover seams in least visible locations.

J. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.

K. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.

L. Insulated equipment containing fluids below ambient temperature: Insulate entire system.

M. Mineral fiber insulated equipment containing fluids below ambient temperature: Provide vapor retarder jackets, factory-applied or field-applied. Finish with glass-cloth and vapor barrier adhesive.

N. For hot equipment containing fluids over 140 degrees Fahrenheit, insulate flanges and unions with removable sections and jackets.

O. Mineral fiber insulated equipment containing fluids above ambient temperature: Provide standard jackets, with or without vapor retarder, factory-applied or field-applied. Finish with glass cloth and adhesive.

P. Finish insulation at supports, protrusions, and interruptions.

Q. Nameplates and ASME Stamps: Bevel and seal insulation around; do not insulate over.

R. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation for easy removal and replacement without damage.

S. Insulated ductwork conveying air below ambient temperature:
   1. Provide insulation with vapor retarder jackets.
   2. Finish with tape and vapor retarder jacket.
   3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.
   4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

T. Insulated ductwork conveying air above ambient temperature:
   1. Provide with or without standard vapor retarder jacket.
   2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

U. External Duct Insulation Application:
   1. Secure insulation with vapor retarder with wires and seal jacket joints with vapor retarder adhesive or tape to match jacket.
   2. Secure insulation without vapor retarder with staples, tape, or wires.
   3. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
   4. Seal vapor retarder penetrations by mechanical fasteners with vapor retarder adhesive.
   5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

V. Duct Liner Application:
   1. Adhere insulation with adhesive for 100 percent coverage.
   2. Secure insulation with mechanical liner fasteners. SMACNA Standards for spacing.
   3. Seal and smooth joints. Seal and coat transverse joints.
   4. Seal liner surface penetrations with adhesive.
   5. Duct dimensions indicated are net inside dimensions required for airflow. Increase duct size to allow for insulation thickness.

W. For hot equipment containing fluids over 140 degrees Fahrenheit, insulate flanges and unions with removable sections and jackets.

X. Exterior Applications: Provide vapor retarder jacket. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor retarder cement. Cover with aluminum jacket with seams located at 3 or 9 o'clock position on side of horizontal piping with overlap facing down to shed water.

3.3 SCHEDULES

A. Plumbing Systems:
   1. Domestic Hot Water Supply:
      a. Man-made Mineral Fiber Insulation:
         1) Pipe Size Range: 1.5-inch or less.
            (a) Thickness: 1-inch.
         2) Pipe Size Range: Greater than 1.5-inch.
            (a) Thickness: 2-inch.
         3) Runout Piping 4 feet or less:
            (a) Pipe Size Range: 1-inch or less.
            (b) Thickness: 1/2-inch.
   2. Domestic Cold Water:
      a. Man-made Mineral Fiber Insulation:
         1) Pipe Size Range: All sizes.
            (a) Thickness: 1/2-inch.

B. Cooling Systems:
   1. Interior Condensate Drains and Refrigerant Suction Piping:
      a. Elastomeric Cellular Foam:
         1) Pipe Size Range: All sizes.
            (a) Thickness: 3/4-inch.

C. Supply Ducts:
   1. Mineral Fiber, Flexible:
      a. Thickness: As required to meet R-6.
   2. Glass Fiber Duct Liner, Flexible (Refer to the Drawings for locations).
      a. Thickness: As required to meet R-6.

D. Return Ducts:
   1. Glass Fiber Duct Liner, Flexible (Refer to the Drawings for locations).
      a. Thickness: As required to meet R-6.
   2. Mineral Fiber, Flexible (return ducts without liner):
      a. Thickness: As required to meet R-6.

END OF SECTION

SECTION 23 09 23- DIRECT DIGITAL CONTROL SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Description - Provide a Building Automation System (BAS) incorporating LONWORKS® technology and LONWORKS Network Services (LNS) as the network methodology and management. The BAS shall consist of Direct Digital Control controllers, Network Devices, Graphical User Interface, sensors, relays, valves, actuators, and other equipment as may be necessary to provide for a complete and operational control system for the HVAC and other building related systems as described within these Specifications.

1. The system installed shall seamlessly connect devices other than HVAC throughout the building regardless of subsystem type, i.e. HVAC, lighting, and security devices should easily coexists on the same network channel with out the need for gateways. LONWORKS components not supplied by the primary manufacturer shall be integrated to share common software for network communications, time scheduling, alarm handling, and history logging.
2. The documentation contained in this Section and other contract documents pertaining to HVAC Controls is schematic in nature. The Contractor shall provide hardware and software necessary to implement the functions shown or as implied in the contract documents.
3. System configuration and monitoring shall be performed via a PC-type computer. Under no circumstances shall the PC be used as a control device for the network. It can be used for storage of data.
4. All system controllers shall utilize a peer-to-peer communications scheme to communicate with each other and with the PC-type monitoring computer(s).
5. DDC system shall be compatible with DDC systems at other City of Midland facilities.

B. Related Requirements:

1. Division 01 Specification Sections will apply to all Work of this Section.

1.2 SYSTEM DESCRIPTION

A. Open Systems Design. The intent of the Specification contained herein is to provide for an open interoperable Building Automaton System (BAS). The BAS provided shall maintain open interoperability in the following areas:

1. Communications - All communication between field level controllers, routers and field level user interface devices, network level devices and personal computers used as GUI or service tools shall use the LonTalk protocol as defined in ANSI standard EIA 709.1
2. Network Management - Network management tools shall be based upon LONWORKS Network Services (LNS) 3.08 version or later, as developed by Echelon Corporation.
3. Databases - All databases shall be provided in an LNS format. This shall include the controller programs being provided as an extension of the LNS database. The data base shall be stored on the Owner PC which serves as the Graphical User Interface and provide on a separate CD upon final acceptance of the Project. An updated database shall be provided on a CD at the end of the warranty period.

4. Network Level Devices - All network level devices (devices that provide for communication interface between the LON and the Ethernet) shall conform to the LONWORKS Network Services (LNS) 3.08 version or later. Such network devices and the associated engineering and operating software shall be available for purchase by the Owner from multiple sources within his respective market. A list of such sources shall be provided as part of the BAS submittals.
5. Field Level Controls - All field level controls shall be certified to the current LONMARK standards appropriate to their application so long as an appropriate LONMARK Certification standard exist. The XIF file shall be provided to the Owner for all controllers provided under this Specification. All points within a controller including hard I/O and software based points such as (constants, variables, NVI, NVO, SCPT, UCPT, SNVT, UNVT) shall be available for viewing and manipulation by any LNS based network management or Graphical User Interface tool. Any products that use explicit messaging shall not be acceptable.
6. Software Tools - All software tools needed for full functional use, including programming of controllers, network management and expansion, and graphical user interface use and development, of the BAS described within these Specifications shall be provided to the Owner or his designated agent. Any licensing required by the manufacturer now and into the future, including changes to the licensee of the software tools and the addition of hardware corresponding to the licenses, to allow for a complete and operational system for both normal day to day operation and servicing shall be provided. Any such changes to the designated license holders shall be made by the manufacturer upon written request by the Owner or his agent. Any cost associated with the license changes shall be identified within the BAS submittals.
7. Training: Manufacturer provided training on the use and operation of all products provided within these Specifications shall be available for purchase and attendance by the Owner or his designated agent. Such training shall be of the same curriculum as the training courses provided by the manufacturer to the system integrator. A manufacturer certified instructor shall give all training classes. A list of training courses and the associated cost shall be provided as part of the BAS submittals.

1.3 QUALITY ASSURANCE

A. General: The HVAC Control System shall be furnished, engineered, and installed by a licensed Controls Contractor or System Integrator (SI). All Work provided under this Section shall be provided by direct employees of the SI or under the direct supervision of the SI personnel.
B. System Integrator Qualifications:
   1. The SI must be regularly engaged in the service and installation of LONWORKS Controls based systems as specified herein, The SI shall have a minimum of 5 years experience in the sales, installation, engineering, programming servicing and commissioning of BAS.
   2. The system integrator must be an authorized factory direct representative in good standing of the manufacturer of the proposed hardware and software components.

3. The SI shall have an office within 100 miles of the building site that is staffed with a minimum of 2 technicians who have successfully completed the factory authorized training of the proposed manufacturer's hardware and software components. SI must provide proof of required training. The SI capabilities shall include engineering and design of control systems, programming, electrical installation of control systems, troubling shooting and service.
4. The system integrator shall submit a list of no less than 3 similar Projects, which have LONWORKS based building systems as specified herein installed by the system integrator these Projects must be on-line and functional such that the Owner's/user's representative can observe the system in full operation.

C. Hardware and Software Component Manufacturer Qualifications:
1. The manufacturer of the hardware and software components must be primarily engaged in the manufacturer of LONWORKS based systems as specified herein and must have been so for a minimum of 5 years.
2. The manufacturer shall be ISO 9001:2000 certified. This is to ensure that all manufacturing, design, and support policies comply to a minimum quality assurance standard. Corporate quality assurance policies should be available for examination upon request by the Owner or his agent.
3. The manufacturer of the hardware and software components as well as its subsidiaries must be a member in good standing of the Echelon Open Systems Alliance and the LONMARK Association.
4. The manufacturer of the hardware and software components shall have a technical support group accessible via a toll-free number that is staffed with qualified personnel, capable of providing instruction and technical support service for networked control systems.
5. The manufacturer of the hardware and software components must be authorized to certify LONWORKS Integrators as defined by the Echelon Corporation. They also must provide for Echelon Corporation's approved LONWORKS curriculum.
6. Acceptable manufacturers of the hardware and software components as specified herein are as follows: Distech Controls Systems.

1.4 SUBMITTALS

A. General:
1. Meet all applicable Submittal requirements of Division 01, Division 23, and the following including listed below and in the Submittal check list.
2. Provide to the Architect and Owner all information or data necessary to determine compliance with these Specifications.
3. Indicate dimensions, description of materials and finishes, general construction, specific modifications, component connections, anchorage methods, hardware, and installation procedures, including specific requirements indicated.
4. All Drawings and Diagrams shall be machine drafted using AutoCAD 2000 or later, or Microsoft Visio. At Project closeout, provide vellum plots and diskette or CD copy of control Drawings and layout Drawings to the Owner.
5. Provide system device and LAN conduit routing Drawing, using building Plans for a background. All controllers, gateways, hubs, devices, and communication cabling shall be accurately shown, except that individual sensor I/O wiring and devices need not be shown. Layout Drawings shall be the same size as the Architect's Construction Documents.

B. Hardware: Include a complete list of materials of equipment to be used, including technical data, performance curves, Project Specification sheets and installation/ maintenance instructions.

C. Control System Diagrams: Provide schematic diagrams for each controlled system. Illustrate the relationship between control system and controlled equipment. Show all control elements. Show all terminations and cable/tube numbers.
   1. Provide equipment interface details using actual equipment termination information. Blank terminals or "field verify" is not acceptable.
   2. Provide individual diagrams for each mechanical system. If 2 systems are identical, then a single diagram may represent multiple mechanical systems. Notations like "this part here only applies to units xxx", etc. are not acceptable.
   3. The control diagrams and sequence of operation shall be together on the same sheet and shall be suitable for posting.
   4. The sequence of operation shall reference a schematic diagram of the controlled system. The sequence of operation shall describe in words the control strategies utilized, worded in such a way to serve as an informative reference to the maintenance and service personnel who will be responsible for unit operation.
   5. Each component and instrument on the control diagrams shall have a unique tag number such as temperature element "TE-1". The sequence of operation verbiage shall make specific reference to the individual component tag numbers, such as "Controller (C-1) compares the space temperature sensor (TE-1) to set point and modulates hot water heating coil valve (V-1) as required". The mechanical system being controlled shall be schematically drawn and show the measurement and control points, such as "TE-1" and "V-1".

D. Graphic Displays - Include draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.

E. Point List - Provide a point list for each system controller including both inputs and outputs (I/O) point, point number, the controlled device associated with the I/O point and the location of the I/O device. Use naming convention consistent with control diagrams and sequence of operation.

F. Software manuals - Include software manuals that describe programming, testing, system overview. The manuals shall include a detailed description of each software feature including editing and writing control programs, reading, or modifying printout and logs, adding, deleting, and modifying user password, creating, and modifying graphics. Software manuals may be provided in pdf format in lieu of paper copy.

G. Other Items Requiring Submittals:
   1. Point to point and basic function commissioning forms to be used on site for the start, test and check of network components and systems.
   2. List of specific personnel who will be involved in the system installation and commissioning.
   3. Functional performance test documentation and procedures to be used in commissioning control sequences.

H. Operation and Maintenance Manuals shall be submitted indicating the correct procedures and processes to operate and maintain the system. O&M's shall be delivered either hard copy or pdf format developed specifically for the Project. Contractor shall submit 3 copies of the Operation and Maintenance Manuals.

I. Parts List shall be submitted listing: manufacturer's name, part number, nomenclature, and stock level required for maintenance and repair necessary to ensure continued operation with minimal delay.

1.5 TRAINING

A. Meet all applicable training requirements of Division 01, Division 23, and the following:
   1. Instruct the operators how to accomplish control of the system. Include basic troubleshooting and override of equipment and controls in the event of system failure.
   2. Training Allowance: Provide not less than 8 hours formal training to the Owner's designated operations personnel.
   3. Trainers: Persons conducting the training shall be knowledgeable in the workings of the system, and shall be regularly engaged in training exercises, so as to provide effective training. Acceptability of the trainers shall be at the discretion of the Owner.
   4. Training Manuals: Include the following in training manuals:
      a. Manufacturer's training brochures.
      b. Operation and maintenance manuals.
      c. Completed Field Acceptance Test Procedure.
      d. "As-Installed" Drawings.
      e. Manufacturer's Operation Manuals.
      f. Software interaction sheets to be used in instructing students how to use the control system, on a command-by-command basis.

B. Training Classes: Prior to conducting training, prepare and submit for approval the proposed training literature and topics. Submit this information at least 2 weeks prior to the first class.

C. Provide approved training manuals to the Owner at least 1 week prior to the first class.

D. Provide Audio Visual turtorials both in a pdf format and on the manufacturers website instructing on the operation of the software tools as provided under this Specification.

1.6 WARRANTY

A. The HVAC Control System shall be free from defects in workmanship and material under normal use and service. If within 18 months from the date of substantial completion, the installed equipment is found to be defective in operation, workmanship or materials, the building systems Contractor shall replace, repair or adjust the defect at no cost. Service shall be provided within 4 hours upon notice from Owner's designated Representative.

B. The warranty shall extend to material that is supplied and installed by the Contractor. Material supplied but not installed by the Contractor shall be covered per the above to the extent of the product only. Installation labor shall be the responsibility of the trade Contractor performing the installation.

C. All corrective software modifications made during warranty service periods shall be updated on all user documentation and on user and manufacturer archived software disks.

PART 2 - NETWORK ARCHITECTURES AND DEVICES

2.1 NETWORK ARCHITECHTURE AND PROTOCOL

A. The intent of this Specification is to provide a peer-to-peer network incorporating the LONWORKS Technologies using Free Topology Transceivers, with specific conformance to the LONMARK Interoperability Association's v3.3 Physical and Logical Layer guidelines in all unitary, terminal unit and other devices. The minimum baud rate shall be 78,000 baud for TP/FT-10 communication between controllers and 1,250,000 baud for TP/XF-1250 communication between network devices that are not communicating over the Ethernet.

B. Strict compliance to the LonTalk communications protocol, as defined in ANSI standard EIA 709.1, shall be required for all communication between controllers, network devices, and personal computers to assure interoperability between all devices within the building network. Where necessary or desired, LonTalk packets may be encapsulated into TCP/IP messages to take advantage of an Ethernet infrastructure.

C. To facilitate facility expansion or to support large Wide Area Networks (WANs) the Network Interface shall directly support a minimum of 4 logical networks using the same physical network (Ethernet or LON Bus).

D. All controllers and network devices shall contain Type 1 Network Transceivers for 78kbs transmission speeds or Type 2 Network Transceivers for 1.25 mbs transmissions speeds.

E. The ability to support bi-directional access to any remote field level controller shall be supported by a single point of connection from any where on the network including communication over the Ethernet.

F. All TP/FT-10 based LON networks shall maintain a Bus topology in order to maintain network integrity and improve network diagnostics and maintenance. Star network topologies shall not be accepted.

G. All Network wiring – See Part 7 - Execution

H. The system shall be able to connect to remote sites via standard telephone lines or Ethernet LAN.

2.2 NETWORK DEVICES

A. These various devices can service multiple functions on the network depending on network design, communication medium and needed task. These functions include management of traffic on the network, reconfiguring and strengthening of signals, the conversion of LonTalk protocol into TCP/IP packets for transmission over the Ethernet, global activities such as alarms, trends and scheduling, control logic, and protocol conversion. Programming and configuration tools for the network devices shall be provided as an LNS based plug-ins.

1. LON to LON Routers and Repeaters - The network router shall be designed to route messages from a segment, sub-net, or domain in full duplex communication mode. Routers shall utilize LonTalk® protocol transport, network, session layers to transparently route messages bound for a node address in another sub-net or domain. Routers shall be fully programmable and permit a systems integrator to define message traffic, destination, and other network management functions utilizing LONWORKS. The routers, shall be capable of DIN rail or panel mounting and be equipped with status LED lights for Network traffic and power. A router may not manage more than 60 nodes on any single channel so as to allow for future expansion. Equip each router with a network transceiver on each network port (inbound and outbound) as dictated by the network type.
2. Repeaters: A repeater or signal booster may only be used to increase the signal strength of the communictions. Under no circumstances may it be used in the place of a router.

3. LonTalk to Ethernet: All network devices that provide for a communication interface between LonTalk and the Ethernet shall comply with LONWORKS Network Services standards.
    a. The LONWORKS to Ethernet Network devices shall provide for the following global functions if required in the sequence of operation. All functions shall be provided with a graphical user interface.
        1) Scheduling – provide for the individual schedules as required in the sequence of operation and the associated points schedule. Scheduling functions shall include:
            (a) Daily schedules – Provide for a minimum of 6 different event changes per day with the ability to set different state values for each event.
            (b) Holiday – Provide for a minimum of 4 separate holiday schedule that can be implemented for any day.
            (c) Global scheduling function – Provide for the ability to implement a permanent and temporary global schedule that will override multiple schedules in multiple network devices. Any temporary global schedule shall be erased once the time period of the schedule elapses.
    b. Alarm Management – provide for the management and reporting of alarms as required in the sequence of operation.
    c. Data Log management – provide for the logging of all points as shown on the associated Points Schedule. Log intervals shall be as frequent as a 1 minute interval. Log Data shall be exportable to other applications via SQL or XML.

2.3 BUILDING AUTOMATION SYSTEM CONTROLLERS

A. All controllers shall be LONMARK Certified so long as a LONMARK certification exists for its intended application. If a LONMARK certification does not exist, then provide the XIF file for the controller to demonstrate that it is in compliance with LONMARK standards for communication and data sharing. Where possible provide controllers that can meet the required sequence of operation that can be configured rather that custom programmed. Under no circumstances shall custom programming be implemented using Neuron C code without the use of an overlay of the manufacturer's Graphical Programming Language or Object-Oriented Basic Code. All controllers shall be designed for easy installation and servicing including removable enclosures, removable terminals, and factory applied labels for all I/O. All internal points shall be fully supported by the Graphical User Interface (GUI), allowing the user to easily modify them and monitor them. All of the internal programming points (e.g., variables, constants, PIDs, timers, inputs and outputs) shall be exposed to the network on dedicated network variable outputs. Each controller shall be provided with an XIF file that is fixed from the manufacture (not allowing any field modifications). Such XIF file shall be a part of the manufacturer's normal product offering. XIF files that can be modified in the field by the system integrator shall not be allowed. Controller programs and schedules shall contain non-volatile flash memory. Upon a loss of power all controllers shall perform a self restart.

B. Programmable Controllers (PCs): A controller designed for more complex sequences of operations such as built-up AHUs, central plant operations, electrical monitoring, and control and management for chillers, boilers and generators. The PCs are to allow for the flexibility of custom control programming to meet the needed sequences of operation.

1. Performance – Each PC shall have a minimum of 64K of Non-volatile Flash memory for control applications and 128K non-volatile flash memory for storage with an 8-bit processor at 10 MHz. The FPC shall have a minimum ambient operating temperature range of 32 degrees Fahrenheit to 158 degrees Fahrenheit.
2. Inputs – Analog inputs shall have the following minimum level of performance: 16-bit A to D resolution; allow monitoring of platinum 100 ohms, platinum 1000 ohm, nickel 1000 ohms, thermistor 10K type II, thermistor 10K type III, voltage input 0-10VDC, current input 4-20mA, digital input, pulsed input minimum 2 Hz.
3. Outputs – Outputs shall be either software configurable to be either analog or digital or dedicated digital only - Analog outputs shall be selectable as voltage of 0-10 VDC (linear) or 4-20mA or Digital outputs shall be 0-12 VDC (off/on), floating or PWM. Outputs shall have an adjustable range of 2 seconds to 15 minutes. Output Resolution shall be a minimum 8 bits digital / analog converter. All individual outputs and power supply shall be protected by an auto reset fuse. There shall be an LED status indicator on each of the outputs.
4. PC Features
    a. The PC shall have minimum of 17 network variable inputs and 17 network variable outputs both with changeable type and changeable length. Products providing fixed type network variables shall not be acceptable. 1 of the network variable inputs on the PC shall have a built-in averaging function such that multiple network variable outputs values can be received by this 1 network variable input and perform a weighted average. This function shall be used to average terminal load (SNVT_lev_percent) or temperature (SNVT_temp_P). The averaging function shall have a customizable input validity period.
    b. Provide an onboard Lon communication jack.
    c. The PC shall be provided with a diagnostic indicator lights for power and network communication of transmit and receives.
    d. Hand/Off/Auto Switches - Provide for the manual override and adjustment of all Analog and Digital outputs through a 3-position switch giving the selection of Hand, Off and Auto (HOA). A HOA shall be provided for each separate digital and analog output from the controller and be an integral part of the controller. HOA switches external from the controller shall not be accepted. For the Analog outputs the Hand position of the switch shall provide for the adjustment of the output signal through a linear scaled potentiometer. The position of the HOA shall be monitored, and an alarm shall be delivered to the Graphical User Interface should the switch be in an Off or Hand position. An indicating LED shall be provided on the controller for each HOA indicating position of the switch. For all Analog outputs, the indicating LED shall provide a linear indication of the position of the Potentiometer through a variation in the intensity of the indicator LED and be provided as a numerical value that can be viewed at the Graphical User Interface.
    e. Enclosures – Provide for a plastic enclosure with a separate back plate with terminals such that the electronic portion of the controller can be easily remover for ease of installation and servicing.

C. Configurable Controllers (CCs)- A controller designed through its I/O configuration and configurable control logic to be used for a specific type mechanical equipment. Typical applications are VAV boxes, Fan Coil Units, Roof Top Units, Unit Ventilators, Split DX Systems, Heat Pumps, etc. All CC's shall be LONMARK certified under the appropriate application profiles, see 3.4. CC's that are not LONMARK certified, or are not certified under the appropriate profiles, shall not be acceptable.

1. Performance: Inputs Provide software selectable universal inputs. Analog inputs - shall have the following minimum level of performance: 12-bit A to D resolution; manage Type II and III 10Kohm thermistors with an accuracy of: ±0.5°C; ±0.9°F, voltage input 0-10VDC, current input 4-20mA, digital input, and a Potentiometer. For VAV Applications provide a differential pressure input sensor built in to the controller with a 16 bit A to D resolution an adjustable range of 0 " to 1" H_20 (0-248.8 Pa) static pressure with a minimum accuracy of ± 3percent. Minimum response time shall be 0.5 seconds from input to output time.
2. Output – Analog outputs shall have the following minimum level of performance: Tri-mode Voltage of 0-10 VDC (linear), digital 0-12 VDC (off/on) or PWM. All analog outputs shall be equipped with an auto-reset fuse. Output Resolution shall be a minimum 8-bit digital/analog converter. Digital outputs shall be provided with a minimum of a triac output rated at 24VAC and 1 amp. All analog outputs shall be fuse protected.
3. CC Features:
   a. The CC shall be provided with an optimum start program internal to its control logic. The optimum start shall be activated by a SNVT_tod_event signal from its associated scheduler on the network.
   b. The CC shall allow the use of its spare I/O as dumb I/O to be shared over the network to other controllers such as PC, where a sequence of operation can be applied to the I/O. Such applications shall include but not be limited to exhaust fan control, heaters, light control, etc.
   c. All physical inputs and outputs by the controller should have its own network variables outputs (NVO). NVO associated to an input should be changeable in type and length up to 4 bytes. Others should be of the type SNVT_switch. so as to allow for greater flexibility in the sharing of information over the network.
   d. Enclosures – Provide for all CC except for the VAV, a plastic enclosure with a separate back plate with terminals such that the electronic portion of the controller can be easily remover for ease of installation and servicing.
4. Powered Fan Coil Unit Specific functions: In addition to the features for the CC the Powered Fan Coil Unit controller shall provide the following functions.
   a. Provide for 4 line voltage relays rated for 85 – 265 at 33 VA for the control of the fan and other auxiliary devices. These relays shall be an integral part of the controller.
   b. Provide for a built in 24 VAC 300 mA power supply.
   c. Provide for a LCD based sensor that operates as an user interface for temperature adjustment, override and display of values.
   d. Accept platinum 1k ohm and thermistor 10k ohms type II sensors as well as nickel 1k ohm thermistor sensors.

D. Schedule of LONMARK application profiles, for a complete outline of the respective profiles please consult www.LONMARK.org.

Terminal Unit Type	LONMARK Application Profile
Roof Top Unit	# 8030
Unit Ventilator	# 8080
Heat Pump Unit	# 8051

E. Special Purpose Configurable Controllers (SPCC): A controller designed with unique functions and featues particular to a specific type of mechanical equipment or applications that may be less common and or standarizied in its use and application.

1. SPCC – Thermostat (SPCCT) – A self contained controller with a built-in user interface that is intended for installation in the occupied space of the building. The SPCCT shall have the following features:
   a. The SPCCT shall be a microprocessor-based controller with all of its control logic, sensors, inputs and outputs, network communication and user interface provided within a manufacture provided enclosure specific to the application. The enclosure shall be aesthetically appealing with a modern design that will fit in with the architecture of the building. A sample of the SPCCT shall be provided as part of the submittal process.
   b. The SPCCT shall be programmed through the user interface contained within the controller and through the LNS plug-in.
   c. The User interface display shall be provided with 3 levels of password protection: Level 1 – Lockout with view only and time adjustment; Level 2 - schedule override and mode settings; Level 3 – full access to all parameters. Where required in the sequence of operation provide for within Level 2 access the ability to change the units of measure displayed for temperature from Fahrenheit to Celsius. The display shall be back lighted for easy viewing.
   d. If required within the sequence of operation, provide for a control schedule and time clock within the SPCCT. The control schedule shall provide for a separate schedule for each day of the week with 4 events per day. The real time clock will have a 6 hour power reserve time.
   e. The SPCCT shall utilize a PI (proportional and integral) control algorithm. Upon power failure, all programmed schedules and parameters must be retained in nonvolatile flash memory. Progressive temperature recovery shall be a standard feature. 2 configurable digital/binary inputs will be available as well as 2 remote temperature sensor inputs for outdoor air and remote room/return air monitoring. Built-in frost protection, which can be disabled, will energize the heating as soon as the ambient temperature falls below 45 degrees Fahrenheit. An auxiliary digital/binary output, which can be configured for normally open or normally closed operation, will also be available.

2.4 BAS SOFTWARE TOOLS

A. Provide 2 copies of all tools necessary for the development, maintenance, expansion and use of the BAS described within these Specifications. All software tools shall be compatible with Microsoft Windows XP Professional. For the purpose of this Specification software tools shall be divided into the following categories and meet these specified requirements:

1. Network Management Tool (NMT): A software tool set that provides for the development and management of Building Automations Systems networks based upon LONWORKS technology. The NMT shall be LONWORKS Network Services (LNS) based version 3.21 or later. It shall provide the following minimum functionality:
   a. Creation of LNS databases through device / node installation. This database shall reside on the BAS GUI Personal Computer or other PC based server as specified. This application shall support multiple clients on the LAN including User Interface devices.
   b. Provide for device / node configuration and or programming using LNS plug-ins.
   c. Support copy-paste function for network, subsystem and device.
   d. Provide for device / node diagnostics.
   e. Provide for device / node maintenance activities.
   f. Provide for the management of LNS plug-ins.
   g. Provide for network variable binding.
   h. Provide for network variable browser.
   i. Provide for the monitoring of network variable and configuration properties in real-time.
   j. Provide for support of a client-sever operating system with a single LNS Server and multiple interoperating client applications.
   k. Provide for support of a full client-sever operating system with multiple LNS Servers and multiple interoperating client applications.
   l. Provide for Provide System diagnostics.
   m. Provide for management of the LNS database.
2. Field Level Controller Programming: Software tools used for the configuration and custom programming of the Configurable Controllers (CCs), Programmable Controllers (PCs) and or the Special Purpose Configurable Controller (SPCCs). These tools shall be provided as a LNS plug-in. The programming tools shall perform the following functions:
   a. PC programming shall be accomplished by either - Text based codes similar to the BASIC programming language combined with objects to define normal controller functions such as PID loops, optimum start stops, I/O configurations, timers, schedules, trends, and network variables or Graphical programming language (GPL) where objects are used to define different portions of the control sequence. All control sequences programmed into the PC shall be stored in non-volatile memory. Systems that only allow selection of sequences from a library or table are not acceptable. All code must be exportable to a library for future use.
   b. CC and SPCC – Provide for the programming of the required sequence of operation through an intuitive menu driven selection process. No text code or graphical programming will be allowed. The configuration tools menu shall define items such as I/O configurations, set point, delays, PID loops, optimum start stops, and network variables settings. The configuration tool must indicate the device status and allows system override.

c. Field Level Controller Programming tools shall provide for the viewing and manipulation in real time all hard I/O and soft points including constants, variables, NVI, NVO, SCPT, UCPT, SNVT, UNVT through a table menu or browser. Any point may be hidden from view for easier operation. Provide the ability to save view configurations settings along with a short cut to the browser that does not require the operating the NMT.

d. LNS plug-ins shall be provided free of charge and be compatible with the current published versions of the network management tool that is provided as part of this Project. The wizard software shall be available for public access from the manufacturer's web site. The SI shall demonstrate as part of their prequalification as to how they intend to comply with these requirements. Should LNS Plug-ins as specified herein not be available then the SI shall provide the following:

1) Provide 2 copies of the programming or configuration tools (excluding the UIP and GUI tools) along with any manufacture specific software tools required to operate the programming or configuration tools. Such tools shall be provided with a permanent and operating system transferable license.

2) Provided free of charge to the owner or his designated agent for a period of 10 years the latest manufactures updates to the software described in Section 4.1B.

3) Provide a statement, as part of the prequalification, signed by an officer of the Manufacture validating the performance of the requirements in Section 4.1B.

B. Network Level Device Programming: Programming software used to configure or program the Network Level Devices. This tool shall be provided as an LNS plug-in.

C. User Interface Design (UID) design tools used to create a graphical or text based user interface. A library of preprogrammed components shall be provided to simplify creation of animated graphics and placement of dynamic point values on the graphical screens. The graphic screen creation shall be accomplished by a drag and drop programming as opposed to line code programming. The line code programming shall be available for advanced screen design and editing. All linking of the data points from the LNS data base to the graphics shall be completed from within the graphical tool set. The tools shall allow for the creation of graphics in animation and 2 and 3 dimensional formats. The software shall place no restriction on number: of points used or tags in the system; of users; or on connectivity to other database aware applications. The software shall be capable of being backed up and restored by commercially available backup mechanisms. Note that this software can be provided as a separate tool set from the GUI.

D. Graphical User Interface (GUI) Operating System: Tools used to provide for user access to the day to day operation of the BAS. These tools shall include for the display, management, and adjustment of all points within the system using a direct LNS driver to LNS 3.21 or latter LONWORKS networks. The following functions shall be included within this toolset:

1. Administrative functions: Provide all necessary administrative functions to insure a complete secure and reliable GUI. Provide a minimum these administrative functions:
   a. Security. Each operator shall be required to log on to the system with a user name and password in order to view, edit, add, or delete data. System security shall be selectable for each operator. The system supervisor shall have the ability to set passwords and security levels for all other operators. Each operator password shall be able to restrict the operators access for viewing and/or changing each system application, full screen editor, and object. Provide 5 levels of password protection ranging from view only to full administrative functions.
   b. On-Line Help. Provide a context sensitive, on-line help system to assist the operator in operation and editing of the system. On-line help shall be available for all applications and shall provide the relevant data for that particular screen.
   c. Manual Database Save and Restore.
   d. System Diagnostics. The system shall automatically monitor the operation of network connections, building management panels, and controllers. The failure of any device shall be annunciated to the operator.
2. Graphics Display: The system graphics shall be able to be modified while online. An operator with the proper password level shall be able to add, delete, or change graphics.
   a. All analog I/O values shall be available to be displayed in imperial and or metric units, with plain English descriptors based upon the owner's preference.
   b. Standard Graphics: All graphics shall be created from a library of standard HVAC equipment such as chillers, boilers, air handlers, terminals, fan coils, fans, pumps, coils, valves, piping, dampers, ductwork, etc. contained within the UIP where possible. If custom graphical objects are required, the objects must be stored within the library of the UIP.
   c. Where floor Plan graphics are required, AutoCAD files shall be provided by Owner for use in developing floor Plan graphics.
   d. As a minimum, the operating software shall permit the operator to perform the following tasks with a minimum knowledge of the HVAC Control System provided and basic computing skills.
   e. View data (temperature, flowrate, etc.) on HVAC equipment, and/or lighting, card access, and intrusion detection equipment.
   f. Navigate multiple sites.
   g. Locate potentially faulty equipment through audible or visible alarms.
      1) Override values and states of all equipment as allowed by their respective password level.
   h. Provide the following Dynamic Graphics.
      1) Show all motor-driven equipment, liquid level control, and temperature deviations from set point in floor Plan graphics.
      2) Show animation by shifting image files based on the status of the point (e.g., moving fan, filling tank, room getting warmer, etc.).
      3) All mechanical system controlled or monitored by the BAS.
      4) Use pictorial representation of components. Provide the current status of all I/O points being controlled and applicable to the mechanical system.

5) Provide overall floor Plan of each floor, showing individual air handler zones and space temperature zones. Show heating and cooling zones in a range of colors, which shows deviations from set points. The colors shall be updated dynamically as zones' comfort conditions change. Show space sensor locations for each zone, with set points.
6) Lighting floor Plan. Show each floor lighting control zone and override push buttons.
7) Point values, adjustment, and override. Provide dynamic point values that are refreshing at a rate of no less than a 20 second interval. All points in override shall be displayed as a separate color from the normal state.

i. Programming tool access. Provide for access to any programming tools required for the configuration and programming of the BAS through a direct link contained within the graphics associated with the controller to be programmed. This function shall not require the inclusion of a LNS network management tool.

j. Trend log management. Display all required trended points in a color graphical format on a XY axis. Provide for the display of up to 10 points on a single graph each with a separate color and a legend to describe the point displayed and the associated color. Date time range shall be selectable from 1 minute to 1 year or more. Provide for a zoom function and a time, date, value stamp that corresponds to the mouse courser position on the graph. All data shall be exportable in a SQL format to an access database.

k. Scheduling – Provide for a graphical display of a monthly calendar that allow for implementation of 6 individual change of states per day plus 4 separate special day schedules. Implementation of special day shall be implemented with a drag and drop function on to the calendar. All resulting time schedules shall be viewable by placing the cursor over the selected day. The scheduling functions shall be provided as a LNS plug-in and be opened from any graphic page without the need for a LNS based network management tool.

l. Alarm Management – All alarms from any LONWORKS device residing on the network shall be reported and logged in an alarm management tool resident in the GUI. The alarms shall be displayed in a table with user defined groups that can be arranged by column, reported date, priority, trouble, disabled, acknowledged and unacknowledged status. Each alarm shall have a user defined name associated with it along with a descriptive action to take. All alarmed points shall have the ability to be delivered to designated reporting devices such as a printer, alpha numeric pager, cell phone, email or to an audio visual device. Each alarm shall have the ability to have its reporting location designated based upon a 24 hour 365 day schedule whereas a different designated reporting destination can be specified based upon the time of day and the day of week. The alarms that are not acknowledged within a user defined period of time shall be provided with 2 additional level escalated levels of reporting. Provide the ability to export all alarm histories in a csv, access or excel format.

2.5 USER INTERFACES

A. GUI Personal Computer – The PC provided as the primary means of access into the BAS. It shall contain all the required software tools as discribed in Section 4 - BAS Software Tools.
   1. PC Hardware – Provide a (insert latest PC discription and printer).
   2. PC Operating System – The PC shall be provided with Microsoft Windows XP professional Operating Systems software and the latest version of Symantec Antivirus Software including a 1 year upgrade subscription service to the Symantec software.

B. LCD Display – A wall-mounted easy-to-operate User Interface that provides direct read / write access to any point on the network. The LCD Display shall provide the following:
   1. Configuration shall be through an easy to use LNS plug-in that can directly access any point within the LNS data base. The configuration shall be through a menu driven format that allows for quick and easy setup. At total of 250 points shall be available for display and or control in groups of 50. Each group shall have a 13 alpha numeric character descriptor and each point shall have up to a 16 character alpha numeric descriptor.
   2. The Display shall consist of an alphanumeric LCD display of 16 lines by 16 characters, and a multi-function keyboard. The display shall have a graphical logo displayed on its default screen. This logo shall be a standard monochrome bitmap of 89 by 128 pixels that the user can download into the device to replace the existing 1 with.
   3. Schedule function – The LCD Display unit shall contain 16 scheduler objects with network variable outputs of changeable types. The scheduler functions shall be the same as provided in the FPC and accessed through an LNS Plug-in. The network variable types should be standard and should support at least the following 3 types: SNVT_occupancy, SNVT_tod_event, SNVT_hvac_mode.
   4. The LCD display unit shall have a real time clock that supports daylight saving time. The schedule and real time clock information must be accessible and modifiable directly through the keypad and the LCD interface. The schedule shall be displayed in a monthly calendar format.
   5. The LCD Display shall be provided as a surface mount or flush mount as shown on the mechanical Drawings.

2.6 PHERIPHERAL DEVICES

A. Temperature Sensors and Transmitters - General Sensor & Transmitter Requirements:
   1. Provide sensors and transmitters required as outlined in the input/output summary and sequence of operation, and as required to achieve the specified accuracy as specified herein.
   2. Temperature transmitters shall be equipped with individual zero and span adjustments. The zero and span adjustments shall be non-interactive to permit calibration without iterative operations. Provide a loop test signal to aid in sensor calibration.
   3. Temperature transmitters shall be sized and constructed to be compatible with the medium to be monitored. Transmitters shall be equipped with a linearization circuit to compensate for non-linearities of the sensor and bridge and provide a true linear output signal.
   4. Temperature sensors shall be of the resistance type and shall be either platinum 1k ohm or 10k ohms type II as specficied elsewhere.

5. Thermistors are acceptable provided the mathematical relationship of a thermistor with respect to resistance and temperature with the thermistor fitting constraints is contained with the CU operating software and the listed accuracy's can be obtained. Submit proof of the software mathematical equation and thermistor manufacturer fitting constants used in the thermistor mathematical/expressions. Thermistors shall be of the Thermistor (NTC) Type with a minimum of 100 ohm/ degrees Fahrenheit resistance change versus temperature to insure good resolution and accuracy. Thermistors shall be certified to be stable ±0.24 degrees Fahrenheit over 5 years and ±0.36 degrees Fahrenheit accurate and free from drift for 5 years.
6. CU operating software shall be equipped with a self-calibrating feature for temperature sensors.
7. The following accuracy's are required and include errors associated with the sensor, lead wire and A to D conversion.

Point Type	Accuracy
Outside Air	0.5°F
Chilled Water	0.5°F
Room Temperature	1.00°F
Hot Water/Steam	0.75°F
Duct Temperature	0.5°F
Sensors Used in Energy Water (BTU) or Process Calculations	0.1°F

8. Sensors used in BTU or process calculations shall be accurate to ±0.10 derees Fahrenheit over the process temperature range. Submit a manufacturer's calibration report indicating that the calibration certification is traceable to the National Bureau of Standards (NBS) Calibration Report Nos. 209527/222173.

B. Thermowells:
1. When thermowells are required, the sensor and well shall be supplied as a complete assembly including well head and greenfield fitting.
2. Thermowells shall be pressure rated and constructed in accordance with the system working pressure.
3. Thermowells and sensors shall be mounted in a threadolet or 1/2-inch NPT saddle and allow easy access to the sensor for repair or replacement.
4. Thermowells shall be constructed of the following materials: Chilled and Hot Water: brass; Steam: 316 stainless-steel; Brine (salt solutions): marine grade stainless-steel.

C. Outside Air Sensors:
1. Outside air sensors shall be designed to withstand the environmental conditions to which they will be exposed. They shall also be provided with a solar shield.
2. Sensors exposed to wind velocity pressures shall be shielded by a perforated plate surrounding the sensor element.
3. Temperature transmitters shall be of NEMA 3R construction and rated for ambient temperatures.

D. Duct Type Sensors:
1. Duct mount sensors shall mount in a hand box through a hole in the duct and be positioned so as to be easily accessible for repair or replacement. A neoprene grommet (sealtite fitting and mounting plate) shall be used on the sensor assembly to prevent air leaks.
2. Duct sensors shall be insertion type and constructed as a complete assembly including lock nut and mounting plate. Duct sensors probe shall be constructed of 304 stainless-steel.

3. For outdoor air duct applications, use a weatherproof mounting box with weatherproof cover and gasket.
4. Averaging Duct Type Sensors - For ductwork greater any dimension than 48 inches and/or where air temperature stratification exists, utilize an averaging sensor with multiple sensing points. The averaging sensor shall be a 304 stainless-steel tube with holes extending across the duct or plenum to be sampled. A bleed hole outside the duct or plenum causes air to enter the sample tube and exit at the bleed hole, thus bathing the sensor in average air. The averaging sensor shall be installed complete with end cap, compression fittings, gaskets, mounting flange and required accessories. Provide capillary supports at the sides of the duct to support the sensing string.

E. Acceptable Manufacturers:
1. Duct/Immersion Sensors – Mamac.
2. Room Sensors – Distech Controls or Mamac.
3. Preapproved equal.

F. Relative Humidity Sensors/Transmitter:
1. The sensor shall be a solid state, resistance type relative humidity sensor of the Bulk Polymer Design. The sensor element shall be washable and shall resist surface contaminations.
2. Humidity transmitter shall be equipped with non-interactive span and zero adjustments, a 2 wire isolated loop powered, 4-20 mA, 0-10 VDC linear proportional output.
3. The humidity transmitter shall meet the following overall accuracy including lead loss and A to D conversion.
4. Room Type Sensor ±3percent RH
5. Provide a single point humidity calibrator, if required, for field calibration. Transmitters shall be shipped factory pre-calibrated.
6. Acceptable Manufacturers:
   a. Mamac.
   b. ACI.
   c. VERIS.
   d. HYCAL.
   e. Bapi.
   f. Preapproved equal.

G. Differential Pressure Transmitters and Accessories:
1. General Air and Water Pressure Transmitter Requirements:
   a. Pressure transmitters shall be constructed to withstand 100 percent pressure over-range without damage and to hold calibrated accuracy when subject to a momentary 40 percent over-range input.
   b. Pressure transmitters shall provide the option to transmit a 0 to 5VDC, 0 to 10VDC, or 4 to 20 mA output signal.
   c. Differential pressure transmitters used for flow measurement shall be sized to the flow-sensing device and shall be supplied with shutoff and bleed valves in the high and low sensing pick-up lines (3 valve manifolds).
   d. Provide a minimum of a NEMA 1 housing for the transmitter. Locate transmitters in accessible local control panels wherever possible.
   e. Low air pressure, differential pressure transmitters used for room filter monitoring. Shall be equipped with a LED display indicating the transmitter output signal.

f. Low Air Pressure Applications (0 to 0.5 inches WC).
   1) The pressure transmitter shall be capable of transmitting a linear electronic signal proportional to the differential of the room and reference static pressure input signals with the following minimum performance Specifications.
   2) Span: Not greater than 2 times the design space DP.
   3) Accuracy: Plus or minus 0.5 percent of F.S.
   4) Dead Band: Less than 0.3 percent of output.
   5) Repeatability: Within 0.2 percent of output.
   6) Linearity: Plus or minus 0.2 percent of span.
   7) Response: Less than 1 second for full span input.
   8) Temperature Stability: Less than 0.01 percent output shift per degree Fahrenheit change.
   9) The transmitter shall utilize variable capacitance sensor technology and be immune to shock and vibration.
   10) Provide a 18 month warranty for each transmitter. Replace all transmitters found to be defective at no cost to the Owner during the warranty period. Acceptable Manufacturers: VERIS - Model PXL100 or preapproved equal.

H. Flow, Pressure, and Electrical Measuring Apparatus:
   1. Traverse Probe Air Flow Measuring Stations- Traverse probes shall be a dual manifold, cylindrical, type constructed of 3003 extruded aluminum with an anodized finish to eliminate surface pitting and unnecessary air friction. The multiple total pressure manifolds shall have sensors located along the stagnation plane of the approaching air flow and without the physical presence of forward Projecting sensors into the airstream. The static pressure manifold shall incorporate dual offset static tips on opposing sides of the averaging manifold so as to be insensitive to flow-angle variations of as much as ±20 degrees in the approaching airstream.
   2. The air flow traverse probe shall not induce a measurable pressure drop, nor shall the sound level within the duct be amplified by its singular or multiple presences in the airstream. Each airflow measuring probe shall contain multiple total and static pressure sensors placed at equal distances along the probe length. The number of sensors on each probe and the quantity of probes utilized at each installation shall comply with the ASHRAE Standards for duct traversing.
   3. Traverse probes shall be accurate to ±25 percent of the measured airflow range down to 0.25-inch WC static pressure.
   4. Each flow measuring station shall be complete with its own dedicated microprocessor with a 4-line, 80 character, Alpha Numeric display and full function keypad. The panel shall be fully programmable and display calculated CFM directly on a LED monitor on the panel face.
   5. Each station shall log air flow rates in real time and download data to its control unit (CU) via a RS-232 interface.
   6. Provide 24 volt 1 phase power to each flow measuring station.
   7. Acceptable Manufacturers: Air Monitor, Brandt, Air Sentinel. Or pre-approved equal

I. Shielded Static Pressure Sensor:
   1. Provide for each zone where required a shielded static pressure sensor suitable for ceiling surface mounting, complete with multiple sensing ports, pressure impulse suppression chamber with minimum volume of 50 cubic inches, airflow shielding, and 3/8-inch compression takeoff fittings, all contained in a welded stainless-steel casing, with polish finish on the exposed surfaces.

2. These probes shall be capable of sensing the static pressure in the proximity of the sensor to within 1 percent of the actual pressure value while being subjected to a maximum airflow of 1000 FPM from a radial source.
3. The shielded static sensing devices shall be used for both reference and space pressure sensing.
4. Pressure sensors used for outside air pressure reference purposes shall be equipped with a conduit seal for pneumatic tubing and bushings for a weather tight installation.

J. Static Pressure Traverse Probe - Provide multipoint traverse probes in the duct at each point where static pressure sensing is required.
1. Each duct static traverse probe shall contain multiple static pressure sensors located along the exterior surface of the cylindrical probe. Pressure sensing points shall not protrude beyond the surface of the probe.
2. The duct static traverse probe shall be of 304 stainless-steel construction and (except for 3/4-inch diameter probes with lengths of 24 inches or less) be complete with threaded end support rod, sealing washer and nut, and mounting plate with gasket and static pressure signal fitting. The static traverse probe shall be capable of producing a steady, non-pulsating signal of standard static pressure without need for correction factors, with an instrument accuracy of 21.

K. Carbon Dioxide Sensor for Demand Controlled Ventilation. Provide a general purpose indoor transmitter/sensor assembly with removable sensor, UL listed. 4-20 mA DC output representing 0-2000 ppm. Minimum 5 year sensor life, with field-replaceable sensor unit. Accuracy +/- 1 percent of reading at 77 degrees Fahrenheit. Long term drift less than 1 percent of scale per year. For wall-mounted sensors, provide local readout display. Acceptable manufacturers: Vaisala GMW/GMD 20, or approved equivalent.

L. Venturi Flowmeter – Provide venture flowmeters with the following features:
1. Pressure drop on venturi type flow meters shall not exceed 0.25" WC. Each venturi low and high pressure taps shall be equipped with nipples, valves and quick disconnects.
2. Equip each venturi with a metal identification tag indicating the size, location, GPM and meter reading for the GPM specified.
3. Provide (1) 6-inch dial differential pressure meter of the proper range to determine piping system flow rate. The meter shall be the property of the Owner.
4. Venturi meters shall utilize flanged or screwed connections for removal purposes and shall be rated for the system operating pressures.
5. The venturi flow meter shall be factory calibrated to provide a minimum of flow accuracy between actual and factory flow calibration data.

M. Current Transformers – Provide current transformers with the following features:
1. The current transformers shall be designed to be installed or removed without dismantling the primary bus or cables. The transformer shall be of a split core design.
2. The core and windings shall be completely encased in a UL approved thermoplastic rated 94VA. No metal parts shall be exposed other than the terminals.
3. Frequency Limits: 50 to 400 Hz. Insulation: 0.6 KV Class, 10 KV BIL.
4. Accuracy: ± 1 percent at 5.0 to 25.0 VA accuracy class with U.P.F. burden.
5. Provide a disconnect switch for each current transformer.

N. Current Sensing Switches - Current sensing switch shall be self-powered with solid-state circuitry and a dry contact output. Current sensing switches shall consist of a solid state current sensing circuit, adjustable trip point, solid state switch, SPDT relay and an LED indicating the on or off status. A conductor of the load shall be passed through the window of the device. It shall accept over current up to twice its trip into range.

O. Relays - Relays other than those associated with digital output cards shall be general purpose, enclosed plug-in type with 8-pin octal plug and protected by a heat and shock resistant duct cover. Number of contacts and operational function shall be as required.

P. Solid State Relays (SSR): Input/output isolation shall be greater than lOE9 ohms with a breakdown voltage of 1500V root mean square or greater at 60 Hz. The contact life shall be 10 by 10 E6 operations or greater. The ambient temperature range of SSRs shall be -20 to +140 Fahrenheit. Input impedance shall not be less than 500 ohms. Relays shall be rated for the application. Operating and release time shall be for 100 milliseconds or less. Transient suppression shall be provided as an integral part of the relay.

Q. Contactors: Contactors shall be of the single coil, electrically operated, mechanically held type. Positive locking shall be obtained without the use of hooks, latches, or semipermanent magnets. Contractor shall be double-break-silver-to-silver type protected by arcing contacts. The number of contacts and rating shall be selected for the application. Operating and release times shall be 100 milliseconds or less. Contactors shall be equipped with coil transient suppression devices.

R. Dirty Filter Differential Air Pressure Switch – Provide for a large diaphragm operated, SPDT switch, exposed adjustment, 1percent repetitive accuracy. Dwyer 1638 with A-302 static tips, or equivalent.

S. Differential Water Pressure Switch – Provide a double diaphragm type, brass or stainless wetted parts, min. 200 psi working pressure. Adjustable cut-in and differential, SPDT snap acting switch suitable for 120 VAC control circuit. Mercoid, Model DP or equivalent.

T. Water Flow Switch (Paddle Type) – Provide a brass body, aluminum housing, and stainless-steel segmented paddle. Magnetic link between paddle movement and switch movement. W.E. Anderson V4-2-U or equivalent.

U. Control Dampers:
   1. Control Dampers, furnished by the Temperature Control Contractor shall be single or multiple blade as required, opposed blade type unless specifically noted.
   2. Damper blades shall be mounted horizontally.
   3. Damper Construction.
      a. Damper frames shall be constructed of minimum 0.125-inch extruded aluminum hat channel and shall have flanges for duct mounting. Damper linkages shall be concealed in the damper frame. Linkage exposed to the air stream is not acceptable. Frames shall not be less than 2 inches in width.
      b. Damper axles shall be a minimum 1/2-inch diameter, rods supported in the damper frame by stainless-steel or bronze bearings. Nylon or plastic bearings are not acceptable.
   4. Damper Assembly - A single damper Section shall have blades no longer than 48 inches and shall be no higher than 72 inches. Larger sizes shall be made from a combination of Sections. Submit damper combination Drawings, showing proposed blade and/or axle connecting hardware and method of actuation.
   5. Damper blades shall not exceed 6" in width. Blades shall be of extruded aluminum airfoil type construction. Blades shall be suitable for air velocities in excess of 2000 FPM.
   6. Replaceable seals shall be provided with the damper. Seals shall be installed along the top, bottom, and sides of the frame and along each blade edge. Seals shall provide a tight closing, low leakage damper. Leakage shall not exceed 10 CFM per square foot at 4-inch water column gauge when tested in accordance with AMCA Standard 300. Jamb seals shall be stainless-steel.
   7. Basis of design is Ruskin CD-50.

8. Damper Linkage.
    a. Operating links external to dampers (such as crank arms, connecting rods, and line shafting for transmitting motion from damper actuators to dampers) shall withstand a load equal to at least twice the maximum required damper-operating force. Rod lengths shall be adjustable. Links shall be brass, bronze, zinc-coated steel, or stainless-steel. Working parts of joints and clevis shall be brass, bronze, or stainless-steel.

2.7 VALVES AND ACTUATORS

A. Acceptable Manufacturers: Subject to compliance with requirements, provide electric and electronic control system products by Distech Controls.

B. General: Provide electric and electronic control system products in sizes and capacities indicated, consisting of automatic control valves, automatic control dampers, thermostats, clocks, sensors, controllers, and other components as required for complete installation. Except as otherwise indicated, provide manufacturer's standard control system components as indicated by published product information, designed, and constructed as recommended by manufacturer. Provide electric control systems with the following functional and construction features as indicated.

C. Direct Coupled Damper Actuators:
1. Actuators shall be designed for mounting directly to the damper shaft without the need for connecting linkages.
2. All actuators having more than 100 lb-in torque output shall have a self-centering damper shaft clamp that guarantees concentric alignment of the actuator's output coupling with the damper shaft. The self-centering clamp shall have a pair of opposed "V" shaped toothed cradles; each having 2 rows of teeth to maximize holding strength. A single clamping bolt shall simultaneously drive both cradles into contact with the damper shaft.
3. All actuators having more than a 100 lb-in torque output shall accept a 1-inch diameter shaft directly, without the need for auxiliary adapters.
4. All actuators having more than 100 lb-in torque output shall have an all metal housing made from die-cast aluminum.
5. All actuators must provide overload protection throughout the full range of rotation, enabling the actuator to detect a blockage in the damper and withstand a continuous stall condition without premature failure, or degradation in performance.
6. All spring return actuators shall be capable of both clockwise and counterclockwise spring return fail-safe operation.
7. All spring return actuators shall use a continuously engaged mechanical return spring that returns the actuator to a fail-safe position within 15 seconds, under rated temperature and load, in response to a loss of power. Other fail-safe mechanisms which are either engaged only in response to a loss of power, or which are non-mechanical are not acceptable.
8. All actuators shall provide a means of manually positioning the output coupling in the absence of power.
9. Dual independently adjustable auxiliary switches must be integral to the actuator, thus maintaining a low total installed cost. The addition of this feature as an accessory kit is not acceptable.
10. All actuators having more than 100 lb-in torque shall provide a factory mounted electrical cable 3 feet and conduit fitting, thus maintaining a low total installed cost.
11. All actuators shall not require more than 10 VA.

12. Proportional actuators shall accept a 0-10 VDC or 4-20mA control signal and provide a 0-10 VDC feedback signal.
13. All actuators shall provide an easily readable high contrast yellow on black position indicator.
14. All actuators shall be designed for a minimum of 50,000 full stroke cycles at the actuator's rated torque and temperatures, and manufactured using ISO9002 and ISO14000 registered procedures, and shall be UL873 and CSA22.2 listed. Actuators shall be as manufactured by SIEMENS.

D. Accessories:
1. Identification tags shall be available for all valves; tags shall be indelibly marked with Cv, model number and location.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification:
1. Verify that all systems are ready to receive Work.
2. The Project Plans shall be thoroughly examined for control device and equipment locations, and any discrepancies, conflicts, or omissions shall be reported to the Architect for resolution before rough-in Work is started.
3. The Contractor shall inspect the site to verify that equipment is installable as show, and any discrepancies, conflicts, or omissions shall be reported to the Architect for resolution before rough-in Work is started.
4. The Control System Contractor shall examine the Drawings and Specifications for other parts of the Work, and if head room or space conditions appear inadequate or if any discrepancies occur between the Plans and his Work and the Plans for the Work of others, he shall report such discrepancies to the Architect and shall obtain written instructions for any changes necessary to accommodate his Work with the Work of others.

B. General Installation Requirements:
1. Install all control components in accordance with manufacturer's instructions and recommendations.
2. If the controls Contractor is responsible for providing the damper then provide mixing dampers of parallel blade construction arranged to mix streams. Provide separate minimum outside air damper Section adjacent to variable outside air damper.
3. Mount control panels adjacent to associated equipment on vibration-free walls or freestanding angle iron supports. 1 cabinet may accommodate more than 1 system in same equipment room. Provide nameplates for instruments and controls inside cabinet and nameplates on cabinet face.
4. After completion of installation, test and adjust control equipment. Submit data showing setpoints and final adjustments of controls.
5. Install equipment, piping, wiring/conduit parallel to building lines (i.e., horizontal, vertical, and parallel to walls) wherever possible.
6. Provide sufficient slack and flexible connections to allow for vibration of piping and equipment.
7. Verify integrity of all wiring to ensure continuity and freedom from shorts and grounds.

8. All equipment, installation, and wiring shall comply with acceptable industry Specifications and standards for performance, reliability, and compatibility and be executed in strict adherence to local codes and standard practices.

C. Graphical User Interface PC Location:
1. Install Graphical User Interface PC in the location indicated. Do not deliver the Graphical User Interface PC to the job site until a proper location has been prepared. Location shall be clean and dry, free from construction dust and debris.
2. Location shall have a dedicated Work surface (table or desk with chair). Work surface shall be provided by Owner or General Contractor for use by this Contractor.
3. Location shall have ample storage provisions for documentation and manuals, either shelving or a 4 drawer upright filing cabinet. Storage provisions shall be provided by Owner or General Contractor for use by this Contractor.
4. Location shall have a dedicated locked electrical circuit for use by this Contractor.

D. Ethernet Network Connection:
1. All nevices that require a connection to the LAN or access to an ISP shall be approved by the Owners information technology representitive prior to installation.
2. All ethernet communication connections shall be provided by the Owner or General Contractor.

3.2 ELECTRICAL SYSTEM INSTALLATION

A. Comply with all Division 26 Installation Requirements.
B. Provide interlock wiring between supply and exhaust fans, electrical wiring for relays (including power feed) for temperature and pressure indication.
C. Provide power wiring, conduit and connections for low temperature thermostats, high temperature thermostats, alarms, flow switches, actuating devices for temperature, humidity, pressure and flow indication, point resets and user disconnect switches for electric heating, appliances controlled by this Section.
D. Provide all other wiring required for the complete operation of the specified systems.
E. Where required install all wiring raceway systems complying with the requirements of the National Electrical Code. All required conduit shall be installed in EMT.
F. Provide interlock wiring between supply and exhaust fans, electrical wiring for relays (including power feed) for temperature and pressure indication.
G. Surge Protection and Lighting Protection
1. All equipment and all communication media shall be suitably protected from damage associated with electrical surge and lightning strike. Submittal and approval is required for all such devices.
2. All input-output hardware and instrumentation located outdoors shall be isolated using approved surge suppression devices.
3. All telephone modem connections shall be isolated using approved surge suppression devices.
4. All building-to-building communication connections shall be isolated using approved surge suppression devices.
5. All temperature control panels and controllers shall be provided with a control power transformer with fuse protection on both the primary and secondary sides.

H. Provide electrical disconnecting means for servicing, for each control panel, digital controller, router, transformer, power supply, and other devices that are served by 120VAC or higher voltage.

I. Enclosures shall be fabricated of 14 gauge steel with sub-panels for component mounting and have removable, hinged doors. Enclosures shall be sized to house the controllers, power supplies, transformers, relays, wire duct and miscellaneous equipment required to support the application. Enclosures shall be provided for all controllers that are not located within an OEM provided mechanical equipment or on a VAV box.

J. Enclosure power supply shall provide at least 1 40VA and 1 100VA transformer with individual on/off switches and circuit breakers and 2 120VAC outlets. Enclosures and power supplies shall be UL listed Class II.

K. Network Communication Requirements:
   1. Wired network communication shall be via channels consisting of a 22 AWG unshielded twisted pair in compliance with manufacturers recommendations for LonTalk communications.
   2. In all communication conduits, provide 1 spare twisted pair to be installed, tagged and labeled at each end.
   3. Communication conduits shall not be installed closer than 6 feet from high power transformers or run parallel within 6 feet of electrical high power cables. Care shall be taken to route the cable as far from interference generating devices as possible.
   4. There shall be no power wiring, in excess of 30 VAC rms, run in conduit with communications wiring.

L. Input/Output Control Wiring:
   1. Platinum 1k ohm and thermistor 10k ohms type II wiring shall be 2-wire or 4-wire twisted, shielded, minimum number 22 gauge.
   2. Other analog inputs shall be a minimum of number 22 gauge, twisted, shielded.
   3. Binary control function wiring shall be a minimum of number 18 gauge.
   4. Analog output control functions shall be a minimum of number 18 gauge, twisted, shielded.
   5. Binary input wiring shall be a minimum of number 18 gauge.

M. Splices in shielded cables shall consist of terminations and the use of shielded cable couplers, which maintain the integrity of the shielding. Terminations shall be in accessible locations. Cables shall be harnessed with cable ties as specified herein.

N. Conduit and Fittings:
   1. Conduit for Control Wiring, Control Cable and Transmission Cable: Electrical metallic tubing (EMT) with compression fittings, cold rolled steel, zinc coated or zinc-coated rigid steel with threaded connections.
   2. Outlet Boxes (Dry Location): Sheradized or galvanized drawn steel suited to each application, in general, 4 inches square or octagon with suitable raised cover.
   3. Outlet Boxes (Exposed to Weather): Threaded hub cast aluminum or iron boxes with gasket device plate.
   4. Pull and Junction Boxes: Size according to number, size, and position of entering raceway as required by National Electrical Codes. Enclosure type shall be suited to location.
   5. Install low voltage power and LON and LAN communication trunks in conduit in the following locations regardless of local building code allowances otherwise.
      a. Mechanical rooms.
      b. Electrical rooms.
      c. Vertical risers (exception: fire rated continuous closet like a telephone closet).
      d. Open Areas where the wiring will be exposed to view or tampering.
   6. Conceal conduit within finished shafts, ceilings and wall as required. Install exposed conduit parallel with or at right angles to the building walls.

O. Where Class 2 wires are in concealed and accessible locations including ceiling return air plenums, approved cables not in raceway may be used provided that:
   1. Circuits meet NEC Class 2 (current-limited) requirements. (Low-voltage power circuits shall be sub-fused when required to meet Class 2 current-limit.)
   2. All cables shall be UL listed for application, i.e., cables used in ceiling plenums shall be UL listed specifically for that purpose.

P. Do not install Class 2 wiring in conduit containing Class 1 wiring. Boxes and panels containing high voltage may not be used for low voltage wiring except for the purpose of interfacing the 2 (e.g., relays and transformers).

Q. Where Class 2 wiring is run exposed, wiring to be run parallel along a surface or perpendicular to it, and NEATLY tied at 10-foot intervals.

R. All wire-to-device connections shall be made at a terminal blocks or terminal strip. All wire-to-wire connections shall be at a terminal block, or with a crimped connector. All wiring within enclosures shall be neatly bundled and anchored to permit access and prevent restriction to devices and terminals.

S. Plug or cap all unused conduit openings and stub-ups. Do not use caulking compound.

T. Route all conduit to clear beams, plates, footings and structure members. Do not route conduit through column footings or grade beams.

U. Set conduits as follows:
   1. Expanding silicone fire stop material sealed watertight where conduit is run between floors and through walls of fireproof shaft.
   2. Oakum and lead, sealed watertight penetration through outside foundation walls.

V. Cap open ends of conduits until conductors are installed.

W. Where conduit is attached to vibrating or rotating equipment, flexible metal conduit with a minimum length of 18 inches and maximum length of 36 inches shall be installed and anchored in such a manner that vibration and equipment noise will not be transmitted to the rigid conduit.

X. Where exposed to the elements or in damp or wet locations, waterproof flexible conduit shall be installed. Installation shall be as specified for flexible metal conduit.

Y. Provide floor, wall, and ceiling plates for all conduits passing through walls, floors or ceilings. Use prime coated cast iron, split-ring type plates, except with polished chrome-plated finish in exposed finished spaces.

3.3 TEMPERATURE SENSORS

A. Temperature sensor assemblies shall be readily accessible and adaptable to each type of application in such manner as to allow for quick, easy replacement and servicing without special tools or skills.

B. Strap-on mountings shall not be permitted.

C. Outdoor installations shall be; of weatherproof construction or in appropriate NEMA enclosures. These installations shall be protected from solar radiation and wind effects. Protective shield shall be stainless-steel.

D. Sensors shall be with enclosure where located in finished space.

E. Sensors in ducts shall be mounted in locations to sense the correct temperature of the air only and shall not be located in dead air spaces or positions obstructed by ducts, equipment, and so forth. Locations where installed shall be within the vibration and velocity limit of the sensing element. Ducts shall be securely sealed where elements or connections penetrate ducts to avoid measuring false conditions.

F. All sensors measuring temperatures in pipes larger than 2 inches in diameter or in pressure vessels shall be supplied with wells properly fabricated for the service. Wells shall be noncorrosive to the medium being measured and shall have sufficient physical strength to withstand pressures and velocities to which they are subjected. Wells shall be installed in the piping at elbows where piping is smaller than the length of the well to effect proper flow across the entire area of the well.

G. All field sensors, transmitters, actuators, switches, etc. shall be field calibrated. The calibration shall be guaranteed for the period of the control system warranty. Any corrections or re-calibration required during the warranty will be performed at no cost to Owner. Calibration methods, means, instruments, and standards shall be in strict accordance with ISO-9000 standards.

3.4 CONTROLS VALVES, CONTROL DAMPERS AND ACTUATORS

A. Control Dampers.
   1. Control dampers shall be installed by Div. 23 Contractor.
   2. Coordinate with the Div. 23 Contractor the service access requirements of the control dampers, and verify that each control damper can be serviced, including adjustment and removal of the actuator.
   3. Div. 23 Contractor shall provide necessary blank-off plates required for installation of reduced-size dampers (dampers that are smaller than duct size).
   4. Furnish interconnecting hardware, linkages, etc. for installation of multiple Section dampers by Div. 23 Contractor.

3.5 ACCESS DOORS

A. Div. 23 Contractor shall provide access doors or other approved means of access through ducts for service to control equipment.

3.6 INSTRUMENT ENCLOSURES AND CONTROL PANELS

A. Securely mount all control panels and enclosures to wall or structure using bolts, anchors, etc. Mount enclosures and control panels with top at 60 inches above finished floor, unless noted otherwise. Field fabricate enclosure mounting rack from Unistrut or Kindorf, where required. Locate enclosures and control panels to ensure full door swing.

B. Seal all conduit entrances into enclosures and control panels, watertight.

C. Locate enclosures indoors where possible. Provide drains and block heaters for all panels located outdoors.

3.7 IDENTIFICATION OF HARDWARE AND WIRING

A. All wiring and cabling, including that within factory-fabricated panels shall be labeled at each end within 2 inches of termination with a cable identifier and other descriptive information.

B. Permanently label or code each point of field terminal strips to show the instrument or item served.

C. Identify control panels with minimum 1-inch letters on nameplates.

D. Identify all other control components with permanent labels. Identifiers shall match record documents.

E. Affix engraved tags plates on each motor starter controlled through the EMS. Minimum tag size shall be 1-inch by 3-inch; minimum lettering size shall be 3/16-inch high. Tag shall be red with white lettering. Tags shall indicate the following:

C A U T I O N
This equipment is operating under automatic control and may start at any time without warning

F. Identify room sensors relating to terminal box or valves with nameplates.

3.8 CLEANING

A. This Contractor shall clean up all debris resulting from his or her activities daily. The Contractor shall remove all cartons, containers, crates, etc. under his control as soon as their contents have been removed. Waste shall be collected and placed in a location designated by the construction manager or General Contractor.
B. At the completion of Work in any area, the Contractor shall clean all of his/her Work, equipment, etc., making it free from dirt and debris, etc.
C. At the completion of Work, all equipment furnished under this Section shall be checked for paint damage, and any factory-finished paint that has been damaged shall be repaired to match the adjacent areas. Any metal cabinet or enclosure that has been deformed shall be replaced with new material and repainted to match the adjacent areas.

3.9 PROTECTION

A. The Contractor shall protect all Work and material from damage by his/her Work or workers, and shall be liable for all damage thus caused.
B. The Contractor shall be responsible for his/her Work and equipment until finally inspected, tested, and accepted. The Contractor shall protect his/her Work against theft or damage, and shall carefully store material and equipment received on-site that is not immediately installed. The Contractor shall close all open ends of Work with temporary covers or plugs during storage and construction to prevent entry of foreign objects.

3.10 FIELD QUAILITY CONTROL

A. All Work, materials and equipment shall comply with the rules and regulations of applicable local, state, and federal codes and ordinances as identified in Part 1 of this Section.
B. Contractor shall continually monitor the field installation for code compliance and quality of workmanship. All visible piping and/or wiring runs shall be installed parallel to building lines and properly supported.
C. Contractor shall arrange for field inspections by local and/or state authorities having jurisdiction over the Work.

3.11 PERFORMANCE EVALUATION/ACCEPTANCE PROCEDURE

A. General: Acceptance of the control system depends in part upon successful demonstration of control system performance. The SI shall prepare a detailed final functional test and verification Plan indicating in a step-by-step logical fashion the procedures by which the control system will be tested. This shall include the following procedures:
   1. Sequence of Operation - Demonstrate all sequences of operation.
   2. Test Documentation - Provide standard formatted documentation for each controlled system and element test.
   3. Pre-Testing - The control system installer shall have performed pre-testing of all tests on all components before final testing. If during final testing more than 10 percent of the points or sequences checked are found to be faulty, the Contractor shall halt the test and re-check all parts of the system test.
   4. Testing Plan. Submit test Plan for approval not less than 4 weeks prior to tests. Meet with Owner's representative, discuss the test Plan, and make necessary revisions. The test Plan shall include, as a minimum, for each control system and sub-system the following:
      a. System name.
      b. List of devices with brief description of functional purpose of each.
      c. The expected signal values transmitted by the sensors/transmitters.
      d. The expected signal values transmitted by the controller to the controlled device or actuator.
      e. The expected values of the control medium from limit-to-limit.
      f. A description of the instrumentation required to test the system, including proof of calibration.
      g. A detailed step-by-step process in conducting test and verification.
      h. Log sheets on which expected and actual values will be recorded.
      i. Other criteria for test to indicate that the system is operating in accordance with Contract requirements.
   5. Testing - Inform the Architect and Owner of all test dates for attendance, so that the Architect and/or Owner may attend the test if desired. Perform all tests. Correct all system maladies found in the testing procedure. Retest as required. If Owner's representative does not witness test, provide performance certification.
   6. Acceptance - The control systems will not be accepted as meeting the requirements of Completion until all tests described in this Specification have been performed to the satisfaction of both the Architect and Owner. Any tests that cannot be performed due to circumstances beyond the control of the Contractor may be exempt from the completion requirements if stated as such in writing by the Owner's representative.

3.12 SCHEDULE OF RESPONSIBLITIES

A. The following schedule identifies the responsible Division for the installation of the building automation system. This schedule should be used as a general guide. The General Contractor is the central authority governing the total responsibility of all trade Contractors. Therefore, deviations and clarifications of this schedule are permitted provided the General Contractor assumes responsibility to coordinate the trade Contractors different than as indicated herein. If deviations or clarifications to this schedule are implemented, submit a record copy to the Architect.

	Item	Furnish By	Install By	Power By	Control Wiring By
1.	Equipment Motors	M	M	E	—
2.	Magnetic Motor Starters:				
a.	Automatically controlled, with or without HOA switches.	E	E	E	SI
b.	Manually controlled.	E	E	E	—
c.	Manually controlled, and which are furnished as part of factory wired equipment.	M	M	E	E
d.	Special duty type (part winding, multi-speed, etc.)	M	See Note 1.	E	See Note 1.
e.	Adjustable frequency drives with manual bypass.	SI	SI	E	SI See Note 2.
f.	Domestic booster pump. Motor Controls	M	M	E	SI
5.	General equipment disconnect switches, thermal overload switches, manual operating switches.	E	E	E	—
6.	Line voltage contactors.	E	E	E	SI
7.	Control relay transformers (other than starters).	SI	SI	E	SI
12.	Line voltage control items such as line voltage thermostats not connected to control panel systems.	M	E	E	E
13.	Loose controls and instruments furnished as part of the packaged mechanical equipment or required for operation such as valves, float controls, relays, sensors, etc.	M	M	M	M
14.	Control and Instrumentation panels	SI	SI	E	SI
17.	Duct type fire and smoke detectors, including relays for fan shut down.	SI	SI	E	SI
23.	Airflow control devices with transmitter.	SI	M	E	SI
25.	Intelligent Devices and Control Units provided with packaged mechanical equipment such as:	M	M	E	SI
27.	Gateways for protocol conversion with a non- LONWORKS based system	SI	SI	**SI**	**SI**
28.	Routers, Bridges and Repeaters.	SI	SI	**SI**	**SI**

Abbreviations

Furnish.	1.1 FURNISHED BY
Install.	Installed by
Power	Power Wiring Connection, Low and Medium Voltage
SI	System Integrator
M	1.2 MECHANICAL CONTRACTOR
E	Electrical Contractor

B. Notes to Schedule of Responsibilities:
1. Magnetic motor starters (special duty type) shall be set in place under electrical division except when part of factory wired equipment, in which case set in place under mechanical division.
2. Where a remote motor disconnect is required in addition to the 1 provided integral to a Variable Frequency Drive (VFD), the SI Contractor shall provide the necessary control interlock between the disconnects.
3. The System Integrator shall inform the Mechanical Contractor and the Electrical Contractor of the additional capacity required of control power transformers.
4. Mechanical Contractor shall refer to the electrical Specifications and Plans for all power and control wiring and shall advise the Architect of any discrepancies prior to bidding. The System Integrator shall be responsible for all control wiring as outlined, whether called for by the mechanical or electrical Drawings and Specifications.

3.13 SEQUENCE OF OPERATIONS

A. SPLIT SYSTEM- HEAT PUMP

1. Run Conditions - Scheduled: The unit shall run according to a user definable time schedule in the following modes:
   a. Occupied Mode: The unit shall maintain:
      1) A 75 degrees Fahrenheit (adj.) cooling setpoint.
      2) A 70 degrees Fahrenheit (adj.) heating setpoint.
   b. Unoccupied Mode (night setback): The unit shall maintain
      1) A 85 degrees Fahrenheit (adj.) cooling setpoint.
      2) A 55 degrees Fahrenheit (adj.) heating setpoint.
2. Alarms shall be provided as follows:
   a. High Zone Temp: If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).
   b. Low Zone Temp: If the zone temperature is less than the heating setpoint by a user definable amount (adj.).
3. Zone Setpoint Adjust: The occupant shall be able to adjust the zone temperature heating and cooling setpoints at the zone sensor.
4. Zone Optimal Start: The unit shall use an optimal start algorithm for morning start-up. This algorithm shall minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.
5. Zone Unoccupied Override: A timed local override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.
6. Freeze Protection: The unit shall shut down and generate an alarm upon receiving a freezestat status.
7. Smoke Detection: The unit shall shut down and generate an alarm upon receiving a smoke detector status.
8. Fan: The fan shall run anytime the unit is commanded to run unless shutdown on safeties.

9. Heating and Cooling - 1 Compressor Stage: The controller shall measure the zone temperature and cycle the compressor to maintain its setpoint. To prevent short cycling, the stage shall have a user definable (adj.) minimum runtime. The compressor shall run subject to its own internal safeties and controls.
    a. The heating shall be enabled whenever: Outside air temperature is less than 65 degrees Fahrenheit (adj.).
        1) AND the fan is on.
        2) AND the reversing valve is in heat mode.
    b. The cooling shall be enabled whenever: Outside air temperature is greater than 60 degrees Fahrenheit (adj.).
        1) AND the fan is on.
        2) AND the reversing valve is in cool mode.
    c. On mode change, the compressor shall be disabled and remain off until after the reversing valve has changed position.
    d. Alarms shall be provided as follows: Compressor Runtime Exceeded: The compressor runtime exceeds a user definable limit (adj.).
10. Supplemental Electric Heating Stage: The controller shall measure the zone temperature and stage the heating to maintain its heating setpoint should the compressors not meet the heating demand. To prevent short cycling, the stage shall have a user definable (adj.) minimum runtime.
    a. The heating shall be enabled whenever:
        1) The heat pump is in heating mode.
        2) AND the zone temperature is below heating setpoint.
        3) AND the fan is on.
11. Discharge Air Temperature: The controller shall monitor the discharge air temperature.
    a. Alarms shall be provided as follows:
        1) High Discharge Air Temp: If the discharge air temperature is greater than 120 degrees Fahrenheit (adj.).
        2) Low Discharge Air Temp: If the discharge air temperature is less than 40 degrees Fahrenheit (adj.).
12. Fan Status: The controller shall monitor the fan status.
    a. Alarms shall be provided as follows:
        1) Fan Failure: Commanded on, but the status is off.
        2) Fan in Hand: Commanded off, but the status is on.
        3) Fan Runtime Exceeded: Fan status runtime exceeds a user definable limit (adj.).

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Discharge Temp	x								x		x
Zone Setpoint Adjust	x										x
Zone Temp	x								x		x
Fan Status			x						x		x
Freezestat			x						x	x	x
Smoke Detector			x						x	x	x
Zone Override			x						x		x
Compressor Stage 1				x					x		x
Fan Start/Stop				x					x		x
Heating Stage 1				x					x		x
Reversing Valve				x					x		x
Cooling Setpoint					x				x		x
Heating Setpoint					x				x		x
Schedule								x			
Compressor Runtime Exceeded										x	
Fan Failure										x	
Fan in Hand										x	
Fan Runtime Exceeded										x	
High Discharge Air Temp										x	
High Zone Temp										x	
Low Discharge Air Temp										x	
Low Zone Temp										x	
Totals	**3**	**0**	**4**	**4**	**2**	**0**	**0**	**1**	**12**	**10**	**13**

Total Hardware (11) **Total Software (25)**

B. SPLIT SYSTEM FURNACE

1. Run Conditions - Scheduled: The unit shall run according to a user definable time schedule in the following modes:
   a. Occupied Mode: The unit shall maintain:
      1) A 75 degrees Fahrenheit (adj.) cooling setpoint.
      2) A 70 degrees Fahrenheit (adj.) heating setpoint.
   b. Unoccupied Mode (night setback): The unit shall maintain:
      1) A 85 degrees Fahrenheit (adj.) cooling setpoint.
      2) A 55 degrees Fahrenheit (adj.) heating setpoint.
2. Alarms shall be provided as follows:
   a. High Zone Temp: If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).
   b. Low Zone Temp: If the zone temperature is less than the heating setpoint by a user definable amount (adj.).
3. Zone Setpoint Adjust: The occupant shall be able to adjust the zone temperature heating and cooling setpoints at the zone sensor.
4. Zone Optimal Start: The unit shall use an optimal start algorithm for morning start-up. This algorithm shall minimize the unoccupied warm-up or cool-down period while still achieving comfort conditions by the start of scheduled occupied period.
5. Zone Unoccupied Override: A timed local override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.
6. Freeze Protection: The unit shall shut down and generate an alarm upon receiving a freezestat status.
7. Supply Air Smoke Detection: The unit shall shut down and generate an alarm upon receiving a supply air smoke detector status.
8. Supply Fan: The supply fan shall run anytime the unit is commanded to run unless shutdown on safeties. To prevent short cycling, the supply fan shall have a user definable (adj.) minimum runtime.
9. Alarms shall be provided as follows:
   a. Supply Fan Failure: Commanded on, but the status is off.
   b. Supply Fan in Hand: Commanded off, but the status is on.
   c. Supply Fan Runtime Exceeded: Status runtime exceeds a user definable limit (adj.).
10. Cooling Stage: The controller shall measure the zone temperature and stage the cooling to maintain its cooling setpoint. To prevent short cycling, the stage shall have a user definable (adj.) minimum runtime.
    a. The cooling shall be enabled whenever: Outside air temperature is greater than 60 degrees Fahrenheit (adj.).
       1) AND the zone temperature is above cooling setpoint.
       2) AND the supply fan status is on.
       3) AND the heating is not active.

11. Gas Heating Stages: The controller shall measure the zone temperature and stage the heating to maintain its heating setpoint. To prevent short cycling, there shall be a user definable (adj.) delay between stages, and each stage shall have a user definable (adj.) minimum runtime.
    a. The heating shall be enabled whenever: Outside air temperature is less than 65 degrees Fahrenheit (adj.).
        1) AND the zone temperature is below heating setpoint.
        2) AND the supply fan status is on.
        3) AND the cooling is not active.
12. Discharge Air Temperature: The controller shall monitor the discharge air temperature.
    a. Alarms shall be provided as follows:
        1) High Discharge Air Temp: If the discharge air temperature is greater than 120 degrees Fahrenheit (adj.).
        2) Low Discharge Air Temp: If the discharge air temperature is less than 40 degrees Fahrenheit (adj.).
13. Environmental Index: When the zone is occupied, the controller will monitor the deviation of the zone temperature from the heating or cooling setpoint and calculate a 0 - 100 percent Environmental Index which gives an indication of how well the zone is maintaining comfort. The controller will also calculate the percentage of time since occupancy began that the Environmental Index is 70 percent or higher. Optionally, a weighting factor can be configured to adjust the contribution of the zone to the rollup average index based upon the floor area of the zone, importance of the zone, or other static criteria.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Return Air Temp	x								x		x
Zone Setpoint Adjust	x										x
Zone Temp	x								x		x
Freezestat			x						x	x	x
Supply Air Smoke Detector			x						x	x	x
Supply Fan Status			x						x		x
Zone Override			x						x		x
Cooling Stage 1				x					x		x
Heating Stage 1				x					x		x
Supply Fan Start/Stop				x					x		x
Cooling Setpoint					x				x		x
Environmental Index					x				x		
Heating Setpoint					x				x		x
Percent of Time Satisfied					x				x		
Schedule								x			
Compressor Runtime Exceeded										x	
Final Filter Change Required										x	x
High Discharge Air Temp										x	
High Zone Temp										x	
Low Discharge Air Temp										x	
Low Zone Temp										x	
Supply Fan Failure										x	
Supply Fan in Hand										x	
Supply Fan Runtime Exceeded										x	
Totals	**5**	**1**	**4**	**4**	**5**	**0**	**0**	**1**	**18**	**13**	**17**

Total Hardware (14) **Total Software (37)**

C. EXHAUST FAN – ON/OFF

1. Run Conditions - Scheduled: The fan shall run according to a user definable schedule.
   a. Fan: The fan shall have a user definable (adj.) minimum runtime.
2. Fan Status: The controller shall monitor the fan status.
3. Alarms shall be provided as follows:
   a. Fan Failure: Commanded on, but the status is off.
   b. Fan in Hand: Commanded off, but the status is on.
   c. Fan Runtime Exceeded: Fan status runtime exceeds a user definable limit (adj.).

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Fan Status			x						x		x
Fan Start/Stop				x					x		x
Schedule								x			
Fan Failure										x	
Fan in Hand										x	
Fan Runtime Exceeded										x	
Totals	**0**	**0**	**1**	**1**	**0**	**0**	**0**	**1**	**2**	**3**	**2**

Total Hardware (2) **Total Software (6)**

D. EXHAUST FAN – MECH/ELEC ROOM

1. Run Conditions: The unit shall be continuously enabled to maintain a zone temperature setpoint of 85 degrees Fahrenheit (adj.).
2. Alarms shall be provided as follows:
   a. High Zone Temp: If the zone temperature is greater than the cooling setpoint by a user definable amount (adj.).
3. Fan: The fan shall run anytime the zone temperature rises above cooling setpoint, unless shutdown on safeties.
4. Fan Status: The controller shall monitor the fan status.
5. Alarms shall be provided as follows:
   a. Fan Failure: Commanded on, but the status is off.
   b. Fan in Hand: Commanded off, but the status is on.
   c. Fan Runtime Exceeded: Fan status runtime exceeds a user definable limit (adj.).

	Hardware Points				**Software Points**						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Zone Temp	x								x		x
Fan Status			x						x		x
Fan Start/Stop				x					x		x
Cooling Setpoint					x				x		x
Fan Failure										x	
Fan in Hand										x	
Fan Runtime Exceeded										x	
High Zone Temp										x	
Totals	**1**	**0**	**1**	**1**	**1**	**0**	**0**	**0**	**4**	**4**	**4**

Total Hardware (3) **Total Software (9)**

E. UNIT HEATER

1. Run Conditions - Scheduled: The unit shall run according to a user definable time schedule in the following modes:
   a. Occupied Mode: The unit shall maintain a heating setpoint of 70 degrees Fahrenheit (adj.).
   b. Unoccupied Mode (night setback): The unit shall maintain a heating setpoint of 65 degrees Fahrenheit (adj.).

2. Alarms shall be provided as follows:
   a. Low Zone Temp: If the zone temperature is less than the heating setpoint by a user definable amount (adj.).
3. Zone Setpoint Adjust: The occupant shall be able to adjust the zone temperature heating and cooling setpoints at the zone sensor.
4. Zone Unoccupied Override: A timed local override control shall allow an occupant to override the schedule and place the unit into an occupied mode for an adjustable period of time. At the expiration of this time, control of the unit shall automatically return to the schedule.
5. Fan: The fan shall run anytime the zone temperature drops below heating setpoint, unless shutdown on safeties.
6. Electric Heating Stage: The controller shall measure the zone temperature and stage the heating to maintain its heating setpoint. To prevent short cycling, the stage shall have a user definable (adj.) minimum runtime.
   a. The heating shall be enabled whenever:
      1) Outside air temperature is less than 65 degrees Fahrenheit (adj.).
      2) AND the zone temperature is below heating setpoint.
      3) AND the fan is on.
7. Discharge Air Temperature: The controller shall monitor the discharge air temperature.
8. Alarms shall be provided as follows:
   a. High Discharge Air Temp: If the discharge air temperature is greater than 120 degrees Fahrenheit (adj.).
   b. Low Discharge Air Temp: If the discharge air temperature is less than 40 degrees Fahrenheit (adj.).

	Hardware Points				**Software Points**						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Discharge Air Temp	x								x		x
Zone Setpoint Adjust	x										x
Zone Temp	x								x		x
Zone Override			x						x		x
Fan Start/Stop				x					x		x
Heating Stage 1				x					x		x
Heating Setpoint					x				x		x
Schedule								x			
High Discharge Air Temp										x	
Low Discharge Air Temp										x	
Low Zone Temp										x	
Totals	**3**	**0**	**1**	**2**	**1**	**0**	**0**	**1**	**6**	**3**	**7**

Total Hardware (6) **Total Software (11)**

F. MDF/IDF ROOMS

1. Alarms shall be provided as follows:
   a. High Temp: If the temperature is above the user defined setpoint (adj.).

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Temperature sensor	x								x	x	x
Totals	**1**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**1**	**1**	**1**

Total Hardware (1) **Total Software (2)**

G. DEDICATED OUTDOOR AIR UNIT (DOAS)

1. DOAS units shall be provided with a factory microprocessor controller to operate the functions of the DOAS unit. Refer to Section 23 74 33.13 "100% Outside Air DX Air Handling Units with Hot Gas Reheat."
2. The BAS shall be connected the unit controller to allow for scheduling and setpoint adjustment only.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Zone Temperature					x				x	x	x
Zone Temperature Setpoint					x				x		x
Zone Occupancy Schedule						x			x		x
Totals	**0**	**0**	**0**	**0**	**2**	**1**	**0**	**0**	**3**	**1**	**3**

Total Hardware (0) **Total Software (7)**

H. DUCT FURNACE

1. Provide duct thermostat to operate duct heater. Unit shall only run after fan proving switch on associated DOAS unit confirms fan is operating.
2. Run Conditions – The duct heater shall modulate the gas valve to maintain 70 degrees Fahrenheit supply air temperature.
3. The heating shall be enabled whenever:
   a. Outside air temperature is less than 66 degrees Fahrenheit (adj.).
   b. AND the supply air temperature is below setpoint.
   c. AND sufficient airflow is provided.

	Hardware Points				Software Points						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Setpoint Adjust	x										x
Supply air Temp	x								x		x
Heating Setpoint					x				x		x
Low Zone Temp										x	
Totals	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**2**	**1**	**3**

Total Hardware (2) **Total Software (3)**

I. OUTSIDE AIR CONDITIONS (TYPICAL OF 1)

1. Outside Air Conditions: The controller shall monitor the outside air temperature and humidity and calculate the outside air enthalpy on a continual basis. These values shall be made available to the system at all times.
2. Alarm shall be generated as follows:
   a. Sensor Failure: Sensor reading indicates shorted or disconnected sensor. In the event of a sensor failure, an alternate outside air conditions sensor shall be made available to the system without interruption in sensor readings.
3. If an OA Temp Sensor cannot be read, a default value of 65 degrees Fahrenheit will be used.
4. If an OA Humidity Sensor cannot be read, a default value of 50 percent will be used.
5. Outside Air Temperature History: The controller shall monitor and record the high and low temperature readings for the outside air. These readings shall be recorded on a daily, month-to-date, and year-to-date basis.

	Hardware Points				**Software Points**						
Point Name	**AI**	**AO**	**BI**	**BO**	**AV**	**BV**	**Loop**	**Sched**	**Trend**	**Alarm**	**Show On Graphic**
Outside Air Humidity	x								x		x
Outside Air Temp	x								x		x
Outside Air Enthalpy					x				x		x
High Temp Month-to-Date									x		x
High Temp Today									x		x
High Temp Year-to-Date									x		x
Low Temp Month-to-Date									x		x
Low Temp Today									x		x
Low Temp Year-to-Date									x		x
Sensor Failure										x	
Totals	**2**	**0**	**0**	**0**	**1**	**0**	**0**	**0**	**9**	**1**	**9**

Total Hardware (2) **Total Software (11)**

END OF SECTION

SECTION 23 11 23 - FACILITY NATURAL-GAS PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Natural gas piping buried.
   2. Natural gas piping above grade.
   3. Unions and flanges.
   4. Valves.
   5. Pipe hangers and supports.
   6. Natural gas pressure regulators.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. American Society of Mechanical Engineers:
   1. ASME B16.3 - Malleable Iron Threaded Fittings.
   2. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
   3. ASME B31.9 - Building Services Piping.
   4. ASME Section IX - Boiler and Pressure Vessel Code - Welding and Brazing Qualifications.

B. ASTM International:
   1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   2. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
   3. ASTM B68 - Standard Specification for Seamless Copper Tube, Bright Annealed.
   4. ASTM B75 - Standard Specification for Seamless Copper Tube.
   5. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
   6. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
   7. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.
   8. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.

C. American Welding Society:
   1. AWS D1.1 - Structural Welding Code - Steel.

D. American Water Works Association:
   1. AWWA C105 - American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems.

E. Manufacturers Standardization Society of the Valve and Fittings Industry:
   1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
   2. MSS SP 67 - Butterfly Valves.
   3. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
   4. MSS SP 78 - Cast Iron Plug Valves, Flanged and Threaded Ends.
   5. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
   6. MSS SP 110 - Ball Valves Threaded, Socket-Welding, Solder Joint, Grooved and Flared Ends.

F. National Fire Protection Association:
   1. NFPA 54 - National Fuel Gas Code.
   2. NFPA 58 - Liquefied Petroleum Gas Code.

G. Underwriters Laboratories Inc.:
   1. UL 842 - Valves for Flammable Fluids.

1.3 SYSTEM DESCRIPTION

A. Where more than 1 piping system material is specified, provide compatible system components and joints. Use non-conducting dielectric connections when joining dissimilar metals in systems.

B. Provide flanges, unions, or couplings at locations requiring servicing. Use unions, flanges, or couplings downstream of valves and at equipment connections. Do not use direct welded or threaded connections to valves, equipment.

C. Provide pipe hangers and supports in accordance with ASME B31.9, ASTM F708, MSS SP 58, MSS SP 69, or MSS SP 89.

D. Use plug valves for shut-off and to isolate equipment, part of systems, or vertical risers.

1.4 SUBMITTALS

A. Division 01 and Section 23 05 00 “General Mechanical Requirements.”

B. Product Data:
   1. Piping: Submit data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
   2. Valves: Submit manufacturers catalog information with valve data and ratings for each service.
   3. Hangers and Supports: Submit manufacturers catalog information including load capacity.
   4. Piping Specialties: Submit manufacturers catalog information including capacity, rough-in requirements, and service sizes for the following:
      a. Natural gas pressure regulators.

C. Test Reports: Indicate results of gas piping system pressure test.

D. Manufacturer's Certificate: Certify Products meet or exceed specified requirements.

E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within previous 12 months.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of valves, piping system, and system components.

B. Operation and Maintenance Data: Submit for valves and gas pressure regulators installation instructions, spare parts lists, and exploded assembly views.

1.6 QUALITY ASSURANCE

A. Perform natural gas Work in accordance with NFPA 54.
B. Perform Work in accordance with ASME B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.
C. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.
D. Perform Work in accordance with State and local standards.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years' experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years' experience.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
B. Protect piping and fittings from soil and debris with temporary end caps and closures. Maintain in place until installation. Furnish temporary protective coating on cast iron and steel valves.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Section 23 05 00 "General Mechanical Requirements."

PART 2 - PRODUCTS

2.1 NATURAL GAS PIPING, BURIED

A. Steel Pipe: ASTM A53 Schedule 40 black.
   1. Fittings: ASTM A234 forged steel welding type.
   2. Joints: ASME B31.9, welded.
   3. Jacket: AWWA C105 polyethylene jacket or double layer, half-lapped 10 mil polyethylene tape.
B. Polyethylene Pipe: ASTM D2513, SDR 11.5.
   1. Fittings: ASTM D2513 or ASTM D2683 socket type.
   2. Joints: Fusion welded.

2.2 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53 Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234 forged steel welding type.
   2. Joints: Threaded for pipe 2-inch and smaller; welded for pipe 2-1/2 inches and larger.

2.3 UNIONS AND FLANGES

A. Unions for Pipe 2 inches and Smaller:
   1. Ferrous Piping: Class 150, malleable iron, threaded.
   2. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

B. Flanges for Pipe 2-1/2 inches and Larger:
   1. Ferrous Piping: Class 150, forged steel, slip-on flanges.
   2. Gaskets: 1/16-inch thick preformed neoprene gaskets.

2.4 PLUG VALVES

A. Manufacturers:
   1. DeZURIK, Unit of SPX Corp.
   2. Flow Control Equipment, Inc.
   3. Homestead Valve Model.
   4. Substitutions: Section 23 05 00 “General Mechanical Requirements.”

B. 2 inches and Smaller: MSS SP 78, Class 150, semi-steel construction, rectangular port, regular opening, pressure-lubricated, Teflon® packing, threaded ends. Furnish 1 plug valve wrench for every 10 plug-valves with minimum of 1 wrench.

C. 2-1/2 inches and Larger: MSS SP 78, Class 150, semi-steel construction, rectangular port, regular opening, pressure-lubricated, Teflon® packing, flanged ends. Furnish wrench-operated.

2.5 PIPE HANGERS AND SUPPORTS

A. Conform to NFPA 54, ASME 31.9, ASTM F708, MSS SP 58, MSS SP 69, and MSS SP 89.

B. Hangers for Pipe Sizes 1/2- to 1-1/2-inch: Malleable iron or Carbon steel, adjustable swivel, split ring.

C. Hangers for Pipe Sizes 2 inches and Larger: Carbon steel, adjustable, clevis.

D. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.

E. Wall Support for Pipe 3 inches and Smaller: Cast iron hook.

F. Vertical Support: Steel riser clamp or Angle ring.

G. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.

H. Roof Support: Refer to Section 23 05 00 “General Mechanical Requirements.”

2.6 NATURAL GAS PRESSURE REGULATORS

A. Product Description: Spring loaded, general purpose, self-operating service regulator including internal relief type diaphragm assembly and vent valve. Diaphragm case can be rotated 360 degrees in relation to body.
   1. Temperatures: minus 20 degrees Fahrenheit to 150 degrees Fahrenheit.
   2. Body: Cast iron or Steel.
   3. Spring case, lower diaphragm casing, union ring, seat ring and disk holder: Aluminum.
   4. Disk, diaphragm, and O-ring: Nitrile.
   5. Maximum inlet pressure: 150 psig
   6. Furnish sizes 2 inches and smaller with threaded ends. Furnish sizes 2-1/2 inches and larger with flanged ends.

PART 3 - EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
B. Remove scale and dirt, on inside and outside, before assembly.
C. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION – PIPE HANGERS AND SUPPORTS

A. Install hangers and supports in accordance with ASME B31.9, ASTM F708 and MSS SP 89.
B. Support horizontal piping hangers as scheduled.
C. Install hangers to provide minimum 1/2-inch space between finished covering and adjacent work.
D. Place hangers within 12 inches of each horizontal elbow.
E. Install hangers to allow 1-1/2-inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
F. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
G. Where installing several pipes in parallel and at same elevation, provide multiple pipe hangers or trapeze hangers.
H. Prime coat exposed steel hangers and supports in accordance with Division 09. Finish paint exposed steel hangers and supports in accordance with Division 09. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
I. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings.
J. Refer to Section 23 05 00 “General Mechanical Requirements” for Roof mounted piping supports.

3.3 INSTALLATION – BURIED PIPING SYSTEMS

A. Install natural gas piping in accordance with NFPA 54.
B. Verify connection to existing piping system size and location is as indicated on Drawings.

C. Establish elevations of buried piping with not less than 2-foot of cover.
D. Establish minimum separation of gas piping from other services piping in accordance with local code.
E. Remove scale and dirt on inside of piping before assembly.
F. Excavate pipe trench in accordance with Section 23 05 00 “General Mechanical Requirements.”
G. Route pipe in straight line.
H. Install pipe to allow for expansion and contraction without stressing pipe or joints.
I. Metallic Pipe: Install plastic ribbon tape continuous buried 12 inches below finish grade, coordinate with Sections 23 05 00 “General Mechanical Requirements” and 23 05 53 “Mechanical Identification.”
J. Non-Metallic Pipe: Install plastic ribbon tape with trace wire continuous buried 12 inches below finish grade, above pipe line; coordinate with Sections 23 05 00 “General Mechanical Requirements” and 23 05 53 “Identification for HVAC and Plumping Piping and Equipment.”
K. Pipe Cover and Backfilling:
    1. Backfill trench in accordance with Section 23 05 00 “General Mechanical Requirements.”
    2. Maintain optimum moisture content of fill material to attain required compaction density.
    3. After pressure test, evenly backfill in accordance with Section 23 05 00 “General Mechanical Requirements.”
    4. Do not use wheeled or tracked vehicles for tamping.

3.4 INSTALLATION – ABOVE GROUND PIPING SYSTEMS

A. Install natural gas piping in accordance with NFPA 54.
B. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
C. Route piping in orderly manner and maintain gradient.
D. Install piping to conserve building space and not interfere with use of space.
E. Group piping whenever practical at common elevations.
F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
G. Sleeve pipe passing through partitions, walls and floors. Refer to Section 23 05 00.20 “Basic Mechanical Materials and Methods.”
H. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping. Refer to Division 07.
I. Provide clearance for installation of insulation and access to valves and fittings.
J. Provide access where valves and fittings are not exposed.
K. Where pipe support members are welded to structural building framing, scrape, brush clean, weld, and apply one coat of zinc rich primer.
L. Provide support for utility meters in accordance with requirements of utility company.
M. Prepare pipe, fittings, supports, and accessories not pre-finished, ready for finish painting. Refer to Division 09.
N. Install identification on piping systems. Refer to Section 23 05 53 “Identification for HVAC and Plumbing Piping and Equipment.”
O. Install valves with stems upright or horizontal, not inverted.
P. Protect piping systems from entry of foreign materials by temporary covers, completing Sections of the Work, and isolating parts of completed system.
Q. Paint exposed piping. Coordinate color with Architect.

3.5 FIELD QUALITY CONTROL

A. Pressure test natural gas piping in accordance with NFPA 54.

3.6 SCHEDULES

PIPE HANGER SPACING		
PIPE SIZE (Inches)	**MAXIMUM HANGER SPACING (Feet)**	**HANGER ROD DIAMETER (Inches)**
1/2	7	3/8
3/4	7	3/8
1	7	3/8
1-1/4	7	3/8
1-1/2	9	3/8
2	10	3/8
2-1/2	11	1/2
3	12	1/2
4	12	5/8
5	12	5/8
6	12	3/4
8	12	3/4

END OF SECTION

SECTION 23 23 00 - REFRIGERANT PIPING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Refrigerant piping.
   2. Unions, flanges, and couplings.
   3. Valves.
   4. Refrigerant strainers.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. Air-Conditioning and Refrigeration Institute:
   1. ARI 495 - Refrigerant Liquid Receivers.
   2. ARI 710 - Liquid-Line Driers.
   3. ARI 730 - Flow-Capacity Rating and Application of Suction-Line Filters and Filter Dryers.
   4. ARI 750 - Thermostatic Refrigerant Expansion Valves.
   5. ARI 760 - Solenoid Valves for Use with Volatile Refrigerants.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
   1. ASHRAE 15 - Safety Code for Mechanical Refrigeration.

C. American Society of Mechanical Engineers:
   1. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
   2. ASME B16.26 - Cast Copper Alloy Fittings for Flared Copper Tubes.
   3. ASME B31.5 - Refrigeration Piping.
   4. ASME Section VIII - Boiler and Pressure Vessel Code - Pressure Vessels.

D. ASTM International:
   1. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
   2. ASTM A234/A234M - Standard Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and High Temperature Service.
   3. ASTM B88 - Standard Specification for Seamless Copper Water Tube.
   4. ASTM B280 - Standard Specification for Seamless Copper Tube for Air Conditioning and Refrigeration Field Service.
   5. ASTM F708 - Standard Practice for Design and Installation of Rigid Pipe Hangers.
   6. ASTM B749 - Standard Specification for Lead and Lead Alloy Strip, Sheet, and Plate Products.

E. American Welding Society:
   1. AWS A5.8 - Specification for Filler Metals for Brazing and Braze Welding.
   2. AWS D1.1 - Structural Welding Code - Steel.

F. Manufacturers Standardization Society of the Valve and Fittings Industry:
   1. MSS SP 58 - Pipe Hangers and Supports - Materials, Design and Manufacturer.
   2. MSS SP 69 - Pipe Hangers and Supports - Selection and Application.
   3. MSS SP 89 - Pipe Hangers and Supports - Fabrication and Installation Practices.
G. Underwriters Laboratories Inc.:
   1. UL 429 - Electrically Operated Valves.

1.3 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified, provide compatible system components and joints. Use non-conducting dielectric connections when joining dissimilar metals in systems.
B. Provide flanges, unions, or couplings at locations requiring servicing. Use unions, flanges, or couplings downstream of valves and at equipment connections. Do not use direct welded or threaded connections to valves or equipment.
C. Provide pipe hangers and supports in accordance with ASME B31.5, ASTM F708, MSS SP 58, MSS SP 69, and MSS SP 89.

1.4 SUBMITTALS

A. Division 01 and Section 23 05 00 “Submittal Procedures.”
B. Product Data:
   1. Piping: Submit data on pipe materials, fittings, and accessories.
   2. Valves: Submit manufacturer's catalog information with valve data and ratings for each service.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ASME B31.5 code for installation of refrigerant piping systems.
B. Perform Work in accordance with AWS D1.1 for welding hanger and support attachments to building structure.
C. Perform Work in accordance with State and local standards.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years' experience.
B. Fabricator or Installer: Company specializing in performing Work of this Section with minimum 3 years' experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Dehydrate and charge refrigeration components including piping and receivers, seal prior to shipment. Maintain seal until connected into system.
B. Accept valves on site in shipping containers with labeling in place. Inspect for damage.
C. Provide temporary end caps and closures on piping and fittings. Maintain in place until installation.
D. Protect piping systems from entry of foreign materials by temporary covers, completing Sections of the Work, and isolating parts of completed system.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not install underground piping when bedding is wet or frozen.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Division 01 and Section 23 05 00 “General Mechanical Requirements.”

PART 2 - PRODUCTS

2.1 REFRIGERANT PIPING

A. Copper Tubing: ASTM B280, drawn.
   1. Fittings: ASME B16.22 wrought copper.
   2. Joints: Braze, AWS A5.8 BCuP silver/phosphorus/copper alloy with melting range 1190 to 1480 degrees Fahrenheit.

2.2 UNIONS, FLANGES, AND COUPLINGS

A. 2 inches and Smaller:
   1. Copper Pipe: Bronze, soldered joints.
B. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

2.3 VALVES

A. Ball Valves:
   1. 2-piece bolted forged brass body with teflon ball seals and copper tube extensions, brass bonnet and seal cap, chrome plated ball, stem with neoprene ring stem seals, soldered ends.
   2. Maximum working pressure: 500 psig.
   3. Maximum working temperature: 325 degrees Fahrenheit.
B. Service Valves:
   1. Forged brass body with copper stubs, brass caps, removable valve core, integral ball check valve, flared or solder ends.
   2. Maximum working pressure: 500 psig.
C. Refrigerant Check Valves:
   1. Straight Through Type:
      a. Spring, neoprene seat.
      b. Maximum working pressure: 500 psig.
      c. Maximum working temperature: 250 degrees Fahrenheit.

2.4 REFRIGERANT STRAINERS

A. Straight Line or Angle Line Type:
1. Brass or steel shell, steel cap and flange, and replaceable cartridge, with screen of stainless steel wire or monel reinforced with brass.
2. Maximum working pressure: 430 psig.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.
B. Remove scale and dirt on inside and outside before assembly.
C. Prepare piping connections to equipment with flanges or unions.
D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.3 INSTALLATION - INSERTS

A. Provide inserts for placement in concrete forms.
B. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
C. Provide hooked rod to concrete reinforcement Section for inserts carrying pipe 4 inches and larger.
D. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
E. Where inserts are omitted, drill through concrete slab from below and provide through-bolt with recessed square steel plate and nut recessed into and grouted flush with slab.

3.4 INSTALLATION - PIPE HANGERS AND SUPPORTS

A. Refer to Section 22 05 29 “Hangers and Supports.”

3.5 INSTALLATION - ABOVE GROUND PIPING SYSTEMS

A. Route piping parallel to building structure and maintain gradient.
B. Install piping to conserve building space, and not interfere with use of space.
C. Group piping whenever practical at common elevations.
D. Sleeve pipe passing through partitions, walls, and floors. Refer to Section 23 05 00 “General Mechanical Requirements.”
E. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
F. Provide access where valves and fittings are not exposed.
G. Arrange refrigerant piping to return oil to compressor. Provide traps and loops in piping, and provide double risers as required. Slope horizontal piping 0.40 percent in direction of flow.
H. Flood refrigerant piping system with nitrogen when brazing.

I. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply 1 coat of zinc rich primer to welds.
J. Install valves with stems upright or horizontal, not inverted.
K. Insulate piping refer to Section 23 07 05 “HVAC and Plumbing Installation.”
L. Fully charge completed system with refrigerant after testing.
M. Follow ASHRAE 15 procedures for charging and purging of systems and for disposal of refrigerant.
N. Install refrigerant piping in accordance with ASME B31.5.

3.6 FIELD QUALITY CONTROL

A. Test refrigeration system in accordance with ASME B31.5.
B. Pressure test refrigeration system with dry nitrogen to 200 psig.
C. Repair leaks.
D. Retest until no leaks are detected.

3.7 SCHEDULES

A. Copper Tube Hanger Spacing:
    1. Pipe Size 1/2-inch:
        a. Maximum Hanger Spacing: 5 feet.
        b. Hanger Rod Diameter: 3/8-inch.
    2. Pipe Size 3/4-inch:
        a. Maximum Hanger Spacing: 5 feet.
        b. Hanger Rod Diameter: 3/8-inch.
    3. Pipe Size 1-inch:
        a. Maximum Hanger Spacing: 6 feet.
        b. Hanger Rod Diameter: 3/8-inch.
    4. Pipe Size 1-1/4 inches:
        a. Maximum Hanger Spacing: 7 feet.
        b. Hanger Rod Diameter: 3/8-inch.
    5. Pipe Size 1-1/2 inches:
        a. Maximum Hanger Spacing: 8 feet.
        b. Hanger Rod Diameter: 3/8-inch.
    6. Pipe Size 2 Inches:
        a. Maximum Hanger Spacing: 8 feet.
        b. Hanger Rod Diameter: 3/8-inch.
    7. Pipe Size 2-1/2 inches:
        a. Maximum Hanger Spacing: 9 feet.
        b. Hanger Rod Diameter: 1/2-inch.
    8. Pipe Size 3 inches:
        a. Maximum Hanger Spacing: 10 feet.
        b. Hanger Rod Diameter: 1/2-inch.
    9. Pipe Size 4 inches:
        a. Maximum Hanger Spacing: 10 feet.
        b. Hanger Rod Diameter: 1/2-inch.

END OF SECTION

SECTION 23 31 00 - HVAC DUCTS AND CASINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Duct Materials.
   2. Ductwork fabrication.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. ASTM International:
   1. ASTM A36/A36M - Carbon Structural Steel.
   2. ASTM A90/A90M - Standard Test Method for Weight Mass of Coating on Iron and Steel Articles with Zinc or Zinc-Alloy Coatings.
   3. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
   4. ASTM A568/A568M - Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements for.
   5. ASTM A653/A653M - Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   6. ASTM A1008/A1008M - Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   7. ASTM A1011/A1011M - Steel Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   8. ASTM B209 - Aluminum and Aluminum-Alloy Sheet and Plate.
   9. ASTM C14 - Concrete Sewer, Storm Drain, and Culvert Pipe.
   10. ASTM C443 - Standard Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets.
   11. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. National Fire Protection Association:
   1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
   2. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems.

C. Sheet Metal and Air Conditioning Contractors:
   1. SMACNA - HVAC Air Duct Leakage Test Manual.
   2. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

D. Underwriters Laboratories Inc.:
   1. UL 181 - Factory-Made Air Ducts and Connectors.

1.3 PERFORMANCE REQUIREMENTS

A. Variation of duct configuration or sizes other than those of equivalent or lower loss coefficient is not permitted except by written permission. Size round ducts installed in place of rectangular ducts in accordance with ASHRAE table of equivalent rectangular and round ducts.

1.4 SUBMITTALS

A. Division 01 and Section 23 05 00 “General Mechanical Requirements.”
B. Product Data: Submit data for duct materials and duct connectors.
C. Test Reports: Indicate pressure tests performed. Include date, section tested, test pressure, and leakage rate, following SMACNA HVAC Air Duct Leakage Test Manual.
D. Manufacturer's Installation Instructions: Submit special procedures for glass fiber ducts.

1.5 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with SMACNA - HVAC Duct Construction Standards - Metal and flexible.
B. Construct ductwork to NFPA 90A standards.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years’ experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years’ experience.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not install duct sealant when temperatures are less than those recommended by sealant manufacturers.
B. Maintain temperatures during and after installation of duct sealant.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Section 23 05 00 “General Mechanical Requirements:” for product warranties.

PART 2 - PRODUCTS

2.1 DUCT MATERIALS

A. Galvanized Steel Ducts: ASTM A653 galvanized steel sheet, lock-forming quality, having G90 zinc coating of in conformance with ASTM A90.
B. Fasteners: Rivets, bolts, or sheet metal screws.

2.2 DUCTWORK FABRICATION

A. Fabricate and support rectangular ducts in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible and as indicated on Drawings. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
B. Fabricate and support round ducts with longitudinal seams in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible (Round Duct Construction Standards), and as indicated on Drawings. Provide duct material, gauges, reinforcing, and sealing for operating pressures indicated.
C. Construct T's, bends, and elbows with minimum radius 1-1/2 times centerline duct width. Where not possible and where rectangular elbows are used, provide air foil turning vanes.
D. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
E. Provide standard 45 degree lateral wye takeoffs. When space does not allow 45 degree lateral wye takeoff, use 90 degree tee connections.
F. Seal joints between duct sections and duct seams with welds, gaskets, mastic adhesives, mastic plus embedded fabric systems, or tape.
    1. Sealants, Mastics and Tape: Conform to UL 181A. Provide products bearing appropriate UL 181A markings.
    2. Do not provide sealing products not bearing UL approval marking.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify sizes of equipment connections before fabricating transitions.

3.2 INSTALLATION

A. Install and seal ducts in accordance with SMACNA HVAC Duct Construction Standards – Metal and Flexible.
B. During construction, install temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.
C. Install duct hangers and supports in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
D. Use double nuts and lock washers on threaded rod supports.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Install openings in ductwork where required to accommodate thermometers and controllers. Install Pitot tube openings for testing of systems. Install Pitot tube complete with metal can with spring device or screw to prevent air leakage. Where openings are provided in insulated ductwork, install insulation material inside metal ring.

3.4 SCHEDULES

A. Ductwork Material Schedule

AIR SYSTEM	MATERIAL
General Exhaust Supply Air Return Air	Steel

B. Ductwork Pressure Class Schedule

AIR SYSTEM	MATERIAL
General Exhaust Supply Air Return Air	1-inch wg regardless of velocity

END OF SECTION

SECTION 23 33 00 - AIR DUCT ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Back-draft dampers.
   2. Combination fire-and-smoke dampers.
   3. Duct access doors.
   4. Volume control dampers.
   5. Flexible duct connections.
   6. Duct test holes.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. Air Movement and Control Association International, Inc.:
   1. AMCA 500 - Test Methods for Louvers, Dampers, and Shutters.

B. ASTM International:
   1. ASTM E1 - Standard Specification for ASTM Thermometers.

C. National Fire Protection Association:
   1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
   2. NFPA 92A - Recommended Practice for Smoke-Control Systems.

D. Sheet Metal and Air Conditioning Contractors:
   1. SMACNA - HVAC Duct Construction Standard - Metal and Flexible.

E. Underwriters Laboratories Inc.:
   1. UL 555 - Standard for Safety for Fire Dampers.
   2. UL 555C - Standard for Safety for Ceiling Dampers.
   3. UL 555S - Standard for Safety for Smoke Dampers.

1.3 SUBMITTALS

A. Division 01 and Section 23 05 00 “General Mechanical Requirements.”

B. Product Data: Submit data for shop fabricated assemblies and hardware used.

C. Product Data: Submit for the following. Include where applicable electrical characteristics and connection requirements.
   1. Fire dampers including locations and ratings.
   2. Smoke dampers including locations and ratings.
   3. Backdraft dampers.
   4. Flexible duct connections.
   5. Volume control dampers.
   6. Duct access doors.
   7. Duct test holes.

D. Product Data: For fire dampers, smoke dampers, or combination fire and smoke dampers submit the following:
   1. Include UL ratings, dynamic ratings, leakage, pressure drop and maximum pressure data.
   2. Indicate materials, construction, dimensions, and installation details.
   3. Damper pressure drop ratings based on tests and procedures performed in accordance with AMCA 500.

E. Manufacturer's Installation Instructions: Submit for Fire and Combination Smoke and Fire Dampers.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of access doors and test holes.
B. Operation and Maintenance Data: Submit for Combination Smoke and Fire Dampers.

1.5 QUALITY ASSURANCE

A. Dampers tested, rated and labeled in accordance with the latest UL requirements.
B. Damper pressure drop ratings based on tests and procedures performed in accordance with AMCA 500.
C. Perform Work in accordance with State and local standard.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years’ experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect dampers from damage to operating linkages and blades.
B. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
C. Storage: Store materials in a dry area indoor, protected from damage.
D. Handling: Handle and lift dampers in accordance with manufacturer's instructions. Protect materials and finishes during handling and installation to prevent damage.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.9 COORDINATION

A. Coordinate Work where appropriate with building control Work.

1.10 WARRANTY

A. Section 23 05 00 “General Mechanical Requirements” for product warranties.

PART 2 - PRODUCTS

2.1 BACK-DRAFT DAMPERS

A. Product Description: Multi-Blade, back-draft dampers: Parallel-action, gravity-balanced, Galvanized 16 gauge thick steel, or extruded aluminum. Blades, maximum 6-inch width, center pivoted, with felt or flexible vinyl sealed edges. Blades linked together in rattle-free manner with 90 degree stop, steel ball bearings, and plated steel pivot pin. Furnish dampers with adjustment device to permit setting for varying differential static pressure.

2.2 COMBINATION FIRE AND SMOKE DAMPERS

A. Manufacturers:
   1. Greenheck
   2. Nailor
   3. Ruskin
   4. Substitutions: Refer to Section 23 05 00 “General Mechanical Requirements.”
B. Fabricate in accordance with NFPA 90A, UL 555, and UL 555S.
C. Multiple-Blade Dampers: Fabricate with 16 gauge galvanized steel frame and blades. Furnish oil-impregnated bronze or stainless-steel sleeve bearings and plated steel axles, stainless-steel jamb seals, 1/8- by 1/2-inch plated steel concealed linkage, stainless-steel closure spring, blade stops, and lock, and 1/2-inch actuator shaft.
D. Operators: UL listed and labeled spring return electric type suitable for 120 volts, single phase, 60 Hz. non-stall motor. Locate damper operator on exterior of duct and link to damper operating shaft.
E. Normally Closed Smoke Responsive Fire Dampers: Curtain type, opening by gravity upon actuation of Electro thermal link, flexible stainless-steel blade edge seals to produce constant sealing pressure.
F. Electro Thermal Link: Fusible link melting at 165 degrees Fahrenheit; 120 volts, single phase, 60 Hz; UL listed and labeled.

2.3 DUCT ACCESS DOORS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings.
B. Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, furnish minimum 1-inch thick insulation with sheet metal cover.
   1. Less than 12 inches square, secure with sash locks.
   2. Up to 18 inches Square: Furnish 2 hinges and 2 sash locks.
   3. Up to 24 by 48 inches: 3 hinges and 2 compression latches.
   4. Larger Sizes: Furnish additional hinge.
   5. Access panels with sheet metal screw fasteners are not acceptable.

2.4 VOLUME CONTROL DAMPERS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible, and as indicated on Drawings.
B. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8- by 72-inch. Assemble center and edge crimped blades in prime coated or galvanized frame channel with suitable hardware.

C. End Bearings: Except in round ductwork 12 inches and smaller, furnish end bearings. On multiple blade dampers, furnish oil-impregnated nylon or sintered bronze bearings. Furnish closed end bearings on ducts having pressure classification over 2 inches wg.
D. Quadrants:
   1. Furnish locking, indicating quadrant regulators on single and multi-blade dampers.
   2. On insulated ducts mount quadrant regulators on standoff mounting brackets, bases, or adapters.
   3. Where rod lengths exceed 30 inches furnish regulator at both ends.

2.5 FLEXIBLE DUCT CONNECTIONS

A. Fabricate in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.
B. Connector: Fabric crimped into metal edging strip.
   1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric conforming to NFPA 90A, minimum density 30 oz per sq yd.
   2. Net Fabric Width: Approximately 6 inches wide.
   3. Metal: 3-inch wide, 24 gauge galvanized steel.

2.6 DUCT TEST HOLES

A. Permanent Test Holes: Factory fabricated, airtight flanged fittings with screw cap. Furnish extended neck fittings to clear insulation.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify rated walls are ready for fire damper installation.
B. Verify ducts and equipment installation are ready for accessories.
C. Check location of air outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.

3.2 INSTALLATION.

A. Install in accordance with NFPA 90A and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Refer to Section 23 31 00 " HVAC Ducts and Casings" for duct construction and pressure class.
B. Install Work in accordance with State and local standards.
C. Install back-draft dampers on exhaust fans or exhaust ducts nearest to outside and where indicated on Drawings.
D. Access Doors: Install access doors at the following locations and as indicated on Drawings:
   1. Before and after each duct mounted filter.
   2. Before and after each duct mounted coil.
   3. Before and after each duct mounted fan.
   4. Before and after each automatic control damper.

5. Before and after each fire damper, smoke damper, or combination fire and smoke damper.
6. Downstream of each VAV box.
7. Install at locations for cleaning kitchen exhaust ductwork in accordance with NFPA 96.

E. Access Door Sizes: Install minimum 8- by 8-inch size for hand access, 18- by 18-inch size for shoulder access, and as indicated on Drawings. Review locations prior to fabrication.
1. Mark access doors for fire and smoke dampers on outside surface, with minimum 1/2-inch high letters reading: FIRE/SMOKE DAMPER, SMOKE DAMPER, OR FIRE DAMPER.

F. Install temporary duct test holes and required for testing and balancing purposes. Cut or drill in ducts. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

G. Install permanent duct test holes and required for testing and balancing purposes.

H. Install fire dampers, combination fire and smoke dampers, and smoke dampers at locations as indicated on Drawings. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings, and hinges.
1. Install smoke dampers and combination smoke and fire dampers in accordance with NFPA 92A.
2. Install dampers square and free from racking with blades running horizontally.
3. Do not compress or stretch damper frame into duct or opening.
4. Handle damper using sleeve or frame. Do not lift damper using blades, actuator, or jack shaft.
5. Install bracing for multiple Section assemblies to support assembly weight and to hold against system pressure. Install bracing as needed.

3.3 DEMONSTRATION

A. Demonstrate re-setting of fire dampers to Owner's representative.

END OF SECTION

SECTION 23 34 00 - HVAC FANS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Sidewall propeller fans.
   2. Inline fans.
   3. Ceiling mounting centrifugal fans.
   4. HVLS Propeller Fans.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. American Bearing Manufacturers Association:
   1. ABMA 9 - Load Ratings and Fatigue Life for Ball Bearings.
   2. ABMA 11 - Load Ratings and Fatigue Life for Roller Bearings.

B. Air Movement and Control Association International, Inc.:
   1. AMCA 99 - Standards Handbook.
   2. AMCA 204 - Balance Quality and Vibration Levels for Fans.
   3. AMCA 210 - Laboratory Methods of Testing Fans for Aerodynamic Performance Rating.
   4. AMCA 300 - Reverberant Room Method for Sound Testing of Fans.
   5. AMCA 301 - Methods for Calculating Fan Sound Ratings from Laboratory Test Data.

C. American Refrigeration Institute:
   1. ARI 1060 - Air-to-Air Energy Recovery Ventilation Equipment Certification Equipment Program.

D. National Electrical Manufacturers Association:
   1. NEMA MG 1 - Motors and Generators.
   2. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).

E. Underwriters Laboratories Inc.:
   1. UL 705 - Power Ventilators.

1.3 SUBMITTALS

A. Section 23 05 00 “General Mechanical Requirements.”

B. Product Data: Submit data on each type of fan and include accessories, fan curves with specified operating point plotted, power, RPM, sound power levels for both fan inlet and outlet at rated capacity, electrical characteristics, and connection requirements.

C. Manufacturer's Installation Instructions: Submit fan manufacturer’s instructions.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit instructions for lubrication, motor and drive replacement, spare parts list, and wiring diagrams.

1.5 QUALITY ASSURANCE

A. Performance Ratings: Conform to AMCA 210 and bear AMCA Certified Rating Seal.
B. Sound Ratings: AMCA 301, tested to AMCA 300, and bear AMCA Certified Sound Rating Seal.
C. UL Compliance: UL listed and labeled, designed, manufactured, and tested in accordance with UL 705.
D. Balance Quality: Conform to AMCA 204.
E. Perform Work in accordance with State and local standards.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years' experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years' experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect motors, shafts, and bearings from weather and construction dust.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.9 WARRANTY

A. Section 23 05 00 "General Mechanical Requirements" for product warranties.

1.10 EXTRA MATERIALS

A. Furnish 2 sets of belts for each fan.

PART 2 - PRODUCTS

2.1 SIDEWALL PROPELLER FAN

A. Manufacturers:
1. Greenheck Corp.
2. Loren Cook Company.
3. Substitutions: Section 23 05 00 "General Mechanical Requirements."

B. General Description:
   1. Fan arrangement shall be exhaust.
   2. Sidewall mounted applications.
   3. Each fan shall bear a permanently affixed manufacturer's engraved metal nameplate containing the model number and individual serial number.

C. Wheel:
   1. Propeller constructed of cast aluminum tapered airfoil blades and cast aluminum hubs.
   2. Securely attached to motor shaft with a standard square key, set screw and tapered bushing.
   3. Statically and dynamically balanced in accordance with AMCA Standard 204-05.
   4. The propeller and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency.

D. Motors:
   1. Electronically Commutated Motor:
      a. Motor enclosure: Open drip proof.
      b. Motor to be a DC electronic commutation type motor (ECM) specially designed for fan application.
      c. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase.
      d. Internal motor circuitry to convert AC power supplied to the fan to DC power to operate the motor.
      e. Motor shall be speed controllable down to 20 percent of full speed (80 percent turndown). Speed shall be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal.
      f. Motor shall be a minimum of 85 percent efficient at all speeds.

E. Drive Frame:
   1. Frames and Panels shall be bolted construction.
   2. Drive frame assemblies and fan panels shall be galvanized steel or painted steel.
   3. Drive frame shall have formed channels and fan panels shall have pre-punched mounting holes, formed flanges and a deep formed one-piece inlet venturi.

F. Options/Accessories:
   1. Dampers:
      a. Type: WD-320, Gravity.
      b. Prevents outside air from entering back into the building when fan is off.
      c. Balanced for minimal resistance to flow.
      d. Galvanized frames with pre-punched mounting holes.
   2. Discharge Diffusers:
      a. Constructed of heavy gauge galvanized steel frame and blades.
      b. Shall have pre-punched mounting flanges.
      c. Designed to mount to the interior end of the wall housing when used in the supply configuration.

3. Wall Housing:
    a. Fan panel will be mounted vertically directing the air horizontally out of the building. Wall housing will be mounted in a manner that will not have any housing protruding outside the building. Motor and drives will be accessible from the interior of the building.
    b. Constructed of galvanized steel with heavy gauge mounting flanges and pre-punched mounting holes.
    c. Housing shall include OSHA approved motor guard.
    d. Reduces installation time and provides maximum installation flexibility.
4. Weatherhood:
    a. Shall shield wall opening and dampers from rain and snow.
    b. Material Type: Galvanized.
    c. Turndown Angle: 45 degrees.
    d. 1/2-inch by 1/2-inch weld wire birdscreen.

2.2 INLINE FANS

A. Manufacturers:
    1. Greenheck Corp.
    2. Loren Cook.
    3. Substitutions: Refer to Section 23 05 00 “General Mechanical Requirements.”
B. General Description:
    1. Base fan performance at standard conditions (density 0.075 lb./ft3).
    2. Normal operating temperature up to 130 degrees Fahrenheit.
    3. Applications include intake, exhaust, return, or make-up air systems.
    4. Each fan shall bear a permanently affixed manufacture's engraved metal nameplate containing the model number and individual serial number.
C. Wheel:
    1. Non-overloading, backward inclined centrifugal wheel.
    2. Constructed of aluminum.
    3. Statically and dynamically balanced in accordance to AMCA Standard 204-05.
    4. The wheel cone and fan inlet will be matched and shall have precise running tolerances for maximum performance and operating efficiency.
    5. Single thickness blades are securely riveted or welded to a heavy gauge back plate and wheel cone.
D. Electronically Commutated Motor:
    1. Motor Enclosure: Open drip proof.
    2. Motor to be a DC Electronic Commutation Type Motor (ECM) specifically designed for fan applications. AC induction type motors are not acceptable. Examples of unacceptable motors are: Shaded Pole, Permanent Split Capacitor (PSC), Split Phase, Capacitor Start and 3 phase induction type motors.
    3. Motors are permanently lubricated, heavy duty ball bearing type to match with the fan load and pre-wired to the specific voltage and phase.
    4. Internal motor circuitry to convert AC power supplied to the fan to DC power to operate the motor.
    5. Motor shall be speed controllable down to 20 percent of full speed (80 percent turndown). Speed shall be controlled by either a potentiometer dial mounted at the motor or by a 0-10 VDC signal.
    6. Motor shall be a minimum of 85 percent efficient at all speeds.

E. Housing/Cabinet Construction:
   1. Square design constructed of heavy gauge galvanized steel and shall include square duct mounting collars.
   2. Housing and bearing supports shall be constructed of heavy gauge bolted and welded steel construction to prevent vibration and to rigidly support the shaft and bearing assembly.
   3. Galvanized Construction material.

F. Housing Supports and Drive Frame:
   1. Housing supports are constructed of structural steel with formed flanges.
   2. Drive frame is welded steel which supports the motor.

G. Disconnect Switches:
   1. NEMA Rated: NEMA 1: Indoor application no water. Factory standard.
   2. Positive electrical shut-off.
   3. Wired from fan motor to junction box.

H. Duct Collars:
   1. Square design to provide a large discharge area.
   2. Inlet and discharge collars provide easy duct connection.

I. Access Panel: 2-sided access panels, permit easy access to all internal components.

2.3 CEILING MOUNTED CENTRIFUGAL EXHAUST FANS

A. General Description:
   1. Base fan performance at standard conditions.
   2. Ceiling mounted applications.
   3. Fans are UL/cUL listed 507 - Electric Fans.
   4. Each fan shall bear a permanently affixed manufacturer's nameplate containing the model number and individual serial number.

B. Wheel:
   1. Forward curved centrifugal wheel.
   2. Constructed of galvanized steel or calcium carbonate filled polypropylene.
   3. Statically and dynamically balanced in accordance to AMCA Standard 204-05.

C. Motors:
   1. AC Induction Motor.
   2. Motor enclosures: Open drip proof (ODP) - opening in the frame body and or end brackets.
      a. Motors shall be permanently lubricated sleeve bearing type to match with the fan load and furnished at the specific voltage and phase.
      b. Motor shall be mounted on vibration isolators and be accessible for maintenance.
      c. Thermal overload Protection.

D. Housing:
   1. Constructed of heavy gauge galvanized steel.
   2. Interior shall be lined with 0.5 inches of acoustical insulation.

E. Spring Loaded Aluminum Backdraft Damper:
   1. Prevents air from entering back into the building when fan is off.
   2. Eliminates rattling or unwanted backdrafts.

F. Outlet:
   1. Type of outlet: Square.
   2. Field rotatable from horizontal to vertical discharge.
   3. Shall include an aluminum backdraft damper.

G. Grille:
1. Type: Designer - Calcium-carbonate, Factory Standard.
2. Constructed of high impact polystyrene, plastic shall be factory standard.

H. External Electrical Accessories:
1. Eliminates removing the motor pack which saves time on installation.

I. Mounting Brackets:
1. Fully adjustable for multiple installation conditions.

J. Options/Accessories:
1. Motion Detector:
a. Type: Grille Mounted.
b. Infrared motion detector shall automatically turn on the fan when there is a change in temperature.
c. Viewing area of 180 degrees.
d. Adjustable time delay shutoff setting of 1 to 20 minutes.
2. Speed Controls:
a. Controls the fan's output.
b. Fan can be adjusted to 60 percent of full speed.
c. Can be used to operate more than 1 fan at a time.

2.4 LOW SPEED HIGH VOLUME (HVLS) PROPELLER FANS

A. Manufacturers:
1. Greenheck.
2. Macro Air.
3. Epic Fans.

B. General Description:
1. High volume, low speed (HVLS) propeller fans shall be licensed to bear the AMCA Certified Rating Seal for Circulating Fan Performance to ensure performance as cataloged in the field. Unlicensed HVLS fans shall not be accepted.
2. Entire fan assembly shall be UL/cUL-Listed to Underwriters Laboratory (UL) Standard 507 and CSA Standard 22.2 No. 113 to ensure compliance with the most current international testing standards. Intertek/ETL certification to UL Standard 507 and CSA Standard 22.2 No. 113 shall not be accepted.
3. Maximum continuous operating temperature of 104 degrees Fahrenheit.
4. Designed for forward (counter-clockwise when viewed from floor) and reverse (clockwise when viewed from floor) operation capabilities, for comfort cooling and destratification applications.
5. Each fan shall bear a permanently affixed manufacturer's mylar nameplate containing the model number, individual serial number, and electrical requirements of the fan.

C. Impeller:
1. Impeller shall be constructed of aerodynamic 6005A-T6 extruded aluminum airfoil blades connected to 6061-T6 machined aluminum struts that are rigidly attached to a heavy-duty, laser-cut aluminum hub. All connections shall be made using a minimum of SAE Grade 8 hardware.
2. Airfoil blades shall be interlocked with one another and the impeller hub via a heavy-duty steel airfoil retaining ring for safety. Airfoil retaining ring shall be constructed of heavy gauge steel and installed at the factory to ensure proper function. Field-installed airfoil retainers shall not be accepted.

3. Airfoil blades shall be provided with a mill aluminum finish as standard. Optional finishes shall include industrial powder coatings, anodize finishes, wood grain finishes, or custom color matched coatings.
4. Airfoil blades shall be optimized for maximum airflow, fan efficiency, and coverage area.
5. Airfoil blades shall be internally reinforced to minimize blade deflection while the fan is in standby or in operation. Blade deflection shall not exceed above or below 3.7 inches in either situation.
6. Airfoil blades shall be designed for minimal weight in order to maximize fan efficiency. Individual blade weight shall not exceed 24 pounds.
7. Impeller hub shall be secured to the face of the motor by a minimum of 12 bolts. Impeller hub shall also be connected to the building structure via a safety restraint cable and hub retaining ring. Hub retaining ring shall be constructed of heavy gauge steel and installed at the factory to ensure proper function.

D. Motor:
1. Motor enclosure: IP54.
2. Motors shall be of the high torque, low speed direct drive type, carefully matched to the fan load and furnished at the specified voltage and phase. High speed motors provided with a gearbox to reduce the operating speed of the fan shall not be permitted.
3. Motors shall be an external rotor design. Internal rotor motors shall not be permitted.
4. Motors shall be of the brushless DC type for maximum efficiency and speed controllability. No other motor type shall be accepted.
5. Motors shall include plug-and-play connectors for all wiring to the variable frequency drive. Motors that require these wiring connections to be stripped and terminated in the field shall not be permitted.
6. Motors shall include an internally-mounted thermistor for continuous monitoring of the motor's internal temperature.
7. Motors shall include Class B insulation.

E. Variable Frequency Drive (VFD):
1. VFD shall be factory programmed and designed for Modbus RS-485 communication with control devices via the Modbus RTU communication protocol.
2. VFD shall include two thermistors for continuous monitoring of VFD's internal and external temperature.
3. VFD shall include sensors for continuous monitoring of voltage and current.
4. VFD shall include intelligent protection systems to prevent failures caused by over/under-voltage, over-current, over-temperature, over-speed, and fan impact. VFDs without these protection features shall not be permitted.
5. VFD shall include the most current firmware version as of the product's manufacturing date to ensure optimal performance. As a result of continuous development, the manufacturer reserves the right to update VFD firmware without notice.

F. Universal Ceiling Mount and Downtube:
   1. Fans shall be provided with a universal ceiling mount that is designed for fast and secure installation on a variety of building structures. Universal ceiling mount shall be constructed of heavy gauge, bolted and welded steel and shall include a pivoting knuckle joint with two axes of rotation to accommodate any ceiling pitch. The knuckle joint shall be constructed of welded steel tubing and reinforced with a redundant steel sleeve for safety.
   2. Downtube shall be constructed of heavy gauge steel to provide a structural connection between the universal ceiling mount and fan motor. Downtube shall also include a welded guy wire connection ring for fast and secure installation of guy wires.
   3. Universal ceiling mount and downtube shall be powder-coated for corrosion resistance and aesthetic appearance.
   4. Standard drop length between top of universal ceiling mount and top of airfoil blades shall be 3.5 feet. Contractor shall coordinate length of downtube before ordering.
   5. Downtube shall be factory-wired for power and control of LED light when fan is supplied with optional LED light kit.
   6. All hardware shall be a minimum of SAE Grade 8.

G. Safety Retention Cables:
   1. Fans shall include a braided galvanized steel safety retention cable that is rated for a load of 495 pounds or greater. Safety retention cable shall be installed on the fan motor at the factory to ensure proper function. Field construction or installation of safety retention cables shall not be permitted.
   2. Safety retention cable shall be secured around the building structure via a minimum of 2 u-bolt steel cable clamps as standard. Optionally, safety retention cable may be secured via a No. 4 Gripple® connector for ease of installation.

H. Guy Wires:
   1. Fans shall include braided galvanized steel guy wires designed to prevent lateral movement of the fan when installed.
   2. Guy wires shall be secured to the building structure via the included beam clamps and quick links for ease of installation.
   3. Guy wires shall be secured to the fan and tensioned via high-strength steel turnbuckles with quick links. Turnbuckles shall be connected to each guy wire via a minimum of 2 u-bolt steel cable clamps per guy wire as standard. Optionally, turnbuckles may be connected to each guy wire via 1 No. 4 Gripple® connector per guy wire for ease of installation.

I. Options/Accessories:
   1. Mounting Hardware:
      a. Type: I-Beam Kit, Steel Truss Kit, or Unistrut Kit (By Others).
   2. Disconnect Switches:
      a. Protection: Fused.
      b. Positive electrical shut-off.
      c. Ability to lock in the open or closed position.
      d. Shipped loose for field mounting.

3. Fan Controls:
   a. Type: Keypad Control.
   b. Controls shall be capable of operating one or multiple HVLS fans as standard. Controls shall provide start/stop, speed, and rotation direction control capabilities as well as diagnostic and fault history information for each connected fan.
   c. Controls shall include RJ45 ports for plug-and-play connection to HVLS fans via CAT-5e communication cable in the field.
4. CAT-5e Cable:
   a. CAT-5e cable must be shielded 26-gauge cable with a drain wire and must be compliant with ISO 11801 to prevent network communication issues. Cable must use shielded RJ45 connectors with a soldered drain and wiring configuration must follow EIA/TIA T568B wiring pinout.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify roof curbs are installed and dimensions are as instructed by manufacturer.

3.2 INSTALLATION

A. Secure roof fans with cadmium plated steel lag screws to roof curb.
B. Install backdraft dampers on inlet to roof exhaust fans.
C. Install safety screen where inlet or outlet is exposed.
D. Provide sheaves required for final air balance.

3.3 DEMONSTRATION

A. Demonstrate fan operation and maintenance procedures.

3.4 PROTECTION OF FINISHED WORK

A. Do not operate fans for until ductwork is clean, filters in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION

SECTION 23 55 00 - FUEL-FIRED HEATERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:
   1. Tubular infrared heaters.
   2. Gas fired duct heaters.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI Z83.8 - Gas Unit Heaters.
   2. ANSI Z83.9 - Gas-Fired Duct Furnaces.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
   1. ASHRAE 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings.
   2. ASHRAE 103 - Methods of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers.

C. National Fire Protection Association:
   1. NFPA 54 - National Fuel Gas Code.
   2. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
   3. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems.
   4. NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances.

1.3 SUBMITTALS

A. Refer to Division 01 and Section 23 05 00 "General Mechanical Requirements" for submittals.

B. Product Data: Submit manufacturer's literature and data indicating rated capacities, weights, accessories, electrical nameplate data, and wiring diagrams.

C. Manufacturer's Installation Instructions: Submit Indicate rigging and assembly.

D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit manufacturer's descriptive literature, operating instructions, maintenance and repair data, and parts listing.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with State and local standards.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years' experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years' experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept heaters and controls on site in factory packaging. Inspect for damage.

1.8 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.9 WARRANTY

A. Furnish 5-year manufacturer warranty for heat exchanger.

PART 2 - PRODUCTS

2.1 TUBULAR RADIANT HEATERS

A. Manufacturers:
   1. Space Ray.
   2. Solaronics.
   3. Substitutions: Refer to Section 23 05 00 "General Mechanical Requirements" for substitutions.
B. Heaters shall be equipped with a 24-volt direct spark ignition with automatic 100 percent shutoff system. Power supplied to each heater shall be 120 VAC, 60 Hz. The heater controls shall include a pressure switch designed to provide complete unit shutoff in the event of combustion air or flue blockage.
C. The heaters shall be equipped with an on-line diagnosis monitoring light system. The 3 lights shall monitor the power to the heater, insufficient air flow, and the spark ignition and combination gas valve operation.
D. The heater's burner shall consist of a heavy-duty cast iron atmospheric burner. The flame characteristics shall be highly luminous for maximum radiant heat transfer through the emitter tube wall.
E. The heater's emitter tube shall be made of 16-gauge calorized aluminized steel or calorized titanium alloy AlumiTherm steel for long life (4-inch O.D.). The emitter tube shall be calorized for longevity, corrosion resistance, and high radiant efficiency. The measured surface emissivity shall be 0.83 - 0.86 at operating temperature. The calorization process shall produce an emitter tube that is highly radiant absorptive (0.95) on the interior and highly radiant emissive (0.83-0.86) on the exterior. The system shall have a radiant efficiency (or radiant coefficient) of 58 percent.

F. To assure a high degree of safety and increased radiant efficiency, the heaters shall operate under negative pressure at all times during operation to preclude the escape of combustion gases inside the building. The heater exhaust assembly shall include a 120-volt draft inducer. The draft inducer shall be equipped with a permanently lubricated, totally enclosed and shielded, fan cooled, and heavy duty ball bearing motor. The motor shall not require maintenance of lubrication for the life of the unit. The draft inducer assembly shall be capable of rotating 90 degrees for vertical or horizontal venting.

G. The heaters will be A.G.A. and C.G.A. design certified for vertical or horizontal venting, maximum 75 feet horizontal sidewall venting, and for 50 feet outside combustion air inlet duct. There shall be no draft hoods. The combustion chamber shall be totally enclosed.

H. The heaters shall utilize factory assembled, highly efficient aluminum reflectors with a reflectivity of 97.5 percent. The reflector ends shall be enclosed for maximum radiant heat output and minimum convection losses.

I. The heaters shall be factory assembled and tested. The heaters shall not require any field adjustments to assure maximum performance and safety. Heaters shall operate satisfactorily in any position from horizontal to 45 degrees from horizontal, and incline mounted up to 2/12 pitch, and shall be suitable for vented/indirect vented applications. Heaters shall be designed to operate on propane gas.

J. Heaters shall be design certified by the American Gas Association. The manufacturer shall provide a written limited warranty covering the heavy 1-piece cast iron burner for a period of 10 years, the emitter tube for a period of 5 years and all components utilized in the heater's control assembly for a period of 1 year.

K. Provide 24-volt 2-stage thermostat as shown on Drawings.

L. Flue Vents:
   1. Provide and install flue vents on all gas burning devices.
   2. All such flue vents shall be constructed of Metalbestos double wall metal conduit and shall be of the sizes recommended by the manufacturers of the devices vented. They shall be complete with all couplings and other required fittings and shall terminate 24 inches above the roof in a ventilator type weatherproof rainhead similar and equal to a Breidert Air-X-Hauster. Where any vent passes through combustible construction it shall be provided with a separation in accordance with the standards of the NFPA. All vents shall be flashed and counterflashed into the roofing construction to the satisfaction of the Architect and shall be watertight.

2.2 GAS FIRED DUCT FURNACES.

A. Manufacturers:
   1. Trane.
   2. Carrier.
   3. Substitutions: 23 05 00 "General Mechanical Requirements."

B. Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, heat exchanger, burner, controls, and accessories.
   1. Gas control: modulating.
   2. Ignition System: Electric ignition pilot to main burner.
   3. Control Voltage: 115 volt, 60 hertz.
   4. Location: Suspended overhead.

C. Cabinet: Galvanized steel, easily removed and secured access panels, insulated or double panel construction.

D. Heat Exchanger: 409 Stainless-steel welded construction.

E. Gas Burner: Separated combustion, Provide with combustion air inlet kit.

F. Gas Burner Safety Controls:
   1. Thermocouple sensor: Prevents opening of gas valve until pilot flame is proven and stops gas flow on ignition failure.
   2. Flame rollout switch: Installed on burner box and prevents operation.
   3. Vent safety shutoff sensor: Temperature sensor installed on draft hood and prevents operation, manual reset.
   4. Limit Control: Fixed stop at maximum permissible setting, de-energizes burner on excessive bonnet temperature, automatic resets.

G. Controls: Unit shall be controlled by outside air unit controller.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify space is ready for installation of units and openings are as indicated on Shop Drawings.

3.2 INSTALLATION

A. Connect propane piping in accordance with NFPA 58.
B. Connect propane piping to unit, full size of unit gas train inlet. Arrange piping with clearances for burner service.
C. Install vent connections in accordance with NFPA 211. Install concentric or separate vents on accordance with manufacturer’s recommendations.
D. Provide hangers and supports for suspended units. Refer to Section 23 05 00.20 "Basic Mechanical Materials and Methods."
E. Provide operating controls.
F. Provide connection to electrical power systems. Refer to Division 26.

END OF SECTION

SECTION 23 74 33.13 - 100% OUTSIDE AIR DX AIR HANDLING UNITS WITH HOT GAS REHEAT

PART 1 - GENERAL

1.1 Section Includes

A. Section Includes:
   1. Packaged air handling units.
   2. Refrigeration components.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 26 05 19 “Equipment Wiring Systems.”

1.2 REFERENCES

A. ANSI/ASHRAE 15 - Safety Code for Mechanical Refrigeration.
B. ANSI/ASHRAE/IES 90 A - Energy Conservation in New Building Design Standard.
C. AHRI 210/240 - Unitary Air-Conditioning Equipment and Air-Source Heat Pump Equipment, (less than 135,000 Btuh).
D. AHRI 360 - Commercial and Industrial Unitary Air Conditioning Equipment testing and rating standard, (equipment greater than 135,000 Btuh).
E. AHRI 340 - Commercial and Industrial Unitary Heat pump Equipment, (heat pumps above 135,000 Btuh).
F. ANSI Z21.47/UL1995 - Unitary Air Conditioning Standard for safety requirements.

1.3 QUALITY ASSURANCE

A. Air Handling Units: Product of manufacturer regularly engaged in production of components who issues complete catalog data on total product.

1.4 SUBMITTALS

A. Submit unit performance data including capacity, nominal and operating performance
B. Submit Mechanical Specifications for unit and accessories describing construction, components and options.
C. Submit Shop Drawings indicating overall dimensions as well as installation, operation and service clearances. Indicate lift points and recommendations and center of gravity. Indicate unit shipping, installation and operating weights including dimensions.
D. Submit data on electrical requirements and connection points. Include recommended wire and fuse sizes or MCA, sequence of operation, safety and start-up instructions.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's installation instructions for rigging, unloading, and transporting units.
B. Store in clean dry place and protect from weather and construction traffic. Handle carefully to avoid damage to components, enclosures, and finish.

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not operate units for any purpose, temporary or permanent, until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

1.7 WARRANTY

A. Provide 1-year parts warranty.

PART 2 - PRODUCTS

2.1 SUMMARY

A. Contractor shall furnish and install air handling units(s) as shown as scheduled on the Contract Documents. Unit(s) shall be installed in accordance with this Specification and perform at the specified conditions as scheduled.

2.2 APPROVED MANUFACTURERS

A. Trane Odyssey Morganizer.
B. Aaon.
C. Addison HVAC.
D. Substitutions: Section 23 05 00 “General Mechanical Requirements.”

2.3 OUTDOOR UNIT

A. Casing:
   1. House components in heavy gauge galvanized steel frame and panels with weather resistant, baked enamel finish. Units surface shall be tested 672 hours in salt spray test.
   2. Casing shall have removable single side maintenance access panels, lifting handles, and provision for forklift and/or crane lifting.
   3. Mount controls in weatherproof panel provided with removable panels and/or access doors with quick opening fasteners.
B. Condenser Coils:
   1. Microchannel-Parallel flow aluminum tubes that are mechanically brazed to enhanced aluminum fins. Provide subcooling circuit(s). Factory leak test and vacuum dehydrate. Seal with holding charge of nitrogen.
C. Fans and Motors:
   1. Vertical discharge direct driven propeller type condenser fans with fan guard on discharge. Fans shall be statically and dynamically balanced.
   2. Weatherproof motors suitable for outdoor use, with permanently lubricated open air over (OAO) motors shall be provided and shall have built in thermal overload protection. Motors shall be rated IPX4 and shall have full contact ball bearings.
D. Compressors:
   1. Provide direct-drive scroll compressor(s) with centrifugal oil pump providing positive lubrication to moving parts. Motor shall be suction gas-cooled with internal temperature and current sensitive motor overloads. External high and low pressure cutout devices shall be provided.

E. Controls:
1. The control shall be a centralized microprocessor with indoor and outdoor temperature sensors that drive algorithms, making decisions for all heating, cooling, and ventilation.
a. The control shall have an integrated anti-short-cycle timer and integrated time delay between compressors.
2. Connectors shall be colored and keyed with colored wires.

2.4 INDOOR UNIT

A. General:
1. Provide indoor-mounted, draw-thru, packaged air handling unit(s). Unit(s) shall be factory-assembled including direct-expansion evaporator and reheat coil, modulating face and bypass dampers, Belimo actuator, expansion valve(s), check valves, condensate drain pan, centrifugal fan assembly with fan motor(s) and mounting bracket sheaves, drives and belts, filters, and DDC controls. Units shall be suitable for either horizontal or vertical airflow configuration and be used with or without ductwork.

B. Casing:
1. Unit casing shall be constructed of zinc-coated, heavy gauge, galvanized steel. Exterior surfaces shall be cleaned, phosphatized and finished with a baked enamel finish. Casing shall meet ASTM B117, 672 hour Salt Spray Test.
2. Unit casing shall be completely insulated with fire-retardant, permanent, foil-faced, 1/2-inch 1 pound glass fiber material.

C. Fans:
1. Provide fan section with forward curved, double width, double inlet, centrifugal type fan belt driven type.
2. Provide self-aligning, grease lubricated, ball or roller bearings with permanent lubrication fittings.
3. Factory mount motor on slide rails. Provide access to motor, drive, and bearings through removable casing panels.
4. Provide shafts constructed of solid hot rolled steel, ground and polished, with key-way, and protectively coated with lubricating oil.
5. Provide cast iron or steel variable and adjustable pitched sheaves, dynamically balanced, bored to fit shafts and keyed.

D. Motors:
1. Motor shall have thermal overload protection, permanently lubricated bearings, and shall meet the 1992 Energy Policy Act.
a. Constant volume units shall have adjustable motor sheaves.

E. Evaporator and Reheat Coils:
1. Provide configured aluminum fin surface mechanically bonded to copper tubing coil. Enclose coils with headers and return bends fully contained within casing. Coil shall have factory installed expansion valves and factory pressure tested at 660 psig.
2. Provide double-sloped condensate drain pan constructed of PVC with external connections on either side of unit under the evaporator coil. The drain pan shall be removable for cleaning.

F. Filters:
1. Provide 1-inch throwaway filters, factory installed. Provide access from side panel for removal. Filter rack shall be field convertible to 2-inch capability with field provided 2-inch throwaway filters.

G. Controls:

1. Provide microprocessor unit mounted control (UCM) which when used with an electronic discharge air sensor mounted on the DX coil provides proportional, integral, and derivative supply air control. This UCM shall perform all unit functions by making all heating, cooling and ventilating decisions through resident software logic. The microprocessor shall include several temperature functions. A discharge air sensor mounted after the evaporator coil shall maintain the specified dehumidification temperature. The second temperature sensor shall modulate the hot gas reheat coil face and by pass damper to maintain the specified supply air temperature. The third temperature sensor shall monitor suction temperature and lockout compressors to keep the evaporator coil from freezing. The fourth temperature sensor shall monitor liquid line temperature to modulate condenser fans to maintain head pressure. The fifth sensor is a space adjustable temperature or humidity input. The last temperature sensor monitors outdoor air temperature and makes the decision on when to lock out the compressors. All functions of the microprocessor shall be fully programmable. The UCM shall be BACnet compatible.

2.5 SEQUENCE OF OPERATIONS

A. Discharge Air Occupied Control:

1. Control of the Trane Hot Gas Reheat DX unit is accomplished through a dedicated standalone control module UC600. 1 controller will be installed on each system. The function of this controller is to maintain a programmed discharge air temperature.
2. A temperature sensor is mounted after the DX evaporator coil. This temperature sensor will be used by the UC600 to control the compressors to cycle on the stage 1 compressor above a 44 degree Fahrenheit dry bulb temperature setpoint in the cooling mode. The second stage compressor will be cycled on above 56 degree Fahrenheit dry bulb and off once the temperature falls below 51 degrees Fahrenheit.
3. A temperature sensor is field mounted in the duct after the hot gas reheat coil and will be used by the controller to output an analog signal to the face and bypass damper actuator to maintain the discharge temperature to a 70 degree Fahrenheit (adjustable) setpoint.
4. 2 strap-on temperature sensors will be used in the system. A suction line temperature will be located on the suction line of circuit #1. This temperature sensor will disable both cooling circuits when the temperature goes below 28 degrees Fahrenheit (adjustable) and enable them above 38 degrees Fahrenheit (adjustable). A liquid line temperature will be located on liquid line of compressor #1. This temperature sensor will enable control of a condenser fan by the controller when the liquid line temperature exceeds 90 (adjustable) degrees Fahrenheit. Under 85 degrees Fahrenheit (adjustable) the fan is disabled.
5. An outside air temperature sensor is mounted in the outside air intake section and monitors the outdoor air intake temperature. The controller is programmed to lock the unit cooling out if the outside air intake is 68 degrees Fahrenheit (adjustable). The cooling will be reenabled after the outside air temperature rises above 70 degrees Fahrenheit (adjustable).
6. When the outside air intake temperature is below 66 degrees Fahrenheit (adjustable). The fan shall continue to operate according to the occupied/unoccupied schedule.

2.6 FAN PROVING DEVICE

A. A contact closure into the controller will indicate to the controller proof of airflow from a differential pressure switch that will allow either cooling or heating to operate.

2.7 OCCUPIED/UNOCCUPIED CONTROL

A. A contact closure into the controller will indicate an occupied mode of operation, the controller will operate in the unoccupied mode while the contacts are open. The dry contact input will be wired from the building energy management system. The system can also be scheduled locally if equipped with a display, controlled by a Trane Building Automation system, or by a command from a BacNet network depending on controller type.

2.8 UNOCCUPIED MODE

A. When the controller is indexed to the unoccupied mode, the system will be off.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with manufacturer's instructions.

END OF SECTION

SECTION 23 76 00 - EVAPORATIVE COOLING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Sections:
1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. The publications listed below form a part of this Specification to the extent referenced. The publications are referred to in the text by basic designation only. The latest edition of the publication shall be used.
B. Air Conditioning and Refrigeration Institute (ARI):
1. ARI ANSI/ARI 410 - Forced-Circulation Air-Cooling and Air-Heating Coils.
C. Air Movement and Control Association (AMCA):
1. AMCA ANSI/AMCA 210 - Laboratory Methods of Testing Fans for Rating.
D. American Bearing Manufacturers Association (ABEMA):
1. ABEMA Std. 9 - Load Ratings and Fatigue Life for Ball Bearings.
2. ABEMA Std. 11 - Load Ratings and Fatigue Life for Roller Bearings.
E. ASTM International (ASTM):
1. ASTM A 36/A 36M - Carbon Structural Steel.
2. ASTM A 123 - Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products.
3. ASTM A 167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
4. ASTM A 176 - Stainless and Heat-Resisting Chromium Steel Plate, Sheet, and Strip.
5. ASTM A 569/A 569M - Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality.
6. ASTM A 924/A 924M - General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
7. ASTM B 117 - Operating Salt Spray (Fog) Apparatus.
8. ASTM B 209 - Aluminum and Aluminum-Alloy Sheet and Plate.
9. ASTM B 696 - Coatings of Cadmium Mechanically Deposited.
10. ASTM D 1654 - Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.
11. ASTM E 437 - Industrial Wire Cloth and Screens (Square Opening Series).
F. National Electrical Manufacturers Association (NEMA):
1. NEMA MG 1 - Motors and Generators.
G. The Society for Protective Coating (SSPC):
1. SSPC Paint 16 - Coal Tar Epoxy-Polyamide Black (or Dark Red) Paint.
2. SSPC PS 10.01 - Hot-Applied Coal Tar Enamel Painting System.
H. UL LLC (UL):
1. UL 94 - Tests for Flammability of Plastic Materials for Parts in Devices and Appliances.
2. UL 507 - Electric Fans.
3. UL 746C (1995; Rev thru Jul 1997) - Polymeric Materials - Use in Electric Equipment Evaluations.
4. UL 900 - Test Performance of Air Filter Units.

1.3 COORDINATION OF TRADES

A. Tank supports, piping offsets, fittings, and any other accessories required shall be furnished as required to provide a complete installation and to eliminate interference with other construction.

1.4 DELIVERY AND STORAGE

A. All equipment delivered and placed in storage shall be stored with protection from the weather, humidity and temperature variations, dirt and dust, or other contaminants.

1.5 FIELD MEASUREMENTS

A. Contractor shall become familiar with all details of the Work, verify all dimensions in the field, and shall advise the Contracting Officer of any discrepancy before performing the Work.

1.6 SUBMITTALS

A. Manufacturer's catalog data included with the detail drawings for the following items. The data shall be highlighted to show model, size, options, etc., that are intended for consideration. Data shall be adequate to demonstrate compliance with Contract requirements for the following:
   1. Industrial evaporative coolers.

B. Evaporative Cooling System Manuals: Electronic format manual (.pdf) listing step-by-step procedures required for system startup, operation, shutdown, cleaning, and routine maintenance, at least 2 weeks prior to field training. The manuals shall include the manufacturer's name, model number, parts list, and list of parts and tools that should be kept in stock by Owner for routine maintenance including the name of a local supplier, simplified wiring, and controls diagrams, and troubleshooting guide.

1.7 QUALIFICATIONS

A. Work specified in this Section shall be performed under the supervision of and certified by the manufacturer's representative. Certification shall be provided for installation Drawings, test procedures, and test results. The manufacturer's representative shall have no less than 3 continuous years of experience directly involved in the design and installation of evaporative cooling systems and shall have served in a similar capacity on no fewer than 5 projects of similar size and scope during that period.

1.8 ASBESTOS PROHIBITION

A. Asbestos and asbestos-containing products shall not be used.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. AeroCool (Phoenix Manufacturing Inc.).
B. Champion Coolers.
C. Essick Air.
D. Substitutions: Section 23 05 00 “General Mechanical Requirements.”

2.2 STANDARD PRODUCTS

A. The evaporative cooling system shall be designed and assembled by a manufacturer regularly engaged in the manufacturing of systems that are of a similar design, workmanship, capacity, and operation. Systems of similar design and capacity shall have been in satisfactory commercial or industrial use for 2 years before bid opening. The system shall be supported by a service organization certified by the system manufacturer.

2.3 NAMEPLATES

A. All equipment shall have a nameplate that identifies the manufacturer's name, address, type or style, model or serial number, and catalog number.

2.4 SPECIAL TOOLS AND SPARE PARTS

A. 1 set of special tools, calibration devices, and instruments required for operation, calibration, and maintenance of the equipment shall be provided. In addition, a 2-year supply of all spare parts for system operation shall be furnished.

2.5 EQUIPMENT GUARDS AND ACCESS

A. Belts, pulleys, chains, gears, couplings, projecting setscrews, keys, and other rotating parts exposed to personnel contact shall be fully enclosed or guarded according to OSHA requirements.

2.6 PIPING COMPONENTS

A. Piping components shall be as specified in Section 22 11 00 “Facility Water Distribution.”

2.7 AIR SUPPLY, DISTRIBUTION, VENTILATION, AND EXHAUST

A. All ductwork and related accessories shall be as specified in Section 23 31 00 “HVAC Ducts and Casings” and 23 33 00 “Air Duct Accessories.”

2.8 ELECTRICAL WORK

A. Electrical motor-driven equipment specified shall be provided complete with motor, motor starter, and controls. Unless otherwise specified, electric equipment, including wiring, shall be according to Division 26. Electrical characteristics and enclosure type shall be as shown. Use of the manufacturer's standard motor for motors less than 1 Hp or for single-phase motors are acceptable. Motor starters shall be provided complete with thermal overload protection and other appurtenances necessary. Each motor shall be according to NEMA MG 1 and shall be of sufficient size to drive the equipment at the specified capacity without exceeding the nameplate rating of the motor. Manual or automatic control and protective or signal devices required for the operation specified, and any control wiring required for controls and devices, but not shown, shall be provided.

2.9 MISCELLANEOUS MATERIALS

A. Materials shall conform to the following:
   1. Aluminum Sheets:
      a. ASTM B 209, Alloy 3003, temper H14.
   2. Steel Sheets, Galvanized:
      a. ASTM A 924, commercial quality.
   3. Steel Sheets, Uncoated:
      a. ASTM A 569, hot-rolled, commercial quality.
   4. Structural Steel:
      a. ASTM A 36.
   5. Stainless-Steel:
      a. ASTM A 167 and ASTM A 176.
   6. Structural Polymeric Components:
      a. Components made of structural polymeric materials shall meet the applicable requirements of UL 746C.

2.10 EVAPORATIVE COOLERS

A. Coolers shall be furnished as a factory package unit, complete with fan unit, pump, nozzles, piping, and evaporative cells.
B. Fan Unit:
   1. The unit shall be the centrifugal type and shall be complete with motor, drive equipment, and vibration-isolation supports between motor and fan housing. The pump shall be separately controlled. Manual reset type thermal overload protection shall be provided in the starter or shall be integral with the motor. The motor enclosure shall be drip proof type. Motor starters shall be magnetic across-the-line type with weather resistant enclosure. Fans and motors shall be provided with vibration isolation supports or mountings. Fan scroll and wheel shall be constructed of galvanized steel, aluminum, or stainless-steel with a stainless-steel, hot-dip zinc coated steel, or cadmium coated steel shaft. Fan scroll may be made of a different material than the wheel. Fans shall have air delivery ratings based on tests by an AMCA approved laboratory to the AMCA ANSI/AMCA 210.

C. Water-Handling Equipment:
   1. 1 or more banks of spray nozzles, flooding nozzles, water piping, pump, and strainers constitute water handling equipment. The number of banks of spray nozzles shall be as required to produce the specified efficiency. Spray nozzles shall be self-cleaning, centrifugal type, constructed of brass, and provided with removable caps for cleaning. Flooding nozzles shall be constructed of machined brass or low pressure PVC nozzles. Pump motor shall be a drip proof type suitable for the available electric service and provided with the thermal overload protection. Motor starter shall be magnetic across-the-line type with weather resistant enclosure. Unless otherwise indicated, all piping materials and installations shall be in conformance with Section 22 05 29 “Hangers and Supports.”

D. Evaporative Cells:
   1. Aspen pads made from shredded aspen wood, bound with plastic netting.

E. Water Tanks:
   1. Water tanks shall be constructed of galvanized steel, and welds shall be coated with zinc-rich paint or thermoplastic pan. The tank shall be provided with a means for drainage, a makeup connection, a float-operated valve, an overflow connection and, when required, a recirculating pump suction connection. The float valve shall be designed for a water working pressure of 125 psi, and both valve stems and seat disks shall be constructed of brass or other approved corrosion resisting material. Continuous bleed-off assembly or automatic flush system shall be provided. This system shall be adjustable to limit the concentrations from 3 to 10 times the incoming water concentration.

F. Cabinets:
   1. Galvanized steel sheets or stainless-steel shall be used in the construction of cabinets. Cabinets shall provide access to all moving parts including fans, pumps, and float valves.
   2. Metal Cabinets:
      a. Where possible, cabinets shall be factory assembled by either welded or bolted and screwed construction. Cabinets shall be braced and reinforced. Bolts, screws, hinges, trim, and other metal appurtenances shall be cadmium plated or galvanized in accordance with ASTM B 696 or ASTM A 123. When it is necessary to ship the unit disassembled, the cabinet sections shall be designed for assembly with cadmium plated or galvanized bolts. The interior and exterior of the galvanized steel cabinet, including hinges, handles, and other trim, shall be cleaned, and chemically treated to assure paint adhesion. The interior bottom of cabinet shall be factory coated with coal tar based enamel or epoxy and shall meet the requirements of SSPC PS 10.01 or SSPC Paint 16. Galvanized surfaces damaged during fabrication or handling shall be given a coat of zinc-rich paint. Finish shall be as specified in paragraph "Painting and Finishing."

2.11 PREVENTION OF GALVANIC CORROSION

A. Materials that will be exposed to water during operation of the unit shall be such that galvanic action will not occur in the normal operation of the equipment. The interior of water tank and cabinet and the exterior of the fan housing shall be finished with an enamel paint coat or epoxy coating. There will be no evidence of holidays and particular attention will be given to sealing joints. Media retainer will not be coated. This paragraph does not apply to the interior water tank and cabinet of stainless-steel materials.

2.12 CONTROLS

A. Refer to the Drawings.

PART 3 - EXECUTION

3.1 INSTALLATION

A. All equipment shall be installed as shown and in accordance with the manufacturer's diagrams and recommendations except where otherwise indicated. Units shall be connected to the building's water supply system. Piping installation shall be as specified in Section 22 11 00 “Facility Water Distribution.” A ball valve and union shall be installed in the water supply line adjacent to each unit. Valves shall not be installed with stems below the horizontal. All supply piping shall be sloped to drain to the indicated stop and waste valve.

3.2 PAINTING AND FINISHING

A. Factory Coating:
   1. Equipment and component items, when fabricated from ferrous metal, shall be factory finished with the manufacturer's standard finish except that all components inside and outside of the evaporative cooling unit shall have weather resistant finishes that will withstand 500 hours of exposure to the salt spray test specified in ASTM B 117 and ASTM D 1654 using a 5 percent sodium chloride solution. Immediately after completion of the test, the specimen shall show no signs of blistering, wrinkling, cracking, or loss of adhesion, and no sign of rust creepage beyond 1/8-inch on either side of the scratch mark. Upon request of the Contracting Officer, results of the test will be submitted by the manufacturer.

B. Field Painting:
   1. Painting of surfaces not otherwise specified, including nonferrous metals, finish painting of items only primed at the factory, and field repair of factory finish, is specified in Division 09 - Finishes.

3.3 CLEANING

A. Ducts, plenums, and casings shall be thoroughly cleaned of all debris and blown free of all small particles of rubbish and dust before installing outlet faces. Equipment shall be wiped clean, with all traces of oil dust, dirt, or paint spots removed. Temporary filters shall be provided for all fans that are operated during construction, and after all construction dirt has been removed from the building, new filters shall be installed. Bearings shall be properly lubricated with oil or grease as recommended by the manufacturer.

3.4 PERFORMANCE TESTS

A. After testing, adjusting, and balancing has been completed as specified, the system shall be tested as a whole to see that all items perform as integral parts of the system, and that operation is as specified. Corrections and adjustments shall be made as necessary to produce the conditions indicated or specified. Capacity tests and general operating tests shall be conducted by the manufacturer's representative. Tests shall cover a period of not less than 1 day and shall demonstrate that the entire system is functioning according to the Specifications. Ambient air temperature and supply air temperature and quantity readings shall be made at hourly intervals for the duration of the time period.

3.5 TRAINING COURSE

A. Contractor shall conduct a training course for operating staff. The training period shall start after the system is functionally completed but prior to final acceptance tests. The field instructions shall cover all of the items contained in the operating and maintenance instructions.

END OF SECTION

SECTION 23 81 26 - SPLIT SYSTEM AIR CONDITIONERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Gas fired furnace.
   2. Evaporator coils.
   3. Condensing units.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. American National Standards Institute:
   1. ANSI Z83.8 - Gas Unit Heaters.
   2. ANSI Z83.9 - Gas-Fired Duct Furnaces.

B. Air-Conditioning and Refrigeration Institute:
   1. ARI 210/240 - Unitary Air-Conditioning and Air-Source Heat Pump Equipment.
   2. ARI 270 - Sound Rating of Outdoor Unitary Equipment.
   3. ARI 520 - Positive Displacement Condensing Units.
   4. ARI 610 - Central System Humidifiers for Residential Applications.

C. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
   1. ASHRAE 15 - Safety Code for Mechanical Refrigeration.
   2. ASHRAE 52.1 - Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.
   3. ASHRAE 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings.
   4. ASHRAE 103 - Methods of Testing for Annual Fuel Utilization Efficiency of Residential Central Furnaces and Boilers.

D. National Electrical Manufacturers Association:
   1. NEMA MG 1 - Motors and Generators.

E. National Fire Protection Association:
   1. NFPA 31 - Standard for the Installation of Oil-Burning Equipment.
   2. NFPA 54 - National Fuel Gas Code.
   3. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.
   4. NFPA 90B - Standard for the Installation of Warm Air Heating and Air Conditioning Systems.
   5. NFPA 211 - Standard for Chimneys, Fireplaces, Vents, and Solid Fuel Burning Appliances.

F. Underwriters Laboratories Inc.:
   1. UL 207 - Refrigerant-Containing Components and Accessories, Nonelectrical.
   2. UL 726 - Oil-Fired Boiler Assemblies.
   3. UL 727 - Oil-Fired Central Furnaces.
   4. UL 729 - Oil-Fired Floor Furnaces.

1.3 SUBMITTALS

A. Refer to Division 01 and Section 23 05 00 “General Mechanical Requirements” for submittals.
B. Product Data: Submit rated capacities, efficiencies, weights, required clearances, and location and size of field connections, accessories, electrical nameplate data, and wiring diagrams.
C. Design Data: Indicate refrigerant pipe sizing.
D. Manufacturer's Installation Instructions: Submit rigging, assembly, and installation instructions.
E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit manufacturer's descriptive literature, operating instructions, service instructions, installation instructions, maintenance and repair data, and parts listing.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with State standards.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years’ experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years’ experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept air handlers, condensing units and thermostats on site in factory packaging. Inspect for damage.

1.8 ENVIRONMENTAL REQUIREMENTS

A. Do not install condensing unit foundation pad when ground is frozen or muddy.

1.9 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.10 WARRANTY

A. Furnish 5-year manufacturer’s warranty for compressors.

PART 2 - PRODUCTS

2.1 GAS FIRED FURNACES

A. Manufacturers:
   1. Lennox.
   2. The Trane Company.
   3. Substitutions: Refer to Section 23 05 00 “General Mechanical Requirements.”

B. Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating element, controls, air filter and accessories; wired for single power connection with control transformer.
   1. Air Flow Configuration: Upflow or Horizontal, refer to the Drawings.
   2. Fuel: Natural gas fired.
   3. Electric Refrigeration: Refrigerant cooling coil and outdoor package containing compressor, condenser coil and condenser fan.
   4. Accessories: Concentric roof termination kit.

C. Provide equipment that is UL listed as suitable for clearance space available in installed location.

D. Cabinet: Steel with baked enamel finish, easily removed and secured access panels with safety interlock switches for furnaces installed indoors, insulation.

E. Supply Fan: Centrifugal type rubber mounted with direct.

F. Motor: Direct drive; 1,750 rpm multiple speed, permanently lubricated.

G. Heat Exchanger: Aluminized steel construction.

H. Gas Burner:
   1. Atmospheric type with adjustable combustion air supply.
   2. Gas valve provides 100 percent safety gas shut-off; 24 volt combining pressure regulation, safety ignition system, manual On-Off valve, pilot filtration, automatic electric valves.
   3. Electronic or pilot ignition, with electric spark or hot surface igniter.
   4. Corrosion resistant combustion air blower with permanently lubricated motor.

I. Gas Burner Safety Controls:
   1. Ignition and flame- sensing safety controls to prove adequate combustion air supply and stop gas flow on ignition failure.
   2. Flame rollout switch: Installed on burner box and prevents unsafe operation.
   3. Blocked Vent shutoff system: Temperature sensor installed on draft hood and prevents operation, manual reset.
   4. Limit Control: Fixed stop at maximum permissible setting, de-energizes burner on excessive outlet air temperature, automatic resets.

J. Operating Controls:
   1. Room Sensor: Cycles furnace system on and off to maintain room temperature setting.
   2. Supply Fan Control: Energize from outlet air temperature or timer device independent of burner controls, with adjustable timed off delay and fixed timed on delay, with manual switch for continuous fan operation.
   3. For additional information refer to 2.5 in this Section.

K. Air Filters: 1-inch thick glass fiber, disposable type arranged for easy replacement.

L. Performance:
   1. Ratings: Seasonal Efficiency Rating not less than requirements of ASHRAE 103.
   2. Refer to Furnace Schedule. Gas heating capacities are sea level ratings.
   3. Air Handling: Refer to schedule on Drawings.

2.2 AUXILIARY DRAINAGE

A. Where blocked drain or condensate pan overflow can cause building damage, provide auxiliary drain pan with a shutoff float switch to turn off unit.
   1. Minimum Length and Width: 3 inches larger than unit length and width.
   2. Minimum Depth: 1.5 inches.
   3. Materials:
      a. Metal Pan: Galvanized steel, minimum 0.0276-inch thick.
      b. Nonmetallic Pan: Minimum 0.0625-inch thick.

2.3 EVAPORATOR COILS

A. Construction and Ratings: In accordance with ARI 210/240.
B. Evaporator Coil: Copper tube aluminum fin assembly, galvanized or polymeric drain pan, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve.

2.4 CONDENSING UNITS

A. Manufacturers:
   1. Lennox.
   2. The Trane Company.
   3. Substitutions: Refer to Section 23 05 00 “General Mechanical Requirements.”
B. Construction and Ratings: In accordance with ARI 210/240. Testing: ASHRAE 15.
C. Compressor: Hermetic, 3600 rpm, resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Furnish time delay control to prevent short cycling.
D. Refrigeration Accessories: Filter Drier, high-pressure switch (manual reset), low-pressure switch (automatic reset), service valves and gage ports and thermometer well (in liquid line).
E. Air Cooled Condenser: Aluminum fin and copper tube coil, with direct drive axial propeller fan resiliently mounted, galvanized fan guard.
F. Refrigeration Operating Controls:
   1. Room Thermostat: Cycles condensing unit and supply fan to maintain room temperature setting.

2.5 CONTROLS

A. Refer to Section 23 09 23 “Direct Digital Controls.”.

2.6 ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Division 26 - Electrical for requirements for electrical characteristics.
B. Disconnect Switch: Mount switch on or near equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify building is ready for installation of units and openings are as indicated on Drawings.
B. Verify piping rough-in is at correct location.
C. Verify electrical rough-in is at correct location.

3.2 INSTALLATION

A. Install refrigerant piping from unit to remote heat pump. Install refrigerant specialties furnished with unit.
B. Pipe condensate from drain pan to condensate drainage system. Refer to Drawings.
C. Install accessories furnished loose for field mounting.
D. Install electrical devices furnished loose for field mounting.
E. Install control wiring between unit control panel and field mounted control devices.

3.3 CLEANING

A. After construction is completed, clean exposed surfaces of units.
B. Vacuum clean coils and inside of cabinets.
C. Touch up marred or scratched surfaces of factory finished cabinets, using finish materials furnished by manufacturer.

3.4 DEMONSTRATION

A. Demonstrate unit operation and maintenance.
B. Furnish services of manufacturer's technical representative for 2 hours to instruct Owner's personnel in operation and maintenance of units. Schedule training with Owner, provide at least 7 days' notice before training date.

3.5 PROTECTION OF FINISHED WORK

A. Protect finished surfaces of cabinets with protective covers during remainder of construction.

END OF SECTION

SECTION 23 81 26.10 - DUCTLESS SPLIT-SYSTEM AIR CONDITIONERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes mini-split system air conditioners, with remote air cooled condensing units.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 23 05 00 "General Mechanical Requirements."
   3. Division 26 Electrical.

1.2 REFERENCES

A. ARI 210/240 - Unitary Air-Conditioning and Air-Source Heat Pump Equipment.
B. ARI 270 - Sound Rating of Outdoor Unitary Equipment.
C. ARI 340/360 - Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment.
D. ASHRAE 52.1 - Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.
E. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

1.3 SUBMITTALS

A. Refer to Division 01 and Section 23 05 00 "General Mechanical Requirements" for submittals.
B. Product Data: Submit data indicating:
   1. Cooling and heating capacities.
   2. Dimensions.
   3. Rough-in connections and connection requirements.
   4. Duct connections.
   5. Electrical requirements with electrical characteristics and connection requirements.
   6. Controls.
   7. Accessories.
C. Manufacturer's Installation Instructions: Submit assembly, support details, connection requirements, and include start-up instructions.
D. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of controls separate from units.
B. Operation and Maintenance Data: Submit manufacturer's descriptive literature, operating instructions, installation instructions, and maintenance and repair data.

1.5 QUALITY ASSURANCE

A. Cooling Capacity: Rate in accordance with ARI 210/240.
B. Sound Rating: Measure in accordance with ARI 270.
C. Insulation and Adhesives: Conform to requirements of NFPA 90A.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years' experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years' experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept equipment on site in factory packaging. Inspect for damage.
B. Protect equipment from damage by providing temporary covers until construction is complete in adjacent space.

1.8 WARRANTY

A. Furnish 5-year manufacturer's warranty for compressors.

PART 2 - PRODUCTS

2.1 MINI SPLIT SYSTEM AIR CONDITIONERS

A. Manufacturers:
   1. Carrier.
   2. Daikin.
   3. Mitsubishi Electric.
   4. L.G.
   5. Samsung.
   6. Substitutions: Refer to Section 23 05 00 "General Mechanical Requirements."
B. Wal-Mounted Indoor Unit:
   1. Indoor unit shall be factory assembled, wired and run tested. Contained within the unit shall be all factory wiring, piping, control circuit board and fan motor. The unit shall have a self-diagnostic function, 3-minute time delay mechanism, an auto restart function, an emergency operation function and a test run switch. Indoor unit and refrigerant pipes will be charged with dry air instead of refrigerant before shipment from the factory.
   2. Unit Cabinet:
      a. Casing shall have a white finish.
      b. Multi-directional drain and refrigerant piping offering 4 directions for refrigerant piping and 2 directions for draining shall be standard.
      c. There shall be a separate back plate which secures the unit firmly to the wall.

3. Fan:
    a. Evaporator fan shall be an assembly with a line-flow fan direct driven by a single motor.
    b. Fan shall be statically and dynamically balanced and run on a motor with permanently lubricated bearings.
    c. A manual adjustable guide vane shall be provided with the ability to change the airflow from side to side (left to right).
    d. A motorized air sweep flow louver shall provide an automatic change in airflow by directing the air up and down to provide for uniform air distribution.
    e. Indoor fan shall consist of 3 speeds: High, Medium, and Low.
4. Filter: Return air shall be filtered by means of an easily removable washable filter.
5. Coil:
    a. Evaporator coil shall be of nonferrous construction with smooth plate fins on copper tubing.
    b. Tubing shall have inner grooves for high efficiency heat exchange.
    c. All tube joints shall be brazed with phos copper or silver alloy.
    d. Coils shall be pressure tested at the factory.
    e. A condensate pan and drain shall be provided under the coil.
6. Electrical:
    a. Unit shall be powered from the outdoor unit.
    b. Indoor unit shall not have any supplemental electrical heat elements.
7. Control:
    a. This unit shall have a wireless controller to perform input functions necessary to operate the system.
    b. Controller shall consist of a Power On-Off switch, Mode Selector, Temperature Setting, Timer Control, Fan Speed Select and Auto Vane selector.
    c. Temperature changes shall be by 2 degrees Fahrenheit increments with a range of 59 to 89 degrees Fahrenheit.
    d. Microprocessor located in the indoor unit shall have the capability of sensing return air temperature and indoor coil temperature, receiving and processing commands from the wireless controller, providing emergency operation and controlling the outdoor unit.
    e. System shall be capable of automatic restart when power is restored after power interruption.
    f. Control system shall control the continued operation of the air sweep louvers, as well as provide on/off and system/mode function switching.

C. Outdoor Unit:
1. Outdoor unit is designed specifically for use with the indoor units. The unit must have a powder coated finish. Outdoor unit shall be completely factory assembled, piped and wired. Each unit must be run tested at the factory.
2. Unit Cabinet: Casing shall be fabricated of galvanized steel, bonderized and finished with a powder coated baked enamel. Provide with manufacturers hail guard.
3. Fan:
    a. Unit shall be furnished with a direct drive propeller type fan.
    b. Motor shall have inherent protection, be permanently lubricated bearings.
    c. Fan motor shall be mounted for quiet operation.
    d. Fan shall be provided with a raised guard to prevent contact with moving parts.
    e. outdoor unit shall have a horizontal discharge airflow.

4. Coil:
   a. Condenser coil shall be of nonferrous construction with lanced or corrugated plate fins on copper tubing.
   b. Coil shall be protected with an integral metal guard.
   c. Refrigerant flow from the condenser shall be controlled by means of a metering orifice.
   d. Provide with either a factory installed or field installed hail screen.
5. Compressor:
   a. Compressor shall be a high-performance rotary.
   b. Outdoor unit shall have an accumulator.
   c. Compressor will be equipped with an internal thermal overload.
   d. Outdoor unit must have the ability to operate with a maximum height difference of 25 feet and have refrigerant tubing length of 49 feet between indoor and outdoor units without the need for line size changes, traps or additional oil.
   e. Compressor shall be mounted to avoid the transmission of vibration.
6. Electrical:
   a. Unit electrical power shall be as scheduled.
   b. Outdoor unit shall be controlled by the microprocessor located in the indoor unit.

2.2 ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Electrical Characteristics: In accordance with Division 26 Electrical.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify piping rough-in is at correct location.
B. Verify electrical rough-in is at correct location.

3.2 INSTALLATION

A. Install refrigerant piping from unit to remote condensing unit. Install refrigerant specialties furnished with unit.
B. Pipe condensate from drain pan to condensate drainage system. Refer to Drawings.
C. Install accessories furnished loose for field mounting.
D. Install electrical devices furnished loose for field mounting.
E. Install control wiring between unit control panel and field mounted control devices.

3.3 CLEANING

A. After construction is completed, clean exposed surfaces of units.
B. Vacuum clean coils and inside of cabinets.
C. Touch-up marred or scratched surfaces of factory finished cabinets, using finish materials furnished by manufacturer.

3.4 DEMONSTRATION

A. Demonstrate unit operation and maintenance.
B. Furnish services of manufacturer's technical representative for 2 hours to instruct Owner's personnel in operation and maintenance of units. Schedule training with Owner, provide at least 7 days' notice to of training date.

3.5 PROTECTION OF FINISHED WORK

A. Protect finished surfaces of cabinets with protective covers during remainder of construction.

END OF SECTION

SECTION 23 81 26.20 - SPLIT-SYSTEM HEAT PUMPS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Air handling unit.
   2. Condensing unit.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 03 30 00 “Cast-In-Place Concrete:” Execution requirements for concrete foundations specified by this section.
   3. Section 23 23 00 “Refrigerant Piping:” Execution requirements for connection to refrigerant piping specified by this section.
   4. Section 23 33 00 “Air Duct Accessories:” Flexible connections.

1.2 REFERENCES

A. Air-Conditioning and Refrigeration Institute:
   1. ARI 210/240 - Unitary Air-Conditioning and Air-Source Heat Pump Equipment.
   2. ARI 270 - Sound Rating of Outdoor Unitary Equipment.
   3. ARI 340/360 - Commercial and Industrial Unitary Air-Conditioning and Heat Pump Equipment.
   4. ARI 365 - Commercial and Industrial Unitary Air-Conditioning Condensing Units.

B. American Society of Heating, Refrigerating and Air-Conditioning Engineers:
   1. ASHRAE 52.1 - Gravimetric and Dust-Spot Procedures for Testing Air-Cleaning Devices Used in General Ventilation for Removing Particulate Matter.
   2. ASHRAE 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings.

C. ASTM International:
   1. ASTM B117 - Standard Practice for Operating Salt Spray (Fog) Apparatus.

D. National Electrical Manufacturers Association:
   1. NEMA MG 1 - Motors and Generators.

E. National Fire Protection Association:
   1. NFPA 90A - Standard for the Installation of Air Conditioning and Ventilating Systems.

1.3 SUBMITTALS

A. Refer to section 23 05 00 “General Mechanical Requirements” for submittals.

B. Product Data: Submit data indicating:
   1. Cooling and heating capacities.
   2. Dimensions.
   3. Weights.
   4. Rough-in connections and connection requirements.
   5. Duct connections.
   6. Electrical requirements with electrical characteristics and connection requirements.

7. Controls.
8. Accessories.

C. Manufacturer's Installation Instructions: Submit assembly, support details, connection requirements, and include start-up instructions.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of controls installed remotely from units.
B. Operation and Maintenance Data: Submit manufacturer's descriptive literature, operating instructions, installation instructions, and maintenance and repair data.

1.5 QUALITY ASSURANCE

A. Cooling Capacity: Rate in accordance with ARI 210/240.
B. Sound Rating: Measure in accordance with ARI 270.
C. Insulation and adhesives: Meet requirements of NFPA 90A.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years' experience.
B. Installer: Company specializing in performing Work of this Section with minimum 3 years' experience.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Accept units and components on site in factory protective containers, with factory shipping skids and lifting lugs. Inspect for damage.
B. Comply with manufacturer's installation instruction for rigging, unloading, and transporting units.
C. Protect units from weather and construction traffic by storing in dry, roofed location.

1.8 WARRANTY

A. Furnish 5-year manufacturer's warranty for compressors.

PART 2 - PRODUCTS

2.1 SPLIT SYSTEM AIR CONDITIONING UNITS

A. Manufacturers:
1. Carrier Corp.
2. Trane.
3. Lennox.
4. Substitutions: Refer to section 23 05 00 “General Mechanical Requirements.”

B. Product Description: Split system consisting of air handling unit and condensing unit including cabinet, evaporator fan, refrigerant cooling coil, compressor, refrigeration circuit, condenser, electric heating coil, air filters, controls, air handling unit accessories, condensing unit accessories, and refrigeration specialties.

2.2 AIR HANDLING UNIT

A. Configuration: As indicated on Drawings.
B. Cabinet:
   1. Panels: Constructed of galvanized steel with baked enamel finish. Access Panels: Located on both sides of unit. Furnish with duct collars on inlets and outlets.
   2. Insulation: Factory applied to each surface to insulate entire cabinet. 1/2-inch thick aluminum foil faced glass fiber with edges protected from erosion.
C. Evaporator Fan: Forward curved centrifugal type, resiliently mounted with adjustable belt drive and ECM motor. Motor permanently lubricated with built-in thermal overload protection.
D. Evaporator Coil: Constructed of copper tubes expanded onto aluminum fins. Factory leak tested under water. Removable, PVC construction, double-sloped drain pan with piping connections on both sides.
E. Refrigeration System: Single refrigeration circuits controlled by factory installed thermal expansion valve.
F. Electric Heating Coil: Helical nickel-chrome resistance wire coil heating elements with refractory ceramic support bushings easily accessible with automatic reset thermal cut-out, built-in contactors, galvanized steel frame, load fuses.
G. Air Filters: 2-inch thick pleated filter.

2.3 CONDENSING UNIT

A. General: Factory assembled, and tested air cooled condensing units, consisting of casing, compressors, condensers, coils, condenser fans and motors, and unit controls.
B. Unit Casings: Exposed casing surfaces constructed of galvanized steel with manufacturer's standard baked enamel finish. Designed for outdoor installation and complete with weather protection for components and controls, and complete with removable panels for required access to compressors, controls, condenser fans, motors, and drives.
C. Compressor: Single refrigeration circuit with reciprocating type compressors, resiliently mounted, with positive lubrication, and internal motor overload protection.
D. Condenser Coil: Constructed of copper tubing mechanically bonded to aluminum fins, factory leak and pressure tested.
E. Controls: Furnish operating and safety controls including high and low pressure cutouts. Control transformer. Furnish magnetic contactors for compressor and condenser fan motors.
F. Condenser Fans and Drives: Direct drive propeller fans statically and dynamically balanced. Wired to operate with compressor. Permanently lubricated ball bearing type motors with built-in thermal overload protection.
G. Condensing Unit Accessories: Furnish the following accessories:
   1. Controls to provide low ambient cooling to 40.
   2. Time delay relay.
   3. Anti-short cycle timer.
   4. Vibration isolators.
   5. Condenser Coil Guard: Condenser fan openings furnished with factory louvered Hail guards.

2.4 CONTROLS

A. Furnish interface to Direct Digital Control System specified in Section 23 09 23 “Direct Digital Controls.”

2.5 ELECTRICAL CHARACTERISTICS AND COMPONENTS

A. Electrical Characteristics: In accordance with Division 26.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify concrete pad for condensing unit is ready for unit installation.

3.2 INSTALLATION - AIR HANDLING UNIT

A. Install air handling units on vibration isolators.
B. Install floor mounted units on concrete housekeeping pads at least 3-1/2 inches high and 6 inches wider than unit.
C. Connect air handling units to supply and return ductwork with flexible connections.
D. Install condensate piping with trap and route from drain pan to location as shown on drawings
E. Install components furnished loose for field mounting.
F. Install connection to electrical power wiring in accordance with Section 26 05 13 “Building Wire and Cable.”

3.3 INSTALLATION - CONDENSING UNIT

A. Install condensing units on vibration isolators.
B. Install units on concrete foundations.
C. Install refrigerant piping from unit to condensing unit. Install refrigerant specialties Refer to Section 23 23 00 “Refrigerant Piping.”
D. Evacuate refrigerant piping and install initial charge of refrigerant.
E. Install electrical devices furnished loose for field mounting.
F. Install control wiring between air handling unit, condensing unit, and field installed accessories.
G. Install connection to electrical power wiring in accordance with 26 05 13 “Building Wire and Cable.”
H. Install Work in accordance with State and local standards.

3.4 CLEANING

A. Vacuum clean coils and inside of unit cabinet.
B. Install temporary filters during construction period. Replace with permanent filters at Substantial Completion.

3.5 DEMONSTRATION

A. Demonstrate air handling unit operation and maintenance.
B. Demonstrate starting, maintenance, and operation of condensing unit including low ambient temperature operation.

3.6 PROTECTION OF FINISHED WORK

A. Do not operate air handling units until ductwork is clean, filters are in place, bearings lubricated, and fan has been test run under observation.

END OF SECTION

SECTION 26 05 00 - BASIC ELECTRICAL METHODS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REQUIREMENTS OF REGULATORY AGENCIES AND STANDARDS

A. Regulatory Agencies: Installation, materials, equipment, and workmanship shall conform to the applicable provisions of the following:
B. National Electrical Code (NEC).
C. National Electrical Safety Code (NESC).
D. Terms and conditions of the electrical utility and other authorities having lawful jurisdiction pertaining to the Work required.
E. All temperature control wiring and associated conduit and boxes shall be provided under other sections of the Specifications. All power and control wiring, not identified under Divisions 22 and 23, shall be provided under Division 26.
F. The Work covered by Division 26 of the Specifications includes the furnishing of all materials, labor, transportation, tools, permits, and fees for the complete installation of all electrical work required in the Contract Drawings.
G. In the event that additional or special construction is required, the Contractor is responsible for providing all material and equipment which are usually furnished with such construction in order to complete the installation, whether indicated or not.
H. The contractor shall familiarize himself with the existing conditions of the site and advise the Architect of any discrepancy or conflict prior to bidding.
I. The contractor shall be responsible for all permits, fees, and licenses required for the Project. All cost of such permits or fees shall be included in the bid.
J. All equipment and material shall be installed in accordance with the applicable manufacturer's recommendations and standards.
K. Install sleeves, sealant pans, and roof penetrations as required for the installation of the electrical work. All such work is subject to the approval of the Architect.
L. Contractor shall be responsible for coordinating with the utility service provider to verify all locations, routing, equipment, and labor that will be furnished as a part of this contract.
M. Any fees or charges associated with delivering permanent power for the Project shall be included in the Contractor's bid.

1.3 SUBMITTALS

A. The intent of this section is to give general submittal information, refer to specific submittal information in the subsequent mechanical sections.
B. Within 10 days after award of the contract, and before orders are placed, Contractor shall submit specific information on list of equipment and principal materials specified. Contractor shall indicate and/or provide names of manufacturers, catalog, and model numbers, cut sheets, and such other supplementary information as necessary for evaluation. Minimum of 6 copies, or as directed by the Architect, of each shall be submitted and shall include all items mentioned by model number and/or manufacturer's name in the Specifications or in schedules on the Drawings.

C. Requirements for each submittal:
   1. Bear a dated stamp or specific written indication that the Contractor has reviewed and approved all submittal prior to submission to Architect.
   2. Have all information deleted by Contractor that pertains to the means and methods of construction or to fabrication, assembly, installation, or erection (approval by Architect shall not extend to these areas unless specifically noted by Architect).
   3. Be clearly and SPECIFICALLY marked as to which specific piece of equipment is being submitted, by use of a permanent marker, stamp, etc., so as to distinguish it from other pieces of equipment that may occur on the same page.
   4. Be clearly marked as to which available options are being submitted that are associated with a piece of equipment.
   5. Be complete with respect to quantities, dimensions, specific performance, materials, and similar data to enable the Architect to review the proposed equipment.

   Omission by Contractor of any of the above requirements or submittals will subject submittal to automatic rejection without review.

   Any submittals received by Architect that were not requested shall be returned without review of any kind.

PART 2 - PRODUCTS

2.1 EQUIPMENT REQUIREMENTS

A. The electrical requirements for equipment specified or indicated on the Drawings are based on information available at the time of design. If equipment furnished for installation has electrical requirements other than indicated on the electrical Drawings, the Contractor shall make any required changes to wire and conduit size, controls, overcurrent protection and installation as required to accommodate the equipment supplied, without additional charge to the Owner. The complete responsibility and costs for such adjustments shall be assigned to the respective section of this Specification under which the equipment is furnished.

2.2 MATERIALS

A. All similar materials and equipment shall be the product of the same manufacturer unless specified otherwise.
B. Materials and equipment shall be the standard products of manufacturers regularly engaged in the production of such material and shall be the manufacturer's current and standard design.
C. Altitude: Equipment affected by altitude shall perform satisfactorily for the function intended at the altitude of the Project site.
D. Detectable Warning Tape: Acid and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, minimum 6-inch wide and 4 mils thick, continuously inscribed with a description of utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30-inch deep; colored as follows:
   1. Red: Electric.
   2. Yellow: Gas, oil, steam, and dangerous materials.
   3. Orange: Telephone and other communications.
   4. Blue: Water systems.
   5. Green: Sewer systems.

E. Backfill Material:
   1. Material 4 inches below and 12 inches above pipes and conduit shall be natural or manufactured sand complying to ASTM C 33.
   2. Material more than 12 inches above pipes and conduits shall be sand indicated above or native fill free of rock or gravel larger than 3/8 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.

PART 3 - EXECUTION

3.1 GENERAL

A. Fabrication, erection, and installation of the complete electrical system shall be done in accordance with accepted good practice by qualified personnel experienced in such work and shall proceed in an orderly manner so as not to impede the progress of the Project. The Electrical Contractor shall check all areas and surfaces where electrical equipment material is to be installed, removed, or relocated and report any unsatisfactory conditions before starting work. Commencement of work signifies this Contractor's acceptance of existing conditions. In the acceptance or rejection of the finished installation, no allowance will be made for lack of skill on the part of workmen. Surfaces requiring coatings will be completed prior to installation of any electrical work on these surfaces.

B. The electrical Drawings are diagrammatic. The installation requirements shall be carefully coordinated with structural, architectural, and mechanical conditions and shall be adjusted to avoid conflict.

C. All work shall be concealed in walls, ceilings, chases unless specifically noted to be exposed or otherwise approved.

D. The locations of electrical equipment are approximate and are not intended to convey the exact details and mounting of location of outlets, equipment, and other items. Exact locations are to be field determined by actual measurements.

E. The location height and projection of fixtures illuminating signs or special features shall be approved by Architect prior to installation.

F. Contractor shall coordinate the location of all exterior fixtures with Architectural Drawings and Specifications.

G. Consult the Architectural Drawings to determine wall finishes and locations of wall mounted equipment, countertop splashes and similar items to avoid conflict with electrical equipment. At locations where surface or pendant mounted light fixtures are noted, provide for all necessary framing channels, pendants, chains, canopies, and other hardware as required for a complete and operable system.

H. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

I. Excavation for Pipe and Conduit:
   1. Excavate trenches to indicated gradients, lines, depths, and elevations.
   2. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12-inch higher than top of pipe or conduit, unless otherwise indicated.

3. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
    a. For pipes and conduit less than 6-inch in nominal diameter and flat-bottomed, multiple-duct conduit units, hand excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
    b. For pipes and conduit 6-inch or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
    c. Excavate trenches 4-inch deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.
4. Place backfill and fill materials in layers not more than 8-inch in loose depth for material compacted by heavy compaction equipment, and not more than 4-inch in loose depth for material compacted by hand-operated tampers.
5. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
    a. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inch of existing subgrade and each layer of backfill or fill material at 95 percent.
    b. Under walkways, scarify and recompact top 6-inch below subgrade and compact each layer of backfill or fill material at 92 percent.
    c. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 85 percent.
6. Install detectable warning tape above conduits and pipe, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.
7. Protection:
    a. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.
    b. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
        1) Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.
    c. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
        1) Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.
8. Disposal of Surplus and Waste Materials:
    a. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property unless otherwise directed by Owner.
    b. Repair: Any damage to shrubs, grass or structures shall be repaired to previous condition by Contractor at no additional expense to Owner.

J. It shall be the responsibility of the Division 26 Contractor to provide for all disconnecting and motor control devices for all equipment. The Contractor shall coordinate to determine voltage, phase, and configurations. Any changes necessary to coordinate these items between Divisions 22 and 23 and Division 26 shall be considered part of this contract.

K. The Division 26 Contractor shall be responsible for providing for all power requirements associated with the mechanical systems including power, control devices, smoke dampers, etc. Refer to Divisions 22 and 23 Drawings for locations and requirements. Connect all smoke dampers to the fire alarm control panel.

3.2 PERFORMANCE TESTS

A. Thoroughly test all control circuits, fixtures, services and all circuits for proper operating condition and freedom from grounds and short circuits before acceptance is requested. All equipment, appliances and devices shall be operated under load conditions.

B. After the interior wiring system installation is complete conduct operating tests for approval. When requested, test all the wire, cable, devices, and equipment after installation, to assure that all material continues to possess all the original characteristics as required by governing codes and standards listed in these Specifications.

C. After motor operation has been verified make voltage readings at all panelboards and starters. Based on these readings, make final adjustments of primary taps on all transformers in the building as directed, or coordinate with the utility proper building voltage.

D. Perform such other tests as required by other sections of these Specifications or as requested to prove acceptability.

E. Furnish all instruments and labor for testing.

F. All material installed shall be listed, inspected, and approved by a nationally accepted testing laboratory such as UL and/or ETL. All material shall bear the UL or ETL label where available.

3.3 SUBMITTAL AND APPROVAL OF MATERIALS

A. All requirements for submittals shall comply with the applicable provisions included in the individual Specification sections.

B. Unless identified as a sole source item, the listing of product manufacturers, catalog numbers, etc., on the Drawings is intended to establish a standard of quality of the product. It is the responsibility of the contractor to review all items he intends to submit. If equipment other than that indicated on Drawings is proposed by the contractor, the information will be reviewed at the time of the submission of the submittal.

END OF SECTION

SECTION 26 05 13 - BUILDING WIRE AND CABLE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Building wire and cable.
   2. Wiring connectors and connections.
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 40 00 “Quality Requirements.” Requirements for references and standards.
   3. Section 26 05 53 “Electrical Identification.”

1.2 REFERENCES

A. NECA Standard of Installation (National Electrical Contractors Association).
B. NETA ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems (International Electrical Testing Association).
C. NFPA 70 – National Electrical Code.

1.3 SUBMITTALS FOR REVIEW

A. Section 01 33 00 “Submittal Procedures.” Procedures for submittals.
B. Product Data: Provide for each cable assembly type.

1.4 SUBMITTALS FOR INFORMATION

A. Section 01 33 00 “Submittal Procedures.” Procedures for submittals.
B. Test Reports: Indicate procedures and values obtained.
C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency specified under Regulatory Requirements.

1.5 SUBMITTALS AT PROJECT CLOSEOUT

A. Section 01 70 00 “Execution and Closeout Requirements.” Procedures for submittals.
B. Project Record Documents: Record actual locations of components and circuits.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years’ documented experience.

1.7 REGULATORY REQUIREMENTS

A. Conform to NFPA 70.
B. Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

1.8 FIELD SAMPLES

A. Provide under provisions of Section 01 40 00 “Quality Requirements.”

1.9 PROJECT CONDITIONS

A. Section 01 30 00 “Administrative Requirements.”
B. Verify that field measurements are as indicated.
C. Conductor sizes are based on copper.
D. Wire and cable routing indicated is approximate unless dimensioned.

1.10 COORDINATION

A. Coordinate Work under provisions of Section 01 30 00 “Administrative Requirements.”
B. Where wire and cable destination are indicated and routing is not shown, determine exact routing and lengths required.

PART 2 - PRODUCTS

2.1 BUILDING WIRE

A. Manufacturers:
   1. American Cable.
   2. Houston Wire and Cable.
   3. Southwire.
   4. Substitutions: Refer to Section 01 60 00 “Product Requirements.”
B. Description: Single conductor insulated wire.
C. Conductor: Copper.
D. Insulation Voltage Rating: 600 volts.
E. Insulation: NFPA 70, Type indicated herein.
F. MC Cable: Shall not be utilized on this project.

2.2 WIRING CONNECTORS

A. Split Bolt Connectors:
   1. Buchanan.
   2. Burndy.
   3. Ilsco.
   4. Substitutions: Refer to Section 01 60 00 “Product Requirements.”
B. Solderless Pressure Connectors:
   1. Buchanan.
   2. Burndy.
   3. Ilsco.
   4. Substitutions: Refer to Section 01 60 00 “Product Requirements.”

C. Spring Wire Connectors:
   1. Ideal.
   2. Substitutions: Refer to Section 01 60 00 “Product Requirements.”
D. Compression Connectors:
   1. Buchanan.
   2. Burndy.
   3. Ilsco.
   4. Substitutions: Refer to Section 01 60 00 “Product Requirements.”

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 “Administrative Requirements:” Verification of existing conditions before starting work.
B. Verify that interior of building has been protected from weather.
C. Verify that mechanical work likely to damage wire and cable has been completed.
D. Verify that raceway installation is complete and supported.

3.2 PREPARATION

A. Completely and thoroughly swab raceway before installing wire.

3.3 WIRING METHODS

A. Concealed Dry Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
B. Exposed Dry Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
C. Above Accessible Ceilings: Use only building wire, Type THHN/THWN insulation, in raceway.
D. Wet or Damp Interior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
E. Exterior Locations: Use only building wire, Type THHN/THWN insulation, in raceway.
F. Use wiring methods indicated.

3.4 INSTALLATION

A. Section 01 40 00 “Quality Requirements.” for manufacturer's instructions.
B. Route wire and cable as required to meet Project Conditions.
C. Install cable in accordance with the NECA "Standard of Installation."
D. Use solid conductor for feeders and branch circuits 10 AWG and smaller.
E. Use stranded conductors for control circuits.
F. Use conductor not smaller than 12 AWG for power and lighting circuits with the exception of pre-manufactured fixture whips, listed for such use and not exceeding 6-foot in length.
G. Use conductor not smaller than 14 AWG for control circuits.
H. Use 10 AWG conductors for 20 ampere, 120 volt branch circuits longer than 100 feet and as indicated on the drawings.
I. Install all conductors in conduit.
J. Pull all conductors into raceway at same time.

K. Use suitable wire pulling lubricant for building wire 4 AWG and larger.
L. Protect exposed cable from damage.
M. All cables shall be neatly supported.
N. Use suitable cable fittings and connectors.
O. Neatly train and lace wiring inside boxes, equipment, and panelboards.
P. Clean conductor surfaces before installing lugs and connectors.
Q. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
R. Use split bolt connectors for copper conductor splices and taps, 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
S. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
T. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
U. Identify and color code wire and cable under provisions of Section 26 05 53 “Electrical Identification.” Identify each conductor with its circuit number or other designation indicated.
V. The number of conductors in each conduit run shall be limited to the requirements as indicated on the drawings and indicated in Article 310 of the National Electrical Code.

3.5 FIELD QUALITY CONTROL

A. Section 01 40 00 “Quality Requirements” for field inspection, testing and adjusting.
B. Inspect and test in accordance with NETA ATS, except Section 4.
C. Perform inspections and tests listed in NETA ATS, Section 7.3.1.

END OF SECTION

SECTION 26 05 19 - EQUIPMENT WIRING SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Electrical connections to equipment specified under other sections.
B. Related Sections:
   1. Section 26 05 00 “Basic Electrical Methods.”

1.2 REFERENCES

A. NEMA WD 1 – General Purpose Wiring Devices.
B. NEMA WD 6 – Wiring Device Configurations.
C. ANSI/NFPA 70 – National Electrical Code.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00 “Submittal Procedures.”
B. Product Data: Provide wiring device manufacturer's catalog information showing dimensions, configurations, and construction.
C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.4 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.
B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and shown.

1.5 COORDINATION

A. Coordinate work under provisions of Section 01 30 00 “Administrative Requirements.”
B. Obtain and review Shop Drawings, product data, and manufacturer's instructions for equipment furnished under other sections.
C. Determine connection locations and requirements.
D. Sequence rough-in of electrical connections to coordinate with installation schedule for equipment.
E. Sequence electrical connections to coordinate with start-up schedule for equipment.

PART 2 - PRODUCTS

2.1 CORDS AND CAPS

A. Attachment Plug Construction: Conform to NEMA WD 1.
B. Configuration: NEMA WD 6; match receptacle configuration at outlet provided for equipment.
C. Cord Construction: ANSI/NFPA 70, multiconductor flexible cord with identified equipment grounding conductor, suitable for use in damp locations.
D. Size: Suitable for connected load of equipment, length of cord, and rating of branch circuit overcurrent protection.
E. Division 26 – Contractor shall be responsible for providing matching cord/receptacle for all equipment not furnished with such equipment.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify conditions under provisions of Section 01 30 00 “Administrative Requirements.”
B. Verify that equipment is ready for electrical connection, wiring, and energization.

3.2 ELECTRICAL CONNECTIONS

A. Make electrical connections in accordance with equipment manufacturer's instructions.
B. Make conduit connections to equipment using flexible conduit. Use liquidtight flexible conduit with watertight connectors in damp or wet locations.
C. Make wiring connections using wire and cable with insulation suitable for temperatures encountered in heat producing equipment.
D. Provide receptacle outlet where connection with attachment plug is indicated. Provide cord and cap where field-supplied attachment plug is indicated.
E. Provide suitable strain-relief clamps and fittings for cord connections at outlet boxes and equipment connection boxes.
F. Install disconnect switches, controllers, control stations, and control devices as indicated.
G. Modify equipment control wiring with terminal block jumpers as indicated.
H. Provide interconnecting conduit and wiring between devices and equipment where indicated.
I. Check and modify phase connections as required for proper motor rotation.
J. Provide power to equipment only after equipment supplier verifies acceptance to receive and approves.
K. Contractor shall coordinate with all equipment to verify exact power and control wiring as required to properly serve equipment.

END OF SECTION

SECTION 26 05 26 - GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Grounding electrodes and conductors.
   2. Equipment grounding conductors.
   3. Bonding.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 01 40 00 “Quality Requirements” for requirements for references and standards.

1.2 REFERENCES

A. NETA ATS – Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems (International Electrical Testing Association).

B. NFPA 70 – National Electrical Code.

1.3 GROUNDING SYSTEM DESCRIPTION

A. Metal underground water pipe.

B. Metal frame of the building.

C. Rod electrodes.

1.4 PERFORMANCE REQUIREMENTS

A. Grounding System Maximum Resistance: 10 ohms.

1.5 SUBMITTALS FOR REVIEW

A. Section 01 33 00 “Submittal Procedures.”

B. Product Data: Provide for grounding electrodes and connections.

1.6 SUBMITTALS FOR CLOSEOUT

A. Section 01 70 00 “Execution and Closeout Requirements:” Procedures for submittals.

B. Project Record Documents: Record actual locations of components and grounding electrodes.

C. Certificate of Compliance: Indicate approval of installation by authority having jurisdiction.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 3 years’ documented experience, and with service facilities within 100 miles of Project.

1.8 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.
B. Products: Listed and classified by Underwriters Laboratories, Inc. as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 ROD ELECTRODES

A. Material: Copper.
B. Diameter: 3/4-inch.
C. Length: 10 feet.

2.2 MECHANICAL CONNECTORS

A. Description: In lieu of exothermic connections, high compression type as manufactured by Burndy using the 12 ton Hy-Ground series.

2.3 EXOTHERMIC CONNECTIONS

A. Manufacturers: Cadweld.

2.4 WIRE

A. Material: Stranded copper.
B. Grounding Electrode Conductor: Minimum size to meet NFPA 70 requirements or as indicated on the Drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 “Administrative Requirements” for verification of existing conditions prior to beginning Work.
B. Verify that final backfill, and compaction has been completed before driving rod electrodes.

3.2 INSTALLATION

A. Section 01 40 00 “Quality Requirements:” for manufacturer's instructions.
B. Install rod electrodes. Install additional rod electrodes as required to achieve a resistance to ground of 10 ohms or less. Rods shall be installed with a minimum separation of 6 feet.
C. Provide bonding to meet Regulatory Requirements.
D. Bond together metal siding not attached to grounded structure, bond to ground.
E. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing.

F. Grounding Electrode System: The new grounding electrode system shall consist of the common bonding of building steel, underground steel water piping and supplemental ground rods, concrete re-enforcing bar, as detailed on the Drawings.
G. Provide proper bonding of the electrical system's grounded conductor (neutral) and the grounding electrode system sized in accordance with N.E.C. Article 250. This bonding shall occur at all locations where there are separately derived systems.

3.3 FIELD QUALITY CONTROL

A. Section 01 40 00 "Quality Requirements" for field inspection, testing, and adjusting.
B. Inspect and test in accordance with NETA ATS, except Section 4.
C. Perform inspections and tests listed in NETA ATS, Section 7.13.

END OF SECTION

SECTION 26 05 29 - SUPPORTING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Conduit and equipment supports.
   2. Anchors and fasteners.
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. NECA – National Electrical Contractors Association.
B. ANSI/NFPA 70 – National Electrical Code.

1.3 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.
B. Furnish products listed and classified by UL as suitable for purpose specified and shown.

PART 2 - PRODUCTS

2.1 PRODUCT REQUIREMENTS

A. Materials and Finishes: Provide adequate corrosion resistance.
B. Provide materials, sizes, and types of anchors, fasteners and supports to carry the loads of equipment and conduit. Consider weight of wire in conduit when selecting products.
C. Anchors and Fasteners:
   1. Concrete Structural Elements: Use expansion anchors, powder actuated anchors and preset inserts.
   2. Steel Structural Elements: Use beam clamps, spring steel clips and steel ramset fasteners.
   3. Concrete Surfaces: Use self-drilling anchors and expansion anchors.
   4. Sheet Metal: Use sheet metal screws.
   5. Wood Elements: Use wood screws.
   6. Roof Support/Jacks: Advanced supports products # SS1000A or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install products in accordance with manufacturer's instructions.
B. Provide anchors, fasteners, and supports in accordance with NECA "Standard of Installation."
C. Do not fasten supports to pipes, ducts, mechanical equipment, and conduit.
D. Obtain permission from Architect before drilling or cutting structural members.

E. Fabricate supports from structural steel as indicated on drawings. Rigidly weld members or use hexagon head bolts to present neat appearance with adequate strength and rigidity. Use lock washers under all nuts.
F. Install surface-mounted cabinets and panelboards with minimum of 4 anchors.
G. In wet and damp locations use steel channel supports to stand cabinets and panelboards 1-inch off wall.
H. Install conduit supports a maximum spacing specified in the NEC.

END OF SECTION

SECTION 26 05 33 - CONDUIT

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Metal conduit.
   2. Flexible metal conduit.
   3. Liquidtight flexible metal conduit.
   4. Electrical metallic tubing.
   5. Fittings and conduit bodies.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 07 84 13 “Penetration Firestopping.”
   3. Section 26 05 26 “Grounding and Bonding.”
   4. Section 26 05 29 “Supporting Devices.”
   5. Section 26 05 33.16 “Boxes.”
   6. Section 26 05 53 “Electrical Identification.”

1.2 REFERENCES

A. ANSI C80.1 - Rigid Steel Conduit, Zinc Coated.
B. ANSI C80.3 - Electrical Metallic Tubing, Zinc Coated.
C. ANSI/NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit and Cable Assemblies.
D. ANSI/NFPA 70 - National Electrical Code.
E. NECA "Standard of Installation."
F. NEMA TC 3 - PVC Fittings for Use with Rigid PVC Conduit and Tubing.

1.3 DESIGN REQUIREMENTS

A. Conduit Size: ANSI/NFPA 70.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 33 00 “Submittal Procedures.”
B. Product Data: Provide for metallic conduit, flexible metal conduit, liquidtight flexible metal conduit, nonmetallic conduit, fittings, and conduit bodies.

1.5 PROJECT RECORD DOCUMENTS

A. Submit under provisions of Section 01 70 00 “Execution and Closeout Requirements.”
B. Accurately record actual routing of conduits.

1.6 REGULATORY REQUIREMENTS

A. Conform to requirements of ANSI/NFPA 70.
B. Furnish products listed and classified by UL as suitable for purpose specified and shown.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle Products to site under provisions of Section 01 60 00 "Product Requirements."
B. Accept conduit on site. Inspect for damage.
C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
D. Protect PVC conduit from sunlight.

1.8 PROJECT CONDITIONS

A. Verify that field measurements are as shown on Drawings.
B. Verify routing and termination locations of conduit prior to rough-in.
C. Conduit routing is shown on Drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

PART 2 - PRODUCTS

2.1 CONDUIT REQUIREMENTS

A. Minimum Size: 3/4-inch unless otherwise specified. Contractor may utilize 1/2-inch conduit on walls to receptacles and light switches.
B. Wet and Damp Locations above grade: Use rigid steel or liquid tight flexible conduit.
C. Dry Locations: Use electrical metallic tubing for concealed and exposed locations.
D. Below Slab: Nonmetallic PVC conduit is acceptable within limitations specified.
E. Below Grade: Use only PVC coated rigid galvanized steel, wrapped rigid steel, or nonmetallic PVC conduit within limitations specified.
F. MC Cable: Shall not be utilized on this project.

2.2 METAL CONDUIT

A. Manufacturers:
   1. Allied.
   2. Wheatland.
   3. Substitutions: Under provisions of Section 01 60 00 "Product Requirements."
B. Rigid Steel Conduit: ANSI C80.1.
C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; all steel fittings.

2.3 FLEXIBLE METAL CONDUIT

A. Manufacturers:
   1. Allied Tube.
   2. Electri-Flex.
   3. Greenfield.
   4. Substitutions: Under provisions of Section 01 60 00 “Product Requirements.”
B. Description: Interlocked steel construction. Aluminum is not permitted.
C. Fittings: ANSI/NEMA FB 1 with fittings approved for steel flex.
D. Applications: Use for final connections to motorized equipment, connections to recessed lighting fixtures located in accessible ceilings, and connections to dry type transformers. Utilization of 3/8-inch in lieu of the minimum 1/2-inch is acceptable under the limitations of the National Electrical Code.

2.4 LIQUIDTIGHT FLEXIBLE METAL CONDUIT

A. Manufacturers:
   1. Electri-flex.
   2. Ultratite.
   3. Substitutions: Under provisions of Section 01 60 00 “Product Requirements.”
B. Description: Interlocked steel construction with PVC jacket.
C. Fittings: ANSI/NEMA FB 1.
D. Applications: Use for final connections to motorized equipment in exterior locations and areas subjected to moisture (kitchen).

2.5 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   1. Allied.
   2. Substitutions: Under provisions of Section 01 60 00 “Product Requirements.”
B. Description: ANSI C80.3; galvanized tubing.
C. Fittings and Conduit Bodies: ANSI/NEMA FB 1; all steel, compression.
D. Applications: Do not use below grade or in exterior locations. Use only in interior locations.

2.6 PVC COATED METAL CONDUIT

A. Manufacturers:
   1. Levy.
   2. Robroy Industries.
   3. Substitutions: Under provisions of Section 01 60 00 “Product Requirements.”
B. Description: NEMA RN-1, rigid steel conduit with external PVC coating, 20 mil thick.
C. General: Protective layer may be factory applied or galvanized rigid steel conduit may be applied with 2 layers of corrosion resistant tape.
D. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel fittings with external PVC coatings to match conduit.

2.7 NON-METALLIC PVC CONDUIT

A. Manufacturers:
   1. Allied.
   2. Carlon.
   3. Substitutions: Under provisions of Section 01 60 00 “Product Requirements.”
B. Description: NEMA TC2; Schedule 40 PVC. Flame retardant type resistant to bending and cracking.
C. Fittings and conduit bodies: NEMA TC3.
D. Vertical risers and ells installed below grade shall be rigid steel with wrapping.
E. Do not use above grade.
F. Joints made with PVC fittings shall be applied with solvent compound after thorough cleaning.
G. Refer to Part 3. Do not use PVC conduit for conduits passing vertically through the slab.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install conduit in accordance with NECA "Standard of Installation."
B. Install nonmetallic conduit in accordance with manufacturer's instructions.
C. Arrange supports to prevent misalignment during wiring installation.
D. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
E. Group related conduits; support using conduit rack. Construct rack using steel channel.
F. Fasten conduit supports to building structure and surfaces under provisions of Section 26 05 29 “Supporting Devices.”
G. Do not support conduit with wire or perforated pipe straps. Remove wire used for temporary supports.
H. Do not attach conduit to ceiling support wires.
I. Arrange conduit to maintain headroom and present neat appearance.
J. Route exposed conduit parallel and perpendicular to walls.
K. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
L. Maintain adequate clearance between conduit and piping.
M. Maintain 12-inch clearance between conduit and surfaces with temperatures exceeding 104 degrees Fahrenheit.
N. Cut conduit square using saw or pipe cutter; de-burr cut ends.
O. Bring conduit to shoulder of fittings; fasten securely.
P. Use conduit hubs or sealing locknuts to fasten conduit to sheet metal boxes in damp and wet locations and to cast boxes.
Q. Install no more than equivalent of three 90-degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use factory elbows for bends in metal conduit larger than 2-inch size.
R. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
S. Provide suitable fittings to accommodate expansion and deflection where conduit crosses, control and expansion joints.
T. Provide suitable pull string in each empty conduit except sleeves and nipples.
U. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
V. Ground and bond conduit under provisions of Section 26 05 26 “Grounding and Bonding.”
W. Identify conduit under provisions of Section 26 05 53 “Electrical Identification.”
X. Ducts shall be cleaned with a flexible mandrel assembly.

Y. All conduits passing vertically through slabs or through earth on grade shall be PVC-coated, rigid steel. Rigid steel conduits shall be applied with protective coatings as indicated herein. All transitions from PVC to rigid steel shall occur below the slab.
Z. Underground branch circuit extensions to parking lot lighting fixtures and other branch circuits may be direct buried PVC conduit. Service entrance PVC conduit shall be concrete encased in accordance with the Drawings unless otherwise approved by the Architect.
AA. Minimum cover for underground conduits shall be 24 inches unless otherwise noted.
BB. All conduit shall be routed concealed as much as possible including conduit serving roof-mounted equipment. Roof penetrations for conduits shall adhere to the requirements and details as indicated on the Architectural Drawings.

3.2 INTERFACE WITH OTHER PRODUCTS

A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods under the provisions of Section 07 84 13 “Penetration Firestopping.”
B. Route conduit through roof openings for piping and ductwork or through suitable roof jack with pitch pocket. Coordinate location with roofing installation.

END OF SECTION

SECTION 26 05 33.16 - BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wall and ceiling outlet boxes.
   2. Pull and junction boxes.
   3. Floor boxes.
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 07 84 13 “Penetration Firestopping.”
   3. Section 26 27 26 “Wiring Devices:” Wall plates in finished areas.

1.2 REFERENCES

A. NECA - Standard of Installation.
B. NEMA FB 1 - Fittings and Supports for Conduit and Cable Assemblies.
C. NEMA OS 1 – Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
D. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
E. NFPA 70 - National Electrical Code.

1.3 SUBMITTALS FOR CLOSEOUT

A. Section 01 70 00 “Execution and Closeout Requirements:” Submittals for Project closeout.
B. Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.4 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.
B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 OUTLET BOXES

A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
B. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include half-inch male fixture studs where required.
C. Cast Boxes: NEMA FB 1, Type FD, cast feralloy. Provide gasketed cover by box manufacturer.
D. Wall Plates for Finished Areas: As specified in Section 26 27 26 “Wiring Devices.”

2.2 PULL AND JUNCTION BOXES

A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
B. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box.
C. Material: Galvanized cast iron.
D. Cover: Furnish with ground flange, neoprene gasket, and stainless-steel cover screws.
E. Fiberglass boxes are allowed in landscaping areas. Equipment shall be pedestrian rated.

2.3 FLOOR BOXES

A. Stamped steel boxes with a minimum of 16-gauge steel for use in concrete slab applications.
B. 16-gauge steel powder coated finish for use with carpet inserts or without. Provide cover with cable door.
C. Provide a minimum of two duplex receptacles and two data outlet locations.
D. In addition to the required power conduits, provide a spare 1-inch conduit to above an accessible ceiling.
E. Boxes shall be Hubbell No. HBLCFB301 BASE with covers, faceplates, devices, and other accessories as noted.
F. Floor boxes located on the 2nd floor shall be Hubbell System One fire-rated poke-thru or approved equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify locations of outlets in all location areas prior to rough-in.

3.2 INSTALLATION

A. Install boxes in accordance with NECA "Standard of Installation."
B. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling, equipment connections and compliance with regulatory requirements.
C. Set wall mounted boxes at elevations to accommodate mounting heights specified in section for outlet device.
D. Electrical boxes are shown on Drawings in approximate locations unless dimensioned. Adjust box location up to 10 feet if required to accommodate intended purpose.
E. Orient boxes to accommodate wiring devices oriented as specified in Section 26 27 26 “Wiring Devices.”
F. Maintain headroom and present neat mechanical appearance.
G. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
H. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling access panel or from removable recessed luminaire.
I. Install boxes to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 13 “Penetration Firestopping.”
J. Coordinate mounting heights and locations of outlets mounted above counters, benches, and backsplashes with Architectural drawings and other trades.
K. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
L. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
M. Use flush mounting outlet box in finished areas.

N. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only. Coordinate masonry cutting to achieve neat opening.
O. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation. Provide minimum 24 inches separation in acoustic rated walls.
P. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for surface finish thickness.
Q. Use stamped steel bridges to fasten flush mounting outlet box between studs.
R. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
S. Use adjustable steel channel fasteners for hung ceiling outlet box.
T. Do not fasten boxes to ceiling support wires.
U. Support boxes independently of conduit.
V. Use gang box where more than one device is mounted together. Do not use sectional box.
W. Use gang box with plaster ring for single device outlets.
X. Use cast outlet box in exterior locations exposed to the weather and wet locations and at all locations serving kitchen equipment.
Y. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.
Z. Coordinate with other trades for box rough-in, such that control devices are grouped (i.e., thermostats, wall switches, volume controls, etc.).

3.3 INTERFACE WITH OTHER PRODUCTS

A. Coordinate installation of outlet box for equipment connected under Section 26 05 19 “Equipment Wiring Systems.”

3.4 ADJUSTING

A. Section 01 70 00 “Execution and Closeout Requirements:” Adjusting installed work.
B. Adjust flush-mounting outlets to make front flush with finished wall material.
C. Install knockout closures in unused box openings.

3.5 CLEANING

A. Section 01 70 00 “Execution and Closeout Requirements:” Cleaning installed work.
B. Clean interior of boxes to remove dust, debris, and other material.
C. Clean exposed surfaces and restore finish.

3.6 REPAIR

A. Repair any areas or surfaces damaged during conduit installation.
B. Paint (resurface) to original condition.

END OF SECTION

SECTION 26 05 53 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Nameplates and labels.
   2. Wire and cable markers.
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. ANSI/NFPA 70 – National Electrical Code.

PART 2 - PRODUCTS

2.1 NAMEPLATES AND LABELS

A. Nameplates and Labels: Engraved 3-layer laminated plastic, white letters on black background.
B. Locations:
   1. Each electrical distribution and control equipment enclosure.
   2. Communication cabinets and computer cabinets.
   3. Field disconnects, start stop stations, control panels.
C. Letter Size:
   1. Use 1/4-inch letters for identifying individual equipment and loads.
   2. Use 1/4-inch letters for identifying grouped equipment and loads.
   3. Use 3/8-inch letters for identifying Main Disconnect equipment.
   4. Use 1/4-inch letters for identifying receptacle and light switches.

2.2 WIRE/CONDUIT/BOX MARKERS

A. Description: Brady B-321 Heat-Shrink Polyolefin markers. Typed label to identify each termination end point of the conductor. DC conductors shall identify polarity.
B. Locations: Each conductor at wireway, pull boxes, outlet and junction boxes, and each load connection. All conduit penetrations identifying the location of each end.
C. Legend:
   1. Power and Lighting Circuits: Branch circuit or feeder number indicated on Drawings.
D. Boxes:
   1. Label each junction box in accessible locations to indicate the type of system (i.e. security; power circuit – 1, 3, 5, etc.)
   2. Boxes serving fire alarm system shall have box covers painted red.
   3. Provide label in each light switch and receptacle back box.

E. Panelboards and Switchboards:
   1. Provide phenolic label with maximum available fault current at main switchboard. Utilize number as indicated in panel schedule.
   2. Provide warning labels with arc-flash hazard warning for all electrical equipment as indicated in Article 110.16 of NEC.

PART 3 - EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive nameplates and labels.

3.2 APPLICATION

A. Install nameplate and label parallel to equipment lines.
B. Secure nameplate to equipment front using screws or rivets.
C. Identify underground conduits using underground warning tape. Install 1 tape per trench at 12 inches below finished grade. Identify all conduit at exposed locations into all boxes, cabinets, etc. (see specification Section 26 05 00 “Basic Electrical Methods”).
D. Identify all conductors at every termination indicating endpoints of termination and tag identification as required.
E. Color Coding for Phase Identification:

120/208 Volts	Phase	277/480 Volts
Black	A	Brown
Red	B	Orange
Blue	C	Yellow
White	Neutral	Gray
Green	Ground	Green

Conductor phase and voltage identification shall be made by color-coded insulation for all conductors smaller than No. 6 AWG. For conductors No. 6 AWG and larger, identification shall be made by color-coded insulation, or conductors with black insulation may be furnished and identified by colored electrical tape. Conductor identification shall be provided within each enclosure where a tap, splice, or termination is made.

END OF SECTION

SECTION 26 05 73 - POWER SYSTEM STUDIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Short-Circuit Analysis.
   2. Protective Device Time-Current Coordination Analysis.
   3. Arc-Flash Hazard Analysis.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 SUBMITTALS

A. Completed studies shall be bound and submitted to Architect.
   1. Short-Circuit Analysis.
   2. Protective Device Time-Current Coordination Analysis.
   3. Arc-Flash Hazard Analysis.

PART 2 - PRODUCTS

2.1 APPROVED MANUFACTURERS

A. Eaton.
B. G.E.
C. Siemens.
D. Square D Company by Schneider Electric.

2.2 POWER SYSTEM STUDIES

A. Short-Circuit Analysis:
   1. Calculation of the maximum root mean squared (rms) symmetrical 3-phase, short-circuit current at each significant location in the electrical system shall be made using a digital computer.
   2. Appropriate motor short-circuit contribution shall be included at the appropriate locations in the system so that the computer calculated values represent the highest short-circuit current the equipment will be subjected to under fault conditions.
   3. A tabular computer printout shall be included which lists the calculated short-circuit currents, X/R ratios, equipment short-circuit interrupting or withstand current ratings, and notes regarding the adequacy or inadequacy of the equipment.
   4. The study shall include a computer printout of input circuit data including conductor lengths, number of conductors per phase, conductor impedance values, insulation types, transformer impedances and X/R ratios, motor contributions, and other circuit information as related to the short-circuit calculations.
   5. Include a computer printout identifying the maximum available short-circuit current in rms symmetrical amperes and the X/R ratio of the fault current for each bus/branch calculation.

6. The system 1-line diagram shall be computer generated and will clearly identify individual equipment buses, bus numbers used in the short-circuit analysis, cable and bus connections between the equipment, calculated maximum short-circuit current at each bus location and other information pertinent to the computer analysis.
7. A comprehensive discussion section evaluating the adequacy or inadequacy of the equipment must be provided and include recommendations as appropriate for improvements to the system.
8. Contractor shall be responsible for supplying pertinent electrical system conductor, circuit breaker, generator, and other component and system information in a timely manner to allow the short-circuit analysis to be completed prior to final installation.
9. Any inadequacies shall be called to the attention of Architect and recommendations made for improvements as soon as they are identified.

B. Protective Device Time-Current Coordination Analysis:
1. The time-current coordination analysis shall be performed with the aid of computer software intended for this purpose, and will include the determination of settings, ratings, or types for the overcurrent protective devices supplied.
2. Where necessary, an appropriate compromise shall be made between system protection and service continuity with system protection considered more important than service continuity.
3. A sufficient number of computer generated log-log plots shall be provided to indicate the degree of system protection and coordination by displaying the time-current characteristics of series connected overcurrent devices and other pertinent system parameters.
4. Computer printouts shall accompany the log-log plots and will contain descriptions for each of the devices shown, settings of the adjustable devices, the short-circuit current availability at the device location when known, and device identification numbers to aid in locating the devices on the log-log plots and the system 1-line diagram.
5. The study shall include a separate, tabular computer printout containing the suggested device settings of all adjustable overcurrent protective devices, the equipment where the device is located, and the device number corresponding to the device on the system 1-line diagram.
6. A computer-generated system 1-line diagram shall be provided which clearly identifies individual equipment buses, bus numbers, device identification numbers and the maximum available short-circuit current at each bus when known.
7. A discussion section which evaluates the degree of system protection and service continuity with overcurrent devices, along with recommendations as required for addressing system protection or device coordination deficiencies.
8. Significant deficiencies in protection and/or coordination shall be called to the attention of Architect and recommendations made for improvements as soon as they are identified.
9. Contractor shall be responsible for supplying pertinent electrical system conductor, circuit breaker, generator, and other component and system information in a timely manner to allow the time-current analysis to be completed prior to final installation.

C. Arc-Flash Hazard Analysis:
1. The Arc-Flash Hazard Analysis shall be performed with the aid of computer software intended for this purpose in order to calculate Arc-Flash Incident Energy (AFIE) levels and flash protection boundary distances.
2. The Arc-Flash Hazard Analysis shall be performed in conjunction with a short-circuit analysis and a time-current coordination analysis.

3. Results of the Analysis shall be submitted in tabular form, and shall include device or bus name, bolted fault and arcing current levels, flash protection boundary distances, personal-protective equipment classes and AFIE levels.
4. The analysis shall be performed under worst-case Arc-Flash conditions, and the final report shall describe, when applicable, how these conditions differ from worst-case bolted fault conditions.
5. The Arc-Flash Hazard Analysis shall be performed by a registered professional engineer.
6. The Arc-Flash Hazard Analysis shall be performed in compliance with IEEE Standard 1584-2002, the IEEE Guide for Performing Arc-Flash Calculations.
7. The Arc-Flash Hazard Analysis shall include recommendations for reducing AFIE levels and enhancing worker safety.
8. The proposed vendor shall demonstrate experience with Arc-Flash Hazard Analysis by submitting names of at least 10 actual Arc-Flash Hazard Analyses it has performed in the past year.
9. The proposed vendor shall demonstrate capabilities in providing equipment, services, and training to reduce Arc-Flash exposure and train workers in accordance with NFPA 70E and other applicable standards.
10. The proposed vendor shall demonstrate experience in providing equipment labels in compliance with NEC-2017 Section 110 and ANSI Z535.4 to identify AFIE and appropriate Personal Protective Equipment classes.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 26 09 43 NETWORK LIGHTING CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes a networked lighting control system comprised of the following components:
   1. System Software Interfaces:
      a. Management Interface.
      b. Visualization Interface.
      c. Personal Control Applications.
      d. Smartphone Programming Interface for Wired Devices.
      e. Smartphone Programming Interface for Wireless Devices.
   2. System Backbone and Integration Equipment:
      a. System Controller.
   3. Wired Networked Devices:
      a. Wall Stations.
      b. Graphic Wall Stations.
      c. Digital Key Switches.
      d. Auxiliary Input/Output Devices.
      e. Occupancy and Photocell Sensors.
      f. Wall Switch Sensors.
      g. Embedded Sensors.
      h. Power Packs and Secondary Packs.
      i. Networked Luminaires.
      j. Relay and Dimming Panel.
      k. Bluetooth® Low Energy Programming Device.
      l. Communication Bridge.
   4. Wireless Networked Devices:
      a. Wireless Networked Wall Switches, Dimmers
      b. Wireless Networked Auxiliary Fixture Control Devices
      c. Wireless Networked Indoor Occupancy and Photosensors
      d. Wireless Networked Outdoor Occupancy and Photosensors
      e. Wireless Networked Indoor Embedded Sensors
      f. Wireless Networked Power Packs
   5. Wireless Networked Luminaires:
      a. The networked lighting control system shall meet all the characteristics and performance requirements specified herein.
      b. The Contractor shall provide, install, and verify proper operation of all equipment necessary for proper operation of the system as specified herein and as shown on applicable Drawings.

B. Related Requirements
   1. Division 01 Specifications apply to Work of this Section.
   2. Section 26 51 00 “Interior Lighting.”

1.2 SUBMITTALS

A. Submittal shall be provided including the following items.
   1. Bill of Materials necessary to install the networked lighting control system.
   2. Product Specification Sheets indicating general device descriptions, dimensions, electrical specifications, wiring details, and nomenclature.
   3. Riser Diagrams showing device wiring connections of system backbone and typical per room/area type.
   4. Information Technology (IT) connection information pertaining to interconnection with facility IT networking equipment and third-party systems.
   5. Other Diagrams and Operational Descriptions – as needed to indicate system operation or interaction with other system(s).
   6. Contractor Startup/Commissioning Worksheet (must be completed prior to factory start-up).
   7. Service Specification Sheets indicating general service descriptions, including start-up, training, post-start-up support, and service contract terms.
   8. Hardware and Software Operation Manuals.

1.3 APPROVALS

A. Prior approval from Owner's representative is required for products or systems manufactured by companies not specified in the Network Lighting Controls section of this specification.
B. Any alternate product or system that has not received prior approval from the Owner's representative at least 10 days prior to submission of a proposal package shall be rejected.
C. Alternate products or systems require submission of catalog datasheets, system overview documents and installation manuals to Owner's representative.
D. For any alternate system that does not support any form of wireless communication to networked luminaires, networked control devices, networked sensors, or networked input devices, bidders shall provide a total installed cost including itemized labor costs for installing network wiring to luminaires, control devices, sensors, input devices and other required system peripherals.

1.4 QUALITY ASSURANCE

A. Product Qualifications:
   1. System electrical components shall be listed or recognized by a nationally recognized testing laboratory (e.g., UL, ETL, or CSA) and shall be labeled with required markings as applicable.
   2. System shall be listed as qualified under DesignLights Consortium Networked Lighting Control System Specification V2.0.
   3. System luminaires and controls are certified by manufacturer to have been designed, manufactured and tested for interoperability.
   4. All components shall be subjected to 100 percent end of line testing prior to shipment to the project site to ensure proper device operation.
   5. All components and the manufacturing facility where product are manufactured must be RoHS compliant.
B. Installation and Startup Qualifications:
   1. System start-up shall be performed by qualified personnel approved or certified by the manufacturer.

C. Service and Support Requirements:
   1. Phone Support: Toll free technical support shall be available.
   2. Remote Support: The bidder shall offer a remote support capability.
   3. Onsite Support: The bidder shall offer onsite support that is billable at whole day rates.
   4. Service Contract: The bidder shall offer a Service Contract that packages phone, remote, and onsite support calls for the Project. Response times for each type of support call shall be indicated in the terms of the service contract included in the bid package.

1.5 PROJECT CONDITIONS

A. Only install indoor equipment after the following site conditions are maintained:
   1. Ambient Temperature: 14 to 105 degrees Fahrenheit.
   2. Relative Humidity: less than 90 percent non-condensing.
B. Equipment shall not be subjected to dust, debris, moisture, or temperature and humidity conditions exceeding the requirements indicated above or as marked on the product, at any point prior to installation.
C. Only properly rated equipment and enclosures, installed per the manufacturer's instructions, may be subjected to dust and moisture following installation.

1.6 WARRANTY

A. The manufacturer shall provide a minimum 5-year warranty on all hardware devices supplied and installed. Warranty coverage shall begin on the date of shipment.
B. The hardware warranty shall cover repair or replacement any defective products within the warranty period.

1.7 MAINTENANCE & SUSTAINABILITY

A. The manufacturer shall make available to the Owner new parts, upgrades, and/or replacements available for a minimum of 5 years following installation.

PART 2 - EQUIPMENT

2.1 MANUFACTURERS

A. Acceptable Manufacturers:
   1. Acuity Brands Lighting, Inc.
   2. ETC.
   3. Cooper Controls.
   4. Lutron.
   5. Hubbell/Watt Stopper.
B. Basis of Design System: Acuity Controls n Light.

2.2 SYSTEM COMPLIANCE

A. System components shall comply with UL 916 and UL 924 standards where applicable.
B. System components shall comply with CFR Title 47, Part 15 standards where applicable.
C. System components shall comply with ISED Canada RSS-247 standards where applicable.
D. All equipment shall be installed and connected in compliance with NFPA 70.

2.3 SYSTEM PERFORMANCE REQUIREMENTS

A. System Architecture:
1. System shall have an architecture that is based upon 3 main concepts: (1) networkable intelligent lighting control devices, (2) standalone lighting control zones using distributed intelligence, (3) optional system backbone for remote, time based and global operation.
2. Intelligent lighting control devices shall have individually addressable network communication capability and consist of 1 or more basic lighting control components: occupancy sensor, photocell sensor, relay, dimming output, contact closure input, analog 0-10V input, and manual wall station capable of indicating switching, dimming, and/or scene control. Combining 1 or more of these components into a single device enclosure shall be permissible so as to minimize overall device count of system.
3. System must be capable of interfacing directly with networked luminaires such that either low voltage network cabling or wireless RF communication is used to interconnect networked luminaires with control components such as sensors, switches, and system backbone (see *Control Zone Characteristics* sections for each type of network connection, wired or wireless).
4. Networked luminaires and intelligent lighting control devices shall support individual (unique) configuration of device settings and properties, with such configuration residing within the networked luminaires and intelligent control devices.
5. Lighting control zones consisting of 1 or more networked luminaires and intelligent lighting control devices and shall be capable of providing automatic control from sensors (occupancy and/or photocell) and manual control from local wall stations without requiring connection to a higher-level system backbone; this capability is referred to as “distributed intelligence.”
    a. Lighting control zones (wired and wireless) of at least 128 devices per zone shall be supported.
6. Networked luminaires and intelligent lighting control devices shall have distributed intelligence programming stored in non-volatile memory, such that following any loss of power the lighting control zones shall operate according to their defined default settings and sequence of operations.
7. Lighting control zones shall be capable of being networked with a higher-level system backbone to provide time-based control, remote control from inputs and/or systems external to the control zone, and remote configuration and monitoring through a software interface.
8. The system may include one or more system controllers that provide time-based control. The system controller also provides a means of connecting the lighting control system to a system software interface and building management systems via BACnet/IP or BACnet MS/TP protocol.
9. All system devices shall support firmware update, either remotely or from within the applications space, for purposes of upgrading functionality at a later date.

B. Wired Networked Control Zone Characteristics:
1. Connections to devices within a wired networked lighting control zone and to backbone components shall be with a single type of low voltage network cable. To prevent wiring errors and provide cost savings, the use of mixed types of low voltage network cables shall not be permitted.

2. Devices in an area shall be connected via a "daisy-chain" topology; requiring all individual networked devices to be connected back to a central component in a "hub-and-spoke" topology shall not be permitted, so as to reduce the total amount of network cable required for each control zone.
3. System shall provide the option of having pre-terminated plenum rated low voltage network cabling supplied with hardware so as to reduce the opportunity for improper wiring and communication errors during system installation.
4. Following proper installation and provision of power, all networked devices connected together with low voltage network cable shall automatically form a functional lighting control. All zones shall be commissioned as described in the Control Sequences described on the plans.
5. Once software is installed, system shall be able to automatically discover all connected devices.
6. All networked devices shall have the ability to detect improper communication wiring and blink its LED in a specific cadence as to alert installation/start-up personnel.
7. Networked control devices intended for control of egress and/or emergency light sources shall not require the use of additional, externally mounted UL924 shunting and/or 0-10V disconnect devices, so as to provide a compliant sequence of operation while reducing the overall installation and wiring costs of the system. The following types of wired networked control devices shall be provided for egress and/or emergency light fixtures:
   a. Low-Voltage power sensing: These devices shall automatically provide 100 percent light level upon detection of loss of power sensed via the low voltage network cable connection.
   b. UL924 Listed Line-Voltage power sensing: These devices shall be listed as emergency relays under the UL924 standard and shall automatically close the load control relay and provide 100 percent light output upon detection of loss of power sensed via line voltage connection to normal power.
8. Networked luminaires and intelligent lighting control devices located in different areas shall be able to transmit and track information within at least 128 system-wide control zones to support required sequences of operation that may span across multiple areas. Occupancy and photocell commands shall be available across a single controller, and switch commands shall be available across single or multiple controllers. These shall also be referred to as global control zones.
9. Wired networked Wall stations shall provide the follow Scene Control Capabilities:
   a. Preset Scenes that can activate a specific combination of light levels across multiple local and global channels, as required.
   b. Profile Scenes that can modify the sequence of operation for the devices in the area (group) in response to a button press. This capability is defined as supporting "Local Profiles" and is used to dynamically optimize the occupant experience and lighting energy usage. Wall stations shall be able to manually start and stop Local Profiles, or the local profile shall be capable of ending after a specific duration of time between 5 minutes and 12 hours. Parameters that shall be configurable and assigned to a Local Profile shall include, but not be limited to, fixture light level, occupancy time delay, response to occupancy sensors (including enabling/disabling response), response to daylight sensors (including enabling/disabling response), and enabling/disabling of wall stations.

c. 3-way / multi-way control: multiple wall stations shall be capable of controlling the same local and global control zones, so as to support "multi-way" preset scene and profile scene control.

C. Wireless Networked Control Zone Characteristics:
1. No wired connections between networked devices shall be required for the purposes of system communications.
2. Multiple wireless networking protocols shall be supported:
   a. All Wireless devices operate shall operate in an uncongested frequency band providing reliable operation as standalone, or networked system.
   b. Fixed network architecture ensures all associated lights and load controls respond in a simultaneous and coordinated fashion from a button press, sensor signal, or command from a wireless hub.
3. Wireless network shall be self-healing, such that the loss of backbone or local communication between devices does not result in the loss of control of the lights in the space.
4. Wireless network communication shall support uniform and instant response such that all luminaires in a lighting control zone respond immediately and synchronously in response to a sensor or wall station signal.
5. To support the system architecture requirement for distributed intelligence, wireless network communication shall support communication of control signals from sensors and wall stations to networked luminaires and wireless load control devices, without requiring any communication, interpretation, or translation of information through a backbone device such as a wireless access point, communication bridge or gateway.
6. All wireless communication between lighting control components shall support the following 5 tiers of security measures.
   a. Data Encryption.
   b. Firmware Protection.
   c. Tamper-Proof Hardware.
   d. Authenticated User Access.
   e. Mutual Device Authentication.
7. Accounting for typical environmental conditions and building construction materials encountered within commercial indoor lighting environments, wireless networked devices shall be designed in Shop Drawings for guaranteed performance under typical site conditions.
8. Exterior Wireless networked devices shall have a line-of-sight communication range of at least 1,000 feet under ideal environmental conditions.

D. System Integration Capabilities:
1. The system shall interface with third party building management systems (BMS) to support 2-way communication using the industry standard BACnet/IP or BACnet MS/TP protocols. The following system integration capabilities shall be available via BACnet/IP and BACnet MS/TP protocols:
   a. The system shall support control of individual devices, including, but not limited to, control of relay and dimming output.
   b. The system shall support reading of individual device status information. The available status will depend on the individual device type and capabilities, which may include but not be limited to, relay state, dimming output, power measurement, occupancy sensor status, and photocell sensor states or readings. All system devices shall be available for polling for devices status.

c. The system shall support activation of pre-defined system Global Profiles (see Supported Sequence of Operations for further definition of Global Profile capabilities).

2. The system shall support activation of Global Profiles from third party systems by receiving dry contact closure output signals or digital commands via RS-232/RS-485. (See *Supported Sequence of Operations for further definition of Profile and Scene Preset capabilities.)*

3. The system shall support activation of demand response levels from Demand Response Automation Servers (DRAS) via the OpenADR 2.0a protocol.

E. Supported Sequence of Operations:

1. Control Zones:

a. Networked luminaires and intelligent lighting control devices installed in an area (also referred to as a group of devices) shall be capable of transmitting and tracking occupancy sensor, photocell sensor, and manual switch information within at least 48 unique control zones to support different and reconfigurable sequences of operation within the area. These shall also be referred to as local control zones.

2. Wall station Capabilities:

a. Wall stations shall be provided to support the following capabilities:

1) On/Off of a local control zone.

2) Continuous dimming control of light level of a local control zone.

b. 3-way / multi-way control: multiple wall stations shall be capable of controlling the same local control zones, so as to support "multi-way" switching and/or dimming control.

3. Occupancy Sensing Capabilities:

a. Occupancy sensors shall be configurable to control a local zone.

b. Multiple occupancy sensors shall be capable of controlling the same local zones. This capability combines occupancy sensing coverage from multiple sensors without consuming multiple control zones.

c. System shall support the following types of occupancy sensing sequence of operations:

1) On/Off Occupancy Sensing.

2) Partial-On Occupancy Sensing.

3) Partial-Off Occupancy Sensing.

4) Vacancy Sensing (Manual-On / Automatic-Off).

d. On/Off, Partial-On, and Partial-Off Occupancy Sensing modes shall function according to the following sequence of operation:

1) Occupancy sensors shall automatically turn lights on to a designated level when occupancy is detected. To support fine tuning of Partial-On sequences the designated occupied light level shall support at least 100 dimming levels.

2) Occupancy sensors shall automatically turn lights off or to a dimmed state (Partial-Off) when vacancy occurs or if sufficient daylight is detected. To support fine tuning of Partial-Off sequences the designated unoccupied dim level shall support at least 100 dimming levels.

3) To provide additional energy savings the system shall also be capable of combining Partial-Off and Full-Off operation by dimming the lights to a designated level when vacant and then turning the lights off completely after an additional amount of time.

4) Photocell readings, if enabled in the Occupancy Sensing control zone, shall be capable of automatically adjusting the light level during occupied or unoccupied conditions as necessary to further reduce energy usage. Additional requirements and details for photocell sensing capabilities are indicated under *Photocell Sensing Capabilities.*

5) The use of a wall station shall change the dimming level or turn lights off as selected by the occupant. The lights shall optionally remain in this manually-specified light level until the zone becomes vacant; upon vacancy the normal sequence of operation, as defined above, shall proceed.

4. Vacancy Sensing mode (also referred to as Manual-On / Automatic-Off) shall function according to the following sequence of operation:
   a. The use of a wall station is required turn lights on. The system shall be capable of programming the zone to turn on to either to a designated light level or the previous user light level. Initially occupying the space without using a wall station shall not result in lights turning on.
   b. Occupancy sensors shall automatically turn lights off or to a dimmed state (Partial-Off) when vacancy occurs or if sufficient daylight is detected. To support fine tuning of Partial-Off sequences the designated unoccupied dim level shall support at least 100 dimming levels.
   c. To provide additional energy savings and an enhanced occupant experience, the system shall also be capable of dimming the lights when vacant and then turning the lights off completely after an additional amount of time.
   d. To minimize occupant impact in case the area or zone is still physically occupied following dimming or shutoff of the lights due to detection of vacancy, the system shall support an "automatic grace period" immediately following detection of vacancy, during which time any detected occupancy shall result in the lights reverting to the previous level. After the grace period has expired, the use of a wall station is required to turn lights on.
   e. Photocell readings, if enabled in the Occupancy Sensing control zone, shall be capable of automatically adjusting the light level during occupied or unoccupied conditions as necessary to further reduce energy usage. Additional requirements and details for photocell sensing capabilities are indicated under *Photocell Sensing Capabilities.*
   f. At any time, the use of a wall station shall change the dimming level or turn lights off as selected by the occupant. The lights shall optionally remain in this manually-specified light level until the zone becomes vacant; upon vacancy the normal sequence of operation, as defined above, shall proceed.
   g. To accommodate diverse types of environments, occupancy time delays before dimming or shutting off lights shall be specifiable for control zones between 15 seconds to 2 hours.
5. Photocell Sensing Capabilities (Automatic Daylight Sensing):
   a. Photocell sensing devices shall be configurable to control a local zone.
   b. The system shall support the following type of photocell-based control:
      1) Continuous Dimming: The control zone automatically adjusts its dimming output in response to photocell readings, such that a minimum light level consisting of both electric light and daylight sources is maintained at the task. The photocell response shall be configurable to adjust the photocell setpoint and dimming rates.

6. Schedule Capabilities:
   a. System shall support the creation of time schedules for time-of-day override of devices including offsets from dusk and dawn.
   b. System shall support blink warning and timed extension capabilities. At the end of a scheduled period, the system shall be capable of providing a visible "blink warning" 5 minutes prior to the end of the schedule. Wall stations may be programmed to provide timed overrides that turn the lights on for an additional period of time. Timed override duration shall be programmable for each individual device, zone of devices, or customized group of devices, ranging from 5 minutes to 12 hours.
7. Global Profile Capabilities
   a. The system shall be capable of automatically modifying the sequence of operation for selected devices in response to any of the following: a time-of-day schedule, contact closure input state, manually triggered wired wall station input, RS-232/RS-485 command to wired input device, and BACnet input command. This capability is defined as supporting "Global Profiles" and is used to dynamically optimize the occupant experience and lighting energy usage.
   b. Global profiles may be scheduled with the following capabilities:
      1) Global Profiles shall be stored within and executed from the system controller (via internal timeclock) such that a dedicated software host or server is not required to be online to support automatic scheduling and/or operation of Global Profiles.
      2) Global Profile time-of-day schedules shall be capable of being given the following recurrence settings: daily, specific days of week, every "n" number of days, weekly, monthly, and yearly. Lighting control profile schedules shall support definition of start date, end date, end after "n" recurrences, or never ending. Daylight savings time adjustments shall be capable of being performed automatically, if desired.
      3) Global Profile Holiday Schedules should follow recurrent settings for specific US holiday dates regardless if they always occur on a specific date or are determined by the day/week of the month.
      4) Global Profiles shall be capable of being scheduled to run according to timed offsets relative to sunrise or sunset. Sunrise/sunset times shall be automatically derived from location information using an astronomical clock.
      5) Software management interface shall be capable of displaying a graphic calendar view of profile schedules for each control zone.
   c. System Global Profiles shall have the following additional capabilities:
      1) Global Profiles shall be capable of being manually activated directly from the system controller, specially programmed wired input devices, scene capable wired wall stations, and the software management interface.
      2) Global Profiles shall be selectable to apply to a single device, zone of devices, or customized group of devices.

3) Parameters that shall be configurable and assigned to a Global Profile shall include, but not be limited to, fixture light level, occupancy time delay, response to occupancy sensors (including enabling/disabling response), response to daylight sensors (including enabling/disabling response) and enabling/disabling of wall stations.

d. A backup of Local and Global Profiles shall be stored on the software's host server such that the Profile backup can be applied to a replacement system controller or wired wall station.

8. System shall support automated demand response capabilities with automatic reduction of light level to at least three levels of demand response.

2.4 SYSTEM SOFTWARE INTERFACES

A. Management Interface

1. System shall provide a web-based management interface that provides remote system control, live status monitoring, and configuration capabilities of lighting control settings and schedules.
2. Management interface must be compatible with industry-standard web browser clients, including, but not limited to, Microsoft Internet Explorer®, Apple Safari®, Google Chrome®, Mozilla Firefox®.
3. Management interface shall require all users to login with a "Username" and Password, and shall support creation of at least 100 unique user accounts.
4. Management interface shall support at least 3 permission levels for users: read-only, read & change settings, and full administrative system access.
5. Management interface shall be capable of restricting access for user accounts to specific devices within the system.
6. All system devices shall be capable of being given user-defined names.
7. The following device identification information shall be displayed in the Management interface: model number, model description, serial number or network ID, manufacturing date code, custom label(s), and parent network device.
8. Management interface shall be able to read the live status of a networked luminaire or intelligent control device and shall be capable of displaying luminaire on/off status, dim level, power measurement, device temperature, PIR occupancy sensor status, microphonic occupancy sensor status, remaining occupancy time delay, photocell reading, and active Profiles.
9. Management interface shall be able to read the current active settings of a networked luminaire or intelligent control device and shall be capable of displaying dimming trim levels, occupancy sensor and photocell enable/disable, occupancy sensor time delay and light level settings, occupancy sensor response (normal or vacancy), and photocell setpoints and transition time delays.
10. Management interface shall be able to change the current active settings and default settings for an individual networked luminaire or intelligent control device.
11. Management interface shall be capable of applying settings changes for a zone of devices or a group of selected devices using a single "save" action that does not require the user to save settings changes for each individual device.
12. A printable network inventory report shall be available via the management interface.
13. A printable report detailing all system profiles shall be available via the management interface.
14. All sensitive information stored by the software shall be encrypted.

15. All system software updates must be available for automatic download and installation via the internet.

B. Visualization and Programming Interfaces:
1. System shall provide an optional web-based visualization interface that displays graphical floorplan.
2. Graphical floorplan shall offer the following types of system visualization:
(a) Full Device Option - A master graphic of the entire building, by floor, showing each control device installed in the project with zones outlined. This shall include, but not be limited to, the following:
1) Controls embedded light fixtures.
2) Controls devices not embedded in light fixtures.
3) Daylight Sensors.
4) Occupancy Sensors.
5) Wall Switches and Dimmers.
6) Scene Controllers.
7) Networked Relays.
8) Wired Bridges.
9) System Controllers.
10) Wired Relay Panels.
11) Group outlines.
3. Group Only Option - A master graphic of the entire building, by floor, showing only control groups outlined.
4. Allow for pan and zoom commands so smaller areas can be displayed on a larger scale simply by panning and zooming each floor's master graphic.
5. Mouse click on any control device shall display the following information (as applicable):
a. The device catalog number.
b. The device name and custom label.
c. Device diagnostic information.
d. Information about the device status or current configuration is available with an additional mouse click.

B. Personal Control Applications for Wired Devices:
1. Software interface shall support personal control software applications that provide user-specific control of individual luminaires/control devices, control zones, global scene presets, and scene selector virtual button presses.
2. The system administrator shall be capable of defining personal control permissions for each user account.
3. Software interface shall provide a Microsoft Windows® operating system taskbar application for personal lighting control.
4. Software interface shall provide an Apple iOS ® operating system application (supported by mobile phones and mobile tablet devices) for personal lighting control.

C. Smartphone Programming Interface for Wired Devices:
1. Application interface shall be provided for both Apple iOS® and Android operating systems that allows configuration of lighting control settings.

2. The application shall support the configuration and control of wired networked control devices via a Bluetooth® Low Energy (BLE) Programming Device.
   a. Application shall support a security pin-code to access the zone of lighting control devices.
   b. The application shall provide indication of signal strength where multiple Bluetooth Low Energy Programming Devices are available for configuration.
   c. The application shall indicate the number of wired networked control devices connected to the local daisy-chain zone.
   d. The application shall provide on/off/dimming control of all control groups.
   e. The application shall provide the ability to identify all individual luminaires and control devices.
3. Programming capabilities through the application shall include, but not be limited to, the following:
   a. Switch/occupancy/photosensor zone configuration.
   b. Manual/automatic on modes.
   c. Turn-on dim level.
   d. Occupancy sensor time delays.
   e. Dual technology occupancy sensors sensitivity.
   f. Photosensor calibration adjustment and auto-setpoint.
   g. Multiple photosensor zone offset.
   h. Trim level settings.
   i. Preset scene creation and copy for scene capable devices.
   j. Application of custom device labels to the Bluetooth Low Energy Programming Devices and individual connected lighting control devices.

D. Smartphone Programming Interface for Wireless Devices:
1. Application interface shall be provided for both Apple iOS® and Android operating systems that allows configuration of lighting control settings.
2. The application shall support the configuration of wireless networked control devices:
   a. Application shall limit access with a “Username and Password.”
   b. Access to the program information will be governed by a permission system that allows users to share access with other users and restrict access to those who should not be able to reconfigure the equipment.
   c. The application shall provide indication of signal strength where multiple Bluetooth Low Energy Programming Devices are available for configuration.
3. Programming capabilities through the application shall include, but not be limited to, the following:
   a. Switch/occupancy/photosensor group configuration.
   b. Manual/automatic on modes.
   c. Turn-on dim level.
   d. Occupancy sensor time delays.
   e. Dual technology occupancy sensors sensitivity.
   f. Photosensor calibration adjustment and auto-setpoint.
   g. Multiple photosensor zone offset.
   h. Trim level settings.

2.5 SYSTEM BACKBONE AND SYSTEM INTEGRATION EQUIPMENT

A. System Controller:
1. System Controller shall be multi-tasking, real-time digital control processor consisting of modular hardware with plug-in enclosed processors, communication controllers, and power supplies.
2. System Controller shall have 32-bit microprocessor operating at a minimum of 1 GHz.
3. System Controller shall have minimum of 512MB memory, with a minimum of 4GB non-volatile flash, to support its own operating system and databases.
4. System Controller shall perform the following functions:
   a. Time-based control of downstream wired and wireless network devices.
   b. Linking into an Ethernet network.
   c. Integration with Building Management Systems (BMS) and Heating, Ventilation and Air Conditioning (HVAC) equipment.
   d. Connection to various software interfaces, including management interface, historical database and analytics interface, and visualization interface.
5. System Controller shall have an integral web server to support configuration, diagnostics and hosting of software interfaces.
6. Device shall have option for a graphical touch screen to support configuration and diagnostics.
7. Device shall have three RJ-45 networked lighting control ports for connection to any of the following:
   a. A graphical touch screen.
   b. Wired communication bridges.
   c. Direct connection to networked wired luminaires and intelligent lighting control devices (up to 128 total devices per port).
8. Device shall automatically detect all networked devices connected to it.
9. Device shall have an internal time clock used for astronomical and standard schedules.
10. Device shall have 2 switched RJ-45 10/100 BaseT Ethernet ports for local area network (LAN) connection.
    a. Ethernet connection shall support daisy chain wiring to other lighting control system LAN devices.
    b. Ethernet connection shall support IPv4 and shall be capable of using a dedicated static or DHCP assigned IP address.
11. Device shall have 2 x USB 2.0 Expansion ports for 802.11 Wi-Fi Adapter enabling wireless connectivity including:
    a. Hot Spot.
    b. Access Point.
    c. Client.
12. Each System Controller shall be capable of managing and operating at least 750 networked devices (wired or wireless).
    a. Multiple System Controllers may be networked together via LAN connection to scale the system up to 20,000 networked devices.

13. System Controller shall support BACnet/IP and BACnet MS/TP protocols to directly interface with BMS and HVAC equipment without the need for additional protocol translation gateways.
    a. BACnet MS/TP shall support 9600 to 115200 baud rate.
    b. System Controller shall be BACnet Testing Laboratory (BTL listed) using Device Profile BACnet Building Controller (B-BC) with outlined enhanced features.
14. System controller shall contain a "FIPS 140-2 Level 1 Inside" cryptographic module.
15. System controller shall support RESTful API control of BACnet objects, user management, date and time, and file management.
16. System controller shall be available within a NEMA 1 enclosure with Class 1 and Class 2 separation.
    a. Enclosure shall support power input power of 120-277VAC, or optional 347.

2.6 WIRED NETWORKED DEVICES

A. Wired Networked Wall Switches, Dimmers, Scene Controllers:
1. Devices shall recess into single-gang switch box and fit a standard GFI opening.
2. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
3. All switches shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
4. Devices with mechanical pushbuttons shall provide tactile and LED user feedback.
5. Devices with mechanical pushbuttons shall be made available with custom button labeling.
6. Wall switches & dimmers shall support the following device options:
    a. Number of control zones: 1, 2 or 4.
    b. Control Types Supported:
        1) On/Off.
        2) On/Off/Dimming.
        3) On/Off/Dimming/Correlated Color Temperature Control for specific luminaire types.
    c. Colors: Ivory, White, Light Almond, Gray, Black, Red.
7. Scene controllers shall support the following device options:
    a. Number of scenes: 1, 2 or 4.
    b. Control Types Supported:
        1) On/Off.
        2) On/Off/Dimming.
        3) Preset Level Scene Type.
        4) On/Off/Dimming/Preset Level for Correlated Color Temperature.
        5) Reprogramming of other devices within daisy-chained zone so as to implement user selected lighting scene. This shall support manual start/stop from the scene controller, or optionally programmed to automatically end after a user selectable duration between 5 minutes and 12 hours.

6) Selecting a lighting profile to be run by the system's upstream controller so as to implement a selected lighting profile across multiple zones. This shall support manual start/stop from the scene controller, or optionally programmed to automatically end after a user selectable duration between 5 minutes and 12 hours.

c. Colors: Ivory, White, Light Almond, Gray, Black, Red.

B. Wired Networked Graphic Wall Stations:

1. Device shall surface mount to single-gang switch box.
2. Device shall have a 3.5", capacitive full color touch screen.
3. Device shall be powered with Class 2 low voltage supplied locally via a directly wired power supply.
   a. Colors: White, Black.

C. Wired Networked Digital Key Switches:

1. Devices shall recess into single-gang switch box and fit a standard GFI opening.
2. Communication and low voltage power shall be delivered to each device via standard low voltage network.
3. Device shall have a micro-USB style connector for local computer connectivity.
4. Communication shall be over standard low voltage network cabling with RJ-45 connectors.
5. Device shall enable user supplied screen saver image to be uploaded within one of the following formats: jpg, png, gif, bmp, tif.
6. Device shall enable configuration of all switches, dimmers, control zones, and lighting preset scenes via password protected setup screens.
7. Graphic wall stations shall support the following device options:
   a. Number of control zones: Up to 16.
   b. Number of scenes: Up to 16.
   c. Profile type scene duration: User configurable from 5 minutes to 12 hours.
8. cabling with RJ-45 connectors.
9. All switches shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
10. Devices shall have LED user feedback to provide indication of on/off status of the programmed lights or scene, as well as indication of device power.
11. Digital key switches shall support the following device options:
    a. Control Types Supported:
       1) On/Off.
       2) On/Off/Dimming.
       3) Preset Level Scene Type.
       4) Reprogramming of other devices within daisy-chained zone so as to implement user selected lighting scene. This shall support manual start/stop from the scene controller, or optionally programmed to automatically end after a user selectable duration between 5 minutes and 12 hours.
       5) Selecting a lighting profile to be run by the system's upstream controller so as to implement a selected lighting profile across multiple zones. This shall support manual start/stop from the scene controller, or optionally programmed to automatically end after a user selectable duration between 5 minutes and 12 hours.
    b. Colors: Ivory, White, Light Almond, Stainless-Steel.

D. Wired Networked Auxiliary Input / Output (I/O) Devices:
   1. Devices shall be plenum rated and be inline wired, screw mountable, or have an extended chase nipple for mounting to a 1/2-inch knockout.
   2. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
   3. Auxiliary Input/Output Devices shall be specified as an input or output device with the following options:
      a. Contact closure or Pull High input.
         1) Input shall be programmable to support maintained or momentary inputs that can activate local or global scenes and profiles, activate lights at a preconfigured level, ramp light level up or down, or toggle lights on/off.
      b. 0-10V analog input.
         1) Input shall be programmable to function as a daylight sensor.
      c. RS-232/RS-485 digital input.
         1) Input supports activation of up to 4 local or global scenes and profiles, and on/off/dimming control of up to 16 local control zones.
      d. 0-10V dimming control output, capable of sinking up to 20mA of current
         1) Output shall be programmable to support all standard sequence of operations supported by system.
      e. Digital control output via EldoLED LEDcode communication.
         1) Output shall be programmable to support light intensity control, as well as optional correlated color temperature (CCT) control, of the connected luminaire.

E. Wired Networked Occupancy and Photosensors:
   1. Occupancy sensors shall sense the presence of human activity within the desired space and fully control the on/off function of the lights.
   2. Sensors shall utilize passive infrared (PIR) technology, which detects occupant motion, to initially turn lights on from an off state, thus preventing false on conditions.
   3. For applications where a second method of sensing is necessary to adequately detect maintained occupancy (such as in rooms with obstructions), a sensor with an additional “dual” technology shall be used.
   4. Dual technology sensors shall have 1 of its 2 technologies do not require motion to detect occupancy. Acceptable dual technology includes PIR/Microphonics (also known as Passive Dual Technology or PDT) which both looks for occupant motion and listens for sounds indicating occupants or (PIR/Ultrasonic).
   5. All sensing technologies shall be acoustically passive, meaning they do not transmit sounds waves of any frequency (for example in the Ultrasonic range), as these technologies have the potential for interference with other electronic devices within the space (such as electronic white board readers). Acceptable detection technologies include Passive Infrared (PIR), and/or Microphonics technology, and Ultrasonic or Microwave based sensing technologies.
   6. System shall have ceiling, fixture, recessed & corner mounted sensors available, with multiple lens options available customized for specific applications.
   7. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
   8. All sensors shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.

9. Sensor programming parameter shall be available and configurable remotely from the software and locally via the device push-button.
10. Ceiling mount occupancy sensors shall be available with 0 or 1 integrated dry contact switching relays, capable of switching 1 amp at 24 VAC/VDC (resistive only).
11. Sensors shall be available with 1 or 2 occupancy "poles", each of which provides a programmable time delay.
12. Sensors shall have optional features for photosensor/daylight override, automatic dimming control, and low temperature/high humidity operation.
13. Photosensor shall provide for an on/off set-point, and a dead band to prevent the artificial light from cycling. Delay shall be incorporated into the photocell to prevent rapid response to passing clouds.
14. Photosensor and dimming sensor's set-point and dead band shall be automatically calibrated through the sensor's microprocessor by initiating an "Automatic Set-point Programming" procedure. Min and max dim settings as well as set-point may be manually entered.
15. Dead band setting shall be verified and modified by the sensor automatically every time the lights cycle to accommodate physical changes in the space (i.e., furniture layouts, lamp depreciation, or lamp outages).
16. A dual zone option shall be available for On/Off Photocell, Automatic Dimming Control Photocell, or Combination units. The secondary daylight zone shall be capable of being controlled as an "offset" from the primary zone.

F. Wired Networked Wall Switch Sensors:
1. Devices shall recess into single-gang switch box and fit a standard GFI opening.
2. Communication and low voltage power shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors.
3. All wall switch sensors shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential wiring issue.
4. Devices with mechanical pushbuttons shall provide tactile user feedback.
5. Wall switches sensors shall support the following device options:
   a. User Input Control Types Supported: On/Off or On/Off/Dimming.
   b. Occupancy Sensing Technology: PIR only or Dual Tech acoustic.
   c. Daylight Sensing Option: Inhibit Photosensor.
   d. Colors: Ivory, White, Light Almond, Gray, Black, Red.

G. Wired Networked Embedded Sensors:
1. Network system shall have embedded sensors consisting of occupancy sensors and/or dimming photocells that can be embedded into luminaire such that only the lens shows on luminaire face.
2. Occupancy sensor detection pattern shall be suitable for 7.5 feet to 20 feet mounting heights.
3. Embedded sensors shall support the following device options:
   a. Occupancy Sensing technology: PIR only or Dual Tech acoustic.
   b. Daylight Sensing Option: Occupancy only, Daylight only, or combination Occupancy/Daylight sensor.

H. Wired Networked Power Packs and Secondary Packs:
1. Power Packs shall incorporate one optional Class 1 relay, optional 0-10 VDC dimming output, and contribute low voltage Class 2 power to the rest of the system.
2. Power Packs shall accept 120 or 277 VAC (or optionally 347 VAC) and carry a plenum rating.

3. Secondary Packs shall incorporate the relay and 0-10 VDC or line voltage dimming output but shall not be required to contribute system power.
4. Power Supplies shall provide system power only but are not required to switch line voltage circuit.
5. Auxiliary Relay Packs shall switch low voltage circuits only, capable of switching 1 amp at 40 VAC/VDC (resistive only).
6. Communication shall be delivered to each device via standard low voltage network cabling with RJ-45 connectors. Secondary packs shall receive low voltage power via standard low voltage network cable.
7. Power Pack programming parameters shall be available and configurable remotely from the software and locally via the device push-button.
8. Power Pack shall securely mount through a threaded 1/2-inch chase nipple or be capable of being secured within a luminaire ballast/driver channel. Plastic clips into junction box shall not be accepted. All Class 1 wiring shall pass through chase nipple into adjacent junction box without any exposure of wire leads. Note: UL Listing under Energy Management or Industrial Control Equipment automatically meets this requirement, whereas Appliance Control Listing does not meet this safety requirement.
9. When required by local code, Power Pack must install inside standard electrical enclosure and provide UL recognized support to junction box. All Class 1 wiring is to pass through chase nipple into adjacent junction box without any exposure of wire leads.
10. Power/Secondary Packs shall be available with the following options:
    a. Power Pack capable of full 16-Amp switching of all normal power lighting load types, with optional 0-10V dimming output capable of up to 100mA of sink current.
    b. Secondary Pack with UL924 listing for switching of full 16-Amp Emergency Power circuits, with optional 0-10V dimming output capable of up to 100mA of sink current.
    c. Power and Secondary Packs capable of full 20-Amp switching of general purpose receptacle (plug-load) control.
    d. Secondary Pack capable of full 16-Amp switching of all normal power lighting load types.
    e. Secondary Pack capable of 5-Amps switching and dimming 120 VAC incandescent lighting loads or 120/277 VAC line voltage dimmable fluorescent ballasts (2-wire and 3-wire versions).
    f. Secondary Pack capable of 5-Amps switching and dimming of 120/277 VAC magnetic low voltage transformers.
    g. Secondary Pack capable of 4-Amps switching and dimming of 120 VAC electronic low voltage transformers.
    h. Secondary Pack capable of louver/damper motor control for skylights.
    i. Secondary Pack capable of providing a pulse on/pulse off signal for purposes of controlling shade systems via relay inputs.
    j. Secondary Pack capable of switching 1 amp at 40 VAC/VDC (resistive only) with the intent to provide relay signal to auxiliary system (e.g. BMS).
    k. Power Supply capable of providing auxiliary bus power (no switched or dimmed load).

I. Wired Networked Luminaires:
1. Networked luminaire shall have a mechanically integrated control device.
2. Networked LED luminaire shall have two RJ-45 ports available (via control device directly or incorporated RJ-45 splitter).

3. Networked LED luminaire shall be able to digitally network directly to other network control devices (sensors, photocells, switches, dimmers).
4. Networked LED luminaire shall provide low voltage power to other networked control devices (excluding EMG and CCT capable versions).
5. System shall be able to turn on/off specific LED luminaires without using a relay, if LED driver supports "sleep mode."
6. System shall be able to maintain constant lumen output over the specified life of the LED luminaire (also called lumen compensation) by automatically varying the dimming control signal to account for lumen depreciation.
    a. System shall indicate (via a blink warning) when the LED luminaire is no longer able to compensate for lumen depreciation.
7. System shall be able to provide control of network luminaire intensity, in addition to correlated color temperature of specific LED luminaires.
8. System shall be able to provide control of network luminaire intensity, in addition to dynamic features, such as grayscale and color accent of specific LED luminaires.

J. Wired Networked Relay and Dimming Panel
1. Relay and dimming panel shall be available with 4, 8, 12, 16, 24, 32, 40 or 48 individual relays per panel, with an equal number of individual 0-10V dimming outputs.
2. Optional Field Configurable Relays (FCR) used shall have the following required properties:
    a. Configurable in the field to operate with single-, double-, or triple-pole relay groupings.
    b. Configurable in the field to operate with normally closed or normally open behavior.
    c. Provides visual status of current state and manual override control of each relay.
    d. Listed for the following minimum ratings:
        1) 40A @ 120-480VAC Ballast.
        2) 16A @ 120-277VAC Electronic.
        3) 20A @ 120-277VAC Tungsten.
        4) 20A @ 48VDC Resistive.
        5) 2HP @ 120VAC.
        6) 3HP @ 240-277VAC.
        7) 65kA SCCR @ 480VAC.
3. 0-10 dimming outputs shall support a minimum of 100mA sink current per output.
4. Relay and dimming outputs shall be individually programmable to support all standard sequence of operations as defined in this specification.
5. Panel shall be UL924 listed for control of emergency lighting circuits.
6. Panel shall power itself from an integrated 120-277 VAC or optional 347VAC supply.

7. Panel shall provide a configurable low-voltage sensor input with the following properties:
    a. Configurable to support any of the following input types:
        1) Indoor Photocell.
        2) Outdoor Photocell.
        3) Occupancy Sensor.
        4) Contact Closure.
    b. Low voltage sensor input shall provide +24VDC power for the sensor so that additional auxiliary power supplies are not required.
    c. Sensor input supports all standard sequence of operations as defined in this Specification.
8. Panel shall provide a contact closure input for each group of 8-relays that acts as a panel override to activate the normally configured state of all relays (i.e., normally open or normally closed) in the panel. This input is intended to provide an interface to alarm systems, fire panels, or BMS system to override the panel.
9. Panel shall supply current limited low voltage power to other networked devices connected via low voltage network cable.
10. Panel shall be available with NEMA 1 rated enclosure with the following mounting and cover options:
    a. Surface-mounted for all panel sizes.
    b. Flush-mounted for up to 16 relay panel sizes.
    c. Screw-fastened for up to 16 relay panel sizes.
    d. Hinged cover with keyed lock for all panel sizes.
11. Surface-mounted screw cover options for 8 and 16 relay panel sizes shall be plenum rated.
12. Panel shall be rated from 0-50C for 8 and 16 enclosure sizes, and 0-45C for 32 and 48 enclosure sizes.

K. Wired Networked Bluetooth® Low Energy Programming Device:
1. Device shall be plenum rated and be inline wired, screw mountable.
2. Communication and low voltage power shall be delivered to device via standard low voltage network cabling with RJ-45 connectors.
3. Bluetooth Low Energy connection shall allow connection from smartphone application for programming device settings within the local daisy-chain zone (*see list of available settings in section 2.4-System Software Interfaces, Sub-section E).*
    a. Device shall provide visual indication of remote Bluetooth connection via LED integrated into device enclosure such that it is visible from all angles while the zone is being programmed.

L. Wired Networked Communication Bridge:
1. Device shall surface mount to a standard 4-inch x 4-inch square junction box.
2. Device shall have 8 RJ-45 ports for connection to lighting control zones (up to 128 devices per port), additional network bridges, and System Controller.
3. Device shall be capable of aggregating communication from multiple lighting control zones for purposes of minimizing backbone wiring requirements back to System Controller.
4. Device shall be powered with Class 2 low voltage supplied locally via a directly wired power supply, or powered via low voltage network connections from powered lighting control devices (e.g. power packs).
5. Wired Bridge shall be capable of redistributing power from its local supply and connected lighting control zones with excess power to lighting control zones with insufficient local power. This architecture also enables loss of power to a particular area to be less impactful on network lighting control system.

2.7 WIRELESS NETWORKED DEVICES

A. Wireless Networked Wall Switches, Dimmers:
   1. Devices shall recess into single-gang switch box and fit a standard GFI opening.
   2. Communication shall be provided by wireless BLE connection and 900MHz link to other devices.
   3. Devices shall have options to be powered by battery or line voltage. If powered by battery, expected battery life shall be no less than 10 years.
   4. Devices with mechanical pushbuttons shall provide tactile and LED user feedback during button press.
   5. Devices with mechanical pushbuttons shall be made available with custom button labeling.
   6. Wall switches & dimmers shall support the following device options:
      a. Number of control zones: 1, 2.
      b. Control Types Supported: On/Off or On/Off/Dimming.
      c. Colors: Ivory, White, Light Almond, Gray, Red.
   7. Scene switches shall support the following device options:
      a. Number of Scenes. 2, 4.
      b. Control types supported.
         1) On/Off.
         2) On/Off/Dimming.
         3) Preset Level Scene Type.

B. Wireless Networked Auxiliary Fixture Control Devices:
   1. Communication shall be provided by wireless BLE connection and 900MHz link to other devices.
   2. Power shall be delivered to each device via standard low voltage wiring from LED driver.

C. Wireless Networked Indoor Occupancy and Photosensors:
   1. Communication shall be provided by wireless BLE connection and 900MHz link to other devices.
   2. Occupancy sensors shall sense the presence of human activity within the desired space and fully control the on/off function of the lights.
   3. Sensors shall utilize passive infrared (PIR) technology, which detects occupant motion, to initially turn lights on from an off state, thus preventing false on conditions. Ultrasonic or Microwave based sensing technologies shall not be accepted.
   4. For applications where a second method of sensing is necessary to adequately detect maintained occupancy (such as in rooms with obstructions), a sensor with an additional “dual” technology shall be used.
   5. Dual technology sensors shall have 1 of its 2 technologies do not require motion to detect occupancy. Acceptable dual technology includes PIR/Microphonics (also known as Passive Dual Technology or PDT) which both looks for occupant motion and listens for sounds indicating occupants. Sensors where both technologies detect motion (PIR/Ultrasonic) shall not be acceptable.
   6. All sensing technologies shall be acoustically passive, meaning they do not transmit sounds waves of any frequency (for example in the Ultrasonic range), as these technologies have the potential for interference with other electronic devices within the space (such as electronic white board readers). Acceptable detection technologies include Passive Infrared (PIR), and/or Microphonics technology. Ultrasonic or Microwave based sensing technologies shall not be accepted.

7. All sensors shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential issue.
8. Power shall be delivered to each device via standard low voltage wiring from a local power pack or by line voltage for devices with available nipple mount.
9. Sensor programming parameter shall be available and configurable remotely from the software.
10. Network system shall have ceiling and fixture mounted sensors available, with multiple lens options available customized for specific applications.
11. Sensors shall be available with 0 or 1 integrated dry contact switching relays, capable of switching 1 amp at 24 VAC/VDC (resistive only).
12. Sensors shall have standard daylight photosensor for programmable daylight harvesting.
13. Photosensor shall provide foot-candle setpoint and a deadband to prevent the artificial light from cycling. Set-point and deadband shall be capable of automatically calibrating through an "Automatic Set-Point Programming" procedure. Min and max dim settings as well as set-point may be manually entered.
14. Deadband setting shall be verified and modified by the sensor automatically every time the lights cycle to accommodate physical changes in the space (i.e., furniture layouts, lamp depreciation, or lamp outages).
15. Nipple mounted devices shall include option for power interruption detection, where unit powers and controls the emergency circuit, and an interruption of power to this circuit for >30 ms forces unit to shunt closed, go to full bright, and ignore all system commands for 90 minutes.

D. Wireless Networked Outdoor Occupancy and Photosensors:
1. Communication shall be provided by wireless BLE connection and 900MHz link to other devices.
2. Sensor shall be available in both nipple mount and in-fixture mount options.
   a. Nipple mount sensor shall carry IP66 rating.
   b. In-fixture mount sensor shall carry IP65 rating.
3. Sensor shall be capable of operating in -40 to 65C ambient temperature ranges.
4. Sensors shall be capable of accepting 120-277, 347, or 480VAC input or DC power for embedded device.
5. Occupancy sensors shall sense the presence of human activity within the desired space and fully control the on/off function of the lights.
6. Sensors shall utilize passive infrared (PIR) technology, which detects occupant motion, to initially turn lights on from an off state, thus preventing false on conditions. Ultrasonic or Microwave based sensing technologies shall not be accepted.
7. All sensors shall have the ability to detect when it is not receiving valid communication and blink its LED in a pattern to visually indicate a potential issue.
8. Sensor programming parameter shall be available and configurable remotely from the software.
9. Nipple mounted sensors shall be available with multiple lens options available for various mounting heights.
10. Sensors shall have standard daylight photosensor for programmable daylight harvesting.
11. Photosensor shall provide foot-candle setpoint and a deadband to prevent the artificial light from cycling. Set-point and deadband shall be capable of automatically calibrating through an "Automatic Set-Point Programming" procedure. Min and max dim settings as well as set-point may be manually entered.

12. Deadband setting shall be verified and modified by the sensor automatically every time the lights cycle to accommodate physical changes in the space (i.e., changes in car type and color, lamp outages).
13. Devices shall include option for power interruption detection, where unit powers and controls the emergency circuit, and an interruption of power to this circuit for >30 ms forces unit to shunt closed, go to full bright, and ignore all system commands for 90 minutes.

E. Wireless Networked Indoor Embedded Sensors:
1. Communication shall be provided by wireless BLE connection and 900MHz link to other devices.
2. Network system shall have embedded sensors consisting of occupancy sensors and/or dimming photocells that can be embedded into luminaire such that only the lens shows on luminaire face.
3. Occupancy sensor detection pattern shall be suitable for 7.5 feet to 40 feet mounting heights.
4. Embedded sensors shall support the following configuration options:
   a. Occupancy Sensing technology: PIR only or Dual Tech acoustic.
   b. Daylight Sensing Option: Occupancy only, Daylight only, or combination Occupancy/Daylight sensor.
5. Devices shall be available with options for both integrated and remote capable antennas such that devices can be optionally installed in a sealed container without detriment to wireless strength.

F. Wireless Networked Power Packs:
1. Communication shall be provided by wireless BLE connection and 900MHz link to other devices.
2. Power Packs shall incorporate one optional Class 1 relay, optional 0-10 VDC dimming output.
3. Power Packs shall accept 120 through 277 VAC and carry a plenum rating.
4. Power Packs shall be available with optional 24VDC, 100mA output for use with ceiling mount sensors or other DC powered products.
5. Power Packs shall be available with options for integrated and remote capable antennas such that devices can be optionally installed in a sealed container without detriment to wireless strength.
6. Power Pack programming parameters shall be available and configurable remotely from the software.
7. Power Pack shall securely mount to junction location through a threaded 1/2-inch chase nipple or be capable of being secured within a luminaire ballast/driver channel. Plastic clips into junction box shall not be accepted. All Class 1 wiring shall pass through chase nipple into adjacent junction box without any exposure of wire leads. Note: UL Listing under Energy Management or Industrial Control Equipment automatically meets this requirement, whereas Appliance Control Listing does not meet this safety requirement.
8. When required by local code, Power Pack must install inside standard electrical enclosure and provide UL recognized support to junction box. All Class 1 wiring is to pass through chase nipple into adjacent junction box without any exposure of wire leads.

9. Power Packs shall be available with the following options:
    a. Power Pack capable of full 20-Amp switching of all normal power lighting load types, with optional 0-10V dimming output capable of up to 100mA of sink current.
    b. Power Packs capable of full 20-Amp switching of general purpose receptacle (plug-load) control.
    c. Power Packs with UL924 listing capable of full 20-Amp switching of all emergency power lighting load types, with optional 0-10V dimming output capable of up to 100mA of sink current. There shall be 2 methods of achieving the UL924 operation:
        1) Power sense of normal power feed, where unit powers and controls emergency circuit, and loss of the normal power sense circuit forces the power pack to shunt closed, go to full bright, and ignore all system commands until normal power is restored.
        2) Power interruption detection, where unit powers and controls the emergency circuit, and an interruption of power to this circuit for >30 ms forces unit to shunt closed, go to full bright, and ignore all system commands for 90 minutes.
    d. Power Packs shall have the option of mounting inside a sealed metal enclosure, with a plenum rated antenna protruding from said enclosure to allow for an IP 67 rated application.

G. Wireless Networked Luminaires:
1. Communication shall be provided by wireless BLE connection and 900MHz link to other devices.
2. Networked luminaire shall have a mechanically integrated control device.
3. System shall be able to turn on/off specific LED luminaires without using a relay, if LED driver supports “sleep mode.”
4. System shall be able to provide control of network luminaire intensity

H. Wireless Networked Communication Adapter:
1. A communication adapter shall be provided that interfaces with the System Controller via USB connection and interfaces with wireless networked devices via an integrated 900MHz.
2. Device shall be capable of communicating with at least 750 wireless networked devices and luminaires.
3. Device shall be supplied with mounting hardware suitable for vertical ceiling mounting or for vertical mounting from a wall.
4. Device shall be unresponsive to wired and wireless communications that do not conform to the specific protocols used by the networked lighting control system.
5. Device shall be IP66 rated and shall be optionally installed in an indoor or outdoor location.
6. Device shall allow programming and control of indoor, outdoor, and industrial wireless control devices through a single user interface.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

A. Installation Procedures and Verification:
1. The successful bidder shall review all required installation and pre-startup procedures with the manufacturer's representative through pre-construction meetings.
2. The successful bidder shall install and connect the networked lighting control system components according to the manufacturer's installation instructions, wiring diagrams, the Project submittals, and plans Specifications.
3. The successful bidder shall be responsible for testing of all low voltage network cable included in the bid. Bidder is responsible for verification of the following minimum parameters:
a. Wire Map (continuity, pin termination, shorts and open connections, etc.).
b. Length.
c. Insertion Loss.

B. Coordination with Owner's IT Network Infrastructure:
1. The successful bidder is required to coordinate with the Owner's representative to secure all required network connections to the Owner's IT network infrastructure.
a. The bidder shall provide to the Owner's representative all network infrastructure requirements of the networked lighting control system.
b. The bidder shall provide to the manufacturer's representative all necessary contacts pertaining to the Owner's IT infrastructure, to ensure that the system is properly connected and started up.

C. Documentation and Deliverables:
1. The installing Contractor shall be responsible for documenting installed location of all networked devices, including networked luminaires. This includes responsibility to provide as-built plan Drawing showing device address barcodes corresponding to locations of installed equipment.
2. The installing Contractor is also responsible for the following additional documentation to the manufacturer's representative if visualization / graphical floorplan software is provided as part of bid package:
a. As-Built floor plan Drawings showing device address locations required above. All documentation shall remain legible when reproducing\scanning Drawing files for electronic submission.
b. As-Built electrical lighting Drawings (reflected ceiling plan) in PDF and CAD format. Architectural floor plans shall be based on as-built conditions.
1) CAD files shall have layers already turned on/off as desired to be shown in the graphical floorplan background images. The following CAD elements are recommended to be hidden to produce an ideal background graphical image:
Titleblock, Text- Inclusive of room names and numbers, fixture tags and Drawings notes, Fixture wiring and homeruns, Control devices , Hatching or oche of light fixtures or architectural elements.
2) CAD files shall be of AutoCAD 2013 or earlier. Revit file overall floor plan views shall be exported to AutoCAD 2013.

3.2 SYSTEM STARTUP

A. Upon completion of installation by the installer, including completion of all required verification and documentation required by the manufacturer, the system shall be started up and programmed.
   1. For CAT5e wired devices, low voltage network cable testing shall be performed prior to system start-up.

B. System start-up and programming shall include:
   1. Verifying operational communication to all system devices.
   2. Programming the network devices into functional control zones to meet the required sequence of operation.
   3. Programming and verifying all sequence of operations.

C. Initial start-up and programming will occur on-site.

3.3 PROJECT TURNOVER

A. System Documentation:
   1. Submit software database file with desired device labels and notes completed. Changes to this file will not be made by the factory.
   2. Installing Contractor to grant access to the Owner for the programming database, if requested.
   3. Pricing shall include an additional 90-day post occupancy visit to be used at the Owner's discretion. This visit is intended to make any system optimization adjustment or additional training to the Owner deemed for a successful system. The visit is not to include any major programming changes or adding equipment to the system.

B. Owner Training:
   1. Provisions for onsite training for Owner and designated attendees to be included in submittal package.
   2. Contractor shall coordinate ensuring the appropriate parties are present during this visit. If not, the Contractor shall incur any cost associated with an additional visit as required by the Owner.

END OF SECTION

SECTION 26 18 39 - ENCLOSED MOTOR CONTROLLERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manual motor starters.
   2. Magnetic motor starters.
   3. Combination magnetic motor starters.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. NFPA 70 – National Electrical Code.
B. UL 1 98C – High-Interrupting Capacity Fuses; Current Limiting Type.
C. UL 1 98E – Class R Fuses.
D. NECA "Standard of Installation," published by National Electrical Contractors Association.
E. NEMA ICS 2 – Industrial Control Devices, Controllers, and Assemblies.
F. NEMA ICS 6 – Enclosures for Industrial Controls and Systems.
G. NEMA KS 1 – Enclosed Switches.

1.3 SUBMITTALS

A. Submit under provisions of Division 01.
B. Product Data: Provide catalog sheets showing voltage, controller size, ratings, and size of switching and overcurrent protective devices, short circuit ratings, dimensions, and enclosure details.
C. Test Reports: Indicate field test and inspection procedures and test results.
D. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency specified under Regulatory Requirements. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with NECA Standard of Installation.
B. Maintain 1 copy of each document on site.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 3 years' documented experience.

1.6 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.
B. Furnish products listed and classified by Underwriters Laboratories, Inc. as suitable for purpose specified and indicated.

PART 2 - PRODUCTS

2.1 MANUAL CONTROLLERS

A. Manual Motor Controller: NEMA ICS 2, AC general-purpose Class A manually operated, full-voltage controller with overload element, NO auxiliary contact, and toggle operator.
B. Fractional Horsepower Manual Controller: NEMA ICS 2, AC general-purpose Class A manually operated, full-voltage controller for fractional horsepower induction motors, with thermal Overload unit, and toggle operator.
C. Enclosure: NEMA ICS 6; Type 1.

2.2 AUTOMATIC CONTROLLERS

A. Magnetic Motor Controllers: NEMA ICS 2, AC general-purpose Class A magnetic controller for induction motors rated in horsepower.
B. Coil operating voltage: 120 volts, 60 Hertz.
C. Overload Relay: NEMA ICS; electronic type; with phase loss and unbalance protection.
D. Enclosure: NEMA ICS 6, Type 1.

2.3 PRODUCT OPTIONS AND FEATURES

A. Auxiliary Contacts: NEMA ICS 2, 2 each field convertible contacts in addition to seal-in contact.
B. Cover Mounted Pilot Devices: NEMA ICS 2, heavy duty type.
C. Pushbuttons: Recessed type.
D. Indicating Lights: LED type.
E. Selector Switches: Rotary type.
F. Relays: NEMA ICS 2.
G. Control Power Transformers: 120 volt secondary. Provide fused primary and secondary, and bond unfused leg of secondary to enclosure.

2.4 DISCONNECTS

A. Combination Controllers: Combine motor controllers with fusible switch disconnect in common enclosure.
B. Fusible Switch Assemblies: NEMA KS 1, enclosed knife switch with externally operable handle. Fuse clips: Designed to accommodate Class R fuses.

2.5 FUSES

A. Description: Dual element, current limiting, time delay, one-time fuse, 250V volt, UL 198E, Class RK 5.
B. Interrupting Rating: 200,000 rms amperes.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install enclosed controllers where indicated, in accordance with manufacturer's instructions. Provide a motor controller for all equipment not furnished as integral with equipment. Coordinate actual motor loads with overload protection.
B. Install enclosed controllers plumb. Provide supports in accordance with Section 26 05 29 “Supporting Devices.”
C. Height: 5 feet to operating handle.
D. Install fuses in fusible switches.
E. Select and install overload heater elements in motor controllers to match installed motor characteristics.
F. Provide engraved plastic nameplates under the provisions of Section 26 05 53 “Electrical Identification.”
G. Provide neatly typed label inside each motor controller door identifying motor served, nameplate horsepower, full load amperes, code letter, service factor, and voltage/phase rating.

3.2 FIELD QUALITY CONTROL

A. Field inspection and testing will be performed under provisions of other Sections.
B. Inspect and test each enclosed controller to NEMA ICS 2.

END OF SECTION

SECTION 26 24 16 – PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Distribution and Branch circuit panelboards.
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 26 05 29 “Supporting Devices.”
   3. Section 26 05 53 “Electrical Identification:” Engraved nameplates.

1.2 REFERENCES

A. NECA (National Electrical Contractors Association) "Standard of Installation."
B. NEMA AB 1 – Molded Case Circuit Breakers.
C. NEMA ICS 2 – Industrial Control Devices, Controllers, and Assemblies.
D. NEMA KS 1 – Enclosed Switches.
E. NEMA PB 1 – Panelboards.
F. NEMA PB 1.1 – Instructions for Safe Installation, Operation and Maintenance of Panelboards Rated 600 Volts or Less.
G. NFPA 70 – National Electrical Code.

1.3 SUBMITTALS

A. Submit under provisions of General Conditions. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, integrated short circuit ampere rating, circuit breaker and fusible switch arrangement and sizes.
B. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by Product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of Product.
C. Panelboard manufacturer shall provide short circuit and arc fault calculations per NEC requirements. Equipment shall be rated per calculations.

1.4 PROJECT RECORD DOCUMENTS

A. Submit under provisions of General Conditions. Record actual locations of Products; indicate actual branch circuit arrangement.

1.5 OPERATION AND MAINTENANCE DATA

A. Submit under provisions of General Conditions. Maintenance Data: Include spare parts data listing; and recommended maintenance procedures and intervals.

1.6 QUALITY ASSURANCE

A. Perform Work in accordance with NECA Standard of Installation.

1.7 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 5 years' experience.

1.8 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70. Furnish products listed and classified by UL as suitable for purpose specified and indicated.

1.9 FIELD MEASUREMENTS

A. Verify that field measurements are as indicated.

1.10 MAINTENANCE MATERIALS

A. Provide maintenance materials under provisions of General Conditions. Provide 2 of each panelboard key if required.

PART 2 - PRODUCTS

2.1 PANELBOARDS

A. Manufacturers:
   1. Eaton.
   2. G.E.
   3. Siemens.
   4. Square-D.
B. Description: NEMA PB-1, circuit breaker type.
C. Panelboard Bus: Copper with ratings as indicated. Provide a copper ground bus in each panelboard.
D. Minimum integrated short circuit rating: Fully rated devices with minimum levels as indicated. Series rated systems will not be allowed. Minimum calculated values are labeled on each panelboard and are indicated as "AIC".
E. Molded Case Circuit Breakers: NEMA AB 1, bolt-on, circuit breakers with integral thermal and instantaneous magnetic trip in each pole. Provide circuit breakers UL listed as type HACR for air-conditioning equipment loads and type SWD for switching applications.
F. Enclosure: NEMA PB-1, Type 1.
G. Cabinet Front: Surface or recessed type as indicated on the drawings, fastened with concealed trim clamps, hinged door with flush lock, metal directory frame, and finished in manufacturer's standard gray enamel.
H. Provide integral Surface Protection Device (SPD) and circuit breaker for the main distribution panel.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install panelboards in accordance with NEMA PB 1.1. Install panelboards plumb. Provide supports in accordance with drawings and Section 26 05 29 “Supporting Devices.” Height: 6-foot maximum to top of panelboard. Provide filler plates for unused spaces in panelboards. Provide typed circuit directory for each branch circuit panelboard. Revise directory to reflect circuiting changes required to balance phase loads. Spare slots shall be labeled as such in erasable pencil on directory. Provide engraved plastic nameplates under the provisions of Section 26 05 53 “Electrical Identification.”

B. Provide 2, empty, 1-inch conduits from each recessed panelboard to an accessible location above and label as “spare.”

C. Ground each panelboard in accordance with Section 26 05 26 “Grounding and Bonding.”

3.2 FIELD QUALITY CONTROL

A. Field inspection and test for grounds on each circuit after installation is completed. Measure steady state load currents at each panelboard feeder; rearrange circuits in the panelboard to balance the phase loads to within 20 percent of each other. Maintain proper phasing for multi-wire branch circuits. Visual and Mechanical Inspection: Inspect for physical damage, proper alignment, anchorage, and grounding. Check proper installation and tightness of connections for circuit breakers, fusible switches, and fuses.

END OF SECTION

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Wall switches.
   2. Receptacles.
   3. Device plates and decorative box covers.
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 26 05 33.16 “Boxes.”

1.2 REFERENCES

A. NECA – Standard of Installation.
B. NEMA WD 1 – General Requirements for Wiring Devices.
C. NEMA WD 6 – Wiring Device - Dimensional Requirements.
D. NFPA 70 – National Electrical Code.

1.3 SUBMITTALS FOR REVIEW

A. Section 01 33 00 “Submittal Procedures.”
B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
C. Manufacturers with similar catalog numbers will not be considered as a basis for an equivalent product.

1.4 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 3 years’ documented experience.

1.5 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.
B. Provide Products listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

PART 2 - PRODUCTS

2.1 WALL SWITCHES

A. Manufacturers:
   1. Hubbell PRO 1221-W.
   2. Substitutions: Refer to Section 01 60 00.
B. Description: NEMA WD 1, 20 amp, Heavy-Duty, AC only general-use snap switch.

C. Body and Handle: Nylon white handle.
D. Utilize equivalent series of manufacturer's numbers above for 3-way, 4-way and 2-pole applications.

2.2 DIMMERS

A. Manufacturers:
   1. Hubbell AS153
B. Description: 1500 watt, 120V, 60hz. Slide control.
C. Device Body: Provide Hubbell AS2I, white plate kit.

2.3 RECEPTACLES

A. Manufacturers:
   1. Hubbell PRO 5352-W.
   2. Substitutions: Refer to Section 01 60 00 "Product Requirements." Equivalent.
B. Description: NEMA WD 1, Heavy-duty general use receptacle, with triple wipe contacts and grounding contacts integral with backstrap (no rivets).
C. Device Body: White plastic.
D. Configuration: NEMA WD 6, type as specified and indicated.
E. Convenience Receptacle: Type 5-20.
F. GFCI Receptacle: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements. Hubbell GF5352-W or equivalent.

2.4 WALL PLATES

A. Decorative Cover Plate: Stainless-steel.
B. Weatherproof Cover Plate: Gasketed cast metal with gasketed device cover on exterior devices.
C. Surface Mounted Plates: Galvanized steel plates.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Section 01 30 00 "Administrative Requirements:" Verification of existing conditions prior to beginning work.
B. Verify that outlet boxes are installed at proper height.
C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
E. Verify installation location of all boxes to be installed in millwork with Architect.

3.2 PREPARATION

A. Provide extension rings to bring outlet boxes flush with finished surface.
B. Clean debris from outlet boxes.

3.3 INSTALLATION

A. Install in accordance with NECA "Standard of Installation."
B. Install devices plumb and level.
C. Install switches with OFF position down.
D. Do not share neutral conductor on load side of dimmers.
E. Install receptacles with grounding pole on top.
F. Connect wiring device grounding terminal to branch circuit equipment grounding conductor.
G. Install decorative plates on switch, receptacle, and blank outlets in finished areas.
H. Connect wiring devices by wrapping conductor around screw terminal.
I. Use jumbo size plates for outlets installed in masonry walls.
J. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.
K. Install blank cover plate to match other wall plates on all unused boxes.

3.4 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 26 05 33.16 “Boxes” to obtain mounting heights specified and indicated on drawings.
B. Install all wall switches, thermostats, and fire alarm pull stations at 48 inches above finished floor.
C. Install convenience receptacle 18 inches above finished floor.
D. Install convenience receptacle 6 inches above backsplash of counter unless otherwise directed by Architect.
E. Install telephone jack 18 inches above finished floor.
F. Install telephone for jack wall telephone to position top of telephone at 48 inches above finished floor.

3.5 FIELD QUALITY CONTROL

A. Section 01 40 00 “Quality Requirements:” Field inspection, testing, adjusting, and balancing.
B. Inspect each wiring device for defects.
C. Operate each wall switch with circuit energized and verify proper operation.
D. Verify that each receptacle device is energized.
E. Test each receptacle device for proper polarity.
F. Test each GFCI receptacle device for proper operation.

3.6 ADJUSTING

A. Section 01 70 00 “Execution and Closeout Requirements:” Adjusting installed work.
B. Adjust devices and wall plates to be flush and level.

3.7 CLEANING

A. Section 01 70 00 “Execution and Closeout Requirements:” Cleaning installed work.
B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION

SECTION 26 28 16.16 - ENCLOSED SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fusible switches.
   2. Non-fusible switches.
   3. Fuses.
B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. NEMA KS 1 – Enclosed Switches.
B. NFPA 70 – National Electrical Code.
C. UL 198C – High-Interrupting Capacity Fuses; Current Limiting Type.
D. UL 198E – Class R Fuses.
E. NEMA AB 1 – Molded Case Circuit Breakers.
F. NECA – Standard of Installation.

1.3 SUBMITTALS

A. Submit under provisions of Section 01 33 00 “Submittal Procedures.”
B. Product Data: Provide switch ratings and enclosure dimensions.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with NECA Standard of Installation.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing Products specified in this Section with minimum 3 years documented experience.

1.6 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.
B. Furnish products listed and classified by UL as suitable for purpose specified and shown.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Eaton.
B. General Electric.
C. Siemens.
D. Square D.

2.2 ENCLOSED SWITCHES

A. Fusible or Non-fusible as indicated.
B. Switch Assemblies: NEMA KS 1, Type HD load interrupter enclosed knife switch with externally operable handle interlocked to prevent opening front cover with switch in ON position. Handle lockable in OFF position.
C. Fuse Clips: Designed to accommodate NEMA FU1, class R fuses.
D. Enclosures: NEMA KS 1.
E. Interior Dry Locations: Type 1.
F. Exterior Locations: Type 3R or 4.
G. NEMA ratings of enclosures as specified on drawings take precedence over location Specification.
H. Current rating of switch to be equal to or greater than that of the circuit it is interrupting.

2.3 FUSES

A. Manufacturers:
   1. Bussman.
   2. Gould Shawmut.
   3. Littlefuse.
B. Dimensions and Performance: NEMA FU 1, Class as specified or indicated.
C. Voltage: Provide fuses with suitable voltage ratings for phase to phase voltages.
D. Service Entrance: Class L, Bussman Low-peak or equivalent.
E. General Purpose Loads: Class RK1, Bussman Low-peak or equivalent.
F. Motor Loads: Class RK5, Bussman Fusetron or equivalent.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install in accordance with NECA Standard of Installation.
B. Install fuses in all fusible disconnects.
C. Apply adhesive tag on the inside door of all disconnects indicating the NEMA class fuse and size installed.
D. Provide a disconnect switch for all equipment where indicated or required by the National Electrical Code. Coordinate with other disciplines to determine where disconnects are furnished with equipment.

END OF SECTION

SECTION 26 36 13 - ENCLOSED TRANSFER SWITCHES

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes a 3-pole, 480 VAC fully rated automatic transfer switch (ATS). The automatic priority selector transfer shall consist of an inherently double throw power transfer switch unit and control modules interconnected to provide complete automatic operation.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. NEMA ICS 10 (National Electrical Manufacturers Association) - AC Transfer Switch Equipment.
B. NETA ATS (International Electrical Testing Association) - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems.
C. UL 1008 - Automatic Transfer Switches.
D. NFPA 70 - National Electrical Code
E. NFPA 110 - Emergency and Standby Systems.
F. IEEE Standard 446 0- IEEE Recommended Practice for Emergency and Standby Power Systems for Commercial and Industrial Applications.

1.3 SUBMITTALS

A. Product Data: Submit catalog sheets showing voltage, switch size, ratings, and size of switching and overcurrent protective devices, operating logic, short circuit ratings, dimensions, and enclosure details.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of enclosed transfer switches.
B. Operation and Maintenance Data: Submit routine preventative maintenance and lubrication schedule. List special tools, maintenance materials, and replacement parts.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing products specified in this Section with minimum 3 years' documented experience.
B. Supplier: Authorized distributor of specified manufacturer with minimum 3 years' experience and factory authorized service facility within 100 miles of the work site.

1.6 MAINTENANCE SERVICE

A. Provide service and maintenance of transfer switches for 1 year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MECHANICALLY HELD AUTOMATIC TRANSFER SWITCH

A. Manufacturers:
   1. ASCO.
   2. CAT.
   3. Russelectric.
   4. Zenith Controls.
   5. Substitutions: Refer to Section 01 60 00 "Product Requirements."

B. Transfer switch unit shall be electrically operated and mechanically held. The electrical operator shall be a single-solenoid mechanism, momentarily energized. Main operators which include overcurrent disconnect devices will not be accepted. The switch shall be mechanically interlocked to ensure only one of two possible positions, normal or standby.

C. Switch shall be positively locked and unaffected by momentary outages so that contact pressure is maintained at a constant value and temperature rise at the contacts is minimized for maximum reliability and operating life.

D. Inspection of all contacts shall be possible from the front of the switch without disassembly of operating linkages and without disconnection of power conductors. A manual operating handle shall be provided for maintenance purposes. The handle shall permit the operator to manually stop the contacts at any point throughout their entire travel to inspect and service the contacts when required.

E. Designs utilizing components of molded-case circuit breakers, contactors, or parts thereof which are not intended for continuous duty, repetitive switching, or transfer between 2 active power sources are not acceptable. Interlocked molded case circuit breakers will not be acceptable.

F. Rating: 208 VAC, 3-phase, 60 Hz, 3-pole.

G. Withstand Current Rating: As indicated on the Drawings.

H. Automatic Sequence of Operation:
   1. Initiate Time Delay to Start Alternate Source Engine Generator: Upon initiation by normal source monitor.
   2. Time Delay to Start Alternate Source Engine Generator: 0 to 60 seconds, adjustable.
   3. Initiate Transfer Load to Alternate Source: Upon initiation by normal source monitor and permission by alternate source monitor.
   4. Time Delay Before Transfer to Alternate Power Source: 0 to 90 seconds, adjustable.
   5. Initiate Retransfer Load to Normal Source: Upon permission by normal source monitor.
   6. Time Delay before Transfer to Normal Power: 0 to 90 seconds, adjustable; bypass time delay in event of alternate source failure.
   7. Time Delay before Engine Shut Down: 0 to 6 minutes, adjustable, of unloaded operation.

I. Enclosure:
   1. Enclosure: NEMA 1.
   2. Finish: Brushed.

J. Main contact material shall consist of silver (87 percent minimum) and cadmium.

K. Plexiglas covers shall shield electronic controls and main contact connections.

L. The break before make transfer switch action shall require no more than 10 cycles, and the mechanism shall incorporate lifetime lubrication within the temperature range of 20 degrees Fahrenheit to 140 degrees Fahrenheit.

2.2 MICROPROCESSOR CONTROL PANEL

A. Control panel shall direct the operation of the transfer switch. The panel's sensing and logic shall be controlled by a built-in microprocessor for maximum reliability, minimum maintenance, and inherent serial communications capability. The control panel shall be connected to the transfer switch by an interconnecting wiring harness. The harness shall include a keyed disconnect plug to enable the control panel to be disconnected from the transfer switch for routine maintenance.
B. Sensing and control logic shall be provided on printed circuit boards. Interfacing relays shall be industrial grade plug-in type with dust covers.
C. The control panel shall meet or exceed the requirements for Electromagnetic Compatibility (EMC) as follows:
    1. Ring Wave Test per IEEE 472 (ANSI C37.090A).
    2. Electrostatic Discharge (ESD) - IEC 801-2, Level 4.
    3. Electrical Fast Transients (EFT) - IEC 801-4, Level 4.
    4. Surge Withstand - IEC 801-5, Level 4.
    5. Electromagnetic Interference - Mil Std 461, Class 3C.

2.3 SOURCE QUALITY CONTROL

A. Provide shop inspection and testing of each transfer switch.

2.4 VOLTAGE AND FREQUENCY SENSING

A. The voltage of each phase of the normal source (Priority-1) shall be monitored, with pickup adjustable from 85 to 100 percent of nominal and dropout adjustable from 75 to 98 percent of pickup setting.
B. The voltage of each phase of the emergency source (Priority-2) shall be monitored, with pickup adjustable from 85 to 100 percent of nominal and dropout adjustable from 75 to 98 percent of pickup setting.
C. Repetitive accuracy of all settings shall be within plus or minus 2 percent over an operating temperature range of minus 4 to 158 degrees Fahrenheit.
D. Voltage and frequency settings shall be field adjustable in 1 percent increments without the use of tools, meters, or power supplies. Actual settings shall be clearly defined in the operator's manual.

2.5 TIME DELAYS

A. A time delay shall be provided to override momentary generator source outages (Priority-1) to delay transfer to the generator source (Priority-2). The delay shall be adjustable from 0 to 6 seconds.
B. A time delay shall be provided on transfer to generator (Priority-2), adjustable from 0 to 5 minutes for controlled timing of transfer of loads to emergency source, factory set at 0 seconds.
C. All time delays shall be fully field adjustable without the use of tools.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide engraved plastic nameplates identifying transfer as indicated in Section 26 05 53 "Electrical Identification."

3.2 FIELD QUALITY CONTROL

A. Perform inspections and tests listed in NETA ATS, Section 7.22.3.

3.3 MANUFACTURER'S FIELD SERVICES

A. Check out transfer switch connections and operations and place in service.

3.4 ADJUSTING

A. Adjust control and sensing devices to achieve specified sequence of operation.

3.5 DEMONSTRATION AND TRAINING

A. Demonstrate operation of transfer switch in normal and standby modes.

3.6 WITHSTAND AND CLOSING RATINGS

A. The ATS shall be UL listed in accordance with UL 1008 and be labeled in accordance with that standard's 1-1/2- and 3-cycle, long-time ratings. ATSs which are not tested and labeled with 1-1/2- and 3-cycle (any breaker) ratings and have series, or specific breaker ratings only, are not acceptable.

3.7 TESTS AND CERTIFICATION

A. The complete ATS shall be factory tested to ensure proper operation of the individual components and correct overall sequence of operation and to ensure that the operating transfer time, voltage, frequency, and time delay settings are in compliance with the Specification requirements.
B. The transfer switch and control panel shall be subjected to a dielectric strength test per NEMA Standard ICS1-109.21.
C. Upon request, manufacturer shall provide a notarized letter certifying compliance with all of the requirements of this Specification, including compliance with the above codes and standards, and withstand and closing ratings. The certification shall identify, by serial number(s), the equipment involved. No exceptions to the Specifications, other than those stipulated at the time of the submittal, shall be included in the certification.
D. Prior to system startup, provide a factory-authorized technician to certify all transfer switch operations and settings.
E. Provide a minimum of 4 hours of on-site training with appropriate operating and maintenance manuals for Owner's personnel.

3.8 SERVICE REPRESENTATION

A. The ATS manufacturer shall maintain a national service organization of factory authorized personnel located throughout the contiguous United States. The service center's personnel must be factory trained and must be on call 24 hours a day, 365 days a year.

END OF SECTION

PACKET 7.683 February 8, 2022

SECTION 26 51 00 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Interior Luminaires and Accessories.
   2. Exit Signs.
   3. LED lamp emergency power supply.
   4. LED fixtures.
   5. Occupancy Sensors.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. NEMA WD 6 - Wiring Devices-Dimensional Requirements.
B. NFPA 70 - National Electrical Code.
C. NFPA 101 - Life Safety Code.

1.3 SUBMITTALS FOR REVIEW

A. Section 01 33 00 “Submittal Procedures:” Procedures for submittals.
B. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
C. Product Data: Provide dimensions, ratings, and performance data.

1.4 SUBSTITUTIONS

A. Refer to Section 26 05 00 “Basic Electrical Methods” for requirements.

1.5 SUBMITTALS FOR CLOSEOUT

A. Section 01 70 00 “Execution and Closeout Requirements:” Submittals for project closeout.
B. Submit manufacturer's operation and maintenance instructions for each product.

1.6 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum 3 years’ documented experience.

1.7 REGULATORY REQUIREMENTS

A. Conform to requirements of NFPA 70.
B. Conform to requirements of NFPA 101.
C. Products: Listed and classified by Underwriters Laboratories, Inc., as suitable for the purpose specified and indicated.

1.8 EXTRA PRODUCTS

A. Section 01 70 00 “Execution and Closeout Requirements.”

PART 2 - PRODUCTS

2.1 LUMINAIRES

A. Furnish Products as scheduled. Refer to Section 01 60 00 “Product Requirements” for substitutions and product options.

2.2 EXIT SIGNS

A. Furnish products as scheduled.

2.3 LED LAMP EMERGENCY POWER SUPPLY

A. Description: Emergency battery supply suitable for installation in ballast compartment of LED luminaire.
B. Lamp Rating: LED lamp providing 1100 lumens minimum.
C. Battery: Sealed lead calcium type, rated 10 year life.
D. Include “Test” switch and “AC on” indicator light, installed to be operable and visible from the outside of an assembled luminaire.

2.4 LED FIXTURES

A. Shall be rated at a minimum of 50,000 hours at 70 percent lumen maintenance based on testing in accordance with LM80.
B. Shall have a class A sound rating.
C. Shall include integral EMI/RFI. Shall be in accordance with applicable FCC and IEEE standards.
D. Shall include integral 0-10 volt dimming capability with dimming range of 10-100 percent dimming minimum.
E. Power factor shall be 0.85 or better.
F. Efficiency:
    1. For standard 2 feet x 4 feet troffers the lumens per watt (L/W) shall be a minimum of 95 L/W.
    2. For other recessed cans, linear recessed fixtures a minimum of 55 L/W.
    3. Or as indicated on plans.
G. Color Rendering Index (CRI) Color shift or maintenance shall be measured by LR14:
    1. For standard 2 feet x 4 feet troffers the CRI should be 82 CRI or better.
    2. For other LED fixtures a minimum of 75 CRI or better.
    3. Or as indicated on plans.

2.5 OCCUPANCY SENSORS

A. Sensors:
   1. Provide dual technology passive infrared/ultrasonic sensors where indicated on the Drawings.
   2. All units shall be U.L. listed.
   3. Provide adjustable sensitivity and digital time delay.
   4. Provide with swivel mounted bracket for use in ceiling mounted applications.
   5. Provide LED indication for occupancy detection of each of the 2 technologies.
   6. Sensors shall be capable of covering an area of approximately 1,000 square feet while detecting typical desktop motions.
   7. Sensors shall be equal to Watt Stopper DT-205 or approved equal.
   8. Single wall switch occupancy sensor shall be Watt Stopper WI-200 or approved equal.
   9. Dual wall switch occupancy sensor shall be Watt Stopper WI-300 or approved equal.

B. Accessories:
   1. Provide power packs and slave packs as required to power the sensors and provide interlocking and control strategies as indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
B. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
C. Exposed Grid Ceilings: Support surface mounted luminaires on grid ceiling directly from building structure.
D. Install recessed luminaires to permit removal from below.
E. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating in locations where fire rated ceilings are present.
F. Install clips to secure recessed grid-supported luminaires in place.
G. Install accessories furnished with each luminaire.
H. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
I. Bond products and metal accessories to branch circuit equipment grounding conductor.
J. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.
K. Contractor shall be responsible for providing branch circuits, grounding and providing rough-in conduits for wall controllers for exam lights where indicated.
L. Provide a minimum of 100 hours of burn-in time at full intensity for lamps to be used on dimming systems or burn-in as recommended by ballast manufacturer.

3.2 FIELD QUALITY CONTROL

A. Section 01 40 00 “Quality Requirements:” Field inspection, testing, and adjusting.
B. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

3.3 ADJUSTING

A. Section 01 70 00 “Execution and Closeout Requirements:” Adjusting installed work.
B. Aim and adjust luminaires as directed.
C. Position exit sign directional arrows as indicated.

3.4 CLEANING

A. Section 01 70 00 “Execution and Closeout Requirements:” Cleaning installed work.
B. Clean electrical parts to remove conductive and excess materials.
C. Remove dirt and debris from enclosures.
D. Clean photometric control surfaces as recommended by manufacturer.
E. Clean finishes and touch up damage.

3.5 DEMONSTRATION AND INSTRUCTIONS

A. Section 01 70 00 “Execution and Closeout Requirements:” Demonstrating installed work.

3.6 PROTECTION OF FINISHED WORK

A. Section 01 70 00 “Execution and Closeout Requirements:” Protecting installed work.
B. Relamp luminaires that have failed lamps at Substantial Completion.

END OF SECTION

SECTION 27 13 43 - TELEPHONE COMMUNICATIONS CABLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Fiber optic cable.
   2. Fiber optic patch panel.
   3. Optical fiber adapters.
   4. Optical fiber connectors.
   5. Jacks and patch panels.
   6. Equipment racks.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REFERENCES

A. Design, installation, and testing of all passive components shall be in compliance with the following referenced documents using latest edition, including any errata or additions:
   1. TIA J-STD-607 (2002a) - Commercial Building Grounding (Earthing) and Bonding Requirements for Telecommunications.
   2. TIA-526-14 (2010b) - OFSTP-14A Optical Power Loss Measurements of Installed Multimode Fiber Cable Plant.
   3. TIA-568-2 (2009c; Errata 2010) - Commercial Building Telecommunications Cabling Standard - Part 2: Balanced Twisted Pair Cable Components.
   4. TIA-568-C.1 (2009) - Commercial Building Telecommunications Cabling Standard.
   5. TIA-568-C.3 (2008; Corrections 2008) - Optical Fiber Cabling Components Standard.
   6. TIA-569 (2004b; Add 1 2009) - Commercial Building Standard for Telecommunications Pathways and Spaces.

1.3 SYSTEM DESCRIPTION AND DEFINITIONS

A. The communication system shall include Category 6 patch panels, Category 6 back bone cables, telephone and data outlets, equipment racks, and connecting hardware. Connecting hardware shall be rated for operation under ambient conditions of 32 degrees Fahrenheit to 140 degrees Fahrenheit.

B. All Work under this Section shall be performed by and all equipment shall be furnished and installed by a qualified telecommunications contractor, hereafter referred to as Contractor. Contractor shall have minimum of three years' experience in the application, installation, and testing of the specified systems and equipment.

C. The equipment and hardware provided under this Contract will be from manufacturers that have a minimum of 3 years' experience in producing the types of systems and equipment specified.

D. Cable Requirements and Definitions:
   1. Horizontal Distribution Wiring - Category 6 UTP:
      a. Intra-building cable that cross-connects the workstation data jack to the designated equipment closet. Horizontal wiring shall be four pair, 100-ohm plenum grade Unshielded Twisted Pair (UTP) cable meeting, at a minimum, Category 6 standards. RJ-45 modular connectors will be wired to meet EIA/TIA-568B standards and color code tables. Each connection shall include all 8 wires of the 4 pair cable. All termination patch panels will comply with category 6 standards. Additionally, all equipment selected will meet the manufacturer's end-to-end solution requirements for warranty. All horizontal wiring shall be secured and/or protected to safeguard against damage. All cables that drop below ceiling level will be concealed conduit.

E. Patch Panels: RJ-45 patch panels shall support all of the RJ-45 connections for a designated LAN zone. Provide fiber optic patch panel. Each port shall be labeled designating the port's destination outlet and port number. All conductors of all cables shall be terminated at both ends. Provide 48 port patch panels and quantity of patch panels required to support communciation cables required plus 2010 spare parts.

F. Data Outlets: Provide Category 6 RJ-45 Outlet as indicated on Drawings.

1.4 SUBMITTALS

A. Product Data: Submit for Category 6 outlet, Category 6 cable, Category 6 patch panel.

B. Test Reports: Reports shall show the field test performed to verify compliance with the specified performance criteria. Test reports shall include record of the physical parameters verified during testing.

PART 2 - PRODUCTS

2.1 HORIZONTAL DISTRIBUTION WIRING SYSTEM REQUIREMENTS

A. The horizontal cable for communication outlet wiring is defined as multi-conductor, thermoplastic-insulated, copper cable, 24 AWG air core, with 4 unshielded twisted pairs rated to a performance criteria of Category 6.

B. Cable protection will be of the highest concern. The cable sheath shall be protected from sharp edges. Where cables pass over a sharp edge, a bushing or grommet shall be inserted to protect the cable.

C. To reduce EMI induced into the cabling from fluorescent lights, cable sheath shall be installed in a hanging pathway in the area above the drop ceilings to maintain proper clearance of 5 inches from fluorescent lights.

D. Testing after installation and termination will be required to ensure a rating to Category 6 performance.

E. The cable's outer sheath shall be "blue" in color for data.

F. Horizontal cabling shall be installed in a star topology. Each work area outlet must be cabled directly to a horizontal cross connect in the appropriate equipment closet.

G. Splices shall not be permitted for twisted-pair horizontal cabling.

H. Bridged taps (multiple appearances of the same cable pairs at several distribution points) shall not be permitted in the horizontal cable.

I. In all cases where the overall cable length allows, an additional 5 feet of slack shall be allowed for in the equipment closet.

J. In all cases where the overall cable length allows, an additional 12 inches of cable slack shall be allowed for at the outlet location.

K. In no case shall the slack allowances cause the overall length of the cable to exceed the limits as described in this Section.

L. Horizontal Cable Lengths: The maximum horizontal cable length from the cross connect panel to the workstation outlet shall not exceed 295 feet. An additional 33-foot allowance has been made for the combined length of patch cables and cables used to connect equipment in the work area and equipment rack.

M. Category 6 High Speed LAN Data Specifications:
   1. Electrical Specifications: Impedance 100 ohm plus or minus 15 percent.
   2. See testing specification for Category 6 performance - Execution for Attenuation and NEXT requirements.
   3. Mutual Capacitance: 17pF/ft Max.

2.2 FIBER OPTIC CABLE

A. Provide in accordance with ICEA S-83-596, TIA/EI-568-C.3, UL and NFPA 70. Cable shall be imprinted with fiber count, fiber type and aggregate length at regular intervals not to exceed 40 inches.

B. EIA TIA/EIA-492AAAA-A, multimode, 50/125-um diameter, tight buffered fiber optic cable. Provide a 12 strand multimode fiber optic cable. Provide nonconductive optical fiber general purpose cable (OFN or OFNG), nonconductive optical fiber plenum cable (OFNP), and nonconductive optical fiber riser cable (OFNR) rated cable in accordance with NFPA 70 and UL 910. Type OFNP or OFNR may be substituted for type OFN or OFNG and type OFNP may be substituted for type OFNR in accordance with NFPA 70. The cable cordage jacket, fiber, unit, and group color shall be in accordance with EIA TIA/EIA-598.

C. Provide fiber optic cable from the main Demark room to the IT room serving the building.

2.3 FIBER OPTIC PATCH PANEL

A. Provide panel for maintenance and cross-connecting of optical fiber cables. Panel shall be constructed of 16 gauge steel minimum and shall be cabinet mounted and compatible with an EIA-310-D 19-inch equipment rack. Each panel shall be compatible with Type LC connectors. Provide dust cover for unused adapters. The rear of each panel shall have a cable management tray a minimum of 8 inches deep with removable cover, incoming cable strain-relief and routing guides. Panels shall have each adapter factory numbered and be equipped with laminated plastic nameplates above each adapter. Provide fiber optic patch panel in each LAN hub enclosure.

2.4 OPTICAL FIBER ADAPTERS

A. Provide optical fiber adapters suitable for LC connectors. Provide dust cover for adapters. Optical fiber adapters shall comply with EIA TIA-455-21-A for 500 mating cycles.

2.5 OPTICAL FIBER CONNECTORS

A. Provide in accordance with EIA TIA-455-21-A. Optical fiber connectors shall be type LC in accordance with applicable EIA/TIA standards. The connectors shall provide a maximum attenuation of 0.3 dB at 850, 1,300, 1,310 and 1,550 µm with less than a 0.2 dB change after 500 mating cycles.

2.6 JACKS AND PATCH PANELS

A. Category 6 rating shall be applied to all connecting hardware appropriate for use with UTP cables specified in the EIA/TIA-568-C3. Components used shall be characterized up to a minimum 6 certification and typically intended for emerging technologies and applications. Provide a minimum of 10 percent spare ports in patch panel. Provide separate patch panels for telephone and data wiring.

2.7 EQUIPMENT RACKS

A. Provide 19-inch, 7-foot tall, 4-post, Refer to Drawings for additional rack information.
B. Provide number of racks to support equipment required, including spaces as indicated.
C. Provide Cable Management System for each rack as manufactured by Panduit.
D. Provide rack with all associated hardware.

2.8 SUPPORT PRODUCTS

A. All Data/Telephone cabling shall be in conduit or cable tray.

PART 3 - EXECUTION

3.1 GENERAL

A. Contractor shall provide Category 6 Cable, Category 6 Patch Panels, Fiber Optic Patch Panel, Fiber Optic Cable, Category 6 Outlets, Equipment Rack and Mounting hardware for LAN HUB. All communication cables shall be terminated and tested.

3.2 CABLE DISTRIBUTION

A. Contractor shall wire the building as indicated on the Contract Drawings in accordance with standards. The building shall be wired using a universal wire plan that must accommodate the cables described in this Specification. The wiring plan is designed to provide adequate pairs to support the campus LAN system's high-speed data connections.
   1. 2 4-pair Category 6, 100-ohm plenum rated UTP cables shall be provided for each data port. Cable shall be rated CMP.
   2. Category 6, RJ-45 modular connections shall be wired to meet TIA/EIA 568-C.1 and TIA/EIA 568-C.2 pin, pair and color designation.
   3. Each connection shall include all 8 conductors of each of the 4 pair cable.
   4. Placement relative to nearby noise sources, such as electric power wiring, radio frequency (RF) sources, large motors and generators, induction heaters, fluorescent light ballast, etc. shall be avoided. If necessary, place exposed cables not closer than 4 feet from large motors or transformers, 1-foot from conduit and cables used for electrical power distribution and 5 inches from fluorescent lighting.

5. Unless otherwise instructed by this Specification installation shall be in compliance with EIA/TIA-568-C1, TIA-568-2, TIA-569, NFPA 70, UL Standards, Telecommunications Cabling Standard, EIA/TIA-569 Commercial Building Standard for Telecommunications Pathways and Spaces, and ANSI/NFPA 70 National Electric Code. Installation shall also meet any additional manufacturer's requirements to fulfill warranty Specifications.
6. Provide a minimum of 5 feet of cable slack in the equipment cabinets and 12 inches at the outlet for each cable run to accommodate for future cabling system changes.

3.3 USER WORK AREA

A. Distribution of drop locations will be as indicated on the Contract Documents. Provide the following at each outlet location: Minimum Telephone/Data - 2 Category 6 jack (RJ-45) at each outlet (with 2 blue cables). Provide number of drops per outlet as indicated on Drawings.
   1. 1,000 Mbite/Sec, Fast Ehternet, Lockable.
   2. Labeling:
      a. All data outlets, patch panel ports, and both ends of each cable shall be clearly and neatly labeled. 2 cable identification schemes will be used, 1 for the end of the cable in the work area, and 1 for the end of the cable at the patch panel. The labeling schemes shall be as follows:
   3. Work Area Scheme: The first digit of the I.D. number will use a numeric character, designating the LAN zone in which the jack is located. The first digit will be followed by a dash (-). The next character will be an alphabetic designator to identify the patch panel in which the cable is terminated. This character will be followed by a dash (-). The last digit will be a numeric designator corresponding with the patch panel port into which the cable is terminated. For example: The cable to the first port in the first patch panel in LAN Zone 1, will be designated as 1-A-1. The cable to the second port will be 1-A-2. Cables to the second patch panel will be labeled 1-B-1, 1-B-2, 1-B-3, etc. Contractor will be responsible for clearly and visibly labeling each patch panel in accordance with the scheme described above.
   4. Patch Panel Scheme: The first portion of the I.D. number will correspond with the room number to which the cable runs. This number will be followed by a dash (-). The next portion of the I.D. number will be an alphabetic designator to identify the faceplate in the work area where the cable is terminated. This character will be followed by a dash (-). The last portion of the I.D. number will be a numeric designator that corresponds with the faceplate jack in which the cable is terminated. For example: The cable to the first jack in the first faceplate in Room 32 will be designated as 32-A-1. The cable to the second jack will be 32-A-2. Cables to the next faceplate in Room 32 will be labeled 32-B-1, 32-B-2, 32-B-3, etc. Contractor will be responsible for clearly and visibly labeling each faceplate in accordance with the scheme described above. Faceplates should be lettered in a clockwise sequence beginning at the main entrance into the room. Jacks on each faceplate will be sequenced in a clockwise direction beginning from the upper left-hand side of the faceplate. In situations where cable is run to an unnumbered room, Contractor will be responsible for coordinating with the appropriate government representative(s) to assign a number to the room.

3.4 EQUIPMENT CLOSETS

A. Equipment racks shall be bolted to the floor slab. Cable guides shall be bolted or screwed to racks. Racks shall be installed level.
   1. Patch Panels: High density, low profile patch panels shall be used in all locations. Patch panels may vary in number of ports provided, but shall be of the same manufacturer and series, for all closets. All patch panels will be populated with port counts that equal or exceed total ports needed, plus 10 percent, for each closet.
      a. UTP Patch Panels: All patch panels used to terminate UTP cables shall comply with selected vendors channel rating for Category 6.
         1) Patch cables connecting data work ports to the LAN switches shall be Category 6 compliant, both cordage and couplers. Patch cables shall be constructed of stranded cable. Although the switches and other active components will be provided by the owner, all patch cables shall be provided by Contractor to provide connection to these active components. Contractor shall also provide each site a quantity of spare patch cables equal to 10 percent of the total used at that site. Patch cables shall be appropriately sized to allow for a neat and maintainable system.
         2) All ports will be labeled in accordance with the labeling scheme described in this Specification.

3.5 TESTING

A. Horizontal Wiring Testing: Testing of all data horizontal UTP cables shall be performed in accordance with EIA/TIA TSB-1152 to ensure rating of Category 6 performance. Test parameters shall include wire mapping, attenuation, NEXT and noise measurements to verify a limit below 100mV.
   1. All distribution plant facilities associated with the new wiring system shall be tested and verified after installation activities and all major plant rearrangements have been completed. Tested copper pairs shall conform to the design guidelines as specified, as well as manufacturer's standards. Cable plant testing of the data jack will diagnose the presence of all open-loop conductors, noisy lines and distortion, low-loop current, high-loop loss, ringer failures, grounded, shorted or crossed conductors, dB loss, split connections, attenuation range, and/or near-end cross-talk. Contractor will supply complete testing and correction reports/information and explanation to the government, or designated representative, for review prior to acceptance of the system(s). Contractor and the government or designated representative will develop a mutually acceptable format for recording and reporting of testing results prior to the start of testing activities. All errors are to be corrected at Contractor's expense prior to providing the completed records.
      a. Perform Category 6 link tests in accordance with EIA TIA/EIA-568-C.1 and EIA TIA/EIA-568-C.2. Tests shall include wire map, length, insertion loss, NEXT, PSNEXT, ELFEXT, PSELFEXT, return loss, propagation delay and delay skew.
   2. A wire map test will be performed as per TIA/EIA TSB-568-C.3. This test will be used to verify pair to pin termination at each end and check for installation connectivity errors.

B. Horizontal Wiring Testing (Test from both ends):
   1. The following parameters will be measured from both sides of the link:
      a. Attenuation - a measure of signal loss in the link.
      b. Near-end crosstalk loss (NEXT) - a measure of signal coupling from 1 pair to another within a UTP cabling link and is derived from swept/stepping frequency voltage measurements.

C. Noise Testing:
   1. The noise level testing associated with the data circuit will only be required if problems occur with the previous test procedures, or if the manufacturer requests it for warranty purposes. If tested, it shall be measured over 7 different frequencies.
      a. Noise will be measured by recording interference from all outside sources (for example, power cables). The noise is generally steady throughout the entire frequency range and permanently exists. Acceptable levels will be the lower of, the manufacturers' specifications, or less than 100mV.
      b. Noise peaks will be measured by adjusting a threshold. All peaks that exceed the threshold will be documented. Acceptable peaks will be determined by the manufacturer's specifications, or by IEEE 802.3 10BaseT Ethernet Standards.

D. Additional Testing:
   1. Any additional testing and/or documentation required by the manufacturer to show full compliance with warranty requirements shall be provided to the government by Contractor. Final test results will meet manufacturer's guidelines for the cabling channel.

E. Telecommunications Cabling Testing:
   1. Perform telecommunications cabling inspection, verification, and performance tests in accordance with TIA-568-C.1, EIA TIA/EIA-568-C.2, EIA TIA/EIA-568-C.3, and TIA-568-2. Perform optical fiber field inspection tests via attenuation measurements on factory reels and provide results along with manufacturer certification for factory reel tests. Remove failed cable reels from project site upon attenuation test failure. All fiber optic, data, and telephone cables shall be terminated and tested.
   2. For multimode optical fiber, perform optical fiber end-to-end attenuation tests in accordance with EIA TIA/EIA-568-C.3 and EIA TIA/EIA-526-14 using Method A, Optical Power Meter and Light Source for multimode optical fiber.

END OF SECTION

SECTION 28 31 00 - FIRE ALARM SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Manual fire alarm stations.
   2. Automatic detectors.
   3. Fire alarm signaling appliances.
   4. Auxiliary fire alarm equipment.

B. Related Sections:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 26 05 13 “Building Wire and Cable.”
   3. Section 26 05 33 “Conduit.”
   4. Section 26 05 33.16 “Boxes.”

1.2 REFERENCES

A. NFPA 70 - National Electrical Code.
B. NFPA 72 - National Fire Alarm Code.
C. NFPA 101 - Life Safety Code.
D. State of Texas Accessibility Standards.
E. Federal Americans with Disabilities Act.
F. ASME 17.1 - Elevator Code.

1.3 SYSTEM DESCRIPTION

A. Fire Alarm System: System is comprised of a new intelligent manual and automatic local fire alarm system with connections for offsite reporting.

1.4 SUBMITTALS FOR REVIEW

A. Product Data: Provide electrical characteristics and connection requirements.
B. Shop Drawings: Provide a system layout and wiring diagram showing each device and the wiring connections that are required.
C. Test Reports: Provide testing reports for certification that the system has been tested and inspected.
D. Manufacturer’s Installation Instructions: Indicate the application conditions and limitations of use stipulated by the product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of products.
E. Battery calculations.

1.5 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70, NFPA 101, and FM Global.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this Section with minimum 3 years’ documented experience.

C. Installer Qualifications: Company and/or installer specializing in installing the products specified in this Section with minimum 3 years' documented experience, and certified by State of Texas as Fire Alarm Installer.
D. Products: Listed and classified by UL testing firm as acceptable to the authority having jurisdiction and suitable for the purpose specified and indicated.
E. At the completion at the Project, Contractor shall provide certification tests and completion documentation in accordance with NFPA 72.
F. Provide to Owner an electronic file with all fire alarm control panel software settings.

1.6 MAINTENANCE SERVICE

A. Provide service and maintenance of fire alarm equipment for 1 year from Date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Notifier.
B. FCI.
C. Or approved equal.

2.2 FIRE ALARM CONTROL PANEL

A. Control Panel: The control panel shall be a Notifier NFS-640 or approved equal. The system shall be microprocessor controlled and shall communicate with intelligent detectors, addressable modules, annunciators, and other system-controlled devices. Provide for panel expansion as required to accommodate the number of devices.
B. The system shall include alarm and trouble relays.
C. The control panel shall feature a full operator interface control and annunciation panel that includes an 80-character backlit liquid crystal display (LCD), individual, color coded system status LEDs, and an alphanumeric keypad for the field programming and control of the fire alarm system. All programming shall be achieved without special equipment and without interrupting the alarm monitoring functions of the control panel.
D. The following minimum features shall be included in the control panel:
    1. Drift compensation to extend detector accuracy over life.
    2. Sensitivity test compliant with NFPA 72.
    3. System status reports for display.
    4. Non-alarm points for general (non-fire) control.
    5. Periodic detector tests conducted automatically by system software.
    6. March time and temporal coding options.
    7. Walk test option.
    8. Alarm signals shall not be lost following a power outage until the signal is processed.
    9. Printer and printer interface capable of logging all events.
    10. Alpha-numeric pager interface.
    11. Real time clock for logging events.

E. The system display shall provide all system control and indication of the system parameters. The display shall provide for custom alphanumeric labels for all intelligent detectors, modules, and zones. The display shall include operator functions for SIGNAL SILENCE, RESET, DRILL, and ACKNOWLEDGE.

F. The signal line circuit (SLC) shall provide power to and communicate with the number of detectors and modules as required to serve all devices. All building risers shall be configured for Class B, and building loops on individual floors shall be Class B. The detector software shall allow manual or automatic sensitivity adjustment.

G. The control panel shall be housed in a UL-listed cabinet suitable for flush mounting. The door shall be key locked and shall include a glass or other transparent opening for viewing of all indicators.

H. The system power supply and battery charger shall operate on 120 volts, 60 Hz, and shall provide for all of the power needs of the system. Provide circuit breaker, wire, and conduit as required.

I. Any proposed control panel substitutions shall also comply with all other system features that are included with the system specified by manufacturer name and number indicated as a part of this Specification.

J. Provide for any necessary interface devices as required to operate SLC and notification appliance circuits (NAC) to accommodate the distances for this Project. Coordinate with Electrical Contractor for all power requirements.

2.3 INITIATING DEVICES

A. Manual Station: Semi-Flush mounted, addressable type, double action manual station with key operated test-reset lock and shall be so designed so they cannot be restored to normal position except by the use of a key. Station shall have the word “FIRE” on the front of the unit in raised letters. Stations shall be red in color. Provide semi-recessed single gang back box which can accept surface mounted raceway. Refer to Section 26 05 33.16 “Boxes” for additional box restrictions.

B. General Area Intelligent Photoelectric Smoke Detectors: The detectors shall use the photoelectric (light-scattering) principal to measure smoke density and shall, on command from the control panel, send data to the panel representing the analog level of smoke density. Detectors shall include a twist-lock base with a tamper proof feature. The detectors shall provide a test means whereby they will simulate an alarm condition and report that condition to the control panel. Such a test may be initiated by the detector itself (by activating a magnetic switch).

C. Intelligent Thermal Detectors: Provide addressable, fixed temperature 135 degrees Fahrenheit detectors where indicated.

D. Modules: Monitor and control modules shall be provided for the system as required for the operations as indicated. Control modules for notification appliance circuits shall supervise the circuits and shall be wired as Style Z in accordance with NFPA.

2.4 SIGNALING APPLIANCES

A. Audible/Visual Devices: The devices shall be combination horn/light units. The audible portion of the device shall have a sound output level of at least 85 dBA measured at 10 feet from the device. This visual portion of the devices shall meet the requirements of the Americans with Disabilities Act and the Texas Accessibility Standards. Minimum candela level for the strobe light intensity shall be 75 and the flash rate shall be a minimum of 1 Hz and a maximum of 3 Hz. The maximum flash duration shall be 2/10 of 1 second. All visual devices shall be synchronized. Contractor is responsible to provide sound level of fire alarm chimes meeting requirements of NFPA. Contractor shall provide additional horn/light units, amplifier, 120 V wiring, fire alarm wiring, and conduit as required.

B. All NAC shall be installed in accordance with NFPA 72, Class B wiring.

C. Refer to the Drawings for device locations. Where devices are shown as ceiling mounted, provide equivalent intensity devices per NFPA.

2.5 AUXILIARY DEVICES

A. Connection to shut down all mechanical equipment provided with duct-mounted smoke detectors and all mechanical equipment that has associated smoke dampers upon initiation of general alarm. Refer to Mechanical Drawing for the location of dampers.

B. Provide 120 V power, control transformers, and control wiring as required for connection to any equipment associated with the shutdown and control of mechanical equipment.

C. Provide for all control wiring and connections for interface with tamper and flow switches associated with the suppression system. Coordinate with Fire Protection Suppression Contractor for all locations. Any modules for the outdoor shut-off valve shall be mounted inside the building as directed. No modules shall be located below grade. This will include connection to the tamper switch at the post indicator valve on the site.

D. Provide door hold-open devices powered by the fire alarm system where indicated. Provide all chains and mounting extensions as required for a complete and operable system.

E. Provide remote fire alarm annunciator panel (FAAP), including audible and visual indication of fire alarm condition device description. Indications shall be provided on an alpha-numeric display. Provide FAAP with in-factory mounted flush wall enclosure.

2.6 FIRE ALARM WIRE AND CABLE

A. Fire Alarm Power Branch Circuits: Building wire as specified in Section 26 05 13 " Building Wire and Cable."

B. Fire alarm circuit conductors have insulation color or coded as follows:
   1. Power Branch Circuit Conductors: Black, red, white.
   2. Initiating Device Circuit: Black, red.
   3. Signal Device Circuit: Blue (positive), white (negative).
   4. Door Release: Gray, gray.
   5. All fire alarm wiring shall be installed in conduit.

C. All fire alarm wiring shall be UL listed for use as a fire protective signaling system.

D. All wiring shall be complying with the recommendations by the fire alarm equipment manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Provide for the service of a competent, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system. All software modifications shall be supervised by this technician. All testing shall comply with NFPA.
B. Before energizing the wiring, check for correct connections and tests for shorts and grounds.
C. Install manual station with operating handle 42 inches above floor. Install audible and visual signal devices on the ceiling as indicated.
D. Automatic Detector Installation: Conform to NFPA.
E. At a minimum, provide the following systems tests:
    1. Open and short signal line circuits and verify that a trouble signal actuates, and alarm receipt is present.
    2. Open and short notification appliance circuits and verify that trouble signal actuates, and alarm receipt is present.
    3. Ground all circuits and verify response of trouble signals and alarm receipt is present.
    4. Check presence and audibility of tone at all notification devices.
    5. Check the installation, supervision, and operation of all initiating devices.
    6. Check proper operation of door release, damper operation, and mechanical unit shutdown.
    7. All alarm inputs and optional features shall be verified.
F. All smoke detectors shall be firmly supported to the ceiling. On lay-in ceiling, secure detectors with suitable ceiling grid bridges that fasten securely to 2 grid runners.
G. Fire alarm reporting will include all modules, fiber, etc., to extend and connect through the building’s system to report trouble and alarm.

3.2 FIELD QUALITY CONTROL

A. Test in accordance with NFPA 72 and local fire department requirements. All test procedures and requirements shall also meet the requirements as set by the Authority having jurisdiction.

3.3 MANUFACTURER'S FIELD SERVICES

A. Include services of certified technician to supervise installation, adjustments, final connections, and system testing.

3.4 DEMONSTRATION AND INSTRUCTIONS

A. Demonstrate normal and abnormal modes of operation and required responses to each.
B. Contractor shall provide for a minimum of 8 hours of training for Owner's personnel.

END OF SECTION

SECTION 28 35 00 – EMERGENCY RADIO COMMUNICATION ENHANCEMENT SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 REQUIREMENTS OF REGULATORY AGENCIES AND STANDARDS

A. Regulatory Agencies: Installation, materials, equipment and workmanship shall conform to the applicable provisions of the following:
   1. U.L., Inc.
   2. National Fire Protection Association (NFPA)
   3. International Fire Code (IFC).
B. Terms and conditions of the authorities having lawful jurisdiction pertaining to work required.

1.3 SUBMITTALS

A. The intent of this Section is to give general submittal information, refer to specific submittal information in the subsequent Mechanical Sections.
B. Within 10 days after award of Contract, and before orders are placed, Contractor shall submit specific information on list of equipment and principal materials specified. Contractor shall indicate/provide names of manufacturers, catalog and model numbers, cut sheets, and such other supplementary information as necessary for evaluation. Minimum 6 copies, or as directed by Architect, of each shall be submitted and include all items mentioned by model number/manufacturer's name in specifications or in Schedules on Drawings.
C. Requirements for each submittal:
   1. Bear a dated stamp or specific written indication that Contractor reviewed and approved all submittal prior to submission to Architect.
   2. Have all information deleted by Contractor that pertains to means and methods of construction or to fabrication, assembly, installation, or erection (approval by Architect shall not extend to these areas unless specifically noted by Architect).
   3. Be clearly and SPECIFICALLY marked as to which specific piece of equipment is submitted, by use of a permanent marker, stamp, etc., to distinguish it from other pieces of equipment that may occur on the same page.
   4. Clearly mark which available options are submitted associated with equipment.
   5. Be complete with respect to quantities, dimensions, specific performance, materials, and similar data to enable Architect to review the proposed equipment.
   6. Clearly indicate compliance with standards indicated.
D. Omission by Contractor of any requirement or submittal will subject submittal to automatic rejection without review.
E. Return any submittals received by Architect that were not requested without review of any kind.

PART 2 - PRODUCTS

2.1 EQUIPMENT REQUIREMENTS

A. Electrical requirements for equipment specified or indicated on Drawings are based on information available at time of design. If equipment furnished for installation has electrical requirements other than indicated on Electrical Drawings, Contractor shall make any required changes to wire and conduit size, controls, overcurrent protection and installation as required to accommodate the equipment supplied, without additional charge to Owner. Complete responsibility and costs for such adjustments shall be assigned to respective Section of this Specification under which equipment is furnished.

2.2 MATERIALS

A. All similar materials and equipment shall be product of same manufacturer unless specified otherwise.
B. Materials and equipment shall be standard products of manufacturers regularly engaged in production of such material and manufacturer's current and standard design.
C. Altitude: Equipment affected by altitude shall perform satisfactorily for the function intended at altitude of Project site.

PART 3 - EXECUTION

3.1 GENERAL

A. As a part of base bid of this Project, provide for testing of radio frequency signal throughout building to determine if Emergency Radio Communication Enhancement System (ERCES) is required. Testing shall be done at direction of Authority Having Jurisdiction. This testing shall include documentation of qualifications of person performing tests, signal strength measurements documented on a building floor plan for both internal to rooms of building as well as areas surrounding building. All testing methods, qualifications and other requirements shall be in accordance with International Fire Code-2015 (IFC-2015).
B. If testing proves that the system is required, provide and install a complete and operational Emergency Radio Communication Enhancement System (ERCES) for coverage throughout building and surrounding areas around building. Contractor shall provide design, installation and certification of the system. This work shall be done in accordance with the International Fire Code-2015 (IFC-2015).
    1. Provide submittal documentation of all correspondence with AHJ, product data, certification of compliance with standards, and a plan layout of all system components on building floor plan. Include wiring diagrams and equipment diagrams.
    2. All power, conduit, controls, etc. required for ERCES shall be included in project.

END OF SECTION

SECTION 28 61 29.10 - TWO-WAY COMMUNICATION SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes IP command center (base station and distribution module), call boxes, and signage.
B. The following is specified around the Rath System. Contractor shall provide Rath or approved equal.
C. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 GENERAL

A. The IP Command Center is to be located at a central control point on the first floor or as determined by local Authority having Jurisdiction. Command Center IP Call Boxes are to be located on all floors above and below the first floor, ideally next to a stairwell emergency exit or elevator landing on each floor.
B. The IP Command Center must be capable of connecting to an existing Network and providing inputs for the IP Call Boxes. Visual indicators on the IP Command Center allow rescue personnel to know which IP Call Box needs assistance. The IP Command Center must allow rescue personnel to speak to each IP Call Box individually. The IP Command Center must include both a handset and speakerphone to communicate back to the IP Call Boxes.
C. The emergency communication hardware shall comply with the Americans with Disabilities Act (ADA). The IP Call Box shall have the ability to be programmed with up to 2 emergency phone numbers (either both off-site or Base Station and off-site). Upon activation of the emergency push button, a call will be automatically placed to the IP Command Center. If no one answers at the IP Command Center, the IP Call Box must dial a secondary location (911) outside the building to activate **2-way, off-site, person-to-person voice communications.**

1.3 SUBMITTALS

A. Submit product data sheets. Include operation manuals.
B. Wiring or shop diagrams detailing wiring schematics, cabling.

PART 2 - PRODUCTS

2.1 CONSTRUCTION

A. The IP Command Center (2500 series) shall include both the Base Station and Distribution Module. The Base Station must have a powder coated steel housing (surface or flush mount) or be desk mounted, include a black handset with coil cord and be powered from the Distribution Module.
B. Distribution Module must be a surface mount enclosure, include connections for the IP Call Boxes and power the Base Station. The Distribution Module shall be powered from 120vac power with a battery backup that provides power for a minimum of 4 hours (RP7700104).
C. The IP Call Boxes must be in full compliance with the ADA. IP Call Boxes require a hands-free speakerphone with an LED to indicate status of call.

D. The IP Call Boxes must allow the programming in of a specific location message of the unit. This allows rescue personnel to know the location of the activated IP Call Box.
E. The IP Call Boxes are to be located no higher than 48-inch front reach or 54-inch side reach to the center of the push button above ground level to ensure conformance with ADA requirements.
F. The IP Call Boxes must have a Braille faceplate to ensure conformance with ADA requirements.
G. The IP Command Center must provide an audible and visual indicator that an IP Call Box has been activated.
H. The 120vac Power Supply model RP7700104 must be capable of supplying power to a minimum of 1 Base Station and 1 Distribution Module.

2.2 MOUNTING

A. The IP Command Center is to be mounted on a flat wall surface or a desk top.
B. The IP Call Boxes are to be wall surface or flush mounted.

2.3 ELECTRICAL

A. The IP Command Center is to be powered by the Distribution Module. The IP Call Boxes are to be powered by PoE at 802.3af or a separate battery backed up 12v source.
B. Distribution Module shall be powered by the Rath model RP7700104 Power Supply. It shall require 120vac power and provide battery backup capable of providing a minimum of 4 hours of electrical backup in case of building power failure.
C. The Base Station shall connect to the Distribution Module with a single wire pair (10 zone) 2-wire pairs (16-64 zone) or 3-wire pairs (80-Up).
D. Each IP Call Box shall connect to the Distribution Module through an Ethernet connection. Maximum run is 300 feet between Network Switches.
E. System shall be in compliance with all state and local Electrical Codes.

2.4 COMMUNICATIONS

A. The IP Call Boxes shall be an ADA-compliant and vandal-resistant speakerphone.
B. The IP Call Boxes shall be hands-free and be a push-button-once to talk system. Once the button has been pushed, the IP Call Box will call the Base Station. If no answer at the Base Station, it will automatically call a preprogrammed emergency number. The IP Call Box must be capable of being programmed with up to 2 emergency phone numbers (either both off-site or Base Station and off-site).
C. The IP Call Box shall have location message capability. The IP Call Box must have a minimum 18 second recordable message capability, programmable to play 1 or 2 times. IP Call Box shall notify called party of the location of the call upon being received at the emergency dispatch center.
D. The IP Call Box shall be capable of allowing the called party to replay the location message, if necessary, to ensure an understanding of the caller location.
E. If system is not attended to 24 hours a day, the IP Call Box must dial a secondary location (911) outside the building to activate **2-way, off-site, person-to-person voice communications**.
F. Once call has been made (button pushed), the call can only be terminated by the called party.
G. The IP Call Box must have a red LED that will light up upon push of the button. The light shall be a solid color when the IP Call Box is activated and will flash when call has been answered.

H. The IP Call Box must be capable of being programmed and reprogrammed on-site.
I. Standard IP Call Box features:
   1. 2 number programming (either both off-site or Base Station and off-site).
   2. Operating temperature of between minus 40 degrees Fahrenheit to plus 150 degrees Fahrenheit.
   3. On-site programmable.
   4. Powered from PoE at 802.3af or separate battery backed up 12v source.
   5. EEPROM memory to protect programming.

2.5 SIGNAGE

A. System shall consist of a minimum of 1 120/277vac edge light sign (Part #7050 or 7050E), and a "location" and "instruction" sign (Part #7049) to clearly indicate location of designated area. A tactile sign (Part #7043/7044 or 7087) with raised letter and Braille shall be located at entrance to area.

2.6 GRAPHICS

A. IP Command Center must include wording identifying the location of each IP Call Box and light an LED when a particular IP Call Box has been activated.
B. The IP Call Box wording must include "Emergency Phone", International Phone symbol, and raised Braille lettering.

2.7 WARRANTY

A. The IP Command Center and IP Call Boxes shall be warranted for a period of 3 years.

PART 3 - EXECUTION (Not Used)

END OF SECTION

SECTION 31 10 00 - SITE CLEARING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Removing existing vegetation.
   2. Clearing and grubbing.
   3. Stripping and stockpiling topsoil.
   4. Removing above- and below-grade site improvements.
   5. Disconnecting, capping, or sealing, and removing site utilities.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 31 20 00 "Earth Moving."

1.2 DEFINITIONS

A. Subsoil: All soil beneath the topsoil layer of the soil profile and typified by the lack of organic matter and soil organisms.

B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.

C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other non-soil materials.

1.3 MATERIAL OWNERSHIP

A. Take possession of all cleared materials and remove from Project site, unless otherwise directed by Architect or Owner or indicated in the Construction Drawings.

1.4 SUBMITTALS

A. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

1.5 QUALITY ASSURANCE

A. Preinstallation conference not used.

1.6 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
B. Improvements on Adjoining Property: No work is anticipated on adjacent property.
   1. However, do not proceed with work on adjoining property unless directed by Architect.
C. Utility Locator Service: Call 811 for area where Project is located before site clearing.
D. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 31 20 00 "Earth Moving."
   1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.
B. Protect existing site improvements to remain from damage during construction.
   1. Restore damaged improvements to their original condition, as acceptable to Owner.

3.2 TEMPORARY EROSION AND SEDIMENTATION CONTROL

A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
B. Inspect, maintain, and repair erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
C. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

3.3 TREE AND PLANT PROTECTION

A. Repair or replace trees, shrubs, and other vegetation indicated to remain or be relocated that are damaged by construction operations, in a manner approved by Architect.

3.4 EXISTING UTILITIES

A. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
   1. Arrange with utility companies or municipality to shut off indicated utilities.
B. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Architect not less than 2 days in advance of proposed utility interruptions.

3.5 CLEARING AND GRUBBING

A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
   1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
   2. Grind down stumps and remove roots, obstructions, and debris to a depth of 18 inches below exposed subgrade.
   3. Backfilling of voids should be accomplished in 8-inch maximum and compacted to a minimum of 95 percent of maximum density, not less than 2 percent optimum moisture content.

3.6 TOPSOIL STRIPPING

A. Remove sod and grass before stripping topsoil.
B. Strip topsoil to a depth and in a manner to prevent intermingling with underlying subsoil or other waste materials.
   1. Remove subsoil and non-soil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
   2. Stockpile sufficient quantities of on-site topsoil to later spread a minimum 6-inch thickness of topsoil on landscaped (non-paved) areas of the Project.

3.7 SITE IMPROVEMENTS

A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
   1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically.
   2. Paint cut ends of steel reinforcement in concrete to remain with 2 coats of antirust coating, following coating manufacturer's written instructions. Keep paint off surfaces that will remain exposed.

3.8 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove and dispose of all surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris from Project Site.

END OF SECTION

SECTION 31 20 00 - EARTH MOVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Preparing subgrades for site areas outside building influence. Section includes Work under walks, pavements, and turf and grasses.
   2. See separate Section prepared by others for backfilling under buildings and structures.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 31 10 00 "Site Clearing."

1.2 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
   1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
   2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
   1. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material 3/4-cu. yd. or more in volume that exceed a standard penetration resistance of 100 blows/2 inches when tested by a geotechnical testing agency, according to ASTM D 1586.

H. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

I. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables.

1.3 SUBMITTALS

A. Material Test Reports: For each on site and borrow soil material proposed for fill and backfill as follows:
   1. Classification according to ASTM D 2487.
   2. Laboratory compaction curve according to ASTM D 1557.

1.4 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
B. Utility Locator Service: Notify utility locator service(s) as required for area where Project is located before beginning earth moving operations.
C. Do not commence earth moving operations until erosion- and sedimentation-control measures are in place.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. For fill under building pad influence areas, see geotechnical report and Spec Sections prepared by others.
B. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
C. Satisfactory Soils: Onsite material or borrow soil free of gravel, debris, waste, frozen materials, vegetation, and other deleterious matter or a select non-expansive material mechanically processed to produce a consistent, uniform material meeting the following general requirements:

Maximum Aggregate Size	2.0 Inches
Percent Retained on No. 4 Sieve	25-50
Percent Retained on No. 40 Sieve	50-85
Plasticity Index	15 maximum

   1. Provide testing of satisfactory soil for conformance with the above gradation and P.I.
D. Unsatisfactory Soils: Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content, or the required density.

2.2 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, a minimum of 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 30 inches deep; colored as follows:
   1. Red: Electric.

2. Yellow: Gas, oil, steam, and dangerous materials.
3. Orange: Telephone and other communications.
4. Blue: Water systems.
5. Green: Sewer systems.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
B. Protect and maintain erosion and sedimentation controls during earth moving operations.
C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
   1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
   1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
   2. Remove rock to lines and grades indicated to permit installation of permanent construction.
B. Classified Excavation: Removal of material encountered above subgrade elevations to line and dimensions indicated.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 SUBGRADE INSPECTION

A. Notify Architect when excavations have reached required subgrade.

B. If Architect's representative or the material testing laboratory's representative determines that unsatisfactory soil is present, continue excavation and replace with satisfactory compacted backfill or fill material as directed.

C. Proof-roll subgrade below pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
   1. Completely proof-roll subgrade in 1 direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
   2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect and replace with satisfactory compacted backfill or fill as directed.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.7 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.8 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
   2. Surveying locations of underground utilities for Record Documents.
   3. Testing and inspecting underground utilities.
   4. Removing concrete formwork.
   5. Removing trash and debris.
   6. Removing temporary shoring and bracing, and sheeting.
   7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.9 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

B. Place and compact fill material in layers to required elevations as follows:
   1. Under pavement and walks use select non-expansive fill material.
   2. Under grass and planted areas, use satisfactory topsoil material.

C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.10 SOIL MOISTURE CONTROL

A. Uniformly moisten and mechanically process soil to produce material with consistent and uniform soil moisture content before compaction.
   1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.11 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
C. Compact soil materials to not less than the following percentages of maximum dry density:
   1. Under structures and building slabs, see specs prepared by others.
   2. Under pavements, scarify and recompact top 12 inches of existing Subgrade and each layer of backfill or fill soil material at 95 percent ASTM D 1557, +/- 2 percent Optimum Moisture.
   3. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at Ordinary compaction.
   4. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at Ordinary compaction.
   5. At Architect's discretion, additional proctors and rework required where compaction exceeds 103 percent of ASTM D 698.

3.12 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
   1. Turf or Unpaved Areas: Plus or minus 1-inch.
   2. Walks: Plus or minus 1/8-inch.
   3. Pavements: Plus or minus 1/4-inch.

3.13 SUBBASE AND BASE COURSES UNDER PAVEMENTS

A. See other Specification Sections.

3.14 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified geotechnical Architecting testing agency to perform tests and inspections.
B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
C. Testing agency will test compaction of soils in place according to ASTM D 1557, and ASTM D 6938, as applicable. Tests will be performed at the following locations and frequencies:

1. Paved Areas: At subgrade and at each compacted fill and backfill layer, at least 1 test for every 5,000 sq. ft. of paved area, but in no case fewer than 3 tests, or as directed by the Architect.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, or degree of moisture specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction and moisture is obtained.

3.15 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.

1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Unless otherwise stated in the plans or directed by the Architect, take possession, and remove surplus satisfactory soil and unsatisfactory soil, trash, waste material and debris, and legally dispose of them from Project Site.

END OF SECTION

SECTION 31 20 00.10 - EARTH MOVING FOR FACILITY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavating and filling for rough grading the Site.
   2. Preparing subgrades for slabs-on-grade.
   3. Excavating and backfilling for buildings and structures.
   4. Drainage course for concrete slabs-on-grade.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 31 10 00 "Site Clearing" for site stripping, grubbing, stripping and stockpiling topsoil, and removal of above- and below-grade improvements and utilities.

1.2 DEFINITIONS

A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
   1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
   2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.

C. Drainage Course: Aggregate layer supporting the slab-on-grade.

D. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
   1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
   2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
   3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

E. Fill: Soil materials used to raise existing grades.

F. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

G. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.

H. Utilities: On-site underground pipes, conduits, ducts, and cables as well as underground services within buildings.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct preexcavation conference at Project site.
   1. Review methods and procedures related to earthmoving, including, but not limited to, the following:
      a. Personnel and equipment needed to make progress and avoid delays.
      b. Coordination of Work with utility locator service.
      c. Coordination of Work and equipment movement with the locations of tree- and plant-protection zones.
      d. Extent of trenching by hand or with air spade.
      e. Field quality control.

1.4 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
   1. Classification according to ASTM D2487.
   2. Laboratory compaction curve according to ASTM D698 or ASTM D1557.

1.5 FIELD CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth-moving operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
   2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
B. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth-moving operations.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
B. Satisfactory Soils: Soil Classification Groups GW, GP, GM, SW, SP, and SM according to ASTM D2487, or a combination of these groups; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
   1. Plasticity Index: 4-15.
C. Unsatisfactory Soils: Soil Classification Groups GC, SC, CL, ML, OL, CH, MH, OH, and PT according to ASTM D2487, or a combination of these groups.
   1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

PART 3 - EXECUTION

3.1 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth-moving operations.
B. Protect and maintain erosion and sedimentation controls during earth-moving operations.
C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

3.2 DEWATERING

A. Provide dewatering system of sufficient scope, size, and capacity to control hydrostatic pressures and to lower, control, remove, and dispose of ground water and permit excavation and construction to proceed on dry, stable subgrades.
B. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
C. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
    1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
D. Dispose of water removed by dewatering in a manner that avoids endangering public health, property, and portions of work under construction or completed. Dispose of water and sediment in a manner that avoids inconvenience to others.

3.3 EXPLOSIVES

A. Explosives: Do not use explosives.

3.4 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavate to subgrade elevations regardless of the character of surface and subsurface conditions encountered. Unclassified excavated materials may include rock, soil materials, and obstructions. No changes in the Contract Sum or the Contract Time will be authorized for rock excavation or removal of obstructions.
    1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.
    2. Remove rock to lines and grades indicated to permit installation of permanent construction.

3.5 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1-inch. If applicable, extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.
    1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.
   1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
   1. Clearance: 12 inches each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
   1. For pipes and conduit less than 6 inches in nominal diameter, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
   2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe or conduit circumference. Fill depressions with tamped sand backfill.
   3. For flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support conduit on an undisturbed subgrade.
   4. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.7 SUBGRADE INSPECTION

A. Proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
   1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
   2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by Architect, and replace with compacted backfill or fill as directed.

B. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

C. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect, without additional compensation.

3.8 STORAGE OF SOIL MATERIALS

A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

3.9 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:
   1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
   2. Surveying locations of underground utilities for Record Documents.
   3. Testing and inspecting underground utilities.
   4. Removing concrete formwork.
   5. Removing trash and debris.
   6. Removing temporary shoring, bracing, and sheeting.
   7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
B. Place backfill on subgrades free of mud, frost, snow, or ice.

3.10 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud, frost, snow, or ice.
B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Section 03 30 00 "Cast-in-Place Concrete."
D. Backfill voids with satisfactory soil while removing shoring and bracing.
E. Initial Backfill:
   1. Soil Backfill: Place and compact initial backfill of satisfactory soil, free of particles larger than 1-inch in any dimension, to a height of 12 inches over the pipe or conduit.
      a. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
F. Final Backfill:
   1. Soil Backfill: Place and compact final backfill of satisfactory soil to final subgrade elevation.
G. Warning Tape: Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.11 SOIL FILL

A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
B. Place and compact fill material in layers to required elevations as follows:
   1. Under grass and planted areas, use satisfactory soil material.
   2. Under walks and pavements, use satisfactory soil material.
   3. Under steps and ramps, use engineered fill.
   4. Under building slabs, use engineered fill.
   5. Under footings and foundations, use engineered fill.
C. Place soil fill on subgrades free of mud, frost, snow, or ice.

3.12 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
   1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.
   2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

3.13 COMPACTION OF SOIL BACKFILLS AND FILLS

A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
B. Place backfill and fill soil materials evenly on all sides of structures to required elevations and uniformly along the full length of each structure.
C. Compact soil materials to not less than the following percentages of maximum dry unit weight according to ASTM D698 or ASTM D1557:
   1. Under structures, building slabs, steps, and pavements, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material at 95 percent.

3.14 GRADING

A. General: Uniformly grade areas to a smooth surface, free of irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.
B. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2-inch when tested with a 10-foot straightedge.

3.15 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE

A. Place drainage course on subgrades free of mud, frost, snow, or ice.
B. On prepared subgrade, place and compact drainage course under 8-inch cast-in-place concrete slabs-on-grade as follows:
   1. Place drainage course 6 inches or less in compacted thickness in a single layer.

3.16 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed Work comply with requirements.

C. Testing agency will test compaction of soils in place according to ASTM D1556, ASTM D2167, ASTM D2937, and ASTM D6938, as applicable. Tests will be performed at the following locations and frequencies:
   1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2000 sq. ft. or less of paved area or building slab but in no case fewer than three tests.
   2. Foundation Wall Backfill: At each compacted backfill layer, at least 1 test for every 100 feet or less of wall length but no fewer than 2 tests.
   3. Trench Backfill: At each compacted initial and final backfill layer, at least 1 test for every 150 feet or less of trench length but no fewer than 2 tests.

D. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

3.17 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
   1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.18 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

END OF SECTION

SECTION 31 23 33 - TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Excavating trenches for utilities from 5 feet outside building to existing municipal utilities.
   2. Compacted fill from top of utility bedding to subgrade elevations.
   3. Backfilling and compaction.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Document: Geotechnical report; bore hole locations and findings of subsurface materials.
   3. Section 31 20 00 "Earth Moving."

1.2 REFERENCES

A. ASTM C 136 - Method for Sieve Analysis of Fine and Coarse Aggregates.

B. ASTM D 1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10-lb. Rammer and 18-inch Drop.

C. ASTM D 6938 - Test Methods for In-Place Density and Water Content of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).

1.3 DEFINITIONS

A. Utility: Any buried pipe, duct, conduit, or cable.

1.4 FIELD MEASUREMENTS

A. Verify that survey benchmark, control point, and intended elevations for the Work are as shown on Drawings.

1.5 COORDINATION

A. Verify work associated with lower elevation utilities is complete before placing higher elevation utilities.

PART 2 - PRODUCTS

2.1 FILL MATERIALS

A. Provide pipe bedding and encasement per municipality details in the Plans.

B. Provide trench backfill for public utilities per the requirements of the local municipality. Refer to municipality details contained in the Plans. Trench backfill on private property for privately maintained utility lines, may be rock crusher fines or the most granular material from the excavated trench spoils. Only the material passing through the 2-inch screen size, and free of organic material shall be used.

C. Provide trench backfill within building areas as specified by other disciplines.

PART 3 - EXECUTION

3.1 PREPARATION

A. Identify required lines, levels, contours, and datum locations.
B. Protect plant life, lawns, and other features remaining as a portion of final landscaping.
C. Protect benchmarks, fences, paving, and curbs from excavating equipment and vehicular traffic.
D. Maintain and protect above and below grade utilities which are to remain.
E. Cut out soft areas of subgrade not capable of compaction in place. Backfill and compact to density equal to or greater than requirements for subsequent backfill material.

3.2 EXCAVATING

A. Excavate subsoil required for utilities.
B. Cut trenches sufficiently wide to enable installation and allow inspection. Remove water or materials that interfere with Work.
C. Do not interfere with 45 degree bearing splay of foundations.
D. Hand trim excavation. Hand trim for bell and spigot pipe joints. Remove loose matter.
E. Remove lumped subsoil, boulders, and rock.
F. Correct areas over excavated in accordance with Paragraph 3.1.E. of this Section.
G. Excavate trenches to indicated gradients, lines, depths, and elevations.
H. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
I. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
    1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

3.3 BACKFILLING

A. Backfill trenches to contours and elevations with unfrozen fill materials.
B. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet, frozen, or spongy subgrade surfaces.
C. Place and compact materials in equal continuous layers not exceeding 8 inches compacted depth.
D. Employ a placement method that does not disturb or damage existing or planned facilities.
E. Maintain optimum moisture content of fill materials to areas coordinated with General Contractor.
F. Transport surplus fill materials to designated stockpile area as noted on the Plans.
G. Place backfill on subgrades free of mud, frost, snow, or ice.
H. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
I. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.

J. Place and compact final backfill of satisfactory soil to final subgrade elevation.
K. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

3.4 TOLERANCES

A. Top Surface of Backfilling Under Paved Areas: Plus or minus 1/2-inch from required elevations.
B. Top Surface of General Backfilling: Plus or minus 1-inch from required elevations.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified Geotechnical Engineering testing agency to perform tests and inspections.
B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent backfill operations only after test results for previously completed work comply with requirements.
C. Compaction and moisture testing will be performed in accordance with ASTM D 1557, and ASTM D 6938.
D. Backfill loose lifts = 12-inch maximum. Density and moisture requirements: Top 4 feet of trench below subgrade = 95 percent ASTM D 1557 and ± 2 percent optimum moisture. Trench levels below 4 feet = 90 percent ASTM D 1557 and ± 2 percent optimum moisture.
E. If tests indicate Work does not meet specified requirements, remove Work, replace, recompact, and retest.
F. Frequency of Tests: 2 tests per 250 linear feet of trench, per lift, unless otherwise allowed by Architect or the municipality inspector.

3.6 PROTECTION OF FINISHED WORK

A. Protect finished Work.
B. Reshape and re-compact fills subjected to vehicular traffic during construction.

END OF SECTION

SECTION 31 31 16 - TERMITE CONTROL

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Soil treatment.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include the EPA-Registered Label for termiticide products.

1.3 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.
B. Product Certificates: For each type of termite control product.
C. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:
   1. Date and time of application.
   2. Moisture content of soil before application.
   3. Termiticide brand name and manufacturer.
   4. Quantity of undiluted termiticide used.
   5. Dilutions, methods, volumes used, and rates of application.
   6. Areas of application.
   7. Water source for application.
D. Wood Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:
   1. Date and time of application.
   2. Termiticide brand name and manufacturer.
   3. Quantity of undiluted termiticide used.
   4. Dilutions, methods, volumes used, and rates of application.
   5. Areas of application.
E. Sample Warranties: For special warranties.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located.

1.5 FIELD CONDITIONS

A. Soil Treatment:
1. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.
2. Related Work: Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.6 WARRANTY

A. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied soil termiticide treatment will prevent infestation of subterranean termites. If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.
1. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain termite control products from single source.

2.2 SOIL TREATMENT

A. Termiticide: EPA-Registered termiticide acceptable to authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation.
1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
a. BASF Corporation, Pest Control Solutions; Termidor.
b. Bayer Environmental Science; Premise 75.
c. Dow AgroSciences LLC: Dursban TC or Equity.
d. FMC Corporation, Agricultural Products Group, Talstar Prevail FT or Torpedo.
e. Syngenta; Demon Max.
2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than 5 years against infestation of subterranean termites.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.
B. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Prepare work areas according to the requirements of authorities having jurisdiction and according to manufacturer's written instructions before beginning application and installation of termite control treatment(s). Remove extraneous sources of wood cellulose and other edible materials, such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, according to requirements of authorities having jurisdiction.

3.3 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Distribute treatment uniformly. Apply treatment at the product's EPA-Registered Label volume and rate for maximum specified concentration of termiticide to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.

1. Slabs-on-Grade and Basement Slabs: Underground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.
2. Foundations: Soil adjacent to and along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing.
3. Crawlspaces: Soil under and adjacent to foundations. Treat adjacent areas, including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.
4. Masonry: Treat voids.
5. Penetrations: At expansion joints, control joints, and areas where slabs and below-grade walls will be penetrated.

B. Post warning signs in areas of application.

C. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.4 PROTECTION

A. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

B. Protect termiticide solution dispersed in treated soils and fills from being diluted by exposure to water spillage or weather until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

END OF SECTION

SECTION 32 11 23 - AGGREGATE BASE COURSE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Foundation course for surface course or other base courses.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 31 20 00 "Earth Moving."

1.2 REFERENCES

A. TxDOT - 101E - Preparation of Soil and Flexible Base Material for Testing.
B. TxDOT - 171-E - Triaxial Compression Tests for Disturbed Soils and Base Materials.

1.3 QUALITY ASSURANCE

A. Obtain materials from same source throughout.

1.4 REGULATOR REQUIREMENTS

A. Conform to applicable local code for paving work.

1.5 TESTS

A. Testing and analysis for fill materials shall be as specified herein.

1.6 SUBMITTALS

A. Submit all products information and quality testing results or as directed by Architect.

PART 2 - PRODUCTS

2.1 MATERIALS

A. The materials shall be crushed or uncrushed as necessary to meet the requirements specified and shall consist of durable coarse aggregate particles mixed with approved binding materials. The materials shall be approved by Architect at the source. All acceptance and quality testing shall be performed prior to the materials being delivered to the Project. For this Project, base material shall be Item 247, Type A, Grade 2 of the 2014 TxDOT Standard Specifications or approved equal.

2.2 FLEXIBLE BASE

A. TYPE A: Type A material shall be crushed and shall consist of durable particles of stone mixed with approved binding material.

B. Grade 2: When properly slaked and tested by TxDOT standard laboratory methods, the flexible base material shall meet the following requirements:

Retained on 2-1/2-inch sieve	0%
Retained on 1-3/4-inch sieve	0 to 10%
Retained on 7/8-inch sieve	10% to 35%
Retained on 3/8-inch sieve	30% to 65%
Retained on No. 4 sieve	45 to 75%
Retained on No. 40 sieve	50 to 90%

Material passing the No. 40 sieve shall be known as "Soil Binder" and shall meet the following requirements when prepared in accordance with Test Method TxDOT 101-E procedure:

The liquid limit shall not exceed	40, or as allowed by the Architect
The plasticity index shall not exceed	10, or as allowed by the Architect
The wet ball mill value shall not exceed	40, or as allowed by the Architect

The % increase on the #40 sieve shall not exceed 20, or as allowed by the Architect.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

A. Subgrade Preparation: Excavate and shape subgrade in conformity with the typical sections shown on Plans and to the lines and grades as established by Architect all unstable or otherwise objectionable material and replace with approved material. Fill all holes, ruts, and depressions with approved material. If necessary, moisture condition the subgrade, reshape and compact as required, prior to receiving the base material. Correct any deviation in excess of 1/2-inch in cross sections and in a length of 16 feet measured longitudinally by loosening, adding or removing material, reshaping, recompacting, and sprinkling. Prepare sufficient subgrade in advance to ensure satisfactory prosecution of the Work. Use material excavated in the preparation of the subgrade in the construction of slopes or dispose as directed. Secure additional material required for the completion of the slopes from an approved source.

B. Do not place base materials on frozen subgrade. Allow curb and gutter shown on the Plans, to cure sufficiently prior to laying and processing base, to provide side forms for the base material without damage to the gutter. The Architect will approve the subgrade prior to placing of base material.

3.2 PLACEMENT OF BASE COURSE

A. Immediately prior to placing of the base material, check the subgrade for conformity with grade and section. Deliver base material in approved vehicles of a uniform capacity. Spread and shape any material deposited upon the subgrade the same day. If inclement weather or other unforeseen circumstances render impractical the spreading of the material during the first 24-hour period, scarify and spread the material as directed by Architect. The material shall be sprinkled, if directed, and shall be bladed, processed, and shaped to conform to typical sections

as shown on Plans. Correct or remove and replace all areas and "nests" of segregated coarse or fine material with well-graded material, as directed by the Architect.

B. Sprinkle and compact each course to not less than the 95 percent of Standard Proctor density, as defined by ASTD D 1557, latest revision. The moisture content shall not vary more than two percent from optimum moisture content. Ensure the full depth of flexible base shown on the Plans is compacted to the extent necessary to remain firm and stable under construction equipment. The Architect will test each section of flexible base when completed. Rework and retest any material that fails to meet the density and moisture requirements. In no event will the density be less than 95 percent of Modified Proctor. Maintain the shape of the course by blading, smooth and in conformity with the typical sections shown on the Plans and to the established lines and grades. Loosen, remove, sprinkle, reshape and recompact any area that deviates in excess of 1/4-inch in cross section, and in a length of 16 feet. Correct all irregularities, depressions, or weak spots, by scarifying the areas affected, adding suitable material as required, reshaping and recompacting by sprinkling and rolling. Should the base course, due to any reason or cause, lose the required moisture, stability, density, or finish before the surfacing is complete, it shall be recompacted and refinished at Contractor's expense.

C. Ensure that any required additional base material that is to be added to existing flexible conforms to the typical sections shown on the Plans and to the lines and grades, as established by Architect and is properly bonded to the existing base and fine graded to the proper section.

D. Ensure aggregate base course moisture content is at least 2 percent below optimum, prior to applying prime coat, when HMAC pavement is specified. Do not allow the optimum moisture to fall below 4 percent of optimum. Sprinkle base course to maintain moisture. Architect reserves the right to test aggregate base course prior to the application of the prime coat. Rework base course if the moisture has dropped below 4 percent of optimum, without additional compensation.

END OF SECTION

SECTION 32 13 13 - CONCRETE PAVING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Driveways.
   2. Roadways.
   3. Parking lots.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash, and other pozzolans.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Four sets of Reinforcing Fabrication Shop Drawings shall be furnished to Architect and shall receive approval before any reinforcing steel is fabricated.

C. Other Action Submittals:
   1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

D. Qualification Data: For qualified Installer of detectable warnings, and ready-mix concrete manufacturer.

E. Material Certificates: For the following, from manufacturer:
   1. Cementitious materials.
   2. Steel reinforcement and reinforcement accessories.
   3. Admixtures.
   4. Curing compounds.
   5. Applied finish materials.
   6. Bonding agent or epoxy adhesive.
   7. Joint fillers.

F. Material Test Reports: For each of the following:
   1. Aggregates.

G. Field quality-control reports.

1.4 QUALITY ASSURANCE

A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. ACI Publications: Comply with ACI 301 unless otherwise indicated.

1.5 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at an ambient or surface temperature of as recommended by manufacturer.
C. Construction: All exposed edges on all structures shall be chamfered 3/4-inch unless otherwise noted on Plans.

PART 2 - PRODUCTS

2.1 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
   1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.
B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

A. All reinforcing bars shall be deformed unless shown otherwise on the plans. Any bars delivered to the site that are not marked with ASTM A 615 Grade 60 shall immediately be removed from the site at Contractor’s expense.
B. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated into flat sheets.
C. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
D. Epoxy-Coated Welded Wire Reinforcement: ASTM A 884/A 884M, Class A, plain steel.
E. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
F. Galvanized Reinforcing Bars: ASTM A 767/A 767M, Class II zinc coated, hot-dip galvanized after fabrication and bending; with ASTM A 615/A 615M, Grade 60 deformed bars.
G. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M; with ASTM A 615/A 615M, Grade 60 deformed bars.
H. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.
I. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
J. Deformed-Steel Wire: ASTM A 496/A 496M.
K. Epoxy-Coated-Steel Wire: ASTM A 884/A 884M, Class A coated, plain.
L. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 plain-steel bars. Cut bars true to length with ends square and free of burrs.
M. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.
N. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars, welded wire reinforcement, and dowels in place. Manufacture bar supports according to CRSI's "Manual of Standard Practice" from steel wire, plastic, or precast concrete of greater compressive strength than concrete specified.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
   1. Portland Cement: ASTM C 150, gray portland cement Type I/II.
   2. Class F Fly Ash or as allowed by the Architect.

B. Normal-Weight Aggregates: ASTM C 33, uniformly graded. Provide aggregates from a single source. Course aggregate will be required to meet the specified soundness and percentage of wear shall not be more than 45 at 500 revolutions as determined by AASHTO.
   1. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
   2. Soundness Loss: 18.
   3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Water: Potable and complying with ASTM C 94/C 94M.

D. Air-Entraining Admixture: ASTM C 260.

E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material. All admixtures require the Architect's approval for use.
   1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
   2. Retarding Admixture: ASTM C 494/C 494M, Type B.
   3. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
   4. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
   5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
   6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

2.4 CURING MATERIALS

A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. or cotton mats.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.

E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.
   1. Products: Subject to compliance with requirements, equal to MB-429 manufactured by Master Builders, Inc.

2.5 RELATED MATERIALS

A. Joint Fillers: ASTM D 1751 in preformed strips.

B. Joint Sealants: Joint sealants for concrete pavement shall be suitable for horizontal traffic joints exposed to fuel or gas spillage and shall be a chemically curing urethane polyurethane or polysulfide polymer-based elastomeric sealant complying with ASTM C 920, Type M, Grade P, Class 25, or Type S, Grade P, Class 25.

C. Joint Backing: ANSI/ASTM D 1056, round, closed cell polyethylene foam rod, oversized 30 to 50 percent larger than joint width.

2.6 PAVEMENT MARKINGS

A. See Section 32 17 23 "Pavement Markings."

2.7 WHEEL STOPS

A. For wheel stops in the parking garage; see Specifications prepared by others.
B. For Site Wheel Stops: Precast, air-entrained concrete, 4,500 psi, 28-day strength minimum compressive strength, 4-1/2 inches high by 9 inches wide by 72 inches long. Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.
   1. Dowels: Galvanized steel, 1/2 inch in diameter, 10-inch minimum length.

2.8 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
   1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
   2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.
B. Proportion mixtures to provide normal-weight concrete with the following properties:
   1. Compressive Strength (28 Days): 3,500 psi.
   2. Minimum 5.0 sacks of cement per cubic yard.
   3. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.50.
   4. Slump Limit: 1.5-inch if slip-formed (3 inches maximum). 4 inches if formed (6.5 inches maximum).
C. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
   1. Use water-reducing admixture in concrete as required for placement and workability with Architect’s approval.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions with the Architects approval.
D. Cementitious Materials: Limit percentage by weight of cementitious materials other than portland cement according to ACI 301 requirements as follows:
   1. Fly Ash or Pozzolan: 20 percent. Architect approval is necessary for the use of Fly Ash.
E. Synthetic Fiber: Uniformly disperse in concrete mixture at manufacturer’s recommended rate, but not less than 1.5 lb/cu. Yd. Fiber is specified for this Project only in concrete within the public right of way, and or as directed by the Architect.

2.9 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Furnish batch certificates for each batch discharged and used in the Work.
   1. When air temperature is between 75 and 90 degrees Fahrenheit, reduce mixing and delivery time from 1-1/2 hours to 60 minutes; when air temperature is above 90 degrees Fahrenheit, reduce mixing and delivery time to 45 minutes.
B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete according to ASTM C 94/C 94M. Mix concrete materials in appropriate drum-type batch machine mixer. Site mixing for batches larger than 1 cu. yd. requires Architect’s approval.

1. For concrete batches of 1 cu. yd. or smaller, continue mixing at least 1-minute, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For concrete batches larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd.
3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixing time, quantity, and amount of water added.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
B. Proof-roll prepared subgrade and base surface below concrete paving to identify soft pockets and areas of excess yielding.
C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove loose material from compacted subbase surface immediately before placing concrete.

3.3 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

3.4 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least 1 full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

3.5 JOINTS

A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
   1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than 1/2-hour unless paving terminates at isolation joints.
   1. Omit steel reinforcement from construction joints unless otherwise indicated.
   2. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt 1/2 of dowel length to prevent concrete bonding to 1 side of joint.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
   1. Locate expansion joints as shown on Plans.
   2. Extend joint fillers full width and depth of joint.
   3. Terminate joint filler not less than 1/4-inch below finished surface if joint sealant is indicated.
   4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
   5. Furnish joint fillers in 1-piece lengths. Where more than 1 length is required, lace or clip joint-filler sections together.
   6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least 1/4 of the concrete thickness.
   1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a 3/8-inch radius. Repeat grooving of contraction joints after applying surface finishes.
   2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.
   3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt 1/2 of dowel length to prevent concrete bonding to one side of joint.

E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 3/8-inch radius. Repeat tooling of edges after applying surface finishes.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.

B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.

D. Comply with ACI 304 requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
   1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels and joint devices.

H. Screed paving surface with a straightedge and strike off.

I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

J. Slip-Form Paving: Use design mixture for automatic machine placement. Produce paving to required thickness, lines, grades, finish and jointing.
   1. Compact subbase and prepare subgrade of sufficient width to prevent displacement of slip-form paving machine during operations.

K. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
   1. When air temperature has fallen to or is expected to fall below 40 degrees Fahrenheit, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees Fahrenheit and not more than 80 degrees Fahrenheit at point of placement.
   2. Do not use frozen materials or materials containing ice or snow.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.

L. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
   1. Cool ingredients before mixing to maintain concrete temperature below 95 degrees Fahrenheit at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option. Take corrective action if concrete temperature reaches 95. Stop pour if corrective action is not taken, and if 2 consecutive trucks show concrete temperature at or above 95 degrees.
   2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
   3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

M. Concrete Batching Time shall not exceed Table 14, Item 421 of TxDOT Specification 2014 in order to avoid placing concrete that has been on site for long periods.
N. Ensure concrete free falls no more than 5 feet except in cases of thin walls such as in culverts.

3.7 FLOAT FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.
B. Float Finish: Begin the second floating operation (see 3.6 I for initial float) when bleed-water sheen has disappeared, and concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots and fill low spots. Refloat surface immediately to uniform granular texture.
    1. Burlap Finish: Drag a seamless strip of damp burlap across float-finished concrete, perpendicular to line of traffic, to provide a uniform, gritty texture; or
    2. Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/8-inch deep with a stiff-bristled broom, transverse to largest dimension.

3.8 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
B. Comply with ACI 306.1 for cold-weather protection.
C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb./sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
E. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound or a combination of these as follows:
    1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
        a. Water.
        b. Continuous water-fog spray.
        c. Absorptive cover, water saturated and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
F. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
G. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

3.9 PAVING TOLERANCES

A. Comply with tolerances in ACI 117 and as follows:
   1. Elevation: 1/2-inch. However, all pavements shall be graded to drain. Depressions resulting in standing water over 1/8-inch deep shall be corrected as directed by the Architect.
   2. Thickness: Plus 1/4-inch, minus 1/4-inch.
   3. Surface: Gap below 10-foot long, unleveled straightedge not to exceed 1/4-inch.

3.10 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
B. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.
C. Sweep and clean surface to eliminate loose material and dust.
D. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.11 WHEEL STOPS

A. Securely attach wheel stops to paving with not less than 2 galvanized-steel dowels located at 1/4 to 1/3 points. Install dowels in drilled holes in the paving and bond dowels to wheel stop. Recess head of dowel beneath top of wheel stop.

3.12 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
   1. Testing Frequency: Obtain at least 1 set of 3 samples for each 50-cu. yd. or fraction thereof of each concrete mixture placed each day.
      a. When frequency of testing will provide fewer than 5 compressive-strength tests for each concrete mixture, testing shall be conducted from at least 5 randomly selected batches or from each batch if fewer than 5 are used.
   2. Slump: ASTM C 143/C 143M; Perform 2 slump tests on randomly selected batches for every 250 cu. yds. or fraction thereof of concrete placed each day. Perform additional tests when concrete consistency appears to change.
   3. Concrete Temperature: ASTM C 1064/C 1064M; 1 test hourly when air temperature is 40 degrees Fahrenheit and below and when it is 80 degrees Fahrenheit and above, and 1 test for each composite sample.
   4. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure 1 set of 3 standard cylinder specimens for each composite sample.
   5. Compressive-Strength Tests: ASTM C 39/C 39M; test 1 specimen at 7 days and 2 specimens at 28 days.
      a. A compressive-strength test shall be the average compressive strength from 2 specimens obtained from same composite sample and tested at 28 days.
C. Strength of each concrete mixture will be satisfactory if average of any 3 consecutive compressive-strength tests equals or exceeds specified compressive.

D. Test results shall be reported in writing to Architect and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mixture proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.
E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. The cost for additional testing shall be borne by Contractor.
G. Concrete paving will be considered defective if it does not pass tests and inspections.
H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
I. Prepare test and inspection reports.

3.13 REPAIRS AND PROTECTION

A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur. Construction traffic is permitted after 48 hours and a strength test of 2,800 psi is obtained.
D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION

SECTION 32 13 14 - STRUCTURAL PORTLAND CEMENT CONCRETE FOR SITE WORK

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. This Section of the Specifications shall govern the materials and construction methods for concrete structures outside of the building. Any precast products utilized in the Project shall be manufactured to meet or exceed these Specifications.

B. Related Requirements:

1. Division 01 Specification Sections apply to Work of this Section.

1.2 CONCRETE MATERIALS TESTS

A. Preconstruction Tests: The proposed concrete mix design shall be submitted to Architect for approval prior to placing any concrete. A laboratory design specific to this project will not be required provided the requirements of this section are met by the submitted design. Architect will require strength records of test cylinders from other projects using the proposed mix design. The costs of all preconstruction tests shall be borne by Contractor. Additional test certificates shall be furnished on the aggregates if requested by Architect.

B. Construction Tests: Test cylinders will be made in accordance with the Method of Making and Curing Concrete Compression and Flexure Test Specimens in the Field (ASTM C 31). The specimens shall be cured under standard moisture and temperature conditions in accordance with the requirements of ASTM C 31. Strength tests shall be made, in general, for each day's run or for each 50 cubic yards of concrete if a day's run greatly exceeds the amount, but these tests may be made entirely at the discretion of Architect. Contractor shall cooperate in securing and storing samples and shall furnish all materials required for sampling.

1.3 STRENGTH REQUIREMENTS

A. Concrete mixes shall be designed to secure a dense, low-absorption concrete having a compressive strength as indicated on the plans, as determined by making and breaking standard 6-inch by l2-inch cylinders in accordance with the provisions of ASTM C 31 and ASTM C 39.

B. The concrete mix shall have no less than 470 pounds of cement per cubic yard concrete mix. Percentage of cementitious materials other than Portland cement shall be limited to 20 percent by weight. Acceptance tests shall be determined at the 28-day mark. Methods such as ACI 301 coring shall be considered only at Architect’s discretion.

PART 2 - PRODUCTS

2.1 CONCRETE MATERIALS

A. Cement: Portland cement shall conform to the latest revision of ASTM C 150, Type II, and shall be of an approved brand. An allowable alternate cement to ASTM C 150, Type II, will be American Petroleum Institute (API) Type C cement of an approved brand. only one brand of cement will be permitted.

B. Fine Aggregate: Fine aggregate shall comply with the requirements of ASTM C 33. The fine aggregate will be required to meet the specified soundness test.

C. Coarse Aggregate: Coarse aggregate shall comply with the requirements of ASTM C 33. Gradation shall not be coarser than Size Number 467 (1-1/2 inch to No.4). The coarse aggregate will be required to meet the specified soundness and the percentage of wear shall not be more than 45 at 500 revolutions as determined by AASHTO T96.

D. Water: Water shall be clear and free from injurious amounts of oil, alkali, organic matter or other deleterious substances.

E. Admixtures:
1. Concrete may be supplied, with the approval of Architect, with the following admixtures:
a. Air Entrainment: ASTM C 260 equal to Siko-Air by Corporation.
b. Water Reducing Admixture: ASTM C 494, Type A equal to Pozzolith 344-N by Master Builders. Water reducing admixture is optional.
c. High-Range Water Reducing Admixture: ASTM C 494, Type F or G equal to Pozzolith 440-N by Master Builders. High-range, water reducing admixture is optional.
2. Admixtures shall be used in strict compliance with manufacturer's instruction. Admixtures which contain calcium chloride shall not be used.

PART 3 - EXECUTION

3.1 REINFORCING

A. Bar Reinforcing:
1. Except where plain bars are specifically shown on the Plans, all bar reinforcing shall be deformed bars. The deformed bar reinforcing shall conform to the requirements of ASTM A 615, Grade 60.
2. Any deformed bars delivered to the site of the work that are not marked in accordance with the requirements of ASTM A 615 shall immediately be removed from the site.

B. Epoxy Coating:
1. All reinforcing steel to be epoxy coated will be designated on the Plans. Epoxy coating and repair of coating shall be in accordance with 2014 Texas Department of Transportation (TxDOT) Standard Specifications, Item 440.2 Epoxy Coating.

C. Storing Reinforcement:
1. Reinforcement stored at the site shall be protected from the accumulation of grease, mud, or other foreign matter and from rust producing conditions. Bars shall be free from loose flaky rust, scale, oil, mud or structural defects where incorporated in the structure.

D. Fabrication and Placing:
1. Reinforcement shall be accurately fabricated to the required dimensions and shapes in accordance with the ACI Manual of Standard Practice unless variations are specifically shown on the Plans. Four sets of fabrication shop drawings shall be furnished Architect and shall receive his approval before any reinforcing steel is fabricated. Shop drawings shall be reviewed by Contractor prior to submission to Architect.
2. Reinforcement shall be accurately placed and adequately supported by concrete, metal or other approved chairs, spacers, or ties and shall be secured against displacement.
3. The concrete cover for reinforcing shall be in accordance with the requirements of the ACI Building Code (ACI 318-05) or as noted on the Drawings.
4. Splices shall be made as shown on the Plans by lapping the bars the required amount and securely wiring them together. Where details of splices are not shown or where unanticipated splices are required, they shall be made in a location approved by Architect and the length of lap shall be as required by the ACI Building Code (ACI 318-05).

3.2 PROPORTIONS

A. General:
1. Materials in the concrete shall be so proportioned that a workable mix, which will readily fill all form angles and properly embed the reinforcement without excessive manipulation, segregation, or water gain, will result. High density and low water

absorption shall be obtained with the mixes proposed and harsh mixes or those with which the required finishes cannot be obtained will not be approved. Concrete shall be provided with air entrainment of 4 percent, plus or minus 1 percent. Adjustments in the approved mixes shall be made during construction to compensate for variations in aggregates or whenever field tests indicate such adjustments are required. Changes in approved mixes required in order to bring the concrete into conformity with the Specifications shall be made by Contractor without additional compensation.

2. Measurements:
   a. Bulk cement- shall be measured by weight to within 1 percent of the required amounts. Cement in standard sacks will be considered as weighing 94 pounds and need not be weighed. Water shall be measured by either weight or volume to within l-1/2 percent of the required amount.
   b. Aggregates shall be measured by weight on a scale separate from that used for weighing cement. The individual aggregates, as weighed, shall be within 2 percent of the required amount and the total weight of the combined aggregates shall be within 1 percent of the required weight.
   c. Water shall be measured by volume or by weight. The device for measurement of the water shall be readily adjusted and, under all operating conditions, shall have an accuracy within 1 percent of the required amount. The device shall be so arranged that the measurements will not be affected by variable pressures in the water supply line.
   d. The complete plant assembly shall meet the approval of Architect, and facilities shall be provided for ready adjustment of aggregate weights for varying moisture content; accurate proportioning of water to cement; accurate control of all materials including positive shutoff where delivery to mixer is from bins; prompt removal of excess materials in hoppers; easy checking of weights of each separate aggregate; delivery of hopper of cement without waste; and for checking accuracy of measuring devices.

B. Proportions: The actual quantities of materials used in each batch shall be in accordance with the approved mix design for the class and slump of concrete being produced. The amount of moisture in the aggregates shall be considered in determining the amount of water to be added to each batch. The total content of any batch shall not exceed that of the approved mix design. Adequate means shall be furnished by Contractor for determining and controlling the amount of water in the aggregate.

C. Control: Architect shall have free access to the plant at all times and Contractor shall furnish materials for samples of all tests required to determine conformity with the Specifications. Changes in the mix shall be made promptly whenever such tests indicate changes are required or whenever the quality of concrete produced fails to meet the requirements.

3.3 SLUMP

A. General:
   1. Slump tests shall be made by the testing company. The number or frequency of such tests shall be entirely at the discretion of Architect. If the slump content falls outside the specified limits, a check test shall be made immediately on another portion of the same sample. In the event of a second failure, the concrete shall be considered as not meeting the requirements of these Specifications.
   2. Slump: The slump of all concrete shall be between 3 inches and 5 inches (8-inch maximum after admixtures) with the conditions of placement governing the exact slump to be used. In all cases, Architect shall specify the slump to be used. When a 3-inch slump is specified, the allowable tolerance shall be 1/2-inch. When the specified slump is greater than 3 inches, the allowable tolerance shall be 1 inch.

3.4 MIXING AND PLACING

A. Mixing Equipment:

1. Mixers may be stationary mixers or truck mixers. Agitators may be truck mixers or truck agitators. Each mixer and agitator shall have attached shall have attached, in a prominent place, a metal plate or plates on which are plainly marked, for the various uses for which the equipment is designed, the capacity of the drum or container in terms of the volume of mixed concrete and the speed of rotation of the mixing drum, blades or paddles. Stationary mixers shall be equipped with an acceptable timing device that will not permit the batch to be discharged until the specified mixing time has elapsed. Truck mixers shall be equipped with means by which the number of revolutions of the drum blades or paddles may be readily verified.
2. The mixer when loaded to capacity shall be capable of combining the ingredients of the concrete within the specified time into a thoroughly mixed and uniform mass and of discharging the concrete with a satisfactory degree of uniformity. No mixer or agitator shall be used if the results of slump tests of individual samples taken at approximately the 1/4, and the 3/4 points of the load differ by more than 2 inches. Mixers and agitators shall be inspected frequently for changes in condition due to accumulations of hardened concrete or mortar or due to wear of blades. When any such change of condition is found, the slump tests described above shall be repeated.
3. Truck mixers shall have adequate water supply and metering devices. No water shall be added to the concrete after the initial mixing water without the permission of Architect.

B. Mixing and Delivery:

1. When a stationary mixer is used for the entire mixing of the concrete, the mixing time for 1 cu. yd. of concrete shall be 1 minute with an increased mixing time of 15 seconds for each additional cubic yard or portion thereof.
2. When a stationary mixer is used for partial mixing, the mixing time shall be a minimum of 30 seconds. Mixing shall be completed by truck mixer at mixing speed.
3. Mixing time shall be measured from the time all cement and aggregates are in the drum. The batch shall be so charged into the mixer that some water will enter in advance of cement and aggregate, and all water shall be in the drum by the end of the first 1/4 of the specified mixing time.
4. Mixing speed shall begin immediately after all ingredients are in the mixer. For complete mixing in the truck each batch shall be mixed not less than 70 nor more than 100 revolutions of the drum. For partial mixing in the truck each batch shall be mixed no less than 50 nor more than 100 revolutions of the drum. Mixing speed shall be as designated by manufacturer. All revolutions after the prescribed mixing time shall be at agitating speed. The agitating speed shall be not less than one nor more than four revolutions per minute. The drum shall be kept in continuous motion from the time mixing is started until the discharge is completed.

5. The maximum time interval between the introduction of the water to the cement and aggregates, or the introduction of the cement to the aggregates, and the placing of the concrete in the forms shall not exceed the following:

AIR OR CONCRETE TEMPERATURE (WHICHEVER IS HIGHER)	MAXIMUM TIME
90 degrees F or above	45 Minutes
75 to 89 degrees F	60 Minutes
35 to 74 degrees F	90 Minutes

6. Concrete shall not be placed when the ambient temperature is less than 40 degrees Fahrenheit and falling but may be placed when the ambient temperature is not less than 35 degrees Fahrenheit if the temperature is rising. The temperature of the concrete at the time of placement in the forms shall be not less than 50 degrees Fahrenheit nor more than 90 degrees Fahrenheit.

C. Transporting: Concrete shall be handled from the mixer to the place of final deposit in a manner which will prevent segregation and when practicable shall be deposited in its final position without rehandling or flowing. All equipment used in transporting concrete shall be maintained in a clean condition. Concrete shall not be delivered from joists by spout or trough, nor dumped into carts with a free fall of more than 4 feet. Every precaution shall be taken to prevent separation or loss of ingredients while transporting the concrete. Pumping and conveying of concrete shall be done only after approval by Architect and with equipment which will ensure a continuous flow without segregation.

D. Placing:

1. Concrete shall not be placed until all reinforcement is securely and properly fastened in its correct position. Form ties shall be checked and retightened where necessary. Forms and reinforcement shall be inspected and approved by Architect before beginning placement of concrete. All embedded items shall be in place and anchored and the forms and reinforcement shall be cleaned, and cleanout openings closed before such inspection. A representative of Architect will be on the job during placement of concrete and concrete shall not be placed unless Architect or his representative is present.
2. Concrete shall be placed in a manner which will prevent segregation, thoroughly embed all reinforcement and fixtures, fill all angles in the forms and prevent formation of aggregate pockets or honeycomb. Placement in walls, columns or other deep forms shall be done through openings in the forms, spaced at frequent intervals, or through tremies so that the free fall shall not exceed 6 feet. Points of depositing the concrete shall be spaced so that the concrete surfaces can be kept level without flowing it into place.
3. Concrete shall be placed with the aid of approved mechanical vibrating equipment. Vibration shall be applied directly to the concrete and shall be of sufficient intensity and duration to cause flow or settlement of the concrete, thorough compaction and complete embedment of reinforcement and fixtures. Supplemental forking and spading by hand may be required to secure dense uniform surfaces and complete filling of corners and angles. Excessive spading or vibrating causing undue water gain or segregation will not be permitted. If moderate working causes excessive water gain, the mixture shall be adjusted. Excess water shall be removed when it appears, and concrete shall not be deposited in such accumulations of water. A grill tamp shall be used on slabs. Completed sections shall conform to the details on the Plans and the concrete shall be dense, uniform, and free of aggregate pockets or honeycomb.

3.5 FORMS

A. Material: Forms for all concrete work shall be of wood or approved metal forms. Wood sheeting, forming surfaces exposed to sight or weather shall be plywood or plywood lines of a quality to produce smooth even surfaces. Whatever material is used shall produce a surface, free from excessive form marks and shall meet the approval of Architect before use. The same type of form shall be used for all exposed portions of the Work unless specifically approved by Architect.

B. Construction: Forms shall be constructed true to lines, grades, and sections shown on the Plans and shall be mortar-tight and sufficiently rigid to prevent displacement or sagging between supports. All exposed edges on all structures, included edges at all joints, shall be chamfered 3/4-inch unless otherwise noted on the Plans. Forms shall be set plumb and true and rigidly braced to maintain them in correct position and alignment.

C. Wetting and Oiling: The inside surface of forms shall be coated with a non-staining mineral oil or other approved coating and shall be cleaned and oiled after each use. Forms which have dried out between uses shall be recoated just prior to placing of concrete. Excess oil or grease shall be wiped from the form surface. If forms have dried out so that the joints have opened, they shall be thoroughly soaked with water prior to placing of concrete.

D. Removing Forms:

1. Forms may be removed only upon approval by Architect. In general, removal of forms will be permitted after 14 days or after concrete has attained design strength and if removal of forms and ties will not damage the concrete.
2. It shall be the responsibility of Contractor, in all form removal, to prevent structural damage or marring of the concrete surfaces.

3.6 PATCHING

A. Concrete work obviously out of horizontal or vertical alignment or which shows serious surface defects shall be removed and replaced by Contractor at his expense. Patching of minor defects will be permitted provided such patching removes the defect. Immediately after removing forms the concrete shall be inspected for defects. All defects permitted to be patched and all form tie holes shall be patched before the concrete is thoroughly dry. Defective areas shall be chipped away to a depth of not less than 1-inch with edges perpendicular to the surface. This and the surrounding area shall be wetted prevent absorption of water from the patching mortar. The patching mortar shall be of the same materials and of the proportions as used for the concrete except that the coarse aggregate shall be omitted and the amount of water used shall be as little as is consistent for proper handling and placing. The mortar shall be re-tempered without the addition of water by allowing it to stand for 1 hour and mixing to prevent setting. The mortar shall be thoroughly compacted into place, screeded off slightly higher than the surrounding surface and left undisturbed for a period of 1 to 2 hours. Final finishing shall conform to the finish of the surrounding areas.

B. Form tie holes shall be patched with this same mortar, the holes being completely filled and the mortar tightly packed into the hole. Holes passing entirely through the concrete shall be filled by forcing the mortar through from one side to the other. Mortar shall be struck off flush with burlap or canvas and the patch finally finished to conform to the surrounding surface.

3.7 FINISHING

A. Exposed Formed Surfaces:

1. All exposed concrete surfaces shall be true, smooth, free from open or rough spaces, depressions, or projections. The concrete in horizontal plane surfaces shall be brought flush with the finished cop surface at the proper elevation and shall be struck-off with a straightedge and floated. Mortar finishing shall not be permitted, nor shall dry

cement or sand-cement mortar be spread over the concrete during the finishing of horizontal plane surfaces.

2. The surface finish of exposed concrete, which includes the wingwalls, the vertical edges of the sidewalks and the end of culvert walls, shall be a rubbed finish. The interior walls of the culvert barrels are not included as exposed concrete in the above. A carborundum stone shall be used to finish the surface. When approved, the finishing can be done with a rubbing machine.

B. Unexposed Formed Surfaces: All surfaces which are not normally exposed to view shall require no finishing other than filling tie rod holes, removing fins and rough edges, and patching or removing of any defects.

C. Slab Finishing: After screeding, consolidating and leveling of concrete slabs, surfaces shall not be worked until ready for floating. Floating shall begin when surface water has disappeared. Final troweling shall begin when the surface produces a ringing sound as the trowel is moved over the surface. The concrete surface shall be consolidated by the final hand-troweling operation, free of trowel marks, uniform in texture and appearance. Immediately after trowel finish, the concrete surface shall be slightly roughened by brooming with a fiber bristle broom.

3.8 CURING AND PROTECTING

A. Curing:

1. The curing period for all concrete begins immediately after placing and/or finishing operations are completed. Delay in initiation of curing measures will not be tolerated. All concrete shall be protected from loss of moisture and large changes in temperature, for a period of 7 days after placement. Curing measures shall be as specified below, unless similar measures which are demonstrated to achieve the same or better results are approved by Architect in writing.
2. Forms shall remain in place 24 hours but shall be removed within 48 hours after placement of the concrete. Forms shall be kept wet at all times until they are removed.
3. All required patching and repair of defects shall be accomplished immediately upon removal of forms. After completion of the patching, each section shall be coated with a membrane curing compound, Horncure 30D or equal, applied at a rate of not more than 200 square feet per gallon.

B. Protecting:

1. Concrete shall be protected against all adverse conditions including weather, and against mechanical damage, until completion of the project. Any such damage incurred shall be promptly repaired by Contractor at his own expense, in a manner approved by Architect.
2. Concrete shall be protected against low temperatures by maintaining a placement temperature not less than 50 degrees Fahrenheit for 5 days after placement. Concrete shall also be protected against extremes of high temperature, low humidity and wind movement by means of the curing methods specified herein or by other methods approved by Architect. It shall be the responsibility of Contractor to anticipate, as nearly as possible, changes in weather conditions which would affect the placement and protection of the concrete. He shall be prepared at all times with proper materials, equipment and personnel, to protect freshly placed concrete when sudden changes in weather make such protection necessary. Failure to have available proper materials, equipment or personnel for expeditious placement and adequate preparation of the concrete will be grounds for postponement of placing of concrete.

3.9 EMBEDDED ITEMS

A. All items required by the Plans or these Specifications to be embedded in the concrete shall be accurately set in place and securely maintained in such positions during placement of concrete.

END OF SECTION

SECTION 32 16 12 - CONCRETE SIDEWALKS, CURBS, AND GUTTERS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Concrete sidewalks and curbs and gutters.
   2. Concrete wheel stops.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 31 20 00 "Earth Moving."

1.2 REFERENCES

A. ACI 301 - Specifications for Structural Concrete for Buildings.
B. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete.
C. ASTM C 33 - Concrete Aggregates.
D. ASTM C 78 - Standard Test Method for Flexural Strength of Concrete.
E. ASTM C 94 - Ready Mix Concrete.
F. ASTM C 143 - Slump of Hydraulic Cement Concrete.
G. ASTM C 150 - Portland Cement.
H. ASTM C 172 - Sampling Freshly Mixed Concrete.
I. ASTM C 173 - Air Content of Freshly Mixed Concrete by the Volumetric Method.
J. ASTM C 260 - Air-Entraining Admixtures for Concrete.
K. ASTM C 309 - Liquid Membrane-Forming Compounds for Curing Concrete.
L. ASTM C 494 - Chemical Admixtures for Concrete.
M. ASTM C 1116 - Fiber-Reinforced Concrete and Shotcrete.
N. ASTM D 1751 - Preformed Expansion Joint Fillers for Concrete Paving and Structural Construction.

1.3 SUBMITTALS

A. Submit the following in accordance with the requirements of the Contract Documents.
B. Product Data: Provide data on joint filler admixtures, curing compounds and fibrous reinforcing.
C. Submit manufacturer's printed product data, clearly marked, indicating required volume of fibrous concrete reinforcement materials to be added to each cubic yard of concrete.
D. Submit manufacturer's printed batching mixing instructions.
E. Submit certificate prepared by concrete supplier stating that approved fibrous concrete reinforcement materials were added at the required volume to each batch of concrete delivered to Project site. Accompanied each certificate by 1 copy of each batch delivery ticket indicating amount of fibrous concrete reinforcement material added to each batch of concrete.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301.
B. Obtain cementitious materials from same source throughout.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Cold Weather Requirements: Do not place concrete when base surface temperature is less than 40 degrees Fahrenheit or surface is wet or frozen.
B. Warm Weather Requirements: Do not place concrete when temperature of mix exceeds 85 degrees Fahrenheit without approved retarder nor 95 degrees Fahrenheit with approved retarder.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

A. Concrete Curbs and Gutters: Steel form material, specifically designed for curb and gutter work, profiled to suit conditions, except that curves may be formed with wood sections built up or laminated, upon prior approval by Architect.
B. Sidewalks: Steel or wood at Contractor's option.
C. Joint Filler: ASTM D 1751 type; 1/2-inch thick.

2.2 REINFORCEMENT

A. Reinforcing Steel Bars: ASTM A 615, deformed steel bars.

2.3 CONCRETE MATERIALS

A. Cement: ASTM C 150 Type II.
B. Fine and Coarse Mix Aggregates: ASTM C 33, maximum 1.5-inch aggregate size.
C. Water-Potable, not detrimental to concrete.
D. Air Entrainment: ASTM C 260.

2.4 ACCESSORIES

A. Curing/Sealing Compound: ASTM C 309, Type 1, Class B; equal to MB-429 manufactured by Master Builders, Inc.
B. Joint Sealers: ASTM D 3405 or approved equal.

2.5 CONCRETE MIX - BY PERFORMANCE CRITERIA

A. Mix concrete in accordance with ACI 304. Deliver concrete in accordance with ASTM C 94.
B. Select proportions for normal weight concrete in accordance with ACI 301 Method 1 or Method 2.
C. Add fibrous concrete reinforcement to concrete materials at the time concrete is batched in amounts in accord with approved submittals.
D. Mix batched concrete in strict accord with fibrous concrete reinforcement manufacturer's instructions and recommendations for uniform and complete dispersion.
E. Provide concrete to the following criteria:
    1. Compressive Strength: 3,000 psi.
    2. Slump: 3 to 5 inches plus or minus 1-inch.
F. Use accelerating admixtures in cold weather only when approved by Architect. Use of admixtures will not relax cold-weather placement requirements.
G. Use set retarding admixtures during hot weather only when approved by Architect.

2.6 SOURCE QUALITY CONTROL AND TESTS

A. Provide mix design for each class of concrete to Architect for review prior to commencement of Work.
B. Tests on cement and aggregates will be performed to ensure conformance with specified requirements.
C. Test samples in accordance with ACI 301.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify base conditions.
B. Verify compacted subgrade is acceptable and ready to support concrete work and imposed loads.
C. Verify gradients and elevations of base are correct.

3.2 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.
B. Notify Architect minimum 24 hours prior to commencement of concreting operations.

3.3 FORMING

A. General: Forms for curb and gutter shall be approved type metal forms. The form sections shall be straight, free of warp and of a depth equal to the depth of the concrete section formed. The forms shall consist of a back form and gutter form with steel templates. Forms shall be constructed accurately to line and grade as established in the field, shall be adequately braced so that they will not move during placing of the concrete, and shall remain in place at least 12 hours after placing of concrete. Forms shall be oiled with a light oil before each use and forms which are to be reused shall be cleaned immediately after use and maintained in good condition. Forms for concrete paving shall also conform to provisions of this paragraph. Forms for curb and gutter on curves with a radius of 130 feet or less shall be flexible steel forms.
B. Templates: The steel templates shall have the shape of the cross-section of the curb and gutter except the bottom portion of the template shall be cut away to allow for a solid mass of concrete. An acceptable shape is shown on a detail sheet of the Plans; however, other shapes may be used upon submission of a design and the approval of Architect.
C. Machine Laid Curb and Gutter:
    1. The concrete curb and gutter sections may be formed with a curb and gutter laydown machine, provided the machine is capable of laying the curb and gutter to the proper grade, alignment and cross-section, and is equipped with adequate vibrators to produce a dense concrete free of honeycombs.
    2. Laydown machines that cannot meet the above requirements will not be acceptable for use.
D. Curb and Gutter Cross-Section: Should Contractor desire to use metal templates which differ slightly from the sections shown on the Plans, such templates or drawings thereof shall be submitted for approval. Slight differences which will not affect the general appearances of the curb and gutter sections will be approved but no forms or templates shall be used which have not been approved by Architect.
E. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.4 MIXING AND PLACING CONCRETE

A. Concrete shall be mixed in an approved batch type mixer which shall be equipped with a device for measuring the water which is accurate to within 2 percent. Minimum time for mixing each batch after all ingredients are in the mixer shall be 1-1/2 minutes. The speed of the mixer shall not exceed that recommended by the manufacturer. Excessive overmixing, requiring the addition of water to preserve the required consistency, will not be permitted. Concrete not in place within 45 minutes from the time of charging the drum, or which has developed initial hardening, shall not be used. Transit mixed concrete conforming to these specifications will be acceptable.

B. Concrete shall be deposited in place in such a manner as to require the minimum of rehandling and shall be placed in a manner which will produce a uniformly dense section, free of honeycomb or other voids, conforming to the grade, thickness, and shapes shown on the Plans. Before placing concrete, the subgrade or base surface shall be sprinkled so that it is in a thoroughly moistened condition (but not muddy). Concrete adjacent to forms or joints shall be thoroughly spaded or vibrated in order to eliminate honeycomb. Honeycombed places in the back of the curb or face of gutter will not be permitted, all honeycombed places shall be patched as directed by Architect. Concrete shall not be placed when the temperature is less than 40 degrees Fahrenheit. and under no circumstances shall it be placed on frozen ground.

C. Mixing concrete for use in a curb and gutter laydown machine shall be mixed as specified above and shall be placed to form the curb and gutter section with the laydown machine. Slump of the concrete shall be accurately controlled and shall be low enough to prevent sagging or slumping of the curb section behind the machine. Batches with excessive slump will be rejected.

D. Place concrete in accordance with ACI 301.

E. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

3.5 JOINTS

A. Align curb, gutter, and sidewalk joints.

B. Place joint filler between paving components and building or other appurtenances. Recess top of filler 1/4-inch for sealant placement.

C. Sidewalk Joints:

1. Place transverse contraction joints continuous across width of walk at a distance not to exceed sidewalk width or 5 feet on center, whichever is less.
2. Place longitudinal contraction joints in centerline of walks 10 feet or more in width.
3. Place transverse expansion joints at sidewalk returns, opposite expansion joints in adjoining curbs and around structures projecting through or into sidewalk, but not less than 20 feet on center.

D. Curb and gutter shall be constructed with an expansion joint at the tangent point of each return at intersections, at intervals of not more than 40 feet between intersections (odd length sections as directed by Architect), and at the end of each day's concrete pour. A construction or contraction joint shall be located at 10-foot intervals, or at each template or as directed by Architect. All joints shall be perpendicular to the surface of the concrete and to the axis of the section. Construction or contraction joints for curb and gutter poured in metal forms shall be formed by metal template plates accurately shaped to the cross-section shown on the Plans and so constructed that they can be removed during the finishing operations. Templates shall be maintained in good condition and warped or bent templates shall not be used.

E. In machine laid curb and gutter the contraction joints shall be made at 10-foot intervals by cutting into the curb and gutter sections with a trowel a depth of approximately 1/2-inch these joints shall be finished as specified under finishing. Expansion joints shall be placed at end returns, but not to exceed a maximum spacing of 300 feet, and at the end of each day's concrete pour.

F. Expansion joint material shall be an approved preformed bituminous impregnated non-extruding type jointing material, 1/2-inch thick (3/4-inch thick for machine laid curb and gutter) and shaped to the section of the curb and gutter, or concrete drainage apron.

3.6 FINISHING

A. Sidewalk Paving: Light broom, radius to 3/8-inch radius, and trowel joint edges.

B. Curbs and Gutters: Light broom.

C. Ramps: Heavy broomed texture perpendicular to slope.

D. Direction of Texturing: Transverse to longest dimension.

E. Place curing compound on exposed concrete surfaces immediately after finishing. Apply in accordance with manufacturer's instructions.

F. Curb and gutter, gutter, concrete valley gutters, fillets, and other miscellaneous concrete work shall be accurately shaped to the cross section shown on the Plans or approved by Architect and finished to a surface of uniform texture by floating with a wood float and troweling. The final finishing shall be done with a brush, the last stroke being one from the back of the curb to the lip of the gutter. Both sides of all joints, the lip of the gutter, and back edge of the curb shall be finished with an approved edging tool before the final brushing. Curves at the top and bottom of curb sections shall be accurately shaped and finished and the finished curb and gutter shall present a uniform appearance without "waves" in the face of the curb or "pockets" in the gutters or slabs. Particular care shall be exercised at valley gutters, both in setting forms and finishing, to ensure that the shape of the gutter shall conform to the details of the Plans and that no water pockets will be formed in the gutter of the pavement. At construction and contraction joints the mortar shall be cut the full width of the joint and shall be neatly finished with an approved edging or grooving tool of such design to groove the joint approximately 2 inches in depth.

G. The construction and contraction joints in machine laid curb and gutter shall be neatly formed and finished with an approved edging or grooving tool of such design to groove the joint approximately 2 inches in depth.

3.7 JOINT SEALING

A. Separate pavement from vertical surfaces with 1/2-inch thick joint filler.

B. Place joint filler in pavement pattern placement sequence. Set top to required elevations. Secure to resist movement by wet concrete.

C. Extend joint filler from bottom of pavement to within 1/4-inch of finished surface. Joint sealer shall conform to ASTM 3405 or approved equal.

3.8 PROTECTING AND CURING

A. All concrete work shall be covered with burlap or other suitable material as soon as it has set sufficiently to prevent marking and kept wet continuously for at least four days. Care shall be taken to prevent mechanical injury to concrete work during this period and until the Work is accepted. Any work damaged prior to acceptance shall be repaired to the satisfaction of Architect.

B. In lieu of the above method of curing, the curb and gutter may be cured by applying a liquid membrane coating to all exposed surfaces as soon as the concrete has set sufficiently. The back and front of the concrete curb and gutter shall have the membrane applied as soon as the forms have been removed. The materials and method of application shall be approved by Architect before concrete placement begins. The coating shall conform to ASTM C 309.
C. Suitable means shall be provided to prevent concrete from freezing for not less than 72 hours after placing. Any concrete damaged by freezing shall be removed and replaced by Contractor at his expense. The addition of any admixture of chemicals to the concrete to prevent freezing shall not be allowed, unless specifically approved by Architect.
D. Suitable means shall be provided to protect freshly poured concrete from rain damage. Such means shall be kept readily accessible at all times during placement of concrete.

3.9 DEFECTIVE WORK

A. Any defective work disclosed after the forms have been removed shall be immediately removed and replaced. If any dimensions are deficient, or if any section is not constructed to the proper grade, or if the surface of the concrete is bulged, uneven, or shows honeycomb, which in the opinion of Architect cannot be repaired satisfactorily, the entire section shall be removed and replaced at the expense of Contractor.

3.10 BACKFILLING

A. Backfill behind and adjacent to all concrete work including curb, gutter, sidewalks, drives, drainage structures and other miscellaneous concrete work shall be made from good quality topsoil. This material shall be free from organic material such as leaves, grass, roots and other unsuitable materials and free of rocks or stones. Contractor shall provide a smooth, even slope between the property line and the top of curb or other concrete structure. Backfill behind the curb and gutter shall be compacted to at least the density of the undisturbed natural ground in the adjacent area.
B. Care shall be taken during the backfill and cleanup process not to scrape, chip, crack or otherwise damage the concrete including tire marks from equipment or trucks. Any damaged concrete will be removed and replaced at the expense of Contractor.

3.11 CONCRETE BUMPERS

A. Install perpendicular to longitudinal axis of parking space, centered between stripes.
B. Anchor to pavement with dowels.

3.12 TOLERANCES

A. Maximum Variation of Surface Flatness: 1/4-inch in 10 feet.
B. Maximum Variation from True Position: 1/4-inch.

3.13 FIELD QUALITY CONTROL

A. Strength Tests:
   1. Take minimum of one set of 3 samples for each day's pour but not less than 1 set for each 50 cu. yds. placed.
   2. Take samples in accordance with ASTM C 172.
B. Slump Test: Perform 2 slump tests in accordance with ASTM G 143 on randomly-selected batches for every 50 cu. yds. or fraction thereof of concrete placed each day.

C. One additional test cylinder will be taken during cold weather and cured on site under same conditions as concrete it represents.
D. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature and test samples taken.

END OF SECTION

SECTION 32 17 23 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. This item shall consist of the painting of markings and stripes on the surface of pavements applied in accordance with these Specifications and at the locations shown on the Plans, or as directed by Architect.

B. Related Requirements:
1. Division 01 Specification Sections apply to Work of this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Paint shall meet the requirements of the following specifications:
1. Federal Test Method Standard No. 141, Methods 4121, 4184, 4281, and 6121.
2. Fed. Spec. TT-P-85b.
3. Fed. Spec. TT-P-115A.
4. Fed. Spec. TT-14-16, Methods 408.1, 409.1, and 409.2.

PART 3 - EXECUTION

3.1 CONSTRUCTION METHODS

A. Weather Limitations: The painting shall be performed only when the surface is dry, when the atmospheric temperature is above 45 degrees Fahrenheit, and when the weather is not foggy or windy.

B. Equipment:
1. All equipment for the Work shall be approved by Architect and shall include the apparatus necessary to properly clean the existing surface, a mechanical marking machine, and such auxiliary hand-painting equipment as may be necessary to satisfactorily complete the job.
2. The mechanical marker shall be an atomizing spray-type marking machine suitable for application of traffic paint. It shall produce an even and uniform film thickness at the required coverage and shall be designed so as to apply markings of uniform cross sections and clear-cut edges without running or spattering.

C. Preparation of Surface:
1. Immediately before application of the paint, the surface shall be dry and free from dirt, grease, oil, laitance, or other foreign material which would reduce the bond between the paint and the pavement. The area to be painted shall be cleaned by sweeping and blowing or by other methods as required to remove all dirt, laitance, and loose materials.
2. Paint shall not be applied to portland cement concrete pavement until the concrete in the areas to be painted is clean of curing material. Sandblasting or high-pressure water shall be used to remove curing material from concrete surfaces.

D. Layout of Markings: On those sections of pavement where no previously applied markings are available to serve as a guide, the proposed markings shall be laid out in advance of the paint application.

E. Fire Lane Markings: All required fire lanes as designated by the local Fire Chief or local official shall be provided with fire lane striping which consists of a 6-inch wide red background stripe with 4-inch high white letters using 3/4-inch stroke stating "FIRE LANE NO PARKING" or "NO PARKING FIRE LANE" to be painted upon the red stripe every 40 feet along the entire length of the fire lane, showing the exact boundary of the fire lane. The words "FIRE LANE NO PARKING" or "NO PARKING FIRE LANE" must be grouped together as a phrase. Separating the words "NO PARKING" and "FIRE LANE" spacing them 40 feet apart does not meet the intention of this ordinance. Fire lane markings shall be upon the vertical surface of the curb unless otherwise approved by the Chief.

F. Application:
   1. Markings shall be applied at the locations and to the dimensions and spacing shown on the Plans. Paint shall not be applied until the layout and condition of the surface have been approved by Architect.
   2. The paint shall be mixed in accordance with the manufacturer's instructions and applied to the pavement with a marking machine at the rate of 100 to 110 sq. ft. per gallon. The addition of thinner will not be permitted. A period of 15 days shall elapse between placement of a bituminous surface course or seal coat and application of the paint.
   3. The edges of the markings shall not vary from a straight line more than 1/2-inch in 50 feet, and the dimensions shall be within a tolerance of plus or minus 5 percent. If indicated on the Plans, glass spheres shall be distributed to the surface of the marked areas immediately after application of the paint. A dispenser shall be furnished which is properly designed for attachment to the marking machine and suitable for dispensing glass spheres. The spheres shall be applied at the rate of 10 pounds per gallon of paint.
   4. Contractor shall furnish certified test reports for the materials shipped to the Project. The reports shall not be interpreted as a basis for Final Acceptance. Contractor shall notify Architect upon arrival of a shipment of paint to the job site. All emptied containers shall be returned to the paint storage area for checking by Architect. The containers shall not be removed from the site or destroyed until authorized by Architect.

G. Protection: After application of the paint all markings shall be protected from damage until the paint is dry. All surfaces shall be protected from disfiguration by spatter, splashes, spillage, or drippings of paint.

END OF SECTION

SECTION 32 31 13 - CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Chain-link fences.
   2. Swing gates.
   3. Horizontal-slide, motor-operated gates.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 03 30 00 "Cast-in-Place Concrete" for cast-in-place concrete equipment bases/pads for gate operators and controls and post footings.

1.2 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.
   1. Inspect and discuss electrical roughing-in, equipment bases, and other preparatory Work specified elsewhere.
   2. Review sequence of operation for each type of gate operator.
   3. Review coordination of interlocked equipment specified in this Section and elsewhere.
   4. Review required testing, inspecting, and certifying procedures.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:
      a. Fence and gate posts, rails, and fittings.
      b. Chain-link fabric, reinforcements, and attachments.
      c. Gates and hardware.
      d. Gate operators, including operating instructions and motor characteristics.

B. Shop Drawings: For each type of fence and gate assembly.
   1. Include plans, elevations, sections, details, and attachments to other Work.
   2. Include accessories, hardware, gate operation, and operational clearances.
   3. Gate Operator: Show locations and details for installing operator components, switches, and controls. Indicate motor size, electrical characteristics, drive arrangement, mounting, and grounding provisions.
   4. Wiring Diagrams: For power, signal, and control wiring.

C. Samples for Initial Selection: For each type of factory-applied finish.

D. Samples for Verification: For each type of component with factory-applied finish, prepared on samples of size indicated below:
   1. Polymer-Coated Components: In 6-inch lengths for components and on full-sized units for accessories.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For factory-authorized service representative.
B. Product Certificates: For each type of chain-link fence, operator, and gate.
C. Product Test Reports: For framework strength according to ASTM F 1043, for tests performed by a qualified testing agency.
D. Field quality-control reports.
E. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For gate operators to include in emergency, operation, and maintenance manuals.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing fence grounding; member company of NETA or an NRTL.
    1. Testing Agency's Field Supervisor: Certified by NETA to supervise on-site testing.
B. Emergency Access Requirements: According to requirements of authorities having jurisdiction for gates with automatic gate operators serving as a required means of access.
C. Mockups: Build mockups to set quality standards for fabrication and installation.
    1. Build mockup for typical chain-link fence and gate, including accessories.
        a. Size: 10-foot length of fence.

1.7 FIELD CONDITIONS

A. Field Measurements: Verify layout information for chain-link fences and gates shown on Drawings in relation to property survey and existing structures. Verify dimensions by field measurements.

1.8 WARRANTY

A. Special Warranty: Installer agrees to repair or replace components of chain-link fences and gates that fail in materials or workmanship within specified warranty period.
    1. Failures include, but are not limited to, the following:
        a. Failure to comply with performance requirements.
        b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
        c. Faulty operation of gate operators and controls.
    2. Warranty Period: 5 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional Engineer, as defined in Section 01 40 00 "Quality Requirements," to design chain-link fence and gate frameworks.

B. Structural Performance: Chain-link fence and gate frameworks shall withstand the design wind loads and stresses for fence height(s) and under exposure conditions indicated according to ASCE/SEI 7.
   1. Design Wind Load: As indicated on Drawings.
      a. Minimum Post Size: Determine according to ASTM F 1043 for post spacing not to exceed 10 feet for Material Group IA, ASTM F 1043, Schedule 40 steel pipe.
      b. Minimum Post Size and Maximum Spacing: Determine according to CLFMI WLG 2445, based on mesh size and pattern specified.

2.2 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in 1-piece heights measured between top and bottom of outer edge of selvage knuckle or twist according to "CLFMI Product Manual" and requirements indicated below:
   1. Fabric Height: As indicated on Drawings.
   2. Steel Wire for Fabric: Wire diameter of 0.148-inch.
      a. Mesh Size: 2 inches.
      b. Zinc-Coated Fabric: ASTM A 392, Type II, Class 2, 2.0 oz./sq. ft. with zinc coating applied after weaving.
      c. Coat selvage ends of metallic-coated fabric before the weaving process with manufacturer's standard clear protective coating.
   3. Selvage: Knuckled at both selvages.

2.3 FENCE FRAMEWORK

A. Posts and Rails : ASTM F 1043 for framework, including rails, braces, and line; terminal; and corner posts. Provide members with minimum dimensions and wall thickness according to ASTM F 1043 or ASTM F 1083 based on the following:
   1. Fence Height: 72 inches.
   2. Heavy-Industrial-Strength Material: Group IA, round steel pipe, Schedule 40.
      a. Line Post: 1.9 inches in diameter.
      b. End, Corner, and Pull Posts: 2.375 inches in diameter 4.0 inches in diameter.
   3. Horizontal Framework Members: top and bottom rails according to ASTM F 1043.
      a. Top Rail: 1.66 inches in diameter.
   4. Brace Rails: ASTM F 1043.
   5. Metallic Coating for Steel Framework:
      a. Type A: Not less than minimum 2.0-oz./sq. ft. average zinc coating according to ASTM A 123/A 123M or 4.0-oz./sq. ft. zinc coating according to ASTM A 653/A 653M.

2.4 SWING GATES

A. General: ASTM F 900 for gate posts and single swing gate types.
   1. Gate Leaf Width: As indicated.
   2. Framework Member Sizes and Strength: Based on gate fabric height as indicated.
B. Pipe and Tubing:
   1. Zinc-Coated Steel: ASTM F 1043 and ASTM F 1083; protective coating and finish to match fence framework.
   2. Gate Posts: Round tubular steel.
   3. Gate Frames and Bracing: Round tubular steel.
C. Frame Corner Construction: Welded.

D. Extended Gate Posts and Frame Members: Fabricate gate posts and frame end members to extend as indicated above top of chain-link fabric at both ends of gate frame to attach barbed wire assemblies.
E. Hardware:
    1. Hinges: 360-degree inward and outward swing.
    2. Latch: Permitting operation from both sides of gate with provision for padlocking accessible from both sides of gate.

2.5 HORIZONTAL-SLIDE GATES

A. General: ASTM F 1184 for gate posts and single sliding gate types. Provide automated vehicular gates according to ASTM F 2200.
    1. Classification: Type II Cantilever Slide, Class 2 with internal roller assemblies.
        a. Gate Frame Width and Height: As indicated.
B. Pipe and Tubing:
    1. Zinc-Coated Steel: Protective coating and finish to match fence framework.
    2. Aluminum: ASTM B 429/B 429M; manufacturer's standard finish.
    3. Gate Posts: ASTM F 1184. Provide round tubular steel posts.
    4. Gate Frames and Bracing: Round tubular steel.
C. Frame Corner Construction: Welded.
D. Extended Gate Posts and Frame Members: Extend gate posts and frame end members above top of chain-link fabric at both ends of gate frame as indicated as required to attach barbed wire assemblies.
E. Hardware:
    1. Hangers, Roller Assemblies, and Stops: Fabricated from galvanized steel.
    2. Insert hardware items and accessories.

2.6 FITTINGS

A. Provide fittings according to ASTM F 626.
B. Post Caps: Provide for each post.
    1. Provide line post caps with loop to receive tension wire or top rail.
C. Rail and Brace Ends: For each gate, corner, pull, and end post.
D. Rail Fittings: Provide the following:
    1. Top Rail Sleeves: Pressed-steel or round-steel tubing not less than 6 inches long.
    2. Rail Clamps: Line and corner boulevard clamps for connecting bottom rails to posts.
E. Tension and Brace Bands: Pressed steel.
F. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle or other means of adjustment.
G. Tie Wires, Clips, and Fasteners: According to ASTM F 626.
    1. Standard Round Wire Ties: For attaching chain-link fabric to posts, rails, and frames, according to the following:
        a. Hot-Dip Galvanized Steel: diameter wire; galvanized coating thickness matching coating thickness of chain-link fence fabric.
H. Finish:
    1. Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz./sq. ft. of zinc.
        a. Polymer coating over metallic coating.

2.7 GATE OPERATORS

A. Operators: Chamberlain/Liftmaster SL585 or approved equal, with S2 keycard system to match City of Midland standard, Factory-assembled, automatic, gate-operating system designed for gate size, type, weight, and frequency of use. Control system shall have characteristics suitable for Project conditions, with control stations, safety devices, and weatherproof enclosures.
   1. Operator design shall allow for removal of cover or motor without disturbing limit-switch adjustment and without affecting auxiliary emergency operation.
   2. Electronic components shall have built-in troubleshooting diagnostic feature.
   3. Unit shall be designed and wired for both right-hand/left-hand opening, permitting universal installation.

B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

C. UL Standard: Manufacture and label gate operators according to UL 325.

D. Motors: Comply with NEMA MG 1.
   1. Duty: Continuous duty at ambient temperature of 40 degrees Celcius and at altitude of 3300 feet above sea level.
   2. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.
   3. Service Factor: 1.15.
   4. Electrical Characteristics:
      a. Horsepower: 1.
      b. Voltage: 115 V ac 208 V ac 230 V ac, single phase, 60 hertz.
      c. Voltage: 208 V ac 230 V ac 460 V ac, three phase, 60 hertz.

E. Gate Operators: Gate Equipment base/pad Pedestal post in-ground mounted and as follows:
   1. Mechanical Swing Gate Operators:
      a. Duty: duty, commercial/industrial.
      b. Gate Speed: Minimum 60 feet per minute.
      c. Maximum Gate Weight: Insert value.
      d. Frequency of Use: Insert requirement.
      e. Operating Type: Roller chain.
      f. Drive Type: Enclosed worm gear reducers, roller-chain drive.
      g. Drive Type: V-belt and reducers, roller-chain drive.

F. Controls: Electric controls separated from gate and motor and drive mechanism, with NEMA 250, Type 3R enclosure for surface equipment base/pad mounting and with space for additional optional equipment.

G. Control Devices:
   1. Card Reader: Functions only when authorized card is presented. Programmable, magnetic multiple-code system; face-lighted unit fully visible at night.
      a. Reader Type: Proximity.
      b. Features: Capable of monitoring and auditing gate activity.

H. Obstruction Detection Devices: Provide each motorized gate with automatic safety sensor(s). Activation of sensor(s) causes operator to immediately function as follows:
   1. Action: Reverse gate in both opening and closing cycles and hold until clear of obstruction; stop gate in opening cycle and reverse gate in closing cycle and hold until clear of obstruction.
   2. Photoelectric/Infrared Sensor: Designed to detect an obstruction in gate's path when infrared beam in the zone pattern is interrupted.

I. Limit Switches: Adjustable switches, interlocked with motor controls and set to automatically stop gate at fully open and fully closed positions.

J. Emergency Release Mechanism: Quick-disconnect release of operator drive system, permitting manual operation if operator fails. Control circuit power is disconnected during manual operation.
   1. Type: Mechanical device, key, or crank-activated release.

K. Operating Features:
   1. Digital Microprocessor Control: Electronic programmable means for setting, changing, and adjusting control features with capability for monitoring and auditing gate activity. Provide unit that is isolated from voltage spikes and surges.
   2. System Integration: With controlling circuit board capable of accepting any type of input from external devices.
   3. Master/Slave Capability: Control stations designed and wired for gate pair operation.
   4. Automatic Closing Timer: With adjustable time delay before closing and timer cut-off switch.
   5. Open Override Circuit: Designed to override closing commands.
   6. Reversal Time Delay: Designed to protect gate system from shock load on reversal in both directions.
   7. Maximum Run Timer: Designed to prevent damage to gate system by shutting down system if normal time to open gate is exceeded.
   8. Clock Timer: 24 hour/ 7 day insert time period, programmable for regular events.

L. Accessories:
   1. Instructional, Safety, and Warning Labels and Signs: According to UL 325 Manufacturer's standard for components and features specified.
   2. Equipment Bases/Pads: Cast-in-place or precast concrete, depth not less than 12 inches, dimensioned and reinforced according to gate-operator component manufacturer's written instructions and as indicated on Drawings.

2.8 GROUT AND ANCHORING CEMENT

A. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M. Provide grout, recommended in writing by manufacturer, for exterior applications.

2.9 GROUNDING MATERIALS

A. Comply with "Grounding and Bonding for Electrical Systems."

B. Connectors and Grounding Rods: Listed and labeled for complying with UL 467.
   1. Grounding Rods: Copper-clad steel, 5/8 by 96 inches, or as recommended by manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance of the Work.
   1. Do not begin installation before final grading is completed unless otherwise permitted by Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Stake locations of fence lines, gates, and terminal posts. Do not exceed intervals of 500 feet or line of sight between stakes. Indicate locations of utilities, lawn sprinkler system, underground structures, benchmarks, and property monuments.

3.3 CHAIN-LINK FENCE INSTALLATION

A. Install chain-link fencing according to ASTM F 567 and more stringent requirements specified.
   1. Install fencing on established boundary lines inside property line.

B. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

C. Post Setting: Set posts in concrete at indicated spacing into firm, undisturbed soil.
   1. Verify that posts are set plumb, aligned, and at correct height and spacing, and hold in position during setting with concrete or mechanical devices.
   2. Concrete Fill: Place concrete around posts to dimensions indicated and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter.
      a. Concealed Concrete: Place top of concrete 2 inches below grade to allow covering with surface material.

D. Terminal Posts: Install terminal end, corner, and gate posts according to ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more. For runs exceeding 500 feet, space pull posts an equal distance between corner or end posts.

E. Line Posts: Space line posts uniformly at 10 feet o.c.

F. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Diagonally brace terminal posts to adjacent line posts with truss rods and turnbuckles. Install braces at end and gate posts and at both sides of corner and pull posts.
   1. Locate horizontal braces at midheight of fabric 72 inches or higher, on fences with top rail, and at 2/3 fabric height on fences without top rail. Install so posts are plumb when diagonal rod is under proper tension.

G. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fence posts. Run rail continuously through line post caps, bending to radius for curved runs and terminating into rail end attached to posts or post caps fabricated to receive rail at terminal posts. Provide expansion couplings as recommended in writing by fencing manufacturer.

H. Intermediate and Bottom Rails: Secure to posts with fittings.

I. Chain-Link Fabric: Apply fabric to outside of enclosing framework. Leave 1-inch bottom clearance between finish grade or surface and bottom selvage unless otherwise indicated. Pull fabric taut and tie to posts, rails, and tension wires. Anchor to framework so fabric remains under tension after pulling force is released.

J. Fasteners: Install nuts for tension bands and carriage bolts on the side of fence opposite the fabric side.

3.4 GATE INSTALLATION

A. Install gates according to manufacturer's written instructions, level, plumb, and secure for full opening without interference. Attach fabric as for fencing. Attach hardware using tamper-resistant or concealed means. Install ground-set items in concrete for anchorage. Adjust hardware for smooth operation.

3.5 GATE-OPERATOR INSTALLATION

A. Install gate operators according to manufacturer's written instructions, aligned and true to fence line and grade.

B. Excavation: Hand-excavate holes for posts, pedestals, and equipment bases/pads, in firm, undisturbed soil to dimensions and depths and at locations according to gate-operator component manufacturer's written instructions and as indicated.

C. Ground electric-powered motors, controls, and other devices according to NFPA 70 and manufacturer's written instructions.

3.6 GROUNDING AND BONDING

A. Comply with "Grounding and Bonding for Electrical Systems."

3.7 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests.

B. Prepare test reports.

3.8 ADJUSTING

A. Gates: Adjust gates to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Confirm that latches and locks engage accurately and securely without forcing or binding.

B. Automatic Gate Operator: Energize circuits to electrical equipment and devices, start units, and verify proper motor rotation and unit operation.

1. Test and adjust operators, controls and safety devices. Replace damaged and malfunctioning controls and equipment.
2. Lubricate operator and related components.

C. Lubricate hardware and other moving parts.

END OF SECTION

SECTION 32 84 00 - PLANTING IRRIGATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Piping.
   2. Manual valves.
   3. Automatic control valves.
   4. Transition fittings.
   5. Dielectric fittings.
   6. Quick couplers.
   7. Drip irrigation specialties.
   8. Controllers.
   9. Boxes for automatic control valves.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Circuit Piping: Downstream from control valves to sprinklers, specialties, and drain valves. Piping is under pressure during flow.

B. Drain Piping: Downstream from circuit-piping drain valves. Piping is not under pressure.

C. ET Controllers: EvapoTranspiration Controllers. Irrigation controllers which use some method of weather based adjustment of irrigation. These adjusting methods include use of historical monthly averages of ET; broadcasting of ET measurements; or use of on-site sensors to track ET.

D. Main Piping: Downstream from point of connection to water distribution piping to, and including, control valves. Piping is under water-distribution-system pressure.

E. Low Voltage: As defined in NFPA 70 for circuits and equipment operating at less than 50 V or for remote-control, signaling power-limited circuits.

1.3 PERFORMANCE REQUIREMENTS

A. Irrigation zone control shall be automatic operation with controller and automatic control valves.

B. Location of Sprinklers and Specialties: Design location is approximate. Make minor adjustments necessary to avoid plantings and obstructions such as signs and light standards. Maintain 100 percent irrigation coverage of areas indicated.

C. Minimum Working Pressures: The following are minimum pressure requirements for piping, valves, and specialties unless otherwise indicated:
   1. Irrigation Main Piping: 200 psig.
   2. Circuit Piping: 200 psig.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.

B. Wiring Diagrams: For power, signal, and control wiring.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Irrigation systems, drawn to scale, on which components are shown and coordinated with each other, using input from Installers of the items involved. Also include adjustments necessary to avoid plantings and obstructions such as signs and light standards.
B. Qualification Data: For qualified Installer.
C. Zoning Chart: Show each irrigation zone and its control valve.
D. Controller Timing Schedule: Indicate timing settings for each automatic controller zone.
E. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For controllers and automatic control valves to include in operation and maintenance manuals.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
   1. Drip-Tube System Tubing: Equal to 10 percent of total length installed for each type and size indicated, but not less than 100 feet.

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers that include a Texas licensed irrigator.
B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver piping with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe-end damage and to prevent entrance of dirt, debris, and moisture.
B. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.10 PROJECT CONDITIONS

A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
   1. Notify Architect no fewer than 2 days in advance of proposed interruption of water service.
   2. Do not proceed with interruption of water service without Architect's written permission.

1.11 WARRANTY

A. Irrigation system shall be guaranteed against defects in materials and workmanship for 1 year after final acceptance. Work covered under the guarantee period will include, but not be limited to, emergency repairs. Repair settling backfilling trenches, and repair replacement of any malfunctioning equipment.
B. Correct all defects and resulting damages within 24 hours after the Owner's notification. If no response to the notification is made within the 24 hour period, the Owner may proceed with repairs and charge the expense incurred with the Work to the Contractor. The Owner may make emergency repairs as necessary without voiding the guarantee.
C. Furnish all materials, labor and equipment for correction at no expense to the Owner.

PART 2 - PRODUCTS

2.1 PIPES, TUBES, AND FITTINGS

A. Comply with requirements in the piping schedule for applications of pipe, tube, and fitting materials, and for joining methods for specific services, service locations, and pipe sizes.
B. Hard Copper Tube: ASTM B 88, Type L, and ASTM B 88, Type M water tube, drawn temper.
C. PVC Pipe: ASTM D 1785, PVC 1120 compound, Schedule 40.
    1. PVC Socket Fittings: ASTM D 2466, Schedule 80.
    2. PVC Threaded Fittings: ASTM D 2464, Schedule 80.
    3. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket ends.
D. PVC Pipe, Pressure Rated: ASTM D 2241, PVC 1120 compound, SDR 21.
    1. PVC Socket Fittings: ASTM D 2467, Schedule 80.
    2. PVC Socket Unions: Construction similar to MSS SP-107, except both headpiece and tailpiece shall be PVC with socket or threaded ends.

2.2 MANUAL VALVES

A. Plastic Ball Valves:
    1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
        a. NIBCO INC.
    2. Description:
        a. Standard: MSS SP-122.
        b. Pressure Rating: 150 psig.
        c. Body Material: PVC.
        d. Type: Union.
        e. End Connections: Socket or threaded.
        f. Port: Full.

B. Bronze Gate Valves:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
      a. NIBCO INC.
   2. Description:
      a. Standard: MSS SP-80, Type 2.
      b. Class: 125.
      c. CWP Rating: 200 psig.
      d. Body Material: ASTM B 62 bronze with integral seat and screw-in bonnet.
      e. Ends: Threaded or solder joint.
      f. Stem: Bronze, nonrising.
      g. Disc: Solid wedge; bronze.
      h. Packing: Asbestos free.
      i. Handwheel: Malleable iron, bronze, or aluminum.

2.3 AUTOMATIC CONTROL VALVES

A. Plastic, Automatic Control Valves:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
      a. Rain Bird Corporation.
   2. Description: Molded-plastic body, normally closed, diaphragm type with manual-flow adjustment, and operated by 24-V ac solenoid.

2.4 TRANSITION FITTINGS

A. General Requirements: Same size as, and with pressure rating at least equal to and with ends compatible with, piping to be joined.
B. Transition Couplings:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
      a. Cascade Waterworks Mfg. Co.
      b. Dresser, Inc.
      c. Ford Meter Box Company, Inc. (The).
      d. JCM Industries, Inc.
      e. Smith-Blair, Inc.
      f. Viking Johnson.
   2. Description: AWWA C219, metal sleeve-type coupling for underground pressure piping.
C. Plastic-to-Metal Transition Fittings:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
      a. Harvel Plastics, Inc.
      b. Spears Manufacturing Company.
   2. Description: PVC 1-piece fitting with manufacturer's Schedule 80 equivalent dimensions; 1 end with threaded brass insert, and 1 solvent-cement-socket or threaded end.

2.5 DIELECTRIC FITTINGS

A. General Requirements: Assembly of copper alloy and ferrous materials or ferrous material body with separating nonconductive insulating material suitable for system fluid, pressure, and temperature.

2.6 SPRINKLERS

A. General Requirements: Designed for uniform coverage over entire spray area indicated at available water pressure.

B. Plastic, Pop-up, Gear-Drive Rotary Sprinklers:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
      a. Hunter Industries Incorporated.
      b. Toro Company (The).
   2. Description:
      a. Body Material: ABS.
      b. Nozzle: ABS.
      c. Retraction Spring: Stainless-steel.
      d. Internal Parts: Corrosion resistant.
   3. Capacities and Characteristics:
      a. Pop-up Height: 4 inches aboveground to nozzle.
      b. Inlet: NPS 1/2 or NPS 3/4.

C. Plastic, Surface, Pop-up Spray Sprinklers:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
      a. Hunter Industries.
      b. Toro.
   2. Description:
      a. Body Material and Flange: ABS.
   3. Capacities and Characteristics:
      a. Pop-up Height: 4 inches.
      b. Nozzle: ABS Rotary.
      c. Inlet: NPS 1/2.

2.7 QUICK COUPLERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by 1 of the following:
   1. Rain Bird Corporation.

B. Description: Factory-fabricated, bronze or brass, 2-piece assembly. Include coupler water-seal valve; removable upper body with spring-loaded or weighted, rubber-covered cap; hose swivel with ASME B1.20.7, 3/4-11.5NH threads for garden hose on outlet; and operating key.
   1. Locking-Top Option: Vandal-resistant locking feature. Include 1 matching key(s).

2.8 DRIP IRRIGATION SPECIALTIES

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
   1. Rain Bird Corporation.

B. Drip Tubes with Direct-Attached Emitters:
   1. Tubing: Flexible PE or PVC with plugged end.
   2. Emitters: Devices to deliver water at approximately 20 psig.
      a. Body Material: PE or vinyl, with flow control.
      b. Mounting: Inserted into tubing at set intervals.
   3. Capacities and Characteristics:
      a. Tubing Size: NPS 1/2.
      b. Emitter Spacing: Insert 12.
      c. Emitter Flow: 1/2 gph.

2.9 CONTROLLERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
   1. Rain Bird Corporation.

B. Description:
   1. Controller Stations for Automatic Control Valves: Each station is variable from approximately 5 to 60 minutes. Include switch for manual or automatic operation of each station.
   2. Exterior Control Enclosures: NEMA 250, Type 4, weatherproof, with locking cover and 2 matching keys; include provision for grounding.
      a. Body Material: Enameled-steel sheet metal.
      b. Mounting: Surface type for wall.
   3. Moisture Sensor: Adjustable from 1 to 7 days, to shut off water flow during rain.
   4. Wiring: UL 493, Type UF multiconductor, with solid-copper conductors; insulated cable; suitable for direct burial.
      a. Feeder-Circuit Cables: No. 12 AWG minimum, between building and controllers.
      b. Low-Voltage, Branch-Circuit Cables: No. 14 AWG minimum, between controllers and automatic control valves; color-coded different from feeder-circuit-cable jacket color; with jackets of different colors for multiple-cable installation in same trench.
      c. Splicing Materials: Manufacturer's packaged kit consisting of insulating, spring-type connector or crimped joint and epoxy resin moisture seal; suitable for direct burial.

2.10 BOXES FOR AUTOMATIC CONTROL VALVES

A. Plastic Boxes:
   1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by 1 of the following:
      a. Carson Industries LLC.
      b. Rainbird Corporation.
   2. Description: Box and cover, with open bottom and openings for piping; designed for installing flush with grade.
      a. Size: As required for valves and service.
      b. Shape: Rectangular.
      c. Sidewall Material: PE.
      d. Cover Material: PE.
         1) Lettering: "IRRIGATION."
B. Drainage Backfill: Cleaned gravel or crushed stone, graded from 3/4-inch minimum to 3 inches maximum.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Section 31 20 00 "Earth Moving."
B. Install warning tape directly above pressure piping, 12 inches below finished grades, except 6 inches below subgrade under pavement and slabs.
C. Provide minimum cover over top of underground piping according to the following:
   1. Irrigation Main Piping: Minimum depth of 18 inches below finished grade, or not less than 12 inches below average local frost depth, whichever is deeper.
   2. Circuit Piping: 12 inches.
   3. Sleeves: 18 inches.

3.2 PREPARATION

A. Set stakes to identify locations of proposed irrigation system. Obtain Architect's approval before excavation.

3.3 PIPING INSTALLATION

A. Location and Arrangement: Drawings indicate location and arrangement of piping systems. Install piping as indicated unless deviations are approved on Coordination Drawings.
B. Install piping at minimum uniform slope of 0.5 percent down toward drain valves.
C. Install piping free of sags and bends.
D. Install groups of pipes parallel to each other, spaced to permit valve servicing.
E. Install fittings for changes in direction and branch connections.
F. Install unions adjacent to valves and to final connections to other components with NPS 2 or smaller pipe connection.
G. Install flanges adjacent to valves and to final connections to other components with NPS 2-1/2 or larger pipe connection.
H. Install underground thermoplastic piping according to ASTM D 2774 and ASTM F 690.
I. Install expansion loops in control-valve boxes for plastic piping.
J. Lay piping on solid subbase, uniformly sloped without humps or depressions.

K. Install ductile-iron piping according to AWWA C600.
L. Install PVC piping in dry weather when temperature is above 40 degrees Fahrenheit. Allow joints to cure at least 24 hours at temperatures above 40 degrees Fahrenheit before testing.
M. Install water regulators with shutoff valve and strainer on inlet and pressure gauge on outlet. Install shutoff valve on outlet. Install aboveground or in control-valve boxes.
N. Install piping in sleeves under parking lots, roadways, and sidewalks.
O. Install sleeves made of Schedule 40 PVC pipe and socket fittings, and solvent-cemented joints.
P. Install transition fittings for plastic-to-metal pipe connections according to the following:
    1. Underground Piping:
        a. NPS 1-1/2 and Smaller: Plastic-to-metal transition fittings.
        b. NPS 2 and Larger: AWWA transition couplings.
    2. Aboveground Piping:
        a. NPS 2 and Smaller: Plastic-to-metal transition fittings.
        b. NPS 2 and Larger: Use dielectric flange kits with 1 plastic flange.
Q. Install dielectric fittings for dissimilar-metal pipe connections according to the following:
    1. Underground Piping:
        a. NPS 2 and Smaller: Dielectric coupling or dielectric nipple.
        b. NPS 2-1/2 and Larger: Prohibited except in control-valve box.
    2. Aboveground Piping:
        a. NPS 2 and Smaller: Dielectric union.
        b. NPS 2-1/2 to NPS 4 : Dielectric flange.
        c. NPS 5 and Larger: Dielectric flange kit.
    3. Piping in Control-Valve Boxes:
        a. NPS 2 and Smaller: Dielectric union.
        b. NPS 2-1/2 to NPS 4 : Dielectric flange.
        c. NPS 5 and Larger: Dielectric flange kit.

3.4 JOINT CONSTRUCTION

A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
    1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
    2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.
D. Flanged Joints: Select rubber gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
E. Ductile-Iron Piping Gasketed Joints: Comply with AWWA C600 and AWWA M41.
F. Copper-Tubing Brazed Joints: Construct joints according to CDA's "Copper Tube Handbook," using copper-phosphorus brazing filler metal.
G. Copper-Tubing Soldered Joints: Apply ASTM B 813 water-flushable flux to tube end unless otherwise indicated. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy (0.20 percent maximum lead content) complying with ASTM B 32.
H. PE Piping Fastener Joints: Join with insert fittings and bands or fasteners according to piping manufacturer's written instructions.

I. PE Piping Heat-Fusion Joints: Clean and dry joining surfaces by wiping with clean cloth or paper towels. Join according to ASTM D 2657.
   1. Plain-End PE Pipe and Fittings: Use butt fusion.
   2. Plain-End PE Pipe and Socket Fittings: Use socket fusion.

J. PVC Piping Solvent-Cemented Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
   1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
   2. PVC Pressure Piping: Join schedule number, ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
   3. PVC Nonpressure Piping: Join according to ASTM D 2855.

3.5 VALVE INSTALLATION

A. Underground Curb Valves: Install in curb-valve casings with tops flush with grade.

B. Underground Iron Gate Valves, Resilient Seat: Comply with AWWA C600 and AWWA M44. Install in valve casing with top flush with grade.
   1. Install valves and PVC pipe with restrained, gasketed joints.

C. Aboveground Valves: Install as components of connected piping system.

D. Throttling Valves: Install in underground piping in boxes for automatic control valves.

E. Drain Valves: Install in underground piping in boxes for automatic control valves.

3.6 DRIP IRRIGATION SPECIALTY INSTALLATION

A. Install freestanding emitters on pipe riser to mounting height indicated.

B. Install manifold emitter systems with tubing to emitters. Plug unused manifold outlets. Install emitters on off-ground supports at height indicated.

C. Install multiple-outlet emitter systems with tubing to outlets. Plug unused emitter outlets. Install outlets on off-ground supports at height indicated.

D. Install drip tubes with direct-attached emitters on ground.

E. Install drip tubes with remote-discharge on ground with outlets on off-ground supports at height indicated.

F. Install off-ground supports of length required for indicated mounted height of device.

G. Install application pressure regulators and filter units in piping near device being protected, and in control-valve boxes.

H. Install air relief valves and vacuum relief valves in piping, and in control-valve boxes.

3.7 AUTOMATIC IRRIGATION-CONTROL SYSTEM INSTALLATION

A. Equipment Mounting: Install interior controllers on wall.
   1. Place and secure anchorage devices. Use setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   2. Install anchor bolts to elevations required for proper attachment to supported equipment.

B. Equipment Mounting: Install exterior freestanding controllers on precast concrete bases.
   1. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   2. Install anchor bolts to elevations required for proper attachment to supported equipment.

C. Install control cable in same trench as irrigation piping and at least 2 inches below piping. Provide conductors of size not smaller than recommended by controller manufacturer. Install cable in separate sleeve under paved areas.

3.8 CONNECTIONS

A. Comply with requirements for piping specified in Section 22 11 00 "Facility Water Distribution" for water supply from exterior water service piping, water meters, protective enclosures, and backflow preventers. Drawings indicate general arrangement of piping, fittings, and specialties.

B. Install piping adjacent to equipment, valves, and devices to allow service and maintenance.

C. Connect wiring between controllers and automatic control valves.

3.9 IDENTIFICATION

A. Identify system components. Comply with requirements for identification specified in Section 23 05 53 "Identification for HVAC and Plumbing Piping and Equipment."

B. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplates and signs on each automatic controller.
   1. Text: In addition to identifying unit, distinguish between multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations.

C. Warning Tapes: Arrange for installation of continuous, underground, detectable warning tapes over underground piping during backfilling of trenches. See Section 31 20 00 "Earth Moving" for warning tapes.

3.10 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections.
   1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.

C. Tests and Inspections:
   1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
   2. Operational Test: After electrical circuitry has been energized, operate controllers and automatic control valves to confirm proper system operation.
   3. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Any irrigation product will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

3.11 STARTUP SERVICE

A. Perform startup service.
   1. Complete installation and startup checks according to manufacturer's written instructions.
   2. Verify that controllers are installed and connected according to the Contract Documents.
   3. Verify that electrical wiring installation complies with manufacturer's submittal.

3.12 ADJUSTING

A. Adjust settings of controllers.
B. Adjust automatic control valves to provide flow rate at rated operating pressure required for each sprinkler circuit.
C. Adjust sprinklers and devices, except those intended to be mounted aboveground, so they will be flush with, or not more than 1/2-inch above, finish grade.

3.13 CLEANING

A. Flush dirt and debris from piping before installing sprinklers and other devices.

3.14 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain automatic control valves and controllers.

3.15 PIPING SCHEDULE

A. Install components having pressure rating equal to or greater than system operating pressure.
B. Piping in control-valve boxes and aboveground may be joined with flanges or unions instead of joints indicated.
C. Underground irrigation main piping, NPS 4 and smaller, shall be the following:
   1. Schedule 40, PVC pipe and socket fittings, and solvent-cemented joints.
   2. SDR 21, PVC, pressure-rated pipe; Schedule 80, PVC socket fittings; and solvent-cemented joints.
D. Underground irrigation main piping, NPS 5 and larger, shall be the following:
   1. SDR 21, PVC, pressure-rated pipe; Schedule 80, PVC socket fittings; and solvent-cemented joints.
E. Circuit piping, NPS 2 and smaller, shall be the following:
   1. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.
F. Circuit piping, NPS 2-1/2 to NPS 4, shall be the following:
   1. Schedule 40, PVC pipe and socket fittings; and solvent-cemented joints.
   2. SDR 21, PVC, pressure-rated pipe; Schedule 40, PVC socket fittings; and solvent-cemented joints.
G. Underground Branches and Offsets at Sprinklers and Devices: Schedule 80, PVC pipe; threaded PVC fittings; and threaded joints.
   1. Option: Plastic swing-joint assemblies, with offsets for flexible joints, manufactured for this application.
H. Risers to Aboveground Sprinklers and Specialties: Schedule 80, PVC pipe and socket fittings; and solvent-cemented joints.

3.16 VALVE SCHEDULE

A. Underground, Shutoff-Duty Valves: Use the following:
   1. NPS 2 and Smaller: PVC ball valve.
   2. NPS 3 and Larger: Bronze gate valve, resilient seated; iron gate valve casing; and operating wrench(es).

END OF SECTION

SECTION 32 91 15 - SOIL PREPARATION (PERFORMANCE SPECIFICATION)

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes planting soils and layered soil assemblies specified according to performance requirements of the mixes.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 32 93 00 "Plants" for placing planting soil for plantings.

1.2 DEFINITIONS

A. AAPFCO: Association of American Plant Food Control Officials.
B. Backfill: The earth used to replace or the act of replacing earth in an excavation. This can be amended or unamended soil as indicated.
C. CEC: Cation exchange capacity.
D. Compost: The product resulting from the controlled biological decomposition of organic material that has been sanitized through the generation of heat and stabilized to the point that it is beneficial to plant growth.
E. Duff Layer: A surface layer of soil, typical of forested areas, that is composed of mostly decayed leaves, twigs, and detritus.
F. Imported Soil: Soil that is transported to Project site for use.
G. Layered Soil Assembly: A designed series of planting soils, layered on each other, that together produce an environment for plant growth.
H. Manufactured Soil: Soil produced by blending soils, sand, stabilized organic soil amendments, and other materials to produce planting soil.
I. NAPT: North American Proficiency Testing Program. An SSSA program to assist soil-, plant-, and water-testing laboratories through interlaboratory sample exchanges and statistical evaluation of analytical data.
J. Organic Matter: The total of organic materials in soil exclusive of undecayed plant and animal tissues, their partial decomposition products, and the soil biomass; also called "humus" or "soil organic matter."
K. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified as specified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
L. RCRA Metals: Hazardous metals identified by the EPA under the Resource Conservation and Recovery Act.
M. SSSA: Soil Science Society of America.
N. Subgrade: Surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.
O. Subsoil: Soil beneath the level of subgrade; soil beneath the topsoil layers of a naturally occurring soil profile, typified by less than 1 percent organic matter and few soil organisms.
P. Surface Soil: Soil that is present at the top layer of the existing soil profile. In undisturbed areas, surface soil is typically called "topsoil;" but in disturbed areas such as urban environments, the surface soil can be subsoil.
Q. USCC: U.S. Composting Council.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include recommendations for application and use.
   2. Include test data substantiating that products comply with requirements.
   3. Include sieve analyses for aggregate materials.
   4. Material Certificates: For each type of imported soil and soil amendment and fertilizer before delivery to the site, according to the following:
      a. Manufacturer's qualified testing agency's certified analysis of standard products.
      b. Analysis of fertilizers, by a qualified testing agency, made according to AAPFCO methods for testing and labeling and according to AAPFCO's SUIP #25.
      c. Analysis of nonstandard materials, by a qualified testing agency, made according to SSSA methods, where applicable.

B. Samples: For each bulk-supplied material, 1-quart volume of each in sealed containers labeled with content, source, and date obtained. Each sample shall be typical of the lot of material to be furnished; provide an accurate representation of composition, color, and texture.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For each testing agency.
B. Preconstruction Test Reports: For preconstruction soil analyses specified in "Preconstruction Testing" Article.
C. Field quality-control reports.

1.6 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction soil analyses on existing, on-site soil.
   1. Notify Architect 7 days in advance of the dates and times when laboratory samples will be taken.

B. Preconstruction Soil Analyses: For each unamended soil type, perform testing on soil samples and furnish soil analysis and a written report containing soil-amendment and fertilizer recommendations by a qualified testing agency performing the testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.
   1. Have testing agency identify and label samples and test reports according to sample collection and labeling requirements.

1.7 SOIL-SAMPLING REQUIREMENTS

A. General: Extract soil samples according to requirements in this article.
B. Sample Collection and Labeling: Have samples taken and labeled by Contractor in presence of Architect under the direction of the testing agency.
   1. Number and Location of Samples: Minimum of 3 representative soil samples from varied locations for each soil to be used or amended for landscaping purposes.

2. Procedures and Depth of Samples: According to USDA-NRCS's "Field Book for Describing and Sampling Soils."
3. Division of Samples: Split each sample into 2, equal parts. Send 1/2 to the testing agency and 1/2 to Owner for its records.
4. Labeling: Label each sample with the date, location keyed to a site plan or other location system, visible soil condition, and sampling depth.

1.8 TESTING REQUIREMENTS

A. General: Perform tests on soil samples according to requirements in this article.
B. Physical Testing:
   1. Soil Texture: Soil-particle, size-distribution analysis by 1 of the following methods according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods:"
      a. Sieving Method: Report sand-gradation percentages for very coarse, coarse, medium, fine, and very fine sand; and fragment-gradation (gravel) percentages for fine, medium, and coarse fragments; according to USDA sand and fragment sizes.
      b. Hydrometer Method: Report percentages of sand, silt, and clay.
   2. Bulk Density: Analysis according to core method of SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
   3. Total Porosity: Calculate using particle density and bulk density according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
   4. Water Retention: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
   5. Saturated Hydraulic Conductivity: According to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods;" at 85 percent compaction according to ASTM D 698 (Standard Proctor).
C. Chemical Testing:
   1. CEC: Analysis by sodium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 3- Chemical Methods."
   2. Clay Mineralogy: Analysis and estimated percentage of expandable clay minerals using CEC by ammonium saturation at pH 7 according to SSSA's "Methods of Soil Analysis - Part 1-Physical and Mineralogical Methods."
   3. Metals Hazardous to Human Health: Test for presence and quantities of RCRA metals including aluminum, arsenic, barium, copper, cadmium, chromium, cobalt, lead, lithium, and vanadium. If RCRA metals are present, include recommendations for corrective action.
   4. Phytotoxicity: Test for plant-available concentrations of phytotoxic minerals including aluminum, arsenic, barium, cadmium, chlorides, chromium, cobalt, copper, lead, lithium, mercury, nickel, selenium, silver, sodium, strontium, tin, titanium, vanadium, and zinc.
D. Fertility Testing: Soil fertility analysis according to standard laboratory protocol of SSSA NAPT SERA-6, including the following:
   1. Percentage of organic matter.
   2. CEC, calcium percent of CEC, and magnesium percent of CEC.
   3. Soil reaction (acidity/alkalinity pH value).
   4. Buffered acidity or alkalinity.
   5. Nitrogen ppm.
   6. Phosphorous ppm.
   7. Potassium ppm.
   8. Manganese ppm.

9. Manganese-availability ppm.
10. Zinc ppm.
11. Zinc availability ppm.
12. Copper ppm.
13. Sodium ppm and sodium absorption ratio.
14. Soluble-salts ppm.
15. Presence and quantities of problem materials including salts and metals cited in the Standard protocol. If such problem materials are present, provide additional recommendations for corrective action.
16. Other deleterious materials, including their characteristics and content of each.

E. Organic-Matter Content: Analysis using loss-by-ignition method according to SSSA's "Methods of Soil Analysis - Part 3-Chemical Methods."

F. Recommendations: Based on the test results, state recommendations for soil treatments and soil amendments to be incorporated to produce satisfactory planting soil suitable for healthy, viable plants indicated. Include, at a minimum, recommendations for nitrogen, phosphorous, and potassium fertilization, and for micronutrients.
1. Fertilizers and Soil Amendment Rates: State recommendations in weight per 1,000 sq. ft. for 6-inch depth of soil.
2. Soil Reaction: State the recommended liming rates for raising pH or sulfur for lowering pH according to the buffered acidity or buffered alkalinity in weight per 1,000 sq. ft. for 6-inch depth of soil.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and compliance with state and Federal laws if applicable.

B. Bulk Materials:
1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.
2. Provide erosion-control measures to prevent erosion or displacement of bulk materials, discharge of soil-bearing water runoff, and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Do not move or handle materials when they are wet or frozen.
4. Accompany each delivery of bulk fertilizers and soil amendments with appropriate certificates.

PART 2 - PRODUCTS

2.1 PLANTING SOILS SPECIFIED ACCORDING TO PERFORMANCE REQUIREMENTS

A. Planting-Soil Type : Existing, on-site surface soil, with the duff layer, if any, retained; and stockpiled on-site; modified to produce viable planting soil. Using preconstruction soil analyses and materials specified in other articles of this Section, amend existing, on-site surface soil to become planting soil complying with the following requirements:
1. Particle Size Distribution by USDA Textures: Classified as sandy loam soil according to USDA textures.
2. Percentage of Organic Matter: Minimum 3 percent by volume.
3. Soil Reaction: pH of 6 to 7.

2.2 INORGANIC SOIL AMENDMENTS

A. Lime: ASTM C 602, agricultural liming material containing a minimum of 80 percent calcium carbonate equivalent and as follows:
   1. Class: T, with a minimum of 99 percent passing through a No. 8 sieve and a minimum of 75 percent passing through a No. 60 sieve.
   2. Class: O, with a minimum of 95 percent passing through No. 8 sieve and a minimum of 55 percent passing through a No. 60 sieve.
   3. Form: Provide lime in form of ground calcitic limestone.

B. Sulfur: Granular, biodegradable, and containing a minimum of 90 percent elemental sulfur, with a minimum of 99 percent passing through a No. 6 (3.35-mm) sieve and a maximum of 10 percent passing through a No. 40 sieve.

C. Iron Sulfate: Granulated ferrous sulfate containing a minimum of 20 percent iron and 10 percent sulfur.

D. Agricultural Gypsum: Minimum 90 percent calcium sulfate, finely ground with 90 percent passing through a No. 50 sieve.

2.3 ORGANIC SOIL AMENDMENTS

A. Compost: Well-composted, stable, and weed-free organic matter produced by composting feedstock, and bearing USCC's "Seal of Testing Assurance," and as follows:
   1. Feedstock: May include animal waste.
   2. Reaction: pH of 5.5 to 8.
   3. Soluble-Salt Concentration: Less than 4 dS/m.
   4. Moisture Content: 35 to 55 percent by weight.
   5. Organic-Matter Content: 30 to 40 percent of dry weight.
   6. Particle Size: Minimum of 98 percent passing through a 1/2-inch sieve.

2.4 FERTILIZERS

A. Superphosphate: Commercial, phosphate mixture, soluble; a minimum of 20 percent available phosphoric acid.

B. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
   1. Composition: 1 lb/1,000 sq. ft. of actual nitrogen, 4 percent phosphorous, and 2 percent potassium, by weight.
   2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

C. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
   1. Composition: 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
   2. Composition: Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified testing agency.

D. Chelated Iron: Commercial-grade FeEDDHA for dicots and woody plants, and commercial-grade FeDTPA for ornamental grasses and monocots.

PART 3 - EXECUTION

3.1 GENERAL

A. Place planting soil and fertilizers according to requirements in other Specification Sections.
B. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in planting soil.
C. Proceed with placement only after unsatisfactory conditions have been corrected.

3.2 PREPARATION OF UNAMENDED, ON-SITE SOIL BEFORE AMENDING

A. Excavation: Excavate soil from designated area(s) to a depth of 6 inches and stockpile until amended.
B. Unacceptable Materials: Clean soil of concrete slurry, concrete layers or chunks, cement, plaster, building debris, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, acid, and other extraneous materials that are harmful to plant growth.
C. Unsuitable Materials: Clean soil to contain a combined maximum of 8 percent by dry weight of stones, roots, plants, sod, clay lumps, and pockets of coarse sand.
D. Screening: Pass unamended soil through a 2-inch sieve to remove large materials.

3.3 PLACING AND MIXING PLANTING SOIL OVER EXPOSED SUBGRADE

A. General: Apply and mix unamended soil with amendments on-site to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
B. Subgrade Preparation: Till subgrade to a minimum depth of 6 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
    1. Apply, add soil amendments, and mix approximately 1/2 the thickness of unamended soil over prepared, loosened subgrade according to "Mixing" Paragraph below. Mix thoroughly into top 4 inches of subgrade. Spread remainder of planting soil.
C. Mixing: Spread unamended soil to total depth of 6 inches, but not less than required to meet finish grades after mixing with amendments and natural settlement. Do not spread if soil or subgrade is frozen, muddy, or excessively wet.
    1. Amendments: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them with unamended soil to produce planting soil.
        a. Mix lime sulfur with dry soil before mixing fertilizer.
        b. Mix fertilizer with planting soil no more than 7 days before planting.
    2. Lifts: Apply and mix unamended soil and amendments in lifts not exceeding 8 inches in loose depth for material compacted by compaction equipment, and not more than 6 inches in loose depth for material compacted by hand-operated tampers.
D. Compaction: Compact each blended lift of planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 except where a different compaction value is indicated on Drawings.
E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.4 BLENDING PLANTING SOIL IN PLACE

A. General: Mix amendments with in-place, unamended soil to produce required planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
B. Preparation: Till unamended, existing soil in planting areas to a minimum depth of 6 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter and legally dispose of them off Owner's property.
C. Mixing: Apply soil amendments, except compost, and fertilizer, if required, evenly on surface, and thoroughly blend them into full depth of unamended, in-place soil to produce planting soil.
    1. Mix lime sulfur with dry soil before mixing fertilizer.
    2. Mix fertilizer with planting soil no more than 7 days before planting.
D. Compaction: Compact blended planting soil to 75 to 82 percent of maximum Standard Proctor density according to ASTM D 698 except where a different compaction value is indicated on Drawings.
E. Finish Grading: Grade planting soil to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.5 APPLYING COMPOST TO SURFACE OF PLANTING SOIL

A. Application: Apply compost component of planting-soil mix to surface of in-place planting soil. Do not apply materials or till if existing soil or subgrade is frozen, muddy, or excessively wet.
B. Finish Grading: Grade surface to a smooth, uniform surface plane with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades.

3.6 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
B. Perform the following tests:
    1. Compaction: Test planting-soil compaction after placing each lift and at completion using a densitometer or soil-compaction meter calibrated to a reference test value based on laboratory testing according to ASTM D 698. Space tests at no less than 1 for each 1,000 sq. ft. of in-place soil or part thereof.
    2. Performance Testing: For each amended planting-soil type, demonstrating compliance with specified performance requirements. Perform testing according to "Soil-Sampling Requirements" and "Testing Requirements" articles.
C. Soil will be considered defective if it does not pass tests and inspections.
D. Prepare test and inspection reports.
E. Label each sample and test report with the date, location keyed to a site plan or other location system, visible conditions when and where sample was taken, and sampling depth.

3.7 PROTECTION

A. Protect areas of in-place soil from additional compaction, disturbance, and contamination. Prohibit the following practices within these areas except as required to perform planting operations:
    1. Storage of construction materials, debris, or excavated material.

2. Parking vehicles or equipment.
3. Vehicle traffic.
4. Foot traffic.
5. Erection of sheds or structures.
6. Impoundment of water.
7. Excavation or other digging unless otherwise indicated.

B. If planting soil or subgrade is overcompacted, disturbed, or contaminated by foreign or deleterious materials or liquids, remove the planting soil and contamination; restore the subgrade as directed by Architect and replace contaminated planting soil with new planting soil.

3.8 CLEANING

A. Protect areas adjacent to planting-soil preparation and placement areas from contamination. Keep adjacent paving and construction clean and work area in an orderly condition.

B. Remove surplus soil and waste material including excess subsoil, unsuitable materials, trash, and debris and legally dispose of them off Owner's property unless otherwise indicated.

1. Dispose of excess subsoil and unsuitable materials on-site where directed by Owner.

END OF SECTION

SECTION 32 93 00 - PLANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Plants.
   2. Tree stabilization.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

1.2 DEFINITIONS

A. Balled and Burlapped Stock: Plants dug with firm, natural balls of earth in which they were grown, with a ball size not less than diameter and depth recommended by ANSI Z60.1 for type and size of plant required; wrapped with burlap, tied, rigidly supported, and drum laced with twine with the root flare visible at the surface of the ball as recommended by ANSI Z60.1.
B. Container-Grown Stock: Healthy, vigorous, well-rooted plants grown in a container, with a well-established root system reaching sides of container and maintaining a firm ball when removed from container. Container shall be rigid enough to hold ball shape and protect root mass during shipping and be sized according to ANSI Z60.1 for type and size of plant required.
C. Finish Grade: Elevation of finished surface of planting soil.
D. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant. Some sources classify herbicides separately from pesticides.
E. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
F. Planting Area: Areas to be planted.
G. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth. See Section 32 91 15 "Soil Preparation (Performance Specification)" for drawing designations for planting soils.
H. Plant; Plants; Plant Material: These terms refer to vegetation in general, including trees, shrubs, vines, ground covers, ornamental grasses, bulbs, corms, tubers, or herbaceous vegetation.
I. Root Flare: Also called "trunk flare." The area at the base of the plant's stem or trunk where the stem or trunk broadens to form roots; the area of transition between the root system and the stem or trunk.
J. Stem Girdling Roots: Roots that encircle the stems (trunks) of trees below the soil surface.
K. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.3 COORDINATION

A. Coordination with Turf Areas (Lawns): Plant trees, shrubs, and other plants after finish grades are established and before planting turf areas unless otherwise indicated.
   1. When planting trees, shrubs, and other plants after planting turf areas, protect turf areas, and promptly repair damage caused by planting operations.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Plant Materials: Include quantities, sizes, quality, and sources for plant materials.
   2. Plant Photographs: Include color photographs in digital format of each required species and size of plant material as it will be furnished to Project. Take photographs from an angle depicting true size and condition of the typical plant to be furnished. Include a scale rod or other measuring device in each photograph. For species where more than 20 plants are required, include a minimum of 3 photographs showing the average plant, the best quality plant, and the worst quality plant to be furnished. Identify each photograph with the full scientific name of the plant, plant size, and name of the growing nursery.

B. Samples for Verification: For each of the following:
   1. Trees and Shrubs: 3 samples of each variety and size. Maintain approved samples on-site as a standard for comparison.
   2. Organic Mulch: 1-pint volume of each organic mulch required; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch. Each sample shall be typical of the lot of material to be furnished; provide an accurate representation of color, texture, and organic makeup.
   3. Mineral Mulch: 2 lb of each mineral mulch required, in sealed plastic bags labeled with source of mulch. Sample shall be typical of the lot of material to be delivered and installed on-site; provide an accurate indication of color, texture, and makeup of the material.
   4. Weed Control Barrier: 12 by 12 inches.
   5. Proprietary Root-Ball-Stabilization Device: 1 unit.
   6. Slow-Release, Tree-Watering Device: 1 unit of each size required.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For landscape Installer. Include list of similar projects completed by Installer demonstrating Installer's capabilities and experience. Include Project names, addresses, and year completed, and include names and addresses of Owners' contact persons.

B. Product Certificates: For each type of manufactured product, from manufacturer, and complying with the following:
   1. Manufacturer's certified analysis of standard products.
   2. Analysis of other materials by a recognized laboratory made according to methods established by the Association of Official Analytical Chemists, where applicable.

C. Pesticides and Herbicides: Product label and manufacturer's application instructions specific to Project.

D. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: Recommended procedures to be established by Owner for maintenance of plants during a calendar year. Submit before expiration of required maintenance periods.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified landscape installer whose Work has resulted in successful establishment of plants.
   1. Professional Membership: Installer shall be a member in good standing of either the Professional Landcare Network or the American Nursery and Landscape Association.
   2. Experience: 5 years' experience in landscape installation in addition to requirements in Section 01 40 00 "Quality Requirements."
   3. Installer's Field Supervision: Require Installer to maintain an experienced full-time supervisor on Project site when Work is in progress.
   4. Personnel Certifications: Installer's field supervisor shall have certification in 1 of the following categories from the Professional Landcare Network:
      a. Landscape Industry Certified Technician - Exterior.
      b. Landscape Industry Certified Interior.
      c. Landscape Industry Certified Horticultural Technician.
   5. Pesticide Applicator: State licensed, commercial.
B. Provide quality, size, genus, species, and variety of plants indicated, complying with applicable requirements in ANSI Z60.1.
C. Measurements: Measure according to ANSI Z60.1. Do not prune to obtain required sizes.
   1. Trees and Shrubs: Measure with branches and trunks or canes in their normal position. Take height measurements from or near the top of the root flare for field-grown stock and container-grown stock. Measure main body of tree or shrub for height and spread; do not measure branches or roots tip to tip. Take caliper measurements 6 inches above the root flare for trees up to 4-inch caliper size, and 12 inches above the root flare for larger sizes.
   2. Other Plants: Measure with stems, petioles, and foliage in their normal position.
D. Plant Material Observation: Architect may observe plant material either at place of growth or at site before planting for compliance with requirements for genus, species, variety, cultivar, size, and quality. Architect may also observe trees and shrubs further for size and condition of balls and root systems, pests, disease symptoms, injuries, and latent defects and may reject unsatisfactory or defective material at any time during progress of work. Remove rejected trees or shrubs immediately from Project site.
   1. Notify Architect of sources of planting materials 7 days in advance of delivery to site.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws if applicable.
B. Bulk Materials:
   1. Do not dump or store bulk materials near structures, utilities, walkways and pavements, or on existing turf areas or plants.

2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
3. Accompany each delivery of bulk materials with appropriate certificates.

C. Deliver bare-root stock plants within 24 hours of digging. Immediately after digging up bare-root stock, pack root system in wet straw, hay, or other suitable material to keep root system moist until planting. Transport in covered, temperature-controlled vehicles, and keep plants cool and protected from sun and wind at all times.

D. Do not prune trees and shrubs before delivery. Protect bark, branches, and root systems from sun scald, drying, wind burn, sweating, whipping, and other handling and tying damage. Do not bend or bind-tie trees or shrubs in such a manner as to destroy their natural shape. Provide protective covering of plants during shipping and delivery. Do not drop plants during delivery and handling.

E. Handle planting stock by root ball.

F. Store bulbs, corms, and tubers in a dry place at 60 to 65 degrees Fahrenheit until planting.

G. Apply antidesiccant to trees and shrubs using power spray to provide an adequate film over trunks (before wrapping), branches, stems, twigs, and foliage to protect during digging, handling, and transportation.
1. If deciduous trees or shrubs are moved in full leaf, spray with antidesiccant at nursery before moving and again 2 weeks after planting.

H. Wrap trees and shrubs with burlap fabric over trunks, branches, stems, twigs, and foliage to protect from wind and other damage during digging, handling, and transportation.

I. Deliver plants after preparations for planting have been completed, and install immediately. If planting is delayed more than 6 hours after delivery, set plants and trees in their appropriate aspect (sun, filtered sun, or shade), protect from weather and mechanical damage, and keep roots moist.
1. Set balled stock on ground and cover ball with soil, peat moss, sawdust, or other acceptable material.
2. Do not remove container-grown stock from containers before time of planting.
3. Water root systems of plants stored on-site deeply and thoroughly with a fine-mist spray. Water as often as necessary to maintain root systems in a moist, but not overly wet condition.

1.9 FIELD CONDITIONS

A. Field Measurements: Verify actual grade elevations, service and utility locations, irrigation system components, and dimensions of plantings and construction contiguous with new plantings by field measurements before proceeding with planting work.

B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions and warranty requirements.

1.10 WARRANTY

A. Special Warranty: Installer agrees to repair or replace plantings and accessories that fail in materials, workmanship, or growth within specified warranty period.
1. Failures include, but are not limited to, the following:
a. Death and unsatisfactory growth, except for defects resulting from abuse, lack of adequate maintenance, or neglect by Owner.
b. Structural failures including plantings falling or blowing over.
c. Faulty performance of tree stabilization.

2. Warranty Periods: From date of Substantial Completion.
   a. Trees, Shrubs, Vines, and Ornamental Grasses: 12 months.
3. Include the following remedial actions as a minimum:
   a. Immediately remove dead plants and replace unless required to plant in the succeeding planting season.
   b. Replace plants that are more than 25 percent dead or in an unhealthy condition at end of warranty period.
   c. A limit of 1 replacement of each plant is required except for losses or replacements due to failure to comply with requirements.
   d. Provide extended warranty for period equal to original warranty period, for replaced plant material.

PART 2 - PRODUCTS

2.1 PLANT MATERIAL

A. General: Furnish nursery-grown plants true to genus, species, variety, cultivar, stem form, shearing, and other features indicated in Plant List, Plant Schedule, or Plant Legend indicated on Drawings and complying with ANSI Z60.1; and with healthy root systems developed by transplanting or root pruning. Provide well-shaped, fully branched, healthy, vigorous stock, densely foliated when in leaf and free of disease, pests, eggs, larvae, and defects such as knots, sun scald, injuries, abrasions, and disfigurement.
   1. Trees with damaged, crooked, or multiple leaders; tight vertical branches where bark is squeezed between 2 branches or between branch and trunk ("included bark"); crossing trunks; cut-off limbs more than 3/4-inch in diameter; or with stem girdling roots are unacceptable.
   2. Collected Stock: Do not use plants harvested from the wild, from native stands, from an established landscape planting, or not grown in a nursery unless otherwise indicated.

B. Provide plants of sizes, grades, and ball or container sizes complying with ANSI Z60.1 for types and form of plants required. Plants of a larger size may be used if acceptable to Architect, with a proportionate increase in size of roots or balls.

C. Root-Ball Depth: Furnish trees and shrubs with root balls measured from top of root ball, which begins at root flare according to ANSI Z60.1. Root flare shall be visible before planting.

D. Labeling: Label each plant of each variety, size, and caliper with a securely attached, waterproof tag bearing legible designation of common name and full scientific name, including genus and species. Include nomenclature for hybrid, variety, or cultivar, if applicable for the plant.

E. If formal arrangements or consecutive order of plants is indicated on Drawings, select stock for uniform height and spread, and number the labels to assure symmetry in planting.

F. Provide healthy, disease-free plants of species and variety shown or listed, with well-established root systems reaching to sides of the container to maintain a firm ball, but not with excessive root growth encircling the container. Provide only plants that are acclimated to outdoor conditions before delivery.

2.2 FERTILIZERS

A. Planting Tablets: Tightly compressed chip-type, long-lasting, slow-release, commercial-grade planting fertilizer in tablet form. Tablets shall break down with soil bacteria, converting nutrients into a form that can be absorbed by plant roots.

1. Size: 5-gram tablets.
2. Nutrient Composition: 20 percent nitrogen, 10 percent phosphorous, and 5 percent potassium, by weight plus micronutrients.

2.3 MULCHES

A. Organic Mulch: Free from deleterious materials and suitable as a top dressing of trees and shrubs, consisting of 1 of the following:
   1. Type: Shredded hardwood.
   2. Size Range: 3 inches maximum, 1/2-inch minimum.
   3. Color: Natural.

B. Mineral Mulch: Hard, durable stone, washed free of loam, sand, clay, and other foreign substances, of the following type, size range, and color:
   1. Type: Crushed stone or gravel.
   2. Size Range: 3/4-inch maximum, 1/4-inch minimum.
   3. Color: Uniform tan-beige color range acceptable to Architect.

2.4 WEED-CONTROL BARRIERS

A. Nonwoven Geotextile Filter Fabric: Polypropylene or polyester fabric, 3oz./sq. yd. minimum, composed of fibers formed into a stable network so that fibers retain their relative position. Fabric shall be inert to biological degradation and resist naturally encountered chemicals, alkalis, and acids.

2.5 PESTICIDES

A. General: Pesticide registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

B. Pre-Emergent Herbicide (Selective and Nonselective): Effective for controlling the germination or growth of weeds within planted areas at the soil level directly below the mulch layer.

C. Post-Emergent Herbicide (Selective and Nonselective): Effective for controlling weed growth that has already germinated.

2.6 TREE-STABILIZATION MATERIALS

A. Root-Ball Stabilization Materials:
   1. Proprietary Root-Ball Stabilization Devices: Proprietary at- or below-grade stabilization systems to secure each new planting by root ball and that do not encircle the trunk; sized according to manufacturer's written recommendations unless otherwise indicated.
      a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
         1) Tree Stake Solutions LLC; Root Anchor.

2.7 MISCELLANEOUS PRODUCTS

A. Planter Filter Fabric: Nonwoven geotextile manufactured for separation applications and made of polypropylene, polyolefin, or polyester fibers or combination of them.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive plants, with Installer present, for compliance with requirements and conditions affecting installation and performance of the Work.
   1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
   2. Verify that plants and vehicles loaded with plants can travel to planting locations with adequate overhead clearance.
   3. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
   4. Uniformly moisten excessively dry soil that is not workable or which is dusty.

B. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities and turf areas and existing plants from damage caused by planting operations.

B. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Lay out individual tree and shrub locations and areas for multiple plantings. Stake locations, outline areas, adjust locations when requested, and obtain Architect's acceptance of layout before excavating or planting. Make minor adjustments as required.

D. Lay out plants at locations directed by Architect. Stake locations of individual trees and shrubs and outline areas for multiple plantings.

3.3 PLANTING AREA ESTABLISHMENT

A. General: Prepare planting area for soil placement and mix planting soil according to Section 32 91 15 "Soil Preparation (Performance Specification)."

B. Placing Planting Soil: Blend planting soil in place.

C. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.

3.4 EXCAVATION FOR TREES AND SHRUBS

A. Planting Pits and Trenches: Excavate circular planting pits.
   1. Excavate planting pits with sides sloping inward at a 45 degree angle. Excavations with vertical sides are unacceptable. Trim perimeter of bottom leaving center area of bottom raised slightly to support root ball and assist in drainage away from center. Do not further disturb base. Ensure that root ball will sit on undisturbed base soil to prevent settling. Scarify sides of planting pit smeared or smoothed during excavation.

2. Excavate approximately 3 times as wide as ball diameter for balled and burlapped container-grown stock.
3. Excavate at least 12 inches wider than root spread and deep enough to accommodate vertical roots for bare-root stock.
4. Do not excavate deeper than depth of the root ball, measured from the root flare to the bottom of the root ball.
5. If area under the plant was initially dug too deep, add soil to raise it to the correct level and thoroughly tamp the added soil to prevent settling.
6. Maintain angles of repose of adjacent materials to ensure stability. Do not excavate subgrades of adjacent paving, structures, hardscapes, or other new or existing improvements.
7. Maintain supervision of excavations during working hours.
8. Keep excavations covered or otherwise protected when unattended by Installer's personnel.
9. If drain tile is indicated on Drawings or required under planting areas, excavate to top of porous backfill over tile.

B. Backfill Soil: Subsoil and topsoil removed from excavations may be used as backfill soil unless otherwise indicated.

C. Obstructions: Notify Architect if unexpected rock or obstructions detrimental to trees or shrubs are encountered in excavations.
1. Hardpan Layer: Drill 6-inch diameter holes, 24 inches apart, into free-draining strata or to a depth of 10 feet, whichever is less, and backfill with free-draining material.

D. Drainage: Notify Architect if subsoil conditions evidence unexpected water seepage or retention in tree or shrub planting pits.

E. Fill excavations with water and allow to percolate away before positioning trees and shrubs.

3.5 TREE, SHRUB, AND VINE PLANTING

A. Inspection: At time of planting, verify that root flare is visible at top of root ball according to ANSI Z60.1. If root flare is not visible, remove soil in a level manner from the root ball to where the top-most root emerges from the trunk. After soil removal to expose the root flare, verify that root ball still meets size requirements.

B. Roots: Remove stem girdling roots and kinked roots. Remove injured roots by cutting cleanly; do not break.

C. Balled and Burlapped Stock: Set each plant plumb and in center of planting pit or trench with root flare 1-inch above adjacent finish grades.
1. Backfill: Planting soil. For trees, use excavated soil for backfill.
2. After placing some backfill around root ball to stabilize plant, carefully cut and remove burlap, rope, and wire baskets from tops of root balls and from sides, but do not remove from under root balls. Remove pallets, if any, before setting. Do not use planting stock if root ball is cracked or broken before or during planting operation.
3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately 1/2 filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
4. Place planting tablets equally distributed around each planting pit when pit is approximately 1/2 filled. Place tablets beside the root ball about 1-inch from root tips; do not place tablets in bottom of the hole.
   a. Quantity: As indicated on Drawings.
5. Continue backfilling process. Water again after placing and tamping final layer of soil.

D. Container-Grown Stock: Set each plant plumb and in center of planting pit or trench with root flare 1-inch above adjacent finish grades.
   1. Backfill: Planting soil. For trees, use excavated soil for backfill.
   2. Carefully remove root ball from container without damaging root ball or plant.
   3. Backfill around root ball in layers, tamping to settle soil and eliminate voids and air pockets. When planting pit is approximately 1/2 filled, water thoroughly before placing remainder of backfill. Repeat watering until no more water is absorbed.
   4. Place planting tablets equally distributed around each planting pit when pit is approximately 1/2 filled. Place tablets beside the root ball about 1-inch from root tips; do not place tablets in bottom of the hole.
      a. Quantity: As indicated on Drawings.
   5. Continue backfilling process. Water again after placing and tamping final layer of soil.

E. Slopes: When planting on slopes, set the plant so the root flare on the uphill side is flush with the surrounding soil on the slope; the edge of the root ball on the downhill side will be above the surrounding soil. Apply enough soil to cover the downhill side of the root ball.

3.6 MECHANIZED TREE-SPADE PLANTING

A. Trees may be planted with an approved mechanized tree spade at the designated locations. Do not use tree spade to move trees larger than the maximum size allowed for a similar field-grown, balled-and-burlapped root-ball diameter according to ANSI Z60.1, or larger than manufacturer's maximum size recommendation for the tree spade being used, whichever is smaller.

B. Use the same tree spade to excavate the planting hole as will be used to extract and transport the tree.

C. When extracting the tree, center the trunk within the tree spade and move tree with a solid ball of earth.

D. Cut exposed roots cleanly during transplanting operations.

E. Plant trees following procedures in "Tree, Shrub, and Vine Planting" Article.

F. Where possible, orient the tree in the same direction as in its original location.

3.7 TREE, SHRUB, AND VINE PRUNING

A. Do not apply pruning paint to wounds.

3.8 TREE STABILIZATION

A. Root-Ball Stabilization: Install at- or below-grade stabilization system to secure each new planting by the root ball unless otherwise indicated.
   1. Proprietary Root-Ball Stabilization Device: Install root-ball stabilization system sized and positioned as recommended by manufacturer unless otherwise indicated and according to manufacturer's written instructions.

3.9 PLANTING AREA MULCHING

A. Install weed-control barriers before mulching according to manufacturer's written instructions. Completely cover area to be mulched, overlapping edges a minimum of 6 inches and secure seams with galvanized pins.

B. Mulch backfilled surfaces of planting areas and other areas indicated.

1. Trees in Turf Areas: Apply organic mulch ring of 3-inch average thickness, with 36-inch radius around trunks or stems. Do not place mulch within 3 inches of trunks or stems.
2. Mineral Mulch in Planting Areas: Apply 3-inch average thickness of mineral mulch over whole surface of planting area, and finish level with adjacent finish grades. Do not place mulch within 3 inches of trunks or stems.

3.10 PLANT MAINTENANCE

A. Maintain plantings by pruning, cultivating, watering, weeding, fertilizing, mulching, restoring planting saucers, adjusting and repairing tree-stabilization devices, resetting to proper grades or vertical position, and performing other operations as required to establish healthy, viable plantings.
B. Fill in, as necessary, soil subsidence that may occur because of settling or other processes. Replace mulch materials damaged or lost in areas of subsidence.
C. Apply treatments as required to keep plant materials, planted areas, and soils free of pests and pathogens or disease. Use integrated pest management practices when possible to minimize use of pesticides and reduce hazards. Treatments include physical controls such as hosing off foliage, mechanical controls such as traps, and biological control agents.

3.11 PESTICIDE APPLICATION

A. Apply pesticides and other chemical products and biological control agents according to authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
B. Pre-Emergent Herbicides (Selective and Nonselective): Apply to tree, shrub, and ground-cover areas according to manufacturer's written recommendations. Do not apply to seeded areas.
C. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.12 REPAIR AND REPLACEMENT

A. General: Repair or replace existing or new trees and other plants that are damaged by construction operations, in a manner approved by Architect.
   1. Submit details of proposed pruning and repairs.
   2. Perform repairs of damaged trunks, branches, and roots within 24 hours, if approved.
   3. Replace trees and other plants that cannot be repaired and restored to full-growth status, as determined by Architect.
B. Remove and replace trees that are more than 25 percent dead or in an unhealthy condition or are damaged during construction operations that Architect determines are incapable of restoring to normal growth pattern.
   1. Provide new trees of same size as those being replaced for each tree of 6 inches or smaller in caliper size.
   2. Provide 2 new tree(s) of 6-inch caliper size for each tree being replaced that measures more than 6 inches in caliper size.
   3. Species of Replacement Trees: Species selected by Architect.

3.13 CLEANING AND PROTECTION

A. During planting, keep adjacent paving and construction clean and work area in an orderly condition. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
B. Remove surplus soil and waste material including excess subsoil, unsuitable soil, trash, and debris and legally dispose of them off Owner's property.
C. Protect plants from damage due to landscape operations and operations of other contractors and trades. Maintain protection during installation and maintenance periods. Treat, repair, or replace damaged plantings.
D. After installation and before Substantial Completion, remove nursery tags, nursery stakes, tie tape, labels, wire, burlap, and other debris from plant material, planting areas, and Project site.
E. At time of Substantial Completion, verify that tree-watering devices are in good working order and leave them in place. Replace improperly functioning devices.

3.14 MAINTENANCE SERVICE

A. Maintenance Service for Trees and Shrubs: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
   1. Maintenance Period: 12 months from date of Substantial Completion.
B. Maintenance Service for Ground Cover and Other Plants: Provide maintenance by skilled employees of landscape Installer. Maintain as required in "Plant Maintenance" Article. Begin maintenance immediately after plants are installed and continue until plantings are acceptably healthy and well established, but for not less than maintenance period below:
   1. Maintenance Period: 6 months from date of Substantial Completion.

END OF SECTION

SECTION 33 10 00 - WATER UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Pipe and fittings for site water line including domestic water line and fire protection water lines from 5 feet outside the building to public water mains.
   2. Valves and fire hydrants.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 31 23 33 "Trenching and Backfilling."
   3. Section 33 13 00 "Disinfecting of Water Utility Distribution."

1.2 REFERENCES

A. ASME B16.18 - Cast Copper Alloy Solder Joint Pressure Fittings.
B. ASME B16.22 - Wrought Copper and Copper Alloy Solder Joint Pressure Fittings.
C. ASTM B 88 - Seamless Copper Water Tube.
D. ASTM D 1557 - Test Methods for Moisture-Density Relations of Soils and Soil-Aggregate Mixtures Using 10 lb. Rammer and 18-inch Drop.
E. ASTM D 1785 - Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120.
F. ASTM D 2241 - Poly (Vinyl Chloride) (PVC) Plastic Pipe (SDR-PR).
G. ASTM D 2466 - Poly (Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40.
H. ASTM D 2855 - Making Solvent-Cemented Joints with Poly (Vinyl Chloride) (PVC) Pipe and fittings.
I. ASTM D 2922 - Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
J. ASTM D 3017 - Test Methods for Moisture Content of Soil and Soil-Aggregate Mixtures.
K. ASTM D 3139 - Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals.
L. ASTM D 3035 - Polyethylene (PE) Plastic Pipe (SDR-PR) Based on Controlled Outside Diameter.
M. AWS A5.8 - Brazing Filler Metal.
N. AWWA C104 - Cement-Mortar Lining for Ductile-Iron Pipe and Fittings for Water.
O. AWWA C105 - Polyethylene Encasement for Ductile Iron Piping for Water and Other liquids.
P. AWWA C111- Rubber-Gasket Joints for Ductile Iron and Grey-Iron Pressure Pipe and Fittings.
Q. AWWA C151 - Ductile-Iron Pipe, Centrifugally Cast in Metal Molds or Sand-Lined Molds, for Water or Other Liquids.
R. AWWA C500 - Gate Valves, 3 through 48 in NPS, for Water and Sewage Systems.
S. AWWA C502 - Dry Barrel Fire Hydrants.
T. AWWA C504 - Rubber Seated Butterfly Valves.
U. AWWA C508 - Swing-Check Valves for Waterworks Service, 2-inch through 24-inch NPS.
V. AWWA C509 - Resilient Seated Gate Valves 3-inch through 12-inch NPS, for Water and Sewage Systems.
W. AWWA C600 - Installation of Ductile-Iron Water Mains and Appurtenances.
X. AWWA C606 - Grooved and Shouldered Type Joints.

Y. AWWA C900 - Standard for Polyvinyl Chloride (PVC) Pressure Pipe, 4-inch through 12-inch, for Water.
Z. AWWA C901 - Polyethylene (PE) Pressure Pipe, Tubing, and Fittings, 2-inch through 3-inch, for Water
AA. UL 246 - Hydrants for Fire - Protection Service.

1.3 SUBMITTALS FOR REVIEW

A. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

1.4 SUBMITTALS AT PROJECT CLOSEOUT

A. Record actual locations of piping mains, valves, connections, and invert elevations.
B. Identify and describe unexpected variations to subsoil conditions or discovery of uncharted utilities.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with standards of local municipality for public items in right-of-way.
B. Valves: Manufacturer's name and pressure rating marked on valve body.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site in such a manner as to prevent damage.
B. Deliver and store valves in shipping containers with labeling in place.

PART 2 - PRODUCTS

2.1 PIPE MATERIALS

A. Contractor shall verify with local municipality regarding allowed fire line material types. Types and classes of pipe to be used at the various locations shall be as scheduled on the Proposal and the Drawings, and shall be as specified below:

PIPE SIZE	TYPE PIPE
1- to 2-inch Diameter	Seamless Tube Type K Copper, ASTM B 88 or Polyethylene Plastic Tubing, ASTM D 2737, 160 psi
4-inch to 12-inch	PVC Pipe, AWWA C-900, or Ductile Iron Pipe, Diameter Pressure Rating 150 psi
16-Inch Diameter	Ductile Iron Pipe, Pressure Rating 150 psi

B. The pipe shall be of the best quality in materials and workmanship. All pipe shall be subjected to thorough inspection at the job site before being placed in the trench. Any piece found to be defective shall be rejected and removed from the Project.

C. Ductile Iron Pipe:
   1. All ductile iron pipe shall be new and manufactured in the U.S. in accordance with current AWWA C 151.
   2. Pipe shall be designed for a minimum working pressure of 150 pounds per square inch. Thickness of ductile iron pipe shall be designed in accordance with Specification AWWA C 150, based on 150 pounds per square inch, working pressure for 10 feet of cover and laying condition Type 2.
   3. Standard Bell and Spigot, Mechanical Joint (Type III), or boltless single gasketed joint pipe similar to that known as "Bell-Tite," "Fastite," "Tyton," or approved equal, may be used for the line and at other specific locations as approved by Architect. Flange joints where noted shall be 150 psi rated.
   4. Ductile iron pipe shall be asphalt coated outside and cement lined, and seal coated inside in accordance with AWWA C 104 (ANSI A21.4). Lining shall be standard cement lining.

D. PVC Pipe:
   1. PVC pipe shall conform to the requirements of AWWA C900 pressure pipe, 4-inch through 12-inch for water distribution pressure class 150, DR18. PVC pipe shall be of the rubber gasketed push on joint type and shall meet the requirements of ASTM D 1784 and ASTM D 2241.
   2. All PVC pipe shall be approved by the National Sanitation Foundation Testing Laboratories, or other accredited laboratory for use in the transportation of potable water and shall bear the seal of approval of the National Sanitation Foundation Testing Laboratories (NSF).
   3. When non-metallic pipelines are to be installed, Contractor shall furnish and lay, above the pipeline, a continuous strip of metallic identification tape.
   4. Tape Material:
      a. The metallic identification tape shall be at least 2 inches in width and shall be of corrosive resistant metal of sufficient thickness to be stable and reflect electronic signals to electronic pipeline detector when buried to a depth of 24 inches below normal ground level.
      b. The metallic tape shall be painted blue on one side and shall have 1-inch high letters painted continuously on the same side of the tape which read, "CAUTION: BURIED WATER LINE BELOW" or other words to this effect.
      c. The marking tape shall be "detectable Warning Tape," as manufactured by the Omega Marking Company, or equal approved by Architect.

E. Schedule 40 and 80 PVC Pipe: The Schedule 40 and 80 PVC Pipe shall be manufactured in accordance with the latest edition of ASTM D 2241, D1785 and shall conform to NSF standard #14 and ANSI/NSF Standard 61, using a PVC Compound having a minimum cell classification 12454B as defined by ASTM D 1784. The bell ends shall conform to ASTM D 2672, "Joints for PVC Pipe using Solvent Cements" when installed per ASTM D2855.

2.2 PIPE FITTINGS

A. General:
   1. Pipe fittings shall be ductile iron of a type and design especially suitable for use with the type of piping with which they are installed. Fittings for PVC pipe shall also be of ductile iron. Pressure rating of fittings shall not be less than that of the pipe.
   2. All mechanical joint fittings shall be ductile iron with retainer gland. The fittings shall be produced in accordance with ANSI/AWWA C153/A21.53 and ANSI/AWWA C111/A21.11 and be cement lined and seal coated in accordance with ANSI/AWWA C104/A21.14. The retaining gland set screws shall be square heads with Type C

knurled cup points manufactured of 4140 grade alloy steel and heat treated to Rockwell "C" 45/53 core hardness.

3. All flanged fittings shall be faced and drilled in accordance with the standard drilling for ANSI B16.1, Class 125 flanges. Bolts for flanged joints shall be of the length and diameter required by the ANSI Specification. Bolts and nuts shall be of best quality mild steel and shall be provided with hexagonal heads. Suitable 1/8-inch thick rubber ring gaskets shall be provided for all flanged joints.

B. Ductile Iron Pipe Fittings:

1. Fittings shall be ductile iron and shall conform to AWWA C 110. Flanged fittings shall be used for fire hydrant valve leads or where indicated on the Plans. All other fittings shall be ductile iron mechanical joint or push-on joint unless otherwise shown on the Drawings. All fittings shall have a pressure rating equal to that of the pipe with which they are used but in no case less than 250 psi.
2. Unless otherwise indicated, all ductile iron fittings shall have an external bituminous coating and shall be cement-lined in accordance with the specifications for coating and lining the pipe.
3. All ductile iron fittings shall be cast from the same quality of metal used in casting the ductile iron pipe and shall be subjected to the same test requirements. Marking and weighing shall be as required for the ductile iron pipe.
4. Where flanged fittings are used the flanges shall be of the same material as the fitting. Where bell or mechanical joint fittings are used, the bells shall be cast integrally with the fitting. Screwed-on bells will not be acceptable.

C. Schedule 40 and 80 Fittings: Schedule 40 and Schedule 80 fittings shall conform to ASTM D 2467, D 1784, NSF Standard 61, and/or 41 Plastic Fittings for potable water. The PVC material shall meet or exceed cell classification 12454, as manufactured by Spears Manufacturing Company or an approved equal.

2.3 PIPE JOINTS

A. Push-on Joints: Push-on joints shall be as specified in AWWA Standard C 111.

B. Mechanical Joints: Mechanical joints shall be as specified in AWWA Standard C 111.

C. Flanged Joints: Flanged joints shall meet the requirements of AWWA C110 and be faced and drilled in accordance with ANSI B16.1. Bolts shall be of the length and diameter required by the ANSI Specification for Class 125 flanges. Bolts and nuts shall be of best quality mild steel and shall be provided with hexagonal heads, except where other types of bolts are specified. Suitable gaskets shall be used in all flanged joints.

D. Miscellaneous Joints: Miscellaneous types of joints shall be made as specified in other paragraphs or as recommended by manufacturer. All joints shall be made using materials and methods as required to produce joints that will function satisfactorily under the various conditions encountered.

2.4 VALVES

A. General: Valves that are 12-inch and smaller shall be gate valves and valves that are 14-inch and larger shall be butterfly valves, unless otherwise noted on the Plans or specified herein. All valves shall be designed for a working pressure of at least 150 psi.

B. Gate Valves:
   1. All gate valves shall be resilient seat, iron body, bronze mounted throughout and shall meet all requirements of AWWA C 509. The valves shall be of the type of joint used in the piping. All valves shall open by turning to the left, and unless otherwise specified, shall have non-rising stem and be furnished with a 2-inch operating nut when valves are outside of buildings, and shall be furnished with hand wheels when inside of buildings or valve vault. Gate valves shall be furnished with O-ring stem packing.
   2. All gate valves shall be designed to withstand a working pressure of 150 pounds per square inch. All valves shall be Mueller Company A-2370 or approved equal.
   3. Valves required in lines smaller than 3 inches in diameter shall be 150 psi water pressure, heavy duty, brass or bronze gate valves, double disc or wedge type, Crane, Walworth, or approved equal. Valves in copper lines shall have solder-joint ends.
   4. All interior cast iron surfaces shall be epoxy coated in accordance with the appropriate paragraphs of this Section.

C. Tapping Sleeves and Valves:
   1. Tapping sleeves shall be designed for a working pressure of 150 psi, and shall be mechanical joint, or as required to make the connection. Tapping sleeves shall be Mueller, ductile iron, with duck-tipped gaskets or approved equal.
   2. All interior cast iron surfaces shall be epoxy coated in accordance with the appropriate paragraphs of this section.
   3. Tapping valves shall be resilient seat Mueller mechanical joint valves designed for a working pressure of 150 psi or approved equal.

D. Valve Boxes and Extension Stems:
   1. Extension stems shall be furnished on buried valves where the top of the operating nut is more than 36-inches below finished grade. Top of the extension stem shall not be more than 9-inches below the top of the valve box.
   2. Buried valves shall be provided with cast iron valve boxes. The boxes shall be designed to fit over a section of 6-inch C900 PVC riser pipe which will be used as an extension from the top of the valve to within 8-inches of the ground surface. The box shall have a heavy cast iron cover. The box shall have a flange type base, with the base being approximately 4 inches larger in diameter than the outside diameter of the barrel of the box. The necessary length of 6-inch C900 PVC riser pipe required for the extension shall be considered as a part of the box.

E. Internal Epoxy Coating for Valves:
   1. All interior wetted ferrous surfaces of all types of valves will be coated with an epoxy. The coating shall be a 2-part, thermal setting epoxy protective coating and shall function as a physical, chemical and electrical barrier between the base metal to which it is applied and the surroundings. The coating shall be nontoxic and shall not impart taste of water. The coating must be formulated from material deemed acceptable per the Food and Drug Administration document title 21 of the Federal Regulations on food additives, Section 121.2514 is entitled, Resin and Polymeric Coatings. The coating shall have a satin finish and shall be suitable for field overcoating and touch-up with the same coating material without sanding or special surface preparation, or application of heat in excess of room temperature. The coating shall have a successful record of performance in valves, pipe or other allied equipment for a minimum of 2 years. The coating adhesion to the substrate shall exceed the cohesion of the coating film as demonstrated by the following test:
      a. Prepare test panel and apply coating as per manufacturer's recommendation.
      b. After sample has properly cured as per manufacturer's recommendation, scribe an "X" through the coating to the metal substrate using a sharp knife or scalpel.

c. At the juncture of the 2 scribes, use the point of the knife to attempt to lift off the coating. The coating should not lift off the substrate or between coats readily but should break up leaving coating material on the substrate of this damaged area.

d. No disbondment of the film shall be noted as tested above after immersion in tap water for 1,500 hours at 100 degrees Fahrenheit.

2. A falling sand abrasion test using ASTM D 968 shall produce an abrasion coefficient of 25.30 liters per mil. As an alternative, a Taber Abrader Test should find 3.5-3.7 milligrams of coating loss per 100 cycles when using a CSFS #10 wheel (1,000-gram weight).

2.5 FLEXIBLE COUPLINGS AND FLANGED COUPLING ADAPTERS

A. Flanged coupling adapters and flexible couplings shall be provided at the locations shown on the Drawings and at other location required for installation of the piping system. Flanged coupling adapters shall be provided with anchoring studs. Epoxy coated steel construction shall be used for couplings larger than 12-inch. Couplings smaller than 12-inch shall be cast iron.

2.6 FIRE HYDRANTS

A. Fire hydrants shall conform to the requirements of AWWA C-502 dry-barrel type. The fire hydrants shall be designed for a bury length of 5 feet; however, the length may vary according to field conditions and Contractor will be required to add extensions to position the top of the flange at the elevation noted on the Plans or as directed by Architect. Extensions shall be considered incidental to the fire hydrant installation and no direct payment shall be given.

B. The hydrants shall have a 5-1/4-inch valve opening, 2 2-1/2-inch hose nozzles and 1 4-1/2-inch pumper nozzle. A swivel flange shall be used to face the hydrant nozzles in any position.

C. Hose threads shall be National Standard Threads.

D. The hydrants shall be sized for 6-inch mains and shall have an inlet connection compatible with the type pipe used. All gaskets, nuts, bolts and other jointing materials shall be considered part of the fire hydrant installation.

E. Operating nut shall be standard 1-1/2-inch pentagon opening counterclockwise. The hydrant shall close with the pressure.

F. Hydrants shall be painted in accordance with the standards of the local municipality.

G. Fire hydrants shall be located at points shown on the Plans, the exact location of the hydrant to be established by Architect. All hydrants shall be set plumb to the grade as established by Architect and shall have their nozzles parallel with and/or at right angles to the curb, with the pumper nozzle facing the curb in accordance with the details shown on the Plans.

H. The hydrants shall be supported in such a manner as not to cause a strain on the fire hydrant lead or branch. The bowl of the hydrant shall be well braced against unexcavated earth at the end of the trench with concrete backing. The concrete backing shall be placed so as not to interfere with the hydrant drains and so that the joints or flanges are accessible.

I. Each hydrant shall be connected to the main with a 6-inch PVC branch controlled by an independent 6-inch resilient seat gate valve. Each hydrant shall be set upon a stone or concrete slab not less than 4-inches thick and not less than 1-sq. ft. of surface area. Where solid rock exists in the bottom of the trench and same is excavated to the proper depth to form a foundation for the hydrant, the slab of stone or concrete may be omitted.

J. There shall be placed round the base of the hydrant not less than 7-cu. ft. of sound broken stone or clean gravel or other suitable material to provide reservoir capacity so that the hydrant will completely drain when closed. The gravel or broken stone shall reach from the bottom of the trench to at least 6 inches above the waste opening in the hydrant. Each hydrant shall be operated by Contractor to prove to the inspector that the drain hole has not been plugged with concrete or other material.

K. The hydrants shall have a breakable safety flange, located approximately 2 inches above the ground, and breakable stem coupling and barrel which breaks cleanly upon impact. The main valve shall also remain closed without loss of water.

L. The hydrants shall be AWWA improved type hydrants and shall be Mueller Centurion Hydrants or approved equal, and shall have self-oiling reservoirs, and shall be internally epoxy coated as described in "Valves and Valve Boxes" paragraph of this Section.

PART 3 - EXECUTION

3.1 WATER SERVICE CONNECTIONS

A. This Specification covers the requirements of installing services on public right-of-way, from the main line to the meter box.

B. Service Taps: Tapping saddles shall be Smith-Blair Taper Seal Style 313 or DMD Dresser Style 194 or approved equal. Service taps on PVC water lines shall be made using hinge type or double strap saddles. Tapping saddles shall support the full circumference of the pipe and shall have a bearing area of sufficient width along the pipe axis to prevent pipe distortion when the saddle is tightened.

C. Polyethylene Plastic Tubing: Service lines shall be constructed with polyethylene plastic tubing as specified in ASTM D 2737 with a rating of 160 psi unless otherwise noted on the Plans. The service line shall be that pipe from the water distribution line to the water meter. The pipe shall be sized to match the nominal water meter size.

D. Copper Tubing: Service lines may be constructed with seamless copper water tube ASTM B 88, Type K, of the sizes required.

E. Meter Boxes, Meter Stop, and Corporation Stop: Meter boxes shall be corrugated metal pipe with locking cast iron lids as specified on the Plans. Meter stops, corporation stops and service clamps for service connections of various sizes shall be as specified on the Plans. Corporation and meter stops shall be compatible with pipe material furnished.

3.2 EXCAVATION, TRENCHING AND BACKFILLING

A. The trench shall be excavated to the lines and grades as established by Architect and as shown on the Plans. The depth of cover for all pipelines on which the grades and elevations are not shown on the Plans, shall be 42 inches. The amount of cover may vary over or under 42 inches as directed by Architect.

B. The minimum width of the trench shall be the outside diameter of the pipe plus 12 inches and the maximum width shall be the outside diameter of the pipe plus 18 inches. The trenching equipment shall be maintained on a sufficiently level roadbed to provide substantially vertical trench walls. The maximum horizontal offset of the trench wall from bottom of trench to the top of the trench (undercutting) shall be 4 inches.

C. The trench shall be excavated to an even grade so that the bottom of the pipe will rest on the bottom of trench throughout the entire length of the pipe. In order to obtain a true even grade, the trench shall be fine graded by hand. On lines that are to be laid to established grades, batter boards shall be set at 50-foot intervals and the trench graded to the established grade.

D. Any part of the trench excavated below grade shall be corrected by filling with approved material and thorough compacting.

E. If large rock, rock fragments, or other unyielding material is encountered in the bottom of the trench it shall be removed to a depth of 3 inches below grade, refilled with selected material, and thoroughly compacted.

F. Bell holes of ample dimensions shall be dug at each joint to permit the jointing of pipe to be made properly, and of sufficient depth to prevent the bell of the pipe from resting on undisturbed materials.

G. Wherever necessary to prevent caving, the trench shall be adequately braced and sheeted.

H. In all trench excavation, where the depth of excavation is 5 feet or more the trench wall shall be shored, sheeted or braced in accordance with OSHA requirements.

I. Trench digging machinery may be used to make the trench excavations except in places where operation of same would cause damages to trees, buildings or other existing structures either above or below ground; in such instances hand methods shall be employed.

J. All excavated material shall be piled in a manner that will not endanger the Work or existing structures and that will cause the least amount of obstructions to walks and driveways.

K. There will be no classification of the excavated materials and the term excavation shall include all materials encountered in excavating the trenches or structural excavations.

L. Contractor shall take all necessary precautions for protecting paved areas from being damaged by the trenching and backfilling equipment. Any damage done to any paved area outside of the area set forth in the Plans as a result of the construction work shall be repaired by Contractor at his own expense.

M. Where the lines are located behind curbs, Contractor shall take special precautions to protect trees and shrubs. Care shall be exercised to cause as little damage to lawns as possible. Where lines cross under curbs, gutters or curbs and gutters, tunneling will be required.

N. As soon as practicable after laying and jointing of the pipe, the completion of bedding, and the completion of structures, the trench shall be backfilled in accordance with the trench backfill detail in the Plans and coordinated with Section 31 23 33 “Trenching and Backfilling.”

O. Metallic Tape:

1. Contractor shall backfill over non-metallic pipelines to a depth which is less than 24 inches and not more than 12 inches from the top of the cut of the ditch section in which the pipeline is laid. Contractor shall stop the backfilling material at a generally uniform level. All machine tamping, jetting and other compaction activities shall be accomplished up to this point of height in the backfilling before the marking tape is placed in the trench.
2. Contractor shall then lay the marking tape in the pipe trench and tape shall be held in position by the spot placement of backfill materials over it to keep it from sliding to the sides and/or from being blown about in the ditch by the wind. The tape shall be laid with the painted side which shall also be the side with the identification lettering on it, in the "up" position. The tape shall be laid in the flat position and kept there until backfill is accomplished.
3. Contractor shall then complete the backfilling operation in such a manner that the marking tape is not cut, crimped, ruptured or separated by the backfilling work.

3.3 PIPE INSTALLATION - WATER LINES

A. General: All pipe and accessories shall be unloaded, handled, laid, jointed, tested for defects and for leakage and disinfected in the manner herein specified.

B. Inspection: The pipe, fittings, valves, and accessories shall be inspected upon delivery and during the progress of the Work and any material found to be defective will be rejected by Architect, and Contractor shall remove such defective material from the site of the Work.

C. Responsibility for Materials: Contractor shall be responsible for all material furnished by him and he shall replace at his own expense all such material that is found to be defective in manufacture or has become damaged in handling after delivery.

D. Handling Pipe and Accessories:
   1. All pipe, fittings, valves, and other accessories shall, unless otherwise directed, be unloaded at the point of delivery, hauled to and distributed at the site of the Work by Contractor. In loading and unloading, they shall be lifted by hoists or slid, or rolled on skidways in such a manner as to avoid shock or damage to the materials. Under no circumstances shall they be dropped. Pipe handled on skidways must not be skidded or rolled against pipe already on the ground.
   2. The pipe, fittings and accessories shall be placed along the site in such a manner as to be kept as free as possible from dirt, sand, mud and other foreign matter.

E. Alignment and Grade:
   1. All pipe shall be laid and maintained to the lines and grades shown on the Plans or as established on the ground by Architect.
   2. Wherever it is necessary to deflect pipe from a straight line either in a vertical or horizontal plane to avoid obstructions, to plumb valves, or where vertical or horizontal curves are shown or permitted, the degree of deflection at each joint shall not exceed one-half the maximum deflection recommended by the manufacturer of the particular kind of pipe being laid and the degree of deflection shall be approved by Architect.

F. Manner of Handling Pipe and Accessories into Trench: After the trench grade has been completed, all bell holes dug and the grade inspected, the pipes and accessories may be placed in the trench. All pipe, fittings, and valves shall be carefully lowered into the trench piece by piece by means of derricks, ropes, or other suitable tools or equipment, in such a manner so as to prevent damage to the material in any way. Under no circumstances shall pipe or accessories be dropped or dumped into the trench.

G. Cleaning and Inspecting:
   1. Before lowering into the trench, the pipe shall be again inspected for defects and the pipe, while suspended, shall be lightly hammered to detect cracks. Any defective, damaged or unsound pipe and materials shall be rejected.
   2. All foreign matter or dirt shall be removed from the inside of the pipe and from all bells, spigots or parts of the pipe used in forming the joint, before the pipe is lowered into the trench, and it shall be kept clean by approved means during and after laying.

H. Laying and Jointing PVC Pipe:
   1. PVC pipe shall be handled and installed in strict accordance with the recommendations of the manufacturer. Special care shall be exercised in handling PVC pipe, in preparing the trench for pipe laying, and in compacting and bedding under and around each side of the pipe.
   2. The ring groove shall be clean before installation of the rubber ring. The ring shall be carefully installed in the groove as recommended by the manufacturer. The spigot end of the pipe shall be wiped clean and lubricated using the recommended lubricant. The spigot end shall be carefully inserted into the bell end until the reference mark on the spigot end is flush with the end of the bell.
   3. Cutting of pipe for inserting valves, fittings or closure pieces shall be done in a neat and workmanlike manner without damage to the pipe or the cement lining.

4. The jointing shall be completed for all pipe laid each day, in order not to leave open joints in the trench overnight. At times when pipe laying is not in progress, the open ends of pipe shall be closed by approved means, and no trench water shall be permitted to enter the pipe.
5. No pipe shall be laid in water, or when the trench conditions or weather is unsuitable for such work, except by permission of Architect.
6. Flanged joints shall be used where shown on the Plans. Mechanical joint, or other approved joints shall be installed with materials furnished by manufacturer and in accordance with manufacturer's specifications.
7. Flanged joints where used shall be bolted with Flange bolts of best quality mild steel and of the size and length required by American Standards Association; bolts and nuts shall be provided with standard hexagonal heads. Gasket rings shall be used and shall be made of best quality rubber composition sheet packing 1/16-inch thick, or a brand and quality approved by Architect.
8. The pipe and fittings shall be properly aligned and free to move in any direction while bolting, and the bolts shall be gradually tightened at a uniform rate around the entire flange.

I. Setting Valves, Valve Boxes, and Fittings:
1. Valves and fittings shall be set at the locations shown on the Plans or at locations as established by Architect and shall be set and jointed to the pipe in the manner heretofore specified for pipe installations. All valves buried in the ground shall have a valve box set over the valve with a concrete pad around the valve box as shown on the Drawings. All valves shall be thoroughly inspected and checked for operation before installation. Concrete blocking shall be provided for all buried valves.
2. Valve boxes shall be firmly supported and maintained centered and plumb over the wrench nut of the valve, with box cover flush with the surface of the ground or at such level as directed.

J. Setting Fire Hydrants:
1. Fire hydrants shall be located at points shown on the Plans, the exact location of the hydrant to be established by Architect. All hydrants shall be set plumb to the grade as established by Architect and shall have their nozzles parallel with and/or at right angles to the curb, with the pumper nozzle facing the curb in accordance with the details shown on the Plans.
2. The hydrants shall be supported in such a manner as not to cause a strain on the fire hydrant lead or branch. The bowl of the hydrant shall be well braced against unexcavated earth at the end of the trench with concrete backing. The concrete backing shall be placed so as not to interfere with the hydrant drains and so that the joints or flanges are accessible.
3. Each hydrant shall be connected to the main with a 6-inch PVC branch controlled by an independent 6-inch resilient seat gate valve. Each hydrant shall be set upon a stone or concrete slab not less than 4 inches thick and not less than 1 sq. ft. of surface area. Where solid rock exists in the bottom of the trench and same is excavated to the proper depth to form a foundation for the hydrant, the slab of stone or concrete may be omitted.
4. There shall be placed around the base of the hydrant not less than 7-cu. ft. of sound broken stone or clean gravel, or other suitable material to provide reservoir capacity so that the hydrant will completely drain when closed. The gravel or broken stone shall reach from the bottom of the trench to at least 6 inches above the waste opening in the hydrant. Each hydrant shall be operated by Contractor to prove to the inspector that the drain hole has not been plugged with concrete or other material.

K. Plugging Dead Ends: Standard plugs shall be inserted into the bells of all dead ends and pipes, tees, or crosses and spigot ends shall be capped. Plugs or caps shall be jointed to the pipe or fittings in the same manner used in jointing the pipe. All plugs and caps shall have horizontal to thrust blocks.

L. Tunneling Under Utility Lines, Etc.: Where pipes, conduits or concrete curbs, gutters or other obstructions are encountered in the construction, the cost of tunneling under such obstructions shall be included as a part of the cost of the pipeline, or other pay items, complete in place.

3.4 ANCHORAGE OF BENDS, TEES AND PLUGS, ETC.

A. Reaction or thrust blocking shall be applied to all pipelines at all tees, plugs, caps, and bends. Concrete shall be used for blocking the pipe and fittings and shall have a minimum 28-day compressive strength of 2,500 psi but shall otherwise conform to Item 421, Class B of the 2014 TxDOT Standard Specifications. The blocking shall be placed between solid ground and the fitting to be anchored in accordance with the details on the Plans. The blocking shall be so placed that the pipe and fitting joints will be accessible for repair.

3.5 DISINFECTION OF PIPELINES

A. Contractor shall furnish all labor, equipment, and materials necessary for the disinfection of the new pipelines which shall be disinfected before being placed in service. The lines shall be disinfected by the application of a chlorinating agent. The chlorinating agent may be a liquid chlorine, liquid chlorine gas-water mixture, or a calcium hypochlorite solution, which shall be fed into the lines through a suitable solution-feed device, or other methods approved by Architect. The chlorinating agent shall be applied at or near the point from which the line is being filled. The water being used to fill the line shall be controlled to flow into the section to be disinfected very slowly, and the rate of application of the chlorinating agent shall be in such proportion to the rate of water entering the pipe that the chlorine dose applied to the water entering the line shall be at least 50 parts per million. The treated water shall be retained in the pipelines for a period of not less than 24 hours. At the end of the retention period, all treated water shall be thoroughly flushed from the lines until the replacement water in the lines shall have chlorine residual of not more than 0.5 parts per million; Architect will designate blowoff valves in the area around the Project site that may be used to purge the lines. Where it is necessary to place the new lines in service in less than 24 hours, the concentration of chlorine may be increased to 300 ppm and the lines flushed and placed in service in 3 hours. Disinfection procedures shall conform to AWWA C 651, latest revision.

B. After final flushing and before any section of water line is placed into service, Contractor shall collect samples as directed by Architect in accordance with AWWA C 651, latest revision. A minimum of 1 bacteriological sample shall be collected for each 1,000 feet of completed water line to check efficiency of disinfection procedures and shall be repeated if contamination persists. The samples shall be submitted by Contractor to an independent testing lab. The samples shall be tested in accordance with AWWA C 651, latest revision.

3.6 HYDROSTATIC TESTS

A. All water pipelines constructed under this contract, prior to acceptance, shall be tested as described in the following paragraphs. This test shall apply to all newly laid pipe or any valved sections thereof. Contractor shall bear all costs of providing all equipment, materials, labor, and other incidentals required to test pipelines. If water of sufficient pressure to test the pipelines will not be available, the Contractor shall provide suitable means for developing the required pressure in lines.

B. Each valved section of the line shall be tested for leakage as soon as practical after laying. Sufficient backfill shall be placed prior to testing to prevent any movement of the pipe, but all joints shall be left exposed. Contractor shall furnish water for filling the line and shall furnish the necessary means for pressuring the line. Duration of the test shall be not less than 4 hours. The line shall be carefully checked for any evidence of leakage. The cause of any leaks shall be found and corrected and the line retested.

C. The pipeline shall be tested so that the pressure at the lowest point in the test section is at least 100 percent but not greater than 120 percent of the pipe pressure class of the pipe, and the minimum pressure at the highest point in the test section is not less than 85 percent of the pipe pressure class of the pipe. The maximum allowable leakage for push-on joints is the number of gallons per hour as determined by the following formula:

$$L = \frac{ND(P)^{1/2}}{7400}$$

Where:

L = Allowable leakage in gallons per hour.
N = Number of rubber-ring gasket joints in the length of the pipe tested.
D = Nominal diameter of the pipe in inches.
P = Average of the maximum and minimum pressures within the test section in psi.

3.7 CLEANING UP

A. After the construction work is completed and before final acceptance by Owner, Contractor shall remove all rubbish and excess materials from excavations and other debris from the site of the Work, and all trench surfaces shall be bladed as heretofore specified. The cost of cleanup shall be included in the proposal prices for the various units of Work.

END OF SECTION

SECTION 33 13 00 - DISINFECTING OF WATER UTILITY DISTRIBUTION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Disinfection of potable water distribution system.
   2. Testing and reporting results.
B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.
   2. Section 33 10 00 "Water Utilities."

1.2 REFERENCES

A. AWWA B300 - Standard for Hypochlorites.
B. AWWA B301 - Standard for Liquid Chlorine.
C. AWWA B302 - Standard for Ammonium Sulfate.
D. AWWA B303 - Standard for Sodium Chlorite.
E. AWWA C651 - Standards for Disinfecting Water Mains.

1.3 SUBMITTALS FOR INFORMATION

A. Test Reports: Indicate results comparative to specified requirements.
B. Certificate: Certify that cleanliness of water distribution system meets or exceeds specified requirements.

1.4 PROJECT RECORD DOCUMENTS

A. Submit test results to Architect.
B. Disinfection Report:
   1. Type and form of disinfectant used.
   2. Date and time of disinfectant injection start and time of completion.
   3. Test locations.
   4. Initial and 24-hour disinfectant residuals (quantity in treated water) in ppm for each outlet tested.
   5. Date and time of flushing start and completion.
   6. Disinfectant residual after flushing in ppm for each outlet tested.
C. Bacteriological Report:
   1. Date issued, Project name, and testing laboratory name, address, and telephone number.
   2. Time and date of water sample collection.
   3. Name of person collecting samples.
   4. Test locations.
   5. Initial and 24-hour disinfectant residuals in ppm for each outlet tested.
   6. Coliform bacteria test results for each outlet tested.
   7. Certification that water conforms, or fails to conform, to bacterial standards of the local health department.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with AWWA C651.
B. Water Treatment Firm: Company specializing in disinfecting potable water systems specified in this Section with minimum 3 years' experience.
C. Testing Firm: Company specializing in examining potable water systems, approved by the State of Texas.
D. Submit bacteriologist's signature and authority associated with testing.

1.6 REGULATORY REQUIREMENTS

A. Conform to applicable code or regulation for performing the Work of this Section.
B. Provide certificate of compliance from authority having jurisdiction indicating approval of water system.

PART 2 - PRODUCTS

2.1 DISINFECTION CHEMICALS

A. Chemicals: AWWA B300, Hypochlorite, AWWA B301, Liquid Chlorine, AWWA B302, Ammonium Sulfate, and AWWA B303, Sodium Chlorite.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that piping system has been cleaned, inspected, and pressure tested.
B. Perform scheduling and disinfecting activity with start-up, testing, adjusting and balancing, demonstration procedures, including coordination with related systems.

3.2 EXECUTION

A. Provide and attach required equipment to perform the Work of this Section.
B. Introduce treatment into piping system.
C. Maintain disinfectant in system for 24 hours.
D. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.
E. Replace permanent system devices removed for disinfection.
F. Pressure test system to 150 psi. Repair leaks and re-test.

3.3 FIELD QUALITY CONTROL

A. Test samples in accordance with AWWA C651.

END OF SECTION

SECTION 33 30 00 - SANITARY SEWER UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. The Work covered by this Section of the Specifications consists of sanitary sewer lines, manholes, service stub outs, service connections and appurtenances from 5-feet outside the building to public sewer mains. The sanitary sewer lines shall be constructed in accordance with these Specifications, at the locations and conforming to the lines, grades, and dimensions shown on the Plans or as required by Architect. Manholes shall be constructed in accordance with the details shown on the Plans and as specified herein.
   2. Contractor shall furnish all materials, equipment, tools, labor, superintendence, and all incidentals required for construction of these items as shown on the Drawings and as specified herein. Reference to a standard Specification numbers for materials and testing shall include the latest revision of that Specification.

B. Related Requirements:
   1. Division 01 Specification Sections apply to Work of this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: All gravity sewer pipe 4-inch through 15-inch shall be polyvinyl chloride (PVC) pipe, except as otherwise specified.

B. Polyvinyl Chloride (PVC) Pipe and Fittings: Sewer pipe and fittings shall be SDR-35 (greater than 3 feet or less than 12 feet of cover) or SDR-26 (less than 3 feet or greater than 12 feet of cover) for pipe diameters 4-inch through 15-inch and shall meet the requirements of ASTM D 3034 and PVC Material 12454-B. All sewer pipe joints shall be integral bell, bell and spigot type with rubber gasket joints manufactured to conform to ASTM D 1784 or ASTM D 3139 and PVC Material 12454-B and ASTM F 477 rubber gaskets.

C. Tape Material:
   1. When non-metallic pipelines are to be installed Contractor shall furnish and lay, above the pipeline, a continuous strip of metallic identification tape.
   2. The metallic identification tape shall be at least 2 inches in width and shall be of corrosive resistant metal of sufficient thickness to be stable and reflect electronic signals to electronic pipeline detector when buried to a depth of 24 inches below normal ground level.
   3. The metallic tape shall be painted green on one side and shall have 1-inch high letters painted continuously on the same side of the tape which read, "CAUTION: BURIED SEWER LINE BELOW" or other words to this effect.
   4. The marking tape shall be "detectable Warning Tape," as manufactured by the Omega Marking Company, or equal approved by Architect.

D. Service Sewers and Fittings: Service sewer pipe and fittings shall be of the same material and specification as the line to which they are connected unless otherwise noted. All service sewer laterals shall be connected to the main line with tees, wyes, etc., that are bell and spigot with rubber gaskets. All service sewer taps shall use an approved gasketed fitting in conjunction with a full circle repair sleeve coupling unless otherwise noted.

E. Manholes:

1. General: Manholes shall be constructed of fiberglass. Sewer manholes shall be constructed in accordance with the design, size, details and at the locations shown on the Plans. Fiberglass reinforced polyester manhole shall be manufactured from commercial grade polyester resin or other suitable polyester or vinyl ester resins, with fiberglass reinforcements. Manhole shall be a 1-piece unit manufactured to meet or exceed all specifications of ASTM D 3753, latest edition, as manufactured by L.F. Manufacturing, Inc., Giddings, Texas or an approved equal.
2. Fiberglass Manhole Materials:
    a. Resin: The resins used shall be a commercial grade unsaturated polyester resin or other suitable polyester or vinyl ester resin.
    b. Reinforcing Materials: The reinforcing materials shall be commercial Grade "E" type glass in the form of continuous roving, and chop roving, having a coupling agent that will provide a suitable bond between the glass reinforcement and the resin.
    c. Interior Surfacing Material: The inner surface exposed to the chemical environment shall be a resin-rich layer of 0.010- to 0.020-inch thick. The inner surface layer exposed to the corrosive environment shall be followed with a minimum of 2 passes of chopped roving of minimum length 0.5-inch to maximum length of 2.0 inches and shall be applied uniformly to an equivalent weight of 3 oz/sq. ft. Each pass of chopped roving shall be well-rolled prior to the application of additional reinforcement. The combined thickness of the inner surface and interior layer shall not be less than 0.10-inch.
    d. Wall Construction Procedure: After inner layer has been applied the manhole wall shall be constructed with chop and continuous strand filament wound manufacturing process which insures continuous reinforcement and uniform strength and composition. The cone section, if produced separately, shall be affixed to the barrel section at the factory with resin-glass reinforced joint resulting in a 1-piece unit. Seams shall be fiber glassed on the inside and the outside using the same glass-resin jointing procedure. Field joints shall not be acceptable by anyone except manufacturer.
    e. Exterior Surface: For a UV inhibiter the resin on the exterior surface of the manhole shall have gray pigment added for a minimum thickness .125-inch.
    f. Stub outs and Connections: Stub outs shall be factory installed. Installation of SDR PVC sewer pipe shall be performed by sanding, priming and using resin fiber-reinforced hand layup. The resin and fiberglass shall be same type and grade as used in the fabrication of the fiberglass manhole. Inserta-Tee fittings or Kor-N-Seal boots may be installed by manhole manufacturer using fiberglass reinforced pipe stub out for Kor-N-Seal boot sealing surface.
    g. Manhole Bottom: Fiberglass manholes installed in new lines shall have 4,000 psi concrete -reinforced bottoms. This concrete bottom shall comply to the City of Midland requirements. Concrete shall be used to form bench area and invert. Also, concrete may be used on top of anti-flotation ring and around the reducer section as required for buoyancy. Manholes installed in

existing lines shall utilize cast-in-place concrete bottoms in accordance with the Plans and Specifications.

h. Fillers and Additives: Fillers, when used, shall be inert to the environment and manhole construction. Sand shall not be accepted as an approved filler. Additives, such a thixotropic agent, catalysts, promoters, etc., may be added as required by the specific manufacturing process to be used to meet the requirements of this standard. The resulting reinforced-plastic material must meet the requirements of this Specification.

i. Manufacture: Manhole cylinders, manway reducers, and connectors shall be produced from glass fiber-reinforced polyester resin using a combination of chop and continuous filament wound process. All manholes shall be designed so that a ladder or step system can be supported by the installed manhole. Manway reducers will be concentric with respect to the larger portion of the manhole diameters through 60 inches. Larger manholes may have concentric or eccentric manway reducer openings. The manhole shall provide an area from which a typical ring and cover plate can be supported without damage to the manhole.

j. Exterior Surface: The exterior surface shall be relatively smooth with no sharp projections. Hand-work finish is acceptable if enough resin is present to eliminate fiber show. The exterior surface shall be free of blisters larger than 0.5-inch in diameter, delamination, or fiber show.

k. Interior Surface: The interior surface shall be resin rich with no exposed fibers. The surface shall be free of crazing, delamination, blisters larger than 0.5 inch in diameter and wrinkles of 0.1256-inch or greater in depth. Surface pits shall be permitted if they are less than 0.75-inch in diameter and less than 0.0625-inch deep. Voids that cannot be broken with finger pressure and that are entirely below the resin surface shall be permitted if they are less than 0.5-inch in diameter and less than 0.0625-inch thick. Any manhole repair is required to meet all requirements of this specification. Manhole lengths shall be in 6-inch increments plus or minus 2 inches. Tolerance of inside diameter shall be plus or minus 1 percent of required manhole diameter.

l. Load Rating: The complete manhole shall have a minimum dynamic-load rating of 16,000 lbf. when tested in accordance with ASTM D 3753 Section 8.4 (Note 1). To establish this rating the complete manhole shall not leak, crack or suffer other damage when load tested to 40,000 lbf., and shall not deflect vertically downward more than 0.25-inch at the point of load application when loaded to 24,000-lb.

m. Stiffness: The manhole cylinder shall have the minimum pipe-stiffness values shown in the table below when tested in accordance with ASTM D 3753 Section 8.5 (Note 1).

MANHOLE LENGTH IN FEET	PSI
3 - 6.5	0.75
7 - 12.5	1.26
13 - 20.5	2.01
21 - 25.5	3.02
26 - 35	5.24

n. Soundness: In order to determine soundness, apply an air or water pressure test to the manhole test sample. Test pressure shall not be less than 3 psig or greater than 5 psig. While holding at the established pressure, inspect the entire manhole for leaks. Any leakage through the laminate is cause for failure of the test. Refer to ASTM D 3753 Section 8.6.

o. Chemical Resistance: When tested in accordance with ASTM D 3753 Section 8.7 the log of percent retention of each property after immersion testing when platted against the log of immersion time and extrapolated to 100,000 hours shall assure retention of at least 50 percent of initial properties.

p. Physical Properties:

	HOOP DIRECTION (psi)	AXIAL DIRECTION (psi)
Tensile Strength	18,000	5,000
Tensile Modules	0.6×10^6	0.7×10^6
Flexural Strength	26,000	4,500
Flexural Modules	1.4×10^6	0.7×10^6
Compressive (psi)	18,000	10,000

All tests shall be performed as specified in ASTM D 3753, latest addition, Section 8. Test Method ASTM D 790 and Test Method ASTM D 695.

q. Quality Control: Each completed manhole shall be examined for dimensional requirements, hardness, and workmanship. All required ASTM D 3753 testing shall be completed, and records of all testing shall be kept, and copies of test records shall be presented to Architect upon formal written request. Manufacturer shall provide an independent certification indicating that the manhole has been sampled, tested, and inspected in accordance with the provisions of this specification and meets all requirements.

r. Shipping and Handling: Do not drop or impact the fiberglass manhole. Fiberglass manhole may be lifted by inserting a 4-inch x 4-inch x 30-inch timber into the top of the manhole with cable attached or by a sling or "choker" connection around center of manhole, lift as required. Use of chains or cables in contact with the manhole surface is prohibited.

s. Concrete Bottom: Lower manhole into wet concrete until it rests at the proper elevation, with a minimum of 4 inches of fiberglass manhole inserted into the wet concrete below flow line, then move manhole to plumb. The concrete shall extend a minimum of 1-foot from the outside wall of the manhole and a minimum of 6 inches above incoming lines. On the inside, concrete shall form the invert area and rise a minimum of 4 inches above incoming lines. If required by Architect, concrete may be used around reducer section buoyancy.

t. Grade Adjustment Rings: All final grade adjustment of manhole metal cover and frame assemblies shall be performed utilizing injection molded High Density Polyethylene (HDPE) grade adjustment rings as manufactured by LADTECH, Inc., Tel.: 651.415.1252, 1.877.ADJ.RING, or approved equal. They shall be used instead of concrete grade adjustment rings. Grade adjustment rings shall be manufactured from polyethylene plastic as identified in ASTM D 1248 (Standard Specification for Polyethylene Plastic Molding

and Extrusion Materials. Material properties shall be tested and qualified for usage per the ASTM Test Methods referred in ASTM D 1248. The grade adjustment rings shall be tested to assure compliance with impact and loading requirements per AASHTO Standard Specification for Highway Bridges.

1) Complete installation of grade adjustment rings shall be performed as per manufacturer's recommendations and "Fiberglass Manhole Details" in Sanitary Sewer Details sheet. The space between the rings, fiberglass, manhole, and metal cover frame shall be sealed utilizing an approved all weather preformed joint sealant made of butyl rubber that can bond properly between HDPE grade adjustment rings, fiberglass manhole, and metal cover frame.
2) All manholes in the proposed roadways shall have grade adjustment rings of a total height of 2 feet. In all other locations, manhole metal cover and frame will seat on HDPE grade adjustment rings as required based on site condition. In proposed roadway locations, top 6 inches height of grade adjustment rings shall be composed of individual grade adjustment rings of maximum 2-inch thickness.

PART 3 - EXECUTION

3.1 PIPE INSTALLATION

A. Pipe Trench Excavation:

1. Pipe trenches shall be excavated to the lines and grades shown on the Drawings or as established by Architect. Before excavation begins in paved areas, the existing pavement shall be cut or sawed to a neat line by methods that meet the approval of Architect. The maximum width of the trench below the top of the pipe shall be the outside diameter of the pipe plus 24 inches with the pipe centered in the trench. The trenching equipment shall be maintained on a sufficiently level roadbed to provide substantially vertical trench walls. The maximum horizontal offset of the trench wall from bottom of trench to top of trench (undercutting) shall be 4 inches. Where necessary to stay within the maximum width limits at the top of the pipe or to maintain a relatively straight trench wall to remain within available right-of-way, the trench shall be adequately braced and sheeted. The trench wall shall not be allowed to slope at a greater than 1:1 slope, above the top of the pipe. Contractor shall be fully responsible for any damage to private property or existing facilities due to inadequate trench sheeting.
2. The trench shall be excavated to an even grade so that the pipe can be laid to true line and grade. In order to obtain a true even grade, the trench shall be fine graded and shaped to fit the details as shown on the Plans. Any part of the trench excavated below grade shall be corrected by filling with approved material and thoroughly compacting. If clay, rock or other unyielding material is encountered in the bottom of the trench, it shall be removed to a depth of 6 inches below grade, refilled with selected material and thoroughly compacted to grade.
3. Bell holes of ample dimensions shall be dug at each joint to permit the jointing and bedding of the pipe to be properly accomplished.

4. Before the next phase of construction can take place above the trench bottom which has been excavated to the proposed subgrade of the specified class of bedding, Contractor shall shape and grade earth subgrade. The earth subgrade for the bedding shall be free of surface water, firm, solid and stable before the specified class of bedding and/or pipe material is laid.
5. If Contractor encounters ground water and cannot maintain a firm, solid and stable earth subgrade, free of surface water, he shall be required to dewater the trench.
6. The dewatering shall be accomplished by means of a well point system or by other suitable means. The dewatering shall be maintained until the trench has been satisfactorily backfilled and then the dewatering means shall be systematically removed to allow the ground water to gradually rise in the trench. Contractor shall make his own arrangements for the disposal of ground water.
7. Trench digging machinery may be used to make trench excavations except in places where operations of same would cause damage to existing structures either above or below ground; in such instances, hand methods shall be employed. Contractor shall locate all existing underground lines, of which he has been advised whether or not they are shown on the Drawings, sufficiently in advance of trenching operations to prevent any damage thereto. Extreme care shall be used to prevent such damage and Contractor shall be fully responsible for damage to any such lines.
8. There will be no classification of excavated materials and all materials encountered shall be excavated as required. Adjacent structures shall be protected from damage by construction equipment. All excavated material shall be placed along the trench or hauled away from the work area where required, in a manner which will not endanger the Work. Contractor shall be responsible for removing all excess material from the job site.

B. Granular Bedding and Backfill:
1. All sewer pipe shall be laid in a prepared crushed rock bedding material and shall be backfilled as detailed on the Plans and coordinated with Section 31 23 33 "Trenching and Backfilling."
2. Metallic Tape:
   a. Contractor shall backfill over non-metallic pipelines to a depth which is less than 24 inches and not more than 12 inches from the top of the cut of the ditch section in which the pipeline is laid. Contractor shall stop the backfilling material at a generally uniform level. All machine tamping, jetting and other compaction activities shall be accomplished up to this point of height in the backfilling before the marking tape is placed in the trench.
   b. Contractor shall then lay the marking tape in the pipe trench and tape shall be held in position by the spot placement of backfill materials over it to keep it from sliding to the sides and/or from being blown about in the ditch by the wind. The tape shall be laid with the painted side which shall also be the side with the identification lettering on it, in the "up" position. The tape shall be laid in the flat position and kept there until backfill is accomplished.
   c. Contractor shall then complete the backfilling operation in such a manner that the marking tape is not cut, crimped, ruptured, or separated by the backfilling work.

3.2 SANITARY SEWER PIPE INSTALLATION

A. General: All sewer pipe and fittings shall be unloaded, handled, laid, jointed, and tested for defects in the manner herein specified.

B. Inspection:
   1. The pipe and fittings shall be inspected upon delivery and during the progress of the Work and any material found to be defective will be rejected and Contractor shall remove such defective material from the site of the Work.
   2. Contractor shall be responsible for all materials furnished by him and he shall replace at his own expense all such material that is found to be defective in manufacture or has been damaged in handling after delivery.

C. Pipe Laying:
   1. After the trench has been properly fine graded and bedded, the pipe shall be laid in accordance with the following specifications. Each length of pipe shall be inspected for defects and shall be thoroughly cleaned inside and outside of the spigot before being lowered into the trench. Pipe laying shall proceed up-grade with the spigot ends pointing in the direction of the flow. All pipe shall be laid true to the lines and grades as established by Architect. A properly calibrated laser instrument shall be used to lay the pipe on grade. Bell holes shall be dug at each joint of sufficient depth to allow the entire length of the barrel of the pipe to rest on the bottom of the trench and to allow ample space for properly jointing the pipe.
   2. The jointing shall be completed for all pipe laid each day, in order not to leave open joints in the trench overnight. At times when pipe laying is not in progress, the open ends of the pipe shall be properly plugged. No pipe shall be laid in water, or when trench conditions or weather is unsuitable for such work.
   3. If water gets in the trench before the joint is completed, or if the pipe is disturbed from line and grade after being laid, the pipe shall be taken up, the joints cleaned, and the pipe relaid.
   4. Plugs shall be placed in the lines at the locations shown on the Plans or as directed by Architect.
   5. The Work shall be watertight at all joints and any leaks or defects shall be immediately repaired. Any pipe which has been disturbed from any cause after being lain in its final position shall be taken up, the joint cleaned, and the pipe properly relaid.
   6. Contractor shall take whatever precautions necessary to protect the sewer pipe that has been laid. At the end of the day or at such time as Contractor deems necessary, all exposed ends of the sewer pipe (main line or interconnects) shall be plugged to prevent the inflow of stormwater or other objectionable materials, animals, and humans. It shall be Contractor's responsibility to prevent these flows from damaging or entering the sewer pipe.
      a. Polyvinyl Chloride (PVC) Pipe: The installation of PVC pipe shall conform to the ASTM D 2321-72, "Underground Installation of Flexible Thermoplastic Sewer Pipe," and the recommended practice of the pipe manufacturer or as specified herein and in accordance with the details on the Plans.

D. Sanitary Sewer Service Connections:
   1. By definition, a sewer service connection is that part of an individual sewer lateral located on City property from the tee in the main line out to the property line of a residence or business. All work shall meet the minimum requirements of the City of Midland, Texas.

2. Requirements for bedding, laying and backfilling sewer service connections shall be the same as those required for the main sewer line.
3. Sanitary Sewer Service Connections on Existing Sewer Lines: New sewer service connection taps to existing lines shall be done using a gasketed fitting in conjunction with a full circle repair sleeve coupling. Cuts in clay pipe shall be made using a 4-inch core cutting machine that will remove the coupon from the pipe. Contractor cannot hammer or chisel, etc. the hole in clay pipe.

E. Backfill: As soon as practicable after laying and jointing of the pipe, the completion of bedding, and the completion of structures, the trench shall be backfilled in accordance with the trench backfill detail in the Plans.

F. Maintaining Existing Sewer System in Operation:
1. At several locations, as shown on the Plans, the proposed sewer will be interconnected to the existing sewer system. Contractor shall, at all times, provide adequate means to ensure continuous operations of the existing sewer system during the construction operations. This may require blocking the existing line at a manhole and pumping the sewage around the construction area. All pumping or diversion shall be the responsibility of Contractor and shall be included in the price bid for the various pipeline items.
2. Contractor shall schedule his work so that he can minimize the interruption time to the existing services along the proposed sewer line.

3.3 MANHOLES

A. General: The manholes shall be constructed at the locations shown on the Plans or as directed by Architect and in accordance with the details shown on the Plans and as specified herein. After the excavation has been completed, the subgrade for the manhole base shall be graded, leveled, and consolidated by means of tamping to achieve a minimum density of 90 percent. The testing will be as outlined in ASTM D 1557. A minimum of 6 inches of rock bedding shall be laid on the prepared subgrade and the manhole shall sit in place level and plumb.

B. Backfill: The backfill around the manholes shall be done in accordance with the details shown on the Plans.

3.4 LEAKAGE

A. Leakage tests shall be made by Contractor on all sewer lines and manholes after installation. The tests on the sewer lines shall be made on sections of pipe between manholes. Each section of sewer line shall be tested using the Air Test Methods, in accordance with ANSI/ASTM C 828 (latest revision).

B. Contractor shall use a water test to check the leakage in manholes. The leakage in the manhole being tested shall not exceed the allowable leakage for the smallest diameter pipe connected into the manhole being tested.

C. If a test fails to meet the minimum allowable requirements of the test, Contractor shall immediately determine the cause, make the necessary repairs and retest. All testing and repair work shall be done at Contractor's expense.

D. Leakage testing will not be performed until all backfill material required has been placed and densified for a period of 30 days, unless specifically authorized by Architect.

3.5 DEFLECTION TEST

A. A deflection test shall be made by Contractor on all flexible sewer pipe. The test shall not be made on a section of sewer until all the backfill on that section has been placed and densified for a period of 30 days, unless otherwise authorized by Architect.
B. The deflection test shall be run using a rigid Go No-Go mandrel with a diameter equal to 95 percent of the base inside diameter of the pipe. Contractor shall submit Shop Drawings of the mandrel to Architect for approval prior to using the mandrel for testing.
C. The test shall be performed without mechanical pulling devices. Wherever possible and practical, the testing shall be initiated at a downstream manhole and proceed upstream.
D. No pipe shall exceed a deflection of 5 percent of the base inside diameter of the pipe. All excess deflections shall be corrected. Contractor shall excavate to the point of the excess deflection, correct the deficiency, and retest the pipe. If the pipe retest fails the 5 percent allowable deflection, the pipe shall be replaced.
E. All testing and repair Work shall be done at Contractor's expense.

3.6 CLEANING UP

A. After the construction work is completed and before Final Acceptance by Owner, Contractor shall remove all rubbish and excess materials from excavations and other debris from the site of the Work, and all trench surfaces shall be bladed as heretofore specified. The cost of cleanup shall be included in the bid prices for the various units of Work.

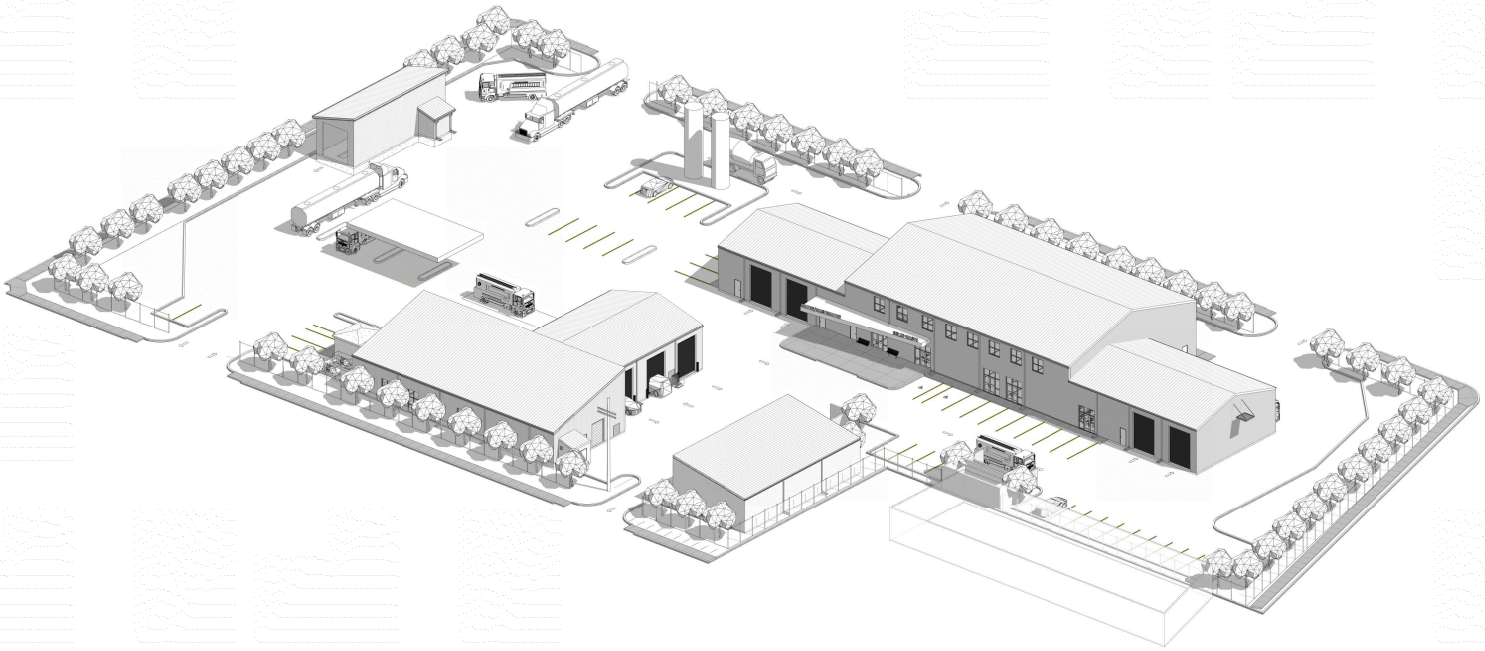
END OF SECTION

City of Midland

Midland Utilities Service Center

Water/Wastewater, Solid Waste, and Vehicle Services

401 N Carver St
Midland, TX 79701



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Parkhill

1700 W. Wall St., Suite 100
Midland, TX 79701
432.697.1447

PACKET

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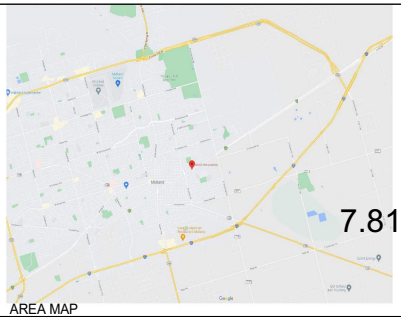
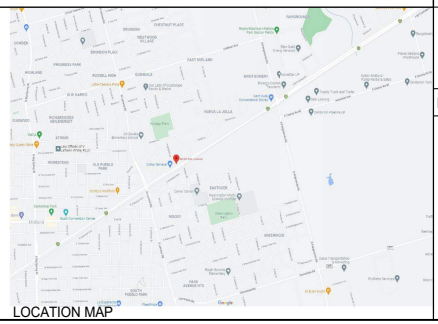
February 8 2022

AREA MAP



LOCATION MAP



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ARCHITECTURE

01/25/2022

Parkhill.com

Midland Utilities Service Center
Water/Wastewater, Solid Waste, and Vehicle Services

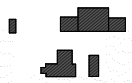
MIDLAND
Feel the Energy!

CLIENT
City of Midland

401 N Carver St
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN



#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Cover Sheet & Index

G-001

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ABBREVIATIONS

A	
ACC	ACCESSIBLE
AB	ANCHOR BOLT
ACI	AMERICAN CONCRETE INSTITUTE
AD	AREA DRAIN
ADA	AMERICANS WITH DISABILITIES ACT
ADDL	ADDITIONAL
ADJ	ADJUSTABLE
ADDM	ADDENDUM
AFF	ABOVE FINISH FLOOR
AHU	AIR HANDLING UNIT
AIA	AMERICAN INSTITUTE OF ARCHITECTS
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
ALT	ALTERNATE
ALUM	ALUMINUM
ANOD	ANODIZED
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APA	AMERICAN PLYWOOD ASSOCIATION
APPROX	APPROXIMATE
ARCH	ARCHITECT
ASCE	AMERICAN SOCIETY OF CIVIL ENGINEERS
ASTM	AMERICAN SOCIETY OF TESTING MATERIALS
AUTO	AUTOMATIC
AVG	AVERAGE
AWG	AMERICAN WIRE GAGE
AWS	AMERICAN WELDING SOCIETY
A/C	AIR CONDITIONING
B	
BAL	BALANCE
BC	BACK OF CURB
BIA	BRICK INSTITUTE OF AMERICA
BITUM	BITUMINOUS
BL	BUILDING LINE
BLDG	BUILDING
BM	BENCHMARK
BOCA	BUILDING OFFICIALS AND CODE ADMINISTRATORS INTERNATIONAL, INC.
BOX	BOTTOM OF STEEL
BOT	BOTTOM (BOTTOM FACE, LAYER, SIDE)
B PL	BASE PLATE
BRDG	BRIDGING
BRG	BEARING
BTWN	BETWEEN
BUR	BUILT-UP ROOFING
C	
C	AMERICAN STANDARD CHANNEL (STRUCTURAL SHAPE)
CU FT	CUBIC FOOT
CF/CI	CONTRACTOR FURNISHED/CONTRACTOR INSTALLED
CF/OI	CONTRACTOR FURNISHED/OWNER INSTALLED
CG	CORNER GUARD
CI	CAST IRON
CIR	CIRCLE
CIRC	CIRCULAR
CJ	CONTROL JOINT
CL	CENTER LINE
CLG	CEILING
cm	CENTIMETER
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN	CONNECT
CONSTR	CONSTRUCTION
CONT	CONTINUE
CONTR	CONTRACTOR
CROMF	CIRCUMFERENCE
CSK	COUNTER SUNK
CSI	CONSTRUCTION SPECIFICATIONS INSTITUTE
D	
D	DEPTH
DAT	DATUM
DBL	DOUBLE
DDS	DOUBLE DISPLAY STRIP
DEG	DEGREE
DEMO	DEMOLISH
DET	DETAIL
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIV	DIVIDE
DL	DEAD LOAD
DS	DOWNSPOUT
DWG	DRAWING
E	
E	EAST, MODULUS OF ELASTICITY
EA	EACH
EF	EACH FACE, EXTERIOR FINISH
EIFS	EXTERIOR INSULATION FINISH SYSTEM
EJ	EXPANSION JOINT
EL	ELEVATION
ELEC	ELECTRIC, ELECTRICAL
ELEV	ELEVATOR
ENGR	ENGINEER
EQ	EQUAL
EQUIP	EQUIPMENT
EW	EACH WAY
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EXP	EXPANSION
EXP BT	EXPANSION BOLT
EXT	EXTERIOR
F	
FD	FLOOR DRAIN
FDTN	FOUNDATION
FEB	FIRE EXTINGUISHER & BRACKET
FEC	FIRE EXTINGUISHER & CABINET
FF EL	FINISH FLOOR ELEVATION
FIN FLR	FINISH FLOOR
FIN	FINISH(ED)
FOC	FACE OF CONCRETE, FACE OF CURB
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FOW	FACE OF WALL
FRTW	FIRE RETARDANT TREATED WOOD
FS	FAR SIDE (FACE, LAYER)
FT	FOOT
FTG	FOOTING
FURG	FURRING
G	
GA	GAGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GOVT	GOVERNMENT
GYP BD	GYPSUM BOARD
GYP	GYPSUM
H	
HDBD	HARDBOARD
HDWD	HARDWOOD
HDW	HARDWARE
HEX	HEXAGON(AL)
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HP	HEAT PUMP
HS	HIGH STRENGTH
HT	HEIGHT
HVAC	HEATING VENTILATION AND AIR CONDITIONING
I	
I	MOMENT OF INERTIA
IBC	INTERNATIONAL BUILDING CODE
ID	INSIDE DIAMETER
IF	INSIDE FACE
INCL	INCLUDE(D)(ING)(S)(VE)
INS	INSULATION
INT	INTERIOR
INV	INVERT(ED)
J	
JAN	JANITOR
K	
NOT USED	

L	
l	LITER
L	ANGLE
LB	POUND
LH	LEFT HAND
LL	LIVE LOAD
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LT	LIGHT
LT WT	LIGHT WEIGHT
M	
MAU	MAKE UP AIR UNIT(S)
m	METER(S)
MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLT
MBS	METAL BUILDING SYSTEM
MCJ	MASONRY CONTROL JOINT
MECH	MECHANIC(AL)
MFG	MANUFACTURING
MFR	MANUFACTURER
MIL STD	MILITARY STANDARD
MIN	MINIMUM
MISC	MISCELLANEOUS
mm	MILLIMETER
MO	MASONRY OPENING
MOD	MODIFY
MT	METAL THRESHOLD
MTL	METAL
MLWK	MILLWORK
N	
N	NORTH
NA	NOT APPLICABLE
NAT	NATURAL
NBS	NATIONAL BUREAU OF STANDARDS
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NOM	NOMINAL
NRC	NOISE REDUCTION COEFFICIENT
NS	NEAR SIDE (FACE)
NTS	NOT TO SCALE
O	
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OFD	OVERFLOW DRAIN
OF/CI	OWNER FURNISHED/CONTRACTOR INSTALLED
OF/OI	OWNER FURNISHED/OWNER INSTALLED
OH DR	OVERHEAD DOOR
OPNG	OPENING
OPH	OPPOSITE HAND
OSHA	OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
Oz	OUNCE
P	
PAR	PARALLEL
PCA	PORTLAND CEMENT ASSOCIATION
PCF	POUNDS PER CUBIC FOOT
PCI	PRESTRESSED CONCRETE INSTITUTE
PERF	PERFORATE(D)
PERP	PERPENDICULAR
PL	PROPERTY LINE
PLAM	PLASTIC LAMINATE
PLF	POUNDS PER LINEAL FOOT
PR	PAIR
PREFAB	PREFABRICATE
PREFIN	PREFINISH
PRELIM	PRELIMINARY
PROJ	PROJECT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PBD	PARTICLE BOARD
PTD	PAPER TOWEL DISPENSER
PTDWR	PAPER TOWEL DISPENSER & WASTER RECEPTACLE
PVC	POLYVINYL CHLORIDE
PLWD	PLYWOOD
PVG	PAVING
Q	
QC	QUALITY CONTROL
QTY	QUANTITY
R	
R	RADIUS
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REF	REFERENCE
REFL	REFLECT
REINF	REINFORCE
REQD	REQUIRED
REV	REVISION
RH	RIGHT HAND(ED)
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RTU	ROOF TOP UNIT
S	
S	SOUTH
SBCCI	SOUTHERN BUILDING CODE CONGRESS INTERNATIONAL
SCHED	SCHEDULE
SD	SOAP DISPENSER
SDI	STEEL DOOR INSTITUTE
SECT	SECTION
SHT	SHEET
SIM	SIMILAR
SJI	STEEL JOIST INSTITUTE
SPEC	SPECIFICATION
SP	SOLID PLASTIC
SST	STAINLESS STEEL
STD	STANDARD
STL	STEEL
STRUCT	STRUCTURAL
SUSP	SUSPENDED
SYMM	SYMMETRICAL
T	
TRD	TREAD
TAN	TANGENT
TEMP	TEMPORARY
TFF	TOP OF FINISH FLOOR
THK	THICKNESS
TLT	TOILET
TMH	TOP OF MANHOLE
TOB	TOP OF BEAM
TOC	TOP OF CURB
TOF	TOP OF FOOTING
TOG	TOP OF GRADE
TOJ	TOP OF JOIST
TOL	TOLERANCE
TOM	TOP OF MASONRY
TOS	TOP OF STEEL
TOW	TOP OF WALL
TTD	TOILET TISSUE DISPENSER
TRANS	TRANSPARENT
TRTD	TREATED
TS	TUBE STEEL
TYP	TYPICAL
T&G	TONGUE AND GROOVE
U	
UBC	UNIFORM BUILDING CODE
UL	UNDERWRITERS LABORATORIES, INC
ULT	ULTIMATE
UNO	UNLESS NOTED OTHERWISE
UON	UNLESS OTHERWISE NOTED
V	
VAR	VARIES
VERT	VERTICAL
W	
W	WEST
WLD	WELDED
WP	WORK POINT
WWF	WELDED WIRE FABRIC
W/	WITH
W/O	WITHOUT
W/W	WALL TO WALL
X	
XFMR	TRANSFORMER
Y	
NOT USED	
Z	
NOT USED	

GENERAL DRAWING LEGEND

	NEW DOOR
	EXISTING DOOR
	PLAN NORTH ARROW TRUE NORTH PLAN NORTH
XX/XXXX	ELEVATION MARK
XX/XXXX, XX/XXXX	SECTION MARK
XX/XXXX	PLAN DETAIL MARK
A1 TITLE 1/8" = 1'-0"	DRAWING TITLE
	SHEET NUMBER WHERE REFERENCED REFERENCE NUMBER
ROOM NAME .0000	ROOM NAME ROOM NUMBER
XX	FURNISHINGS/EQUIPMENT
#	KEY NOTE
#	
#D	KEY DEMOLITION NOTE
1	REVISION
XX	STRUCTURAL COLUMN LINE
	DATUM ELEVATION (EXISTING)
	DATUM ELEVATION (NEW)
	BREAK LINE
	CENTER LINE
	MATCH/DIVIDE LINE
	NOT IN SCOPE

SHEET IDENTIFICATION FORMAT

AANNN

- AA — DISCIPLINE DESIGNATOR
- NNN — SHEET SEQUENCE NUMBER
- A — SHEET TYPE DESIGNATOR (SEE BELOW)

SHEET TYPE DESIGNATORS

0	GENERAL (COVER SHEETS, INDEX, SYMBOLS LEGEND, NOTES, ETC.)
1	PLANS (HORIZONTAL VIEWS)
2	ELEVATIONS (VERTICAL VIEWS)
3	SECTIONS (SECTIONAL VIEWS)
4	LARGE SCALE VIEWS (ENLARGED PLANS, ELEVATIONS, OR SECTIONS THAT ARE NOT DETAILS)
5	DETAILS
6	SCHEDULES
7	USER DEFINED (FOR TYPES THAT DO NOT FALL IN OTHER CATEGORIES)
8	USER DEFINED (FOR TYPES THAT DO NOT FALL IN OTHER CATEGORIES)
9	3D REPRESENTATIONS (ISOMETRICS, PERSPECTIVES, PHOTOGRAPHS)

PACKET

7.820

February 8, 2022

1/26/2022 10:28:18 AM
R_G11

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ARCHITECTURE

01/25/2022

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Midland Utilities Service Center

Water/Wastewater, Solid Waste, and Vehicle Services

MIDLAND
Feel the Energy!

CLIENT
City of Midland

401 N Carver St
Midland, TX 79701

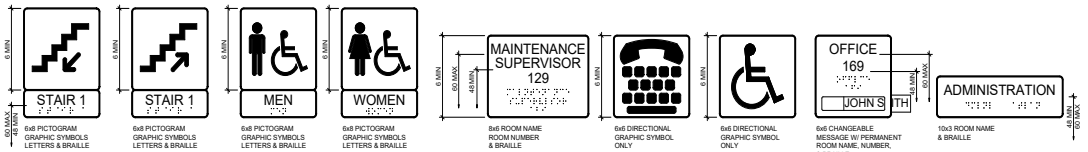
PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Symbols, Legends & Abbreviations

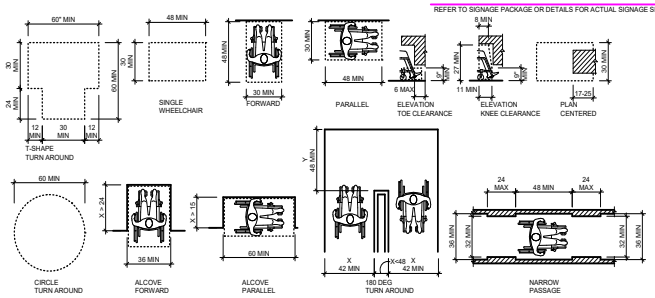
G-011



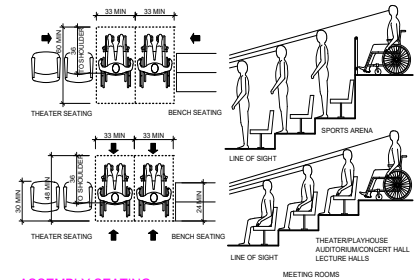
6x8 PICTOGRAM GRAPHIC SYMBOLS LETTERS & BRAILLE | 6x8 PICTOGRAM GRAPHIC SYMBOLS LETTERS & BRAILLE | 6x8 PICTOGRAM GRAPHIC SYMBOLS LETTERS & BRAILLE | 6x8 PICTOGRAM GRAPHIC SYMBOLS LETTERS & BRAILLE | 8x6 ROOM NAME ROOM NUMBER & BRAILLE | 6x6 DIRECTIONAL GRAPHIC SYMBOL ONLY | 6x6 DIRECTIONAL GRAPHIC SYMBOL ONLY | 6x6 CHANGEABLE MESSAGE W/ PERMANENT ROOM NAME, NUMBER, & BRAILLE | 10x3 ROOM NAME & BRAILLE

EXAMPLE SIGNAGE - SEE STANDARD ACCESSIBLE MOUNTING HEIGHT

REFER TO SIGNAGE PACKAGE OR DETAILS FOR ACTUAL SIGNAGE SPECIFIED

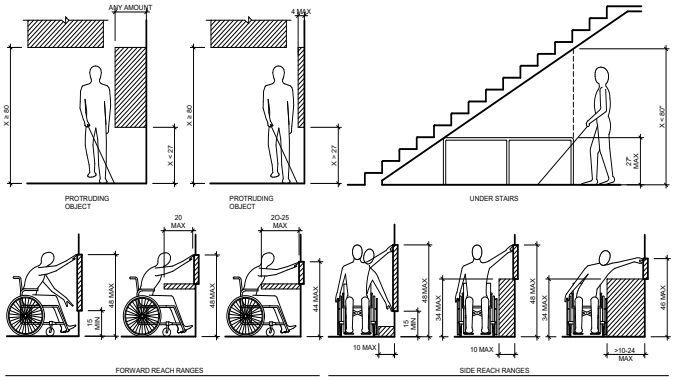


CLEAR FLOOR AREA/ACCESSIBLE ROUTE

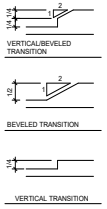


ASSEMBLY SEATING

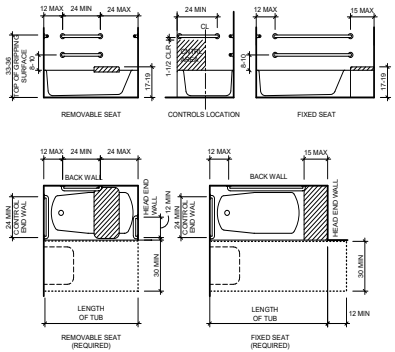
CHILDREN'S MOUNTING HEIGHTS & REACH RANGES	AGES: 3 AND 4	AGES: 5 THROUGH 8	AGES: 9 THROUGH 12
REACH RANGES HIGH LOW	 36 20	 40 18	 44 16
RAMPS AND STAIRS TOP OF HANDRAIL GRIPPING SURFACE	 28 MAX	 28 MAX	 28 MAX
WATER CLOSETS WATER CLOSET CENTERLINE GRAB BARS DISPENSER HEIGHT	 12 18-20 14	 12-15 20-25 14-17	 15-18 25-27 17-19
FIXED OR BUILT-IN SEATING AND TABLES, READING AND STUDY AREAS, AND WORK STATIONS HEIGHT OF TABLES OR COUNTERS KNEE CLEARANCE	AGES: 5 & YOUNGER PARALLEL APPROACH ALLOWED	AGES: 6-12 26-30 MAX 24 MIN	



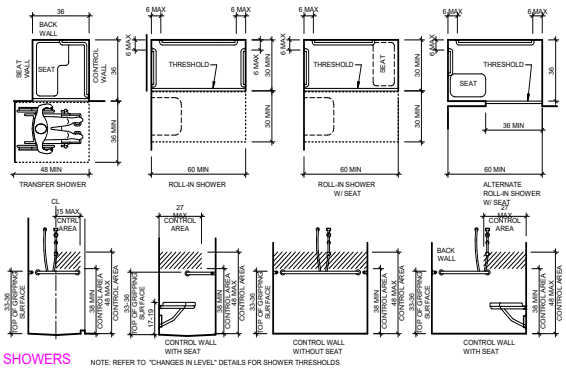
PROTRUDING OBJECT PROTECTION/REACH RANGES



CHANGES IN LEVEL

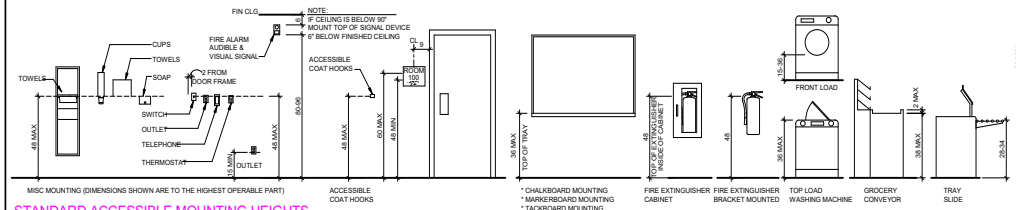


TUBS

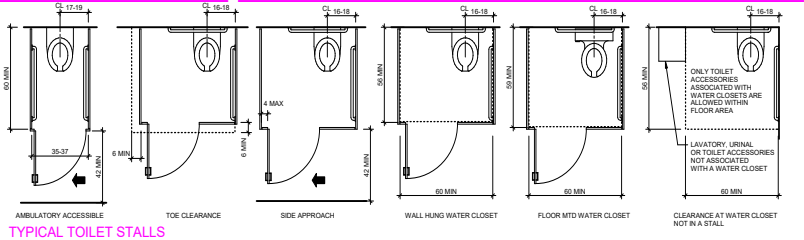


SHOWERS

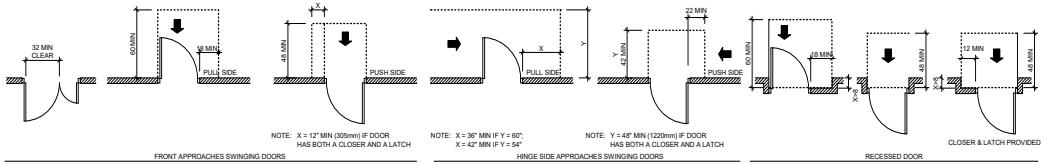
NOTE: REFER TO "CHANGES IN LEVEL" DETAILS FOR SHOWER THRESHOLDS



STANDARD ACCESSIBLE MOUNTING HEIGHTS



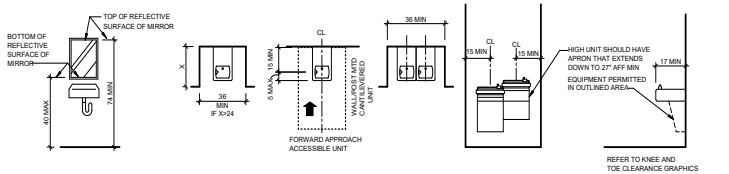
TYPICAL TOILET STALLS



NOTE: X = 12" MIN (305mm) IF DOOR HAS BOTH A CLOSER AND A LATCH

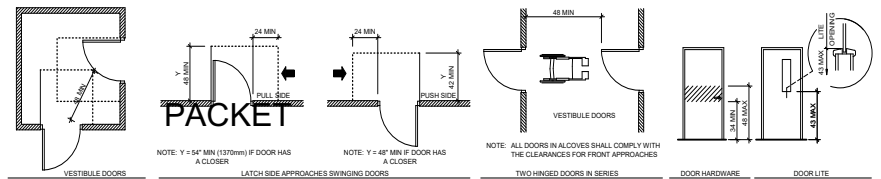
NOTE: X = 36" MIN IF Y = 60"; X = 42" MIN IF Y = 54"

NOTE: Y = 48" MIN (1220mm) IF DOOR HAS BOTH A CLOSER AND A LATCH



REFLECTIVE SURFACE

EWC/DRINKING FOUNTAINS

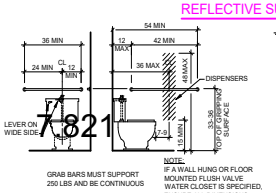


NOTE: Y = 54" MIN (1370mm) IF DOOR HAS A CLOSER

NOTE: Y = 48" MIN IF DOOR HAS A CLOSER

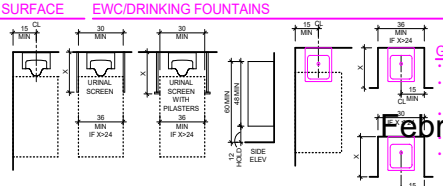
NOTE: ALL DOORS IN ALCOVES SHALL COMPLY WITH THE CLEARANCES FOR FRONT APPROACHES

TYPICAL DOOR CLEARANCES



NOTE: IF A WALL HUNG OR FLOOR MOUNTED FLUSH VALVE WATER CLOSET IS SPECIFIED, ENSURE ALL DIMENSIONS SHOWN ARE MET.

TYPICAL WATER CLOSETS



URINALS

LAVATORIES

GENERAL NOTES

- ACCESSIBILITY GUIDELINE SHEETS ARE BASED ON THE 2012 TEXAS ACCESSIBILITY STANDARDS (TAS).
- ACCESSIBILITY GUIDELINE SHEETS ARE FOR INFORMATIONAL PURPOSES ONLY AND INTENDED TO SERVE AS A GUIDE FOR CONSTRUCTION PROFESSIONALS AND OWNERS.
- SOME OF THE INFORMATION ADDRESSED IN THESE GUIDELINES MAY NOT BE APPLICABLE TO ALL SITUATIONS.
- ALL DIMENSIONS ARE FOR NEW CONSTRUCTION AND FIXTURE MOUNTING HEIGHTS.
- GRAPHICS SHOWN ARE FOR ADULTS.

PACKET 7821 February 8, 2022

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Water/Wastewater, Solid Waste, and Vehicle Services

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401 N Carver St
Midland, TX 79701

PROJECT NO.
6077.21

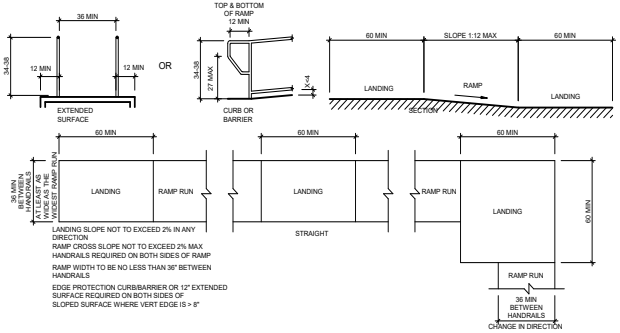
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

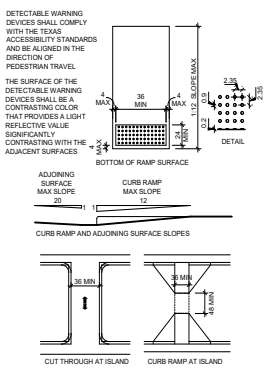
Accessibility Standards

G-021

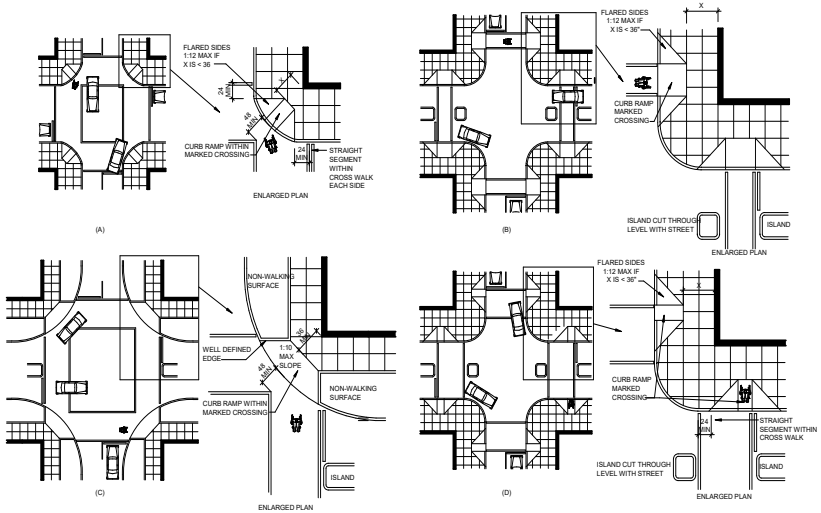
1/26/2022 10:28:19 AM
G-021



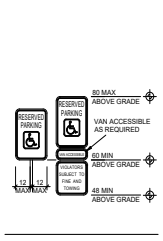
ACCESSIBLE RAMP



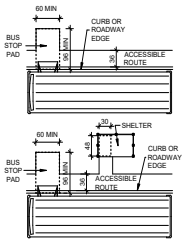
CURB RAMPS



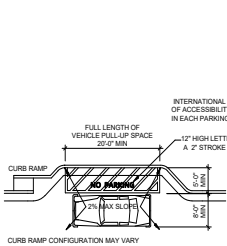
CURB RAMPS AT MARKED CROSSINGS



ACCESSIBLE PARKING SIGNAGE

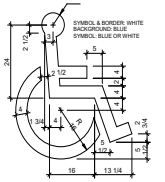


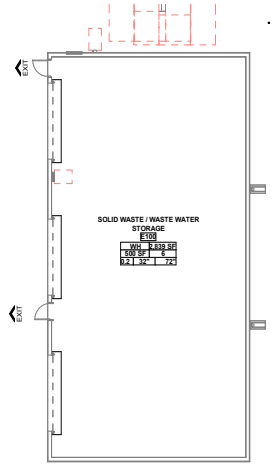
BUS STOPS



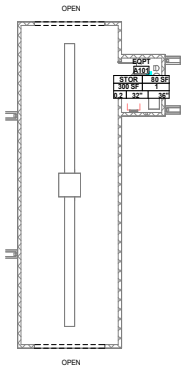
PASSENGER LOADING ZONE

PARKING SPACES

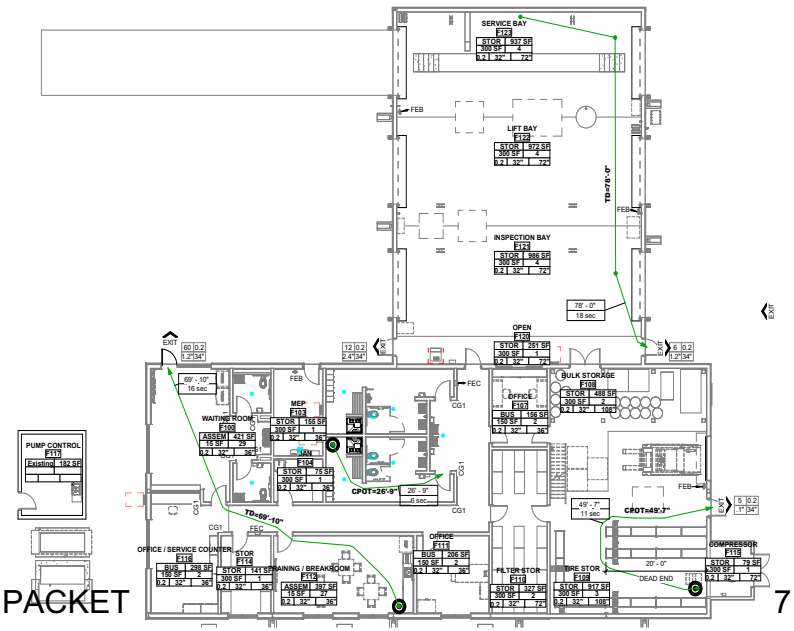

R 4
SYMBOL & BORDER: WHITE
BACKGROUND: BLUE
SYMBOL: BLUE OR WHITE
2 1/2
24
6
12
4
3
4
3
4
3



D1 CODE FLOOR PLAN - AREA E
1" = 10'-0"



D3 CODE FLOOR PLAN - AREA A
1" = 10'-0"



A1 CODE FLOOR PLAN - AREA F
1" = 10'-0"

EGRESS

BUILDING: AREA F

TOTAL OCCUPANT LOAD FOR THE BUILDING	87 PEOPLE
TOTAL OCCUPANT LOAD EGRESS WILL ACCOMMODATE	680 PEOPLE
EGRESS WIDTH REQUIRED	
87 X 0.2 (SECTION 1005.3.1 FOR STAIRS; 1005.3.2 FOR OTHERS)	17.4" INCHES
EGRESS PROVIDED	136 INCHES
MAXIMUM ALLOWABLE TRAVEL DISTANCE (TABLE 1017.2)	300 FEET (SPRINKLED)
LONGEST TRAVEL DISTANCE	78 FEET (SPRINKLED)
MAXIMUM DEAD END LIMIT (SECTION 1020.4)	50 FEET
MAXIMUM DEAD END LIMIT PROVIDED	20 FEET
MAXIMUM COMMON PATH OF EGRESS TRAVEL (TABLE 1006.2.1)	75 FEET
COMMON PATH OF EGRESS TRAVEL PROVIDED	27 FEET
TWO EXITS REQUIRED WHERE DESIGN OCCUPANT LOAD EXCEEDS VALUES LISTED (TABLE 1006.2.1)	
MINIMUM NUMBER OF EXITS FOR OCCUPANT LOAD (TABLE 1006.3.2)	
1-500	2 EXITS
501-1000	3 EXITS
MORE THAN 1000	4 EXITS

FRONTAGE AND AREA INCREASES

BUILDING: AREA F

DESIGN CONDITIONS	PROVIDED	ALLOWED (BEFORE INCREASE)		
	N/A			
PERIMETER ALLOWED (FT) (F)		GROUP H	GROUP R	ALL OTHERS
PERIMETER TOTAL (FT) OF ENTIRE BUILDING (P)	437'-9"			
WIDTH OF PUBLIC WAY OR OPEN SPACE (W)	30'			
INCREASE (PERCENT) DUE TO FRONTAGE (LF)		-	-	NOT REQUIRED
OCCUPANCY CLASSIFICATION	S-1	-	-	-
CONSTRUCTION TYPE	II-B			
FLOOR AREA - FIRST FLOOR	10,147 SF	-	-	52,500 SF
TOTAL FLOOR AREA-INCLUDING ALL FLOORS	10, 147 SF			
STORIES	1	-	-	-
BUILDING HEIGHT	27'-1"	-	-	75
SPRINKLER SYSTEM PROVIDED	YES			
SPRINKLER SYSTEM TYPE	NEPA13			

LEGEND

EXIT — EGRESS EXIT REQUIRED

200' — EGRESS PATH AND TRAVEL DISTANCE

1 HOUR FIRE - UF411 - 6" STUD+5/8 GYP BOTH SIDES +INSULATION

200' — DISTANCE BETWEEN EXITS

EW=36" — EXIT WIDTH PROVIDED AT SPECIFIC EXIT

GSF — GROSS SQUARE FOOT

NSF — NET SQUARE FOOT

FEC — FIRE EXTINGUISHER CABINET

TD — TRAVEL DISTANCE

CPOT — COMMON PATH OF TRAVEL

(M)DBE — (MINIMUM) DISTANCE BETWEEN EXITS

OL — OCCUPANT LOAD

ASSEM 2080 / 15 NET 139 / .2 27.8" 140" — FUNCTION OF SPACE (TABLE 1004.1.2); TOTAL FLOOR AREA (SF); CALCULATED OCCUPANT LOAD OF SPACE; EGRESS WIDTH PROVIDED (INCHES); MINIMUM EGRESS WIDTH REQUIRED (INCHES); EGRESS WIDTH FACTOR (SECTION 1005.3.1 FOR STAIRS; 1005.3.2 FOR OTHERS); FLOOR AREA (SF) PER OCCUPANT (TABLE 1004.1.2)

459 0.2 / 32" 36" — TOTAL OCCUPANT LOAD PER EXIT; EGRESS WIDTH FACTOR (SECTION 1005.3.1 FOR STAIRS; 1005.3.2 FOR OTHERS); EGRESS WIDTH PROVIDED (INCHES); MINIMUM EGRESS WIDTH REQUIRED (INCHES)

GENERAL CONSTRUCTION INFORMATION

APPLICABLE CODES:

BUILDING	IBC 2018
PLUMBING	IPC 2018
MECHANICAL	IMC 2018
ELECTRICAL	NEC 2017
FIRE	IFC 2015
ENERGY	ECC 2015
ACCESSIBILITY	2012 TAS, 2010 ADA/SAD
OTHER	XXX

FIRE PROTECTION RQMTS (TABLE 601)

CONSTRUCTION TYPE: TYPE II-B

STRUCTURAL FRAME	0 HOUR(S)
EXTERIOR BEARING WALLS	0 HOUR(S)
INTERIOR BEARING WALLS	0 HOUR(S)
FLOOR CONSTRUCTION	0 HOUR(S)
ROOF CONSTRUCTION	0 HOUR(S)
EXTERIOR WALLS (TABLE 602)	0 HOUR(S) TYPE OF FIRE DOORS 0 HR.
CORRIDORS (TABLE 1020.1)	0 HOUR(S) W/ SPRINKLER SYSTEM

SPRINKLED BUILDING: BCD

ENVELOPE RQMTS

OPAQUE ELEMENTS

ROOF (ZONE 3) INSULATION ABOVE DECK	R-19+r-11 LS
WALLS ABOVE GRADE (ZONE 3) METAL FRAMED	R-13 + 6.5ci
DOORS (ZONE 3) SWINGING / NONSWINGING	R-4.75

FENESTRATION

VERTICAL GLAZING (ZONE X) METAL FRAMING (CW / SF) ENTRANCE DOORS	AS SPEC.

OCCUPANT LOAD (TAB 1004.5)

FUNCTION OF SPACE	OCCUPANT PER SF
ACCESSORY STORAGE AREAS, MECHANICAL EQUIPMENT ROOM	300 GROSS
AGRICULTURAL BUILDING	300 GROSS
AIRCRAFT HANGARS	500 GROSS
AIRPORT TERMINAL	
BAGGAGE CLAIM	20 GROSS
BAGGAGE HANDLING	300 GROSS
CONCOURSE	100 GROSS
WAITING AREAS	15 GROSS
ASSEMBLY	
GAMING FLOORS (KENO, SLOTS, ETC.)	11 GROSS
EXHIBIT GALLERY AND MUSEUM	30 NET
ASSEMBLY W/ FIXED SEATS	SEE SECTION 1004.6
ASSEMBLY WITHOUT FIXED SEATS	
CONCENTRATED (CHAIRS ONLY-NOT FIXED)	7 NET
STANDING SPACE	5 NET
UNCONCENTRATED (TABLES AND CHAIRS)	15 NET
BOWLING CENTERS, ALLOW 5 PERSONS FOR EACH LANE INCLUDING 15 FEET OF RUNWAY, AND FOR ADDITIONAL AREAS	7 NET
BUSINESS AREAS	150 GROSS
CONCENTRATED BUSINESS USE AREA	SEE SECTION 1004.8
COURT ROOMS-OTHER THAN FIXED SEATING AREAS	40 NET
DAY CARE	35 NET
DORMITORIES	50 GROSS
EDUCATIONAL	
CLASSROOM AREA	20 NET
SHOPS AND OTHER VOCATIONAL ROOM AREAS	50 NET
EXERCISE ROOMS	50 GROSS
H-5 FABRICATION AND MANUFACTURING AREAS	200 GROSS
INDUSTRIAL AREAS	100 GROSS
INSTITUTIONAL AREAS	
INPATIENT TREATMENT AREAS	240 GROSS
OUTPATIENT AREAS	100 GROSS
SLEEPING AREAS	120 GROSS
KITCHENS, COMMERCIAL	200 GROSS
LIBRARY	
READING ROOM	50 NET
STACK AREA	100 GROSS
LOCKER ROOMS	50 GROSS
MALL BUILDINGS - COVERED AND OPEN	SEE SECTION 402.8.2
MERCANTILE	
AREAS ON OTHER FLOORS	60 GROSS
STORAGE, STOCK, SHIPPING AREAS	300 GROSS
PARKING GARAGES	200 GROSS
RESIDENTIAL	200 GROSS
SKATING RINKS, SWIMMING POOLS	
RINK AND POOL	50 GROSS
DECKS	15 GROSS
STAGES AND PLATFORMS	15 NET
WAREHOUSES	500 GROSS

OCCUPANT LOAD	# OF PEOPLE
ASSEMBLY X,XXX SF @ 15 SF PER PERSON	X
BUSINESS X,XXX SF @ 100 SF PER PERSON	X
STORAGE/MECHANICAL X,XXX SF @ 300 SF PER PERSON	X
TOTAL	X

GENERAL NOTES

1. UL ASSEMBLIES INDICATED ESTABLISH BASIS PERFORMANCE. OTHER ASSEMBLIES MAY BE CONSIDERED AT DISCRETION OF ARCHITECT IF EQUIVALENT PERFORMANCE IS PROVIDED. SUBSTITUTION PROPOSALS SHALL INCLUDE CHANGES REQUIRED TO COMPONENTS OF ASSEMBLY.
2. FIRE EXTINGUISHERS. (IFC SECTION 906 AND NFPA 10; CHAPTER 6 AND TABLE 6.2.1.1, CLASS A - LIGHT HAZARD OCCUPANCY) MAXIMUM FLOOR AREA FOR UNIT - 11,250 SF; MAXIMUM TRAVEL DISTANCE TO EXTINGUISHER - 75 FT.

PLUMBING FIXTURE RQMTS - IPC - BUILDING F

OCCUPANCY			WATER CLOSETS				LAVATORIES				DRINKING FOUNTAINS		OTHER
USE	DESCRIPTION	LOAD	RATIO	MALE	RATIO	FEMALE	RATIO	MALE	RATIO	FEMALE	DF RATIO	DF	
B	BUSINESS	6	1 per 25	0.12	1 per 25	0.12	1 per 40	0.08	1 per 40	0.08	1 per 100	0.03	1 service sink
S-1 S-2	STORAGE	25	1 per 100	0.13	1 per 100	0.13	1 per 100	0.13	1 per 100	0.13	1 per 1,000	0.01	
A3	ASSEMBLY	56	1 per 75	0.22	1 per 75	0.43	1 per 200	0.14	1 per 200	0.14	1 per 500	0.6	
SUBTOTALS				0.47		0.68		0.35		0.35		0.10	
REQUIRED TOTALS				1		1		1		1		1	1

REQUIRED TOTALS W/ URINAL SUBSTITUTION	MALE TOILET FACILITY			FEMALE TOILET FACILITY		DRINKING FOUNTAIN	SERVICE SINK	FAMILY OR ASSISTED USE	
	URINAL	W/C	LAV	W/C	LAV				
	#	1	1	1	1	1	1	#	#
PROVIDED TOTAL	1	2	3	3	3	1	1	#	#

PACKET 7.823 February 8, 2022

Parkhill

THIS DOCUMENT IS RELEASED ON 01-25-2022 FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF R. ASHLEY COCO LICENSE #15122. IT IS NOT TO BE USED FOR REGULATORY APPROVAL, CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

ARCHITECTURE

01/25/2022

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Midland Utilities Service Center

Water/Wastewater, Solid Waste, and Vehicle Services

MIDLAND Feel the Energy!

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City of Midland

401 N Carver St
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Code Information

G-101

1/26/2022 10:29:23 AM

EGRESS

BUILDING: AREA BCD

TOTAL OCCUPANT LOAD FOR THE BUILDING	87 PEOPLE
TOTAL OCCUPANT LOAD EGRESS WILL ACCOMMODATE	680 PEOPLE
EGRESS WIDTH REQUIRED	
87 X 0.2 (SECTION 1005.3.1 FOR STAIRS; 1005.3.2 FOR OTHERS)	17.4" INCHES
EGRESS PROVIDED	136 INCHES
MAXIMUM ALLOWABLE TRAVEL DISTANCE (TABLE 1017.2)	300 FEET (SPRINKLED)
LONGEST TRAVEL DISTANCE	128 FEET (SPRINKLED)
MAXIMUM DEAD END LIMIT (SECTION 1020.4)	50 FEET
MAXIMUM DEAD END LIMIT PROVIDED	8 FEET
MAXIMUM COMMON PATH OF EGRESS TRAVEL (TABLE 1006.2.1)	75 FEET
COMMON PATH OF EGRESS TRAVEL PROVIDED	21 FEET
TWO EXITS REQUIRED WHERE DESIGN OCCUPANT LOAD EXCEEDS VALUES LISTED (TABLE 1006.2.1)	
MINIMUM NUMBER OF EXITS FOR OCCUPANT LOAD (TABLE 1006.3.2)	
1-500	2 EXITS
501-1000	3 EXITS
MORE THAN 1000	4 EXITS

GENERAL CONSTRUCTION INFORMATION

APPLICABLE CODES:

BUILDING	IBC 2018
PLUMBING	IPC 2018
MECHANICAL	IMC 2018
ELECTRICAL	NEC 2017
FIRE	IFC 2015
ENERGY	IECC 2015
ACCESSIBILITY	2012 TAS, 2010 ADA/SAD
OTHER	XXX

FIRE PROTECTION RQMTS (TABLE 601)

CONSTRUCTION TYPE: TYPE II-B

STRUCTURAL FRAME	0 HOUR(S)
EXTERIOR BEARING WALLS	0 HOUR(S)
INTERIOR BEARING WALLS	0 HOUR(S)
FLOOR CONSTRUCTION	0 HOUR(S)
ROOF CONSTRUCTION	0 HOUR(S)
EXTERIOR WALLS (TABLE 602)	0 HOUR(S) TYPE OF FIRE DOORS 0 HR.
CORRIDORS (TABLE 1020.1)	0 HOUR(S) W/ SPRINKLER SYSTEM

SPRINKLED BUILDING: BCD

FRONTAGE AND AREA INCREASES

BUILDING: AREA BCD

DESIGN CONDITIONS	PROVIDED	ALLOWED (BEFORE INCREASE)		
		GROUP H	GROUP R	ALL OTHERS
PERIMETER ALLOWED (FT) (F)	2'-0"			
PERIMETER TOTAL (FT) OF ENTIRE BUILDING (P)	N/A			
WIDTH OF PUBLIC WAY OR OPEN SPACE (W)	30'			
INCREASE (PERCENT) DUE TO FRONTAGE (LF)		-	-	NOT REQUIRED
OCCUPANCY CLASSIFICATION	MIXED	-	-	-
CONSTRUCTION TYPE	II-B			
FLOOR AREA - FIRST FLOOR	17,613 SF	-	-	28,500 SF
TOTAL FLOOR AREA-INCLUDING ALL FLOORS	27,978 SF			
STORIES	1	-	-	-
BUILDING HEIGHT	35'-9"	-	-	75
SPRINKLER SYSTEM PROVIDED	YES			
SPRINKLER SYSTEM TYPE	NEPA13			

ENVELOPE RQMTS

OPAQUE ELEMENTS

ROOF (ZONE 3)	
INSULATION ABOVE DECK	R-19 + R-11 LS
WALLS ABOVE GRADE (ZONE 3)	
METAL FRAMED	R-13 + 6.5ci
DOORS (ZONE 3)	
SWINGING	R-4.75
NONSWINGING	

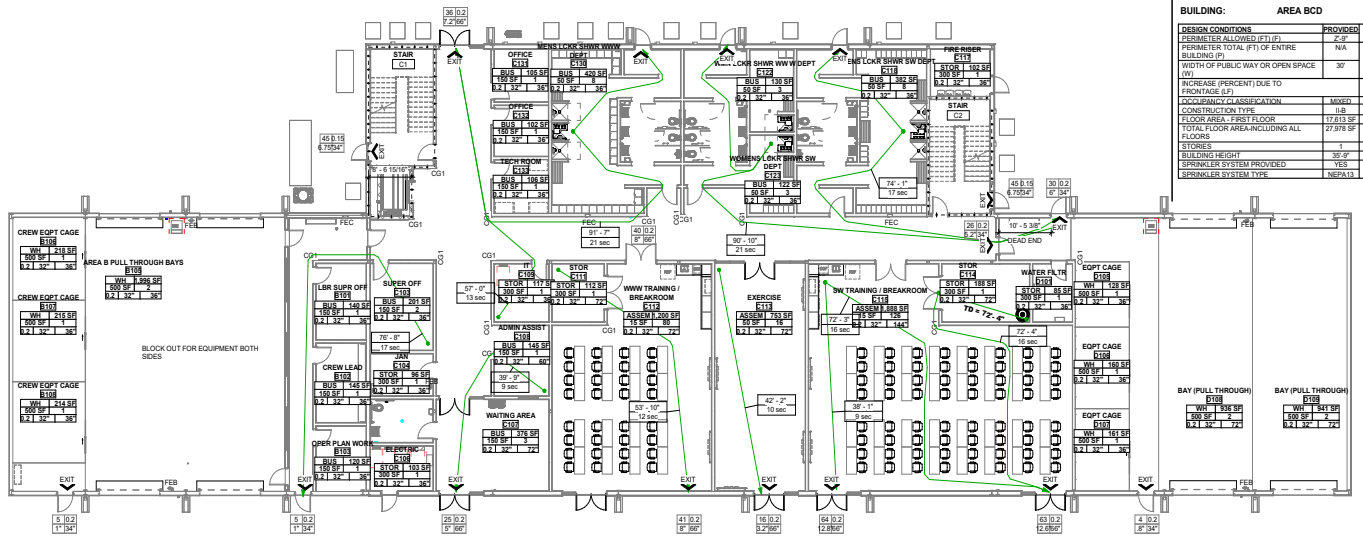
FENESTRATION

VERTICAL GLAZING (ZONE X)	
METAL FRAMING (CW / SF)	AS SPEC.
ENTRANCE DOORS	

OCCUPANT LOAD (TAB 1004.5)

FUNCTION OF SPACE	OCCUPANT PER SF
ACCESSORY STORAGE AREAS, MECHANICAL, EQUIPMENT ROOM	300 GROSS
AGRICULTURAL BUILDING	300 GROSS
AIRCRAFT HANGARS	500 GROSS
AIRPORT TERMINAL	
BAGGAGE CLAIM	20 GROSS
BAGGAGE HANDLING	300 GROSS
CONCOURSE	100 GROSS
WAITING AREAS	15 GROSS
ASSEMBLY	
GAMING FLOORS (KENO, SLOTS, ETC.)	11 GROSS
EXHIBIT GALLERY AND MUSEUM	30 NET
ASSEMBLY W/ FIXED SEATS	SEE SECTION 1004.6
ASSEMBLY WITHOUT FIXED SEATS	
CONCENTRATED (CHAIRS ONLY-NOT FIXED)	7 NET
STANDING SPACE	5 NET
UNCONCENTRATED (TABLES AND CHAIRS)	15 NET
BOWLING CENTERS, ALLOW 5 PERSONS FOR EACH LANE INCLUDING 15 FEET OF RUNWAY, AND FOR ADDITIONAL AREAS	7 NET
BUSINESS AREAS	150 GROSS
CONCENTRATED BUSINESS USE AREA	SEE SECTION 1004.8
COURT ROOMS-OTHER THAN FIXED SEATING AREAS	40 NET
DAY CARE	35 NET
DORMITORIES	50 GROSS
EDUCATIONAL	
CLASSROOM AREA	20 NET
SHOPS AND OTHER VOCATIONAL ROOM AREAS	50 NET
EXERCISE ROOMS	50 GROSS
H-5 FABRICATION AND MANUFACTURING AREAS	200 GROSS
INDUSTRIAL AREAS	100 GROSS
INSTITUTIONAL AREAS	
INPATIENT TREATMENT AREAS	240 GROSS
OUTPATIENT AREAS	100 GROSS
SLEEPING AREAS	120 GROSS
KITCHENS, COMMERCIAL	200 GROSS
LIBRARY	
READING ROOM	50 NET
STACK AREA	100 GROSS
LOCKER ROOMS	50 GROSS
MALL BUILDINGS - COVERED AND OPEN	SEE SECTION 402.8.2
MERCANTILE	
AREAS ON OTHER FLOORS	60 GROSS
STORAGE, STOCK, SHIPPING AREAS	300 GROSS
PARKING GARAGES	200 GROSS
RESIDENTIAL	200 GROSS
SKATING RINKS, SWIMMING POOLS	
RINK AND POOL	50 GROSS
DECKS	15 GROSS
STAGES AND PLATFORMS	15 NET
WAREHOUSES	500 GROSS

OCCUPANT LOAD	# OF PEOPLE
ASSEMBLY X,XXX SF @ 15 SF PER PERSON	X
BUSINESS X,XXX SF @ 100 SF PER PERSON	X
STORAGE/MECHANICAL X,XXX SF @ 300 SF PER PERSON	X
TOTAL	X



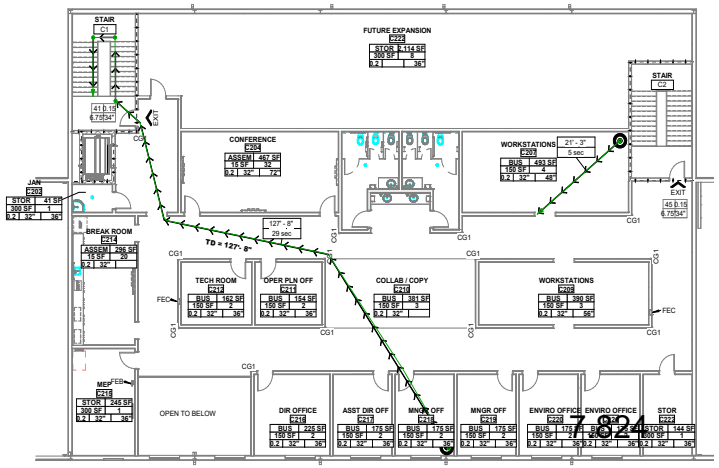
B1 CODE FLOOR PLAN - AREA B, C, & D
1" = 10'-0"

LEGEND

- EXIT — EGRESS EXIT REQUIRED
- 200' — EGRESS PATH AND TRAVEL DISTANCE
- 1 HOUR FIRE - UF411 - 6" STUD+5/8 GYP BOTH SIDES +INSULATION
- 200' — DISTANCE BETWEEN EXITS
- EW=36" — EXIT WIDTH PROVIDED AT SPECIFIC EXIT
- GSF — GROSS SQUARE FOOT
- NSF — NET SQUARE FOOT
- FEC — FIRE EXTINGUISHER CABINET
- TD — TRAVEL DISTANCE
- CPOT — COMMON PATH OF TRAVEL
- (M)DBE — (MINIMUM) DISTANCE BETWEEN EXITS
- OL — OCCUPANT LOAD

ASSEM | 2080 — FUNCTION OF SPACE (TABLE 1004.1.2)
15 NET | 139 — TOTAL FLOOR AREA (SF)
.2 | 27.8" | 140" — CALCULATED OCCUPANT LOAD OF SPACE; EGRESS WIDTH PROVIDED (INCHES); MINIMUM EGRESS WIDTH REQUIRED (INCHES)
EGRESS WIDTH FACTOR (SECTION 1005.3.1 FOR STAIRS; 1005.3.2 FOR OTHERS)
FLOOR AREA (SF) PER OCCUPANT (TABLE 1004.1.2)

459 | 0.2 | 32" | 36" — TOTAL OCCUPANT LOAD PER EXIT; EGRESS WIDTH FACTOR (SECTION 1005.3.1 FOR STAIRS; 1005.3.2 FOR OTHERS); EGRESS WIDTH PROVIDED (INCHES); MINIMUM EGRESS WIDTH REQUIRED (INCHES)



A2 SECOND FLOOR - CODE PLAN - AREA C
1" = 10'-0"

PLUMBING FIXTURE RQMTS - IPC - BUILDING AREA BCD

OCCUPANCY			WATER CLOSETS				LAVATORIES				DRINKING FOUNTAINS		OTHER
USE	DESCRIPTION	LOAD	RATIO	MALE	RATIO	FEMALE	RATIO	MALE	RATIO	FEMALE	DF RATIO	DF	
B	BUSINESS	59	1 per 25	1.2	1 per 25	1.2	1 per 40	0.72	1 per 40	0.75	1 per 100	0.59	1 service sink
S-1 S-2	STORAGE	36	1 per 100	0.19	1 per 100	0.19	1 per 100	0.19	1 per 100	0.19	1 per 1,000	0.04	
A3	ASSEMBLY	336	1 per 75	2.17	1 per 75	2.17	1 per 200	0.82	1 per 200	0.82	1 per 500	0.65	
SUBTOTALS				3.56		3.56		1.75		1.75		1.28	1
REQUIRED TOTALS				4		4		2		2		2	1

REQUIRED TOTALS W URINAL SUBSTITUTION	MALE TOILET FACILITY			FEMALE TOILET FACILITY		DRINKING FOUNTAINS	SERVICE SINK	FAMILY OR ASSISTED USE
	URINAL	W/C	LAV	W/C	LAV			
	0	4	2	4	2	2	1	#
PROVIDED TOTAL	4	7	6	7	6	2	2	#

*1 W/C & LAV REQUIREMENT FOR FEMALE WILL BE ACCOMPLISHED THROUGH THE FAMILY OR ASSISTED USE RESTROOM

GENERAL NOTES

1. UL ASSEMBLIES INDICATED ESTABLISH BASIS PERFORMANCE. OTHER ASSEMBLIES MAY BE CONSIDERED AT DISCRETION OF ARCHITECT IF EQUIVALENT PERFORMANCE IS PROVIDED. SUBSTITUTION PROPOSALS SHALL INCLUDE CHANGES REQUIRED TO COMPONENTS OF ASSEMBLY.
2. FIRE EXTINGUISHERS, (IFC SECTION 906 AND NFPA 10, CHAPTER 6 AND TABLE 6.2.1.1, CLASS A - LIGHT HAZARD OCCUPANCY) MAXIMUM FLOOR AREA FOR UNIT - 11,250 SF, MAXIMUM TRAVEL DISTANCE TO EXTINGUISHER - 75 FT.

PACKET Page 7 of 30 February 8, 2022

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01/25/2022

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Midland Utilities Service Center
Water/Wastewater, Solid Waste, and Vehicle Services

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CLIENT
City of Midland

401 N Carver St
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

- 01/25/2022 Owner Review

#	DATE	DESCRIPTION

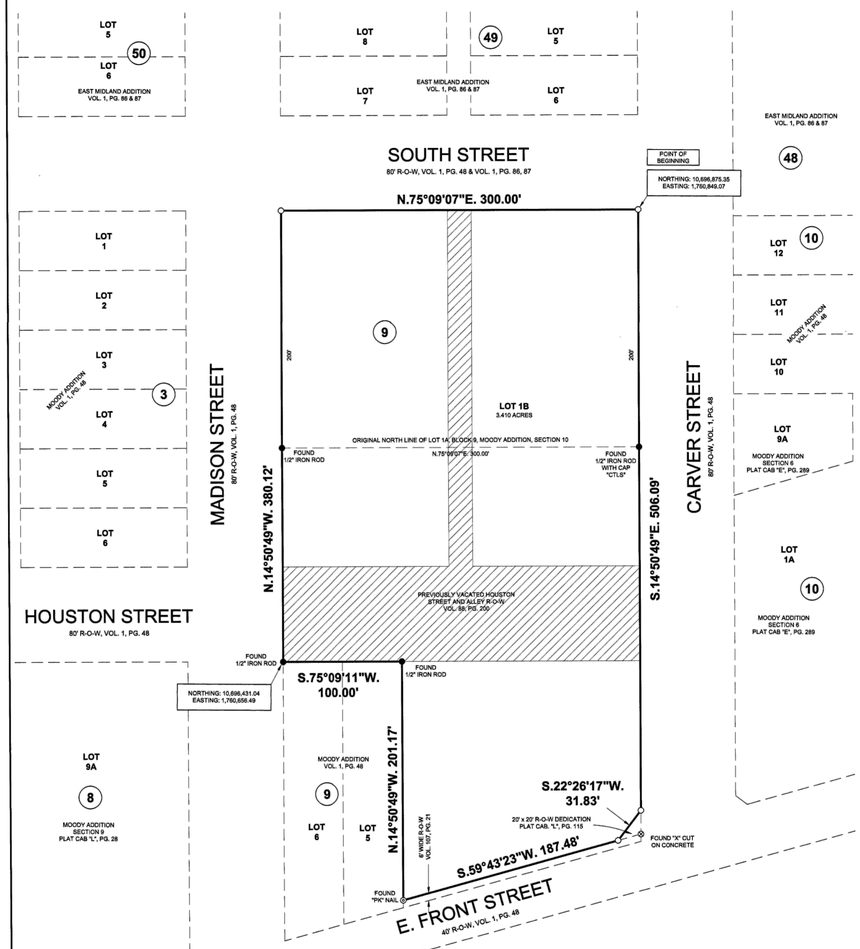
Code Information

G-102

1/26/2022 10:29:35 AM

MOODY ADDITION
SECTION 14

Being a re-plat of all of Lot 1A, Block 9, Moody Addition, Section 10 and all of Lots 1-4 and 10-12, Block 2, Moody Addition, City and County of Midland, Texas



NORTH

50' 25' 0 50'

Original Scale: 1" = 50'

STATE OF TEXAS
COUNTY OF HARRIS

WHEREAS, THE CITY OF MIDLAND is the record owner of Lot 1B, Block 9, Moody Addition, Section 14, City and County of Midland, and more particularly described, shown on the plat hereon.

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS :

That we, the City of Midland, do hereby adopt this plat designating the herein above described property as MOODY ADDITION, SECTION 14, City and County of Midland, Texas, and we do hereby dedicate to the public use forever the streets, and easements shown thereon.

WITNESS our hands at Midland, Texas, this the___ day of_____2021.

By:_____

NAME_____ Title_____

STATE OF TEXAS :
COUNTY OF MIDLAND :

This instrument was acknowledged before me

on_____, 2021

by_____

on behalf of THE CITY OF MIDLAND.

_____
Notary Public Signature

NOTES:

1. Selling a portion of this addition by metes and bounds may be a violation of city ordinance and state law and subject to fines and withholding of utilities and building permits.
2. A blanket easement of ingress and egress is hereby granted for Moody Addition Section 14 to the City of Midland for garbage and trash collection and location and maintenance of trash containers, save and except those areas occupied by a building or structure. Said easement is conditioned such that no construction shall commence on said lot until exact location of said containers and the easements in connection therewith have been selected and approved by the director of utilities.
3. Approval of a site plan by the City of Midland may be required before these lots may be developed or before a building permit may be obtained.
4. Initial impact fees will be assessed during the final platting process. Implementation and collection of impact fees will take place during the building permit process. Additional impact fees or increases in fees may not be assessed against the tract unless the number of service units to be developed on the tract increases.

UTILITY COMPANY'S CERTIFICATE

This plat has been checked for accessibility of utilities.

David Hutchason — Digitally signed by David Hutchason Date: 2021.11.10 17:42:39 -06'00'
Oncor Electric Delivery Service (PLEASE PRINT)

AT&T Texas (PLEASE PRINT)

Mark Lieb
Atmos Energy (PLEASE PRINT)

Luis.Montez — Digitally signed by Luis.Montez Date: 2021.10.22 08:34:17 -05'00'
SuddenLink Communications (PLEASE PRINT)

Grande Communications (PLEASE PRINT)

FLOOD ZONE INFORMATION

Based on the U.S. Department of Housing and Urban Development, Federal Insurance Administration Flood Hazard Boundary Map, Community Number 480477, Map Number 48329C0089F & 48329C0093F, Panel 89 and 93 of 525, revised September 16, 2005, the surveyed property is not located in a Special Flood Hazard Area. According to the map, the current flood zone classification for the surveyed property is Zone X.

SURVEYOR'S CERTIFICATE

KNOW ALL MEN BY THESE PRESENTS

That I, Samuel Wyatt, a Registered Professional Land Surveyor, do hereby certify that I prepared this plat from an actual and accurate survey of the land and that the corner monuments shown thereon were properly placed under my personal supervision, in accordance with the Subdivision Regulations of the City of Midland, Texas.

STATE OF TEXAS — SAMUEL WYATT — 6453 — REGISTERED PROFESSIONAL LAND SURVEYOR

Samuel Wyatt, R.P.L.S. #6453

SPECIAL STATE PLANE COORDINATE NOTE

Bearings, distances and coordinates are relative to the Texas State Plane Coordinate System (Central Zone1983 NAD) , with a combined grid factor of 0.9998958 for mean project datum. The theta angle is equal to -00°54'48.39" at USC&GS station "Midland", with published values of N=10,690,154.70 and E=1,746,696.78 in U.S. Survey Feet.

PLAT FILED FOR RECORD
MIDLAND COUNTY, TEXAS
NO. _____ CABINET _____
DATE _____ PAGE _____

Proposed Plat Limits
Easement (See plat for details)
Proposed Lot Line

WLE = Water Line Easement
DRE = Drainage Easement
UEE = Underground Electric Easement

OWNER &
DEVELOPER:

CITY OF MIDLAND
300 N. Loraine
Midland, Texas 79701

ENGINEER:

Parkhill, Smith & Cooper, Inc.
1700 W Wall St., #100
Midland, Texas 79701
432-697-1447

This is to certify that the above and foregoing plat of MOODY ADDITION, SECTION 14 was approved by proper action of the City Planning and Zoning Commission of the City of Midland, Texas, on this the_____ day of_____2021.

Chairman - PRINT NAME

Secretary - PRINT NAME

MOODY ADDITION
SECTION 14

Parkhill
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TBPELS FIRM REGISTRATION NO. 10194091

THE PLAT/SURVEY INCLUDED ON THIS SHEET IS INCLUDED FOR REFERENCE PURPOSES ONLY. THE SEALING PROFESSIONAL FOR THIS CONSTRUCTION DRAWING SET TAKES NO OWNERSHIP OF THIS SHEET OR THE INFORMATION PROVIDED THEREON, BUT DOES AUTHORIZE IT TO BE PART OF THIS CONSTRUCTION DRAWING SET.

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Midland Utilities Service Center
Water/Wastewater, Solid Waste, and Vehicle Services

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City of Midland
401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Plat

C-001

PACKET
7.825
February 8, 2022

FILE NAME: \\Data\Projects\2021\6077.21\03_DSGN\01_DWG\050_CIVIL\00_SHEETS\C-001-6077_PLAT.dwg LAYOUT NAME: C-001 PRINTED: Tuesday, January 25, 2022 - 2:42pm USER: sfreeman

CONVERGENCE = -00 DEGREES 53 MINUTES 25 SECONDS
COMBINED SCALE FACTOR = 0.999905993

REFERENCE STATION IS A 1/2-INCH IRON ROD WITH A PLASTIC CAP AT THE FOLLOWING COORDINATES
NORTHING: 10,696,729.50
EASTING: 1,760,778.83
ELEVATION: 2769.37

COORDINATES ARE BASED ON THE TEXAS COORDINATE SYSTEM, CENTRAL ZONE 4203, NORTH AMERICAN DATUM OF 1983
ELEVATIONS ARE BASED ON THE NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88)

NOTES

A. THE EXISTING UTILITIES, ABOVE GROUND AND UNDER GROUND, INDICATED ON THESE PLANS HAVE BEEN LOCATED FROM REFERENCE INFORMATION SUPPLIED BY OTHERS. VERIFY, BOTH HORIZONTALLY AND VERTICALLY, THE LOCATIONS OF ALL EXISTING UTILITIES, APPURTENANCES, OR OTHER FEATURES, PRIOR TO CONSTRUCTION. TAKE ALL NECESSARY PRECAUTIONS TO PROTECT ALL EXISTING UTILITIES, APPURTENANCES, AND ANY OTHER FEATURES ENCOUNTERED, AND NOTIFY THE ENGINEER PROMPTLY OF ANY CONFLICTS WITH THE WORK.

B. CALL 811 PRIOR TO CONSTRUCTION.

LEGEND

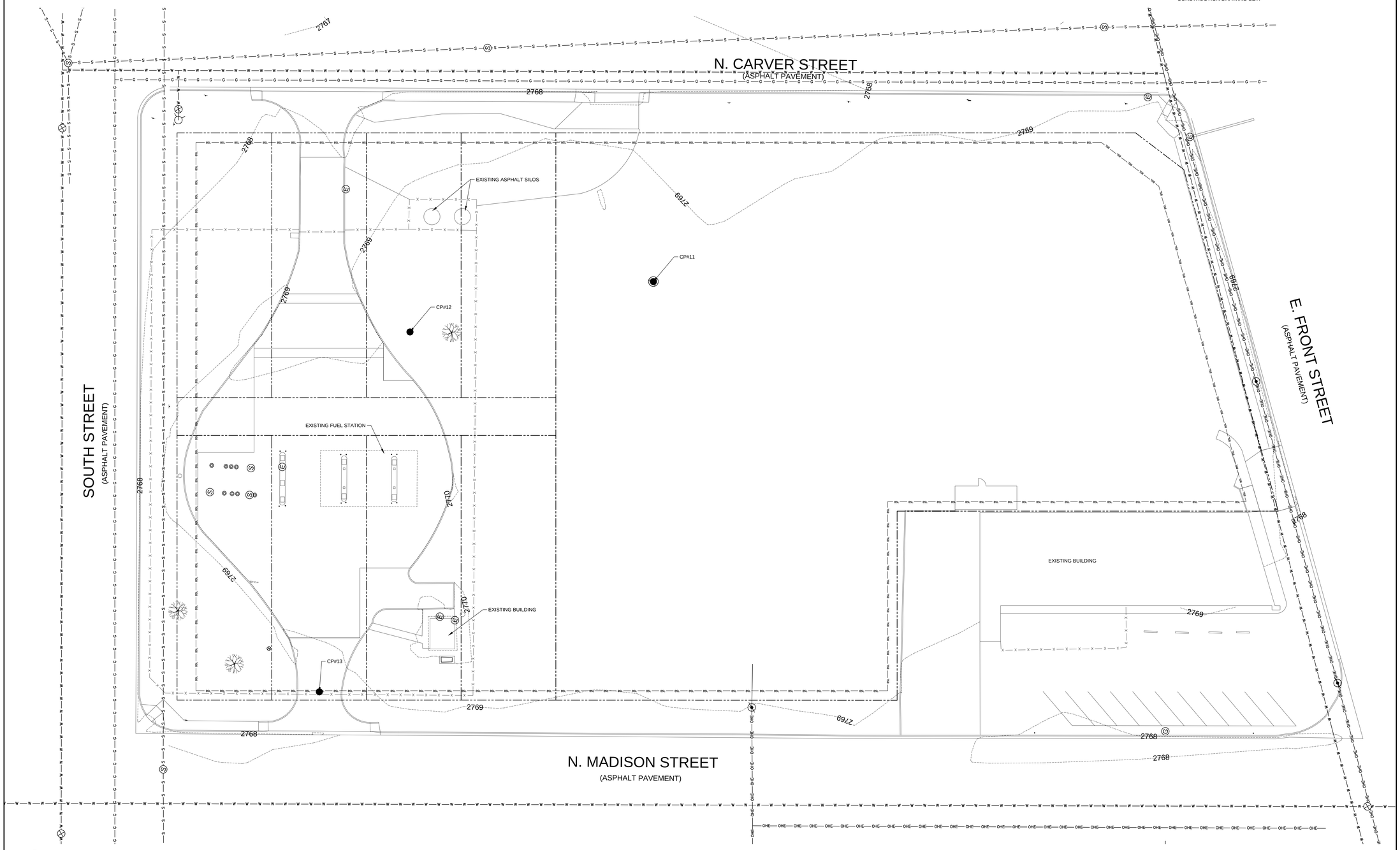
- EXISTING FENCE
- BUILDING SETBACK LINE
- PROPERTY LINE
- EXISTING WATER LINE
- EXISTING SEWER LINE
- EXISTING OVERHEAD ELECTRIC LINE
- EXISTING GAS LINE
- EXISTING CONTOURS
- EXISTING FIRE HYDRANT AND VALVE
- EXISTING MANHOLE
- EXISTING POWER POLE
- EXISTING GAS METER
- EXISTING ELECTRICAL EQUIPMENT

THE PLAT/SURVEY INCLUDED ON THIS SHEET IS INCLUDED FOR REFERENCE PURPOSES ONLY. THE SEALING PROFESSIONAL FOR THIS CONSTRUCTION DRAWING SET TAKES NO OWNERSHIP OF THIS SHEET OR THE INFORMATION PROVIDED THEREON, BUT DOES AUTHORIZE IT TO BE PART OF THIS CONSTRUCTION DRAWING SET.

SURVEY CONTROL POINTS TABLE

BASIS OR BEARINGS TEXAS COORDINATE SYSTEM OF 1983, CENTRAL ZONE, NAVD88 (GRID)

POINT NO.	NORTHING	EASTING	ELEVATION	DESCRIPTION
CP11	10696612.12	1760837.51	2769.25	MAVERICK ½" IRON ROD
CP12	10696729.50	1760778.83	2769.37	SET .5 IRON ROD PSC CONTROL
CP13	10696729.97	1760582.60	2768.43	MAGNAIL PSC CONTROL



A1 EXISTING CONDITIONS
SCALE: 1" = 20'

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City of Midland
401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

0 20' 40'

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Existing Condition

C-002

FILE NAME: \\Data1\Projects3\2021\6077.21\03_DSGN\01_DWG\050_CIVIL\00_SHEETS\C-002-6077_EXISTING-CONDITIONS.dwg LAYOUT NAME: C-002 PRINTED: Tuesday, January 25, 2022 - 2:43pm USER: skfreeman

Texas 811
Know what's below.
Call before you dig.

TEXAS ONE CALL SYSTEM
STOP - CALL BEFORE YOU DIG!

CONTRACTOR IS RESPONSIBLE TO
CONTACT UTILITIES & ONE CALL SYSTEM
14 DAYS PRIOR TO DIGGING

ALL SECTIONS DIGTESS @ 1-800-344-8377

KEY NOTES

1. SAWCUT AND REMOVE TO NEXT JOINT. MAINTAIN A NEAT VERTICAL FACE.
2. SAWCUT AND REMOVE CONCRETE CURB & GUTTER
3. REMOVE EXISTING PAVEMENT OR SIDEWALK
4. REMOVE EXISTING ASPHALT PAVING
5. EXISTING CONCRETE PAVING TO REMAIN
6. GENERATOR AND PAD TO REMAIN
7. REMOVE EXISTING TREE
8. EXISTING ASPHALT SILOS - DO NOT DISTURB
9. SLAVAGE AND RELOCATE GATE CONTROLLERS
   COORDINATE WITH ELECTRICAL PLANS
10. RELOCATE RAILROAD CROSSING SIGN - COORDINATE WITH LOCAL AUTHORITY
11. EXISTING BUILDING, FOUNDATION, AND ALL APPURTENANCES TO REMAIN
12. REMOVE EXISTING IRRIGATION APPURTENANCES. COORDINATE WITH LANDSCAPE DRAWINGS

NOTES

A. THE EXISTING UTILITIES, ABOVE GROUND AND UNDER GROUND, INDICATED ON THESE PLANS HAVE BEEN LOCATED FROM REFERENCE INFORMATION SUPPLIED BY OTHERS. VERIFY, BOTH HORIZONTALLY AND VERTICALLY, THE LOCATIONS OF ALL EXISTING UTILITIES, APPURTENANCES, OR OTHER FEATURES, PRIOR TO CONSTRUCTION. TAKE ALL NECESSARY PRECAUTIONS TO PROTECT ALL EXISTING UTILITIES, APPURTENANCES, AND ANY OTHER FEATURES ENCOUNTERED, AND NOTIFY THE ENGINEER PROMPTLY OF ANY CONFLICTS WITH THE WORK.

B. CONTACT THE ONE CALL SYSTEM (811) PRIOR TO CONSTRUCTION. REPAIR DAMAGE TO ANY EXISTING UTILITIES AND FACILITIES.

C. HAUL AWAY AND PROPERLY DISPOSE OF ALL MATERIAL REMOVED/DEMOLISHED FROM THE SITE IN ACCORDANCE WITH CITY, STATE, AND NATIONAL REQUIREMENTS.

D. CONTRACTOR IS RESPONSIBLE FOR ALL MISCELLANEOUS REPAIRS DUE TO DEMOLITION DAMAGE, AT HIS OWN EXPENSE.

E. ALL STREET SIGNS WILL REMAIN UNLESS OTHERWISE NOTED

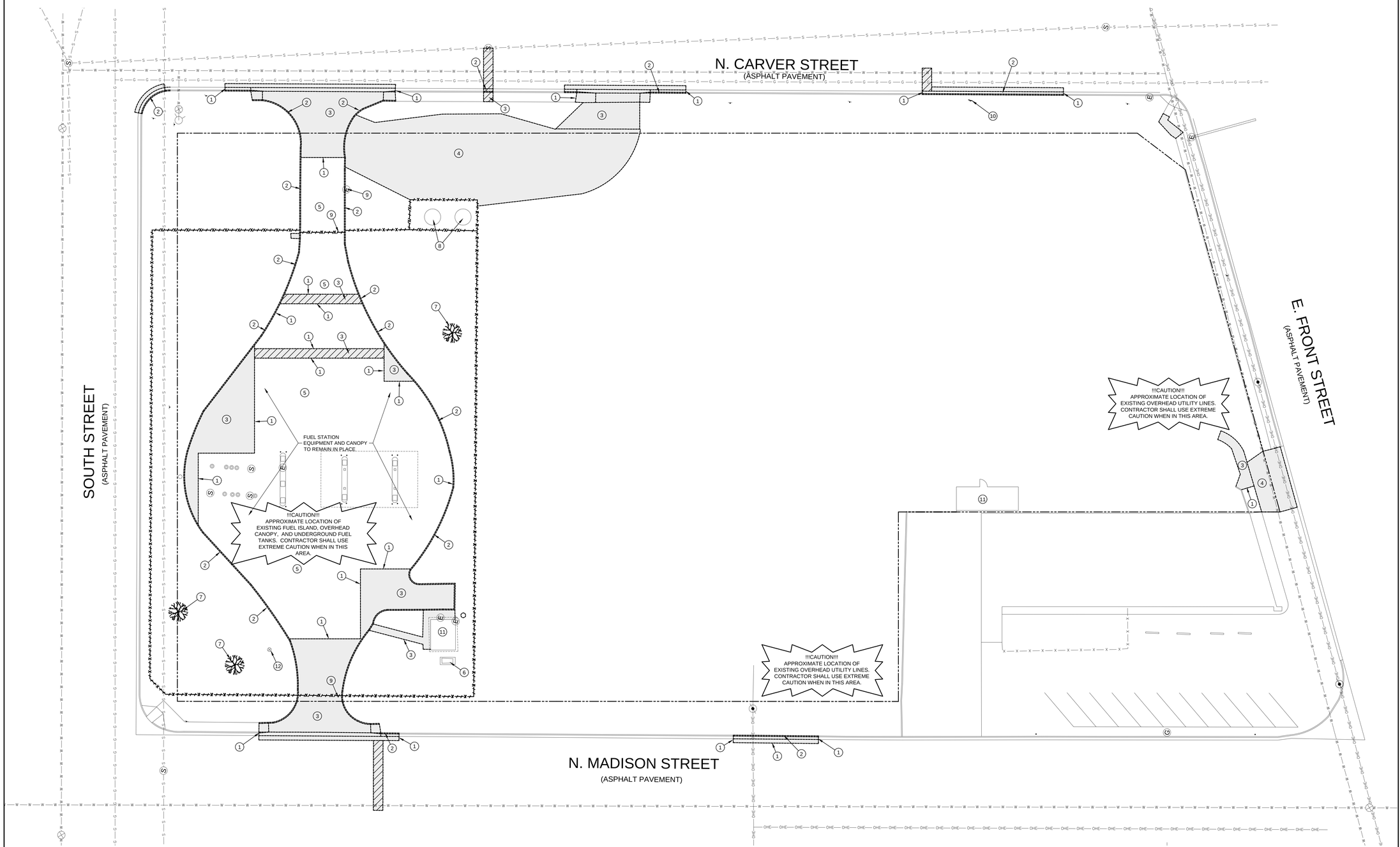
F. COORDINATE WITH APPROPRIATE UTILITY OWNER OR THE CITY OF MIDLAND PRIOR TO REMOVING, RELOCATING, CONNECTING TO, OR DISCONNECTING ANY UTILITIES

G. ALL POWER POLES TO BE PROTECTED DURING DEMOLITION CONSTRUCTION AND TO REMAIN UNLESS OTHERWISE NOTED

H. VERIFY EXACT LOCATIONS OF EXISTING UTILITIES PRIOR TO COMMENCING WORK, EXCAVATION OR TRENCHING.

LEGEND

- REMOVE EXISTING CHAIN-LINK FENCE
- DEMOLISH EXISTING CONCRETE OR HARD SURFACE AND REMOVE FROM SITE
- UTILITY TRENCH REPAIR - SEE COM DETAILS 311 & 312/C-503



A1 DEMOLITION PLAN
SCALE: 1" = 20'

FILE NAME: \\Data1\Projects\2021\6077.21\03_DSGN\01_DWG\00_CIVIL\00_SHEETS\C-003-6077_DEMOLITION.dwg LAYOUT NAME: C-003 PRINTED: Tuesday, January 25, 2022 - 2:43pm USER: skfreeman

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PROJECT NO.
6077.21

KEY PLAN

0 20' 40'

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
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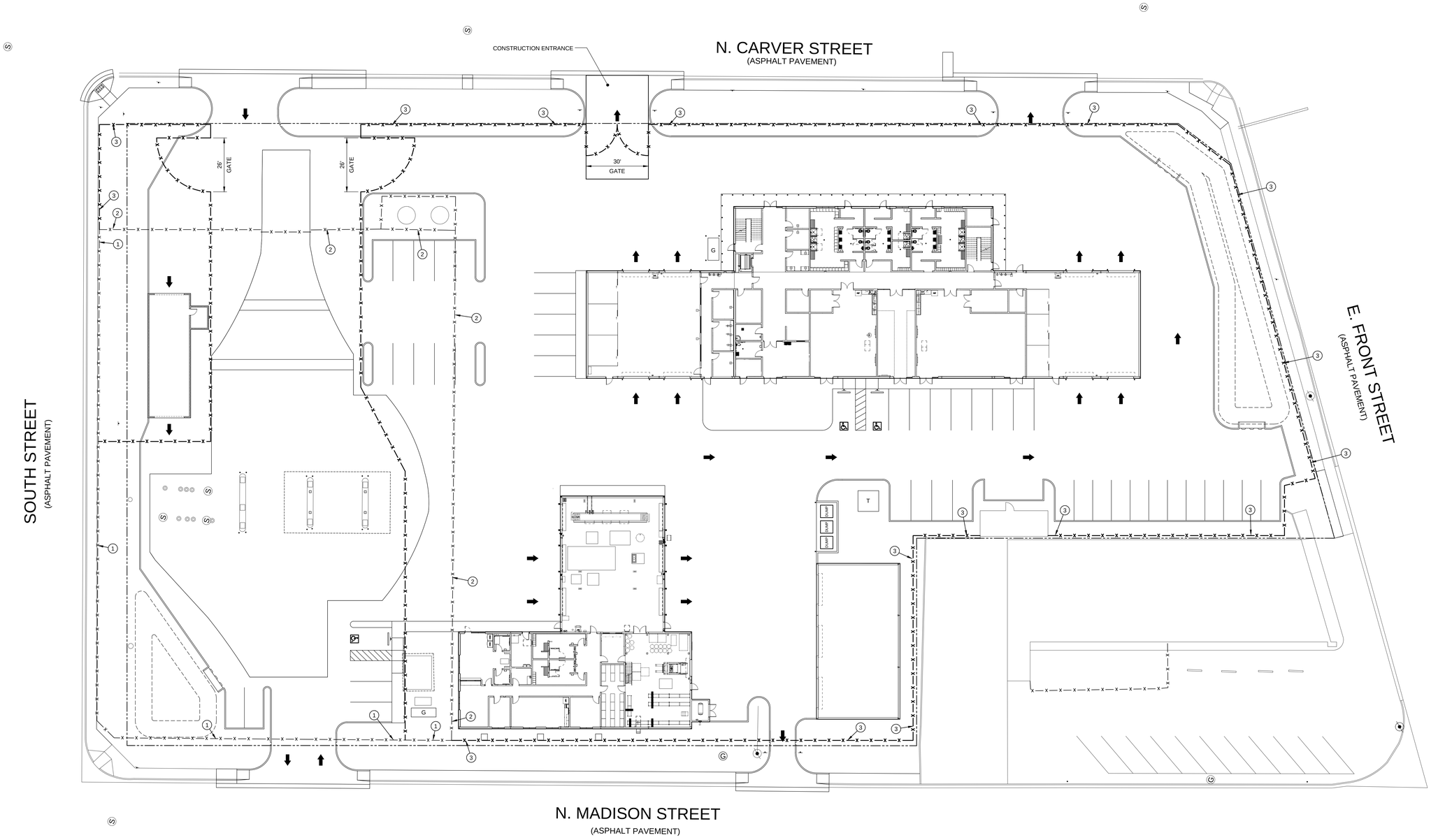
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Demolition Plan

C-003

KEY NOTES

1. EXISTING FENCE TO REMAIN
2. DEMOLISH EXISTING FENCE
3. NEW CONSTRUCTION FENCE



A1 CONSTRUCTION FENCE PLAN
SCALE: 1" = 20'

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Construction Fence Plan

C-004

FILE NAME: \\Data1\Projects\2020\216077.2103_DSGN\01_DWG\H50_CIVIL\00_SHEETS\C-004-6077_CONSTRUCTION-FENCE.dwg LAYOUT NAME: C-004 PRINTED: Tuesday, January 25, 2022 - 2:44pm USER: skfreeman

PARKING LOT CALCULATIONS	
FLOOR SPACE SQ FT	±31,000
REQUIRED SPACES @ 1/1000 SQ FT	31

PARKING LOT COUNT	
REGULAR SPACES	43
ACCESSIBLE SPACES	3
TOTAL SPACES	46

KEY NOTES

1. DRIVEWAY - SEE DETAIL 221(A)/C-502
2. PARALLEL CURB RAMP - SEE DETAIL 230/C-502
3. FLARED HANDICAP RAMP - SEE DETAIL 226/C-502
4. PARKING BLOCK - SEE DETAIL A3/C-502
5. HANDICAP SIGN - SEE DETAIL D1/C-501
6. HANDICAP SIGN WITH "VAN ACCESSIBLE" PLACARD - SEE DETAIL D1/C-501
7. HANDICAP MARKING - SEE DETAIL D3/C-501
8. ACCESS AISLE MARKING - SEE DETAIL D2/C-501
9. INTEGRAL SIDEWALK/CURB - SEE DETAIL A2/C-501
10. EXISTING GUY WIRE - DO NOT DISTURB
11. PAVEMENT PATCH - SEE DETAIL 224/C-502
12. TIE TO EXISTING CONCRETE
13. BOLLARD - SEE DETAIL A5/C-501
14. GENERATOR PAD - BY OTHERS
15. SAWTOOTH CURB AND APRON - SEE DETAIL A6/C-501
16. LARGE RIVER ROCK - SEE LANDSCAPE PLANS
17. ELECTRICAL TRANSFORMER AND PAD - BY OTHERS
18. DUMPSTERS AND SCREEN WALL - SEE DETAIL A4/C-501
19. RAISED CONCRETE MEDIAN - SEE DETAIL C2/C-501

NOTES

A. FIRE LANE MARKING, 6" WIDE RED BACKGROUND STRIPE WITH 4" WHITE LETTERS USING 3/4" STROKE STATING "NO PARKING FIRE LANE". PAINT EVERY 25' ON CENTER ALONG THE FIRE LANE. PLACE FIRE LANE MARKING ON THE VERTICAL SURFACE OF THE CURB WHEN PRESENT OR ON THE PARKING SURFACE WHEN NOT.

B. FIRE LANE MARKING SHOWN IS REPRESENTATIONAL. FIRE LANE MARKING SHALL BE A MINIMUM OF 20' APART OR 26' APART ADJACENT TO BUILDINGS OVER 30' HIGH. FIRE LANE MARKING SHALL BE PAINTED ON A CURB FACE WHERE THE REPRESENTATIONAL MARKING IS SHOWN NEXT TO A CURB. COORDINATE FIRE LANE MARKINGS WITH CITY OF MIDLAND FIRE MARSHAL PRIOR TO INSTALLATION. 432-685-7436

C. INSTALL FIRE APPARATUS ACCESS ROADS AND MAKE SERVICEABLE PRIOR TO THE START OF BUILDING FRAMING.

D. STRIPING WIDTH = 4", STRIPE COLOR = WHITE, HANDICAP AND MEDIAN ISLAND STRIPES (YELLOW), PLACE DIAGONAL STRIPES (45°) AT 24" ON CENTER.

E. FOR SIDEWALK CONTINUATION AND ADDITIONAL HANDICAP RAMP LOCATIONS - SEE LANDSCAPE PLANS

F. NOTIFY ONE-CALL UTILITY LOCATOR SERVICE (811) PRIOR TO CONSTRUCTION AND HAVE ALL EXISTING UTILITIES AND PIPELINES WITHIN THE CONSTRUCTION AREA MARKED.

G. LOCATE AND PROTECT EXISTING UTILITIES AND STRUCTURES DURING CONSTRUCTION, AND REPAIR ANY DAMAGES TO EXISTING FEATURES AT CONTRACTOR'S EXPENSE.

H. ALL CONSTRUCTION SHALL BE ACCORDANCE WITH THE LATEST CITY OF MIDLAND DESIGN STANDARDS, REQUIREMENTS AND SPECIFICATIONS, UNLESS OTHERWISE NOTED ON THE PLANS.

I. FOLLOW BEST MANAGEMENT PRACTICES (BMP'S) AND COMPLY WITH EPA & TCEQ STORM WATER POLLUTION PREVENTION PLAN (SWPPP) REQUIREMENTS.

J. EARTHWORK AND BACKFILL WITHIN THE LIMITS OF EXISTING AND PROPOSED PAVEMENT SHALL BE COMPACTED IN MAXIMUM 8" LIFTS TO 95% MODIFIED PROCTOR (ASTM D-1557), WITHIN 2% OF OPTIMUM MOISTURE CONTENT, PRIOR TO PLACEMENT OF IMPROVEMENTS.

K. DOWEL SIDEWALKS INTO PAVEMENT AT TIE-INS TO EXISTING SLABS, AND TO DRIVEWAY PAVEMENTS. INSTALL EXPANSION JOINT MATERIAL WHERE PAVEMENT ABUTS EXISTING STRUCTURES FOR ISOLATION PURPOSES.

L. DO NOT INSTALL STEEL REINFORCEMENT IN CONCRETE LOCATED WITHIN THE PUBLIC RIGHT OF WAY. USE FIBER MESH PER CITY REQUIREMENTS.

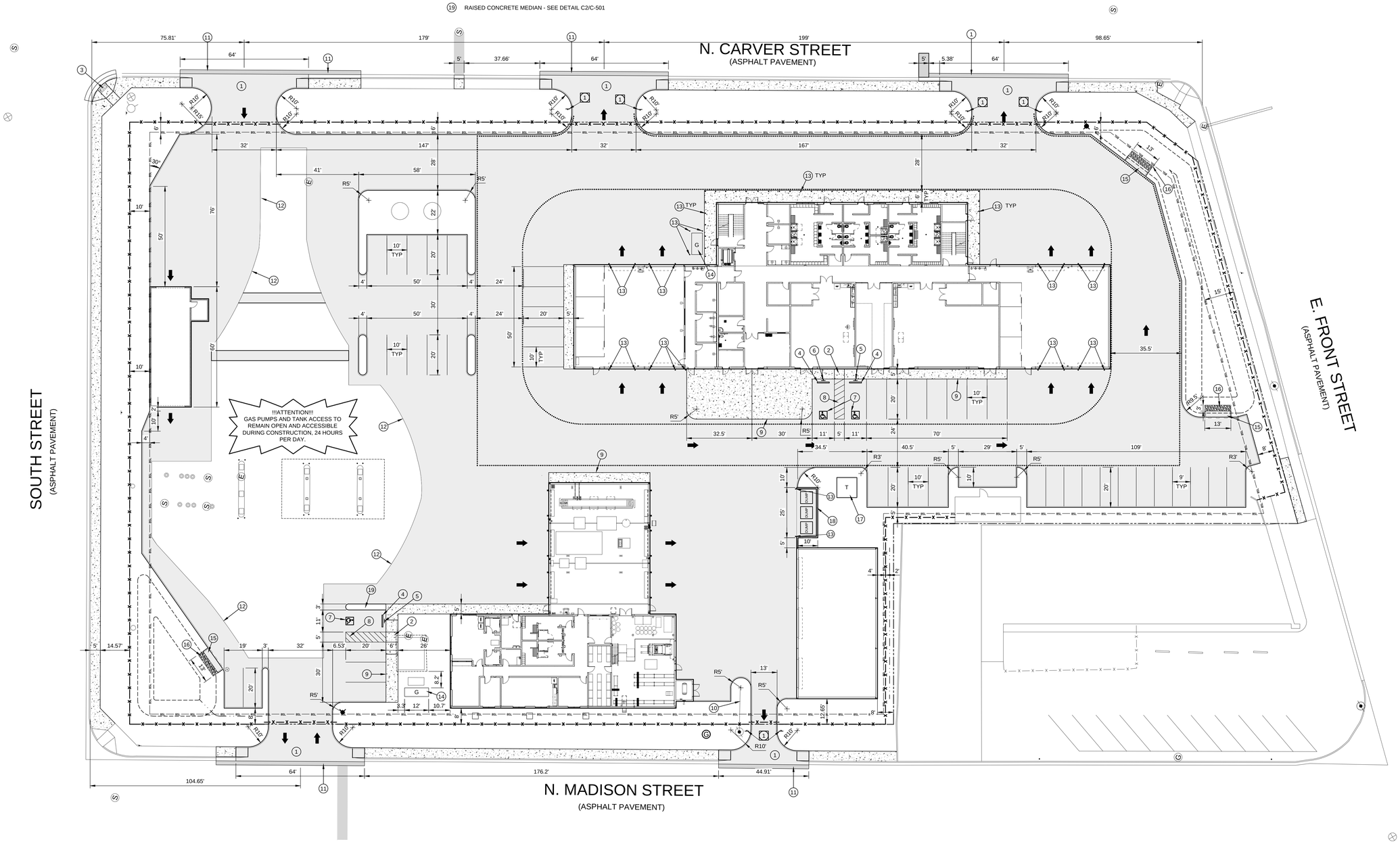
M. ALL DIMENSIONS ARE SHOWN TO BACK OF CURB, FACE OF BUILDING, AND PROPERTY LINE UNLESS OTHERWISE NOTED.

LEGEND

- PERIMETER FENCE AND GATES - SEE LANDSCAPE DRAWINGS
- BUILDING SETBACK LINE
- PROPERTY LINE
- FIRE LANE MARKING - SEE DETAIL B1/C-501 AND NOTES THIS SHEET
- SIDEWALK - SEE DETAIL 225/C-502
- CONCRETE PAVING - SEE DETAIL A2/C-501 AND NOTE L. THIS SHEET
- EXISTING BUILDING CANOPY
- TRAFFIC ARROW STRIPING - SEE DETAIL C1/C-501

SIGNAGE

DO NOT ENTER — R5-1 — TMUTCD



A1 SITE PLAN
SCALE: 1" = 20'

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6077.21

KEY PLAN

0 20' 40'

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1	08/20/2021	50% DD

Site Plan

C-101

PACKET
7.829
February 8, 2022

FILE NAME: \\Data1\Projects\2021\6077.21\03_DSGN\01_DWG\050_CIVIL\00_SHEETS\C-101-6077_SITE-PLAN.dwg LAYOUT NAME: C-101 PRINTED: Tuesday, January 25, 2022 - 2:44pm USER: skfreeman

KEY NOTES

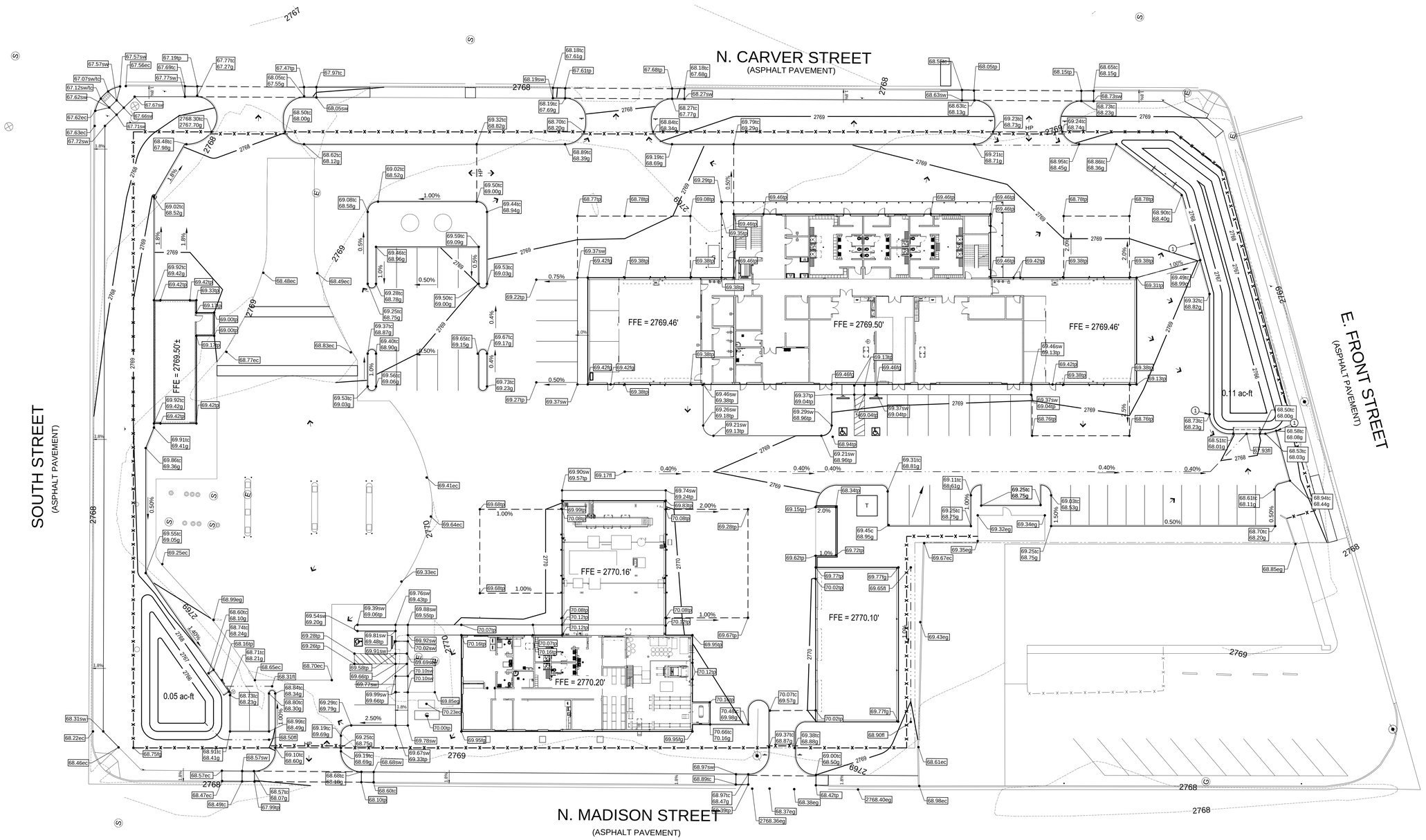
1. TURNDOWN CURB - SEE DETAIL C3/C-501

NOTES

A. THE EXISTING CONTOURS AND SURFACE ELEVATIONS INDICATED ON THESE PLANS HAVE BEEN LOCATED FROM REFERENCE INFORMATION SUPPLIED BY OTHERS AND SURFACE LOCATIONS SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY, BOTH HORIZONTALLY AND VERTICALLY, THE LOCATIONS OF ALL EXISTING HARD SURFACE PRIOR TO CONSTRUCTION, AND TO NOTIFY THE ENGINEER PROMPTLY OF ALL CONFLICTS OF THE WORK WITH EXISTING SURFACE ELEVATIONS.

LEGEND

- EXISTING CONTOURS (0.5' INTERVAL)
- NEW CONTOURS (1' INTERVAL)
- DIRECTION OF FLOW
- SWALE
- RIDGELINE
- EDGE OF SLOPED SURFACE
- CURB & GUTTER
- DROP LIP CURB & GUTTER
- 2812.219 NEW SPOT ELEVATION
  - fg = finish grade
  - g = gutter
  - fl = flowline
  - t = topsoil
  - sw = sidewalk
  - tc = top of curb



A1 GRADING PLAN
SCALE: 1" = 20'

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PROJECT NO.
6077.21

KEY PLAN

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5	01/25/2022	Owner Review
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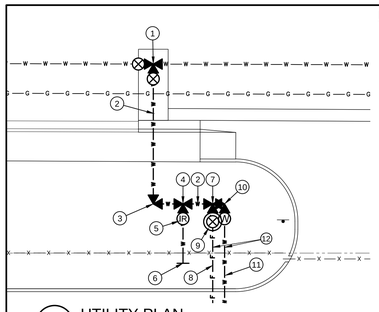
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Grading Plan

C-102

PACKET
7.A30
February 8, 2022

FILE NAME: \\Data1\Projects\2021\6077.21\03_DSGN\01_DWG\050_CIVIL\00_SHEETS\C-102 6077_GRADING PLAN.dwg LAYOUT NAME: C-102 PRINTED: Tuesday, January 25, 2022 - 2:45pm USER: skfreeman



A1 UTILITY PLAN
SCALE: 1" = 20'

KEY NOTES

1. 6"x6" TAPPING SLEEVE AND VALVE
2. 6" C-900 PVC WATER LINE
3. 6"x6" 90° BEND
4. 6"x2" TEE
5. 2" IRRIGATION METER - SEE IRRIGATION PLANS
6. SEE IRRIGATION PLANS FOR CONTINUATION AND BACKFLOW PREVENTION
7. 6"x6" TEE
8. 6" C-900 DR-14 PVC FIRE PROTECTION LINE
9. 6" POST INDICATOR VALVE
10. 6"x3" 90° BEND, 2" WATER METER, 3" REDUCER - SEE DETAIL 604(A)/C-504
11. 3" C-901 POLY WATER LINE
12. BACKFLOW PREVENTER
13. SEE PLUMBING PLANS FOR CONTINUATION
14. GAS SERVICE DESIGN AND SPECIFICATIONS BY PLUMBING
15. ASPHALT UTILITY TRENCH REPAIR
16. CLEANOUT - SEE DETAIL B5/C-501
17. FIELD BEND AS NECESSARY PER MANUFACTURER'S RECOMMENDATIONS

NOTES

A. THE EXISTING UTILITIES, ABOVE GROUND AND UNDER GROUND, INDICATED ON THESE PLANS HAVE BEEN LOCATED FROM REFERENCE INFORMATION SUPPLIED BY OTHERS. VERIFY, BOTH HORIZONTALLY AND VERTICALLY, THE LOCATIONS OF ALL EXISTING UTILITIES, APPURTENANCES, OR OTHER FEATURES, PRIOR TO CONSTRUCTION. TAKE ALL NECESSARY PRECAUTIONS TO PROTECT ALL EXISTING UTILITIES, APPURTENANCES, AND ANY OTHER FEATURES ENCOUNTERED, AND NOTIFY THE ENGINEER PROMPTLY OF ANY CONFLICTS WITH THE WORK. REPAIR DAMAGE TO UTILITIES CAUSED BY CONTRACTOR, AT CONTRACTOR'S EXPENSE.

B. PRIVATE FIRE HYDRANTS MUST BE COATED RED BY THE MANUFACTURER AND THE FLOW RATE THROUGH THE HYDRANT MUST BE INDICATED WITH COLOR-CODED PLASTIC RINGS (LESS THAN 500GPM RED, 500-999GPM YELLOW, 1000-1499GPM GREEN, GREATER THAN 1500GPM BLUE).

C. PRIVATE FIRE HYDRANTS MUST BE COATED RED BY THE MANUFACTURER. PRESSURE INDICATOR RINGS ARE TO BE INSTALLED AND WILL REQUIRE THE DEVELOPER OR CONTRACTOR TO PAY FOR THE FLOW TEST. WATER LINE IS TO BE PVC C-900 DR-14 AFTER THE GATE VALVE HEADING TOT HE FIRE HYDRANT OR FDC.

D. COORDINATE FIRE LINE INSPECTIONS WITH THE FIRE MARSHAL'S OFFICE 432-685-7436.

E. FIELD VERIFY ALL DIMENSIONS AND GRADES, NEW OR EXISTING, OF THE SANITARY SEWER LINE PRIOR TO CONSTRUCTION, AND NOTIFY THE ENGINEER OF ANY DISCREPANCIES WITH EXISTING OR NEW CONDITIONS. PROVIDE POSITIVE FLOW.

F. ALL WORK WITHIN THE PUBLIC RIGHT OF WAY SHALL CONFORM TO CITY OF MIDLAND STANDARDS AND ALL APPLICABLE CODES.

G. DRY UTILITY ONE LINES SHOWN IN RESPECTIVE DISCIPLINE DRAWINGS

H. ALL WATER LINE FITTINGS REQUIRE RESTRAINED JOINTS AND THRUST BLOCKING.

LEGEND

- EXISTING SANITARY SEWER LINE WITH MANHOLE
- EXISTING WATER LINE WITH VALVE
- EXISTING FIRE HYDRANT
- NEW GAS LINE WITH METER (BY PLUMBING)
- NEW ELECTRIC LINE (BY OTHERS)
- NEW DOMESTIC WATER LINE WITH VALVE
- NEW C-900 PVC DR-14 FIRE PROTECTION WATER LINE
- NEW FIRE HYDRANT
- NEW SANITARY SEWER SERVICE LINE
- NEW ELECTRICAL TRANSFORMER

CONNECT TO MANHOLE
STA = 0+00.00
8" FL (IN) = 2760.99
12" FL (IN) = 2753.17
12" FL (S) = 2753.18
N = 10696728.39
E = 1760934.47

N. CARVER STREET
(ASPHALT PAVEMENT)

STA = 0+00.00
CONNECT TO 6" WATER MAIN
INSTALL:
1 - 6" x 6" TEE
2 - 6" GATE VALVE
N = 10696501.54
E = 1760981.11

CONNECT TO 8" WATER MAIN
INSTALL:
1 - 6" x 8" TAPPING SLEEVE & VALVE
N = 10696366.83
E = 1760989.55

INSTALL:
1 - 90° BEND W/ BLOCKING

51.2 LF - 6" C-900 PVC DR-14

INSTALL:
1 - FIRE HYDRANT
N = 10696414.59
E = 1760969.15

STA = 0+22.28
INSTALL:
1 - 6" x 6" TEE
1 - 6" GATE VALVE

E1/C-103

INSTALL:
1 - 3" x 3" TEE
STA = 0+61.84

INSTALL:
1 - 3" x 3" TEE
STA = 2+81.32

INSTALL:
1 - 6" 45° BEND
STA = 2+29.76

INSTALL:
1 - 6" 45° BEND
STA = 2+46.73

6" C-900 PVC DR-14

3" C-900 POLY

6" PVC SDR-26

STA = 4+26.36
STA = 4+33.43
27.64'
STA = 4+94.85

INSTALL:
1 - 45° WYE CONNECTION
1 - CLEANOUT
STA = 1+13.80
6" FL = 2763.35
8" FL = 2763.27

INSTALL:
1 - 45° WYE CONNECTION
1 - CLEANOUT
STA = 1+56.22
6" FL = 2764.20

114.8 LF - 6" SDR-26 PVC

CONNECT TO
BLDG. SERVICE
4" FL = 2766.83
6" FL = 2766.75

CONNECT TO
BLDG. SERVICE
STA = 1+48.54

48.1'

6" SDR-26 PVC

SEWER CROSSING
BELOW WATER

6" PVC SDR-26 @ 3.0%

28.32'

6" C-900 PVC DR-14

3" C-900 POLY

6" PVC SDR-26 @ 1.50%

FFE = 2769.46'
FFE = 2769.50'
FFE = 2769.46'
FFE = 2769.50'

3/4" GAS SERVICE
1" GAS SERVICE
1 1/2" GAS SERVICE

25'
21.75'
20.85'
14.24'
15'

FFE = 2770.16'
FFE = 2770.20'
FFE = 2770.10'

STA = 2+85.00
CONNECT TO BLDG. SERVICE
INSTALL 45° VERTICAL BEND
4" FL = 2767.70
6" FL = 2767.62

CONNECT TO BLDG. SERVICE
STA = 2+22.11

CONNECT TO BLDG. SERVICE
STA = 4+60.84

INSTALL:
1 - FIRE HYDRANT
N = 10696697.52
E = 1760591.95

319.8'
GAS SERVICE EXTENSION - BY ATMOS

INSTALL:
1 - NEW GAS METER (5 psi)
N = 10696519.82
E = 1760627.74

CONNECT TO
EXISTING GAS MAIN
(BY ATMOS)

CONNECT TO 6" WATER MAIN
INSTALL:
1 - 6" x 6" TEE
2 - 6" GATE VALVE
N = 10696682.04
E = 1760532.98

N. MADISON STREET
(ASPHALT PAVEMENT)

SOUTH STREET
(ASPHALT PAVEMENT)

E. FRONT STREET
(ASPHALT PAVEMENT)

A1 UTILITY PLAN
SCALE: 1" = 20'

FILE NAME: \\Data\Projects\2021\6077.21\03_DSGN\01_DWG\050_CIVIL\00_SHEET\SIC-103-6077_UTILITY-PLAN.dwg LAYOUT NAME: C-103 PRINTED: Tuesday, January 25, 2022 - 2:46pm USER: skfreeman

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KEY PLAN

0 20' 40'

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Utility Plan

C-103

KEY NOTES

(1) MATCH EXISTING JOINTING

NOTES

A. INSTALL THICKENED EDGE EXPANSION JOINTS AT JUNCTURES WITH STRUCTURES.

B. FORM BOX-OUTS AROUND FEATURES THAT PROJECT THROUGH THE CONCRETE PAVEMENT.

C. CURB & GUTTER, FILLETS AND VALLEYS ON PRIVATE PROPERTY MAY BE POURED MONOLITHICALLY WITH ADJACENT SLABS OR POURED SEPARATE. IF POURED SEPARATE,INSTALL EXPANSION MATERIAL BETWEEN CURBS AND PAVEMENT

D. CONSTRUCTION JOINTS SHALL BE DOWELED.

E. CONTRACTION JOINTS MAY HAVE DISTRIBUTED REINFORCEMENT EXTENDED CONTINUOUSLY THROUGH THE JOINT.

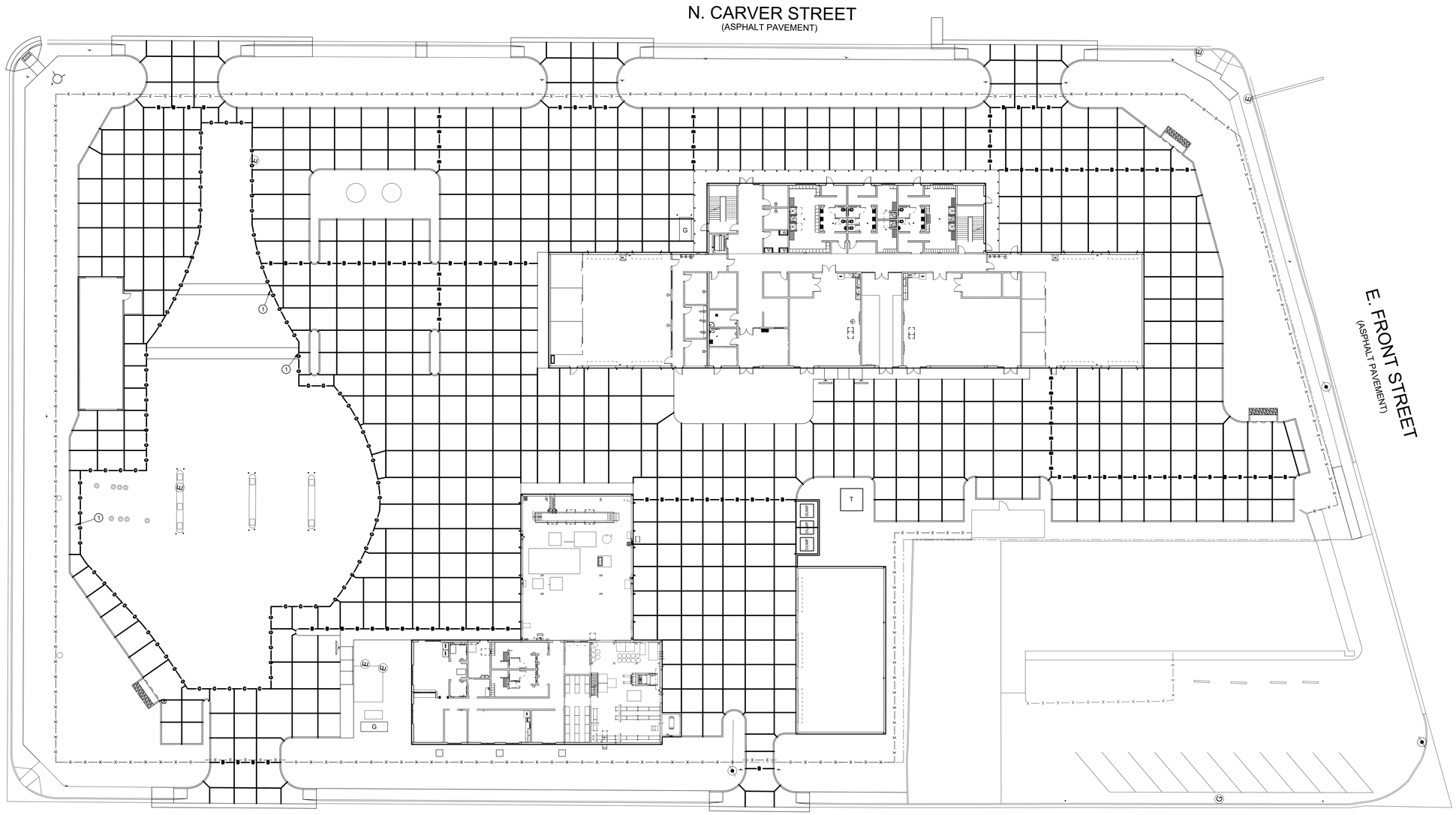
F. DOWELS SHALL BE SMOOTH STEEL, 14" LONG, ¾" DIAMETER, PLACED AT 12" ON CENTER.

G. JOINTING LENGTH SHALL NOT BE LESS THAN 75% IN THE PERPENDICULAR DIRECTION. SPACING NOT TO EXCEED 15'.

H. INSTALL CONSTRUCTION JOINT WHEN BEGINNING A NEW POUR ABUTTING ADJACENT PAVEMENT.

LEGEND

- EXPANSION JOINT, TYPE 'B' SEE DETAILS 234(A)/C-503 AND 234(B)/C-503
- DOWELED EXPANSION JOINT, TYPE 'C' SEE DETAILS 234(A)/C-503 AND 234(B)/C-503
- SAWED CONTRACTION JOINT, TYPE 'F' SEE DETAILS 234(A)/C-503 AND 234(B)/C-503



A1 JOINTING PLAN
SCALE: 1" = 20'

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Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

0 20' 40'

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Jointing Plan

C-104

FILE NAME: \\Data1\Projects\3\2021\6077.21\03_DSGN\01_DWG\050_CIVIL\00_SHEETS\C-104-6077_JOINTING-PLAN.dwg LAYOUT NAME: C-104 PRINTED: Tuesday, January 25, 2022 - 3:10pm USER: skfreeman

FINAL SITE STABILIZATION: IN ACCORDANCE WITH PARTS III.G.1 AND III.G.2 OF THE CONSTRUCTION STORMWATER GENERAL PERMIT, STABILIZATION OF ALL DISTURBED AREAS MUST, AT A MINIMUM, BE INITIATED IMMEDIATELY (i.e. AS SOON AS PRACTICABLE, BUT NO LATER THAN THE END OF THE NEXT WORK DAY) WHENEVER ANY EARTHWORK ACTIVITIES HAVE PERMANENTLY CEASED ON ANY PORTION OF THE SITE. THE CITY WILL NOT SUPPORT A C.O. UNLESS THIS REQUIREMENT HAS BEEN FULFILLED.

CONTRACTOR BEWARE: THIS REQUIREMENT WILL BE ENFORCED WITH ZEAL

NOTE

A. THIS MAP IS PART OF A TPDES STORMWATER POLLUTION PREVENTION PLAN. REFER TO THE TEXT PORTION OF THE PLAN FOR ADDITIONAL INFORMATION, REQUIREMENTS AND PROCEDURES. PLAN TO BE DEVELOPED BY THE CONTRACTOR.

B. REFER TO SHEET C-202 FOR DETAILS

C. REMOVE AND REPLACE CONCRETE WASHOUT WHEN 75% OF THE VOLUME IS REACHED.

D. CONCRETE WASHOUT AREA MAY BE RELOCATED OR DUPLICATED AS NECESSARY. PORTABLE WASHOUT IS ALLOWED.

E. THE USE OF A PORTABLE CONCRETE WASHOUT STATION IS ACCEPTABLE.

F. SUBMIT ALTERNATE BMP'S FOR APPROVAL PRIOR TO INSTALLATION.

G. PER THE CITY STORM WATER ADMINISTRATORS: STABILIZE BORROWED STOCKPILES AND STAGING AREAS AT THE COMPLETION OF THE PROJECT

H. PRIOR TO ANY SOIL GRADING ACTIVITIES, CONTRACTOR TO CALL 432-685-2365 FOR INSPECTION.

I. PRE-APPROVED DEVELOPMENT SWPPP REQUIREMENTS:

I.A. *DEVELOPERS ARE NOW REQUIRED TO CALL 432-685-7517 TO REQUEST A STORMWATER INSPECTION BEFORE GRADING LAND FOR PROJECT SITES*

I.B. FOR COMMERCIAL PLANS THAT ARE IN THE PRE-APPROVAL STAGES, THE DEVELOPER, CONTRACTOR, BUILDER ETC. MUST HAVE THE FOLLOWING STORMWATER MEASURES IN PLACE, PER THE APPROVED CITY STANDARD, PRIOR TO BEGINNING ANY CONSTRUCTION. THESE MEASURES INCLUDE:

I.B.A. SILT FENCE - INSTALL PER CITY STANDARDS AND MUST BE TRENCHED 6 INCHES INTO THE GROUND WITH METAL MESH FACING THE STREET AND J-HOOKED AND BACKFILLED. ADDITIONALLY, FENCE MUST BE STAKED EVERY 6 FT. TO ENSURE PROPER STABILITY.

I.B.B. CONSTRUCTION SITE ENTRANCE - CITY STANDARDS CALL FOR "BULL ROCK" WITH A 6-8-INCH DIAMETER ROCK. THE TYPICAL ENTRANCE MUST BE 50 FT. LONG AND 14 FT. WIDE. (LENGTH AND WIDTH CAN BE ADJUSTED DEPENDING ON SITE SIZE)

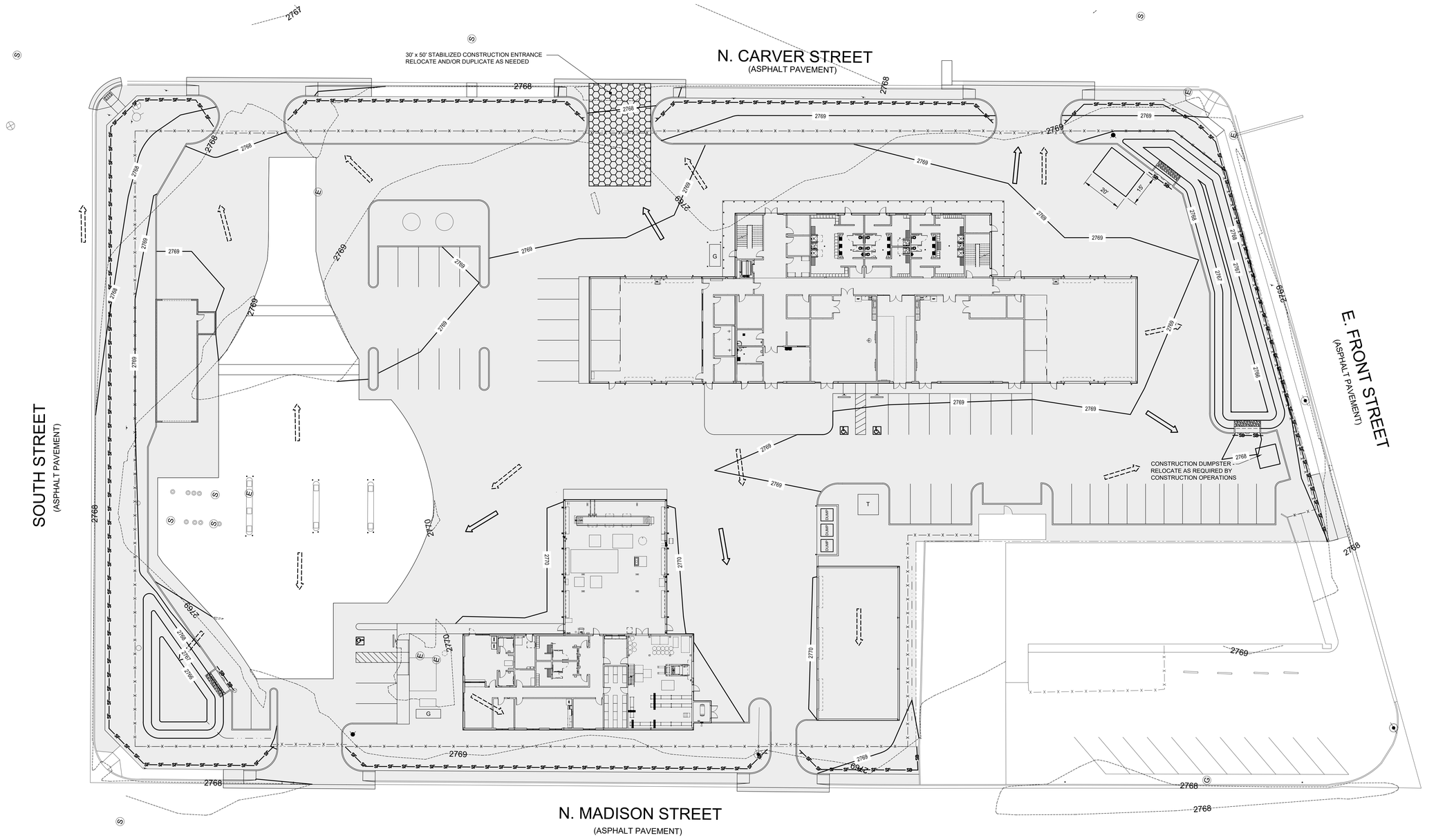
I.B.C. INLET PROTECTION - IF THE SITE IS BORDERED BY STORMWATER INLETS, THEY MUST BE PROTECTED BY THE DEVELOPER USING SANDBAGS OR FIBER WATTLES.

I.B.D. TCEQ REQUIRES ALL DEVELOPERS IN THE CITY OF MIDLAND THAT DEVELOP SMALL SITES (1-5 ACRES CONSTRUCTION SITE); AND LARGE SITES (5 OR MORE ACRES CONSTRUCTION SITE) TO SUBMIT A SIGNED COPY OF THE NOTICE OF INTENT (NOI) OR CONSTRUCTION SITE NOTICE (CSN) TO THE CITY OF MIDLAND AT LEAST 7 DAYS PRIOR TO THE BEGINNING ANY SITE PREPARATION.

I.C. IF THERE ARE ANY QUESTIONS OR CONCERNS, PLEASE CONTACT THE CITY OF MIDLAND, STORMWATER DIVISION AT 432-685-7517.

LEGEND

- AREA AFFECTED BY PROJECT (APPROX. 3.50 ACRES)
- SF — SILT FENCE
- SB — SAND BAGS
- EXISTING CONTOURS (1' INTERVAL)
- STABILIZED CONSTRUCTION ENTRANCE - SEE DETAIL 701/C-202
- NEW CONTOURS (1' INTERVAL)
- FLOW DIRECTION (EXISTING)
- FLOW DIRECTION (PROPOSED)



A1 EROSION CONTROL PLAN
SCALE: 1" = 20'

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PROJECT NO.
6077.21

KEY PLAN

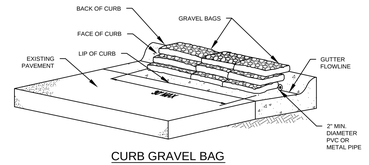
0 20' 40'

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

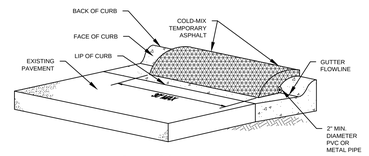
Erosion Control Plan

C-201

FILE NAME: \\Data1\Projects\2021\6077.21\03_DSGN\01_DWG\050_CIVIL\00_SHEETS\C-201-6077_EROSION-CONTROL-PLAN.dwg LAYOUT NAME: C-201 PRINTED: Tuesday, January 25, 2022 - 3:01pm USER: akfreeman



CURB GRAVEL BAG



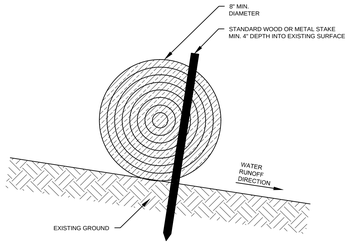
CURB COLD-MIX TEMPORARY ASPHALT

NOTES:

1. UTILIZE THIS DETAIL WHEN ACCESSING PROJECT SITE OVER EXISTING CURB ONLY IF NO USABLE CURB OPENING EXISTS.
2. FILL BAGS TO 60% CAPACITY WITH CLEAN GRAVEL NO LESS THAN 1" DIAMETER AND NO GREATER THAN 2" DIAMETER.
3. PLACE BAGS WITH BAG OPENINGS SECURED AND FACE UP, AND SO THAT EACH BAG IS FLAT AND HAS THE GREATEST POSSIBLE SURFACE AREA CONTACT WITH THE CURB.
4. PLACE BAGS AGAINST THE PIPE AND FACE-OF-CURB . DO NOT PLACE BAGS BEYOND THE LIP-OF-CURB.
5. DO NOT BLOCK ADA RAMPS OR WALKWAYS WITH BAGS.
6. DO NOT PLACE TEMPORARY ASPHALT BEYOND LIP-OF-CURB.
7. PIPE MUST EXTEND ACROSS FULL LENGTH OF TEMPORARY CURB PROTECTION AND BE COMPLETELY EXPOSED AT BOTH ENDS.
8. MINIMUM 4" THICK LAYER OF GRAVEL OR ASPHALT REQUIRED OVER ALL PARTS OF AFFECTED CURB.
9. MAXIMUM WIDTH OF CURB PROTECTION IS 30'.
10. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
11. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:	713

TEMPORARY CURB PROTECTION

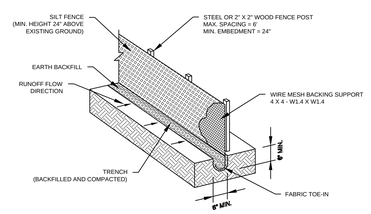


NOTES:

1. THIS DETAIL IS TO USED FOR SHEET FLOW CONDITIONS ONLY. DO NOT USE FILTER SOCK FOR POINT FLOW OR CONCENTRATED FLOW CONDITIONS.
2. DO NOT USE FILTER SOCK FOR SHEET FLOW WATERSHEDS LARGER THAN ONE (1) ACRE.
3. USE POLYPROPYLENE NETTING, BURLAP, OR JUTE FABRIC TO CONSTRUCT THE FILTER SOCK.
4. FILL FILTER SOCK WITH STRAW, HAY, COCONUT FIBER, OR COMPOSITE MATERIAL.
5. PLACE STAKING EVERY THREE (3) TO FOUR (4) FEET AT A MINIMUM.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:	707

FILTER SOCK

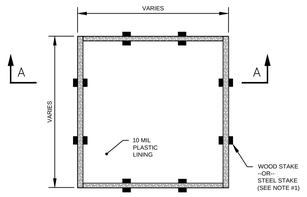


NOTES:

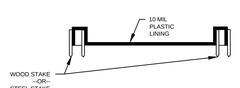
1. THIS DETAIL IS TO BE USED FOR SHEET FLOW CONDITIONS ONLY. DO NOT USE SILT FENCE FOR POINT FLOW OR CONCENTRATED FLOW CONDITIONS.
2. INSTALL STEEL OR WOOD POSTS, WHICH SUPPORT THE SILT FENCE, WITH A SLIGHT ANGLE TOWARD THE ANTICIPATED RUNOFF SOURCE. POSTS MUST BE EMBEDDED A MINIMUM OF ONE (1) FOOT.
3. TRENCH THE TOE OF THE SILT FENCE IN WITH A SPADE OR MECHANICAL TRENCHER, SO THAT THE DOWNSLOPE FACE OF THE TRENCH IS FLAT AND PERPENDICULAR TO THE LINE OF FLOW. WHERE THE FENCE CANNOT BE TRENCHED IN (E.G.PAVEMENT), WEIGHT DOWN FABRIC FLAP WITH WASHED GRAVEL ON UPHILL SIDE TO PREVENT FLOW UNDER FENCE.
4. THE TRENCH MUST BE A MINIMUM OF SIX (6) INCHES DEEP AND SIX (6) INCHES WIDE TO ALLOW FOR THE SILT FENCE FABRIC TO BE LAID IN THE GROUND AND BACKFILLED WITH COMPACTED MATERIAL.
5. SECURELY FASTEN SILT FENCE TO EACH STEEL SUPPORT POST OR TO WOVEN WIRE, WHICH IN TURN IS TO BE ATTACHED TO THE STEEL OR WOOD FENCE POST. INCLUDE A SIX (6) INCH DOUBLE OVERLAP, SECURELY FASTENED, WHERE ENDS OF FABRIC MEET.
6. REMOVE SILT FENCE WHEN THE SITE IS COMPLETELY STABILIZED SO AS NOT TO BLOCK OR IMPEDE STORM FLOW OR DRAINAGE.
7. REMOVE ACCUMULATED SILT WHEN IT REACHES A DEPTH OF SIX (6) INCHES. DISPOSE OF THE SILT ONSITE IN AN APPROVED LOCATION AND IN SUCH A MANNER AS TO NOT CONTRIBUTE TO ADDITIONAL SILTATION.
8. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
9. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:	706

SILT FENCE



ELEVATED WASHOUT



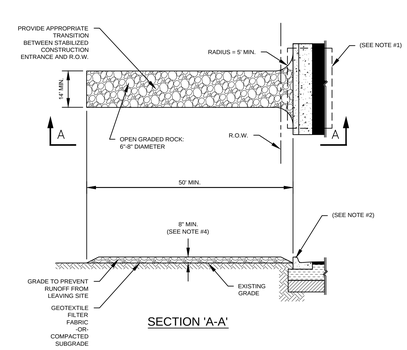
SECTION 'A-A'

NOTES:

1. THIS WASHOUT CONFIGURATION MAY NOT BE USED IN PAVED AREAS.
2. WOOD FRAME IS TO BE EQUAL TO OR BETTER THAN TWO-STACKED 2X12 ROUGH WOOD FRAME.
3. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
4. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEERING.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:	705

CONCRETE WASHOUT OPTION 2



SECTION 'A-A'

NOTES:

1. IF CURB DOES NOT EXIST OR IF EXISTING CURB IS REMOVED DURING CONSTRUCTION THEN STABILIZED CONSTRUCTION ENTRANCE IS TO EXTEND TO THE EDGE OF PAVEMENT.
2. IF CURB IS LEFT IN PLACE DURING CONSTRUCTION THEN INSTALL TEMPORARY CURB PROTECTION AS PER CITY DETAIL 713.
3. LENGTH SHALL BE AS SHOWN ON THE CONSTRUCTION DRAWINGS, BUT NOT LESS THAN FIFTY (50) FEET.
4. THICKNESS OF OPEN GRADED ROCK TO BE NO LESS THAN EIGHT (8) INCHES.
5. WIDTH SHALL BE NO LESS THAN FOURTEEN (14) FEET OR THE FULL WIDTH OF ALL POINTS OF INGRESS OR EGRESS, WHICHEVER IS WIDER.
6. STABILIZED CONSTRUCTION ENTRANCE TO BE REMOVED UPON COMPLETION OF CONSTRUCTION.
7. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS
8. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:	701

STABILIZED CONSTRUCTION ENTRANCE OPTION 1

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PROJECT NO.

6077.21

KEY PLAN

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Erosion Control Details

C-202

PACKET
7.834
February 8, 2022

FILE NAME: \\Data\Projects\2020\6077.21\03_DSGN\01_DWG\05D_CIVIL\00_SHEETS\C-202-6077_EROSION-CONTROL-DETAILS.dwg LAYOUT NAME: C-202 PRINTED: Tuesday, January 25, 2022 - 2:47pm USER: skfreeman

PRE-DEVELOPMENT CONDITIONS HYDROLOGY CALCULATIONS

DA#	AREA (AC)	TC (MIN)	C_w5	5-YEAR (IN/HR)	**Q5 (CFS)**	C_w100	100-YR (IN/HR)	**Q100 (CFS)**	COMMENTS
1	0.48	10	0.30	4.91	**0.71**	0.43	8.53	**1.77**	SURFACE DRAINAGE TO SOUTH STREET
2	1.91	10	0.39	4.91	**3.67**	0.53	8.53	**8.68**	SURFACE DRAINAGE TO N. CARVER STREET
3	1.57	10	0.37	4.91	**2.83**	0.51	8.53	**6.78**	SURFACE DRAINAGE TO N. MADISON STREET

NOTES:

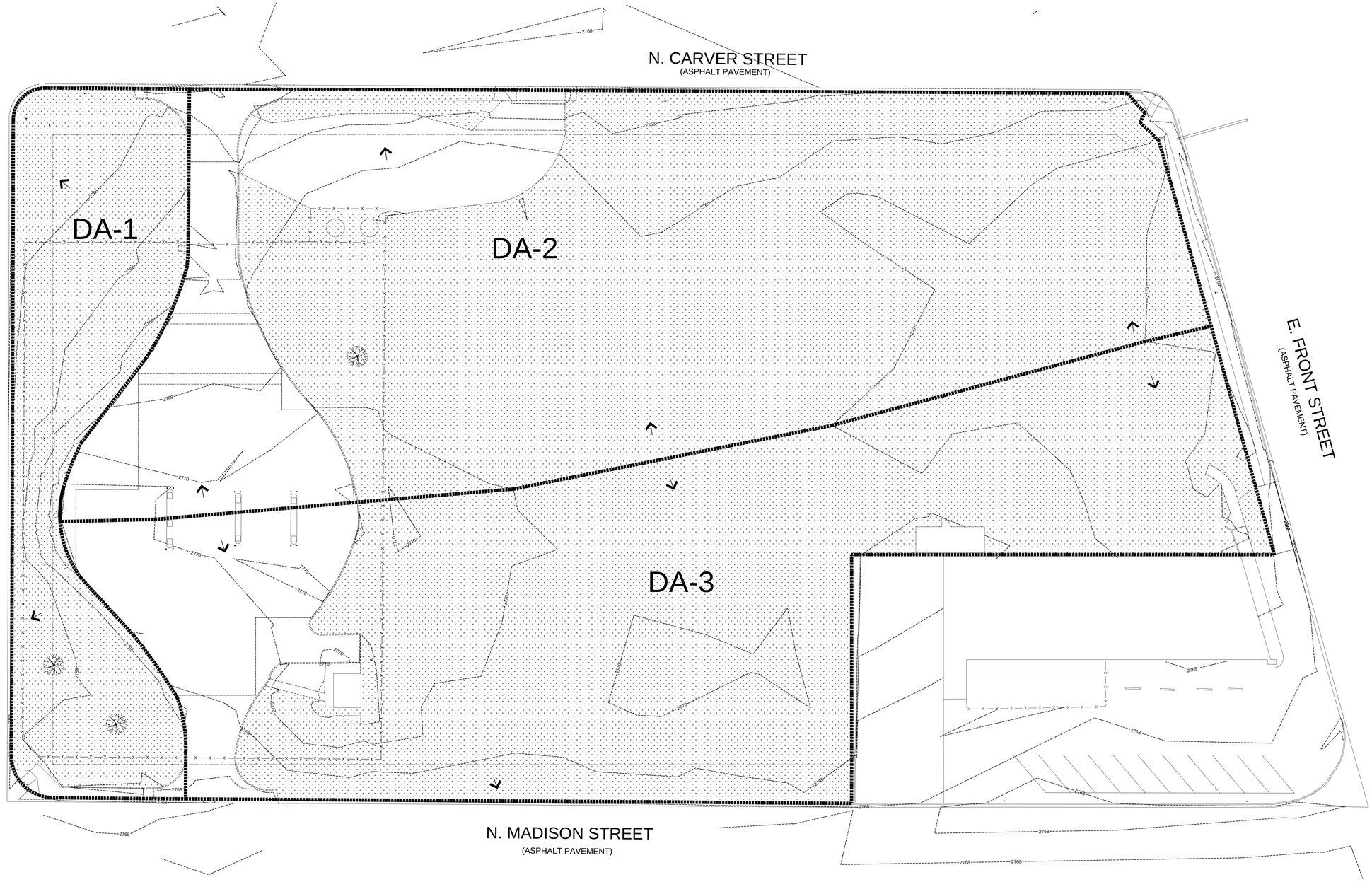
1. PRE-DEVELOPMENT WEIGHTED RUNOFF COEFFICIENT,CW, CALCULATIONS BASED ON TABLE 4-2 UNDEVELOPED LAND, FLAT 0-2% & ASPHALTIC/CONCRETE

NOTES

A. THE EXISTING CONTOURS AND SURFACE ELEVATIONS INDICATED ON THESE PLANS HAVE BEEN LOCATED FROM REFERENCE INFORMATION SUPPLIED BY OTHERS AND SURFACE LOCATIONS SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY, BOTH HORIZONTALLY AND VERTICALLY, THE LOCATIONS OF ALL EXISTING HARD SURFACE PRIOR TO CONSTRUCTION, AND TO NOTIFY THE ENGINEER PROMPTLY OF ALL CONFLICTS OF THE WORK WITH EXISTING SURFACE ELEVATIONS.

LEGEND

- EXISTING CONTOURS (0.5' INTERVAL)
- DIRECTION OF FLOW
- SWALE
- RIDGELINE
- DRAINAGE AREA BOUNDARY (MAJOR)
- OPEN SPACE



A1 PRE-DEVELOPMENT DRAINAGE AREA MAP
SCALE: 1" = 20'

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PROJECT NO.
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KEY PLAN

0 20' 40'

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Pre-Development Drainage Area Map

C-203

FILE NAME: \\Data1\Projects\3\2021\6077.21\03_DSGN\01_DWG\050_CIVIL\00_SHEETS\C-203-6077_DAM.dwg LAYOUT NAME: C-203 PRINTED: Tuesday, January 25, 2022 - 2:47pm USER: slifreeman

DRAINAGE NARRATIVE

THE DRAINAGE ANALYSIS FOR THE MIDLAND UTILITY SERVICE CENTER WAS CONDUCTED USING THE RATIONAL METHOD TO DETERMINE THE PRE AND POST-DEVELOPED CONDITIONS FOR A 5-YEAR AND 100-YEAR STORM EVENT.

THE SUBJECT PROPERTY IS PROPOSED TO BE DEVELOPED IN ACCORDANCE WITH LIGHT INDUSTRIAL ZONING DESIGNATION. RUNOFF COEFFICIENTS USED ARE WEIGHTED BASED ON THE PERCENT IMPERVIOUS AND PERVIOUS ACREAGE.

DRAINAGE PATTERNS WILL BE MAINTAINED IN ACCORDANCE WITH THE CURRENT DRAINAGE PATTERNS OF THE PROPERTY.

IN THE PRE-DEVELOPMENT CONDITION, THE LAND IS UTILIZED FOR A SMALL SERVICE STATION, WITH A LARGE PORTION OF THE LAND CURRENTLY UNDEVELOPED. DRAINAGE BASIN DENOTED 'DA-1' DRAINS NORTH TO SOUTH STREET. THE TOTAL FLOW SURFACE DRAINING TO N. MADISON STREET IN A 100-YEAR EVENT IS CALCULATED TO BE 1.77 CFS, AND 0.71 CFS N THE 5-YEAR EVENT. DRAINAGE BASIN DENOTED 'DA-2' SURFACE DRAINS EAST TO N. CARVER STREET. THE TOTAL FLOW DRAINING TO N. CARVER STREET STREET IN A 100-YEAR EVENT IS CALCULATED TO BE 8.68 CFS, AND 3.67 CFS IN THE 5-YEAR EVENT. DRAINAGE BASIN DENOTED 'DA-3' DRAINS WEST TO N. MADISON STREET. THE TOTAL FLOW DRAINING TO N. MADISON STREET IN A 100-YEAR EVENT IS CALCULATED TO BE 6.78 CFS, AND 2.83 IN THE 5-YEAR EVENT. THE TOTAL ON-SITE RUNOFF, ULTIMATELY COLLECTING IN SOUTH STREET, FLOWING EAST IS 7.21 CFS IN THE 5-YEAR EVENT, AND 17.23 CFS IN THE 100-YEAR EVENT.

IN THE POST-DEVELOPMENT CONDITION, THE SUBJECT PROPERTY, 'DA-1', WILL MAINTAIN THE EXISTING ESTABLISHED DRAINAGE PATTERNS AND DRAIN NORTH TO SOUTH STREET. THE TOTAL FLOW DRAINING TO SOUTH STREET IN A 100-YEAR EVENT HAS BEEN REDUCED TO 1.06 CFS AND 0.45 CFS IN THE 5-YEAR EVENT. DRAINAGE AREAS 'DA-2' WILL MAINTAIN THE EXISTING ESTABLISHED DRAINAGE PATTERN AND DRAIN EAST TO N. CARVER STREET. THE TOTAL FLOW DRAINING TO THE ROADWAY IN A 100-YEAR EVENT IS CALCULATED TO BE 9.25 CFS AND 4.33 CFS IN THE 5-YEAR EVENT. DRAINAGE AREA 'DA-3' WILL MAINTAIN THE EXISTING ESTABLISHED DRAINAGE PATTERNS AND DRAIN WEST TO N. MADISON STREET. THE TOTAL FLOW DRAINING TO THE ROADWAY IN A 100-YEAR EVENT IS CALCULATED TO BE 2.15 CFS AND 0.97 CFS IN THE 5-YEAR EVENT. THIS RESULTS IN A REDUCTION IN THE 5 AND 100-YEAR EVENT FROM THE PRE-DEVELOPMENT CONDITION. DRAINAGE AREA 'DA-4' WILL DRAIN TO THE NORTHWEST CORNER OF THE SITE AND DRAIN TO A PROPOSED RETENTION BASIN. DRAINAGE AREA 'DA-5' WILL DRAIN SOUTH AND WILL BE RETAINED ON-SITE. RUNOFF FROM 'DA-5' IS CALCULATED TO BE 5.71 CFS IN THE 5-YEAR EVENT, AND 12.17 CFS IN THE 100-YEAR EVENT.

INCREASE IN RUNOFF FROM PRE TO POST-DEVELOPMENT WILL BE MITIGATED BY MEANS OF TWO RETENTION AREAS ON-SITE. IN THE POST-DEVELOPMENT CONDITION, ON-SITE RUNOFF WILL BE RETAINED TO DECREASE THE DISCHARGE TO THE ADJACENT STREETS, ULTIMATELY COLLECTING IN SOUTH STREET, TO 5.75 CFS IN THE 5-YEAR EVENT, AND 12.46 IN THE 100-YEAR EVENT.
THE CALCULATED AVERAGE RUNOFF COEFFICIENT IS 0.78 IN THE POST-DEVELOPMENT CONDITION.

POST-DEVELOPMENT CONDITIONS HYDROLOGY CALCULATIONS

DA#	AREA (AC)	TC (MIN)	C_{w5}	5-YEAR (IN/HR)	Q5 (CFS)	C_{w100}	100-YR (IN/HR)	Q100 (CFS)	COMMENTS
1	0.22	10	0.42	4.91	**0.45**	0.56	8.53	**1.06**	SURFACE DRAINAGE TO SOUTH STREET
2	1.23	10	0.72	4.91	**4.33**	0.88	8.53	**9.25**	SURFACE DRAINAGE TO N. CARVER STREET
3	0.36	10	0.55	4.91	**0.97**	0.70	8.53	**2.15**	SURFACE DRAINAGE TO N. MADISON STREET
4	0.56	10	0.72	4.91	**1.98**	0.88	8.53	**4.22**	SURFACE DRAINAGE TO N. MADISON STREET
5	1.59	10	0.73	4.91	**5.71**	0.90	8.53	**12.17**	SURFACE DRAINAGE TO N. MADISON STREET

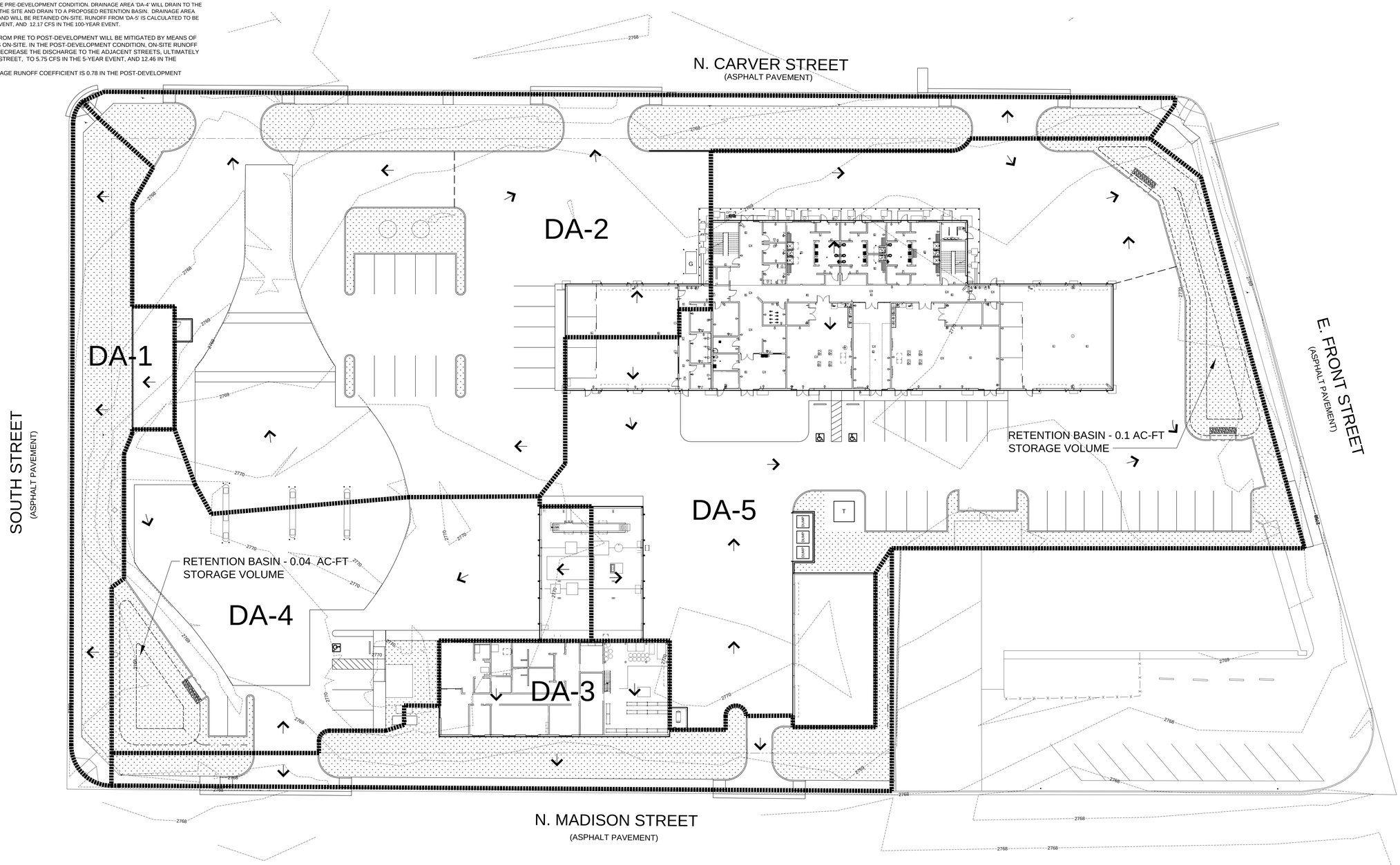
NOTES:
1. POST-DEVELOPMENT WEIGHTED RUNOFF COEFFICIENT,CW, CALCULATIONS BASED ON TABLE 4-2 GRASS AREA, FLAT 0-2% & CONCRETE/ROOF

NOTES

A. THE EXISTING CONTOURS AND SURFACE ELEVATIONS INDICATED ON THESE PLANS HAVE BEEN LOCATED FROM REFERENCE INFORMATION SUPPLIED BY OTHERS AND SURFACE LOCATIONS SHOWN. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY, BOTH HORIZONTALLY AND VERTICALLY, THE LOCATIONS OF ALL EXISTING HARD SURFACE PRIOR TO CONSTRUCTION, AND TO NOTIFY THE ENGINEER PROMPTLY OF ALL CONFLICTS OF THE WORK WITH EXISTING SURFACE ELEVATIONS.

LEGEND

- EXISTING CONTOURS (0.5' INTERVAL)
- NEW CONTOURS (1' INTERVAL)
- DIRECTION OF FLOW
- SWALE
- RIDGELINE
- DRAINAGE AREA BOUNDARY (MAJOR)
- OPEN SPACE



A1 POST-DEVELOPED DRAINAGE AREA MAP
SCALE: 1" = 20'

FILE NAME: \\Data\Projects\2022\6077.21\03_DSGN\01_DWG\00_CIVIL\00_SHEETS\C-204-6077_DAM.dwg LAYOUT NAME: C-204 PRINTED: Tuesday, January 25, 2022 - 2:48pm USER: skfreeman

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City of Midland
401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

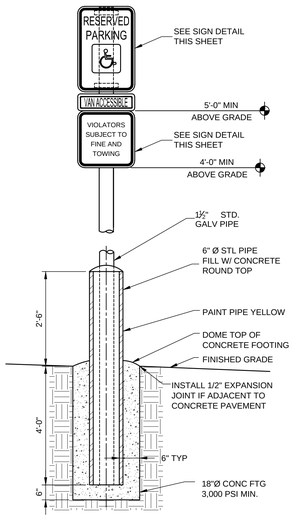
KEY PLAN

0 20' 40'

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

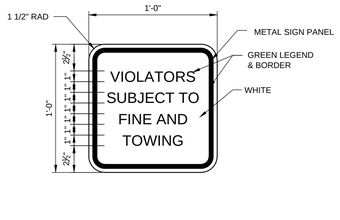
Post-Developed Drainage Area Map

C-204

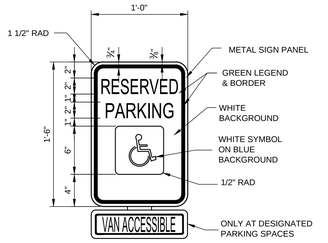


SIGN IN PAVED AREA

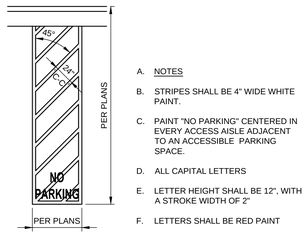
D1 ACCESSIBLE PARKING SIGN
NO SCALE



E2 SIGN DIMENSIONS
NO SCALE



E3 SIGN DIMENSIONS
NO SCALE



A. NOTES

B. STRIPES SHALL BE 4" WIDE WHITE PAINT.

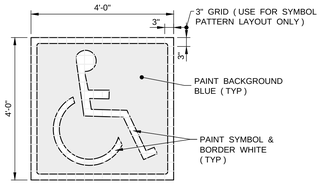
C. PAINT "NO PARKING" CENTERED IN EVERY ACCESS AISLE ADJACENT TO AN ACCESSIBLE PARKING SPACE.

D. ALL CAPITAL LETTERS

E. LETTER HEIGHT SHALL BE 12", WITH A STROKE WIDTH OF 2"

F. LETTERS SHALL BE RED PAINT

D2 ACCESS AISLE MARKING
NO SCALE

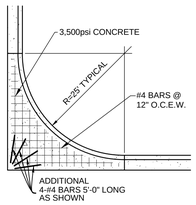


D3 SYMBOL OF ACCESSIBILITY
NO SCALE

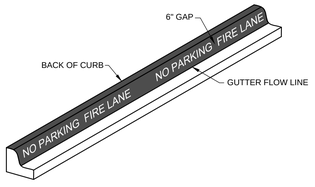
C1 TRAFFIC ARROW STRIPING
NO SCALE

C2 RAISED CONCRETE MEDIAN DETAIL
NO SCALE

C3 TURNDOWN CURB
NO SCALE

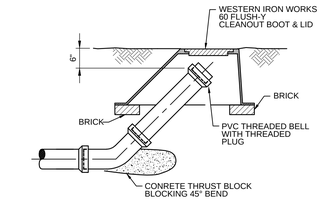


B1 FILLET REINFORCEMENT
NO SCALE

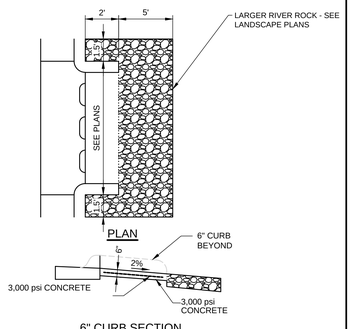


A. FIRE LANE MARKING SHALL BE RED BACKGROUND AS SHOWN, WITH 4" HIGH WHITE LETTERS USING 3/4" STROKE STATING "NO PARKING FIRE LANE". PAINT EVERY 25' ON CENTER ALONG THE FIRE LANE. FIRE LANE MARKING SHALL B PAINTED FLAT ON THE PARKING SURFACE WHEN CONCRETE CURBS ARE NOT AVAILABLE.

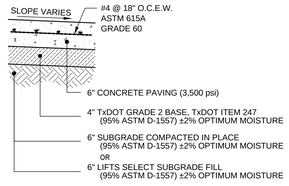
B2 FIRE LANE MARKING
NO SCALE



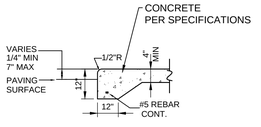
B5 CLEANOUT DETAIL
NO SCALE



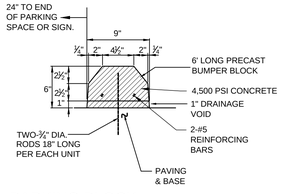
1. REFER TO PROJECT GEOTECHNICAL REPORT PERFORMED BY BEYOND ENGINEERING AND TESTING, PROJECT NO. GT2105020, DATED JUNE 25, 2021 FOR SUBGRADE PREPARATION AND PAVEMENT RECOMMENDATIONS.



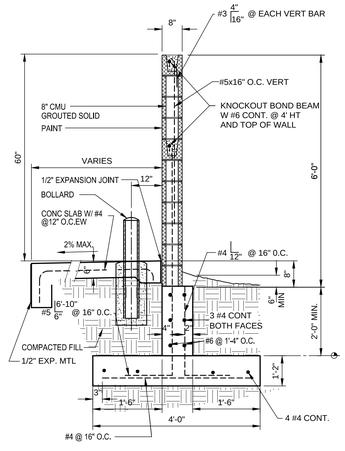
A1 CONCRETE PAVING SECTION
NO SCALE



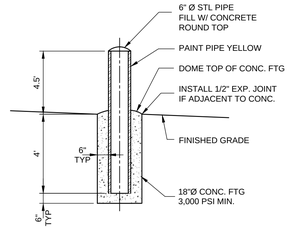
A2 INTEGRAL SIDEWALK/CURB
NO SCALE



A3 PARKING BLOCK
NO SCALE



A4 DUMPSTER SCREEN WALL SECTION
NO SCALE



A5 BOLLARD
NO SCALE

A6 SAWTOOTH CURB & GUTTER
NO SCALE

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Midland, TX 79701

PROJECT NO.
6077.21

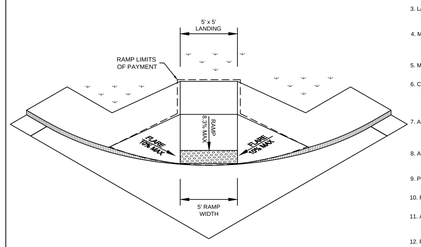
KEY PLAN

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Details

C-501

FILE NAME: \\Data\1Projects\3\2021\6077.21\03_DSGN\01_DWG\05D_CIVIL\00_SHEETS\C-501-6077_DETAILS.dwg LAYOUT NAME: C-501 PRINTED: Tuesday, January 25, 2022 - 2:48pm USER: sktreeman



TYPE 8
DIAGONAL CURB RAMP

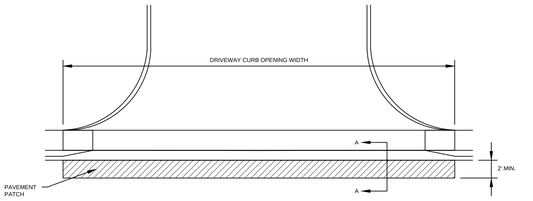
CURB RAMP NOTES:

1. ADJUST CURB RAMP LOCATION AND OR TYPE SO THAT NO OBSTRUCTION IS LOCATED WITHIN THE LANDING AREA.
2. ALL SLOPES ARE MAXIMUM ALLOWABLE. THE LEAST POSSIBLE SLOPE THAT WILL STILL DRAIN PROPERLY SHOULD BE USED.
3. LANDINGS SHALL BE 5'X 5' MINIMUM WITH A MAXIMUM 2% SLOPE IN ANY DIRECTION. WHERE OBSTRUCTIONS EXIST, THERE SHALL BE A 3' MINIMUM CLEARANCE IN WIDTH AND LENGTH OF THE LANDING.
4. MANEUVERING SPACE AT THE BOTTOM OF CURB RAMPS SHALL BE A MINIMUM OF 4'X4' WHOLLY CONTAINED WITHIN THE CROSSWALK AND TO THE ENTIRE OUTSIDE OF THE PARALLEL VEHICULAR TRAVEL PATH.
5. MAXIMUM ALLOWABLE CROSS SLOPE ON SIDEWALK AND CURB RAMP SURFACES IS 2%.
6. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP, EITHER BECAUSE THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE OR BECAUSE THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED. OTHERWISE, PROVIDE FLARED SIDES.
7. ADDITIONAL INFORMATION ON CURB RAMP LOCATION, DESIGN, LIGHT REFLECTIVE VALUE AND TEXTURE MAY BE FOUND IN THE CURRENT EDITION OF THE TEXAS ACCESSIBILITY STANDARDS (TAS) AND 16 TAC 68.102.
8. AT INTERSECTIONS WHERE CROSSWALK MARKINGS ARE NOT REQUIRED, CURB RAMPS SHALL BE ALIGNED WITH THEORETICAL CROSSWALKS OR AS DIRECTED BY THE ENGINEER.
9. PROVIDE A SMOOTH TRANSITION WHERE THE CURB RAMPS CONNECT TO THE STREET.
10. FLARE SLOPE SHALL NOT EXCEED 10% MEASURED ALONG CURB LINE.
11. ALL RAMPS AND LANDINGS WITH A CONCRETE SURFACE SHALL HAVE A COURSE BROOM FINISH OR OTHER ROUGH NON-SKID TYPE FINISH AS APPROVED BY THE ENGINEER.
12. PLACE 6" OF CONCRETE IN RAMPS, LANDINGS, AND FLARES THAT ARE LOCATED AT THE RETURNS ADJACENT TO THE BACK OF CURB OF ARTERIAL STREETS AND COMMERCIAL SITES.

GENERAL NOTES:

1. CONCRETE TO BE CITY OF MIDLAND CLASS "A" WITH A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 PSI. USE FIBER REINFORCED CONCRETE THROUGHOUT.
2. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE CITY OF MIDLAND STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE DIRECTED BY ADA STANDARDS AND RESOURCES.

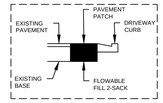
DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	DIAGONAL CURB RAMP		226
APPROVED: MCC			



PLAN VIEW

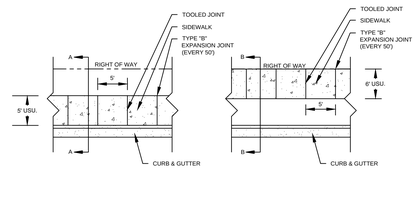
NOTES:

1. CLEANLY SAW-CUT PAVEMENT ACROSS FULL EXTENT OF DRIVEWAY CURB OPENING AND REMOVE.
2. ASPHALT PAVEMENT PATCHES TO BE MINIMUM OF 2" TYPE "D" HMAC OR MATCH EXISTING ASPHALT THICKNESS IF IT IS GREATER THAN 2" THICK, WITH 95% MODIFIED COMPACTION THROUGHOUT. TACK COAT ALL EXPOSED SURFACES PRIOR TO PLACING NEW ASPHALT PATCH.
3. CONCRETE PAVEMENT PATCHES TO BE MINIMUM OF 6" OR MATCH EXISTING CONCRETE THICKNESS IF IT IS GREATER THAN 6" THICK. CONCRETE PATCHES ARE TO EXTEND FROM JOINT-TO-JOINT IF EXISTING CONCRETE PAVEMENT IS JOINTED AND MATCH EXISTING PAVEMENT JOINTING. IF EXISTING CONCRETE PAVEMENT IS NOT JOINTED THEN CONCRETE PATCH IS TO BE JOINTED EVERY 10', SEAL ALL CONCRETE JOINTS.
4. REMOVE AND REPLACE ALL BASE MATERIAL BENEATH PAVEMENT PATCH WITH FLOWABLE FILL 2-SACK (2-SACK=188 LBS/CY, PORTLAND CEMENT). PLACE ALL FLOWABLE FILL 2-SACK AS A SINGLE CONTINUOUS POUR.
5. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
6. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.



SECTION A-A

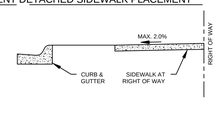
DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	PAVEMENT PATCH FOR NEW DRIVEWAYS		224
APPROVED: MCC			



ATTACHED SIDEWALK PLACEMENT

SECTION A - A

DETACHED SIDEWALK PLACEMENT

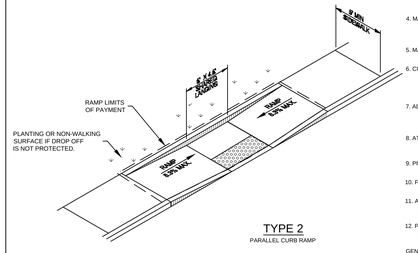


SECTION B - B

NOTES:

1. CONCRETE TO BE CITY OF MIDLAND CLASS "A" AND HAVE A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 PSI. USE FIBER REINFORCED CONCRETE PAVEMENT THROUGHOUT.
2. SIDEWALK TO BE A MINIMUM OF 5' WIDE AND 4" THICK.
3. SIDEWALKS TO HAVE TYPE A SAWCUT JOINTS OR TOOLED JOINTS EVERY 5'.
4. TYPE "B" EXPANSION JOINTS TO BE LOCATED AT ALL PEDESTRIAN ACCESS RAMPS AND WHEREVER NEW SIDEWALK IS PLACED ADJACENT TO EXISTING CONCRETE.
5. ATTACHED SIDEWALK WILL BE LOCATED ADJACENT TO THE BACK OF CURB.
6. DETACHED SIDEWALK WILL BE LOCATED ADJACENT TO THE RIGHT-OF-WAY.
7. SIDEWALK CROSS-SLOPE MAY NOT EXCEED 2.0%.
8. ALL EXPOSED SIDEWALK EDGES TO HAVE A 1/2" RADIUS.
9. WHERE OBSTRUCTION IN SIDEWALK EXIST, THERE SHALL BE A 3' MINIMUM CLEARANCE. SIDEWALK LOCATION MAY BE SHIFTED WITH THE APPROVAL OF THE CITY ENGINEER.
10. ALL SIDEWALKS WITH A CONCRETE SURFACE SHALL HAVE A COURSE BROOM FINISH OR OTHER ROUGH NON-SKID TYPE FINISH AS APPROVED BY THE CITY ENGINEER.
11. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
12. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.
13. SIDEWALKS IN DOWNTOWN PER CENTRAL BUSINESS DISTRICT POLICY.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	STANDARD SIDEWALK		225
APPROVED: MCC			



TYPE 2
PARALLEL CURB RAMP

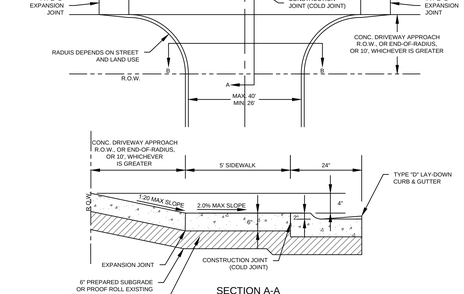
CURB RAMP NOTES:

1. ADJUST CURB RAMP LOCATION AND OR TYPE SO THAT NO OBSTRUCTION IS LOCATED WITHIN THE LANDING AREA.
2. ALL SLOPES ARE MAXIMUM ALLOWABLE. THE LEAST POSSIBLE SLOPE THAT WILL STILL DRAIN PROPERLY SHOULD BE USED.
3. LANDINGS SHALL BE 5'X 5' MINIMUM WITH A MAXIMUM 2% SLOPE IN ANY DIRECTION. WHERE OBSTRUCTIONS EXIST, THERE SHALL BE A 3' MINIMUM CLEARANCE IN WIDTH AND LENGTH OF THE LANDING.
4. MANEUVERING SPACE AT THE BOTTOM OF CURB RAMPS SHALL BE A MINIMUM OF 4'X4' WHOLLY CONTAINED WITHIN THE CROSSWALK AND TO THE ENTIRE OUTSIDE OF THE PARALLEL VEHICULAR TRAVEL PATH.
5. MAXIMUM ALLOWABLE CROSS SLOPE ON SIDEWALK AND CURB RAMP SURFACES IS 2%.
6. CURB RAMPS WITH RETURNED CURBS MAY BE USED ONLY WHERE PEDESTRIANS WOULD NOT NORMALLY WALK ACROSS THE RAMP, EITHER BECAUSE THE ADJACENT SURFACE IS PLANTING OR OTHER NON-WALKING SURFACE OR BECAUSE THE SIDE APPROACH IS SUBSTANTIALLY OBSTRUCTED. OTHERWISE, PROVIDE FLARED SIDES.
7. ADDITIONAL INFORMATION ON CURB RAMP LOCATION, DESIGN, LIGHT REFLECTIVE VALUE AND TEXTURE MAY BE FOUND IN THE CURRENT EDITION OF THE TEXAS ACCESSIBILITY STANDARDS (TAS) AND 16 TAC 68.102.
8. AT INTERSECTIONS WHERE CROSSWALK MARKINGS ARE NOT REQUIRED, CURB RAMPS SHALL BE ALIGNED WITH THEORETICAL CROSSWALKS,OR AS DIRECTED BY THE ENGINEER.
9. PROVIDE A SMOOTH TRANSITION WHERE THE CURB RAMPS CONNECT TO THE STREET.
10. FLARE SLOPE SHALL NOT EXCEED 10% MEASURED ALONG CURB LINE.
11. ALL RAMPS AND LANDINGS WITH A CONCRETE SURFACE SHALL HAVE A COURSE BROOM FINISH OR OTHER ROUGH NON-SKID TYPE FINISH AS APPROVED BY THE ENGINEER.
12. PLACE 6" OF CONCRETE IN RAMPS, LANDINGS, AND FLARES THAT ARE LOCATED AT THE RETURNS ADJACENT TO THE BACK OF CURB OF ARTERIAL STREETS AND COMMERCIAL SITES.

GENERAL NOTES:

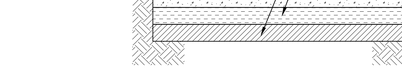
1. CONCRETE TO BE CITY OF MIDLAND CLASS "A" WITH A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 PSI. USE FIBER REINFORCED CONCRETE THROUGHOUT.
2. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE CITY OF MIDLAND STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE DIRECTED BY ADA STANDARDS AND RESOURCES.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	PARALLEL CURB RAMP		230
APPROVED: MCC			



SECTION A-A

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	MULTI-FAMILY & COMMERCIAL DRIVEWAY		221(A)
APPROVED: MCC			



SECTION B-B

NOTES:

1. REMOVE AND REPLACE EXISTING CURB AND GUTTER TO NEAREST JOINT IF LESS THAN 4' SECTION OF EXISTING CURB AND GUTTER REMAINS AFTER DRIVEWAY APPROACH PLACED.
2. LANDING MAY BE CLOSER THAN 5' FROM PROPERTY LINE WITH ADJOINING PROPERTY OWNER'S CONSENT. CONSENT FORMS ARE AVAILABLE IN ENGINEERING SERVICES. APPROVAL FROM ADJOINING PROPERTY OWNER DOES NOT GUARANTEE ENGINEERING SERVICES APPROVAL.
3. THIS DETAIL ONLY APPLIES WHEN ADJACENT PROPERTY IS NOT AN ALLEY. A MINIMUM 10' IS REQUIRED BETWEEN DRIVEWAY CURB OPENING AND ALLEY PAVING.
4. MATCH GUTTER/ FLOWLINE ELEVATION ON EACH END OF DRIVEWAY APPROACH. WATER MUST FLOW IN GUTTER ACROSS THE DRIVEWAY APPROACH.
5. THE CITY ENGINEER OR TRAFFIC ENGINEER MAY APPROVE WIDER OPENINGS FOR COMMERCIAL DRIVES TO ACCOMMODATE DIVIDED ENTRY/EXIT AND ANGLED DRIVES OR HIGH VOLUME, HIGH SPEED STREETS.
6. CONCRETE TO BE CITY OF MIDLAND CLASS "C", 3600 PSI. USE FIBER REINFORCED CONCRETE PAVEMENT THROUGHOUT.
7. CONTRACTOR, AT THEIR OPTION, MAY ELECT TO PLACE 8" CONCRETE PAVEMENT WITHOUT FLEXIBLE COMPACTED BASE RATHER THAN 6" CONCRETE PAVEMENT WITH COMPACTED FLEXIBLE BASE.
8. OVER-EXCAVATION BELOW THE GRADE REQUIRED TO BE CORRECTED BY PLACING EXTRA CONCRETE AT THE TIME THE DRIVEWAY IS PLACED OR BY PLACING ADDITIONAL CITY STANDARD FLEXIBLE COMPACTED BASE.
9. FLEXIBLE COMPACTED BASE TO BE PLACED IN LIFTS NO THICKER THAN 6".
10. SIDEWALKS AND RAMPS TO HAVE COURSE BROOM FINISH.
11. SEAL ALL CONCRETE JOINTS.
12. MATERIAL AND CONSTRUCTION METHODS TO CONFORM TO THE CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
13. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

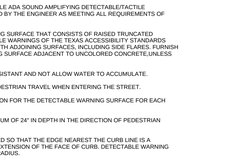
DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	MULTI-FAMILY & COMMERCIAL DRIVEWAY		221(B)
APPROVED: MCC			

DETECTABLE WARNING SURFACE NOTES:

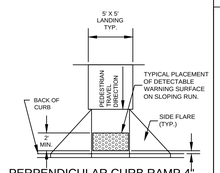
1. DETECTABLE WARNING SURFACE SUCH AS ARMOR-TILE ADA SOUND AMPLIFYING DETECTABLE/TACTILE WARNING SURFACE TILE OR EQUAL AND APPROVED BY THE ENGINEER AS MEETING ALL REQUIREMENTS OF ASTM C-936, C-33.
2. CURB RAMPS MUST CONTAIN A DETECTABLE WARNING SURFACE THAT CONSISTS OF RAISED TRUNCATED DOMES COMPLYING WITH SECTION 7.05 DETACHABLE WARNINGS OF THE TEXAS ACCESSIBILITY STANDARDS (TAS). THE SURFACE MUST CONTRAST VISUALLY WITH ADJOINING SURFACES, INCLUDING SIDE FLARES. FURNISH DARK BROWN OR DARK RED DETECTABLE WARNING SURFACE ADJACENT TO UNCOLORED CONCRETE,UNLESS SPECIFIED ELSEWHERE IN THE PLANS.
3. DETECTABLE WARNING SURFACES MUST BE SLIP RESISTANT AND NOT ALLOW WATER TO ACCUMULATE.
4. ALIGN TRUNCATED DOMES IN THE DIRECTION OF PEDESTRIAN TRAVEL WHEN ENTERING THE STREET.
5. SHADED AREAS INDICATE THE APPROXIMATE LOCATION FOR THE DETECTABLE WARNING SURFACE FOR EACH CURB RAMP TYPE.
6. DETECTABLE WARNING SURFACES SHALL BE A MINIMUM OF 24" IN DEPTH IN THE DIRECTION OF PEDESTRIAN TRAVEL.
7. DETECTABLE WARNING SURFACES SHALL BE LOCATED SO THAT THE EDGE NEAREST THE CURB LINE IS A MINIMUM OF 6" AND A MAXIMUM OF 10" FROM THE EXTENSION OF THE FACE OF CURB. DETECTABLE WARNING SURFACES MAY BE CURVED ALONG THE CORNER RADIUS.
8. SINGLE TILE PLATES COLONIAL RED COLOR.

GENERAL NOTES:

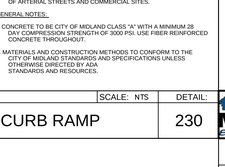
1. CONCRETE TO BE CITY OF MIDLAND CLASS "A" WITH A MINIMUM 28 DAY COMPRESSION STRENGTH OF 3000 PSI. USE FIBER REINFORCED CONCRETE THROUGHOUT.
2. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO THE CITY OF MIDLAND STANDARDS AND SPECIFICATIONS UNLESS OTHERWISE DIRECTED BY ADA STANDARDS AND RESOURCES.



TRUNCATED DOME PATTERN

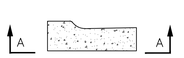


PARALLEL CURB RAMP MAX

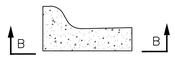


PERPENDICULAR CURB RAMP 4" MAX

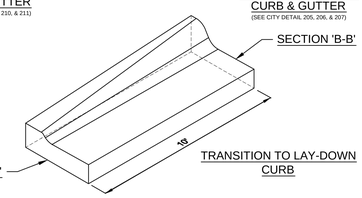
DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	DETECTABLE WARNING SURFACE		233
APPROVED: MCC			



TYPE "D", "E" , OR "F" LAY-DOWN CURB & GUTTER
(SEE CITY DETAIL 209, 210, & 211)



TYPE "A" , "B", OR "C" CURB & GUTTER
(SEE CITY DETAIL 205, 206, & 207)

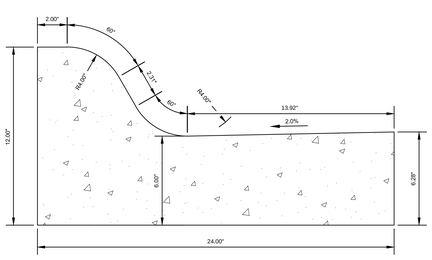


TRANSITION TO LAY-DOWN CURB

NOTES:

1. CONCRETE TO BE CITY OF MIDLAND CLASS "C", 3600 PSI. USE FIBER REINFORCED CONCRETE PAVEMENT THROUGHOUT.
2. SEAL CONCRETE JOINT AT FACE OF CURB WHEN ADJACENT TO CONCRETE PAVEMENT AND NOT INTEGRAL WITH THAT PAVEMENT.
3. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
4. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	TRANSITION TO LAY-DOWN CURB		208
APPROVED: MCC			



NOTES:

1. CONCRETE TO BE CITY OF MIDLAND CLASS "C", 3600 PSI. USE FIBER REINFORCED CONCRETE PAVEMENT THROUGHOUT.
2. SEAL CONCRETE JOINT AT FACE OF CURB WHEN ADJACENT TO CONCRETE PAVEMENT AND NOT INTEGRAL WITH THAT PAVEMENT.
3. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
4. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	TYPE A STANDARD CURB AND GUTTER		205
APPROVED: MCC			

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Midland Utilities Service Center

Water/Wastewater, Solid Waste, and Vehicle Services

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CLIENT

City of Midland
401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

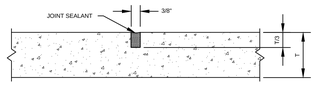
KEY PLAN

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

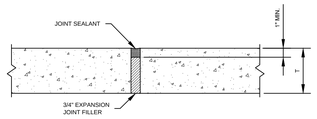
Details

C-502

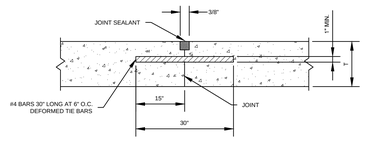
FILE NAME: \\Data1\Projects\2021\6077.21\03_DSGN\01_DWG\050_CIVIL\00_SHEETS\C-502-6077_COM-DETAILS.dwg LAYOUT NAME: C-502 PRINTED: Tuesday, January 25, 2022 - 2:49pm USER: skfreeman



TYPE "A" SAW-CUT JOINT



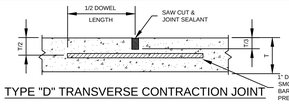
TYPE "B" DOWEL-LESS EXPANSION JOINT



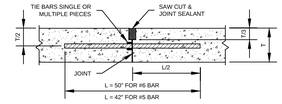
TYPE "C" CONSTRUCTION COLD JOINT

DRAWN: DPM | CHECKED: JCF | APPROVED: MCC
EFFECTIVE DATE: 10/01/2018 | SCALE: NTS | DETAIL: 234(A)

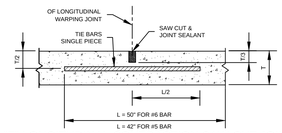
TYPICAL CONCRETE JOINTS



TYPE "D" TRANSVERSE CONTRACTION JOINT



TYPE "E" LONGITUDINAL CONTRACTION JOINT



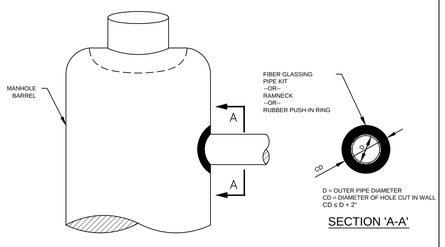
TYPE "F" LONGITUDINAL CONTRACTION SAW-CUT JOINT

NOTES:

1. JOINTING , DOWEL, AND TIE BAR DESIGN REQUIREMENTS ARE SUBJECT TO CHANGE FOR ARTERIAL OR HIGHER CLASSIFICATION ROADS IF DEEMED NECESSARY BY THE CITY ENGINEER.
2. TYPICAL CONCRETE PAVEMENT JOINT SPACING IS TO BE NO LESS THAN 10' X 10' AND NO MORE THAT 15' X 15'.
3. DOWELS ARE TO BE SPACED AT 12" INTERVALS WITH MINIMUM 18" SEPARATION FROM PARALLEL JOINTS OR EDGES OF PAVEMENT.
4. TIE BARS ARE TO BE SET AT 24" INTERVALS WITH MINIMUM 18" SEPARATION FROM PARALLEL JOINTS OR EDGES OF PAVEMENT.
5. ALL JOINT SEALANT TO BE TxDOT DMS-6310 SL-2 OR APPROVED EQUAL.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM | CHECKED: JCF | APPROVED: MCC
EFFECTIVE DATE: 10/01/2018 | SCALE: NTS | DETAIL: 234(B)

TYPICAL CONCRETE JOINTS



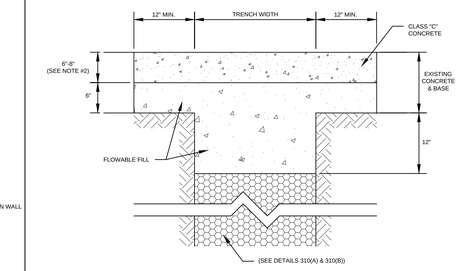
SECTION 'A-A'

NOTES:

1. THE DIAMETER OF THE CUTOUT IN THE MANHOLE BARREL IS TO BE NO MORE THAN 2.0" WIDER THAN THE OUTER WALL DIAMETER OF THE PENETRATING PIPE.
2. THE PENETRATING PIPE IS TO BE CENTERED IN THE MANHOLE BARREL CUTOUT.
3. PIPES PENETRATING MANHOLE MUST BE MINIMUM 6" DIAMETER, AND SERVICE LINES MUST BE CONSTRUCTED TO CITY WASTEWATER MAIN OR STORM DRAIN STANDARDS WITHIN PUBLIC RIGHT OF WAY OR EASEMENT.
4. FORM FLOW SURFACE AND MOUND CONCRETE AROUND PIPE PENETRATIONS, TO FORM A SEAL, IN ONE CONTINUOUS PLACEMENT OPERATION.
5. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
6. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM | CHECKED: JCF | APPROVED: MCC
EFFECTIVE DATE: 10/01/2018 | SCALE: | DETAIL: 314

TYPICAL FIBERGLASS MANHOLE PIPE PENETRATION

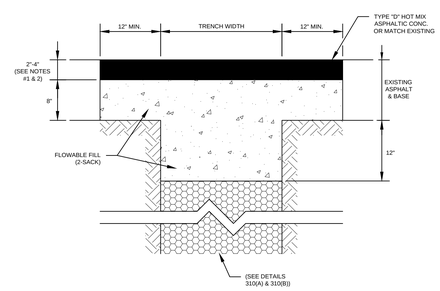


NOTES:

1. CONCRETE TO BE CITY OF MIDLAND CLASS "C" CONCRETE, 3600 PSI. USE FIBER REINFORCED CONCRETE PAVEMENT THROUGHOUT.
2. CONCRETE PAVEMENT THICKNESS TO BE A MINIMUM OF 6" OR MATCH THE EXISTING CONCRETE THICKNESS IF IT IS GREATER THAN 6" THICK. CONCRETE PAVEMENT THICKNESS TO BE MINIMUM 8" FOR ARTERIAL PAVEMENT.
3. PLACE ALL FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT) AS A SINGLE CONTINUOUS POUR.
4. EXTEND BOTH CONCRETE AND FLOWABLE FILL 12" BEYOND THE EDGE OF THE TRENCH ON BOTH SIDES.
5. SEE DETAILS 310(A) AND 310(B) REGARDING TRENCH BACKFILL REQUIREMENTS BENEATH THE FLOWABLE FILL.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM | CHECKED: JCF | APPROVED: MCC
EFFECTIVE DATE: 10/01/2018 | SCALE: NTS | DETAIL: 312

CONCRETE TRENCH PAVEMENT REPLACEMENT

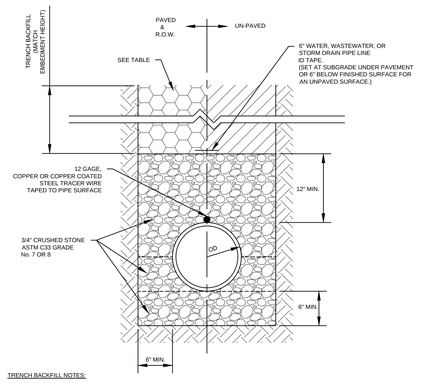


NOTES:

1. ASPHALT PAVEMENT THICKNESS TO BE A MINIMUM OF 2" OR MATCH THE EXISTING ASPHALT THICKNESS IF IT IS GREATER THAN 2" THICK.
2. PLACE ASPHALT PAVEMENT IN MAXIMUM 2" LIFTS, 95% MODIFIED COMPACTION.
3. PLACE ALL FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT) AS A SINGLE CONTINUOUS POUR.
4. EXTEND BOTH ASPHALT AND FLOWABLE FILL 12" BEYOND THE EDGE OF THE TRENCH ON BOTH SIDES.
5. SEE DETAILS 310(A) AND 310(B) REGARDING TRENCH BACKFILL REQUIREMENTS BENEATH THE FLOWABLE FILL.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM | CHECKED: JCF | APPROVED: MCC
EFFECTIVE DATE: 10/01/2018 | SCALE: NTS | DETAIL: 311

ASPHALT TRENCH PAVEMENT REPLACEMENT



TRENCH BACKFILL NOTES:

1. APPLIES TO ALL PIPE TYPES. (DUCTILE IRON, PVC, ETC.)
2. UTILIZE SELECT FILL BACKFILL BENEATH ALL PAVED SURFACES. NATIVE MATERIAL BACKFILL CAN ONLY BE USER FOR UNPAVED TRENCH CONDITIONS IE BACKFILL MATERIAL IS ≤ 30LL AND ≤ 15 PI.
3. NATIVE MATERIAL TO BE EXISTING EXCAVATED SOIL FROM TRENCH WITH ALL MATERIAL BROKEN DOWN ≤ 2".
4. MOISTURE CONDITION ALL BACKFILL MATERIAL PRIOR TO PLACING IN TRENCH.
5. PLACE TRENCH BACKFILL MATERIAL IN MAXIMUM 12" LOOSE LIFTS AND COMPACT TO MAXIMUM 8" COMPACTED LIFTS.
6. REFER TO CITY DETAILS 311 AND 312 FOR TRENCH PAVEMENT REPLACEMENT REQUIREMENTS.
7. PLACE LAYERS B, C, AND E FOUND ON CITY DETAIL 310(B) AS SEPARATE LAYERS.
8. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
9. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM | CHECKED: JCF | APPROVED: MCC
EFFECTIVE DATE: 10/01/2018 | SCALE: NTS | DETAIL: 310(A)

TRENCHING AND BEDDING

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City of Midland
401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

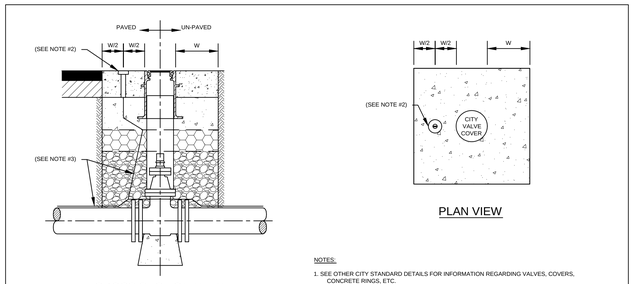
KEY PLAN

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Details

C-503

FILE NAME: \\Data1\Projects\30\2021\6077.21\03_DSGN\01_DWG\050_CIVIL\00_SHEETS\C-503-6077_COM-DETAILS.dwg LAYOUT NAME: C-503 PRINTED: Tuesday, January 25, 2022 - 2:49pm USER: skfreeman



CROSS SECTION VIEW

PLAN VIEW

NOTES:

1. SEE OTHER CITY STANDARD DETAILS FOR INFORMATION REGARDING VALVES, COVERS, CONCRETE RINGS, ETC.
2. TRAFFIC RATED COPPERHEAD SNAKEPIT TEST STATION OR APPROVED EQUAL. SET FLUSH WITH FINISHED SURFACE OF CONCRETE RING.
3. TRACER WIRE PER DETAIL 310 (A) TO BE TAPED TO SIDE OF VALVE BOX AND FASTENED SECURELY TO END OF TEST STATION. TRACER WIRE TO REMAIN ENTIRELY COVERED.
4. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
5. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	VALVE DETECTOR WIRE END		320
APPROVED: MCC			

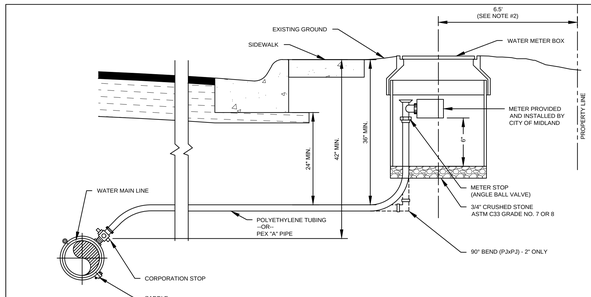
APPROVED COMPONENT LIST

1" WATER METER SERVICE	2" WATER METER SERVICE
SADDLE OPTION 1: DUCTILE IRON W/DUAL BAND CC THREAD STEEL STRAP 1. FORD FCD202 SADDLE 2. MUELLER DR 2 S SERIES 3. A.Y. MCDONALD SERIES 4855A 4. OR APPROVED EQUAL	SADDLE OPTION 1: DUCTILE IRON W/DUAL BAND CC THREAD STEEL STRAP 1. FORD FCD202 SADDLE 2. MUELLER DR 2 S SERIES 3. A.Y. MCDONALD SERIES 4855A 4. OR APPROVED EQUAL
SADDLE OPTION 2: BRASS W/DUAL BAND CC THREAD STEEL STRAP 1. FORD 202BSD SADDLE 2. MUELLER BR 2 S SERIES 3. A.Y. MCDONALD SERIES 3855 4. OR APPROVED EQUAL	SADDLE OPTION 2: BRASS W/DUAL BAND CC THREAD STEEL STRAP 1. FORD 202BSD SADDLE 2. MUELLER BR 2 S SERIES 3. A.Y. MCDONALD SERIES 3855 4. OR APPROVED EQUAL
CORPORATION STOP 1. FORD FB1000-4-G-NL 2. MUELLER B-25008N 3. A.Y. MCDONALD SERIES 74701B-22 1 4. OR APPROVED EQUAL	CORPORATION STOP 1. FORD FB1000-7-G-NL 2. MUELLER B-25008N 3. A.Y. MCDONALD SERIES 74701B-22 2 4. OR APPROVED EQUAL
CURB STOP METER VALVE 1. FORD BA43-444W-G-NL 2. MUELLER B-25172N 3. A.Y. MCDONALD SERIES 74602B-22 1 4. OR APPROVED EQUAL	CURB STOP METER VALVE 1. FORD BFA43-777W-G-NL 2. MUELLER B-25172N 3. A.Y. MCDONALD SERIES 74602B-22 2 4. OR APPROVED EQUAL
WATER METER BOX 1. EAST JORDAN 32197099A02 2. OR APPROVED EQUAL	WATER METER BOX 1. EAST JORDAN 32244000A01 2. OR APPROVED EQUAL
SERVICE LINE PIPE 1. ASTM D-2737 POLYETHYLENE TUBING 2. MUNICI PEX 'A' PIPE 3. OR APPROVED EQUAL	SERVICE LINE PIPE 1. ASTM D-2737 POLYETHYLENE TUBING 2. MUNICI PEX 'A' PIPE 3. OR APPROVED EQUAL

NOTES:

1. ALL COMPONENTS OF ANY WATER METER SERVICE LINE MUST COME FROM THE SAME BRAND WHENEVER POSSIBLE.
2. PLASTIC WRAP ALL SADDLES.
3. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
4. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	1" AND 2" WATER METER AND SERVICE CONNECTION	SCALE: NTS	DETAIL: 604(B)



NOTES:

1. ALL WATER SERVICES TO BE 1" OR 2" DIAMETER.
2. THE DISTANCE FROM PROPERTY LINE SHOWN IS FOR 5' SIDEWALK AT THE PROPERTY LINE. WHEN 5' SIDEWALK IS PLACED AT THE BACK OF CURB, PLACE METER BOXES A MINIMUM OF 6.5' FROM THE BACK OF CURB.
3. TWO ADJACENT SERVICE LATERALS MAY BE PLACED IN THE SAME TRENCH. EACH TAP MUST BE SEPARATE AND HAVE BOTH A CORPORATION STOP AND A METER STOP. ("BULLHEAD TAPS ARE NOT PERMITTED".)
4. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
5. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	1" AND 2" WATER METER AND SERVICE CONNECTION		604(A)
APPROVED: MCC			

APPROVED COMPONENT LIST

NO.	VALVES	VALVE COVERS	VALVE BOX
1	MUELLER 2360 MJ	MUELLER 2360 FL X FL	BASS & HAYS STANDARD 390-1 "SHORTY"
2	M & H 4067 MJ	M & H 4067-0	OR APPROVED EQUAL
3	CLOW 2838 MJ	CLOW 2840 FL X FL	
4	OR APPROVED EQUAL	OR APPROVED EQUAL	

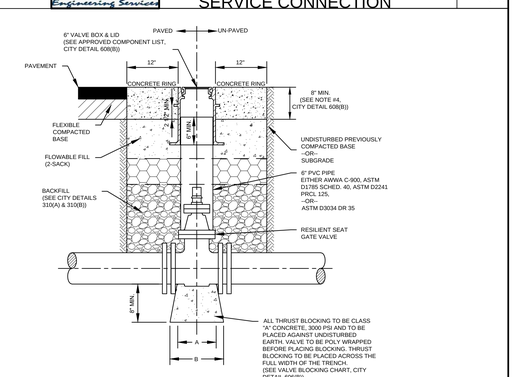
VALVE BLOCKING CHART

PIPE SIZE	A	B
4"	5.0"	10.5"
6"	6.5"	1'-0"
8"	6.5"	1'-0"
10"	8.0"	1'-1.0"
12"	8.5"	1'-2.0"

NOTES:

1. FOR VALVES ON WATER MAIN PIPES LARGER THAN 12" SEE CITY DETAIL 609.
2. SETTING VALVE BOX TO GRADE MAY REQUIRE ADDING PVC PIPE. IF ADDITIONAL PIPE IS REQUIRED, USE BELL SECTION WITH GASKET AND SET BELL DOWN OVER EXISTING PIPE RISER. A GASKETED SELF CENTERING COLLAR MAY BE USED IN LIEU OF THE BELL SECTION.
3. CONCRETE RING TO BE CITY OF MIDLAND CLASS "C", 3600 PSI, UNLESS OTHERWISE NOTED.
4. USE FIBER REINFORCEMENT FOR ALL CONCRETE , WHETHER PAVEMENT OR THRUST BLOCKING.
5. 12" MINIMUM FOR CONCRETE RING IN AN ARTERIAL ROADWAY.
6. FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT.) REQUIRED BENEATH ALL CONCRETE RINGS.
7. FLOWABLE FILL 2-SACK (2 SACK = 188 LBS/CY, PORTLAND CEMENT.) REQUIRED FOR ALL OVER EXCAVATION BACKFILL.
8. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
9. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

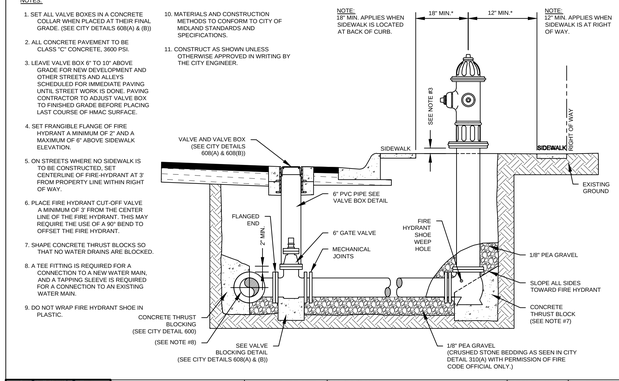
DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	TYPICAL VALVE AND VALVE BOX DETAILS		608(B)
APPROVED: MCC			



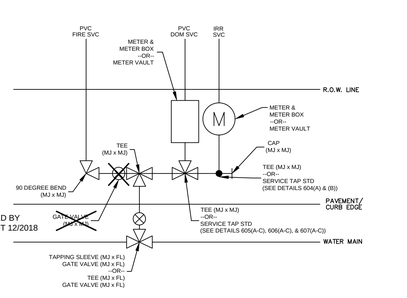
DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	TYPICAL VALVE AND VALVE BOX		608(A)
APPROVED: MCC			

NOTES:

1. SET ALL VALVE BOXES IN A CONCRETE COLLAR WHEN PLACED AT THEIR FINAL GRADE. (SEE CITY DETAILS 608(A) & (B))
2. ALL CONCRETE PAVEMENT TO BE CLASS "C" CONCRETE, 3600 PSI.
3. LEAVE VALVE BOX 6" TO 10" ABOVE GRADE FOR NEW DEVELOPMENT AND OTHER STREETS AND ALLEYS SCHEDULED FOR IMMEDIATE PAVING UNTIL STREET WORK IS DONE. PAVING CONTRACTOR TO ADJUST VALVE BOX TO FINISHED GRADE BEFORE PLACING LAST COURSE OF HMAC SURFACE.
4. SET FRANGIBLE FLANGE OF FIRE HYDRANT A MINIMUM OF 2" AND A MAXIMUM OF 6" ABOVE SIDEWALK ELEVATION.
5. ON STREETS WHERE NO SIDEWALK IS TO BE CONSTRUCTED, SET CENTERLINE OF FIRE HYDRANT AT 3' FROM PROPERTY LINE WITHIN RIGHT OF WAY.
6. PLACE FIRE HYDRANT CUT-OFF VALVE A MINIMUM OF 3' FROM THE CENTER LINE OF THE FIRE HYDRANT. THIS MAY REQUIRE THE USE OF A 90° BEND TO OFFSET THE FIRE HYDRANT.
7. SHAPE CONCRETE THRUST BLOCKS SO THAT NO WATER DRAINS ARE BLOCKED.
8. A TEE FITTING IS REQUIRED FOR A CONNECTION TO A NEW WATER MAIN, AND A TAPPING SLEEVE IS REQUIRED FOR A CONNECTION TO AN EXISTING WATER MAIN.
9. DO NOT WRAP FIRE HYDRANT SHOE IN PLASTIC.
10. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
11. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.



DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	FIRE HYDRANT NEW WATER MAIN		603
APPROVED: MCC			

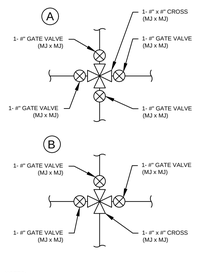


NOTES:

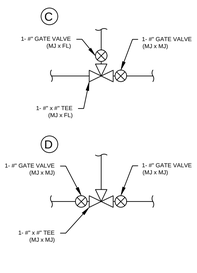
1. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
2. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE:	DETAIL:
CHECKED: JCF	STANDARD MULTI-FAMILY & COMMERCIAL WATER SERVICE MANIFOLD		602
APPROVED: MCC			

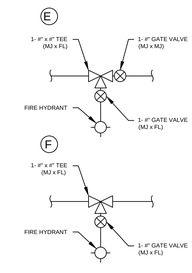
CROSS FITTING RESTRAINTS



TEE FITTING RESTRAINTS



FIRE HYDRANT RESTRAINTS



NOTES:

1. ALL MECHANICAL JOINT (MJ) FITTINGS TO BE RESTRAINED.
2. ALL FLANGES (FL) TO BE ON THE BRANCH SIDE OF TEE FITTINGS.
3. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
4. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	TYPICAL FITTING RESTRAINT CONFIGURATIONS		601
APPROVED: MCC			

Parkhill

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Midland Utilities Service Center

Water/Wastewater, Solid Waste, and Vehicle Services

MIDLAND Feel the Energy!

CLIENT

City of Midland
401 N. Carver St.
Midland, TX 79701

PROJECT NO.

6077.21

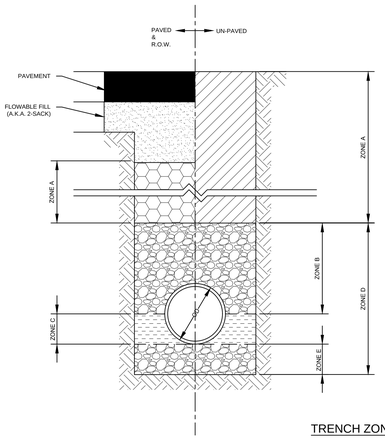
KEY PLAN

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Details

C-504

FILE NAME: \\Data\1Projects\2020\16077.2\103_DSGN\00_CIVIL\00_SHEETS\C-504-6077_COM-DETAILS.dwg LAYOUT NAME: C-504 PRINTED: Tuesday, January 25, 2022 - 2:49pm USER: skfreeman



TRENCH ZONES:

ZONE A: TRENCH BACKFILL

ZONE B: PIPE BACKFILL

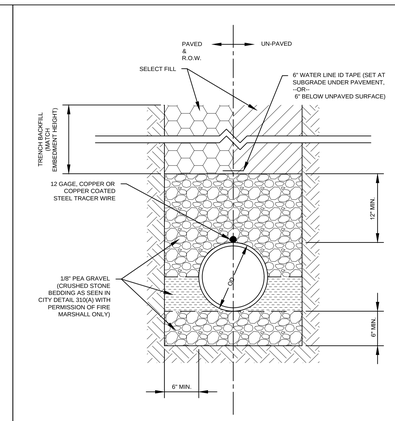
ZONE C: HAUNCHING

ZONE D: PIPE EMBEDMENT

ZONE E: BEDDING

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS		DETAIL: F03(B)

FIRE LINE TRENCHING AND BEDDING

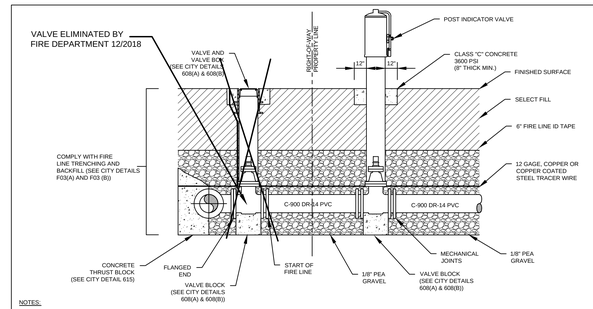


NOTES:

1. APPLIES TO ALL PIPE TYPES. (DUCTILE IRON, PVC, ETC.)
2. USE SELECT FILL FOR ALL BACKFILL MATERIAL.
3. MOISTURE CONDITION ALL BACKFILL MATERIAL PRIOR TO PLACING IN TRENCH.
4. PLACE BACKFILL MATERIAL IN MAXIMUM 12" LOOSE LIFTS AND COMPACT TO MAXIMUM 8" COMPACTED LIFTS.
5. REFER TO CITY DETAILS 311 AND 312 FOR TRENCH PAVEMENT REPLACEMENT REQUIREMENTS
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE FIRE CODE OFFICIAL.

DRAWN: DPM	CHECKED: JCF	APPROVED: MCC	
EFFECTIVE DATE: 10/01/2018	SCALE: NTS		DETAIL: F03(A)

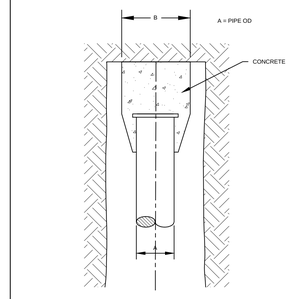
FIRE LINE TRENCHING AND BEDDING



NOTES:

1. ALL VALVE BOXES TO BE SET IN CONCRETE COLLARS AND BE FLUSH WITH THE FINAL SURFACE GRADE.
2. A TEE FITTING IS REQUIRED FOR A CONNECTION TO A NEW WATER MAIN, AND A TAPPING SLEEVE IS REQUIRED FOR A CONNECTION TO AN EXISTING WATER MAIN.
3. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
4. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE FIRE CODE OFFICIAL.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	FIRE SERVICE LINE		F01
APPROVED: MCC			



PIPE OD A	BLOCKING DIMENSIONS	
	B	*C
4"	1'-0"	1'-0"
6"	1'-7"	1'-0"
8"	2'-2"	2'-2"
10"	2'-8"	2'-8"
12"	3'-2"	3'-2"
14"	3'-8"	3'-8"
16"	4'-3"	4'-3"

*C - VERTICAL DEPTH OF CONCRETE BEARING ON UNDISTURBED EARTH

CAP BLOCKING

NOTES:

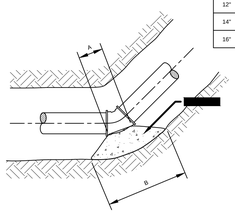
1. CAP ALL WATER MAIN STUB OUTS.
2. FORM ALL CONCRETE THRUST BLOCKING . DO NOT PLACE UN-FORMED THRUST BLOCKING.
3. ALL THRUST BLOCKING TO BE CLASS "A" CONCRETE, 3000 PSI, AND TO BE PLACED AGAINST UNDISTURBED EARTH. USE FIBER REINFORCEMENT THROUGHOUT.
4. FITTINGS TO BE POLY WRAPPED BEFORE BLOCKING IS PLACED.
5. THRUST BLOCKING DESIGN TO BE PROVIDED IN CONSTRUCTION DRAWINGS FOR PIPES LARGER THAN 16" DIAMETER.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	BLOCKING FOR CAP		617
APPROVED: MCC			

BLOCKING FOR HORIZONTAL BENDS
DESIGN 180 PSI LINE PRESSURE
SOIL BEARING CAP 2KSF

DIA. OF PIPE	DEGREE OF BEND											
	11 1/4°			22 1/2°			45°			90°		
	A	B	*C	A	B	*C	A	B	*C	A	B	*C
4"	0'-4"	1'-0"	1'-0"	0'-5"	1'-0"	1'-0"	0'-6"	1'-0"	1'-0"	0'-11"	1'-3"	1'-3"
6"	0'-7"	1'-0"	1'-0"	0'-7"	1'-0"	1'-0"	0'-8"	1'-5"	1'-5"	1'-3"	1'-11"	1'-11"
8"	0'-8"	0'-10"	1'-2"	0'-9"	1'-4"	1'-4"	0'-10"	1'-10"	1'-10"	1'-6"	2'-6"	2'-6"
10"	0'-10"	1'-0"	1'-5"	0'-11"	1'-8"	1'-8"	1'-1"	2'-4"	2'-4"	1'-11"	3'-2"	3'-2"
12"	1'-0"	1'-3"	1'-8"	1'-1"	2'-0"	2'-0"	1'-3"	2'-10"	2'-10"	2'-2"	3'-10"	3'-10"
14"	0'-11"	1'-5"	1'-11"	1'-1"	2'-4"	2'-4"	1'-3"	3'-3"	3'-3"			
16"	1'-1"	1'-8"	2'-2"	1'-2"	2'-8"	2'-8"	1'-5"	3'-9"	3'-9"			

*C - VERTICAL DEPTH OF CONCRETE BEARING ON UNDISTURBED EARTH

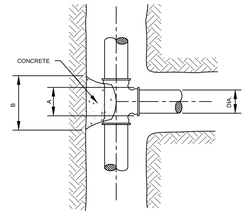


NOTES:

1. FORM ALL CONCRETE THRUST BLOCKING. DO NOT PLACE UN-FORMED THRUST BLOCKING.
2. ALL THRUST BLOCKING TO BE CLASS "A" CONCRETE, 3000 PSI, AND TO BE PLACED AGAINST UNDISTURBED EARTH. USE FIBER REINFORCEMENT THROUGHOUT.
3. FITTING TO BE POLY WRAPPED BEFORE BLOCKING IS PLACED.
4. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS
5. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	BLOCKING FOR HORIZONTAL BENDS		616
APPROVED: MCC			

"T" BLOCKING
DESIGN 180 PSI LINE PRESSURE
SOIL BEARING CAP 2KSF



TEE

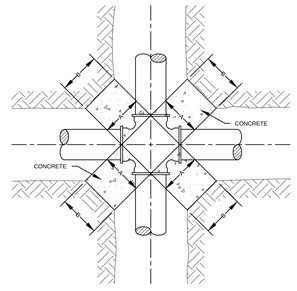
"T" RUN DIA.	STEM DIA.	BLOCKING DIMENSIONS		
		A	B	*C
TEE				
4"	ALL	11"	1'-0"	1'-0"
6"	ALL	1'-2"	1'-7"	1'-0"
8"	ALL	1'-4"	2'-2"	2'-2"
10"	ALL	1'-8"	2'-8"	2'-8"
1'-0"	THRU 6"	1'-10"	1'-10"	1'-8"
1'-0"	OVER 6"	1'-10"	3'-2"	3'-2"
1'-2"	THRU 8"	2'-2"	2'-2"	1'-11"
1'-2"	OVER 8"	2'-2"	3'-8"	3'-8"
1'-4"	THRU 8"	2'-4"	2'-4"	2'-2"
1'-4"	OVER 8"	2'-4"	4'-3"	4'-3"

*C - VERTICAL DEPTH OF CONCRETE BEARING ON UNDISTURBED EARTH

NOTE:

1. FORM ALL CONCRETE THRUST BLOCKING. DO NO PLACE UN-FORMED THRUST BLOCKING.
2. BLOCKING FOR TEES LARGER THAN 16" RUN TO BE SHOWN ON THE PLANS.
3. ALL THRUST BLOCKING TO BE CLASS "A" CONCRETE, 3000 PSI, AND TO BE PLACED AGAINST UNDISTURBED EARTH. USE FIBER REINFORCEMENT THROUGHOUT.
4. FITTING TO BE POLY WRAPPED BEFORE BLOCKING IS PLACED.
5. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
6. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	BLOCKING FOR TEE		615
APPROVED: MCC			



CROSS BLOCKING
DESIGN 180 PSI LINE PRESSURE
SOIL BEARING CAP 2KSF

CROSS DIA.	BLOCKING DIMENSIONS		
	A	B	*C
4"x 4"	0'-11"	1'-0"	1'-0"
6"x 6"	1'-2"	1'-7"	1'-0"
8"x 8"	1'-4"	2'-2"	2'-2"
10"x 10"	1'-8"	2'-8"	2'-8"
12"x 12"	1'-10"	3'-2"	3'-2"
14"x 14"	2'-2"	3'-8"	3'-8"
16"x 16"	2'-4"	4'-3"	4'-3"

*C - VERTICAL DEPTH OF CONCRETE BEARING ON UNDISTURBED EARTH

NOTES:

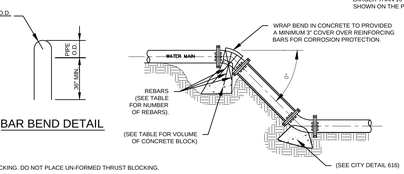
1. FORM ALL CONCRETE THRUST BLOCKING. DO NOT PLACE UN-FORMED THRUST BLOCKING
2. BLOCK CROSSES WITH DIFFERENT SIZE RUNS FOR THE LARGER RUN IN ALL DIRECTIONS.
3. BLOCKING FOR CROSSES LARGER THAN 16" WILL BE AS SHOWN ON THE PLANS.
4. ALL THRUST BLOCKING TO BE CLASS "A" CONCRETE, 3000 PSI, AND TO BE PLACED AGAINST UNDISTURBED EARTH. USE FIBER REINFORCEMENT THROUGHOUT.
5. FITTINGS TO BE POLY WRAPPED BEFORE BLOCKING IS PLACED.
6. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
7. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	BLOCKING FOR CROSS		614
APPROVED: MCC			

BLOCK FOR EXTERNAL VERTICAL BENDS
DESIGN PRESSURE 180 PSI

DIA. OF PIPE	DEGREE OF BEND @							
	11 1/4°		22 1/2°		45°		90°	
	VOLUME BLOCK	REBAR NO. SIZE	VOLUME BLOCK	REBAR NO. SIZE	VOLUME BLOCK	REBAR NO. SIZE	VOLUME BLOCK	REBAR NO. SIZE
4"	3 C.F.	2-#3	6 C.F.	2-#3	12 C.F.	2-#3	22 C.F.	2-#3
6"	7 C.F.	2-#3	13 C.F.	2-#3	26 C.F.	2-#3	1.0 C.Y.	2-#3
8"	12 C.F.	2-#3	24 C.F.	2-#3	2.0 C.Y.	2-#4	3.0 C.Y.	2-#4
10"	19 C.F.	2-#3	1.5 C.Y.	2-#4	3.0 C.Y.	2-#4	5.0 C.Y.	2-#6
12"	1.0 C.Y.	2-#3	2.0 C.Y.	2-#4	4.0 C.Y.	2-#6	7.0 C.Y.	2-#8
14"	1.5 C.Y.	2-#4	3.0 C.Y.	2-#4	5.5 C.Y.	2-#6	*	*
16"	2.0 C.Y.	2-#4	3.5 C.Y.	2-#4	7.0 C.Y.	2-#7	*	*

* BLOCKING FOR 14" AND 16" 90° BENDS AND FOR ALL BENDS LARGER THAN 16" WILL BE SHOWN ON THE PLANS.

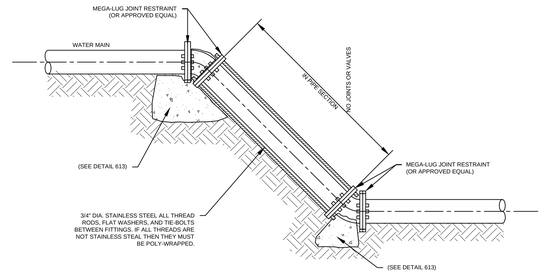


BAR BEND DETAIL

NOTES:

1. FORM ALL CONCRETE THRUST BLOCKING. DO NOT PLACE UN-FORMED THRUST BLOCKING.
2. ALL THRUST BLOCKING TO BE CLASS "A" CONCRETE, 3000 PSI, AND TO BE PLACED AGAINST UNDISTURBED EARTH. USE FIBER REINFORCEMENT THROUGHOUT.
3. FITTINGS TO BE POLY WRAPPED BEFORE BLOCKING IS PLACED.
4. MATERIALS AND CONSTRUCTION METHODS TO CONFORM TO CITY OF MIDLAND STANDARDS AND SPECIFICATIONS.
5. CONSTRUCT AS SHOWN UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY ENGINEER.

DRAWN: DPM	EFFECTIVE DATE: 10/01/2018	SCALE: NTS	DETAIL:
CHECKED: JCF	BLOCKING FOR VERTICAL BEND		613
APPROVED: MCC			


MEGA-LUG JOINT RESTRAINT (OR APPROVED EQUAL)
WATER MAIN
W.V.F.D.
W.V.F.D.
W.V.F.D.

TCEQ GENERAL NOTES

THIS IRRIGATION SYSTEM HAS BEEN DESIGNED AND SHALL BE INSTALLED ACCORDING TO TEXAS ADMINISTRATIVE CODE, TITLE 30 - ENVIRONMENTAL QUALITY, PART 1 - TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ), CHAPTER 344 - LANDSCAPE IRRIGATION; THE FOLLOWING INFORMATION IS PROVIDED AS A COURTESY AND IS NOT A COMPLETE LIST OF TCEQ REQUIREMENTS

THE MAXIMUM SPACING BETWEEN EMISSION DEVICES MUST NOT EXCEED THE MANUFACTURER'S PUBLISHED RADIUS OR SPACING OF THE DEVICE

NEW IRRIGATION SYSTEMS SHALL NOT UTILIZE ABOVE-GROUND SPRAY EMISSION DEVICES IN LANDSCAPES THAT ARE LESS THAN 48 INCHES NOT INCLUDING THE IMPERVIOUS SURFACES IN EITHER LENGTH OR WIDTH AND WHICH CONTAIN IMPERVIOUS PEDESTRIAN OR VEHICULAR TRAFFIC SURFACES ALONG TWO OR MORE PERIMETERS

EMISSION DEVICES MUST BE INSTALLED TO OPERATE AT THE MINIMUM AND NOT ABOVE THE MAXIMUM SPRINKLER HEAD PRESSURE AS PUBLISHED BY THE MANUFACTURER FOR THE NOZZLE AND HEAD SPACING THAT IS USED

IRRIGATION SYSTEMS SHALL NOT SPRAY WATER OVER SURFACES MADE OF CONCRETE, ASPHALT, BRICK, WOOD, STONES SET WITH MORTAR, OR ANY OTHER IMPERVIOUS MATERIAL, SUCH AS, BUT NOT LIMITED TO, WALLS, FENCES, SIDEWALKS, STREETS, ETC

ALL NEW IRRIGATION SYSTEMS THAT ARE INSTALLED USING PVC PIPE AND FITTINGS SHALL BE PRIMED WITH A COLORED PRIMER PRIOR TO APPLYING THE PVC CEMENT

THE IRRIGATION SYSTEM MUST INCLUDE AN ISOLATION VALVE BETWEEN THE WATER METER AND THE BACKFLOW PREVENTION DEVICE

WATER CONTAINED WITHIN THE PIPING OF AN IRRIGATION SYSTEM IS DEEMED TO BE NON-POTABLE. NO DRINKING OR DOMESTIC WATER USAGE, SUCH AS, BUT NOT LIMITED TO, FILLING SWIMMING POOLS OR DECORATIVE FOUNTAINS, SHALL BE CONNECTED TO AN IRRIGATION SYSTEM

HOSE BIBS MUST BE INSTALLED USING A QUICK COUPLER KEY ON A QUICK COUPLER INSTALLED IN A COVERED PURPLE VALVE BOX AND THE HOSE BIB AND ANY HOSES CONNECTED TO THE BIB MUST BE LABELED "NON-POTABLE, NOT SAFE FOR DRINKING." AN ISOLATION VALVE MUST BE INSTALLED UPSTREAM OF A QUICK COUPLER CONNECTING A HOSE BIB TO AN IRRIGATION SYSTEM

A LICENSED IRRIGATOR OR A LICENSED IRRIGATION TECHNICIAN SHALL BE ON-SITE AT ALL TIMES WHILE THE LANDSCAPE IRRIGATION SYSTEM IS BEING INSTALLED

UPON COMPLETION OF THE IRRIGATION SYSTEM, THE IRRIGATOR OR IRRIGATION TECHNICIAN WHO PROVIDED SUPERVISION FOR THE ON-SITE INSTALLATION SHALL BE REQUIRED TO COMPLETE FOUR ITEMS: (1) A FINAL "WALK THROUGH" WITH THE IRRIGATION SYSTEM'S OWNER OR THE OWNER'S REPRESENTATIVE TO EXPLAIN THE OPERATION OF THE SYSTEM; (2) THE MAINTENANCE CHECKLIST ON WHICH THE IRRIGATOR OR IRRIGATION TECHNICIAN SHALL OBTAIN THE SIGNATURE OF THE IRRIGATION SYSTEM'S OWNER OR OWNER'S REPRESENTATIVE AND SHALL SIGN, DATE, AND SEAL THE CHECKLIST. (3) A PERMANENT STICKER WHICH CONTAINS THE IRRIGATOR'S NAME, LICENSE NUMBER, COMPANY NAME, TELEPHONE NUMBER AND THE DATES OF THE WARRANTY PERIOD SHALL BE AFFIXED TO EACH AUTOMATIC CONTROLLER INSTALLED BY THE IRRIGATOR OR IRRIGATION TECHNICIAN; (4) THE IRRIGATION PLAN INDICATING THE ACTUAL INSTALLATION OF THE SYSTEM MUST BE PROVIDED TO THE IRRIGATION SYSTEM'S OWNER OR OWNER REPRESENTATIVE

THE ITEMS ON THE MAINTENANCE CHECKLIST SHALL INCLUDE BUT ARE NOT LIMITED TO: (A) THE MANUFACTURER'S MANUAL FOR THE AUTOMATIC CONTROLLER, IF THE SYSTEM IS AUTOMATIC; (B) A SEASONAL (SPRING, SUMMER, FALL, WINTER) WATERING SCHEDULE BASED ON EITHER CURRENT/REAL TIME EVAPOTRANSPIRATION OR MONTHLY HISTORICAL REFERENCE EVAPOTRANSPIRATION (HISTORICAL ET) DATA, MONTHLY EFFECTIVE RAINFALL ESTIMATES, PLANT LANDSCAPE COEFFICIENT FACTORS, AND SITE FACTORS; (C) A LIST OF COMPONENTS, SUCH AS THE NOZZLE, OR PUMP FILTERS, AND OTHER SUCH COMPONENTS; THAT REQUIRE MAINTENANCE, AND THE RECOMMENDED FREQUENCY FOR THE SERVICE; AND (D) THE STATEMENT, "THIS IRRIGATION SYSTEM HAS BEEN INSTALLED IN ACCORDANCE WITH ALL APPLICABLE STATE AND LOCAL LAWS, ORDINANCES, RULES, REGULATIONS OR ORDERS. I HAVE TESTED THE SYSTEM AND DETERMINED THAT IT HAS BEEN INSTALLED ACCORDING TO THE IRRIGATION PLAN AND IS PROPERLY ADJUSTED FOR THE MOST EFFICIENT APPLICATION OF WATER AT THIS TIME."

THE IRRIGATOR SHALL PRESENT THE IRRIGATION SYSTEM'S OWNER OR OWNER'S REPRESENTATIVE WITH A WRITTEN WARRANTY COVERING MATERIALS AND LABOR FURNISHED IN THE NEW INSTALLATION OF THE IRRIGATION SYSTEM. THE IRRIGATOR SHALL BE RESPONSIBLE FOR ADHERING TO TERMS OF THE WARRANTY. IF THE IRRIGATOR'S WARRANTY IS LESS THAN THE MANUFACTURER'S WARRANTY FOR THE SYSTEM COMPONENTS, THEN THE IRRIGATOR SHALL PROVIDE THE IRRIGATION SYSTEM'S OWNER OR THE OWNER'S REPRESENTATIVE WITH APPLICABLE INFORMATION REGARDING THE MANUFACTURER'S WARRANTY PERIOD. THE WARRANTY MUST INCLUDE THE IRRIGATOR'S SEAL, SIGNATURE, AND DATE. WRITTEN WARRANTY ON NEW IRRIGATION SYSTEMS MUST SPECIFY THE IRRIGATOR'S NAME, BUSINESS ADDRESS, AND BUSINESS TELEPHONE NUMBER(S), MUST CONTAIN THE SIGNATURE OF THE IRRIGATION SYSTEM'S OWNER OR OWNER'S REPRESENTATIVE CONFIRMING RECEIPT OF THE WARRANTY AND MUST INCLUDE THE STATEMENT: "IRRIGATION IN TEXAS IS REGULATED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ), MC-178, P.O. BOX 130897, AUSTIN, TEXAS 78711-3087. TCEQ'S WEBSITE IS: WWW.TCEQ.STATE.TX.US

ON ALL MAINTENANCE, ALTERATIONS, REPAIRS, OR SERVICE TO EXISTING IRRIGATION SYSTEMS, AN IRRIGATOR SHALL PRESENT THE IRRIGATION SYSTEM'S OWNER OR OWNER'S REPRESENTATIVE A WRITTEN DOCUMENT THAT IDENTIFIES THE MATERIALS FURNISHED IN THE MAINTENANCE, ALTERATION, REPAIR, OR SERVICE AND ALL APPLICABLE WARRANTIES

IRRIGATION GENERAL NOTES

ALL IRRIGATION EQUIPMENT TO BE USED ON THE PROJECT SHALL BE SUBMITTED TO THE LANDSCAPE ARCHITECT FOR REVIEW AND APPROVAL PRIOR TO DELIVERY AND INSTALLATION

IRRIGATION PLAN SHOWN IS DIAGRAMMATIC IN NATURE, CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING DRIP EMITTERS AT EACH PLANT LOCATION AND FULL COVERAGE OF ALL TURF AREAS, ANY DISCREPANCIES IN THE PLANS SHOULD BE BROUGHT TO THE LANDSCAPE ARCHITECT'S ATTENTION PRIOR TO BID

WHEN BACKFLOW PREVENTION IS SHOWN TO BE INSTALLED BELOW GRADE, A WYE STRAINER THE SAME SIZE AS THE BACKFLOW DEVICE SHALL BE INSTALLED UPSTREAM

THIS IRRIGATION SYSTEM HAS BEEN DESIGNED FOR THE USE OF POTABLE WATER

ALL FITTINGS AND NECESSARY EQUIPMENT REQUIRED TO MAKE THIS IRRIGATION SYSTEM OPERATE PROPERLY AND TO COMPLY WITH LOCAL AND STATE CODES ARE INCIDENTAL TO THESE PLANS AND ARE THE CONTRACTOR'S RESPONSIBILITY

CONTRACTOR WILL BE HELD LIABLE FOR GAINING ACCESS UNDER ALL PAVEMENTS, SLEEVES SHOWN ON THE PLANS SHOULD BE VERIFIED FOR ACCESSIBILITY AND PASSIBILITY BEFORE BID IS MADE

THE CONTRACTOR SHALL LOCATE AND VERIFY EACH WATER TAP TO WHICH THIS THE IRRIGATION SYSTEM WILL CONNECT

ALL EQUIPMENT AND INSTALLATION METHODS SHALL COMPLY WITH LOCAL AND STATE CODES AND THE PLANS AND SPECIFICATIONS

CONTRACTOR IS RESPONSIBLE FOR ALL CONNECTIONS AND METERS REQUIRED FOR THE FULL IMPLEMENTATION OF THE SYSTEM

CONTRACTOR SHALL LOCATE AND VERIFY THE EXISTENCE OF ALL UTILITIES PRIOR TO INITIATING WORK CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE OR INTERRUPTION IN SERVICE CAUSED BY EXCAVATIONS AND/OR WORK

EACH CONTROLLER WILL HAVE AN INDEPENDENT COMMON WIRE

ALL REMOTE CONTROL VALVE WIRES NEED TO BE LABELED AT VALVE W/ WEATHER (WATER) PROOF LABELS, AND AT CONTROLLER WITH CORRESPONDING LABEL

SPLICING OF REMOTE CONTROL VALVE WIRES IS NOT ALLOWED BETWEEN CONTROLLER AND VALVE BOX FOR REMOTE CONTROL VALVES, WIRES MUST BE CONTINUOUS FROM CONTROLLER TO REMOTE CONTROL VALVE WITHOUT SPLICING

CONTRACTOR MUST VERIFY LOCATION OF ALL OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION

CONTRACTOR SHALL COORDINATE WITH CITY OFFICIALS AND UTILITY COMPANIES IN LOCATING UTILITIES.
CONTRACTOR SHALL BE HELD RESPONSIBLE FOR LOSSES DUE TO DAMAGE TO UTILITIES, LOCATION FOR ALL UTILITIES SHOWN ON PLANS ARE APPROXIMATE, CALL 1 (800) DIG-TESS

CONTRACTOR SHALL PROVIDE A SINGLE 120-VOLT, 20 AMP CIRCUIT FROM ELECTRICAL PANEL TO IRRIGATION CONTROLLER, ALL WORK AND MATERIALS SHALL MEET LOCAL CODES AND THE NATIONAL ELECTRIC CODE (N.E.C.)

THIS IRRIGATION SYSTEM WAS DESIGNED FOR A MINIMUM STATIC PRESSURE AT THE POINT OF CONNECTION AS LISTED ON THE PLANS, THE CONTRACTOR SHALL VERIFY ACTUAL PSI AND DELIVER BULTS TO THE LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION. IN THE EVENT THE ACTUAL PSI IS LESS THAN THE LISTED DESIGN PRESSURE, THE CONTRACTOR SHALL RECEIVE DIRECTION FROM THE LANDSCAPE ARCHITECT REGARDING DESIGN MODIFICATIONS IF NECESSARY

CONTRACTOR SHALL SIZE VALVE BOXES TO HOUSE THE ENTIRE ASSEMBLY OF BACKFLOW PREVENTION, VALVE, FILTER AND PRESSURE REDUCER

CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO CONSTRUCT PROPOSED IRRIGATION SYSTEM IN ACCORDANCE WITH PLANS, WRITTEN SPECIFICATIONS AND DETAILS

PIPE SLEEVES SHOWN CROSSING EXISTING PAVING SHALL BE BORED TO AVOID DAMAGE TO EXISTING ROADWAYS

WHEN A BOOSTER PUMP IS SHOWN ON THE PLANS, THE CONTRACTOR SHALL PROVIDE AN ELECTRICAL CIRCUIT, CONDUIT, AND WIRING AS REQUIRED FOR FULL FUNCTIONALITY OF THE PUMP SYSTEM, ALL WORK AND MATERIALS SHALL MEET LOCAL CODES AND THE NATIONAL ELECTRIC CODE (N.E.C.)

WHEN A HEATED BACKFLOW ENCLOSURE IS SHOWN ON THE PLANS, THE CONTRACTOR SHALL PROVIDE AN ELECTRICAL CIRCUIT, CONDUIT, AND WIRING AS REQUIRED FOR FULL FUNCTIONALITY OF THE HEATER SYSTEM, ALL WORK AND MATERIALS SHALL MEET LOCAL CODES AND THE NATIONAL ELECTRIC CODE (N.E.C.)

PRIOR TO A REQUEST FOR PUNCH LIST REVIEW, THE CONTRACTOR SHALL CYCLE THE ENTIRE IRRIGATION SYSTEM, CHECK FORREPAIR LEAKS, ADJUST HEAD RADII AND PATTERNS, FILL SETTLED TRENCHES, BRING VALVE BOXES AND HEADS TO FINISH GRADE, CREATE ZONE CHART, INSTALL GRAVEL IN VALVE BOXES, LABEL VALVES, INSTALL SENSORS, INSTALL PROPER WIRE CONNECTORS, INSTALL UNION VALVES, AND PROVIDE AS-BUILT DRAWINGS; SHOULD A PUNCH LIST REVIEW BE REQUESTED AND PERFORMED PRIOR TO THESE ITEMS BEING PERFORMED, THE CONTRACTOR SHALL PAY FOR ADDITIONAL TIME AND TRAVEL EXPENSES REQUIRED BY THE LANDSCAPE ARCHITECT FOR A FOLLOW-UP SITE VISIT

PLANTING GENERAL NOTES

THE LANDSCAPE CONTRACTOR SHALL REFER TO THE CONTRACT AND SPECIFICATIONS FOR REQUIREMENTS NOT LISTED HEREIN

THE CONTRACTOR SHALL LOCATE AND VERIFY THE EXISTENCE OF ALL UTILITIES PRIOR TO STARTING WORK
THE CONTRACTOR SHALL SUPPLY ALL PLANT MATERIALS IN QUANTITIES SUFFICIENT TO COMPLETE THE PLANTING PLAN SHOWN ON ALL DRAWINGS

PLANT COUNTS AND SQUARE FOOTAGES ARE PROVIDED AS A COURTESY ONLY, THE CONTRACTOR SHALL PROVIDE ALL MATERIALS REQUIRED FOR THE FULL IMPLEMENTATION OF THE PLANS

ALL PLANT MATERIAL SHALL CONFORM TO THE GUIDELINES ESTABLISHED BY THE CURRENT AMERICAN STANDARD FOR NURSERY STOCK, PUBLISHED BY THE AMERICAN ASSOCIATION OF NURSERYMEN OR EQUIVALENT

IN THE CASE OF A DISCREPANCY BETWEEN THE CONTAINER SIZE CALLED OUT IN PLANT LIST AND THE CALIPER AND HEIGHT OF PLANT MATERIAL, THE SPECIFIED TREE MUST MEET THE CALIPER AND HEIGHT REQUIREMENTS SPECIFIED, EVEN IF THE LARGER CONTAINER SIZE IS REQUIRED TO MEET THESE SPECIFICATIONS AT NO ADDITIONAL COST TO THE OWNER

ALL PLANTS TO BE GROWN AS SPECIFIED, NO CONTAINER GROWN STOCK WILL BE ACCEPTED IF IT IS ROOT BOUND, WITH CONTAINER GROWN STOCK, THE CONTAINER SHALL BE REMOVED AND THE PLANT BALL SHALL BE CUT THROUGH THE SURFACE IN TWO VERTICAL LOCATIONS

LANDSCAPE CONTRACTOR SHALL LOCATE THE SOURCE OF AND SELECT ALL PLANTS FOR APPROVAL BY THE PROJECT LANDSCAPE ARCHITECT

ALL PLANT MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY AT THE NURSERIES OR SUPPLIERS BY THE PROJECT LANDSCAPE ARCHITECT, IF ANY SOURCE OF PLANTS IS LOCATED FURTHER THAN 30 MILES FROM THE PROJECT SITE, THE CONTRACTOR WILL BE REQUIRED TO PAY TIME AND TRAVEL EXPENSES INCURRED BY THE PROJECT LANDSCAPE ARCHITECT, AT THE OPTION OF THE LANDSCAPE ARCHITECT, PHOTOS OF ALL PLANT MATERIAL SHOWING CONTAINER SIZE, HEIGHT, AND CALIPER CAN BE SUBMITTED FOR APPROVAL

ALL PLANTS TAGGED AS APPROVED AT NURSERY OR SUPPLIER SHALL BEAR THE SAME TAG WHEN DELIVERED ON SITE, THE RIGHT TO REJECT PLANT MATERIALS DELIVERED TO THE SITE THAT DO NOT BEAR APPROVAL TAGS IS RESERVED BY THE PROJECT LANDSCAPE ARCHITECT

IN AREAS WHERE PAVING SUBGRADES AND BUILDING PADS EXTEND INTO PLANT BED AREAS, 6 INCH HOLES SHALL BE DRILLED EVERY 3 FEET AND FILLED WITH 1 INCH DIAMETER GRAVEL TO PROVIDE PERCOLATION AND DRAINAGE FOR THE PLANTING BED, HOLES SHALL BE DRILLED THROUGH IMPROVED SUBGRADES INTO EXISTING SITE SOILS BUT NO DEEPER THAN FOUR FEET

ALL PLANTING BEDS TO RECEIVE 2 INCHES OF BACK TO EARTH COMPOST PER SQUARE FOOT AND 1 POUND OF A 4(N)-1(P)-2(K) RATIO FERTILIZER PER 100 SQUARE FEET AT A MINIMUM, ADJUST QUANTITIES BASED ON TOPSOIL TEST REPORT, BOTH MATERIALS SHALL BE INCORPORATED INTO THE SOIL TO A DEPTH OF 12 INCHES

ALL FINAL PLANTING BED GRADES IN AREAS WHERE MULCH IS BEING APPLIED SHOULD BE 3 OR 4 INCHES BELOW ADJACENT HARD SURFACES ACCORDING TO MULCH DEPTH INDICATED ON PLANS

NO PLANT SHALL BE PUT INTO THE GROUND BEFORE ROUGH GRADING IS COMPLETE AND APPROVED BY THE PROJECT LANDSCAPE ARCHITECT, ALL PLANTS SHALL BEAR THE SAME RELATIONSHIP TO FINISHED GRADE AS THE PLANT'S ORIGINAL GRADE BEFORE DIGGING OR AS ESTABLISHED IN CONTAINER

ALL PLANTS SHALL BE INSTALLED AS PER DETAILS AND SPECIFICATIONS

ALL PLANTS SHALL BE WATERED THOROUGHLY TWICE DURING THE FIRST 24 HOUR PERIOD AFTER PLANTING, ALL PLANTS SHALL THEN BE WATERED WEEKLY OR MORE OFTEN AS NEEDED DURING THE FIRST GROWING SEASON

ALL PLANTING BEDS SHALL RECEIVE ORGANIC AND/OR INORGANIC MULCH MATERIALS AS NOTED ON PLANS

PRIOR TO PLANTING, THE LOCATION OF ALL TREES AND SHRUBS SHALL BE STAKED FOR APPROVAL BY THE LANDSCAPE ARCHITECT

THE CONTRACTOR SHALL PRUNE ALL BRANCHES 6 FEET ABOVE FINISH GRADE ON ALL DECIDUOUS TREES 12 FEET OR TALLER

INORGANIC MULCHES WITH A DIAMETER LESS THAN 1/4 INCH IN SIZE SHALL BE COMPACTED TO 85% PROCTOR DENSITY IN TWO EQUAL LIFTS

Existing Site	Quantity	Unit
Lot area	148,577	SF
Existing structures	2,291	SF
Proposed structures	30,792	SF
Total Structures	**33,083**	SF
Total areas minus structures	**115,494**	SF
Street frontage (without existing trees)	1,706	LF
Parking stalls	51	EA

Proposed Plants	Quantity	Unit
Minimum Landscape required	**11,550**	SF
Street front trees	**57**	EA
Parking lot trees	**4**	EA
Required trees	**61**	EA
Landscape Provided	32,532	SF
Street trees provided	57	EA
Parking lot trees provided	4	EA
Trees provided	**61**	EA
Additional trees provided	**0**	EA

Positive	Possible points	Used in design
Rainwater harvesting	10	0
Permeable weed barrier	2	2
Drip in all areas 15' or less in width	10	10
Tree quantity exceeds required (per tree)	2	0
Drought tolerant sod used	5	5
Landscape area curbed or shaped to hold water	2	2
Landscape area exceeds requirement by additional 10%	2	2
50% of plant material is water efficient (see exhibit A)	2	2
Polymer injection or other water saving technology	2	0
Negative		0
More than 20% of landscape is turf grass	-5	0
Existing tree >12" is removed	-5	0
Fescue or St. Augustine grass used	-10	0
Slope within 10' of street exceeds 20%	-5	0
Undesirable tree species used	-5	0
Total points (must equal 20 or more)		**23**

PLANT SCHEDULE

TREES	QTY	BOTANICAL / COMMON NAME	CONTAINER	HEIGHT	SPREAD	CALIPER
	37	PISTACIA CHINENSIS CHINESE PISTACHE	B & B	14-16 FT	4-6 FT	3-1/2"
	24	ULMUS CRASSIFOLIA CEDAR ELM	B & B	14-16 FT	4-6 FT	3-1/2"
SHRUBS	QTY	BOTANICAL / COMMON NAME	CONTAINER	HEIGHT	SPREAD	CALIPER
	84	BOUTELOUA CURTIPENDULA SIDE OATS GRAMA	#1	12"	6"	
	69	CALYLOPHUS HARTWEGII SUNDROPS	#1	6"	9"	
	21	DASYLIRION TEXANUM GREEN SOTOL	#5	24"	18"	
	55	HESPERALOE PARVIFLORA RED YUCCA	#5	18"	18"	
	63	MUHLENBERGIA CAPILLARIS PINK MUHLY GRASS	#1	12"	6"	
	32	MUHLENBERGIA LINDHEIMERI LINDHEIMER'S MUHLY	#5	24"	12"	
	47	SALVIA CHAMAEDRYOIDES MEXICAN BLUE SAGE	#1	9"	9"	
	29	SALVIA GREGGII AUTUMN SAGE	#1	12"	6"	
	61	SALVIA X SYLVESTRIS 'MAY NIGHT' MAY NIGHT SALVIA	#1	9"	6"	
	9	YUCCA RECURVIFOLIA SPINELESS YUCCA	#5	18"	18"	
GROUND COVERS	QTY	BOTANICAL / COMMON NAME	CONTAINER	HEIGHT	SPREAD	CALIPER
	117 SF	2"-4" ROCK MULCH TRAILMIX, AVAILABLE FROM DESERT ROCK CO INSTALLED OVER WEED BARRIER	5" DEPTH			
	29,833 SF	3/4" ROCK MULCH TRAIL MIX, AVAILABLE FROM DESERT ROCK CO INSTALLED OVER WEED BARRIER	4" DEPTH			
	6,743 SF	CYNODON DACTYLON 'CELEBRATION' BERMUDA GRASS	SOD			

VALVE SCHEDULE

NUMBER	MODEL	SIZE	TYPE	GPM	HEADS	PIPE	WIRE	DESIGN PSI	FRICTION LOSS	VALVE LOSS	PSI	PSI @ POC	PRECIP
1	RAIN BIRD PESB	1-1/2"	TURF ROTOR	37.54	27	424.9	950.2	35	2.51	3.52	41.03	50.42	0.68 in/h
2	RAIN BIRD XCZ-100-PRB-COM	1"	AREA FOR DRIPLINE	33.39	3,340 L.F.	994.7	213.4	20	3.77	22.5	46.27	55.36	1.5 in/h
3	RAIN BIRD PESB	1"	TURF ROTOR	28.00	20	254.9	232.9	35	1.63	5.06	41.69	48.83	0.71 in/h
4	RAIN BIRD XCZ-100-PRB-COM	1"	AREA FOR DRIPLINE	9.50	951.1 L.F.	210.1	642.7	20	0.34	6.97	27.31	30.35	1.51 in/h
5	RAIN BIRD XCZ-100-PRB-COM	1"	DRIP EMITTER	13.50	36	1,035	650.9	20	3.98	11.29	35.28	38.79	0.72 in/h
6	RAIN BIRD XCZ-100-PRB-COM	1"	DRIP EMITTER	9.75	26	731.6	907.6	20	1.35	7.14	28.48	31.37	0.72 in/h
7	RAIN BIRD XCZ-100-PRB-COM	1"	AREA FOR DRIPLINE	8.85	885.7 L.F.	183.6	911.2	20	0.45	6.54	26.99	29.87	1.57 in/h
	Common Wire						1,743						

WATERING SCHEDULE

NUMBER	MODEL	TYPE	PRECIP	SUN	MON	TUE	WED	THU	FRI	SAT	IN./WEEK	MIN./WEEK	GAL./WEEK	GAL./DAY
1	RAIN BIRD PESB	TURF ROTOR	0.68 in/h		15 min		15 min		15 min		0.5	45	1,689	563.1
2	RAIN BIRD XCZ-100-PRB-COM	AREA FOR DRIPLINE	1.5 in/h		7 min		7 min		7 min		0.5	21	701.2	233.7
3	RAIN BIRD PESB	TURF ROTOR	0.71 in/h		15 min		15 min		15 min		0.5	43	1,204	401.3
4	RAIN BIRD XCZ-100-PRB-COM	AREA FOR DRIPLINE	1.51 in/h		7 min		7 min		7 min		0.5	20	190	63.3
5	RAIN BIRD XCZ-100-PRB-COM	DRIP EMITTER	0.72 in/h		14 min		14 min		14 min		0.5	42	567	189
6	RAIN BIRD XCZ-100-PRB-COM	DRIP EMITTER	0.72 in/h		14 min		14 min		14 min		0.5	42	409.5	136.5
7	RAIN BIRD XCZ-100-PRB-COM	AREA FOR DRIPLINE	1.57 in/h		7 min		7 min		7 min		0.5	20	177	59
		TOTALS:			79		79		79			233	4,938	1,646

IRRIGATION SCHEDULE

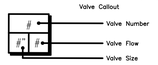
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	ARC	PSI	GPM	RADIUS	DETAIL
	RAIN BIRD R-VAN14 1804-SAM-P45 TURF ROTARY, 8'-14' 45-270 DEGREES AND 360 DEGREES. HAND ADJUSTABLE MULTI-STREAM ROTARY W/1800 TURF SPRAY BODY ON 4" POP-UP, WITH CHECK VALVE AND 45 PSI IN-STEM PRESSURE REGULATOR. 1/2" NPT FEMALE THREADED INLET.	21	ADJ	35		13'	D5/LD501

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	PSI	GPM	RADIUS	DETAIL
	RAIN BIRD 5004-PC,FC-MPR TURF ROTOR, 4.0" POP-UP, PLASTIC RISER, MATCHED PRECIPITATION ROTOR (MPR NOZZLE). ARC AND RADIUS AS PER SYMBOL. 25 FT=RED, 30 FT=GREEN, 35FT=BEIGE.	18	35		24'	D4/LD501
	RAIN BIRD 5004-PC,FC-MPR TURF ROTOR, 4.0" POP-UP, PLASTIC RISER, MATCHED PRECIPITATION ROTOR (MPR NOZZLE). ARC AND RADIUS AS PER SYMBOL. 25 FT=RED, 30 FT=GREEN, 35FT=BEIGE.	8	35		34'	D4/LD501

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	DETAIL
	RAIN BIRD XCZ-100-PRB-COM WIDE FLOW DRIP CONTROL KIT FOR COMMERCIAL APPLICATIONS. 1" BALL VALVE WITH 1" PESB VALVE AND 1" PRESSURE REGULATING 40PSI QUICK-CHECK BASKET FILTER. 0.3GPM TO 20GPM.	5	E3/LD501
	DRIPLINE AT TREE (TREE RING) RAINBIRD XFS-CV ON-SURFACE LANDSCAPE DRIPLINE WITH A HEAVY-DUTY 4.3 PSI CHECK VALVE. 0.9 GPH EMITTERS AT 12" O.C. DRIPLINE LATERALS SPACED AT 12" APART, APPROXIMATELY 25 L.F. OF TUBING PER TREE	62	C1/LD501
	AREA TO RECEIVE DRIPLINE RAIN BIRD XFCV-06-12 XFCV ON-SURFACE LANDSCAPE DRIPLINE WITH A HEAVY-DUTY 3.5 PSI CHECK VALVE. 0.6 GPH EMITTERS AT 12" O.C. DRIPLINE LATERALS SPACED AT 12" APART, WITH EMITTERS OFFSET FOR TRIANGULAR PATTERN, GREAT FOR ELEVATION CHANGE. SPECIFY XF INSERT FITTINGS.	5,177 L.F.	C2/LD501

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	DETAIL
	RAIN BIRD PESB 1", 1-1/2", 2" PLASTIC INDUSTRIAL VALVES. LOW FLOW OPERATING CAPABILITY, GLOBE CONFIGURATION, WITH SCRUBBER TECHNOLOGY FOR RELIABLE PERFORMANCE IN DIRTY WATER IRRIGATION APPLICATIONS.	2	D1/LD501
	RAIN BIRD 5-NP 1" BRASS QUICK-COUPLING VALVE, WITH CORROSION-RESISTANT STAINLESS STEEL SPRING, LOCKING NON-POTABLE PURPLE RUBBER COVER, AND 1-PIECE BODY.	2	E4/LD501
	NIBCO T-113-K CLASS 125 BRONZE GATE SHUT OFF VALVE WITH CROSS HANDLE, SAME SIZE AS MAINLINE PIPE DIAMETER AT VALVE LOCATION. SIZE RANGE - 1/4" - 3"	1	E1/LD501
BF	APOLLO VALVES 4A505A4 1" APOLLOÂ® MODEL PVB4A PRESSURE VACUUM BREAKER. BRONZE BODY, INLET SIZE 1", UNION END BALL VALVES, NPT TESTCOCKS	1	E2/LD501
C	HUNTER HC-6 6 STATION CONTROLLER WITH WI-FI CONNECTION	1	E5/LD501
S	HUNTER WRF-CLIK RAIN/FREEZE SENSOR. INSTALL WITHIN 1000 FT OF CONTROLLER, IN LINE OF SIGHT. 22-28 VAC/VDC 100 MA POWER FROM TIMER TRANSFORMER. MOUNT AS NOTED. INCLUDES GUTTER MOUNT.	1	E5/LD501
M	WATER METER 1-1/2"	1	
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21	3,835 L.F.	D2/LD501
	IRRIGATION MAINLINE: PVC SCHEDULE 40	1,743 L.F.	D2/LD501
	PIPE SLEEVE: PVC CLASS 200 SDR 21 EXTEND 12" PAST ADJACENT HARD CONSTRUCTION, TYP	394.5 L.F.	D2/LD501

Valve Callout



CRITICAL ANALYSIS

Generated:	2021-12-29 13:43
P.O.C. NUMBER: 01	
Water Source Information:	
FLOW AVAILABLE	
Water Meter Size:	1-1/2"
Flow Available:	75 GPM
PRESSURE AVAILABLE	
Static Pressure at POC:	60.00 PSI
Elevation Change:	5.00 ft
Service Line Size:	2"
Length of Service Line:	20 ft
Pressure Available:	57.00 psi
DESIGN ANALYSIS	
Maximum Station Flow:	37.54 GPM
Flow Available at POC:	75 GPM
Residual Flow Available:	37.46 GPM
Critical Station:	2
Design Pressure:	20 PSI
Friction Loss:	3.43 PSI
Fittings Loss:	0.34 PSI
Elevation Loss:	0 PSI
Loss through Valve:	22.5 PSI
Pressure Req. at Critical Station:	46.28 PSI
Loss for Fittings:	0.23 PSI
Loss for Main Line:	2.3 PSI
Loss for POC to Valve Elevation:	0 PSI
Loss for Backflow:	4.21 PSI
Loss for Water Meter:	2.34 PSI
Critical Station Pressure at POC:	55.36 PSI
Pressure Available:	57 PSI
Residual Pressure Available:	1.64 PSI

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CLIENT
City of Midland
401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021

KEY NOTES

AS INDICATED BY: (XX)

1. 12" CONCRETE BORDER SEE DETAIL C5/LD500.
2. 12" CONCRETE BORDER BELOW FENCE, SEE DETAIL C6/LD500.

PLANT SCHEDULE

TREES	QTY	BOTANICAL / COMMON NAME	CONTAINER	HEIGHT	SPREAD	CALIPER
	37	PISTACIA CHINENSIS CHINESE PISTACHE	B & B	14-16 FT	4-6 FT	3-1/2"
	24	ULMUS CRASSIFOLIA CEDAR ELM	B & B	14-16 FT	4-6 FT	3-1/2"
SHRUBS	**QTY**	**BOTANICAL / COMMON NAME**	**CONTAINER**	**HEIGHT**	**SPREAD**	**CALIPER**
	84	BOUTELOUA CURTIPENDULA SIDE OATS GRAMA	#1	12"	6"	
	69	CALYLOPHUS HARTWEGII SUNDROPS	#1	6"	9"	
	21	DASYLIRION TEXANUM GREEN SOTOL	#5	24"	18"	
	55	HESPERALOE PARVIFLORA RED YUCCA	#5	18"	18"	
	63	MUHLENBERGIA CAPILLARIS PINK MUHLY GRASS	#1	12"	6"	
	32	MUHLENBERGIA LINDHEIMERI LINDHEIMER`S MUHLY	#5	24"	12"	
	47	SALVIA CHAMAEDRYOIDES MEXICAN BLUE SAGE	#1	9"	9"	
	29	SALVIA GREGGII AUTUMN SAGE	#1	12"	6"	
	61	SALVIA X SYLVESTRIS 'MAY NIGHT' MAY NIGHT SALVIA	#1	9"	6"	
	9	YUCCA RECURVIFOLIA SPINELESS YUCCA	#5	18"	18"	
GROUND COVERS	**QTY**	**BOTANICAL / COMMON NAME**	**CONTAINER**	**HEIGHT**	**SPREAD**	**CALIPER**
	117 SF	2"-4" ROCK MULCH TRAILMIX, AVAILABLE FROM DESERT ROCK CO INSTALLED OVER WEED BARRIER	5" DEPTH			
	29,833 SF	3/4" ROCK MULCH TRAIL MIX, AVAILABLE FROM DESERT ROCK CO INSTALLED OVER WEED BARRIER	4" DEPTH			
	6,743 SF	CYNODON DACTYLON `CELEBRATION` BERMUDA GRASS	SOD			

N. CARVER STREET
(ASPHALT PAVEMENT)

E. FRONT STREET
(ASPHALT PAVEMENT)

N. MADISON STREET

(5) May Night Salvia
(3) Green Sotol
(5) Sundrops
(3) Mexican Blue Sage
(4) Chinese Pistache
(18) Pink Muhly Grass
(12) Red Yucca
(3,233 sf) 3/4" Rock Mulch
(1) Spineless Yucca
(5) Chinese Pistache
(24) Pink Muhly Grass
(16) Red Yucca
(3,538 sf) 3/4" Rock Mulch
(4) Cedar Elm
(5) Chinese Pistache
(7,408 sf) 3/4" Rock Mulch
(69 sf) 3/4" Rock Mulch
(39 sf) 2"-4" Rock Mulch
(7) Chinese Pistache
(1,161 sf) 3/4" Rock Mulch
(847 sf) 3/4" Rock Mulch
(2) Cedar Elm
(77 sf) 3/4" Rock Mulch
(3) Cedar Elm
(7,944 sf) 3/4" Rock Mulch
(2,823 sf) Bermuda Grass
(39 sf) 2"-4" Rock Mulch
(56 sf) 3/4" Rock Mulch
(4) Mexican Blue Sage
(5) Lindheimer`s Muhly
(13) Sundrops
(3) May Night Salvia
(6) Sundrops
(5,423 sf) 3/4" Rock Mulch
(5) Autumn Sage
(1) Cedar Elm
(7) Sundrops
(6) Red Yucca
(6) Chinese Pistache
(1) Spineless Yucca
(6) Mexican Blue Sage
(7) Lindheimer`s Muhly
(1) Cedar Elm
(2) Cedar Elm
(9) Autumn Sage
(1) Chinese Pistache
(46) Side Oats Grama
(3) Red Yucca
(6) May Night Salvia
(10) Mexican Blue Sage
(9) Lindheimer`s Muhly
(7) Pink Muhly Grass
(33) Side Oats Grama
(14) Pink Muhly Grass
(3,920 sf) Bermuda Grass

A1 PLANTING PLAN
1" = 20' - 0"

0 20 40 NORTH

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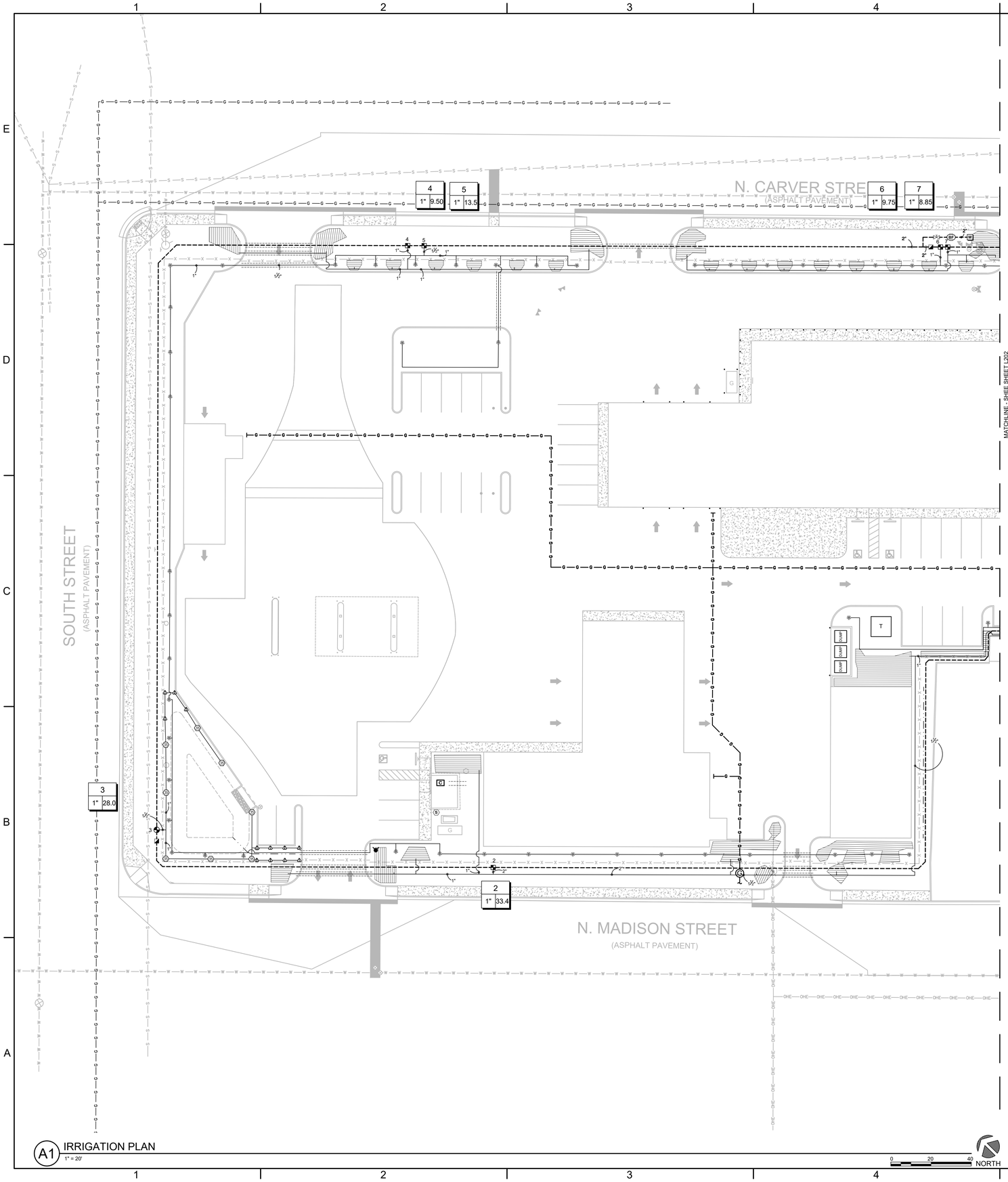
1	08/20/2021	50% DD

Planting Plan

L100



IRRIGATION SCHEDULE

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	ARC	PSI	GPM	RADIUS	DETAIL
	RAIN BIRD R-VAN14 1804-SAM-P45 TURF ROTARY .8'-14' 45-270 DEGREES AND 360 DEGREES HAND ADJUSTABLE MULTI-STREAM ROTARY W/1800 TURF SPRAY BODY ON 4" POP-UP, WITH CHECK VALVE AND 45 PSI IN-STEM PRESSURE REGULATOR. 1/2" NPT FEMALE THREADED INLET.	21	ADJ	35		13'	D5/LD501

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	PSI	GPM	RADIUS	DETAIL
	RAIN BIRD 5004-PC,FC-MPR TURF ROTOR, 4.0" POP-UP, PLASTIC RISER, MATCHED PRECIPITATION ROTOR (MPR NOZZLE). ARC AND RADIUS AS PER SYMBOL. 25 FT=RED, 30 FT=GREEN, 35FT=BEIGE.	18	35		24'	D4/LD501
	RAIN BIRD 5004-PC,FC-MPR TURF ROTOR, 4.0" POP-UP, PLASTIC RISER, MATCHED PRECIPITATION ROTOR (MPR NOZZLE). ARC AND RADIUS AS PER SYMBOL. 25 FT=RED, 30 FT=GREEN, 35FT=BEIGE.	8	35		34'	D4/LD501

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	DETAIL
	RAIN BIRD XCZ-100-PRB-COM WIDE FLOW DRIP CONTROL KIT FOR COMMERCIAL APPLICATIONS. 1" BALL VALVE WITH 1" PESB VALVE AND 1" PRESSURE REGULATING 40PSI QUICK-CHECK BASKET FILTER. 0.3GPM TO 20GPM.	5	E3/LD501
	DRIPLINE AT TREE (TREE RING) RAINBIRD XFS-CV ON-SURFACE LANDSCAPE DRIPLINE WITH A HEAVY-DUTY 4.3 PSI CHECK VALVE. 0.9 GPH EMITTERS AT 12" O.C. DRIPLINE LATERALS SPACED AT 12" APART, APPROXIMATELY 25 L.F. OF TUBING PER TREE	62	C1/LD501
	AREA TO RECEIVE DRIPLINE RAIN BIRD XFCV-06-12 XFCV ON-SURFACE LANDSCAPE DRIPLINE WITH A HEAVY-DUTY 3.5 PSI CHECK VALVE. 0.6 GPH EMITTERS AT 12" O.C. DRIPLINE LATERALS SPACED AT 12" APART, WITH EMITTERS OFFSET FOR TRIANGULAR PATTERN. GREAT FOR ELEVATION CHANGE. SPECIFY XF INSERT FITTINGS.	5,177 L.F.	C2/LD501

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	DETAIL
	RAIN BIRD PESB 1", 1-1/2", 2" PLASTIC INDUSTRIAL VALVES. LOW FLOW OPERATING CAPABILITY, GLOBE CONFIGURATION. WITH SCRUBBER TECHNOLOGY FOR RELIABLE PERFORMANCE IN DIRTY WATER IRRIGATION APPLICATIONS.	2	D1/LD501
	RAIN BIRD 5-NP 1" BRASS QUICK-COUPLING VALVE, WITH CORROSION-RESISTANT STAINLESS STEEL SPRING, LOCKING NON-POTABLE PURPLE RUBBER COVER, AND 1-PIECE BODY.	2	E4/LD501
	NIBCO T-113-K CLASS 125 BRONZE GATE SHUT OFF VALVE WITH CROSS HANDLE, SAME SIZE AS MAINLINE PIPE DIAMETER AT VALVE LOCATION. SIZE RANGE - 1/4" - 3"	1	E1/LD501
BF	APOLLO VALVES 4A505A4 1" APOLLO® MODEL PVB4A PRESSURE VACUUM BREAKER, BRONZE BODY, INLET SIZE 1", UNION END BALL VALVES, NPT TESTCOCKS	1	E2/LD501
C	HUNTER HC-6 6 STATION CONTROLLER WITH WI-FI CONNECTION	1	E5/LD501
S	HUNTER WRF-CLIK RAIN/FREEZE SENSOR, INSTALL WITHIN 1000 FT OF CONTROLLER, IN LINE OF SIGHT. 22-28 VAC/VDC 100 MA POWER FROM TIMER TRANSFORMER. MOUNT AS NOTED. INCLUDES GUTTER MOUNT.	1	E5/LD501
M	WATER METER 1-1/2"	1	
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21	3,835 L.F.	D2/LD501
	IRRIGATION MAINLINE: PVC SCHEDULE 40	1,743 L.F.	D2/LD501
	PIPE SLEEVE: PVC CLASS 200 SDR 21 EXTEND 12" PAST ADJACENT HARD CONSTRUCTION, TYP	394.5 L.F.	D2/LD501

Valve Callout

TCEQ GENERAL NOTES

THIS IRRIGATION SYSTEM HAS BEEN DESIGNED AND SHALL BE INSTALLED ACCORDING TO TEXAS ADMINISTRATIVE CODE, TITLE 30 - ENVIRONMENTAL QUALITY, PART 1 - TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ), CHAPTER 344 - LANDSCAPE IRRIGATION; THE FOLLOWING INFORMATION IS PROVIDED AS A COURTESY AND IS NOT A COMPLETE LIST OF TCEQ REQUIREMENTS

THE MAXIMUM SPACING BETWEEN EMISSION DEVICES MUST NOT EXCEED THE MANUFACTURER'S PUBLISHED RADIUS OR SPACING OF THE DEVICE

NEW IRRIGATION SYSTEMS SHALL NOT UTILIZE ABOVE-GROUND SPRAY EMISSION DEVICES IN LANDSCAPES THAT ARE LESS THAN 48 INCHES NOT INCLUDING THE IMPERVIOUS SURFACES IN EITHER LENGTH OR WIDTH AND WHICH CONTAIN IMPERVIOUS PEDESTRIAN OR VEHICULAR TRAFFIC SURFACES ALONG TWO OR MORE PERIMETERS

EMISSION DEVICES MUST BE INSTALLED TO OPERATE AT THE MINIMUM AND NOT ABOVE THE MAXIMUM SPRINKLER HEAD PRESSURE AS PUBLISHED BY THE MANUFACTURER FOR THE NOZZLE AND HEAD SPACING THAT IS USED

IRRIGATION SYSTEMS SHALL NOT SPRAY WATER OVER SURFACES MADE OF CONCRETE, ASPHALT, BRICK, WOOD, STONES SET WITH MORTAR, OR ANY OTHER IMPERVIOUS MATERIAL, SUCH AS, BUT NOT LIMITED TO, WALLS, FENCES, SIDEWALKS, STREETS, ETC

ALL NEW IRRIGATION SYSTEMS THAT ARE INSTALLED USING PVC PIPE AND FITTINGS SHALL BE PRIMED WITH A COLORED PRIMER PRIOR TO APPLYING THE PVC CEMENT

THE IRRIGATION SYSTEM MUST INCLUDE AN ISOLATION VALVE BETWEEN THE WATER METER AND THE BACKFLOW PREVENTION DEVICE

WATER CONTAINED WITHIN THE PIPING OF AN IRRIGATION SYSTEM IS DEEMED TO BE NON-POTABLE. NO DRINKING OR DOMESTIC WATER USAGE, SUCH AS, BUT NOT LIMITED TO, FILLING SWIMMING POOLS OR DECORATIVE FOUNTAINS, SHALL BE CONNECTED TO AN IRRIGATION SYSTEM

HOSE BIBS MUST BE INSTALLED USING A QUICK COUPLER KEY ON A QUICK COUPLER INSTALLED IN A COVERED PURPLE VALVE BOX AND THE HOSE BIB AND ANY HOSES CONNECTED TO THE BIB MUST BE LABELED "NON-POTABLE, NOT SAFE FOR DRINKING." AN ISOLATION VALVE MUST BE INSTALLED UPSTREAM OF A QUICK COUPLER CONNECTING A HOSE BIB TO AN IRRIGATION SYSTEM

A LICENSED IRRIGATOR OR A LICENSED IRRIGATION TECHNICIAN SHALL BE ON-SITE AT ALL TIMES WHILE THE LANDSCAPE IRRIGATION SYSTEM IS BEING INSTALLED

UPON COMPLETION OF THE IRRIGATION SYSTEM, THE IRRIGATOR OR IRRIGATION TECHNICIAN WHO PROVIDED SUPERVISION FOR THE ON-SITE INSTALLATION SHALL BE REQUIRED TO COMPLETE FOUR ITEMS: (1) A FINAL "WALK THROUGH" WITH THE IRRIGATION SYSTEM'S OWNER OR THE OWNER'S REPRESENTATIVE TO EXPLAIN THE OPERATION OF THE SYSTEM; (2) THE MAINTENANCE CHECKLIST ON WHICH THE IRRIGATOR OR IRRIGATION TECHNICIAN SHALL OBTAIN THE SIGNATURE OF THE IRRIGATION SYSTEM'S OWNER OR OWNER'S REPRESENTATIVE AND SHALL SIGN, DATE, AND SEAL THE CHECKLIST. (3) A PERMANENT STICKER WHICH CONTAINS THE IRRIGATOR'S NAME, LICENSE NUMBER, COMPANY NAME, TELEPHONE NUMBER AND THE DATES OF THE WARRANTY PERIOD SHALL BE AFFIXED TO EACH AUTOMATIC CONTROLLER INSTALLED BY THE IRRIGATOR OR IRRIGATION TECHNICIAN. (4) THE IRRIGATION PLAN INDICATING THE ACTUAL INSTALLATION OF THE SYSTEM MUST BE PROVIDED TO THE IRRIGATION SYSTEM'S OWNER OR OWNER REPRESENTATIVE

THE ITEMS ON THE MAINTENANCE CHECKLIST SHALL INCLUDE BUT ARE NOT LIMITED TO: (A) THE MANUFACTURER'S MANUAL FOR THE AUTOMATIC CONTROLLER, IF THE SYSTEM IS AUTOMATIC; (B) A SEASONAL (SPRING, SUMMER, FALL, WINTER) WATERING SCHEDULE BASED ON EITHER CURRENT/REAL TIME EVAPOTRANSPIRATION OR MONTHLY HISTORICAL REFERENCE EVAPOTRANSPIRATION (HISTORICAL ET) DATA, MONTHLY EFFECTIVE RAINFALL ESTIMATES, PLANT LANDSCAPE COEFFICIENT FACTORS, AND SITE FACTORS; (C) A LIST OF COMPONENTS, SUCH AS THE NOZZLE, OR PUMP FILTERS, AND OTHER SUCH COMPONENTS; THAT REQUIRE MAINTENANCE AND THE RECOMMENDED FREQUENCY FOR THE SERVICE; AND (D) THE STATEMENT, "THIS IRRIGATION SYSTEM HAS BEEN INSTALLED IN ACCORDANCE WITH ALL APPLICABLE STATE AND LOCAL LAWS, ORDINANCES, RULES, REGULATIONS OR ORDERS. I HAVE TESTED THE SYSTEM AND DETERMINED THAT IT HAS BEEN INSTALLED ACCORDING TO THE IRRIGATION PLAN AND IS PROPERLY ADJUSTED FOR THE MOST EFFICIENT APPLICATION OF WATER AT THIS TIME."

THE IRRIGATOR SHALL PRESENT THE IRRIGATION SYSTEM'S OWNER OR OWNER'S REPRESENTATIVE WITH A WRITTEN WARRANTY COVERING MATERIALS AND LABOR FURNISHED IN THE NEW INSTALLATION OF THE IRRIGATION SYSTEM. THE IRRIGATOR SHALL BE RESPONSIBLE FOR ADHERING TO TERMS OF THE WARRANTY. IF THE IRRIGATOR'S WARRANTY IS LESS THAN THE MANUFACTURER'S WARRANTY FOR THE SYSTEM COMPONENTS, THEN THE IRRIGATOR SHALL PROVIDE THE IRRIGATION SYSTEM'S OWNER OR THE OWNER'S REPRESENTATIVE WITH APPLICABLE INFORMATION REGARDING THE MANUFACTURER'S WARRANTY PERIOD. THE WARRANTY MUST INCLUDE THE IRRIGATOR'S SEAL, SIGNATURE, AND DATE. WRITTEN WARRANTY ON NEW IRRIGATION SYSTEMS MUST SPECIFY THE IRRIGATOR'S NAME, BUSINESS ADDRESS, AND BUSINESS TELEPHONE NUMBER(S), MUST CONTAIN THE SIGNATURE OF THE IRRIGATION SYSTEM'S OWNER OR OWNER'S REPRESENTATIVE CONFIRMING RECEIPT OF THE WARRANTY AND MUST INCLUDE THE STATEMENT: "IRRIGATION IN TEXAS IS REGULATED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ), MC-178, P.O. BOX 130897, AUSTIN, TEXAS 78711-3087. TCEQ'S WEBSITE IS: WWW.TCEQ.STATE.TX.US

ON ALL MAINTENANCE, ALTERATIONS, REPAIRS, OR SERVICE TO EXISTING IRRIGATION SYSTEMS, AN IRRIGATOR SHALL PRESENT THE IRRIGATION SYSTEM'S OWNER OR OWNER'S REPRESENTATIVE A WRITTEN DOCUMENT THAT IDENTIFIES THE MATERIALS FURNISHED IN THE MAINTENANCE, ALTERATION, REPAIR, OR SERVICE AND ALL APPLICABLE WARRANTIES

IRRIGATION GENERAL NOTES

TEXAS 811. CONTRACTOR SHALL COORDINATE WITH CITY OFFICIALS AND UTILITY COMPANIES IN LOCATING UTILITIES. CONTRACTOR SHALL BE HELD RESPONSIBLE FOR LOSSES DUE TO DAMAGE TO UTILITIES, LOCATION FOR ALL UTILITIES SHOWN ON PLANS ARE APPROXIMATE, DIAL 811 FROM ANY PHONE IN TEXAS OR (800) 344-8377

CONTRACTOR MUST VERIFY LOCATION OF ALL OVERHEAD AND UNDERGROUND UTILITIES PRIOR TO CONSTRUCTION

THIS IRRIGATION SYSTEM HAS BEEN DESIGNED FOR THE USE OF POTABLE WATER

THIS IRRIGATION SYSTEM WAS DESIGNED FOR A MINIMUM STATIC PRESSURE AT THE POINT OF CONNECTION AS LISTED ON THE PLANS, THE CONTRACTOR SHALL VERIFY ACTUAL PSI AND DELIVER RESULTS TO THE LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION, IN THE EVENT THE ACTUAL PSI IS LESS THAN THE LISTED DESIGN PRESSURE, THE CONTRACTOR SHALL RECEIVE DIRECTION FROM THE LANDSCAPE ARCHITECT REGARDING DESIGN MODIFICATIONS IF NECESSARY

ALL IRRIGATION EQUIPMENT TO BE USED ON THE PROJECT SHALL BE SUBMITTED TO THE LANDSCAPE ARCHITECT FOR REVIEW AND APPROVAL PRIOR TO DELIVERY AND INSTALLATION

IRRIGATION PLAN SHOWN IS DIAGRAMMATIC IN NATURE, CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING DRIP EMITTERS AT EACH PLANT LOCATION AND FULL COVERAGE OF ALL TURF AREAS, ANY DISCREPANCIES IN THE PLANS SHOULD BE BROUGHT TO THE LANDSCAPE ARCHITECT'S ATTENTION PRIOR TO BID

WHEN BACKFLOW PREVENTION IS SHOWN TO BE INSTALLED BELOW GRADE, A WYE STRAINER THE SAME SIZE AS THE BACKFLOW DEVICE SHALL BE INSTALLED UPSTREAM

ALL FITTINGS AND NECESSARY EQUIPMENT REQUIRED TO MAKE THIS IRRIGATION SYSTEM OPERATE PROPERLY AND TO COMPLY WITH LOCAL AND STATE CODES ARE INCIDENTAL TO THESE PLANS AND ARE THE CONTRACTOR'S RESPONSIBILITY

CONTRACTOR WILL BE HELD LIABLE FOR GAINING ACCESS UNDER ALL PAVEMENTS, SLEEVES SHOWN ON THE PLANS SHOULD BE VERIFIED FOR ACCESSIBILITY AND PASSIBILITY BEFORE BID IS MADE

IRRIGATION SLEEVES SHALL BE SIZED TWO FULL PIPE SIZES LARGER THAN PIPE INSTALLED INSIDE THE SLEEVE. FITTINGS SHALL BE INSTALLED INSIDE SLEEVES IF POSSIBLE, TAPE BOTH ENDS OF SLEEVES WITH TWO LAYERS OF DUCT TAPE

THE CONTRACTOR SHALL LOCATE AND VERIFY EACH WATER TAP TO WHICH THIS THE IRRIGATION SYSTEM WILL CONNECT

ALL EQUIPMENT AND INSTALLATION METHODS SHALL COMPLY WITH LOCAL AND STATE CODES AND THE PLANS AND SPECIFICATIONS

CONTRACTOR IS RESPONSIBLE FOR ALL CONNECTIONS AND METERS REQUIRED FOR THE FULL IMPLEMENTATION OF THE SYSTEM

CONTRACTOR SHALL LOCATE AND VERIFY THE EXISTENCE OF ALL UTILITIES PRIOR TO INITIATING WORK CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE OR INTERRUPTION IN SERVICE CAUSED BY EXCAVATIONS AND/OR WORK

EACH CONTROLLER WILL HAVE AN INDEPENDENT COMMON WIRE

ALL REMOTE CONTROL VALVE WIRES NEED TO BE LABELED AT VALVE W/ WEATHER (WATER) PROOF LABELS, AND AT CONTROLLER WITH CORRESPONDING LABEL

SPLICING OF REMOTE CONTROL VALVE WIRES IS NOT ALLOWED BETWEEN CONTROLLER AND VALVE BOX FOR REMOTE CONTROL VALVES, WIRES MUST BE CONTINUOUS FROM CONTROLLER TO REMOTE CONTROL VALVE WITHOUT SPLICING

CONTRACTOR SHALL PROVIDE A SINGLE 120-VOLT, 20 AMP CIRCUIT FROM ELECTRICAL PANEL TO IRRIGATION CONTROLLER, ALL WORK AND MATERIALS SHALL MEET LOCAL CODES AND THE NATIONAL ELECTRIC CODE (N.E.C.)

CONTRACTOR SHALL SIZE VALVE BOXES TO HOUSE THE ENTIRE ASSEMBLY OF BACKFLOW PREVENTION, VALVE, FILTER AND PRESSURE REDUCER

CONTRACTOR SHALL FURNISH ALL LABOR, MATERIALS AND EQUIPMENT NECESSARY TO CONSTRUCT PROPOSED IRRIGATION SYSTEM IN ACCORDANCE WITH PLANS, WRITTEN SPECIFICATIONS AND DETAILS

PIPE SLEEVES SHOWN CROSSING EXISTING PAVING SHALL BE BORED TO AVOID DAMAGE TO EXISTING ROADWAYS

WHEN A BOOSTER PUMP IS SHOWN ON THE PLANS, THE CONTRACTOR SHALL PROVIDE AN ELECTRICAL CIRCUIT, CONDUIT, AND WIRING AS REQUIRED FOR FULL FUNCTIONALITY OF THE PUMP SYSTEM, ALL WORK AND MATERIALS SHALL MEET LOCAL CODES AND THE NATIONAL ELECTRIC CODE (N.E.C.)

WHEN A HEATED BACKFLOW ENCLOSURE IS SHOWN ON THE PLANS, THE CONTRACTOR SHALL PROVIDE AN ELECTRICAL CIRCUIT, CONDUIT, AND WIRING AS REQUIRED FOR FULL FUNCTIONALITY OF THE HEATER SYSTEM, ALL WORK AND MATERIALS SHALL MEET LOCAL CODES AND THE NATIONAL ELECTRIC CODE (N.E.C.)

PRIOR TO A REQUEST FOR PUNCH LIST REVIEW, THE CONTRACTOR SHALL CYCLE THE ENTIRE IRRIGATION SYSTEM, CHECK FOR/REPAIR LEAKS, ADJUST HEAD RADII AND PATTERNS, FILL SETTLED TRENCHES, BRING VALVE BOXES AND HEADS TO FINISH GRADE, CREATE ZONE CHART, INSTALL GRAVEL IN VALVE BOXES, LABEL VALVES, INSTALL SENSORS, INSTALL PROPER WIRE CONNECTORS, INSTALL UNION VALVES, AND PROVIDE AS-BUILT DRAWINGS; SHOULD A PUNCH LIST REVIEW BE REQUESTED AND PERFORMED PRIOR TO THESE ITEMS BEING PERFORMED, THE CONTRACTOR SHALL PAY FOR ADDITIONAL TIME AND TRAVEL EXPENSES REQUIRED BY THE LANDSCAPE ARCHITECT FOR A FOLLOW-UP SITE VISIT

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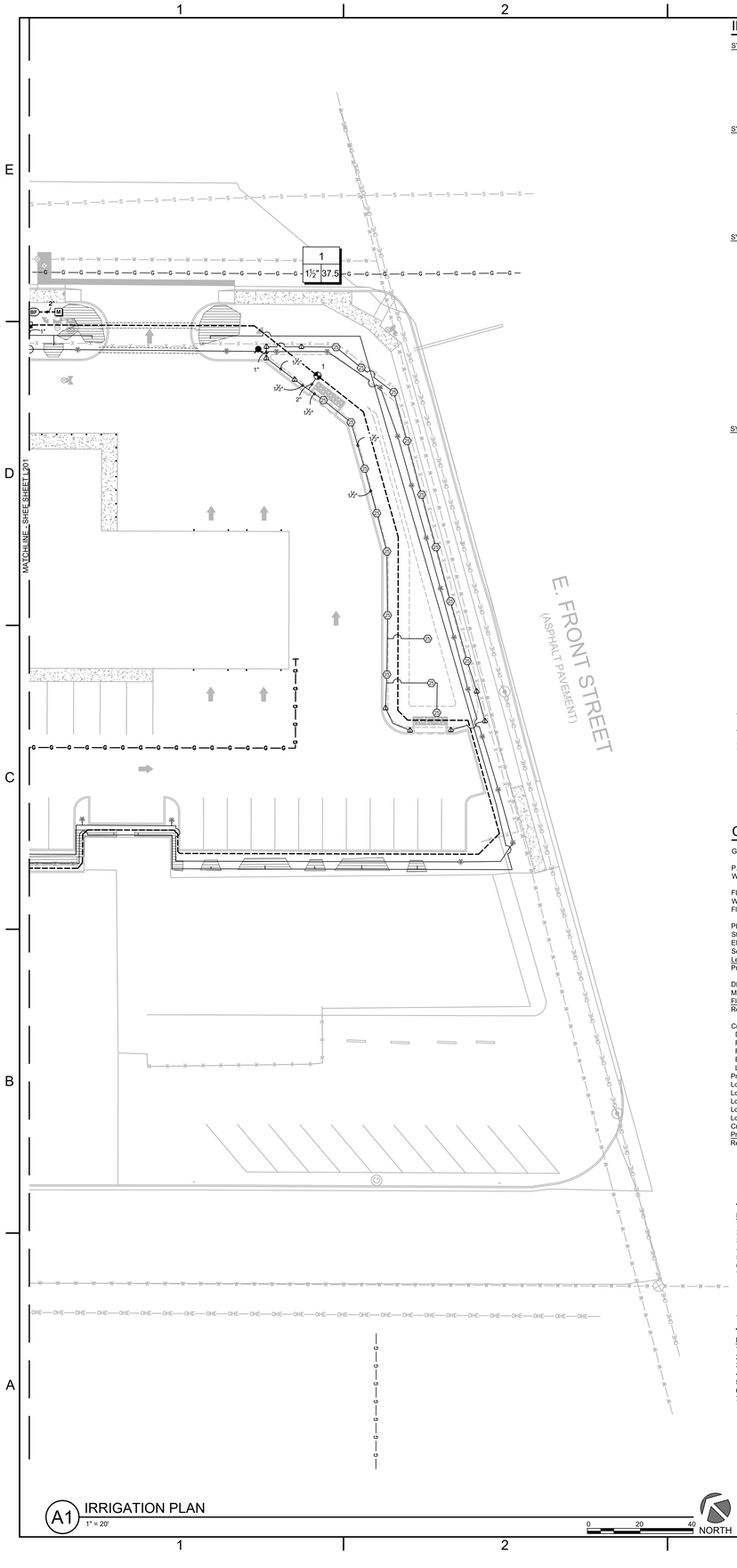
Irrigation Plan

L201



A1 IRRIGATION PLAN
1" = 20'

0 20 40 NORTH

IRRIGATION SCHEDULE

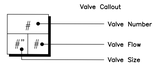
SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	ARC	PSI	GPM	RADIUS	DETAIL
	RAIN BIRD R-VAN14 1804-SAM-P45 TURF ROTARY, 8'-14' 45-270 DEGREES AND 360 DEGREES, HAND ADJUSTABLE MULTI-STREAM ROTARY W/1800 TURF SPRAY BODY ON 4" POP-UP, WITH CHECK VALVE AND 45 PSI IN-STEM PRESSURE REGULATOR. 1/2" NPT FEMALE THREADED INLET.	21	ADJ	35		13'	D5/LD501

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	PSI	GPM	RADIUS	DETAIL
25	RAIN BIRD 5004-PC,FC-MPR TURF ROTOR, 4.0" POP-UP, PLASTIC RISER, MATCHED PRECIPITATION ROTOR (MPR NOZZLE). ARC AND RADIUS AS PER SYMBOL. 25 FT=RED, 30 FT=GREEN, 35FT=BEIGE.	18	35		24'	D4/LD501
35	RAIN BIRD 5004-PC,FC-MPR TURF ROTOR, 4.0" POP-UP, PLASTIC RISER, MATCHED PRECIPITATION ROTOR (MPR NOZZLE). ARC AND RADIUS AS PER SYMBOL. 25 FT=RED, 30 FT=GREEN, 35FT=BEIGE.	8	35		34'	D4/LD501

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	DETAIL
	RAIN BIRD XCZ-100-PRB-COM WIDE FLOW DRIP CONTROL KIT FOR COMMERCIAL APPLICATIONS. 1" BALL VALVE WITH 1" PESB VALVE AND 1" PRESSURE REGULATING 40PSI QUICK-CHECK BASKET FILTER. 0.3GPM TO 20GPM.	5	E3/LD501
	DRIPLINE AT TREE (TREE RING) RAINBIRD XFS-CV ON-SURFACE LANDSCAPE DRIPLINE WITH A HEAVY-DUTY 4.3 PSI CHECK VALVE. 0.9 GPH EMITTERS AT 12" O.C. DRIPLINE LATERALS SPACED AT 12" APART, APPROXIMATELY 25 L.F. OF TUBING PER TREE	62	C1/LD501
	AREA TO RECEIVE DRIPLINE RAIN BIRD XFCV-06-12 XFCV ON-SURFACE LANDSCAPE DRIPLINE WITH A HEAVY-DUTY 3.5 PSI CHECK VALVE. 0.6 GPH EMITTERS AT 12" O.C. DRIPLINE LATERALS SPACED AT 12" APART, WITH EMITTERS OFFSET FOR TRIANGULAR PATTERN. GREAT FOR ELEVATION CHANGE. SPECIFY XF INSERT FITTINGS.	5,177 L.F.	C2/LD501

SYMBOL	MANUFACTURER/MODEL/DESCRIPTION	QTY	DETAIL
	RAIN BIRD PESB 1", 1-1/2", 2" PLASTIC INDUSTRIAL VALVES. LOW FLOW OPERATING CAPABILITY, GLOBE CONFIGURATION. WITH SCRUBBER TECHNOLOGY FOR RELIABLE PERFORMANCE IN DIRTY WATER IRRIGATION APPLICATIONS.	2	D1/LD501
	RAIN BIRD 5-NP 1" BRASS QUICK-COUPLING VALVE, WITH CORROSION-RESISTANT STAINLESS STEEL SPRING, LOCKING NON-POTABLE PURPLE RUBBER COVER, AND 1-PIECE BODY.	2	E4/LD501
	NIBCO T-113-K CLASS 125 BRONZE GATE SHUT OFF VALVE WITH CROSS HANDLE, SAME SIZE AS MAINLINE PIPE DIAMETER AT VALVE LOCATION. SIZE RANGE - 1/4" - 3"	1	E1/LD501
BF	APOLLO VALVES 4A505A4 1" APOLLOÂ® MODEL PVB4A PRESSURE VACUUM BREAKER, BRONZE BODY, INLET SIZE 1", UNION END BALL VALVES, NPT TESTCOCKS	1	E2/LD501
C	HUNTER HC-6 6 STATION CONTROLLER WITH WI-FI CONNECTION	1	E5/LD501
S	HUNTER WRF-CLIK RAINFREEZE SENSOR, INSTALL WITHIN 1000 FT OF CONTROLLER, IN LINE OF SIGHT. 22-28 VAC/VDC 100 MA POWER FROM TIMER TRANSFORMER. MOUNT AS NOTED. INCLUDES GUTTER MOUNT.	1	E5/LD501
M	WATER METER 1-1/2"	1	
	IRRIGATION LATERAL LINE: PVC CLASS 200 SDR 21	3,835 L.F.	D2/LD501
	IRRIGATION MAINLINE: PVC SCHEDULE 40	1,743 L.F.	D2/LD501
	PIPE SLEEVE: PVC CLASS 200 SDR 21 EXTEND 12" PAST ADJACENT HARD CONSTRUCTION, TYP	394.5 L.F.	D2/LD501

Valve Callout



CRITICAL ANALYSIS

Generated:	2021-12-29 13:43
P.O.C. NUMBER: 01	
Water Source Information:	
FLOW AVAILABLE	
Water Meter Size:	1-1/2"
Flow Available:	75 GPM
PRESSURE AVAILABLE	
Static Pressure at POC:	60.00 PSI
Elevation Change:	5.00 ft
Service Line Size:	2"
Length of Service Line:	20 ft
Pressure Available:	57.00 psi
DESIGN ANALYSIS	
Maximum Station Flow:	37.54 GPM
Flow Available at POC:	75 GPM
Residual Flow Available:	37.46 GPM
Critical Station:	2
Design Pressure:	20 PSI
Friction Loss:	3.43 PSI
Fittings Loss:	0.34 PSI
Elevation Loss:	0 PSI
Loss through Valve:	22.5 PSI
Pressure Req. at Critical Station:	46.28 PSI
Loss for Fittings:	0.23 PSI
Loss for Main Line:	2.3 PSI
Loss for POC to Valve Elevation:	0 PSI
Loss for Backflow:	4.21 PSI
Loss for Water Meter:	2.34 PSI
Critical Station Pressure at POC:	55.36 PSI
Pressure Available:	57 PSI
Residual Pressure Available:	1.64 PSI

WATERING SCHEDULE

NUMBER	MODEL	TYPE	PRECIP	SUN	MON	TUE	WED	THU	FRI	SAT	IN./WEEK	MIN./WEEK	GAL./WEEK	GAL./DAY
1	RAIN BIRD PESB	TURF ROTOR	0.68 in/h		15 min		15 min		15 min		0.5	45	1,689	563.1
2	RAIN BIRD XCZ-100-PRB-COM	AREA FOR DRIPLINE	1.5 in/h		7 min		7 min		7 min		0.5	21	701.2	233.7
3	RAIN BIRD PESB	TURF ROTOR	0.71 in/h		15 min		15 min		15 min		0.5	43	1,204	401.3
4	RAIN BIRD XCZ-100-PRB-COM	AREA FOR DRIPLINE	1.51 in/h		7 min		7 min		7 min		0.5	20	190	63.3
5	RAIN BIRD XCZ-100-PRB-COM	DRIP EMITTER	0.72 in/h		14 min		14 min		14 min		0.5	42	567	189
6	RAIN BIRD XCZ-100-PRB-COM	DRIP EMITTER	0.72 in/h		14 min		14 min		14 min		0.5	42	409.5	136.5
7	RAIN BIRD XCZ-100-PRB-COM	AREA FOR DRIPLINE	1.57 in/h		7 min		7 min		7 min		0.5	20	177	59
		TOTALS:			79		79		79			233	4,938	1,646

VALVE SCHEDULE

NUMBER	MODEL	SIZE	TYPE	GPM	HEADS	PIPE	WIRE	DESIGN PSI	FRICTION LOSS	VALVE LOSS	PSI	PSI @ POC	PRECIP
1	RAIN BIRD PESB	1-1/2"	TURF ROTOR	37.54	27	424.9	950.2	35	2.51	3.52	41.03	50.42	0.68 in/h
2	RAIN BIRD XCZ-100-PRB-COM	1"	AREA FOR DRIPLINE	33.39	3,340 L.F.	994.7	213.4	20	3.77	22.5	46.27	55.36	1.5 in/h
3	RAIN BIRD PESB	1"	TURF ROTOR	28.00	20	254.9	232.9	35	1.63	5.06	41.69	48.83	0.71 in/h
4	RAIN BIRD XCZ-100-PRB-COM	1"	AREA FOR DRIPLINE	9.50	951.1 L.F.	210.1	642.7	20	0.34	6.97	27.31	30.35	1.51 in/h
5	RAIN BIRD XCZ-100-PRB-COM	1"	DRIP EMITTER	13.50	36	1,035	650.9	20	3.98	11.29	35.28	38.79	0.72 in/h
6	RAIN BIRD XCZ-100-PRB-COM	1"	DRIP EMITTER	9.75	26	731.6	907.6	20	1.35	7.14	28.48	31.37	0.72 in/h
7	RAIN BIRD XCZ-100-PRB-COM Common Wire	1"	AREA FOR DRIPLINE	8.85	885.7 L.F.	183.6	911.2 1,743	20	0.45	6.54	26.99	29.87	1.57 in/h

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Midland Utilities Service Center
Water/Wastewater, Solid Waste, and Vehicle Services

MIDLAND Feel the Energy!

CLIENT
City of Midland
401 N. Carver St.
Midland, TX 79701

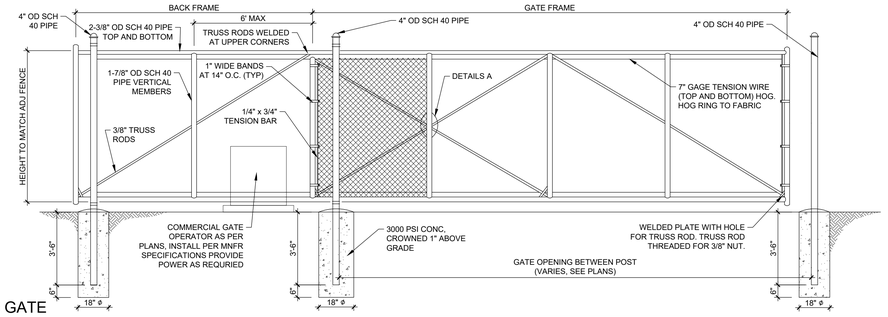
PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Irrigation Plan

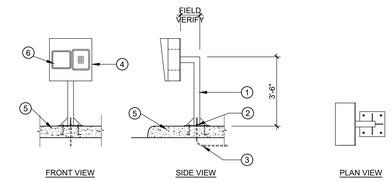
L202



E2 CANTILEVER GATE
1" = 1"
PSC-MID-CMU-323113-01

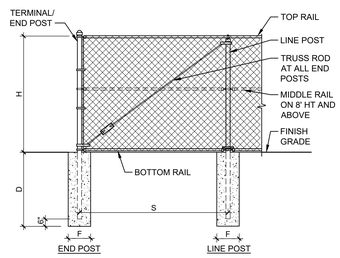
CHAIN LINK FENCE DATA (TYPE I - ASTM F1083-06 REG GRADE PIPE)			
H = FENCE HEIGHT	4'-0"	5'-0"	6'-0"
END/TERMINAL/GATE POST SIZE	2 3/8" OD SCH 40	2 3/8" OD SCH 40	2 3/8" OD SCH 40
LINE POST SIZE	1 7/8" OD SCH 40	1 7/8" OD SCH 40	1 7/8" OD SCH 40
TOP AND BOTTOM RAIL	1 5/8" OD SCH 40	1 5/8" OD SCH 40	1 5/8" OD SCH 40
MIDDLE RAIL	N/A	N/A	N/A
GATE FRAME	2 3/8" OD SCH 40	2 3/8" OD SCH 40	2 3/8" OD SCH 40
D = FOOTING DEPTH	3'-6"	3'-6"	3'-6"
F = FOOTING DIAMETER	1'-0"	1'-0"	1'-0"
S = POST SPACING	10'-0" MAX OR AS SPEC'D	10'-0" MAX OR AS SPEC'D	10'-0" MAX OR AS SPEC'D
MESH SIZE	2"	2"	2"
FABRIC GAUGE	9	9	9

E5 CHAIN LINK FENCE SIZING CHART
1/4" = 1'-0"
PSC-MID-CMU-323113-08

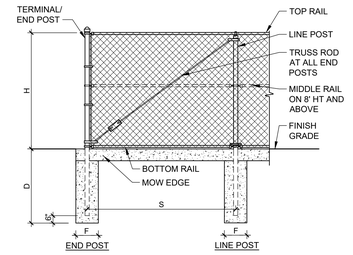


KEY NOTES:
1. 3" SQUARE GALVANIZED STEEL TUBE PEDESTAL WITH WEATHERPROOF STAINLESS STEEL HOUSING. SIZE PEDESTAL AND HOUSING TO ACCOMMODATE INSTALLED EQUIPMENT AND FIELD CONDITIONS.
2. STUB CONDUIT INTO BASE OF PEDESTAL.
3. ROUTE CONDUIT AS INDICATED ON ELECTRICAL PLANS.
4. PROVIDE PEDESTAL COVER PLATE WITH INDIVIDUAL BACKBOXES AND BLANK COVER PLATES FOR EACH DEVICE CONFIRM INDIVIDUAL BACKBOXES AND DEVICE COVER PLATE DIMENSIONS. DEVICE TEMPLATES AND DRILLING AND TAPPING REQUIREMENTS FOR EACH DEVICE.
5. CONCRETE ISLAND FOR PEDESTALS WHERE REQUIRED (SEE DETAIL D4/C-501).
6. PROXIMITY CARD READER AND PUSH BUTTON REMOTE CONTROL TRANSMITTER

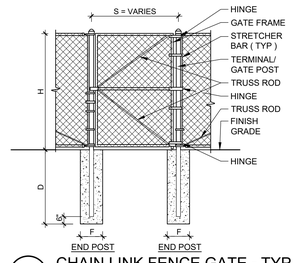
D1 GATE OPERATOR PEDESTAL
NO SCALE
PSC-MID-CMU-323111-01



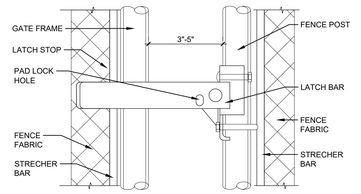
D3 CHAIN LINK FENCE - TYP
1/4" = 1'-0"
PSC-MID-CMU-323113-02



D4 CHAIN LINK FENCE W/ MOW EDGE - TYP
1/4" = 1'-0"
PSC-MID-CMU-323113-03



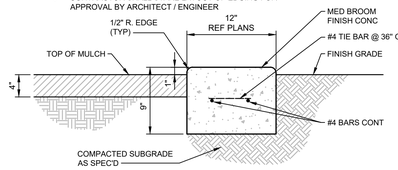
D5 CHAIN LINK FENCE GATE - TYP
1/4" = 1'-0"
PSC-MID-CMU-323113-04



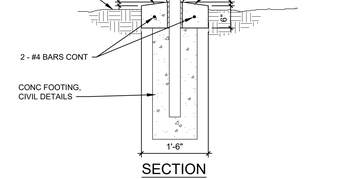
NOTE: LATCH SHALL BE FULCRUM DOUBLE DRIVE INDUSTRIAL GRADE, ALL COMPONENTS SHALL BE HOT DIPPED GALVANIZED AFTER FABRICATION, ALL BOLTS SHALL HAVE LOCKING NUTS, BOLT THREADS SHALL BE WREAKED

D6 SINGLE GATE LATCH
3" = 1'-0"
PSC-MID-CMU-323113-11

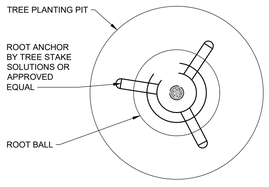
NOTE:
- MOWSTRIP TO BE DOWELED INTO EDGE OF CONC. PAVING
- CONTROL JOINTS TO BE 1/8" WIDE X 1 3/4" DEEP, SPACED 5' OC
- DOWELED EXPANSION JOINTS TO BE 51' OC, AND AT ENDS. DOWELED EXPANSION JOINTS TO BE 12" L. W/ #4 SMOOTH BAR DOWEL, CAP AND LUBE ONE END. JOINT IS TO BE 1/2" PREMOLDED FIBER EXPANSION JOINT MATERIAL WITH 1" JOINT SEALER ABOVE.
- CONTRACTOR SHALL STAKE LAYOUT OF EDGING FOR APPROVAL BY ARCHITECT / ENGINEER



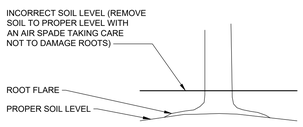
C5 12" CONCRETE LANDSCAPE EDGE
1 1/2" = 1'-0"
PVMT_CONC_MOWSTRIP_LANDSCAPE_EDGE



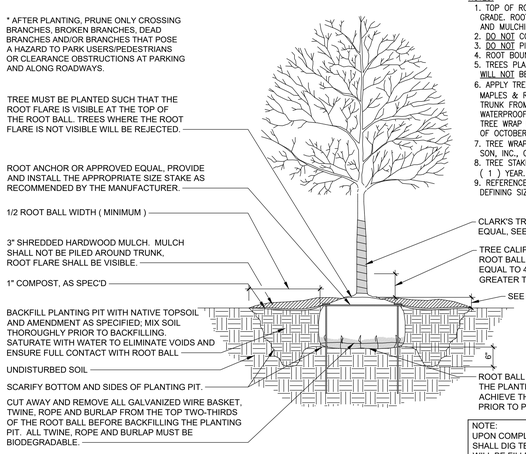
C6 MOW CURB AT FENCE
3/4" = 1'-0"
PSC-MID-CMU-321613-01



TYPICAL TREE CALIPER MEASUREMENTS (ANSI-Z60.1)			
TREE TYPE	TREE CALIPER SPECIFIED	METHOD OF CALIPER MEASUREMENT	DISTANCE (D)
SINGLE TRUNK	LESS THAN 4 1/2"	CALIPER AT (D) ABOVE SOIL LINE	0'-6"
SINGLE TRUNK	4 1/2" AND LARGER	CALIPER AT (D) ABOVE SOIL LINE	1'-0"



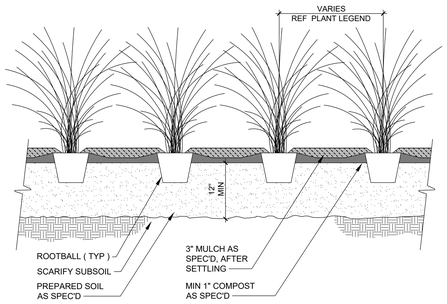
EXPOSED COVERED ROOT FLARE



NOTES:
1. TOP OF ROOT BALL SHALL BE TWO–INCHES (2") ABOVE FINISHED GRADE. ROOT FLARE MUST BE VISIBLE AFTER PLANTING AND MULCHING.
2. DO NOT CONSTRUCT A WATER BASIN AROUND THE PLANTING PIT.
3. DO NOT PILE MULCH AROUND THE TREE TRUNK.
4. ROOT BOUND TREES WILL NOT BE ACCEPTED.
5. TREES PLANTED TOO LOW, OR WITH THE ROOT FLARE COVERED, WILL NOT BE ACCEPTED.
6. APPLY TREE WRAPPING MATERIAL ON SMOOTH BARKED TREES (i.e. MAPLES & RED OAK) INSTALLED DURING THE SPRING SEASON. WRAP TRUNK FROM GUYING STRAPS TO THE ROOT BALL. USE A WATERPROOF TAPE OR ADHESIVE TO AFFIX THE PRODUCT TO ITSELF. TREE WRAP IS TO BE REMOVED BY THE CONTRACTOR AT THE END OF OCTOBER THAT SAME YEAR.
7. TREE WRAP SHALL BE CLARK'S TREE WRAP BY WALTER E. CLARK & SON, INC., OR APPROVED EQUAL.
8. TREE STAKING IS TO BE REMOVED BY THE CONTRACTOR AFTER ONE (1) YEAR.
9. REFERENCE PLANS AND PROJECT MANUAL FOR SPECIFICATIONS DEFINING SIZE, TYPE, QUALITY, ETC.

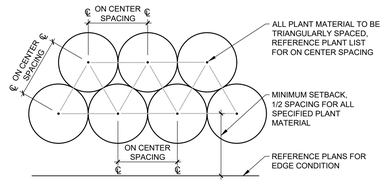
NOTE:
UPON COMPLETION OF ROUGH GRADING THE CONTRACTOR SHALL DIG TEST TREE PITS ACROSS THE SITE. THE TEST PITS WILL BE FILLED WITH WATER AND OBSERVED FOR DRAINAGE. IF THE PIT HOLDS WATER FOR GREATER THAN 24 HOURS THE TREE LOCATIONS AND/OR SPECIES WILL BE REVISED.

A1 TREE PLANTING AND BELOW GRADE STAKING
1/2" = 1'-0"

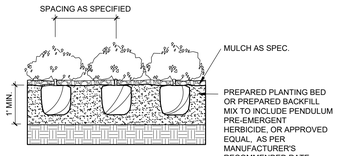


NOTES:
1. APPLY PRE-EMERGENT HERBICIDE AS PER SPECIFICATIONS
2. SMALL ROOTS (1/4" OR LESS) THAT GROW AROUND, UP, OR DOWN THE ROOT BALL PERIPHERY ARE CONSIDERED A NORMAL CONDITION IN CONTAINER PRODUCTION AND ARE ACCEPTABLE; HOWEVER, THEY SHOULD BE ELIMINATED AT THE TIME OF PLANTING. ROOTS ON THE PERIPHERY CAN BE REMOVED AT THE TIME OF PLANTING. (SEE ROOT BALL SHAVING CONTAINER DETAIL)
3. PLANT ID TAG TO REMAIN
4. ON EACH PLANT UNTIL INSPECTED BY LANDSCAPE ARCHITECT. TO BE REMOVED AFTER SUBSTANTIAL COMPLETION ACCEPTANCE
5. CONTAINER TO BE TOTALLY REMOVED ON CONTAINER-GROWN STOCK. REMOVE ANY WRAPPINGS, TWINE, WIRES, ETC.
6. BACKFILL TO BE TAMPED AND WATER SETTLED TO REMOVE ALL POCKETS OF AIR. TOP OF PLANT ROOT BALL TO BE FLUSH WITH ADJACENT FINISH GRADE.

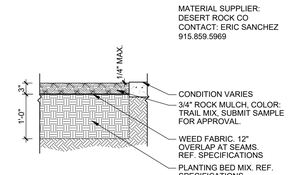
B3 ORNAMENTAL GRASS PLANTING
1" = 1'-0"
PSC-MID-CMU-3293-0-03



A3 PLANT SPACING DIAGRAM
1/2" = 1'-0"
PSC-MID-CMU-3293-0-01



A5 SHRUB PLANTING
1/2"=1'-0"
SHRUB_PLT_DET



NOTE:
AFTER 30 DAYS, CONTRACTOR TO REAPPLY ADDITIONAL MULCH TO SPECIFIED DEPTH TO REESTABLISH FINISH GRADE AT SETTLED CONDITIONS.

A6 3/4" ROCK MULCH
3/4"=1'-0"
MULCH_PLT_DET

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Water/Wastewater, Solid Waste, and Vehicle Services

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CLIENT
City of Midland
401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

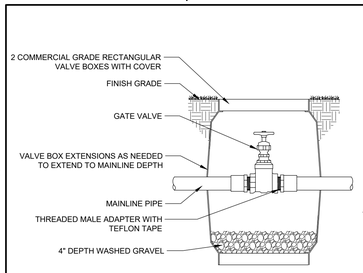
KEY PLAN

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Planting Details

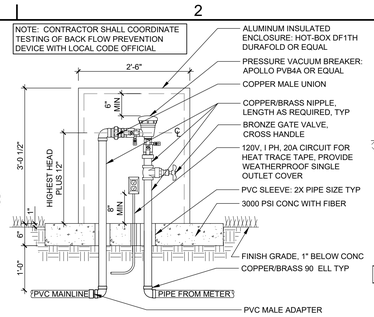
LD500

PACKET
7.846
February 8, 2022



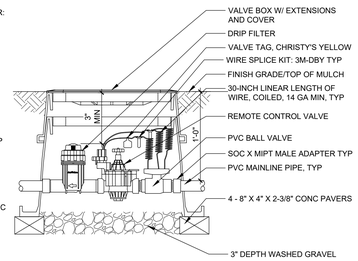
E1 GATE VALVE

1 1/2" = 1'-0" PSC-MID-CMU-328406-01



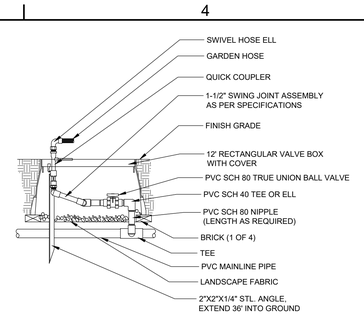
E2 PVB BACKFLOW PREVENTER

3/4" = 1'-0" PSC-MID-CMU-328409-01



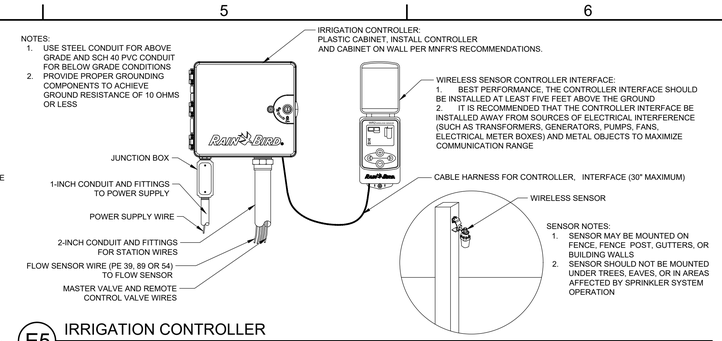
E3 DRIP VALVE

1 1/2" = 1'-0" PSC-MID-CMU-328406-08



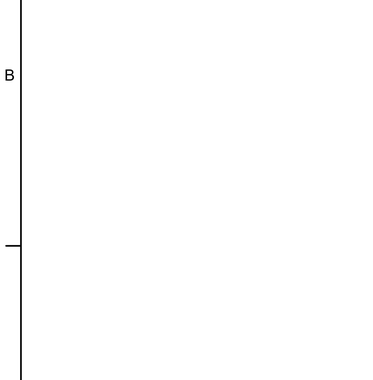
E4 QUICK-COUPLER VALVE

1/2" = 1'-0" PSC-MID-CMU-328406-03



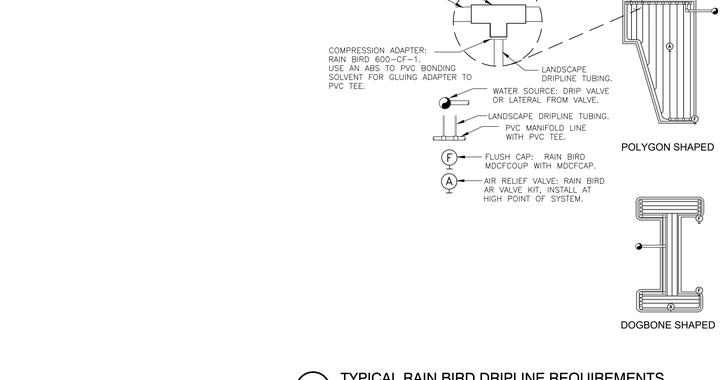
E5 IRRIGATION CONTROLLER

1 1/2" = 1'-0" PSC-MID-CMU-328409-05



D1 ZONE VALVE

1 1/2" = 1'-0" 328406-07



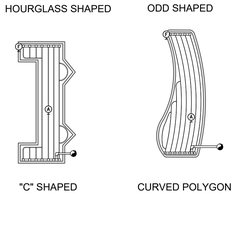
D2 TRENCHING

1" = 1" PSC-MID-CMU-328409-04

KEY NOTES

AS INDICATED BY: (X)

A. BOTTOM OF EXCAVATED TRENCH WHERE NON-ROCKY SOILS ARE ENCOUNTERED
B. IRRIGATION SYSTEM PIPING
C. MINIMUM 4" DEEP BEDDING MATERIAL WHERE ROCKY SOILS ARE ENCOUNTERED
D. IRRIGATION SYSTEM VALVE WIRING: WIRE TO BE INSTALLED IN A SEPARATE TRENCH RUNNING PARALLEL TO THE MAINLINE AND OFFSET 2'-0" TO THE NORTH AND WEST OR AS APPROVED BY OWNER
E. DETECTABLE WARNING TAPE, INSTALL 6" BELOW FINISH GRADE DIRECTLY ABOVE MAINLINE
F. TRENCH BACKFILL BACKFILL MAY BE NATIVE SOILS IF IT IS FREE OF STONES LARGER THAN 1" IN SIZE. SOIL COMPACTION IN TURF AREAS TO BE 80% TO 85% DENSITY (ASTM D-1557) AND 95% (ASTM D-1557) DENSITY UNDER PAVED OR HARDSCAPE SURFACES



D4 ROTOR HEAD

3" = 1'-0" PSC-MID-CMU-328403-04

D5 POP-UP SPRAY HEAD

1 1/2" = 1'-0" PSC-MID-CMU-328403-03

C1 20 GPH DRIPLINE RING-0.9 GPH @ 12" O.C.

1" = 1" FX-IR-FX-EMIT-01

MAXIMUM LATERAL LENGTH (FEET)						
	EMITTER FLOW RATE GPH					
	12" SPACING		18" SPACING		24" SPACING	
PSI	0.6	0.9	0.6	0.9	0.6	0.9
10	125	96	175	135	218	171
20	249	191	350	171	442	340
30	307	236	434	333	550	422
40	350	268	495	380	627	171
50	125	96	175	135	218	171
60	125	96	175	135	218	171

GRID PRECIPITATION RATES (IN/HR)			
EMITTER SPACING	LATERAL SPACING	EMITTER FLOW RATE	
		0.6	0.9
12	12	0.96	1.44
18	18	0.69	1.03
24	24	0.28	0.41

MAXIMUM FLOW PER ZONE		
	MAX GPM	PSI LOSS
SCHEDULE 40 PVC HEADER SIZE		
1/2"	4.7 GPM	7.7 PSI
3/4"	8.3 GPM	5.6 PSI
1"	13.5 GPM	4.2 PSI
1-1/2"	33.9 GPM	2.9 PSI
2"	52.4 GPM	1.9 PSI
POLY PIPE HEADER SIZE		
1/2"	4.7 GPM	8.8 PSI
3/4"	8.3 GPM	6.3 PSI
1"	13.5 GPM	4.8 PSI
1-1/2"	31.8 GPM	2.9 PSI
2"	52.4 GPM	2.2 PSI

LATERAL FLOW PER 100 FT (GPM)				
EMITTER FLOW	12" SPACING	18" SPACING	24" SPACING	
0.6 GPH	1.0 GPM	0.67 GPM	0.50 GPM	
0.9 GPH	1.5 GPM	1.0 GPM	0.75 GPM	

SLOPED CONDITION NOTE:
1. DRIPLINE LATERALS SHOULD FOLLOW THE CONTOURS OF THE SLOPE WHENEVER POSSIBLE.
2. INSTALL AIR RELIEF VALVE AT HIGHEST POINT.
3. NORMAL SPACING WITHIN THE TOP ⅔ OF SLOPE.
4. INSTALL DRIPLINE AT 25% GREATER SPACING AT THE BOTTOM ⅓ OF THE SLOPE.
5. WHEN ELEVATION CHANGE IS 10 FT OR MORE, ZONE THE BOTTOM ⅓ ON A SEPARATE VALVE.

A2 TYPICAL RAIN BIRD DRIPLINE REQUIREMENTS

3" = 1'-0" FX-IR-RB-DRIP-33

Parkhill

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Parkhill.com

Midland Utilities Service Center

Water/Wastewater, Solid Waste, and Vehicle Services

MIDLAND Feel the Energy!

CLIENT

City of Midland
401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
5	01/25/2022	Owner Review
4	01/05/2022	95% CD
3	11/19/2021	50% CD
2	10/01/2021	100% DD
1	08/20/2021	50% DD

Irrigation Details

LD501

GENERAL REQUIREMENTS

A. REFER TO SPECIFICATIONS FOR SPECIFIC REQUIREMENTS FOR MATERIALS, PRODUCTS, HANDLING, AND INSTALLATION.
B. THE CONTRACTOR IS RESPONSIBLE FOR THE STABILITY OF THE STRUCTURE UNTIL THE CONSTRUCTION OF THE STRUCTURE REACHES ITS FINAL CONDITION, AND ALL DIAPHRAGMS, BRACES, AND/OR SHEAR WALLS ARE INSTALLED.
C. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE DESIGN, INSTALLATION, AND REMOVAL OF TEMPORARY BRACING AND CONSTRUCTION SUPPORTS FOR NEW AND EXISTING STRUCTURES, AS NECESSARY TO COMPLETE THE PROJECT. NO PORTION OF THE PROJECT WHILE UNDER CONSTRUCTION IS INTENDED TO BE STABLE IN THE ABSENCE OF THE CONTRACTOR'S TEMPORARY SUPPORTS AND BRACES. CONTRACTOR SHALL RETAIN A STRUCTURAL ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED TO DESIGN TEMPORARY BRACING AND CONSTRUCTION SUPPORTS.
D. APPLY DETAILS, SECTIONS, AND NOTES ON THE DRAWINGS WHERE CONDITIONS ARE SIMILAR TO THOSE INDICATED ON DETAILS, TITLES, OR NOTES.
E. ONLY USE DIMENSIONS INDICATED ON THE DRAWINGS. DO NOT SCALE DRAWINGS.
F. THE CONTRACTOR SHALL VERIFY ALL OPENING SIZES AND LOCATIONS WITH OTHER DISCIPLINES. THE DRAWINGS DO NOT SHOW ALL OPENINGS REQUIRED. ADDITIONAL OPENINGS, BLOCKOUTS, AND SLEEVES MAY BE REQUIRED BY OTHER DISCIPLINES AND SHALL BE CONSTRUCTED USING THE TYPICAL DETAILS AND/OR THE CRITERIA INDICATED ON THE DRAWINGS. OPENINGS REQUIRED BUT NOT SHOWN ON THE STRUCTURAL DRAWINGS MUST BE APPROVED BY THE STRUCTURAL ENGINEER.
G. REFER TO ARCHITECTURAL, CIVIL, MEP, AND VERTICAL TRANSPORTATION CONTRACT DOCUMENTS FOR ADDITIONAL INFORMATION RELATING TO THE COORDINATION OF STRUCTURAL COMPONENTS INCLUDING, BUT NOT LIMITED TO:
   a. CIVIL:
      1. SITING OF BUILDING GRID LINES WITH RESPECT TO CITY BENCHMARKS
      2. SITE PREPARATION
      3. BACKFILLING MATERIALS AND REQUIREMENTS
      4. PAVING AND SITE ELEMENTS OUTSIDE OF BUILDING ENVELOPE
      5. NEW AND EXISTING SITE UTILITIES
   b. ARCHITECTURAL:
      1. PLAN DIMENSIONS AND PROJECT DATUM
      2. SLAB EDGE DIMENSIONS
      3. FINISH ELEVATION
      4. WATERPROOFING AND DAMP-PROOFING DETAILS
      5. RAMP GEOMETRY, PITS, SLAB SLOPES, AND DEPRESSIONS
      6. EMBEDMENTS, INSERTS, BLOCKOUTS, ETC.
      7. EXACT OPENING SIZES FOR PIPES, DUCT, ETC.
      8. CONCRETE FINISHES AND TOPPING SLABS
      9. CONCRETE CURBS AND HOUSEKEEPING PADS
      10. INTERIOR NON-STRUCTURAL MASONRY PARTITIONS
      11. FIRE RATINGS
      12. METAL PAN STAIRS AND SUPPORTS
      13. OPERABLE PARTITIONS
   c. MEP:
      1. PIPE AND DUCT SIZES FOR OPENINGS AND SLEEVE COORDINATION
      2. FLOOR DRAINS
      3. UNDERFLOOR AND PERIMETER DRAINAGE SYSTEMS
      4. EQUIPMENT CURBS
      5. CONDUITS AND EMBEDMENTS IN WALLS AND SLABS
   d. VERTICAL TRANSPORTATION:
      1. INSERTS, HANGERS, TRENCHES, PITS, AND CONDUITS IN WALLS AND SLABS
      2. EQUIPMENT SUPPORT, ELEVATOR DIVIDER BEAMS, EMBEDMENTS, AND ANCHOR RODS
H. ELEVATOR GUIDERAIL SUPPORTS, MACHINE ROOMS, PITS, AND PENTHOUSES ARE BASED ON ELEVATOR TYPES INDICATED ON ARCHITECTURAL CONTRACT DOCUMENTS. CONTRACTOR SHALL SUBMIT FOR REVIEW ANY PLANNED CHANGE TO ELEVATOR(S) TO DESIGN PROFESSIONAL PRIOR TO SUBMITTING CORRESPONDING STRUCTURAL SHOP DRAWINGS FOR ACTION.
I. STRUCTURAL COMPONENTS ARE NOT DESIGNED FOR VIBRATING EQUIPMENT. MOUNT VIBRATING EQUIPMENT ON VIBRATING ISOLATORS.

CODES

ALL FABRICATION, ERECTION, AND DESIGN OF STRUCTURAL MEMBERS SHALL MEET THE MINIMUM STANDARDS OF THE FOLLOWING CODES:
A. INTERNATIONAL BUILDING CODE (IBC) 2018
B. AMERICAN CONCRETE INSTITUTE (ACI): ACI 318-14 AND OTHER APPLICABLE ACI STANDARDS
C. AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC) 360-16 SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS
D. AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) - STANDARD 7-16
E. AMERICAN WELDING SOCIETY (AWS)
F. CONCRETE REINFORCING STEEL INSTITUTE (CRSI)
G. NATIONAL CONCRETE MASONRY ASSOCIATION (NCMA)
H. STEEL DECK INSTITUTE (SDI)
I. STEEL JOIST INSTITUTE (SJI)
J. ASTM SPECIFICATIONS
K. AMERICAN IRON AND STEEL INSTITUTE (AISI)
L. NATIONAL DESIGN STANDARDS (NDS) FOR WOOD CONSTRUCTION 2018

DESIGN LOADS

A. ALL APPLICABLE DEAD LOADS
B. COLLATERAL LOADS — 10 PSF
B. LIVE LOADS:
   ROOF LIVE LOAD: 20 PSF
   FLOOR LIVE LOAD: 100 PSF
C. SNOW LOAD: PER ASCE 7-16
   GROUND SNOW LOAD, P_g: 5 PSF
   FLAT-ROOF SNOW LOAD, P_f: 3.8 PSF
   DRIFT SURCHARGE LOAD(S) P_d: NA
   SNOW EXPOSURE FACTOR, C_e: 0.9
   SNOW LOAD IMPORTANCE FACTOR, I_s: 1.0
   THERMAL FACTOR, C_t: 1.2
   SLOPE FACTOR(S), C_s: 0.9
   WIDTH OF SNOW DRIFT(S), w: NA
D. LATERAL SOIL PRESSURE: 60 PCF
E. WIND LOAD: PER ASCE 7-16
   BASIC WIND SPEED: 105 MPH
   EXPOSURE: C
   CATEGORY: II
F. SEISMIC LOADS: PER IBC 2018
   BUILDING CATEGORY: II
   SEISMIC IMPORTANCE FACTOR, I_E: 1.00
   MAPPED SPECTRAL RESPONSE ACCELERATION, S_S: 0.121g
   MAPPED SPECTRAL RESPONSE ACCELERATION, S_1: 0.034g
   SITE CLASS: D
   SPECTRAL RESPONSE COEFFICIENT, S_{DS}: 0.129g
   SPECTRAL RESPONSE COEFFICIENT, S_{D1}: 0.054g
   SEISMIC DESIGN CATEGORY: A
   BASIC SEISMIC FORCE RESISTING SYSTEM: A9
   DESIGN BASE SHEAR, V: 1.5 k
   SEISMIC RESPONSE COEFFICIENT, C_s: 0.01
   RESPONSE MODIFICATION FACTOR, R: 2
   ANALYSIS PROCEDURE USED: EQUIVALENT LATERAL FORCE
G. DISTRIBUTE THE MAXIMUM LOAD HUNG FROM ANY STRUCTURAL MEMBER FOR MEP DUCTWORK, PIPING, ETC. OVER THE MEMBER'S TRIBUTARY AREA IN A WAY THAT THE DESIGN SUPERIMPOSED DEAD LOADS LISTED IN CONTRACT DOCUMENTS ARE NOT EXCEEDED. HANGING ITEMS FROM DECK IS STRICTLY PROHIBITED. THE CONTRACTOR SHALL COORDINATE THE LOADS OF ALL TRADES AND PROVIDE ADDITIONAL SUPPORT OR DISTRIBUTION FRAMING AS REQUIRED TO ACHIEVE THE ALLOWABLE LOAD DISTRIBUTION.

MATERIAL PROPERTIES

STEEL	
WIDE FLANGE MEMBERS	ASTM A992 - GRADE 50
STEEL PIPE	ASTM A501 OR ASTM A53 TYPE E OR S - GRADE B
STEEL TUBE	ASTM A500 GRADE C - 50 KSI
MISC STEEL	ASTM A36 - 36 KSI
CONCRETE	
SLABS & FOOTINGS	3000 PSI
MASONRY	
MINIMUM PRISM STRENGTH	1800 PSI
REINFORCING	
TYPICAL	ASTM A-615 - GRADE 60
LOW ALLOY/WELDABLE	ASTM A-706 - GRADE 60
ANCHOR RODS	ASTM F-1554 - GRADE 36 UNO
BOLTS	ASTM A325 (3/4" DIAMETER MINIMUM)
WELD	
STRUCTURAL STEEL	E70XX
LIGHT GAUGE METALS	E60XX

FLOOR SLABS

A. A PUMP TRUCK SHOULD BE USED TO PLACE CONCRETE TO AVOID TRUCK TRAFFIC ON THE FINISHED SUBGRADE.
B. CURING SLABS ON GROUND
   a. SLABS ON GROUND SHALL BE WET CURED FOR 7 DAYS AFTER CONCRETE PLACEMENT. WET CURING SHALL BEGIN IMMEDIATELY AFTER FINAL FINISHING OF SLAB SURFACE AND SHALL CONSIST OF CONTINUOUS MISTING BY SPRINKLER, WET BURLAP, OR CONTRACTOR SHALL APPLY APPROVED CURING COMPOUND.
C. FLOOR SLAB ISOLATION JOINTS SHALL BE 30 POUND FELT, UNLESS NOTED OTHERWISE.
D. CONSTRUCTION AND CONTRACTION JOINTS SHALL BE LOCATED AS INDICATED ON THE PLAN. WHERE CONTRACTION JOINTS ARE INDICATED, SAW CUTTING SHALL BEGIN AS SOON AS POSSIBLE WITHOUT DAMAGING THE SLAB.

STRUCTURAL STEEL

A. STRUCTURAL STEEL DETAILS AND CONNECTIONS SHALL CONFORM TO THE STANDARDS OF THE AISC.
B. MODIFYING OR SPLICING OF STRUCTURAL MEMBERS SHALL BE REJECTED WITHOUT PRIOR APPROVAL OF THE ENGINEER. ANY MODIFICATION OR SPLICE NOT SHOWN AND DETAILED ON SHOP DRAWINGS WILL BE REJECTED.
C. ALL WELDING SHALL CONFORM TO THE AMERICAN WELDING SOCIETY CODE AND SHALL BE DONE BY CERTIFIED WELDERS.
D. STEEL BEAMS BEARING ON MASONRY SHALL HAVE BEARING AT EACH END EQUAL TO 1 INCH PER FOOT OF SPAN BUT NOT LESS THAN 8 INCHES UNLESS OTHERWISE NOTED.
E. STEEL BEAMS BEARING ON MASONRY SHALL HAVE SOLID MASONRY OR BLOCK FILLED WITH CEMENT GROUT FROM BOTTOM OF STEEL TO THE BEAM, WALL OR FOUNDATION BELOW.

FOUNDATIONS

A. ALL SPREAD FOOTINGS ARE DESIGNED ON AN ALLOWABLE SOIL BEARING PRESSURE OF 2750 POUNDS PER SQUARE FOOT AT A MINIMUM DEPTH OF THREE FEET BELOW 100'-0" FINISHED FLOOR ELEVATION.
B. ALL CONTINUOUS FOOTINGS ARE DESIGNED ON AN ALLOWABLE SOIL BEARING PRESSURE OF 1250 POUNDS PER SQUARE FOOT AT A MINIMUM DEPTH OF ONE AND ONE-HALF FEET BELOW 100'-0" FINISHED FLOOR ELEVATION.
C. PLACE 3 INCH GRANULAR FILL UNDER VAPOR BARRIER UNDER ALL 5" THICK SLABS-ON-GROUND.
D. PLACE 4 INCH CRUSHED STONE MEETING TxDOT ITEM 247, GRADE 3 UNDER VAPOR BARRIER UNDER ALL 8" THICK SLABS-ON-GROUND.
E. EXCAVATIONS FOR FOOTINGS SHOULD BE ACCOMPLISHED WITH A SMOOTH-MOUTHED BUCKET. IF A TOOTHED BUCKET IS USED, EXCAVATION WITH THIS BUCKET SHOULD BE TERMINATED A FEW INCHES ABOVE FINAL GRADE AND THE EXCAVATION COMPLETED WITH A SMOOTH-MOUTHED BUCKET OR BY HAND. DEBRIS OR LOOSE NATURAL MATERIAL IN THE BOTTOM OF THE EXCAVATION SHOULD BE RECOMPACTED OR REMOVED PRIOR TO PLACING CONCRETE.
F. DO NOT ALLOW LOOSE, EXCAVATED SOILS FROM THE FOOTINGS TO BE SPREAD OUT WITHIN THE BUILDING PAD. THESE SOILS WILL CAUSE DIFFERENTIAL SETTLEMENTS.
G. PROMPT PLACEMENT OF CONCRETE IN THE FOOTING EXCAVATIONS AS THEY ARE COMPLETED, CLEANED, AND OBSERVED, IS STRONGLY RECOMMENDED.
H. REFER TO THE SOIL REPORT FOR SUBSOIL CONDITIONS THAT MAY BE ENCOUNTERED IN THE INSTALLATION OF FOUNDATIONS, AND OTHER INFORMATION RELEVANT TO FOUNDATIONS AND SITE PREPARATION.
I. DESIGN OF FOUNDATIONS AND STRUCTURAL COMPONENTS IN CONTACT WITH SOIL IS BASED ON THE RECOMMENDATIONS GIVEN IN THE FOLLOWING GEOTECHNICAL REPORT:
   REPORT BY : BEYOND ENGINEERING & TESTING
   DATE OF REPORT : JUNE 25, 2021
   REPORT NUMBER : GT2105020

SITE PLANNING AND FILL NOTES

A. PROPER CONSTRUCTION DRAINAGE SHALL BE PROVIDED AND MAINTAINED AT ALL TIMES DURING FOUNDATION CONSTRUCTION. PONDING OF WATER AT THE SITE SHOULD BE AVOIDED DURING ALL PHASES OF CONSTRUCTION.
B. LOOSE SAND WAS ENCOUNTERED IN THE TOP 5 FEET BELOW EXISTING GRADE AT BORING-05 (CAR WASH BUILDING) AND THEREFORE, SUBGRADE REMEDIATION IS REQUIRED ACCORDING TO THE GEOTECHNICAL REPORT, SECTION 7.3 AS FOLLOWS. THE SOILS BELOW THE CAR WASH BUILDING FOOTPRINT SHOULD BE EXCAVATED TO AT LEAST FIVE FEET BELOW THE EXISTING GROUND SURFACE AND EXTEND HORIZONTALLY FOR AT LEAST FIVE FEET BEYOND THE BUILDING'S FOOTPRINT. EXCAVATED SOILS, FREE OF DEBRIS, CAN BE STOCKPILED FOR REUSE. COMPACT THE RESULTING EXPOSED SUBGRADE SOILS TO 98% OF THE MAXIMUM DRY DENSITY PER ASTM D698. USE THE EXCAVATED/STOCKPILED SOILS, FREE OF DEBRIS, TO BACKFILL PLACE BACKFILL IN 6 TO 8-INCH LOOSE LIFTS AND COMPACT TO 98% OF THE MAXIMUM DRY DENSITY PER ASTM D698. IF ADDITIONAL MATERIAL IS NEEDED TO COMPLETE THE BUILDING PAD, USE SELECT FILL MATERIALS MEETING THE REQUIREMENTS IN SECTION 7.2 OF THE GEOTECHNICAL REPORT.
C. NEWLY PLACED FILL SHOULD NOT BE PLACED ON FROZEN SUBGRADE AND FROZEN MATERIAL SHOULD NOT BE USED FOR FILL.
D. SCARIFY SITE TO MINIMUM DEPTH OF 6 INCHES TO REMOVE ALL EXISTING VEGETATION. REMOVAL SHALL EXTEND 5 FOOT BEYOND BUILDING AREAS AND 2 FOOT BEYOND PAVING AREAS.
E. RECOMPACT TOP 6 INCHES OF SUBGRADE TO MINIMUM OF 98 PERCENT OF ASTM D698 OR ASTM D1557 MAXIMUM DENSITY. REMOVE AND REPLACE WEAK OR SOFT AREAS WITH GRANULAR FILL OR BASE MATERIALS.
F. BUILDING PAD SHALL BE RAISED TO PROPER ELEVATION USING SATISFACTORY SOILS COMPACTED IN 6 TO 8 INCH LOOSE LIFTS TO 98 PERCENT OF ASTM D698 MAXIMUM DENSITY. MOISTURE SHALL BE CONTROLLED TO WITHIN 2 PERCENT OF OPTIMUM PER D698 DURING COMPACTION OPERATIONS. COMPACTED FILL DENSITY SHOULD BE VERIFIED BY NUCLEAR DENSITY TESTS, WITH AT LEAST ONE TEST PER 2,500 SF FOR EACH LIFT UNDER BUILDINGS.
G. FOOTINGS MAY BE BACK FILLED USING SATISFACTORY SOILS MEETING THE REQUIREMENTS OF SECTION 7.2 OF THE GEOTECHNICAL REPORT.
H. UTILITY TRENCHES WITHIN BUILDING OR PAVING AREAS SHALL BE FILLED PER THE ABOVE CRITERIA.
I. TREE STUMPS, IF ENCOUNTERED, SHOULD BE COMPLETELY REMOVED AND BACK FILLED PER THE ABOVE CRITERIA.

CONCRETE

A. ALL EXTERIOR CONCRETE, INCLUDING WALKS AND CURBS OUTSIDE THE BUILDING LINE, SHALL BE AIR ENTRAINED.
B. PROVIDE STANDARD BAR CHAIRS AND SPACERS FOR REINFORCING AT A MAXIMUM OF 4 FOOT CENTERS FOR ALL SLABS AND BEAMS.
C. LAP CONTINUOUS UNSCHEDULED REINFORCING BARS AS FOLLOWS: BOTTOM BARS IN MEMBERS SUPPORTED BY COLUMNS OR FOOTINGS - 12 INCH AT SUPPORTS ONLY; ALL OTHERS - (36) BAR DIAMETERS MINIMUM.
D. ALL HORIZONTAL REINFORCING IN CONTINUOUS FOOTINGS AND WALLS SHALL BE CONTINUOUS AROUND CORNERS OR HAVE CORNER BARS OF THE SAME SIZE AND SPACING AS THE HORIZONTAL BARS AND LAP A MINIMUM OF (50) BAR DIAMETERS, OR 24 INCH MINIMUM.
E. THERE SHALL BE NO HORIZONTAL CONSTRUCTION JOINTS IN CONCRETE BEAM, FOOTING, OR SLAB POURS. ALL CONSTRUCTION JOINTS SHALL BE MADE WITHIN THE CENTER THIRD OF SPANS WITH VERTICAL BULKHEADS. THE LOCATION OF CONSTRUCTION JOINTS SHALL BE APPROVED BY THE STRUCTURAL ENGINEER.
F. WHERE CONCRETE PILASTERS, COLUMNS, OR BEAMS ARE TO BE LEFT EXPOSED AND DO NOT ABUT OTHER MATERIALS, EXTERNAL CORNERS SHALL BE CHAMFERED 3/4 INCH.
G. WHERE SLEEVES ARE REQUIRED THROUGH BEAMS OR JOISTS, VERTICAL OR HORIZONTAL PIPE SLEEVES SHALL BE PROVIDED AS SPECIFIED UNDER THE MECHANICAL AND ELECTRICAL SECTIONS OF THE SPECIFICATION. LOCATION OF ALL SUCH SLEEVES SHALL BE APPROVED BY THE STRUCTURAL ENGINEER. WHERE NECESSARY FOR STRUCTURAL REASONS, BEAMS OR JOISTS SHALL BE WIDENED TO COMPENSATE FOR THE LOSS OF CROSS SECTION DUE TO THE SLEEVE. ADD ONE EXTRA TIE OR STIRRUP ON BOTH SIDES OF EACH SLEEVE. WHERE TWO OR MORE PIPE SLEEVES ARE REQUIRED THROUGH CONCRETE SLABS, A DISTANCE EQUAL TO THREE TIMES THE LARGER SLEEVE DIAMETER SHALL BE PROVIDED BETWEEN SLEEVES.

POST-INSTALLED ANCHORS

EXCEPT WHERE INDICATED ON THE DRAWINGS, POST-INSTALLED ANCHORS SHALL CONSIST OF THE FOLLOWING ANCHOR TYPES, AS PROVIDED BY HILTI, INC. OR APPROVED EQUAL. CONTACT HILTI AT (800) 879-8000 FOR PRODUCT RELATED QUESTIONS.

A. ANCHORS TO CONCRETE
   a. ADHESIVE ANCHORS FOR CRACKED AND UNCRACKED CONCRETE USE:
      1. HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI HIT-Z ROD PER ICC ESR-3187.
      2. HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI HOLLOW DRILL BIT AND VACUUM WITH HAS-E-55 THREADED ROD PER ICC ESR-3187.
      3. HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI ROUGHENING TOOL (HIT RT) WITH HAS-E THREADED ROD PER ICC ESR-3187 FOR DIAMOND CORED HOLES.
      4. HILTI HIT-RE-500-V3 SAFESET SYSTEM WITH HILTI HOLLOW DRILL BIT AND VACUUM WITH HAS-E-55 THREADED ROD PER ICC ESR-3814 FOR SLOW CURE APPLICATIONS.
      5. HILTI HIT-RE 500-V3 SAFESET SYSTEM WITH HILTI ROUGHENING TOOL (HIT RT) WITH HAS-E THREADED ROD PER ICC EST-3814 FOR DIAMOND CURED HOLES.
B. REBAR DOWELING INTO CONCRETE
   a. ADHESIVE ANCHORS FOR CRACKED AND UNCRACKED CONCRETE USE:
      1. HILTI HIT-HY 200 SAFE SET SYSTEM WITH HOLLOW DRILL BIT AND VACUUM WITH CONTINUOUSLY DEFORMED REBAR PER ICC ESR-3187.
      2. HILTI HIT-HY 200 SAFESET SYSTEM WITH HILTI ROUGHENING TOOL (HIT RT) WITH HAS-E THREADED ROD PER ICC ESR-3187 FOR DIAMOND CORED HOLES.
      3. HILTI HIT-RE-500-V3 SAFESET SYSTEM WITH HILTI HOLLOW DRILL BIT WITH VACUUM WITH CONTINUOUSLY DEFORMED REBAR PER ICC ESR-3814.
      4. HILTI HIT-RE 500-V3 SAFESET SYSTEM WITH HILTI ROUGHENING TOOL (HIT RT) WITH CONTINUOUSLY DEFORMED REBAR PER ICC ESR-3814 IN DIAMOND CORED HOLES.
C. ANCHOR CAPACITY USED IN DESIGN SHALL BE BASED ON THE TECHNICAL DATA PUBLISHED BY HILTI OR SUCH OTHER METHOD AS APPROVED BY THE STRUCTURAL ENGINEER OF RECORD. SUBSTITUTION REQUESTS FOR ALTERNATE PRODUCTS MUST BE APPROVED IN WRITING BY THE STRUCTURAL ENGINEER OF RECORD PRIOR TO USE. CONTRACTOR SHALL PROVIDE CALCULATIONS DEMONSTRATING THAT THE SUBMITTED PRODUCT IS CAPABLE OF ACHIEVING THE PERFORMANCE VALUES OF THE SPECIFIED PRODUCT. SUBSTITUTIONS WILL BE EVALUATED BY THEIRS HAVING AN ICC ESR SHOWING COMPLIANCE WITH THE RELEVANT BUILDING CODE FOR SEISMIC USES, LOAD RESISTANCE, INSTALLATION CATEGORY, AND AVAILABILITY OF COMPREHENSIVE INSTALLATION INSTRUCTIONS. ADHESIVE ANCHOR EVALUATION WILL ALSO CONSIDER CREEP, IN-SERVICE TEMPERATURE AND INSTALLATION TEMPERATURE.
D. INSTALL ANCHOR PER THE MANUFACTURER INSTRUCTION, AS INCLUDED IN THE ANCHOR PACKAGING.
E. OVERHEAD ADHESIVE ANCHORS MUST BE INSTALLED USING THE HILTI PROFIS SYSTEM.
F. THE CONTRACTOR SHALL ARRANGE FOR AN ANCHOR MANUFACTURER'S REPRESENTATIVE TO PROVIDE ON-SITE INSTALLATION TRAINING FOR ALL OF THEIR ANCHORING PRODUCTS SPECIFIED. THE STRUCTURAL ENGINEER OF RECORD MUST RECEIVE DOCUMENTED CONFIRMATION THAT ALL OF THE CONTRACTOR PERSONNEL WHO INSTALL ANCHORS ARE TRAINED PRIOR TO COMMENCEMENT OF INSTALLING ANCHORS.
G. ANCHOR CAPACITY IS DEPENDENT UPON SPACING BETWEEN ADJACENT ANCHORS AND PROXIMITY OF ANCHORS TO EDGE OF CONCRETE. INSTALL ANCHORS IN ACCORDANCE WITH SPACING AND EDGE CLEARANCES INDICATED ON THE DRAWINGS.
H. EXISTING REINFORCING BARS IN THE CONCRETE STRUCTURAL DRAWINGS MAY CONFLICT WITH SPECIFIC ANCHOR LOCATIONS. UNLESS NOTED OTHERWISE, ENSURE THAT THE BARS CAN BE CUT. THE CONTRACTOR SHALL REVIEW THE EXISTING STRUCTURAL DRAWINGS AND SHALL UNDERTAKE TO LOCATE THE POSITION OF THE REINFORCING BARS AT THE LOCATIONS OF THE CONCRETE ANCHORS BY HILTI FERROSCAN, GPR, X-RAYING, CHIPPING, OR OTHER APPROVED MEANS.

STEEL JOISTS

A. K SERIES STEEL JOISTS BEARING ON STEEL BEAMS, CONCRETE OR MASONRY SHALL BE SECURED WITH A MINIMUM OF (2) 3 INCH LONG, 1/8 INCH FILLET WELDS ON EACH SIDE.
B. PROVIDE FLAT BEARING FOR ALL JOISTS.
C. PROVIDE CAMBER IN ALL JOISTS IN ACCORDANCE WITH SJI SPECIFICATIONS.
D. JOISTS SHALL BE DESIGNED FOR A NET UPLIFT AS GIVEN IN THE WIND PRESSURE PLAN.

VERIFICATION AND INSPECTION	C	P
1704.2.5 - FABRICATED ITEMS		
INSPECT FABRICATOR'S FABRICATION AND QUALITY CONTROL PROCEDURES FOR COMPLETENESS AND ADEQUACY.	---	---
1705.1 - GENERAL		
1705.1.1 - SPECIAL CASES AS REQUIRED BY BUILDING OFFICIAL		
1. CONSTRUCTION MATERIALS AND SYSTEMS THAT ARE ALTERNATIVES TO MATERIALS AND SYSTEMS PRESCRIBED BY THIS CODE.		
2. UNUSUAL DESIGN APPLICATIONS OF MATERIALS DESCRIBED IN THIS CODE.		
3. MATERIALS AND SYSTEMS REQUIRED TO BE INSTALLED IN ACCORDANCE WITH ADDITIONAL MANUFACTURER'S INSTRUCTIONS THAT PRESCRIBE REQUIREMENTS NOT CONTAINED IN THIS CODE OR IN STANDARDS REFERENCED BY THIS CODE.		
TABLE 1705.3 - CONCRETE CONSTRUCTION		
1. INSPECT REINFORCEMENT, INCLUDING PRESTRESSING TENDONS, AND VERIFY PLACEMENT.	---	
2. REINFORCING BAR WELDING:		
a. VERIFY WELDABILITY OF REINFORCING BARS OTHER THAN ASTM A706.	---	X
b. INSPECT SINGLE-PASS FILLET WELDS, MAXIMUM 5/16 INCH.	---	X
c. INSPECT ALL OTHER WELDS.	X	
3. INSPECT ANCHORS CAST IN CONCRETE.	---	X
4. INSPECT ANCHORS POST-INSTALLED IN HARDENED CONCRETE MEMBERS.		
a. ADHESIVE ANCHORS INSTALLED IN HORIZONTALLY OR UPWARDLY INCLINED ORIENTATIONS TO RESIST SUSTAINED TENSION LOADS.	X	
b. MECHANICAL ANCHORS AND ADHESIVE ANCHORS NOT DEFINED IN 4.a.		X
5. VERIFY USE OF REQUIRED DESIGN MIX.	---	X
6. PRIOR TO CONCRETE PLACEMENT, FABRICATE SPECIMENS FOR STRENGTH TESTS, PERFORM SLUMP AND AIR CONTENT TESTS, AND DETERMINE THE TEMPERATURE OF THE CONCRETE.	X	
7. INSPECTION OF CONCRETE AND SHOTCRETE PLACEMENT FOR PROPER APPLICATION TECHNIQUES.	X	---
8. VERIFY MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES.	---	X
9. INSPECT PRESTRESSED CONCRETE FOR:		
a. APPLICATION OF PRESTRESSING FORCES.	X	---
b. GROUTING OF BONDED PRESTRESSING TENDONS.	X	---
10. INSPECT ERECTION OF PRECAST CONCRETE MEMBERS.	---	X
11. VERIFY IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POST-TENSIONED CONCRETE AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS.	---	X
12. INSPECT FORMWORK FOR SHAPE, LOCATION AND DIMENSIONS OF THE CONCRETE MEMBER BEING FORMED.	---	X
TABLE 1705.6 - SOILS		
1. VERIFY MATERIALS BELOW SHALLOW FOUNDATIONS ARE ADEQUATE TO ACHIEVE THE DESIGN BEARING CAPACITY.	---	X
2. VERIFY EXCAVATIONS ARE EXTENDED TO PROPER DEPTH AND HAVE REACHED PROPER MATERIAL.	---	X
3. PERFORM CLASSIFICATION AND TESTING OF COMPACTED FILL MATERIALS.	---	X
4. VERIFY USE OF PROPER MATERIALS, DENSITIES AND LIFT THICKNESSES DURING PLACEMENT AND COMPACTION OF COMPACTED FILL.	X	---
5. PRIOR TO PLACEMENT OF COMPACTED FILL, OBSERVE SUBGRADE AND VERIFY THAT SITE HAS BEEN PREPARED PROPERLY.	---	X

NOTATION USED IN TABLE:

COLUMN HEADERS:
C INDICATES CONTINUOUS INSPECTION IS REQUIRED.
P INDICATES PERIODIC INSPECTION IS REQUIRED.

BOX ENTRIES:
X IS PLACED IN THE APPROPRIATE COLUMN TO DENOTE EITHER "C" CONTINUOUS OR "P" PERIODIC INSPECTIONS.
--- DENOTES AN ACTIVITY THAT IS EITHER A ONE-TIME ACTIVITY OR ONE WHOSE FREQUENCY IS DEFINED IN SOME OTHER MANNER.

ADDITIONAL DETAIL REGARDING INSPECTIONS AND TESTS ARE PROVIDED IN THE PROJECT SPECIFICATIONS AND NOTES ON THE DRAWINGS.

ELEVATORS

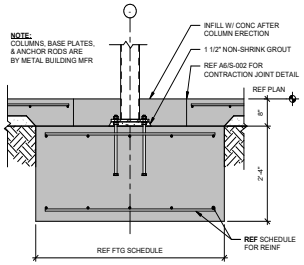
A. THE DEPTH AND CLEAR DIMENSIONS OF THE ELEVATOR PIT(S) SHALL BE VERIFIED WITH ELEVATOR MANUFACTURER PRIOR TO CONSTRUCTION OF THE ELEVATOR PIT.
B. ALL REQUIRED STRUCTURAL STEEL FOR THE ELEVATOR(S), INCLUDING GUIDERAIL SUPPORT, COUNTERWEIGHT RAIL SUPPORT, HOIST BEAMS, AND MACHINE BEAM SUPPORT, SHALL BE INCLUDED IN THE BID. WHERE STRUCTURAL STEEL IS SHOWN, IT IS THE MINIMUM SIZE AND DOES NOT RELIEVE THE CONTRACTOR OF PROVIDING ADDITIONAL REQUIRED STEEL SUPPORT FOR THE ELEVATOR.
C. FINAL REACTIONS FROM THE ELEVATORS SHALL BE PROVIDED TO THE ENGINEER PRIOR TO CONSTRUCTION OF THE ELEVATOR PIT TO CONFIRM THE STRUCTURE HAS SUFFICIENT CAPACITY TO SUPPORT THE ELEVATOR LOADS.
D. HOIST BEAM MUST BE POSITIONED SUCH THAT THE ENDS OF HOIST BEAM ARE DIRECTLY ABOVE THE GUIDE RAILS.
E. REFER TO ELEVATOR MFR SHOP DRAWINGS FOR REQUIRED LOCATION OF SUMP PIT.
F. PLACE WATERSTOPS IN ALL VERTICAL AND HORIZONTAL CONSTRUCTION JOINTS BELOW GRADE. WATERSTOPS SHALL BE STRIP APPLIED EXPANDING WATERSTOPS: SIKA GREENSTREAK SWELLSTOP OR HENRY SYNKO-FLEX.

REINFORCEMENT AND MISC STEEL

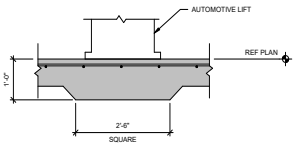
A. UNLESS OTHERWISE NOTED, CONCRETE COVER OVER STEEL REINFORCEMENT SHALL CONFORM TO THE MINIMUMS REQUIRED BY THE AFOREMENTIONED EDITION OF ACI 318.
B. REINFORCEMENT DETAILING AND PLACEMENT SHALL CONFORM TO ACI 318 AND ACI 315, EXCEPT WHERE OTHERWISE INDICATED.
C. SUBSTITUTION OF EXPANSION ANCHORS FOR EMBEDDED ANCHORS SHOWN ON THE DRAWINGS WILL NOT BE PERMITTED.
D. ALL REINFORCING STEEL, ANCHOR BOLTS, AND EMBEDDED ANCHORS SHALL BE SECURELY SET IN PLACE PRIOR TO PLACEMENT OF CONCRETE.

PRE-ENGINEERED BUILDING

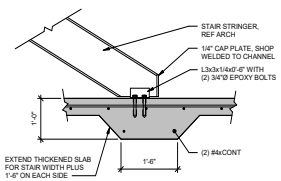
A. THE BUILDING SHALL BE A MANUFACTURER'S STANDARD PREFABRICATED METAL STRUCTURE OF THE APPROXIMATE INSIDE AREA SHOWN, EXCEPT AS NOTED. RIGID FRAMES SHALL BE SPACED AS SHOWN ON THE DRAWINGS, BUT OVERALL DIMENSIONS AND CONSTRUCTION DETAILS MAY VARY TO SUIT MANUFACTURER'S STANDARD DESIGN. HOWEVER, MINIMUM WEB THICKNESS OF RIGID FRAMES SHALL BE 3/16 INCH. DRIFT LIMITS SHOULD BE IN ACCORDANCE WITH AISC DESIGN GUIDE 3 - SERVICEABILITY DESIGN CONSIDERATIONS FOR STEEL BUILDINGS.
B. THE BUILDING SHALL BE DESIGNED AND FABRICATED ACCORDING TO AISC, MBMA, AND AISI LATEST SPECIFICATIONS. THE DIMENSIONAL TOLERANCES APPLICABLE TO ROLL FORM STEEL UNDER THE AISC "STANDARD MILL PRACTICE" SECTION SHALL BE REQUIRED IN THE FABRICATION OF THE STEEL BUILDING FRAMES.
C. A COMPLETE DESIGN ANALYSIS SHOWING ALL CALCULATIONS FOR THE RIGID FRAMES, PORTAL FRAMES, GIRTS, PURLINS, AND X-BRACING FOR WIND AND SEISMIC LOADS AND A LAYOUT OF ANCHOR BOLTS AND OTHER EMBEDDED ITEMS SHALL BE SUBMITTED FOR APPROVAL WITH THE SHOP DRAWINGS. SHOP DRAWINGS SHALL INCLUDE DETAILS OF MAIN MEMBERS, TYPICAL CONNECTIONS (SHOWING BOLT HOLES AND WELDS), AND ERECTION DRAWINGS.
D. THE BUILDING SHALL BE DESIGNED TO SUPPORT ALL MECHANICAL EQUIPMENT INCLUDING HEATERS, SPRINKLERS, EXHAUST SYSTEMS, AND ALL OTHER SUCH DEVICES. ADDITIONAL GIRTS OR PURLINS SHALL BE PLACED IN CONVENIENT LOCATIONS FOR ATTACHMENT OF ALL MECHANICAL EQUIPMENT.
E. WIND LOAD REDUCTIONS ARE NOT PERMITTED



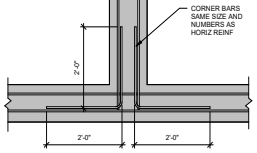
E1 TYPICAL HSS COLUMN BASE
3/4" = 1'-0"



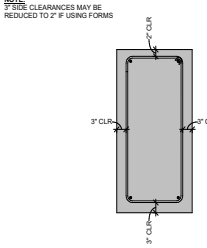
E2 THICKENED SLAB AT AUTOMOTIVE LIFT
3/4" = 1'-0"



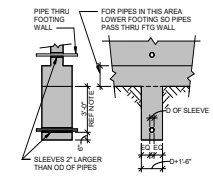
E3 STAIR STRINGER TO SLAB ON GRADE
3/4" = 1'-0"



E4 TYPICAL INTERSECTION BAR
NTS

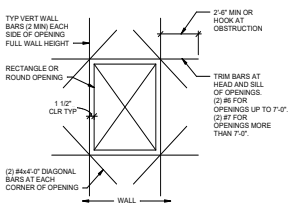


E5 TYPICAL CONT FOOTING COVER
NTS

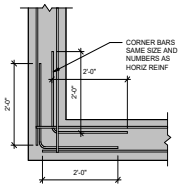


NOTE:
FOR PIPES 3 FOOT OR LESS BELOW FOOTING, PROVIDE SLEEVE AND CONCRETE AS SHOWN; MORE THAN 3 FOOT COMPACT FILL OVER PIPE TO 95 PERCENT AS APPROVED BY SOILS ENGINEER, OR USE STEPPED FOOTING BELOW PIPE.

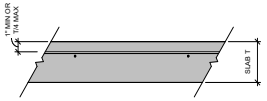
E6 EXCAVATIONS
NTS



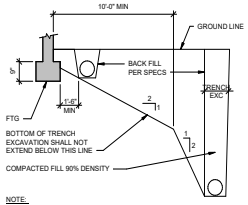
D3 TYPICAL MINIMUM REINFORCING AT CONCRETE WALL OPENINGS
3/4" = 1'-0"



D4 TYPICAL CORNER BAR
NTS



D5 TYPICAL REBAR PLACEMENT
NTS



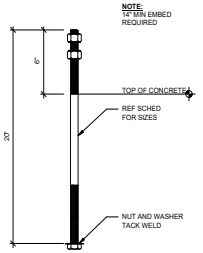
NOTE:
THE CONTRACTOR SHALL BE RESPONSIBLE FOR SHORING, SHEATHING OR OTHERWISE MAINTAINING THE SIDES OF THE EXCAVATION FROM CAVE-INS UNTIL ALL BACK FILL IS COMPLETED PER SPECIFICATIONS.

D6 EXCAVATIONS
NTS

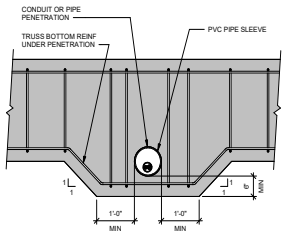
LENGTH OF LAPPED SPLICES FOR REINF (IN)

f'c (PSI)	BEAMS AND COLUMNS			WALLS AND SLABS		
	BAR SIZE	** TOP BARS	OTHERS	** TOP BARS	OTHERS	BAR SIZE
3000	3	28	22	42	33	3
	4	38	29	56	43	4
	5	47	36	70	54	5
	6	56	43	84	65	6
	7	81	63	122	94	7
	8	93	72	139	107	8
	9	105	81	157	121	9
	10	116	90	174	134	10
	11	128	98	191	147	11
4000	3	25	19	37	28	3
	4	33	25	49	37	4
	5	41	31	61	47	5
	6	49	37	73	56	6
	7	71	54	106	81	7
	8	81	62	121	93	8
	9	91	70	136	105	9
	10	101	78	151	116	10
	11	111	85	166	128	11

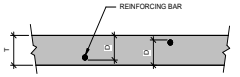
* USE THIS SCHEDULE UNLESS NOTED OTHERWISE ON THE DRAWINGS
** TOP BARS ARE HORIZONTAL BARS SO PLACED THAT MORE THAN 12" OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR. HORIZONTAL BARS IN WALLS ARE TO BE PROVIDED WITH LAP LENGTHS AS REQUIRED FOR TOP BARS. VERTICAL BARS MAY BE CONSIDERED AS OTHER BARS



C3 TYPICAL ANCHOR ROD
NTS



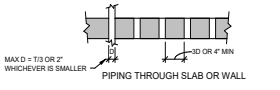
C4 TYPICAL PIPE PENETRATION
NTS



UNLESS OTHERWISE NOTED, REINFORCING SHALL BE PLACED AS SHOWN ON THE DRAWINGS WITHIN THE FOLLOWING TOLERANCE:

DEPTH, D, IN SLABS , JOISTS, BEAMS, WALLS, COLUMNS AND SIMILAR ELEMENTS WHERE D IS 24" OR LESS ..... ±1/4"
WHERE D IS MORE THAN 24" ..... ±1/2"
LONGITUDINAL LOCATION OF BENDS AND ENDS OF BARS ..... ±2"
EXCEPT THAT SPECIFIED CONCRETE COVER AT ENDS OF MEMBERS SHALL NOT BE REDUCED.
FABRICATED DIMENSIONS OF TIES, STIRRUPS AND SPIRALS ... 0"-1/4"
OFFSET DIMENSIONS IN BENT BARS ..... 0"-1/2"
DIMENSION FROM FACE OF SUPPORT TO LOCATION OF A TIE OR STIRRUP ..... ±1"

C5 TOLERANCES FOR PLACING AND FABRICATION OF REINFORCING BARS
NTS



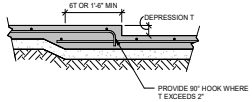
NOTE:
WHERE CLEAR DISTANCE BETWEEN SLEEVES IS IMPOSSIBLE, THIS AREA SHALL BE TREATED AS A SLAB OPENING PER TYPICAL DETAIL "OPENING IN SLAB ON GRADE".

C6 PIPING AND CONDUIT IN OR THROUGH SLAB OR WALL
NTS

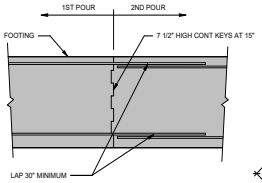
CONCRETE COVER FOR REINF

LOCATION	MIN COVER
UNFORMED SURFACE ADJACENT TO EXCAVATION	3"
SURFACES INSIDE OF OZONE CONTACTORS EXPOSED TO OZONE IN WATER OR AIR	3"
FORMED OR TOP SURFACES EXPOSED TO WEATHER OR SATURATED AIR, SUBMERGED OR IN CONTACT WITH EARTH, INCLUDING STIRRUPS, TIES OR SPIRALS	2"
OTHER LOCATIONS:	
BARS IN BEAMS OR GIRDERS, INCLUDING STIRRUPS AND COLUMN SPIRALS OR TIES	1 1/2"
SLABS, WALLS AND JOISTS	
#6 AND LARGER	1 1/2"
#5 AND SMALLER	1"

NOTE:
TOLERANCES FOR CONCRETE COVER AND THE FABRICATION AND PLACEMENT OF REINFORCEMENT SHALL CONFORM TO ACI 117.

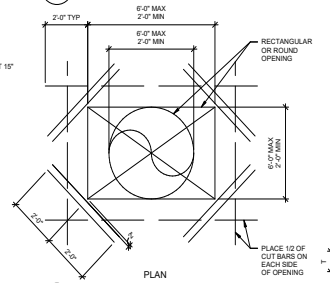


B3 DEPRESSED SLAB
NTS



NOTE:
WELDED SPLICES REQUIRED FOR #14 AND LARGER BARS WHERE CONT FOOTING IS UNDER A WALL. LOCATE CONSTRUCTION JOINT AT 1/4 OF THE CLEAR OPENING WIDTH ABOVE FROM FACE OF OPENING, OR IN MIDDLE 1/3 OF THE DISTANCE BETWEEN COLUMNS.

B4 CONTINUOUS FOOTING CONSTRUCTION JOINT
NTS

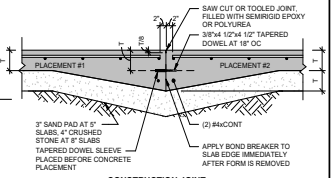


PLAN

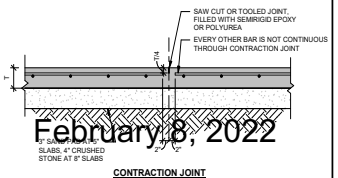
B5 OPENING IN SLAB-ON-GROUND
NTS

SLAB JOINT NOTES:

1. DOWELS SHOULD BE SMOOTH, ALIGNED, AND SUPPORTED SO THEY REMAIN PARALLEL IN BOTH THE HORIZONTAL AND VERTICAL PLANES DURING THE PLACING AND FINISHING OPERATION.
2. DOWELS SHOULD HAVE FLAT, SQUARE, AND DEBURRED END EDGES THAT WILL NOT RESTRAIN CONCRETE SHRINKAGE.
3. TAPERED DOWELS SHOULD HAVE A THIN BOND BREAKER ON THE TOP AND BOTTOM SURFACES. CYLINDRICAL DOWELS SHOULD HAVE A THIN BOND BREAKER ALONG THEIR ENTIRE LENGTH.
4. CYLINDRICAL DOWELS SHOULD NOT BE PLACED WITHIN 6 INCHES OF EITHER A CONTRCACTION JOINT OR CONSTRUCTION JOINT INTERSECTION.
5. JOINTS SHOULD BE FILLED WITH A SEMIRIGID EPOXY OR POLYUREA DRYING 100% SOLID WITH A MINIMUM SHORE A HARDNESS OF 90 WHEN MEASURED IN ACCORDANCE WITH ASTM D2240.
6. IN ORDER TO ALLOW MUCH OF THE CONCRETE SHRINKAGE TO OCCUR BEFORE JOINT FILLING, THE CONTRACTOR SHOULD WAIT TO FILL JOINTS UNTIL THE HVAC SYSTEM HAS BEEN IN OPERATION FOR TWO WEEKS.
7. JOINT FILLER SHOULD BE INSTALLED FULL SAWCUT DEPTH TO BOTTOM OF SAWCUT. JOINTS SHOULD BE VACUUMED CLEAN PRIOR TO FILLING TO PROVIDE OPTIMUM CONTACT BETWEEN THE FILLER AND THE BARE CONCRETE.
8. CURED EPOXY AND POLYUREA FILLERS SHOULD BE FLUSH WITH THE FLOOR TO PROTECT THE JOINT EDGES AND RECREATE AN INTERRUPTION-FREE FLOOR SURFACE.

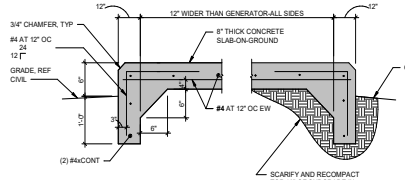


CONSTRUCTION JOINT



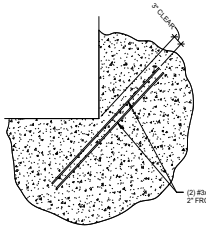
CONTRACTION JOINT

A6 CONSTRUCTION & CONTRACTION JOINTS
3/4" = 1'-0"



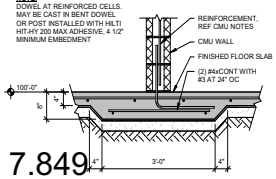
NOTES:
1. CONCRETE SHALL BE 3000 PSI AT 28 DAYS.
2. HORIZONTAL SURFACES SHALL BE TAMPED AND SCREEDED TO A TRUE SURFACE AND STEEL TROWLED TO A HARD SLATE-LIKE FINISH. THE TOP OF THE PAD SHALL BE SMOOTH AND FLAT (NO SAWCUT OR TOOLED JOINTS).
3. ALL VERTICAL SURFACES SHALL HAVE A RUBBED FINISH.
4. ALL EXPOSED EDGES SHALL BE CHAMFERED 3/4".
5. WHERE THE PAD IS TO BE LOCATED ADJACENT TO ANOTHER STRUCTURE, PROVIDE 1/2" THICK PREMOLDED EXPANSION JOINT FILLER BETWEEN THE TWO SURFACES.
6. ALL ORGANIC MATERIALS SHALL BE REMOVED UNDER THE CONCRETE PAD.
7. CONCRETE SLAB WIDTH SHALL BE ADJUSTED TO ACTUAL GENERATOR INSTALLED.

A2 ELECTRICAL GENERATOR CONCRETE PAD
NTS

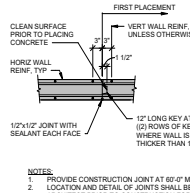


* ALSO USE AT COLUMN LEAVE OUTS

A3 DETAIL AT RE-ENTRANT CORNER
NTS



A4 TYPICAL INTERIOR CMU PARTITION WALL
NTS



NOTES:
1. PROVIDE CONSTRUCTION JOINT AT 60'-0" MAX.
2. LOCATION AND DETAIL OF JOINTS SHALL BE APPROVED BY ARCHITECT PRIOR TO CONSTRUCTION FORMS OR PLACING CONCRETE.

A5 WALL VERTICAL CONSTRUCTION JOINTS
3/4" = 1'-0"

PACKET 7.849 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

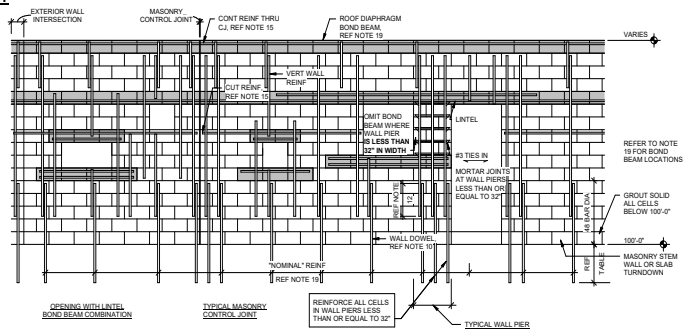
Typical Foundation Details

S-002

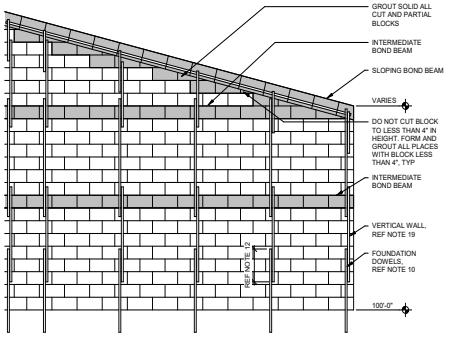
1/25/2022 7:24:01 PM

REINFORCED HOLLOW CONCRETE MASONRY

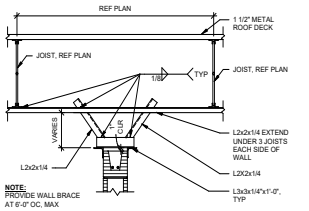
1. CMU CONSTRUCTION SHALL CONFORM TO TMS 402, "BUILDING CODE REQUIREMENTS FOR MASONRY STRUCTURES," AND TO TMS 602-16, "SPECIFICATION FOR MASONRY STRUCTURES."
2. ALL CMU SHALL BE 2-CELL, NORMAL WEIGHT BLOCK CONFORMING TO ASTM C 90, AND SHALL HAVE A SPECIFIED COMPRESSIVE STRENGTH OF 1,900 POUNDS PER SQUARE INCH ON THE NET AREA AT 28 DAYS (f'm = 1,500 POUNDS PER SQUARE INCH).
3. PROVIDE TYPE S MORTAR FOR LOAD-BEARING WALLS. MINIMUM MORTAR COMPRESSIVE STRENGTH SHALL BE 1,800 POUNDS PER SQUARE INCH AT 28 DAYS.
4. CELLS WHICH CONTAIN REINFORCING STEEL SHALL BE FILLED SOLIDLY WITH FINE GROUT CONFORMING TO ASTM C 476. MINIMUM GROUT COMPRESSIVE STRENGTH SHALL BE 2,000 POUNDS PER SQUARE INCH. GROUTED LOCATIONS SHALL INCLUDE BOND BEAMS, LINTELS, PILASTERS, AND VERTICAL REINFORCING LOCATIONS.
5. VERTICAL CELLS TO BE FILLED SHALL HAVE VERTICAL ALIGNMENT SUFFICIENT TO MAINTAIN A CLEAR UNOBSTRUCTED CONTINUOUS VERTICAL CELL NOT LESS THAN 2 INCH x 3 INCH IN PLAN DIMENSIONS.
6. GROUT POURS SHALL NOT EXCEED 5 FOOT IN HEIGHT, UNLESS CLEANOUTS ARE PROVIDED IN THE BOTTOM OF THE GROUT SPACES.
7. BETWEEN GROUT POURS, A HORIZONTAL CONSTRUCTION JOINT SHALL BE FORMED BY STOPPING ALL WYTHES AT THE SAME ELEVATION AND WITH THE GROUT STOPPING A MINIMUM OF 1 1/2 INCHES BELOW THE TOP OF THE MASONRY.
8. VERTICAL WALL REINFORCING SHALL EXTEND CONTINUOUSLY FROM THE TOP OF FOUNDATION TO EXTEND AT LEAST 6 INCHES INTO ROOF DIAPHRAGM BOND BEAM OR PARAPET BOND BEAM.
9. PROVIDE BAR POSITIONERS AT A MAXIMUM DISTANCE OF 4 FOOT ALONG VERTICAL REINFORCING.
10. FOUNDATION AND WALL DOWELS SHALL EXTEND A MINIMUM OF 30 DIAMETERS INTO THE FOUNDATION OR UNDERLYING SUPPORT AND 48 DIAMETERS INTO THE MASONRY WALL. PARTITION, OR PILASTER. THERE SHALL BE FOUNDATION OR WALL DOWEL OF THE SAME SIZE AS EACH VERTICAL REINFORCING BAR, EXCEPT AS NOTES FOR JAMB BARS IN NOTE 17. PROVIDE 90 DEGREE STANDARD HOOK WHERE SUFFICIENT EMBED DEPTH IS NOT AVAILABLE.
11. AN ADDITIONAL VERTICAL BAR WITH FOUNDATION DOWEL, SAME SIZE AS THE NORMAL REINFORCING BAR, SHALL BE PLACED:
    A. ON EACH SIDE OF MASONRY CONTROL JOINTS.
    B. AT CORNERS AND INTERSECTIONS OF EXTERIOR WALLS.
    C. AT INTERSECTION OF INTERIOR WALLS WITH EXTERIOR WALLS.
12. LAP SPLICES OF REINFORCING STEEL IN MASONRY WALLS SHALL BE OF THE LENGTH INDICATED IN THE TABLE, "CMU REINFORCING STEEL DEVELOPMENT AND LAP LENGTH". MECHANICAL SPLICES MAY BE PERMITTED, SUBJECT TO APPROVAL BY ENGINEER.
13. ALL INTERIOR WALLS SHALL HAVE INTERMEDIATE BOND BEAMS LOCATED AT THE SAME LEVELS AS THE EXTERIOR WALL BOND BEAMS.
14. WHERE KNOCKOUT BLOCKS ARE USED FOR BOND BEAMS OR GROUTED COURSES, PROVIDE A CONTINUOUS GROUT SCREEN UNDER THE KNOCKOUT BLOCKS. DISCONTINUE THE GROUT SCREEN AT VERTICALLY REINFORCED CELLS.
15. BOND BEAM REINFORCING FOR INTERIOR AND EXTERIOR WALLS SHALL BE CONTINUOUS THROUGHOUT, EXCEPT AT MASONRY CONTROL AND ISOLATION JOINTS:
    A. AT MASONRY CONTROL JOINTS INTERMEDIATE BOND BEAM REINFORCING SHALL BE DISCONTINUOUS. REINFORCEMENT IN BOND BEAMS AT ROOF AND FLOOR DIAPHRAGM LEVELS SHALL BE CONTINUOUS.
    B. AT ISOLATION JOINTS ALL BOND BEAM REINFORCING STEEL SHALL BE DISCONTINUOUS.
16. LOCATION AND DETAILS OF MASONRY CONTROL JOINTS AND ISOLATION WALL JOINTS SHALL BE AS INDICATED HEREIN. IF MASONRY CONTROL JOINTS ARE NOT SPECIFICALLY LOCATED ON THESE DRAWINGS, LOCATE JOINTS AT A MAXIMUM SPACING OF 25 FOOT IN NO CASE SHALL A MASONRY CONTROL JOINT BE LOCATED WITHIN 24 INCHES OF A WALL OPENING.
17. BARS AROUND PERIMETER OF OPENINGS - EXCEPT FOR LINTEL BARS - SHALL EXTEND NOT LESS THAN (48) BAR DIAMETERS OR 24 INCHES, WHICHEVER IS GREATER, BEYOND CORNER OF OPENING. VERTICAL JAMB BARS WILL BE OF THE SAME SIZE AS NORMAL VERTICAL REINFORCING. WALL DOWELS ARE ONLY REQUIRED WHEN BAR DEVELOPMENT LENGTH (48) BAR DIAMETERS OR 24 INCHES DOES NOT EXIST BELOW THE OPENING.
18. LINTEL BARS SHALL EXTEND BEYOND CORNER OF OPENINGS A MINIMUM DISTANCE OF 16 AS INDICATED IN THE TABLE, "CMU REINFORCING STEEL DEVELOPMENT AND LAP LENGTH". ALTERNATELY, A STANDARD 90 DEGREE HOOK OR MECHANICAL ANCHOR MAY BE PROVIDED AT EACH END OF EACH LINTEL BAR, AND THE BAR SHALL EXTEND A MINIMUM OF 24 INCHES BEYOND THE CORNER OF THE OPENING.
19. EXCEPT AS AND WHERE SPECIFICALLY NOTED OR INDICATED ON THE DRAWINGS, HORIZONTAL AND VERTICAL REINFORCING SHALL BE AS FOLLOWS:
    VERTICAL REINFORCING - #5 BARS AT 32 INCH CENTERS
    HORIZONTAL REINFORCING - REINFORCED BOND BEAM AT 7'-4", AND AT 6'-0" MAXIMUM VERTICAL SPACING THEREAFTER UNO
    - LADDER JOINT REINFORCING AT 16 INCHES VERTICAL SPACING
    BOND BEAM REINFORCING - (1) #5xCONT FOR 8 INCH WALLS



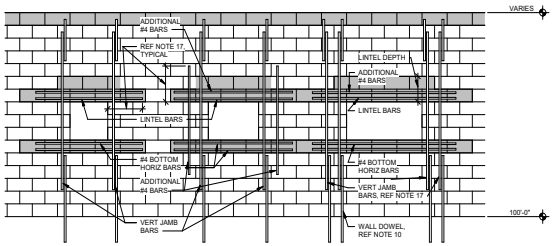
E2 TYPICAL WALL REINFORCING
NTS



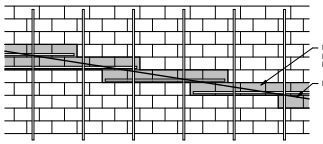
E4 TYPICAL SLOPED WALL
NTS



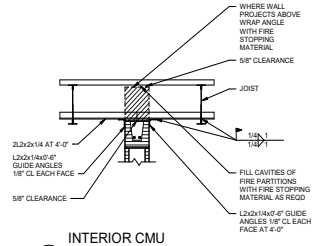
E6 SECTION AT INTERIOR WALL-TYPICAL
NTS



D2 REINFORCEMENT AROUND WALL OPENINGS
NTS



D4 TYPICAL WALL WITH STEPPED BOND BEAM
NTS



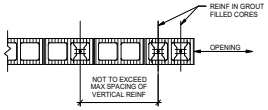
INTERIOR CMU PARTITION AT STEEL JOIST
D6 NTS

CMU REINFORCING STEEL DEVELOPMENT AND LAP LENGTH		
	BAR SIZE	DEVELOPMENT/LAP LENGTH (ld), INCHES
VERTICAL AND BOND BEAM REINFORCING	4	24
	5	30
	6	36
	7	42
	8	48
	9	54

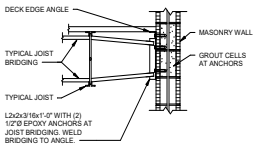
NOTE:
1. THIS TABLE SHALL BE APPLIED ONLY TO REINFORCING STEEL IN GROUTED CMU.
2. MAINTAIN BARS IN CORRECT POSITION RELATIVE TO THE DEPTH OF THE MEMBER.

CONCRETE REINFORCING STEEL DEVELOPMENT LENGTH AT CMU WALLS	
BAR SIZE	DEVELOPMENT/LAP LENGTH (ld), INCHES
4	22
5	28
6	33
7	39
8	44
9	50

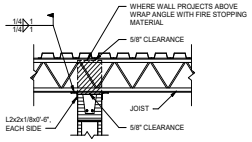
NOTE:
1. THIS TABLE SHALL BE APPLIED TO REINFORCING STEEL EMBEDED IN NORMAL WEIGHT CONCRETE AS DOWELS FOR CMU WALLS.
2. PROVIDE STANDARD HOOKS AS NECESSARY TO FIT BARS IN FOUNDATIONS.



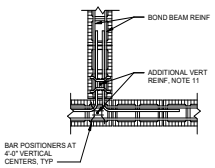
C4 TYPICAL MASONRY JAMB PLAN
NTS



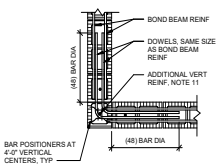
C5 TYPICAL JOIST BRIDGING ANCHORAGE AT MASONRY WALL
NTS



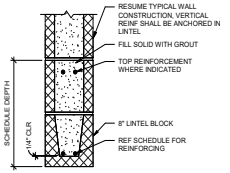
C6 INTERIOR CMU PARTITION AT STEEL JOIST
NTS



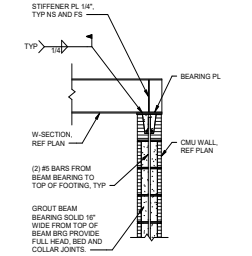
B3 BOND BEAM INTERSECTION DETAIL
NTS



B4 BOND BEAM CORNER DETAILS
NTS



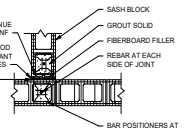
B5 TYPICAL CMU LINTEL
NTS



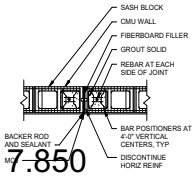
B6 BEAM BEARING DETAIL (TYP)
NTS

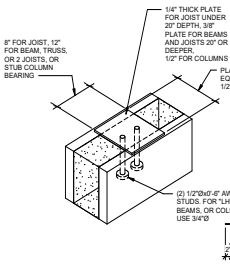
UNSCHEDULED MASONRY LINTEL TABLE				
CLEAR OPENING	4" CMU/FACE BRICK	6" CMU	8" CMU	12" CMU
UP TO 4'-0"	L3 1/2x3 1/2x1/4	8" DEEP LINTEL WITH (1) #4	8" DEEP LINTEL WITH (2) #4	8" DEEP LINTEL WITH (2) #4
UP TO 6'-0"	L3 1/2x3 1/2x1/4	8" DEEP LINTEL WITH (1) #4	8" DEEP LINTEL WITH (2) #4	8" DEEP LINTEL WITH (2) #4
UP TO 8'-0"	L4x3 1/2x5/16	#4 AT 24" 16" DEEP LINTEL WITH (1) #4	#4 AT 24" 16" DEEP LINTEL WITH (2) #4	#4 AT 24" 16" DEEP LINTEL WITH (2) #4
UP TO 10'-0"	L6x3 1/2x5/16	#4 AT 24" 16" DEEP LINTEL WITH (1) #4	#4 AT 24" 16" DEEP LINTEL WITH (2) #4	#4 AT 24" 16" DEEP LINTEL WITH (2) #4
UP TO 12'-0"	L6x3 1/2x5/16	—	#4 AT 24" 16" DEEP LINTEL WITH (2) #4	#4 AT 24" 16" DEEP LINTEL WITH (2) #6

NOTE:
1. PROVIDE AT LEAST 8" OF BEARING AT EACH END OF OPENING
2. FOR UNSCHEDULED OPENINGS GREATER THAN 12'-0", CONSULT THE STRUCTURAL ENGINEER
3. PROVIDE 180° HOOKS AT EACH END OF LINTEL VERTICAL BARS.
4. MASONRY CONTROL JOINTS FOR MASONRY WALLS OR MASONRY VENEER SHALL NOT BE LOCATED WITHIN 24" OF END OF LINTELS.

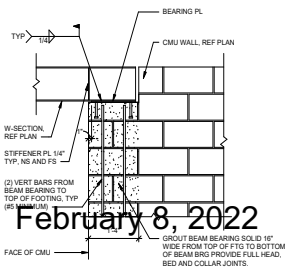


A3 CMU CONTROL JOINT (MCJ) DETAILS
NTS





A5 TYPICAL BEARING PLATE
NTS



A6 BEAM BEARING DETAIL (TYP)
NTS

PACKET 7.850 February 8, 2022

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6077.21

KEY PLAN

#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

Typical Masonry Details

S-003

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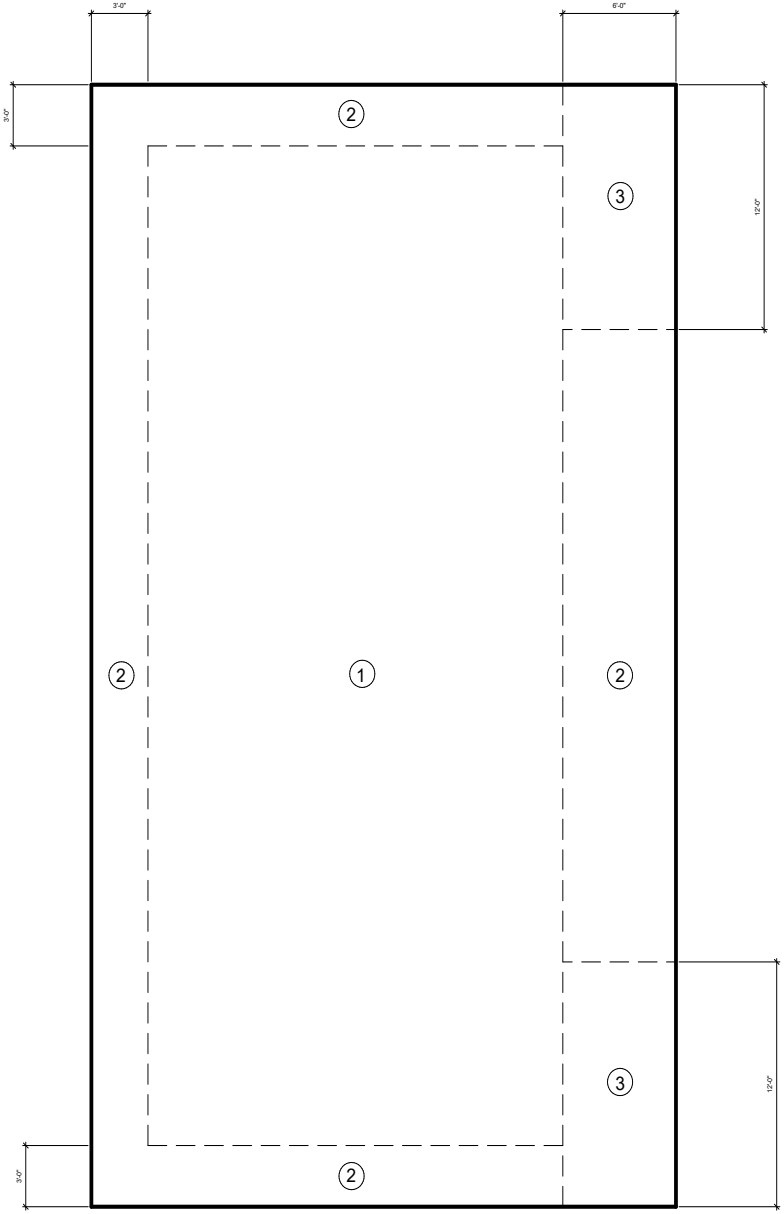
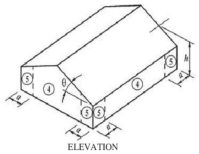


A1 CMU BUILDING, C&C WIND PRESSURE PLAN
3/8" = 1'-0"

PLAN NORTH



C&C - LRFD WALL WIND PRESSURES (PSF)

HEIGHT	MARK	EFFECTIVE WIND AREA (SQ FT)						
		10	20	50	100	200	500	1000
15 FT	4	-28, +25	-27, +23	-25, +22	-23, +21	-22, +20	-21, +19	-21, +19
15 FT	5	-34, +25	-32, +23	-29, +22	-28, +21	-23, +20	-21, +19	-21, +19
20 FT	4	-29, +27	-28, +25	-27, +24	-25, +22	-24, +21	-22, +20	-22, +20
20 FT	5	-36, +27	-34, +25	-30, +24	-29, +22	-25, +21	-22, +20	-22, +20

NOTE:
a = 3 FT
h = 18.5 FT
θ = 14°

C&C POSITIVE - LRFD ROOF WIND PRESSURES (PSF)

MARK	EFFECTIVE WIND AREA (SQ FT)						
	10	20	50	100	200	500	1000
ALL	14	14	13	12	12	12	12

C&C NET UPLIFT - LRFD ROOF WIND PRESSURES (PSF)

MARK	EFFECTIVE WIND AREA (SQ FT)						
	10	20	50	100	200	500	1000
1	-27	-25	-23	-22	-22	-22	-22
2	-34	-31	-28	-24	-24	-24	-24
3	-66	-60	-51	-44	-44	-44	-44

NOTE:
NET UPLIFT PRESSURES WERE CALCULATED BY ADDING 10 PSF (ESTIMATED ROOF DEAD LOAD) TO THE GROSS UPLIFT C&C ROOF PRESSURES

PACKET 7.851 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

Wind Pressure Plan

S-004

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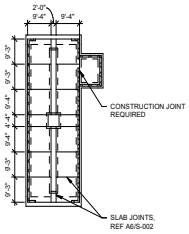

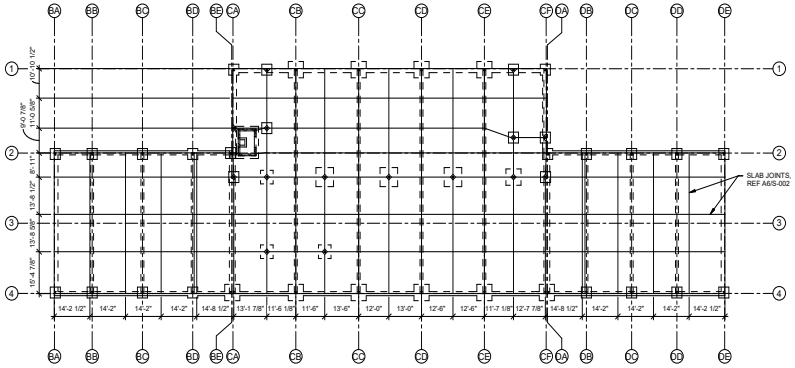

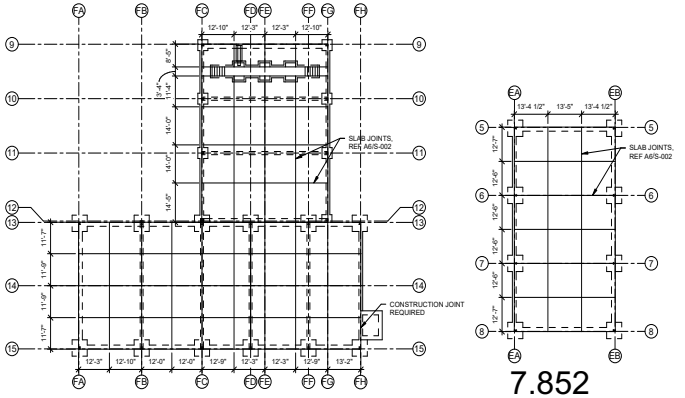

PACKET

7.852

February 8, 2022

PLAN NORTH

A1 SLAB JOINT LOCATIONS
1" = 20'-0"

1/25/2022 7:24:05 PM

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401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

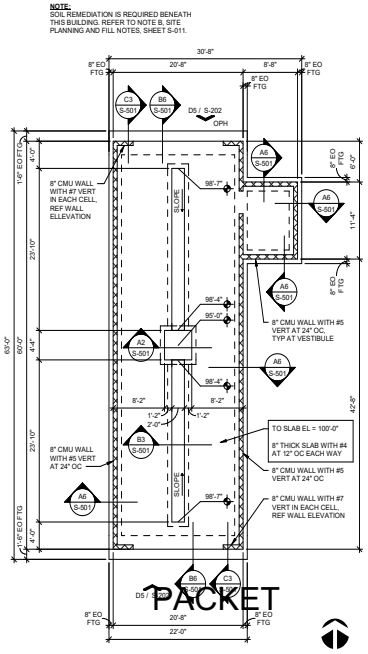
Foundation Plan - Overall

S-111

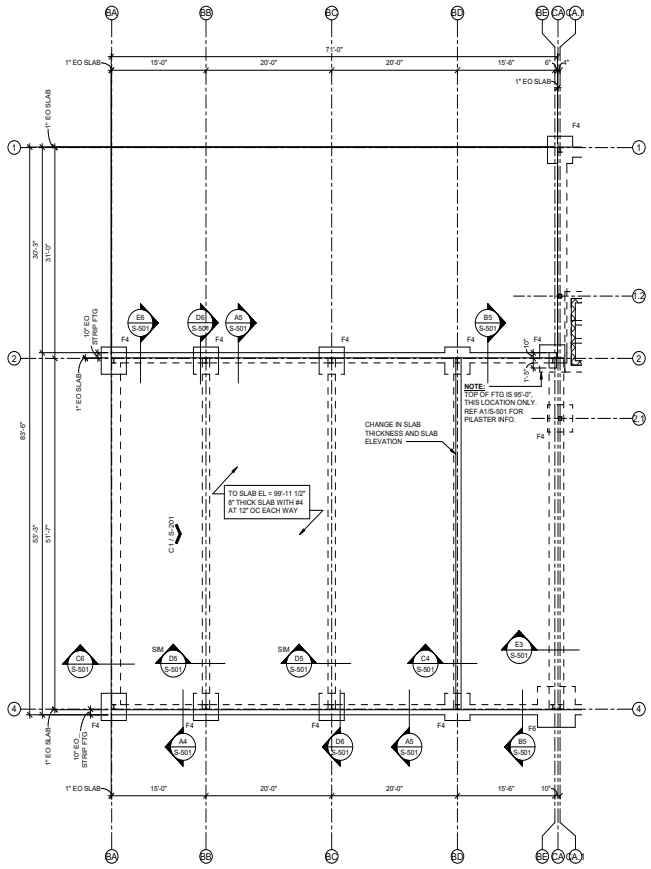
FOOTING SCHEDULE		
MARK	SIZE	REINFORCING
F4	4'-0" x 4'-0" x 2'-4"	(4) #5 TOP AND BOT, EA WAY
F5	5'-0" x 5'-0" x 2'-4"	(5) #5 TOP AND BOT, EA WAY
F6	6'-0" x 6'-0" x 2'-4"	(6) #5 TOP AND BOT, EA WAY
F7	7'-0" x 7'-0" x 2'-4"	(7) #5 TOP AND BOT, EA WAY

GENERAL FOUNDATION NOTES

1. REFER TO S-001 AND S-002 FOR GENERAL NOTES AND TYPICAL FOUNDATION DETAILS NOT NOTED ON PLAN.
2. TOP OF SLAB ELEVATION = 100'-0" UNLESS NOTED OWTHERWISE. REFER TO CIVIL DRAWINGS FOR ACTUAL ELEVATION.
3. REFERENCE METAL BUILDING MANUFACTURER FOR ALL COLUMNS, BASE PLATES, AND STEEL PANEL INFORMATION.
4. VERIFY FOOTING LOCATIONS WITH METAL BUILDING MANUFACTURER.
5. COLUMNS SHOULD BE CENTERED ON FOOTINGS.
6. REFER TO THE PLAN FOR SLAB THICKNESS AND REINFORCING REQUIREMENTS. REINFORCEMENT BARS ARE TO BE PLACED IN THE UPPER 1/3 OF THE SLAB.
7. GC TO COORDINATE LOCATION OF THICKENED SLAB BENEATH VEHICLE LIFT POSTS AS SHOWN IN DETAIL E2/S-002.
8. REFER TO OVERALL FOUNDATION PLAN FOR SLAB JOINT LOCATIONS.
9. REFER TO A6/S-002 FOR CONTRACTION JOINT AND CONSTRUCTION JOINT DETAILS.
10. REFER TO THE ARCHITECTURAL DRAWINGS FOR OVERHEAD DOOR DIMENSIONS.



A1 FOUNDATION PLAN - AREA A
1/8" = 1'-0"



A3 FOUNDATION PLAN - AREA B
1/8" = 1'-0"

PACKET
7.853
February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

Foundation Plans - Areas A And B

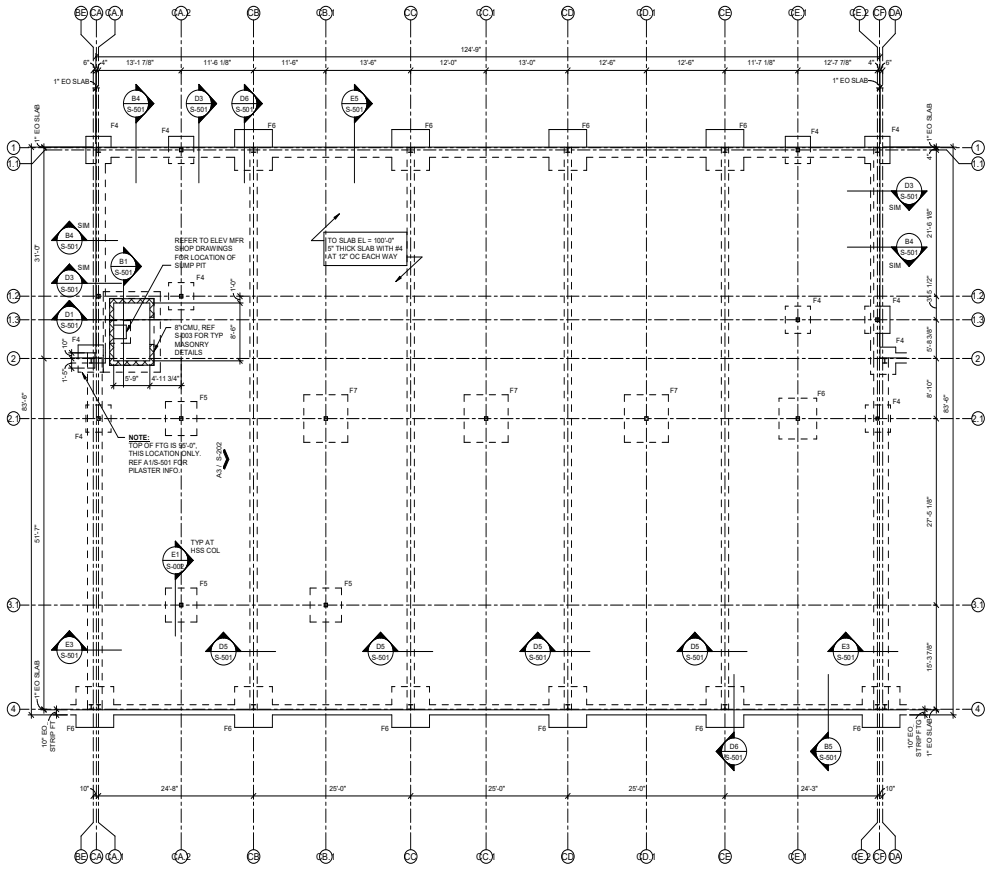
S-111A

1/26/2022 7:24:07 PM

FOOTING SCHEDULE		
MARK	SIZE	REINFORCING
F4	4'-0" x 4'-0" x 2'-4"	(4) #5 TOP AND BOT, EA WAY
F5	5'-0" x 5'-0" x 2'-4"	(5) #5 TOP AND BOT, EA WAY
F6	6'-0" x 6'-0" x 2'-4"	(6) #5 TOP AND BOT, EA WAY
F7	7'-0" x 7'-0" x 2'-4"	(7) #5 TOP AND BOT, EA WAY

GENERAL FOUNDATION NOTES

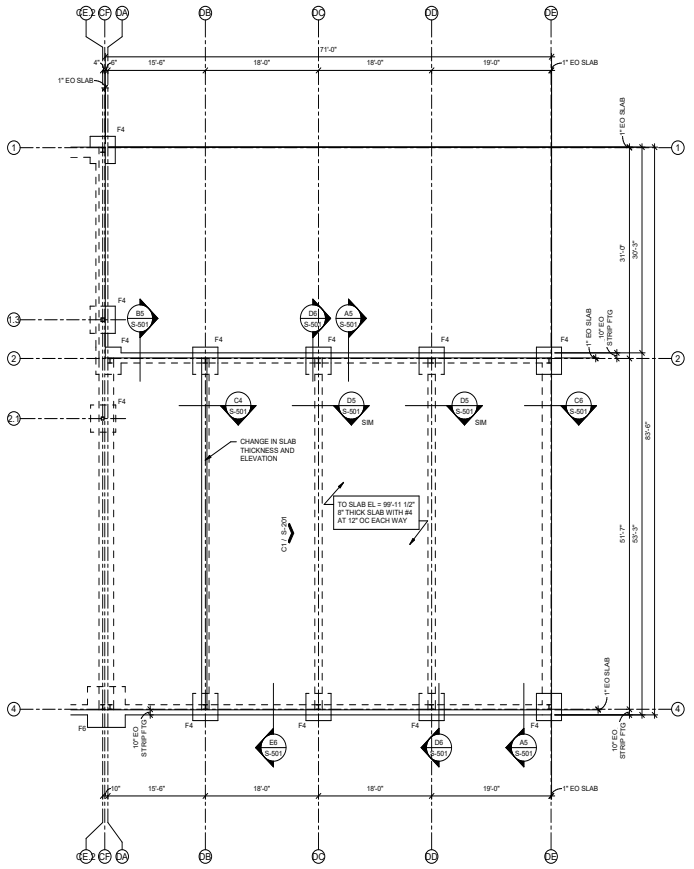
1. REFER TO S-001 AND S-002 FOR GENERAL NOTES AND TYPICAL FOUNDATION DETAILS NOT NOTED ON PLAN.
2. TOP OF SLAB ELEVATION = 100'-0" UNLESS NOTED OWTHERWISE. REFER TO CIVIL DRAWINGS FOR ACTUAL ELEVATION.
3. REFERENCE METAL BUILDING MANUFACTURER FOR ALL COLUMNS, BASE PLATES, AND STEEL PANEL INFORMATION.
4. VERIFY FOOTING LOCATIONS WITH METAL BUILDING MANUFACTURER.
5. COLUMNS SHOULD BE CENTERED ON FOOTINGS.
6. REFER TO THE PLAN FOR SLAB THICKNESS AND REINFORCING REQUIREMENTS. REINFORCEMENT BARS ARE TO BE PLACED IN THE UPPER 1/3 OF THE SLAB.
7. GC TO COORDINATE LOCATION OF THICKENED SLAB BENEATH VEHICLE LIFT POSTS AS SHOWN IN DETAIL E2/S-002.
8. REFER TO OVERALL FOUNDATION PLAN FOR SLAB JOINT LOCATIONS.
9. REFER TO A6/S-002 FOR CONTRACTION JOINT AND CONSTRUCTION JOINT DETAILS.
10. REFER TO THE ARCHITECTURAL DRAWINGS FOR OVERHEAD DOOR DIMENSIONS.



PACKET 7.854

A1 FOUNDATION PLAN - AREA C
1/8" = 1'-0"

PLAN NORTH



February 8, 2022

A5 FOUNDATION PLAN - AREA D
1/8" = 1'-0"

PLAN NORTH

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PROJECT NO.
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KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

Foundation Plan - Areas C And D

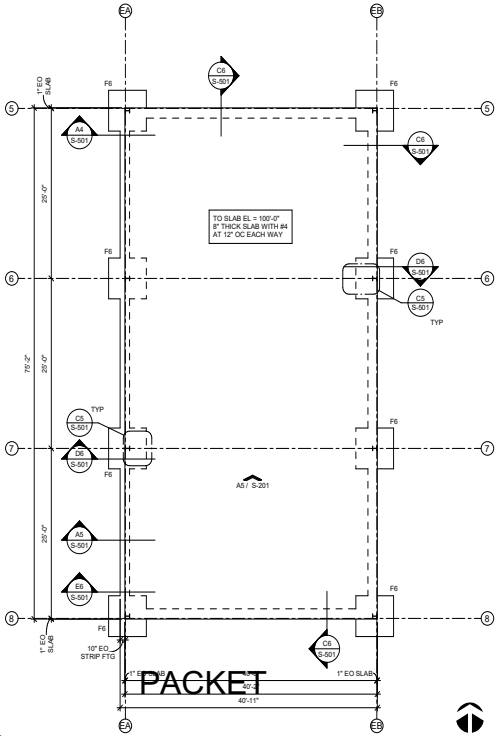
S-111B

1/25/2022 7:24:05 PM

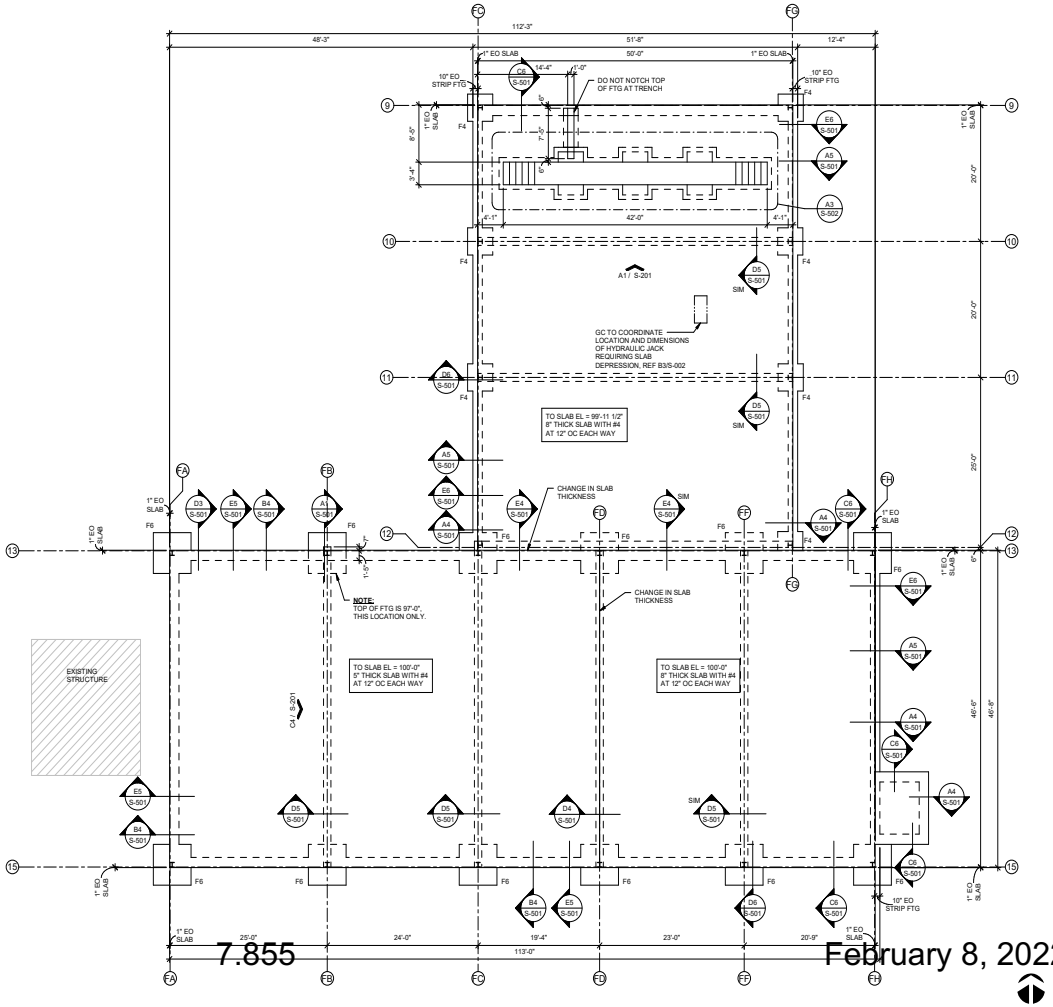
FOOTING SCHEDULE		
MARK	SIZE	REINFORCING
F4	4'-0" x 4'-0" x 2'-4"	(4) #5 TOP AND BOT, EA WAY
F5	5'-0" x 5'-0" x 2'-4"	(5) #5 TOP AND BOT, EA WAY
F6	6'-0" x 6'-0" x 2'-4"	(6) #5 TOP AND BOT, EA WAY
F7	7'-0" x 7'-0" x 2'-4"	(7) #5 TOP AND BOT, EA WAY

GENERAL FOUNDATION NOTES

1. REFER TO S-001 AND S-002 FOR GENERAL NOTES AND TYPICAL FOUNDATION DETAILS NOT NOTED ON PLAN.
2. TOP OF SLAB ELEVATION = 100'-0" UNLESS NOTED OWTHERWISE. REFER TO CIVIL DRAWINGS FOR ACTUAL ELEVATION.
3. REFERENCE METAL BUILDING MANUFACTURER FOR ALL COLUMNS, BASE PLATES, AND STEEL PANEL INFORMATION.
4. VERIFY FOOTING LOCATIONS WITH METAL BUILDING MANUFACTURER.
5. COLUMNS SHOULD BE CENTERED ON FOOTINGS.
6. REFER TO THE PLAN FOR SLAB THICKNESS AND REINFORCING REQUIREMENTS. REINFORCEMENT BARS ARE TO BE PLACED IN THE UPPER 1/3 OF THE SLAB.
7. GC TO COORDINATE LOCATION OF THICKENED SLAB BENEATH VEHICLE LIFT POSTS AS SHOWN IN DETAIL E2/S-002.
8. REFER TO OVERALL FOUNDATION PLAN FOR SLAB JOINT LOCATIONS.
9. REFER TO A6/S-002 FOR CONTRACTION JOINT AND CONSTRUCTION JOINT DETAILS.
10. REFER TO THE ARCHITECTURAL DRAWINGS FOR OVERHEAD DOOR DIMENSIONS.



A1 FOUNDATION PLAN - AREA E
1/8" = 1'-0"



A3 FOUNDATION PLAN - AREA F
1/8" = 1'-0"

PACKET 7.855 February 8, 2022

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KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

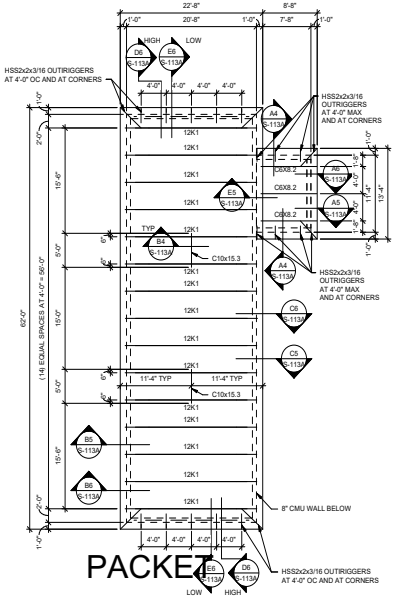
Foundation Plan - Areas E And F

S-111C

1/25/2022 2:24:09 PM

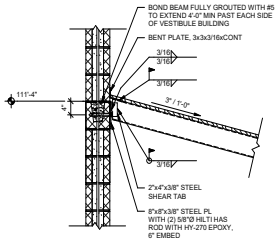
GENERAL FRAMING NOTES

1. REFER TO S-001 THROUGH S-003 FOR GENERAL NOTES AND TYPICAL DETAILS NOT NOTED ON THE PLAN.
2. REFER TO S-004 FOR WIND NET UPLIFT PRESSURES.
3. REFER TO DETAILS FOR JOIST BEARING ELEVATIONS.
4. COORDINATE LOCATIONS AND DIMENSIONS OF ARCHITECTURAL COMPONENTS (I.E. DOORS) WITH ARCHITECTURAL DRAWINGS.
5. WOOD FRAMING:
   - A. ALL LUMBER SHALL BE STORED OFF THE GROUND, WELL VENTILATED AND PROTECTED FROM MOISTURE. MOISTURE CONTENT OF LUMBER 2 INCHES OR LESS IN THICKNESS SHALL BE 15 PERCENT OR LESS AT TIME OF ENCLOSURE.
   - B. ALL LUMBER SHALL BE SURFACED FOUR SIDES.
   - C. LUMBER GRADES AND MINIMUM REQUIRED STRESSES SHALL BE AS FOLLOWS:
     - a. LIGHT FRAMING:
       - SOUTHERN PINE - GRADE NO.2
       - COMPRESSION PARALLEL TO GRAIN (Fc) = 1450 PSI
       - MODULUS OF ELASTICITY (E) = 1,400,000 PSI
       - BENDING (Fb) = 1,100 PSI
       - SHEAR PARALLEL TO GRAIN (Fv) = 175 PSI
   - D. ROOF SHEATHING SHALL BE 7/8 INCH THICK WITH PANEL SPAN RATING OF 60/32 AND SHALL BE OF A TYPE MANUFACTURED WITH EXTERIOR GLUE (EXPOSURE 1 OR EXTERIOR). SHEATHING SHALL BE ATTACHED TO STEEL BAR JOISTS WITH HILTI X-CR P8 STAINLESS STEEL NAILS AND BE ATTACHED TO WOOD BLOCKING WITH 10d STAINLESS STEEL COMMON OR DEFORMED NAILS SPACED AT 6 INCHES ON CENTER AT EDGES AND 12 INCHES ON CENTER AT INTERMEDIATE SUPPORTS.
   - E. PROVIDE 1/8 INCH SPACE OR JOINT AT ALL EDGES OF ROOF SHEATHING.
   - F. ALL TIMBER SHALL BE PRESSURE TREATED. ALL CONNECTIONS SHALL BE MADE WITH STAINLESS STEEL BOLTS OR NAILS.

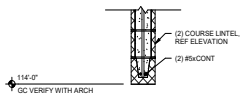


A1 ROOF FRAMING PLAN - AREA A
1/8" = 1'-0"

PLAN NORTH

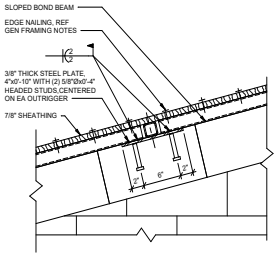


E5 CHANNEL TO MASONRY CONNECTION
3/4" = 1'-0"

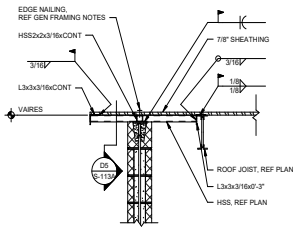


NOTES:
1. PROVIDE AT LEAST 8" OF BEARING AT EACH END OF OPENING.
2. FULLY GROUT ALL CELLS IN LINTEL MONOLITHICALLY (ONE LIFT)
3. USE A SOLID BOTTOM MASONRY LINTEL UNIT FOR FIRST COURSE.

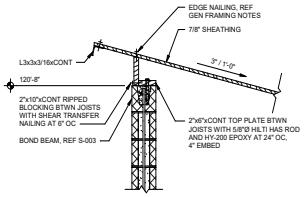
E6 CMU LINTEL
3/4" = 1'-0"



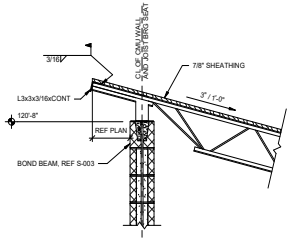
D5 SECTION
1 1/2" = 1'-0"



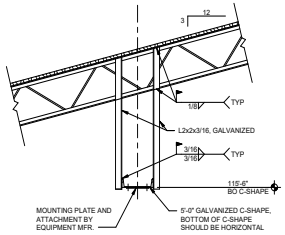
D6 SECTION
3/4" = 1'-0"



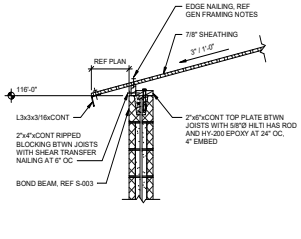
C5 SECTION BTW JOISTS
3/4" = 1'-0"



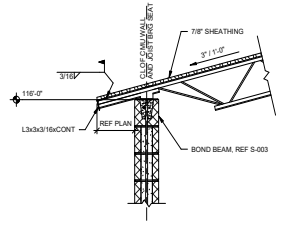
C6 SECTION AT JOISTS
3/4" = 1'-0"



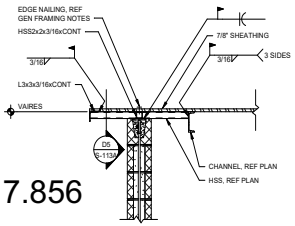
B4 SECTION
3/4" = 1'-0"



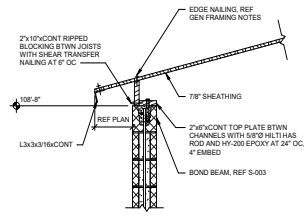
B5 SECTION BTW JOISTS
3/4" = 1'-0"



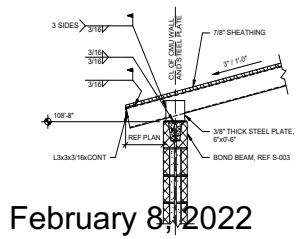
B6 SECTION AT JOISTS
3/4" = 1'-0"



A4 SECTION
3/4" = 1'-0"



A5 SECTION BTW CHANNELS
3/4" = 1'-0"



A6 SECTION AT CHANNELS
3/4" = 1'-0"

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

Roof Framing Plan And Details - Area A

S-113A

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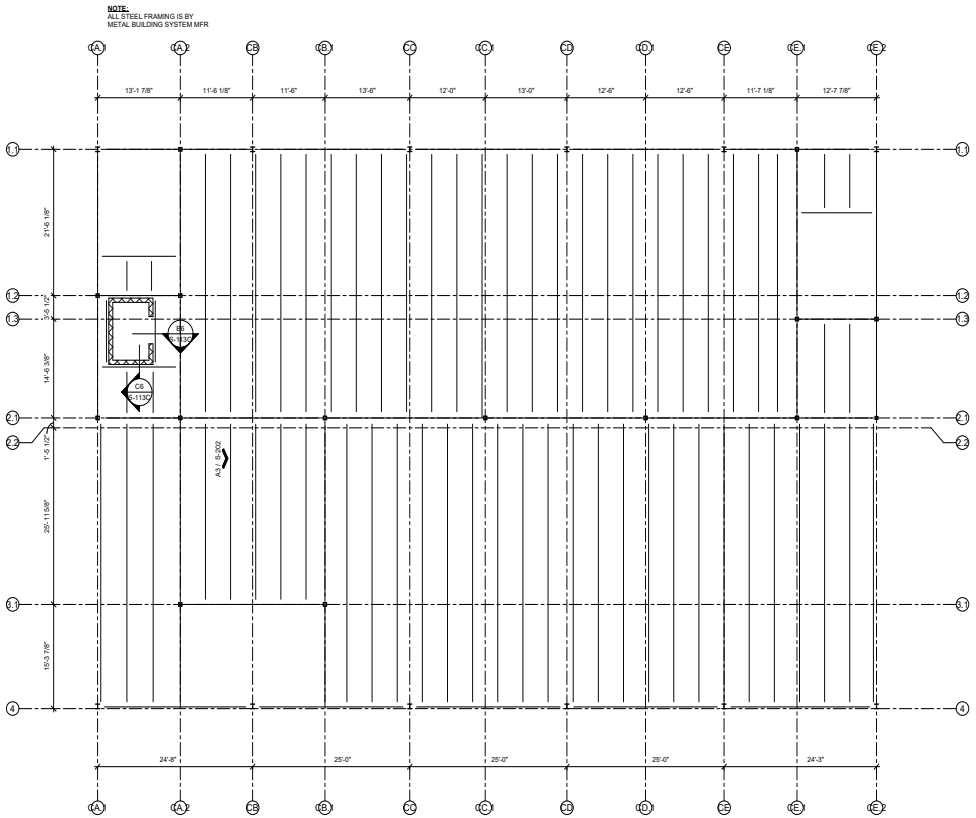
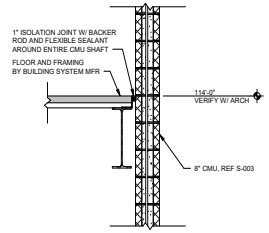


PACKET

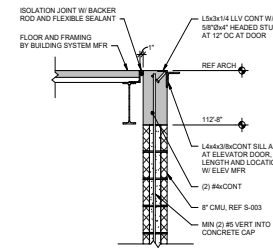
7.857

PLAN NORTH

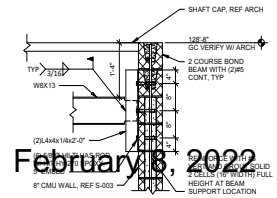
A1 SUGGESTED FRAMING LAYOUT COORDINATED WITH FOUNDATION DESIGN
1/8" = 1'-0"



C6 METAL BUILDING SYSTEM-TO-CMU JOINT
3/4" = 1'-0"



B6 DOOR OPENING IN ELEVATOR SHAFT
3/4" = 1'-0"



A6 HOIST BEAM CONNECTION
3/4" = 1'-0"

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KEY PLAN
A B C D
E F

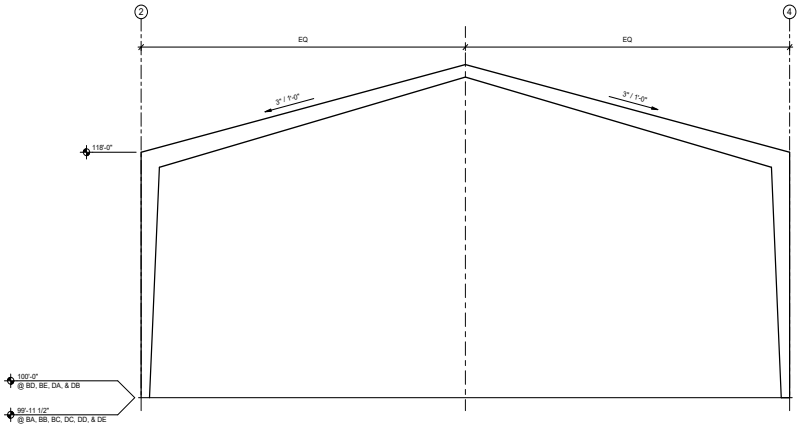
#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

February 8, 2022

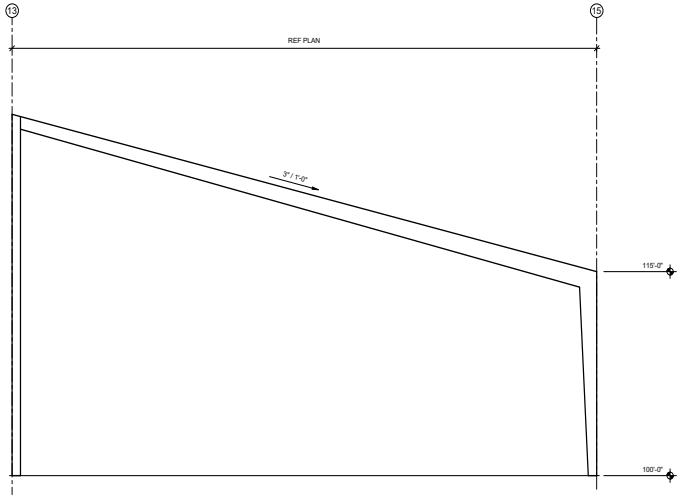
Area C - Suggested Framing Plan & Elevator Details

S-113C

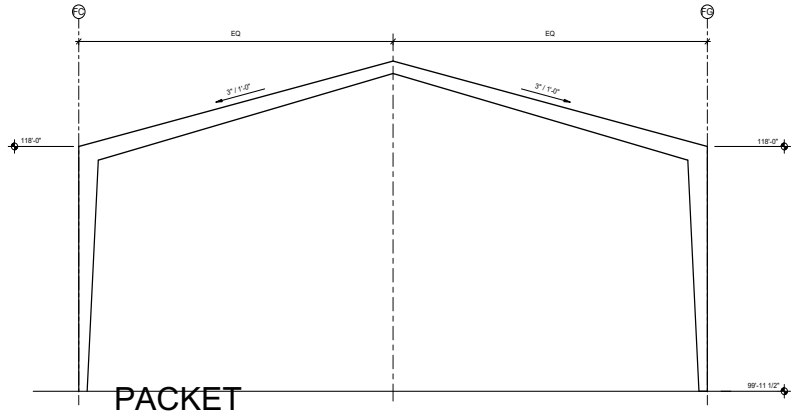
BL-001 1/25/2022 2:24:50 PM



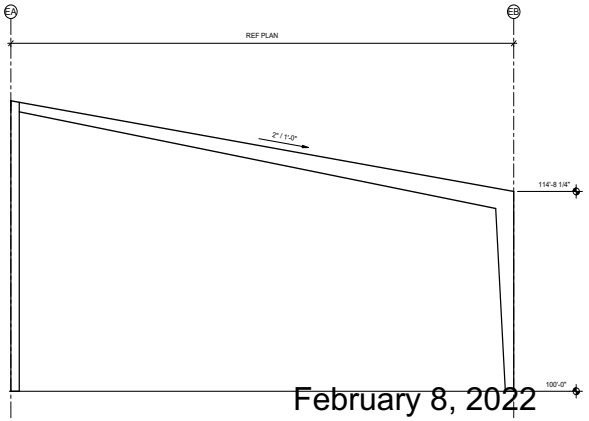
C1 FRAME ELEVATION - GRIDS BA, BB, BC, BD, BE, DA, DB, DC, DD, & DE
1/4" = 1'-0"



C4 FRAME ELEVATION - GRIDS FA, FB, FC, FD, FF, FH
1/4" = 1'-0"



A1 FRAME ELEVATION - GRIDS 9, 10, 11, & 12
1/4" = 1'-0"



A5 FRAME ELEVATION - GRIDS 5, 6, 7, & 8
1/4" = 1'-0"

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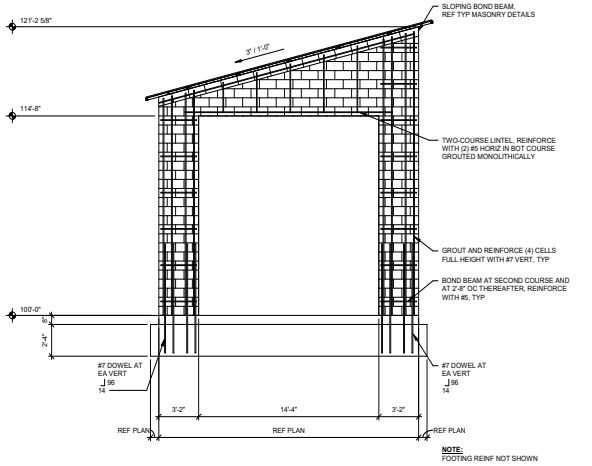
PROJECT NO.
6077.21

KEY PLAN

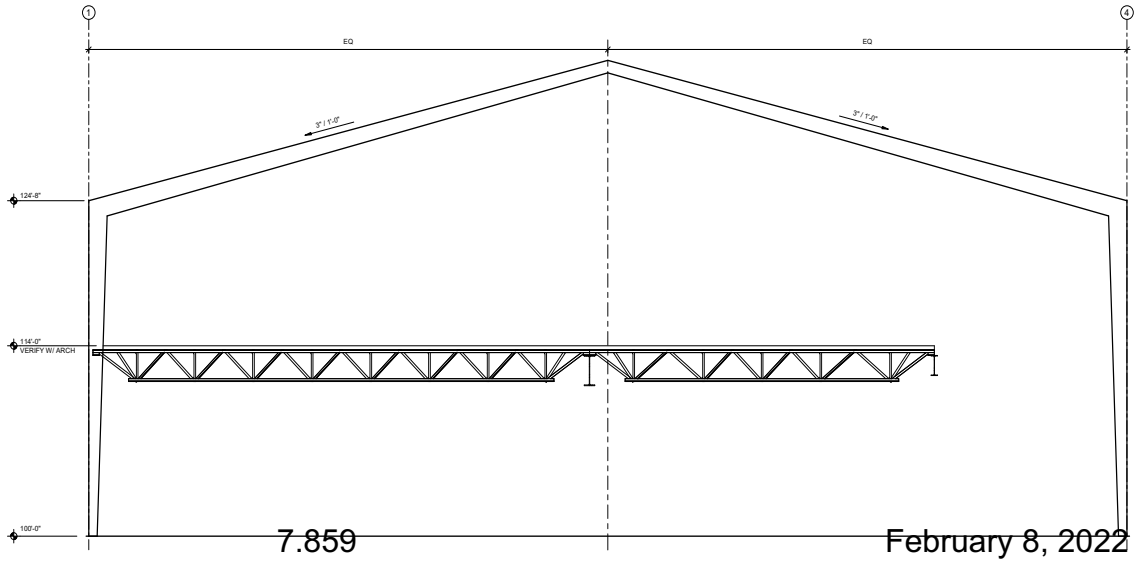
#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

Frame Elevations
S-201

1/25/2022 2:24:51 PM



D5 SHEAR WALL ELEVATION
1/4" = 1'-0"



A3 FRAME ELEVATION - GRIDS CA, CB, CC, CD, CE, & CF
1/4" = 1'-0"

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KEY PLAN

#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

Frame Elevations

S-202

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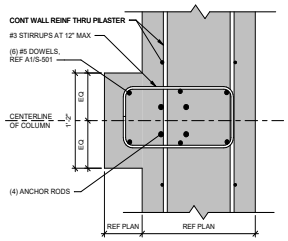
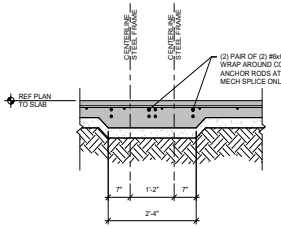
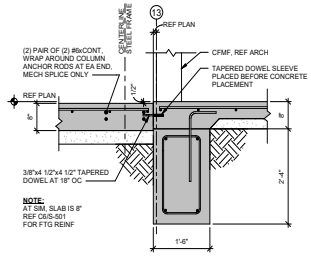


E2 PILASTER REINFORCEMENT
1 1/2" = 1'-0"



E3 SECTION
3/4" = 1'-0"



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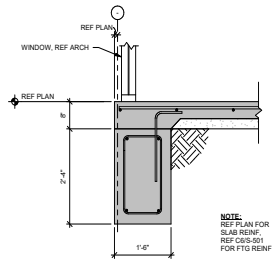
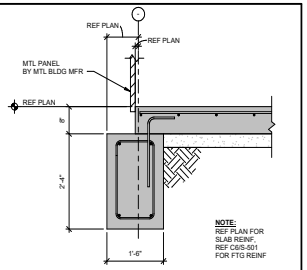
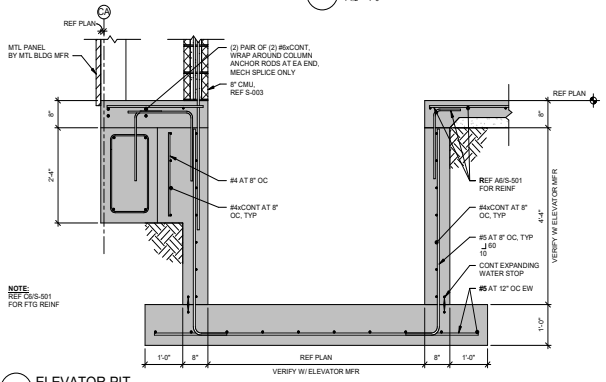


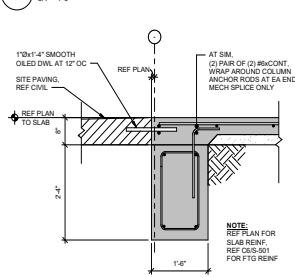
E5 SECTION
3/4" = 1'-0"



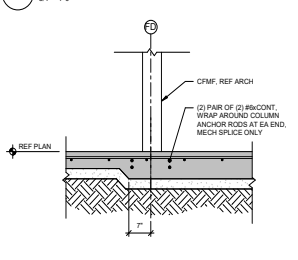
E6 SECTION
3/4" = 1'-0"



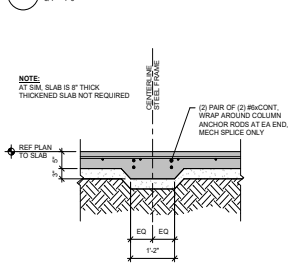
D1 ELEVATOR PIT
3/4" = 1'-0"



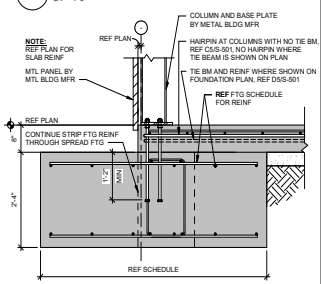
D3 SECTION AT MAN DOOR
3/4" = 1'-0"



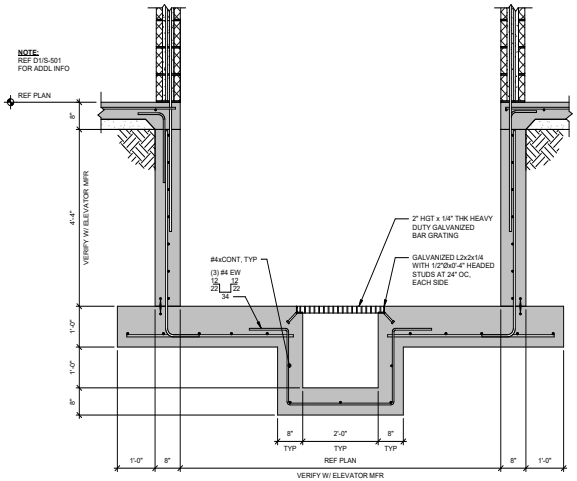
D4 SECTION
3/4" = 1'-0"



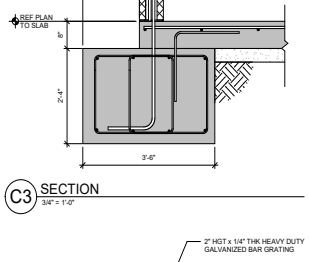
D5 TIE BEAM
3/4" = 1'-0"



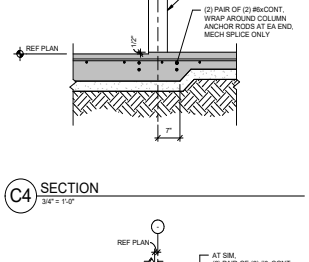
D6 SECTION
3/4" = 1'-0"



B1 SUMP PIT
3/4" = 1'-0"



C3 SECTION
3/4" = 1'-0"



C4 SECTION
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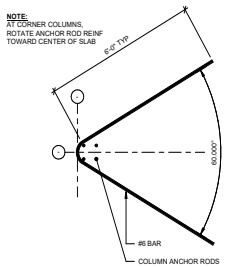

C5 SECTION
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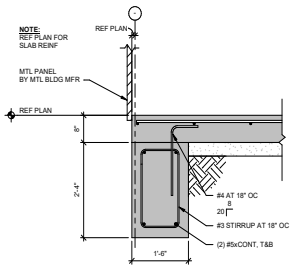
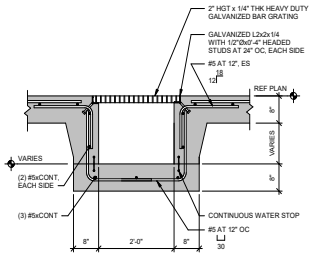
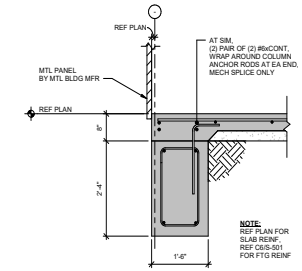


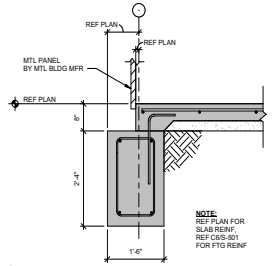
C6 SECTION
3/4" = 1'-0"



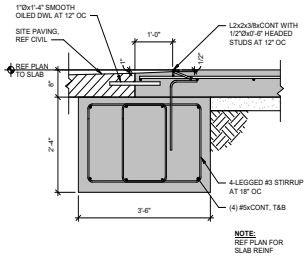
B3 TRENCH DRAIN IN SLAB
3/4" = 1'-0"



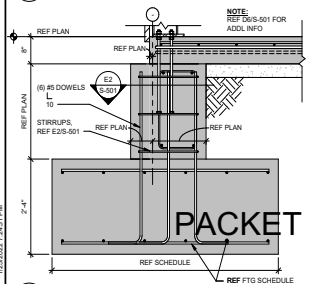
B4 SECTION
3/4" = 1'-0"



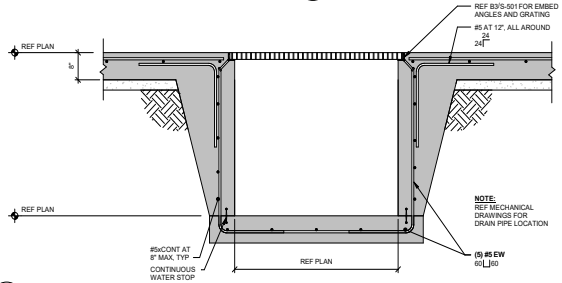
B5 SECTION
3/4" = 1'-0"



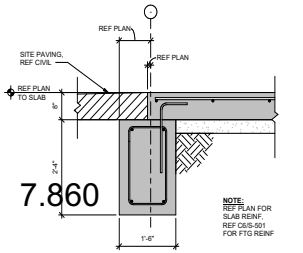
B6 SECTION AT OVERHEAD DOOR
3/4" = 1'-0"



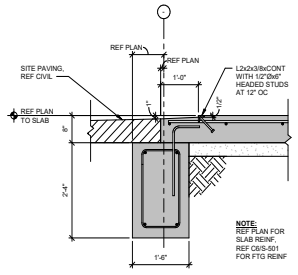
A1 LOWERED FOOTING
3/4" = 1'-0"



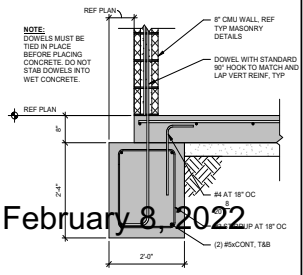
A2 SEDIMENT BASIN
3/4" = 1'-0"



A4 SECTION AT MAN DOOR
3/4" = 1'-0"



A5 SECTION AT OVERHEAD DOOR
3/4" = 1'-0"



A6 SECTION
3/4" = 1'-0"

PACKET
7.860
February 8, 2022

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PROJECT NO.
6077.21

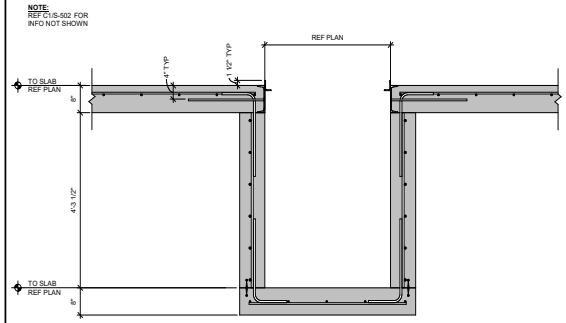
KEY PLAN

#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

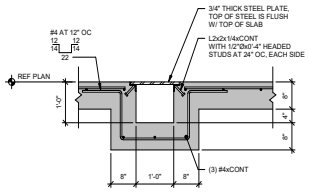
Foundation Details

S-501

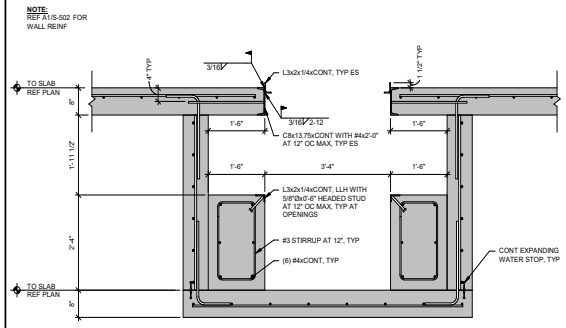
1/25/2022 7:24:51 PM



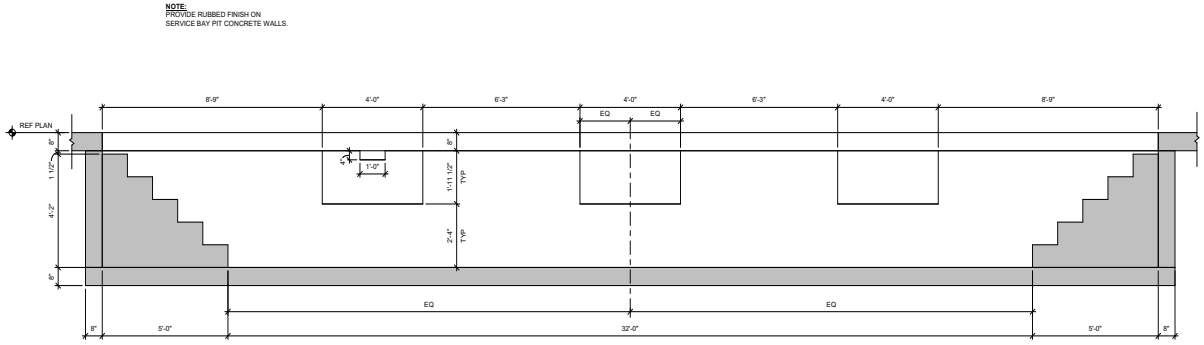
D1 SECTION
3/4" = 1'-0"



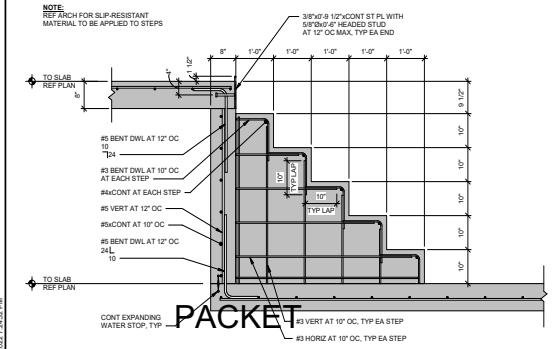
E3 ACCESSIBLE TRENCH
3/4" = 1'-0"



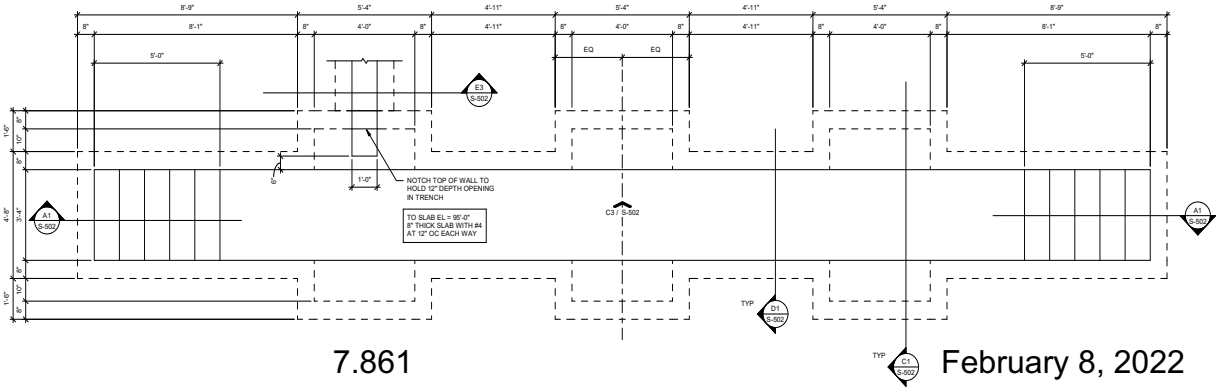
C1 SECTION
3/4" = 1'-0"



C3 SERVICE BAY PIT ELEVATION
1/2" = 1'-0"



A1 SECTION
3/4" = 1'-0"



A3 SERVICE BAY PIT PLAN
1/2" = 1'-0"

PACKET 7.861 February 8, 2022

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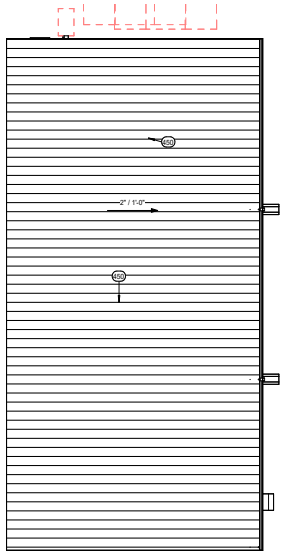
6077.21

KEY PLAN

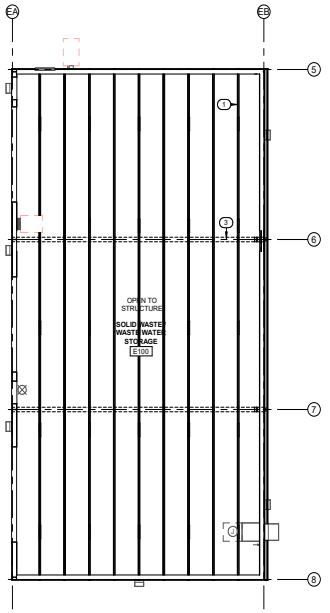
#	DATE	DESCRIPTION
-	1/25/2022	Owner Review

Service Bay Pit - Plan And Details

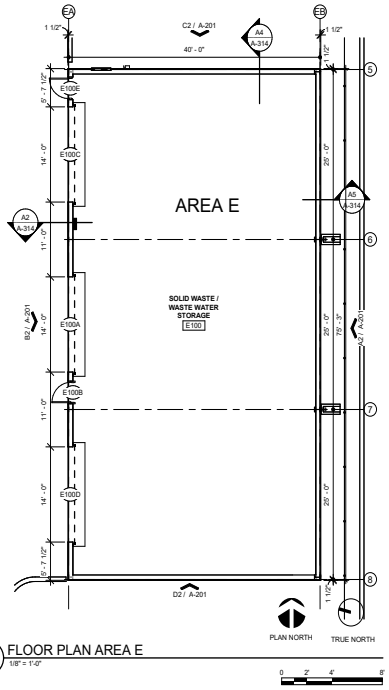
S-502



C1 ROOF PLAN AREA E
1/8" = 1'-0"



C3 REFLECTED CEILING PLAN AREA E
1/8" = 1'-0"



C4 FLOOR PLAN AREA E
1/8" = 1'-0"

GENERAL NOTES

A. REFER TO ACCESSIBILITY STANDARDS SHEETS FOR TYPICAL MOUNTING HEIGHTS/LOCATIONS FOR TOILET ROOM ACCESSORIES.
B. ALL INTERIOR WALLS ARE A5e UNLESS NOTED OTHERWISE. REFER TO SHEET A-002 FOR INTERIOR PARTITION SCHEDULE.

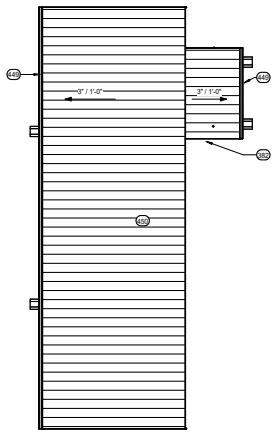
LEGEND

GYPSUM WALL BOARD CEILING
LAY-IN CEILING
DENOTES SOUND INSULATION

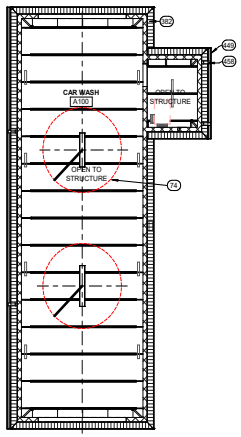
KEY NOTES

AS INDICATED BY: (#)

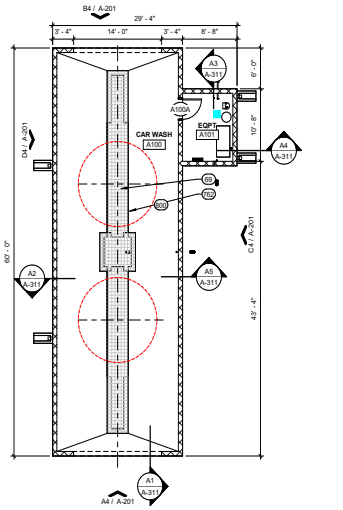
3	MBS RIGID FRAME
69	GRATE, REF STRUCT
382	MTL SOFFIT PANEL
449	MBS MTL GUTTER
450	MTL ROOFING
458	MTL DS
762	FDN, REF STRUCT



A1 ROOF PLAN AREA A
1/8" = 1'-0"



A3 REFLECTED CEILING PLAN AREA A
1/8" = 1'-0"



A4 FLOOR PLAN AREA A
1/8" = 1'-0"

PARTITION GENERAL NOTES

THE FOLLOWING PARTITION GRAPHIC SYMBOL AND THREE PART NOTATION SYSTEM IS USED IN THE CONSTRUCTION DOCUMENTS FOR THIS PROJECT. NOTE: THE PARTITION CONSTRUCTION WILL MAINTAIN ITS DESIGNATION TO THE POINT OF AN INTERSECTING PARTITION. IF NO CHANGE IN DESIGNATION IS SHOWN BEYOND THE INTERSECTION, THE PREVIOUS PARTITION CONSTRUCTION DESIGNATION APPLIES. REFER TO CODE PLAN G-101 FOR RATED WALLS. EDITOR'S NOTE: VERIFY CODE PLAN SHEET NUMBER.

PARTITION TYPE
ABOVE CEILING CONDITION

- WHERE SOUND-ATTENUATION BLANKETS ARE SCHEDULED:
  1. INSTALL ACOUSTICAL SEALANT AT ALL PENETRATIONS PER MANUFACTURER'S INSTRUCTIONS AT TOP AND BOTTOM OF WALLS (BOTH SIDES).
  2. PUTTY PADS AT ALL WALL PENETRATIONS INCLUDING ELECTRIC OUTLETS, IT BACK BOXES.
- ALL ASSEMBLY THICKNESSES LISTED IN THE PARTITION TYPES ARE BASED ON 5/8" THICK GYPSUM BOARD. ALTERNATE GYPSUM BOARD THICKNESSES WILL HAVE A DIFFERENT ASSEMBLY THICKNESS.
- WHERE RATED ASSEMBLY EXTENDS TO STRUCTURE ABOVE PROVIDE UL APPROVED FIRE RATED HEAD OF WALL ASSEMBLY TO MATCH RATING OF WALL. WALL HEIGHTS EXCEEDING STUD MANUFACTURER'S MAXIMUM (LIMITING) SPAN USING 5PSF LATERAL LOADING SHALL BE BRACED TO STRUCTURE ABOVE. (LAY-IN CEILINGS ARE NOT ACCEPTABLE BRACING, HARD CEILINGS ARE ACCEPTABLE).
- "STRUCTURE ABOVE" (AS NOTED IN THE PARTITION CONDITIONS) IS DEFINED AS THE UNDERSIDE OF ONE OR MORE OF THE FOLLOWING:
  - COMPOSITE FLOOR SLAB
  - STAIR TREADS/RISERS
  - METAL ROOF DECK
  - STEEL BEAMS
- IN NO CASE SHALL THE BOTTOM OF STEEL JOISTS BE CONSIDERED BOTTOM OF STRUCTURE ABOVE
- NR = NOT RATED

EDITOR'S NOTE: SPECIAL CONDITIONS CAN BE EDITED PER PROJECT.

SPECIAL CONDITIONS

1. FIRE-RATED PLYWOOD PAINTED ON ALL SIDES - ONE SIDE OF WALL
2. FIRE-RATED PLYWOOD PAINTED ON ALL SIDES - BOTH SIDES OF WALL
3. ACOUSTIC GYPSUM BOARD ONE SIDE OF WALL
4. ACOUSTIC GYPSUM BOARD BOTH SIDES OF WALL
5. FRP BOTH SIDES OF WALL
6. TILE BACKER BOARD ONE SIDE OF WALL
7. TILE BACKER BOARD BOTH SIDES OF WALL
8. LEAD LINING ONE SIDE OF WALL
9. LEAD LINING BOTH SIDES OF WALL
10. DRAFT STOP ASSEMBLY
11.

PACKET

7.862

February 8, 2022

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PROJECT NO.
6077.21

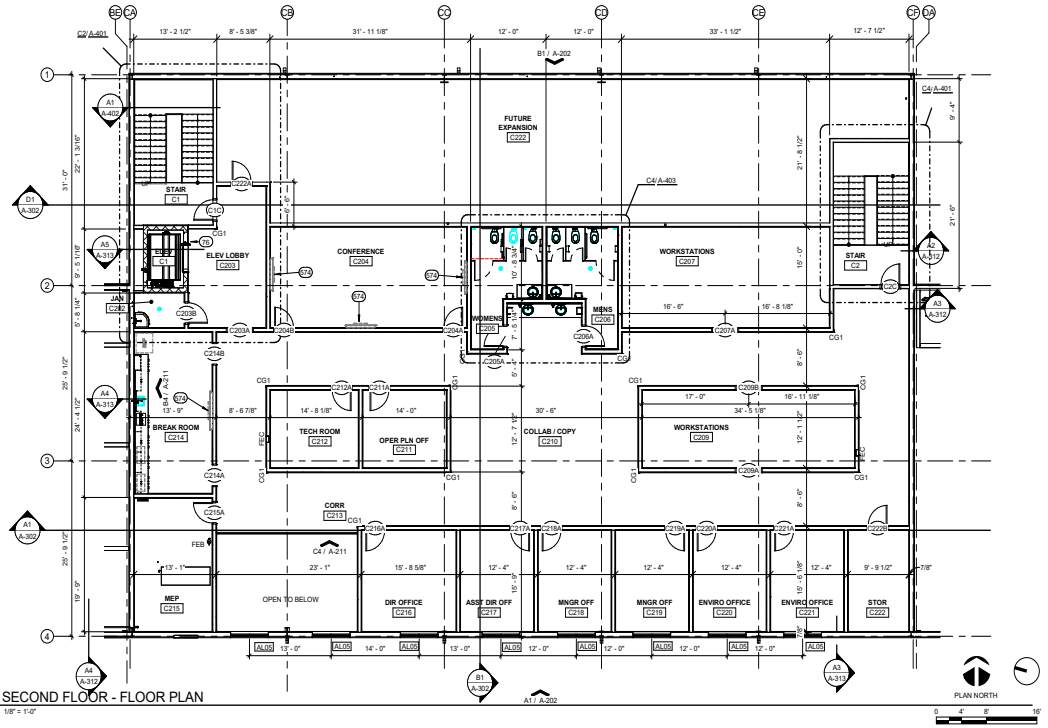
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

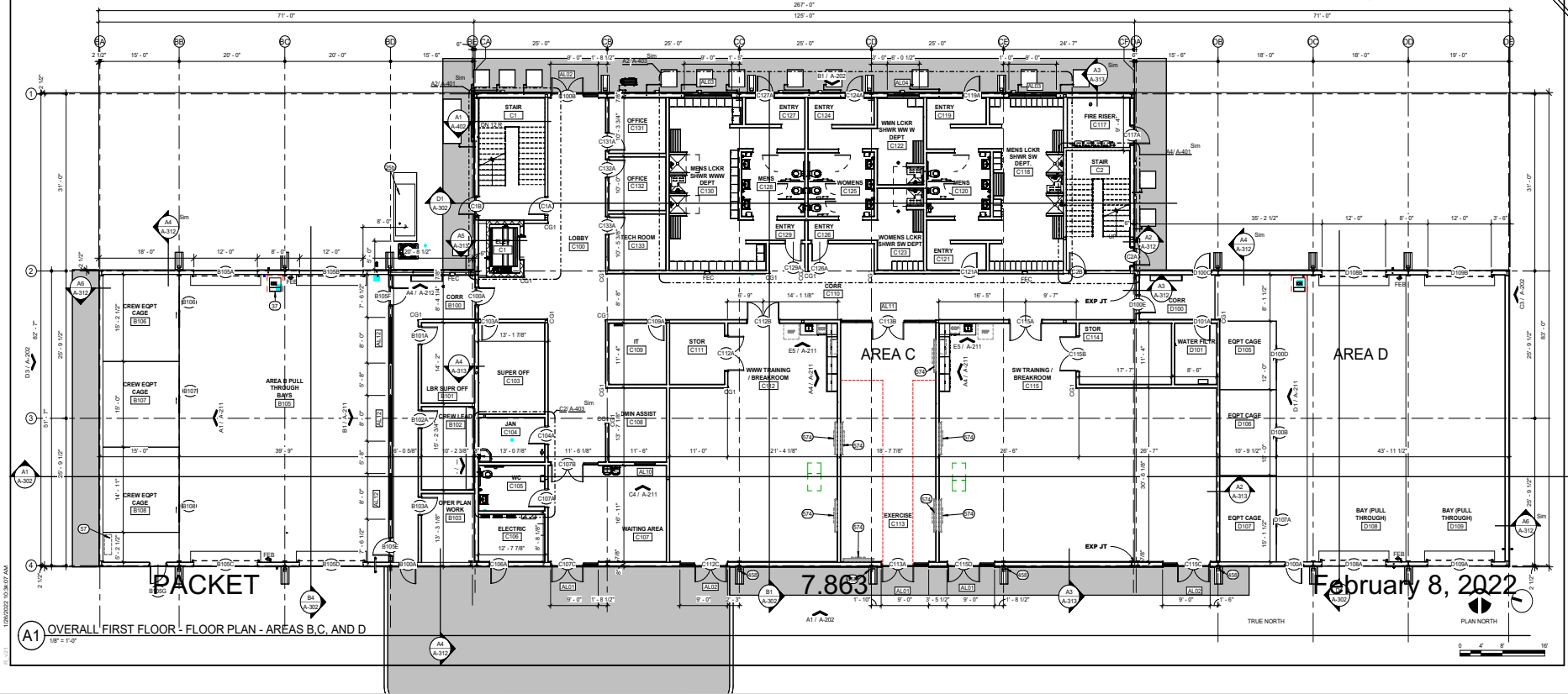
Buildings A & E Floor Plan, Reflected Clg Plan & Roof Plan

A-111

12/6/2022 10:38:44 AM



C2 SECOND FLOOR - FLOOR PLAN
1/8" = 1'-0"



A1 OVERALL FIRST FLOOR - FLOOR PLAN - AREAS B,C, AND D
1/8" = 1'-0"

GENERAL NOTES

A. REFER TO ACCESSIBILITY STANDARDS SHEETS FOR TYPICAL MOUNTING HEIGHTS/LOCATIONS FOR TOILET ROOM ACCESSORIES.
B. ALL INTERIOR WALLS ARE A5e UNLESS NOTED OTHERWISE. REFER TO SHEET A-002 FOR INTERIOR PARTITION SCHEDULE.

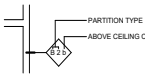
KEY NOTES

AS INDICATED BY: (E)

25b	NEW STANDBY GENERATOR
37	MICRO FILTER, TANK & ICE MACHINE, OFCI
57	HAZARDOUS CHEMICAL CABINET
76	1" JOINT BETWEEN ELEVATOR SHAFT AND 2ND FLOOR SLAB
458	MTL DS
551	FEC
552	FEB
574	TV, COORDINATE INSTALLATION WITH OWNER, OFCI

PARTITION GENERAL NOTES

THE FOLLOWING PARTITION GRAPHIC SYMBOL AND THREE PART NOTATION SYSTEM IS USED IN THE CONSTRUCTION DOCUMENTS FOR THIS PROJECT: NOTE: THE PARTITION CONSTRUCTION WILL MAINTAIN ITS DESIGNATION TO THE POINT OF AN INTERSECTING PARTITION. IF NO CHANGE IN DESIGNATION IS SHOWN BEYOND THE INTERSECTION, THE PREVIOUS PARTITION CONSTRUCTION DESIGNATION APPLIES. REFER TO CODE PLAN G-101 FOR RATED WALLS. EDITOR'S NOTE: VERIFY CODE PLAN SHEET NUMBER.



- WHERE SOUND-ATTENUATION BLANKETS ARE SCHEDULED :
  1. INSTALL ACOUSTICAL SEALANT AT ALL PENETRATIONS PER MANUFACTURER'S INSTRUCTIONS AT TOP AND BOTTOM OF WALLS (BOTH SIDES).
  2. PUTTY PADS AT ALL WALL PENETRATIONS INCLUDING ELECTRIC OUTLETS, IT BACK BOXES.
- ALL ASSEMBLY THICKNESSES LISTED IN THE PARTITION TYPES ARE BASED ON 5/8" THICK GYPSUM BOARD. ALTERNATE GYPSUM BOARD THICKNESSES WILL HAVE A DIFFERENT ASSEMBLY THICKNESS.
- WHERE RATED ASSEMBLY EXTENDS TO STRUCTURE ABOVE PROVIDE UL APPROVED FIRE RATED HEAD OF WALL ASSEMBLY TO MATCH RATING OF WALL. WALL HEIGHTS EXCEEDING STUD MANUFACTURER'S MAXIMUM (LIMITING) SPAN USING SPSF LATERAL LOADING SHALL BE BRACED TO STRUCTURE ABOVE. (LAY-IN CEILINGS ARE NOT ACCEPTABLE BRACING, HARD CEILINGS ARE ACCEPTABLE).
- "STRUCTURE ABOVE" (AS NOTED IN THE PARTITION CONDITIONS) IS DEFINED AS THE UNDERSIDE OF ONE OR MORE OF THE FOLLOWING:
  - COMPOSITE FLOOR SLAB
  - STAIR TREADS/RISERS
  - METAL ROOF DECK
  - STEEL BEAMS
- IN NO CASE SHALL THE BOTTOM OF STEEL JOISTS BE CONSIDERED BOTTOM OF STRUCTURE ABOVE
- NR = NOT RATED

EDITOR'S NOTE: SPECIAL CONDITIONS CAN BE EDITED PER PROJECT.

SPECIAL CONDITIONS

1. FIRE-RATED PLYWOOD PAINTED ON ALL SIDES - ONE SIDE OF WALL
2. FIRE-RATED PLYWOOD PAINTED ON ALL SIDES - BOTH SIDES OF WALL
3. ACOUSTIC GYPSUM BOARD ONE SIDE OF WALL
4. ACOUSTIC GYPSUM BOARD BOTH SIDES OF WALL
5. FRP ONE SIDE OF WALL
6. FRP BOTH SIDES OF WALL
7. TILE BACKER BOARD ONE SIDE OF WALL
8. TILE BACKER BOARD BOTH SIDES OF WALL
9. LEAD LINING ONE SIDE OF WALL
10. LEAD LINING BOTH SIDES OF WALL
11. DRAFT STOP ASSEMBLY

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01/25/2022

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

First & Second Floor Plan - Area B, C, & D

A-112

PACKET 7.863 February 8, 2022

GENERAL NOTES

A. REFER TO ACCESSIBILITY STANDARDS SHEETS FOR TYPICAL MOUNTING HEIGHTS/LOCATIONS FOR TOILET ROOM ACCESSORIES.
B. ALL INTERIOR WALLS ARE A5e UNLESS NOTED OTHERWISE. REFER TO SHEET A-002 FOR INTERIOR PARTITION SCHEDULE.

KEY NOTES

AS INDICATED BY: (#)

19 120 GAL AIR COMPRESSOR, OFCI
20 LARGE TIRE MACHINE, PRICE NEW OPPTION
21 SMALL TIRE MACHINE, OFCI
22 WHEEL BALANCER, 220V, OFCI
24 18,000 LB ROTARY VEHICLE LIFT (AR18EL); OFCI
25 STANDBY GENERATOR, RELOCATING, OFCI, REF CIVIL
25a STANDBY GENERATOR FOR PUMP STATION, EXISTING TO REMAIN
26 1000 GAL USED OIL STORAGE, OFCI
27 OIL DRUM 55 GAL, 15W40, 5W30, 80-90W, HYDRAULIC, OFCI
27A OIL DRUM 55 GAL, 15W40, 5W30, 80-90W, HYDRAULIC, W/ HOSES, OFCI
29 TIRE CUTTER, OFCI
31 500 GALLON OIL TANKS, OFCI
32 NEW HEAVY EQUIPMENT LIFT, OFCI LIFT REFERENCE EQUIPMENT FOR SLAB RECESS SIZE
33 300 GAL OIL TANK, OFCI
34 5/30 OIL WMI TANK, OFCI
35 COMPUTER STATION
36 INSPECTION STATION
37 MICRO FILTER, TANK & ICE MACHINE, OFCI
38 TIRE RACK, GLOBAL INDUSTRIAL TRUCK RACK 3 TIER BASIS OF DESIGN, 96"W X 24" DEEP X 120" H, CFCI, SECURED TO WALL AND EACH OTHER
39 WAREHOUSE SHELVES, BASIS OF DESIGN GLOBAL INDUSTRIAL EXTRA HEAVY DUTY , 48"W/X24"D/72"H 5 SHELVES, CFCI
42 TIRE CAGE, OFCI
44 BOMB PLATE, 1/4" PLATE STEEL 4'-0" X 6'-0" W/ 2X2 TUBE POSTS BEHIND
45 LOCKING KEY BOX
50 REF & VENDING, NIC, OFOI
58 AIR HOSE REELS
59 GREASE GUN
64 BOLLARD, REF AS:C-501
66 OIL/GREASE REEL
68 OPTION A MEZZANINE, STAIR AND SUPPORT COLS
73 VERIFY SLAB DIMENSIONS BEFORE POUR
77 SLIP RESISTANT MATERIAL, REF SPEC
78 MUST HOLD TOLERANCES
549 METAL LINER PANEL
551 FEC
552 FEB
830 REF MECH
860 REF ELECT
901 REPLACE EXISTING DOOR

PARTITION GENERAL NOTES

THE FOLLOWING PARTITION GRAPHIC SYMBOL AND THREE PART NOTATION SYSTEM IS USED IN THE CONSTRUCTION DOCUMENTS FOR THIS PROJECT. NOTE: THE PARTITION CONSTRUCTION WILL MAINTAIN ITS DESIGNATION TO THE POINT OF AN INTERSECTING PARTITION. IF NO CHANGE IN DESIGNATION IS SHOWN BEYOND THE INTERSECTION, THE PREVIOUS PARTITION CONSTRUCTION DESIGNATION APPLIES. REFER TO CODE PLAN G-101 FOR RATED WALLS. EDITOR'S NOTE: VERIFY CODE PLAN SHEET NUMBER.

PARTITION TYPE
ABOVE CEILING CONDITION

- WHERE SOUND-ATTENUATION BLANKETS ARE SCHEDULED :
  1. INSTALL ACOUSTICAL SEALANT AT ALL PENETRATIONS PER MANUFACTURER'S INSTRUCTIONS AT TOP AND BOTTOM OF WALLS (BOTH SIDES).
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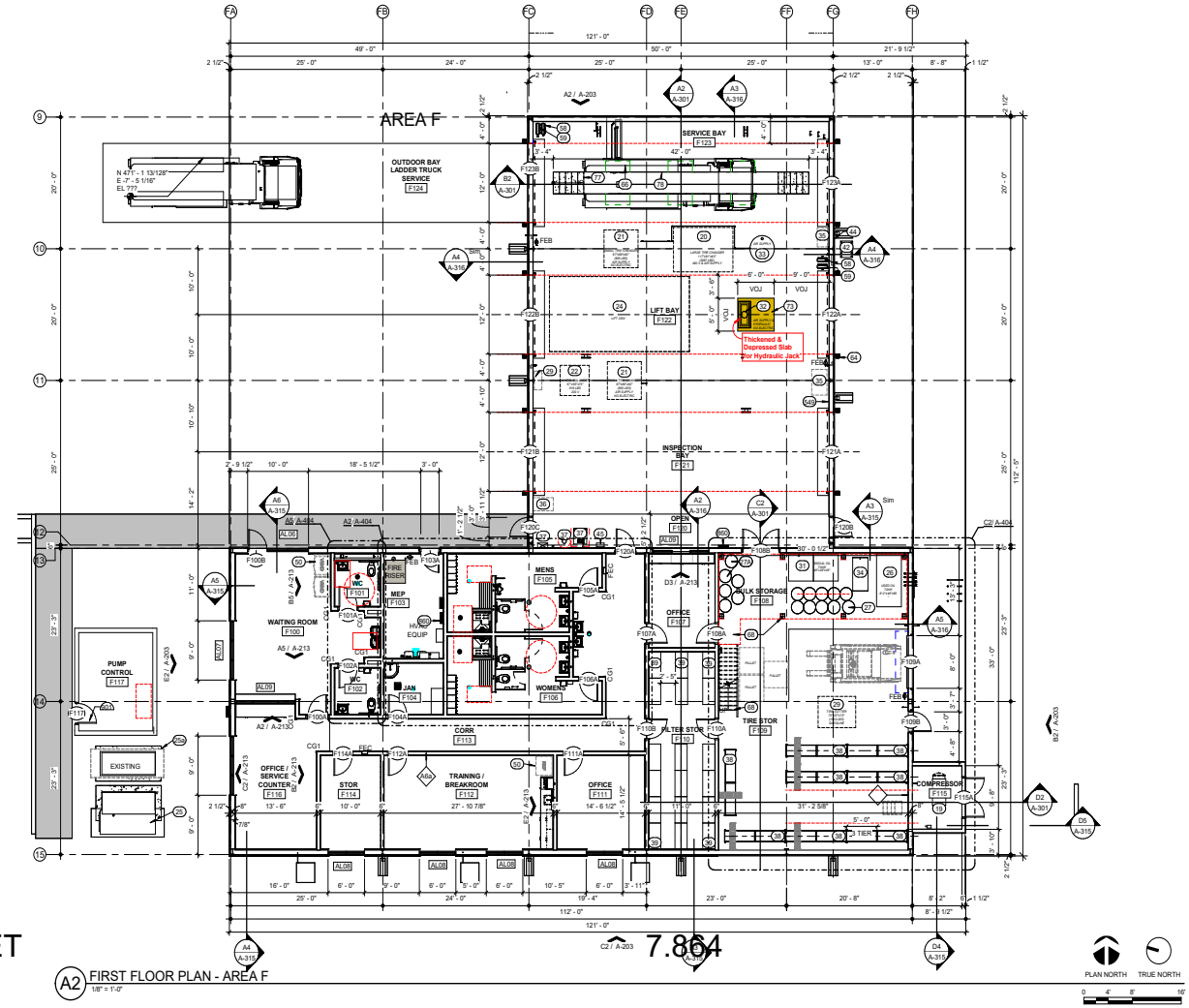
  - COMPOSITE FLOOR SLAB
  - STAIR TREADS/RISERS
  - METAL ROOF DECK
  - STEEL BEAMS
- IN NO CASE SHALL THE BOTTOM OF STEEL JOISTS BE CONSIDERED BOTTOM OF STRUCTURE ABOVE
- NR = NOT RATED

EDITOR'S NOTE: SPECIAL CONDITIONS CAN BE EDITED PER PROJECT.

SPECIAL CONDITIONS

1. GYPSUM BOARD BOTH SIDES OF WALL
2. GYPSUM BOARD BOTH SIDES OF WALL
3. ACOUSTIC GYPSUM BOARD ONE SIDE OF WALL
4. ACOUSTIC GYPSUM BOARD BOTH SIDES OF WALL
5. FRP ONE SIDE OF WALL
6. FRP BOTH SIDES OF WALL
7. TILE BACKER BOARD ONE SIDE OF WALL
8. TILE BACKER BOARD BOTH SIDES OF WALL
9. LEAD LINING ONE SIDE OF WALL
10. LEAD LINING BOTH SIDES OF WALL
11. DRAFT STOP ASSEMBLY



A2 FIRST FLOOR PLAN - AREA F
1/8" = 1'-0"

PACKET 7.864 February 8, 2022

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01/25/2022

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PROJECT NO.
6077.21

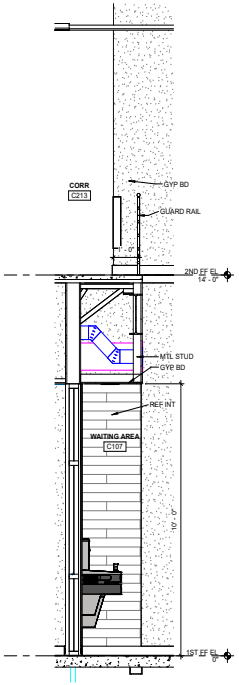
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

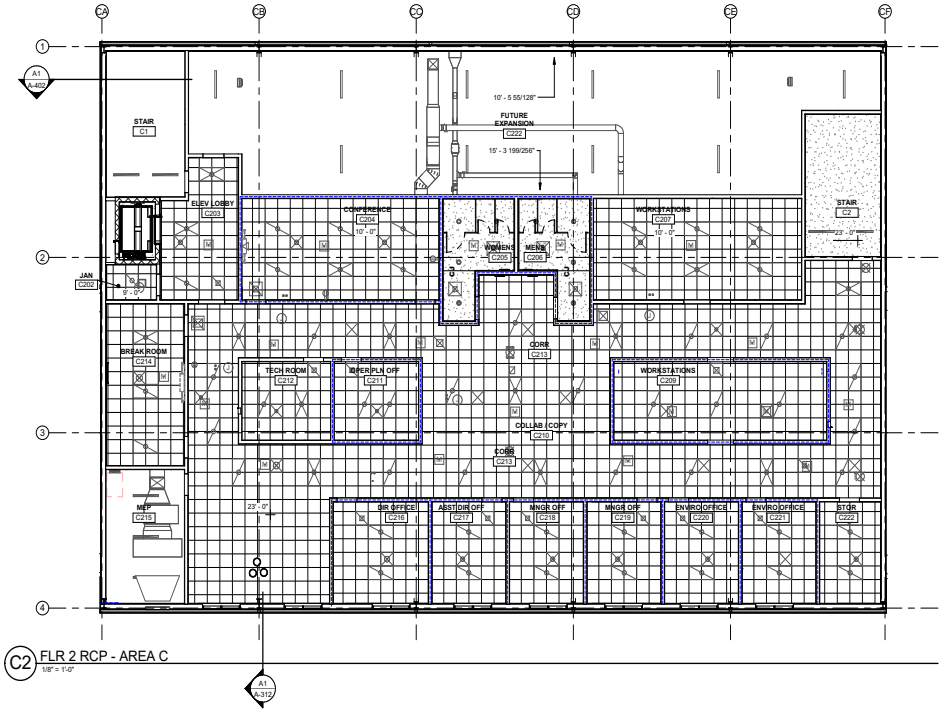
Floor Plan - First Floor - Area F

A-113

1/26/2022 10:34:17 AM



C1 RCP CLG C107 SECTION
1/2" = 1'-0"



C2 FLR 2 RCP - AREA C
1/8" = 1'-0"

GENERAL NOTES

A. DIMENSIONS ARE TO FACE OF STUD, CMU, OR CENTERLINE OF STRUCTURE UNO.
B. COORDINATE WITH MEP DRAWINGS FOR LOCATIONS OF FIXTURES. LOCATE AS SHOWN ON ARCHITECTURAL PLANS AND DETAILS. NOTIFY ARCHITECT OF CONFLICTS PRIOR TO CONSTRUCTION.
C. FINAL SPRINKLER HEAD LOCATIONS SHALL BE SET BY FIRE PROTECTION ENGINEER AND APPROVED BY ARCHITECT.
D. CENTER DEVICES, SPRINKLER HEADS, ETC. IN CEILING TILES UNO.
E. CEILING HEIGHTS SHALL BE 9' - 0" ABOVE FINISHED FLOOR UNO.
F. REFER TO INTERIOR ELEVATIONS AND ROOM FINISH SCHEDULE FOR ADDITIONAL INFORMATION CONCERNING HEIGHTS, CEILING MATERIALS AND FURRED CEILINGS.
G. AT LOCATIONS OF PERFORATED RETURN AIR GRILLES, WIRING, CABLING, ETC. TO BE HELD CLEAR OF OPEN LINE OF SIGHT THROUGH GRILLE. IN CASES WHERE THIS IS UNAVOIDABLE, ITEMS VISIBLE ABOVE GRILLE ARE TO BE PAINTED FLAT BLACK.

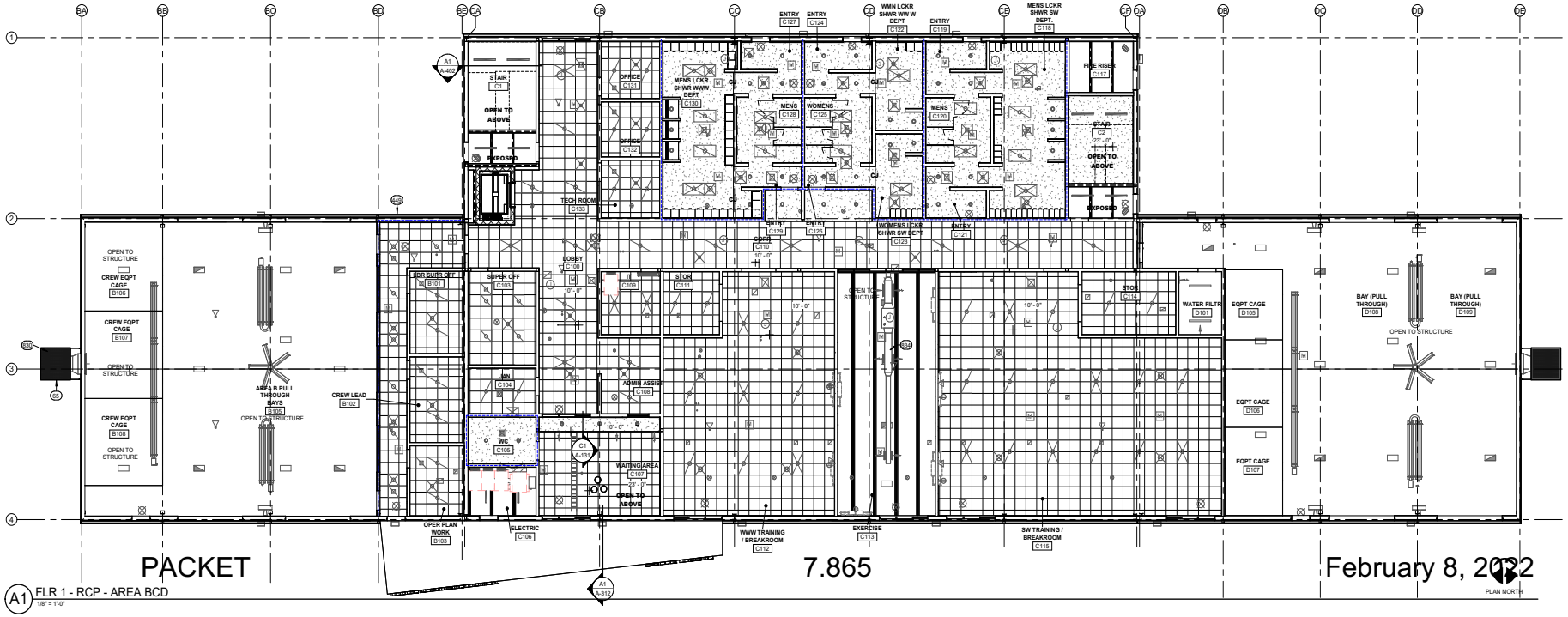
KEY NOTES

AS INDICATED BY: (#)

220 GYP BD
320 MTL STUD
485 GUARD RAIL
659 REF INT
834 EXPOSED DUCTWORK, REF MECH

LEGEND

GYPSUM WALL BOARD CEILING
LAY-IN CEILING
DENOTES SOUND INSULATION



A1 FLR 1 - RCP - AREA BCD
1/8" = 1'-0"

PACKET 7.865 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

RCP - First Floor Area BCD & Second Floor Area C

A-131

1/26/2022 10:36:06 AM

GENERAL NOTES

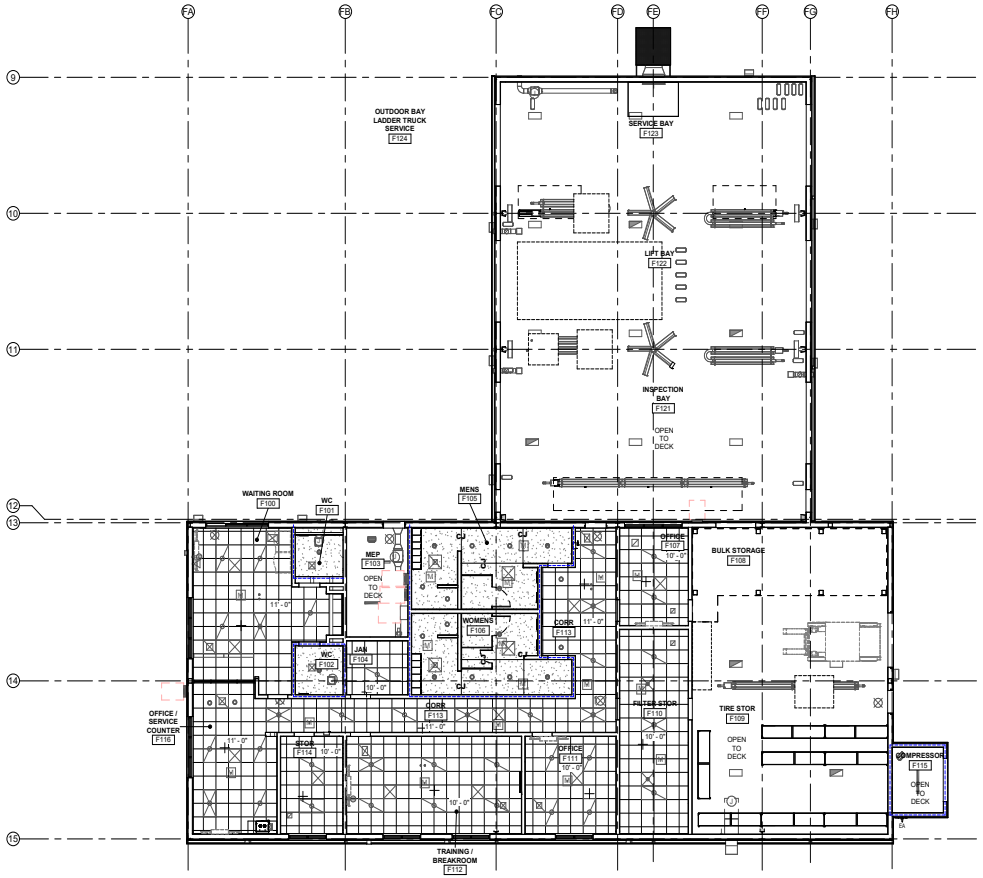
A. DIMENSIONS ARE TO FACE OF STUD, CMU, OR CENTERLINE OF STRUCTURE UNO.
B. COORDINATE WITH MEP DRAWINGS FOR LOCATIONS OF FIXTURES. LOCATE AS SHOWN ON ARCHITECTURAL PLANS AND DETAILS. NOTIFY ARCHITECT OF CONFLICTS PRIOR TO CONSTRUCTION.
C. FINAL SPRINKLER HEAD LOCATIONS SHALL BE SET BY FIRE PROTECTION ENGINEER AND APPROVED BY ARCHITECT.
D. CENTER DEVICES, SPRINKLER HEADS, ETC. IN CEILING TILES UNO.
E. CEILING HEIGHTS SHALL BE 9' - 0" ABOVE FINISHED FLOOR UNO.
F. REFER TO INTERIOR ELEVATIONS AND ROOM FINISH SCHEDULE FOR ADDITIONAL INFORMATION CONCERNING HEIGHTS, CEILING MATERIALS AND FURRED CEILINGS.
G. AT LOCATIONS OF PERFORATED RETURN AIR GRILLES, WIRING, CABLING, ETC. TO BE HELD CLEAR OF OPEN LINE OF SIGHT THROUGH GRILLE. IN CASES WHERE THIS IS UNAVOIDABLE, ITEMS VISIBLE ABOVE GRILLE ARE TO BE PAINTED FLAT BLACK.

KEY NOTES

AS INDICATED BY: (#)

LEGEND

- GYPSUM WALL BOARD CEILING
- LAY-IN CEILING
- DENOTES SOUND INSULATION



A1 REFLECTED CEILING PLAN AREA F
1/8" = 1'-0"

PACKET 7.866 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Reflected Ceiling Plan Area F

A-132

1/26/2022 10:34:51 AM

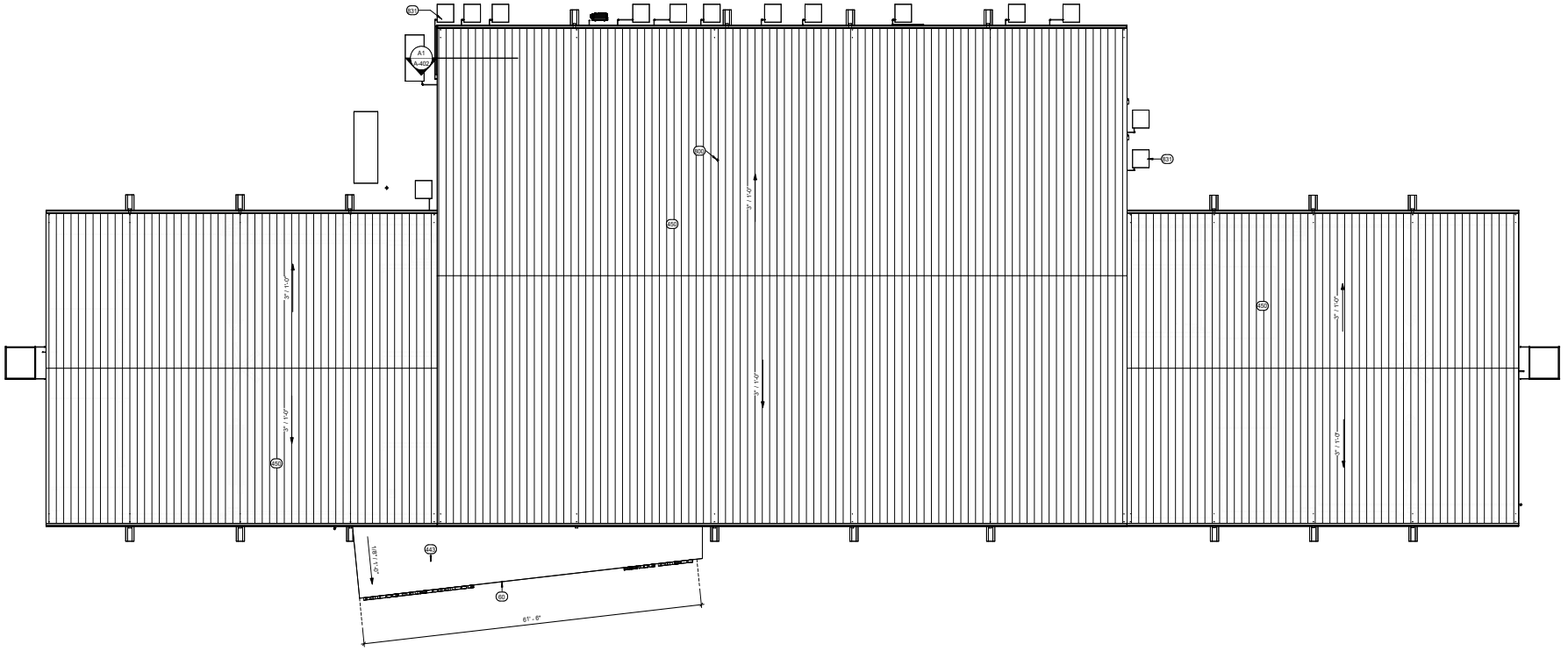
GENERAL NOTES

A. COORDINATE LOCATION OF ROOFTOP EQUIPMENT WITH STRUCTURAL.
B. ALL ROOF PENETRATIONS NOT SHOWN FOR CLARITY. ROOF PENETRATIONS SHALL BE FLASHED TO A POSITIVE SLOPE AWAY FROM PENETRATION. COORDINATE WITH TRADES.
C. COORDINATE RTU INSTALLATIONS WITH TRADES. COORDINATE HOOKUP OF ROOFTOP EQUIP. VENTS, CURBS, ETC WITH MECHANICAL, ELECTRICAL AND PLUMBING TRADES AND CONSTRUCTION DOCUMENT REQUIREMENTS.

KEY NOTES

AS INDICATED BY: (#)

60 CANTILEVER CANOPY BY MBS MFR
443 ROOF MEMBRANE
450 MTL ROOFING
800 REF PLUMBING
831 MECH EQUIP, REF MECH



A1 ROOF PLAN
1/8" = 1'-0"

PACKET 7.867 February 8, 2022

PLAN NORTH TRUE NORTH

0 20' 40'

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Roof Plan Area B C D

A-141

1/26/2022 10:34:56 AM

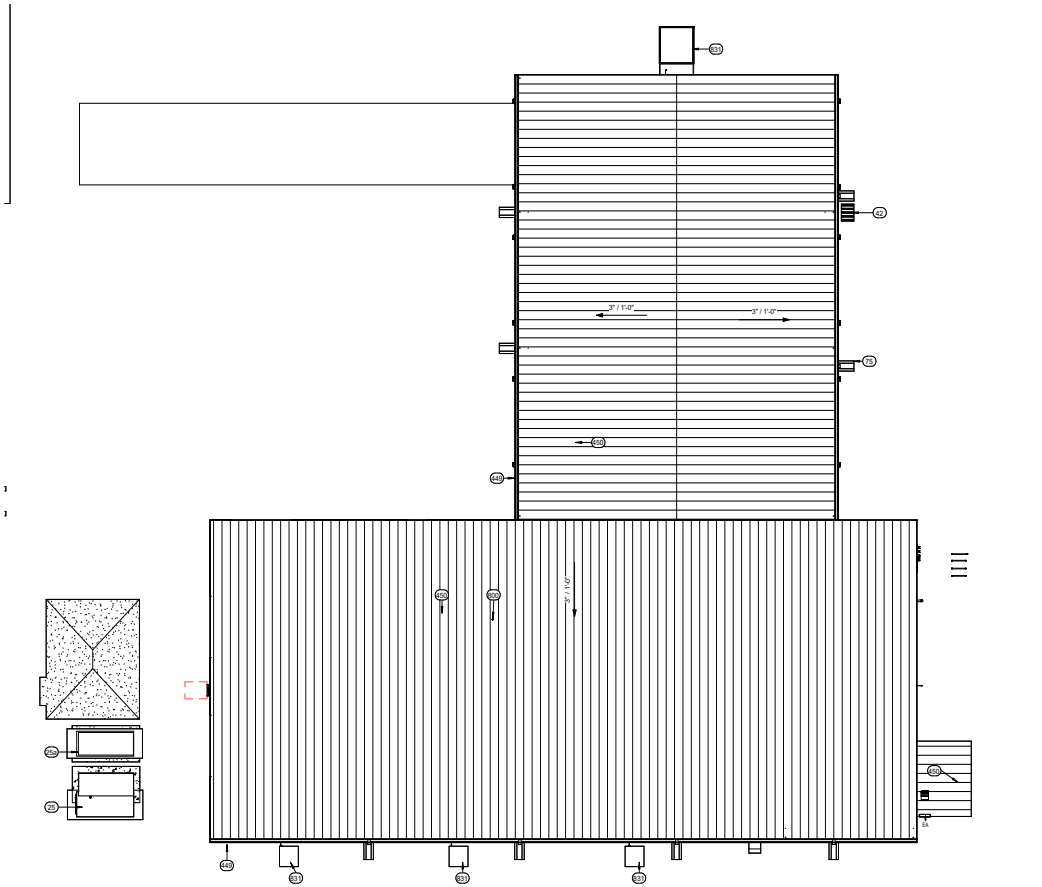
GENERAL NOTES

A. COORDINATE LOCATION OF ROOFTOP EQUIPMENT WITH STRUCTURAL.
B. ALL ROOF PENETRATIONS NOT SHOWN FOR CLARITY. ROOF PENETRATIONS SHALL BE FLASHED TO A POSITIVE SLOPE AWAY FROM PENETRATION. COORDINATE WITH TRADES.
C. COORDINATE RTU INSTALLATIONS WITH TRADES. COORDINATE HOOKUP OF ROOFTOP EQUIP. VENTS, CURBS, ETC WITH MECHANICAL, ELECTRICAL AND PLUMBING TRADES AND CONSTRUCTION DOCUMENT REQUIREMENTS.

KEY NOTES

AS INDICATED BY: (#)

25	STANDBY GENERATOR, RELOCATING, OFCI, REF CIVIL
25a	STANDBY GENERATOR FOR PUMP STATION, EXISTING TO REMAIN
42	TIRE CAGE, OFCI
75	SPLASH BLOCK
449	MBS MTL GUTTER
450	MTL ROOFING
800	REF PLUMBING
831	MECH EQUIP, REF MECH



A2 ROOF PLAN
1/8" = 1'-0"

PACKET 7.868 February 8, 2022

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ARCHITECTURE

01/25/2022

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E **F**

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Roof Plan Area F

A-142

1/26/2022 10:34:59 AM

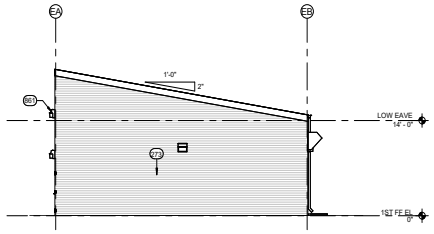
GENERAL NOTES

A. EXTERIOR ELEVATION NOTES AS NEEDED.

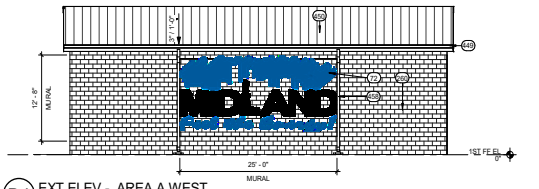
KEY NOTES

AS INDICATED BY: (#)

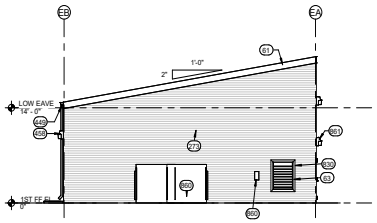
61	MTL TRIM FACIA
63	MITER FRAME ALL MEP OPENINGS
72	PAINTED CITY OF MIDLAND LOGO
75	SPLASH BLOCK
260	CMU PAINT
273	MTL PANEL SYSTEM TYPE D
309	CONT SST FLASHING
382	MTL SOFFIT PANEL
449	MBS MTL GUTTER
450	MTL ROOFING
458	MTL DS
800	REF PLUMBING
830	REF MECH
860	REF ELECT
861	LIGHT FIXTURE, REF ELECT



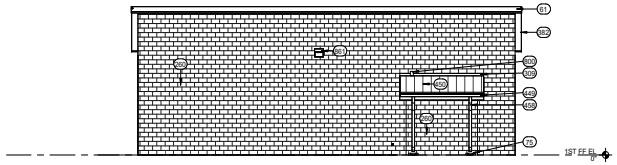
D2 EXT ELEVATION - AREA E - 4
1/8" = 1'-0"



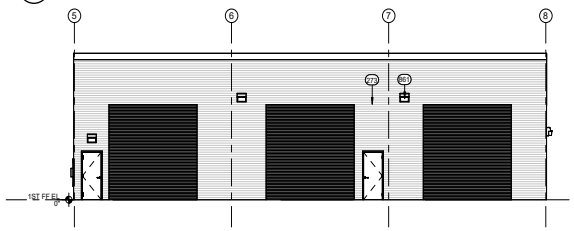
D4 EXT ELEV - AREA A WEST
1/8" = 1'-0"



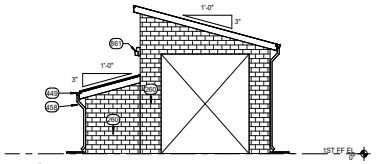
C2 EXT ELEVATION - AREA E - 3
1/8" = 1'-0"



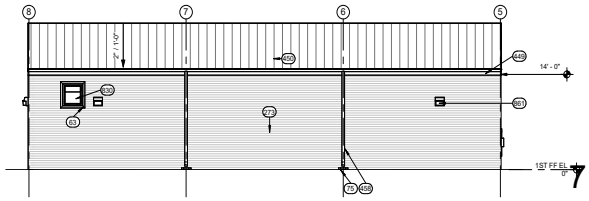
C4 EXT ELEV - AREA A EAST
1/8" = 1'-0"



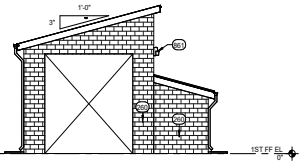
B2 EXT ELEVATION - AREA E - 2
1/8" = 1'-0"



B4 EXT ELEV - AREA A NORTH
1/8" = 1'-0"



A2 EXT ELEVATION - AREA E - 1
1/8" = 1'-0"



A4 EXT ELEV - AREA A SOUTH
1/8" = 1'-0"

PACKET 7.869 February 8, 2022

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ARCHITECTURE

01/25/2022

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Midland Utilities Service Center

Water/Wastewater, Solid Waste, and Vehicle Services

MIDLAND Feel the Energy!

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City of Midland

401 N Carver St
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Exterior Elevations Area A and Area E

A-201

1/26/2022 10:34:46 AM

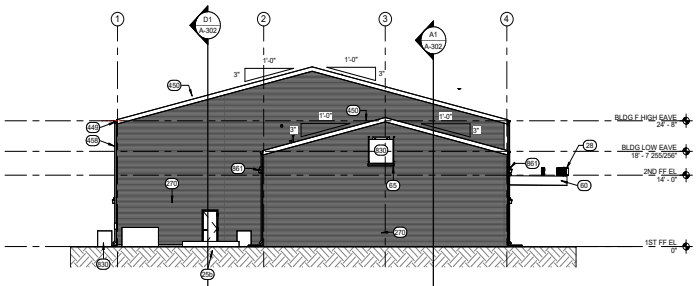
GENERAL NOTES

A. EXTERIOR ELEVATION NOTES AS NEEDED.

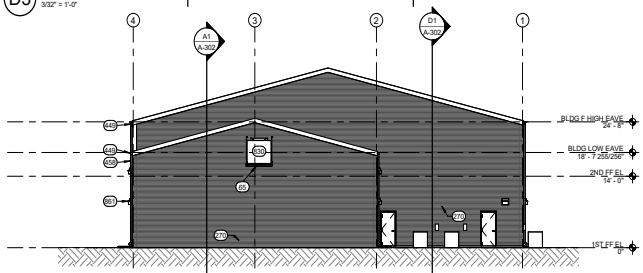
KEY NOTES

AS INDICATED BY: (#)

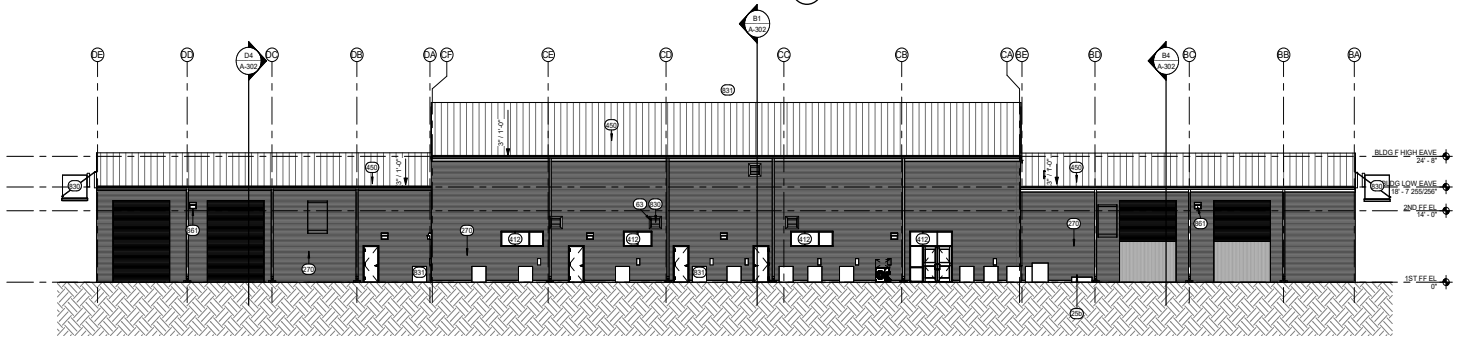
25b	NEW STANDBY GENERATOR
28	16" TALL DIMENSIONAL LETTERS
60	CANTILEVER CANOPY BY MBS MFR
61	MTL TRIM FACIA
63	MITER FRAME ALL MEP OPENINGS
65	EVAP SUPPORT
270	MTL PANEL SYSTEM TYPE A
412	ALUM STORE FRONT & GLAZING, AS SCHED
449	MBS MTL GUTTER
450	MTL ROOFING
458	MTL DS
830	REF MECH
831	MECH EQUIP, REF MECH
835	MECH GRILLE, REF MECH
861	LIGHT FIXTURE, REF ELECT



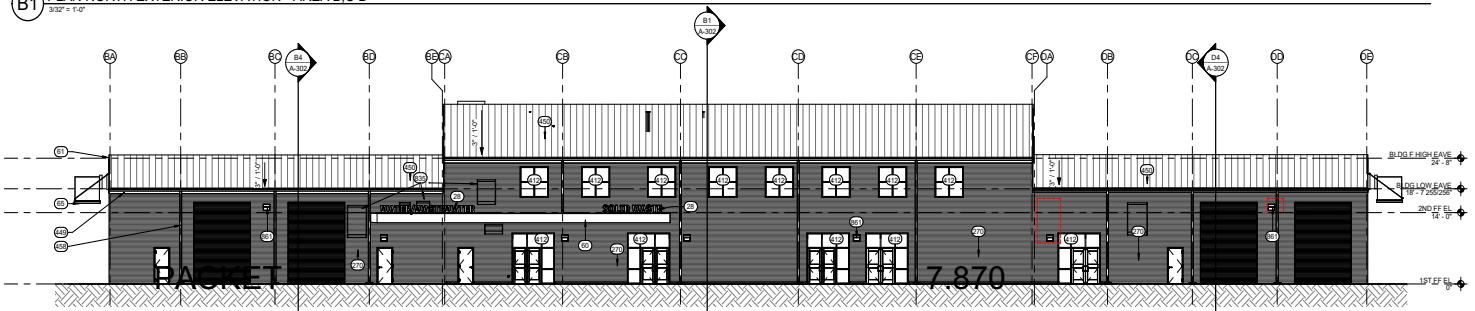
D3 PLAN WEST EXTERIOR ELEVATION - AREA B,C D
3/32" = 1'-0"



C3 PLAN EAST EXTERIOR ELEVATION - AREA B,C D
3/32" = 1'-0"



B1 PLAN NORTH EXTERIOR ELEVATION - AREA B,C D
3/32" = 1'-0"



A1 PLAN SOUTH EXTERIOR ELEVATION - AREA B,C D
3/32" = 1'-0"

PACKET 7.870

February 8, 2022

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PROJECT NO.
6077.21

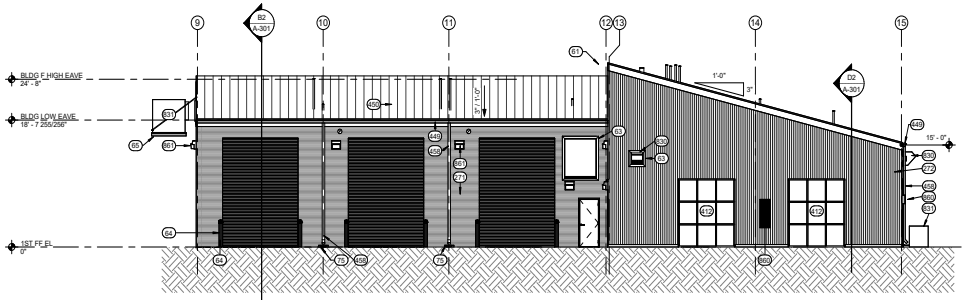
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

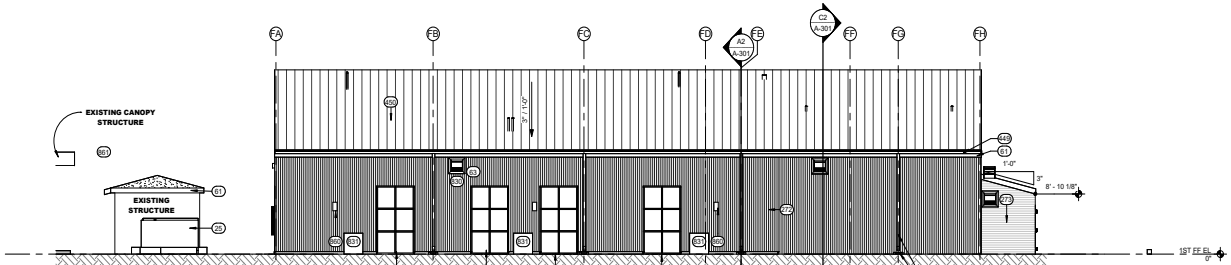
Exterior Elevations Area B, C & D

A-202

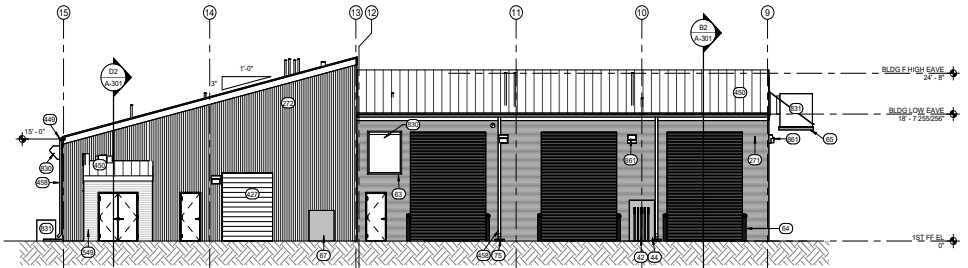
12/6/2022 10:35:02 AM



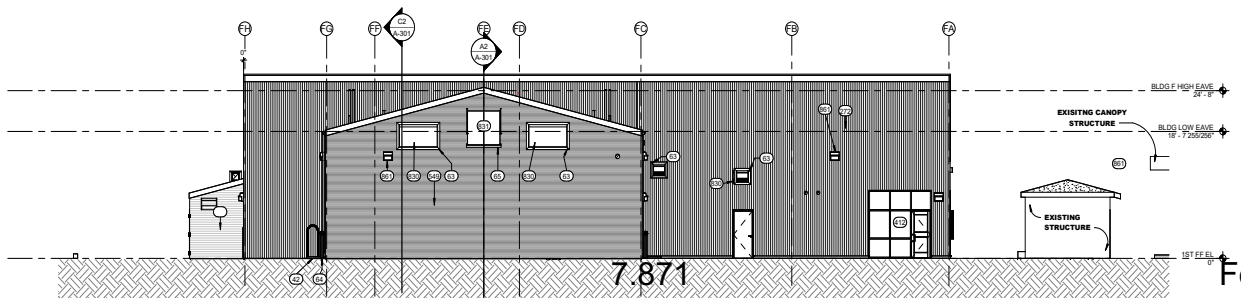
E2 WEST EXTERIOR ELEVATION - AREA F
1/8" = 1'-0"



C2 SOUTH EXTERIOR ELEVATION - AREA F
1/8" = 1'-0"



B2 EAST EXTERIOR ELEVATION - AREA F
1/8" = 1'-0"



A2 NORTH EXTERIOR ELEVATION - AREA F
1/8" = 1'-0"

GENERAL NOTES

A. EXTERIOR ELEVATION NOTES AS NEEDED.

KEY NOTES

AS INDICATED BY: #

25	STANDBY GENERATOR, RELOCATING, OFCI, REF CIVIL
42	TIRE CAGE, OFCI
44	BOMB PLATE, 1/4" PLATE STEEL 4'-0" X 6'-0" W/ 2X2 TUBE POSTS BEHIND
61	MTL TRIM FACIA
63	MITER FRAME ALL MEP OPENINGS
64	BOLLARD, REF AS C-501
65	EVAP SUPPORT
67	EXT STEEL PLATE BLOCKING, PL 1/4" X 4'-0" X 4'-0", REF MP FOR CONNECTION VALVES
75	SPLASH BLOCK
271	MTL PANEL SYSTEM TYPE B
272	MTL PANEL SYSTEM TYPE C
273	MTL PANEL SYSTEM TYPE D
412	ALUM STORE FRONT & GLAZING, AS SCHED
427	OH DR, AS SCHED
449	MBS MTL GUTTER
450	MTL ROOFING
458	MTL DS
549	METAL LINER PANEL
830	REF MECH
831	MECH EQUIP, REF MECH
860	REF ELECT
861	LIGHT FIXTURE, REF ELECT

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PROJECT NO.
6077.21

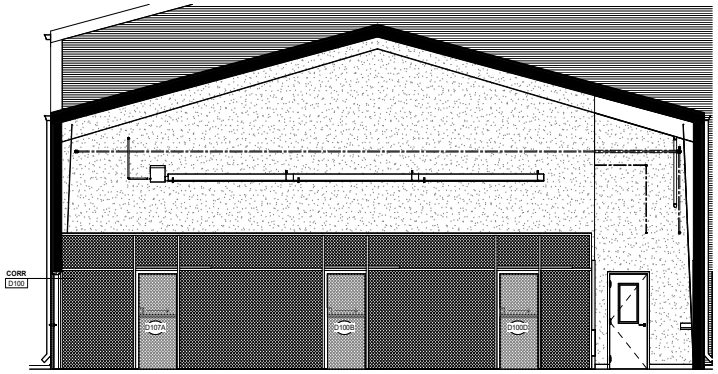
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

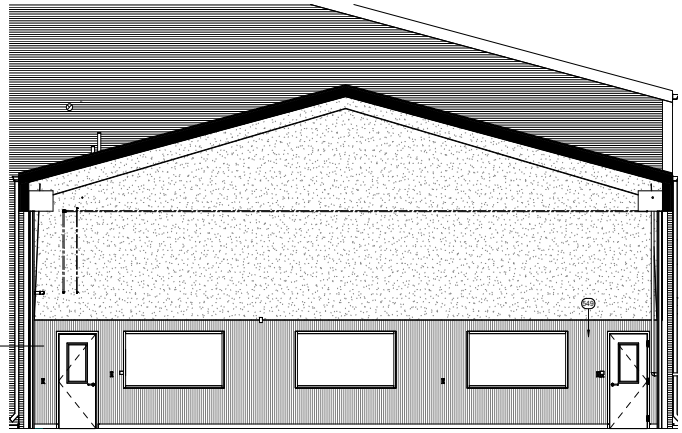
Exterior Elevations Area F

A-203

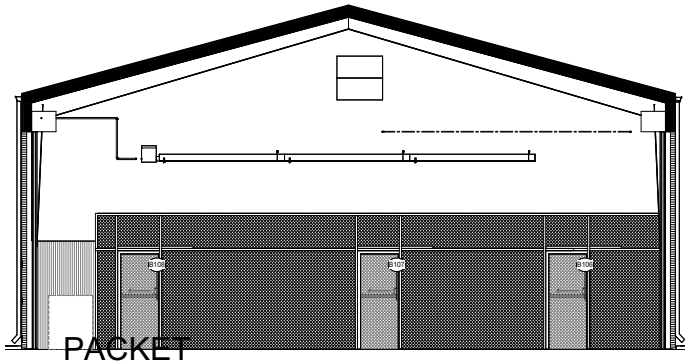
1/26/2022 10:35:12 AM



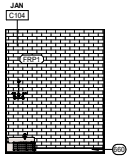
D1 D105 D106 D107 INTERIOR ELEVATION - 01
1/4" = 1'-0"



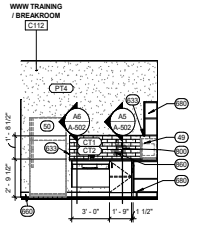
B1 B104 INTERIOR ELEVATION - 01
1/4" = 1'-0"



A1 B105-INTERIOR ELEVATION
1/4" = 1'-0"



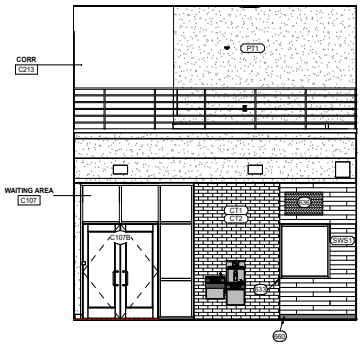
E4 C104
1/4" = 1'-0"



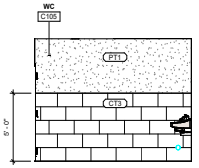
E5 C112 INTERIOR ELEVATION - 02
1/4" = 1'-0"

KEY NOTES
AS INDICATED BY: #

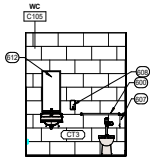
49	MICROWAVE
50	REF & VENDING, NIC, OFOI
549	METAL LINER PANEL
574	TV; COORDINATE INSTALLATION WITH OWNER, OFCI
600	GRAB BAR (GB)
603	PAPER TOWEL DISPENSER (PTD)
604	WASTE RECEPTACLE
607	TLT TISSUE DISPENSER (TTD-1)
608	SOAP DISPENSER (SD)
612	MIRROR (M1)
633	ALIGN
636	LASER CUT METAL WALL SIGNAGE; REF SPECIFICATION
660	BASE, AS SCHED
680	MILLWORK
800	REF PLUMBING
831	MECH EQUIP, REF MECH
860	REF ELECT



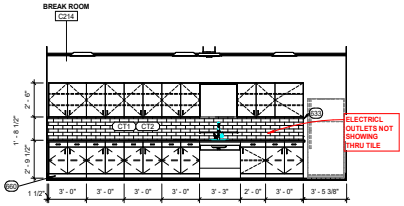
C4 C107
1/4" = 1'-0"



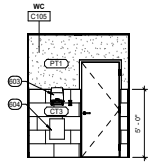
C5 C105 - 03
1/4" = 1'-0"



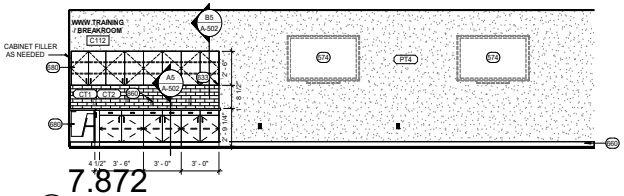
C6 C105 - 04
1/4" = 1'-0"



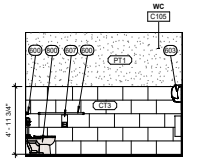
B4 C214 INTERIOR ELEVATION - 01
1/4" = 1'-0"



B6 C105 - 02
1/4" = 1'-0"



A4 C112 INTERIOR ELEVATION - 01
1/4" = 1'-0"



A6 C105 - 01
1/4" = 1'-0"

PACKET
7.872
February 8, 2022

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ARCHITECTURE

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Midland, TX 79701

PROJECT NO.
6077.21

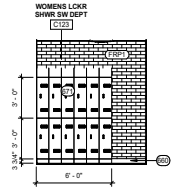
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

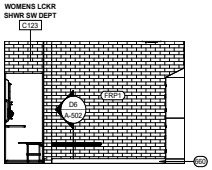
Interior Elevations Area B. C & D

A-211

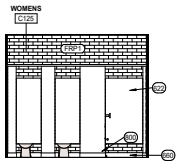
1/26/2022 10:35:55 AM



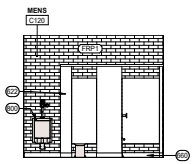
E1 C123-2
1/4" = 1'-0"



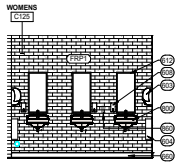
E2 C123-1
1/4" = 1'-0"



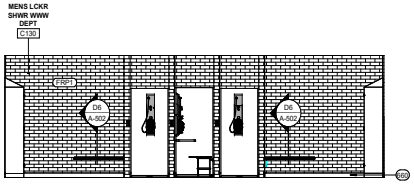
E3 C125-WC
1/4" = 1'-0"



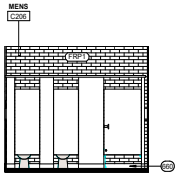
E4 C120-C128-WC
1/4" = 1'-0"



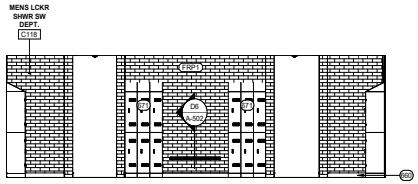
E5 C120-C125-C128-SINK
1/4" = 1'-0"



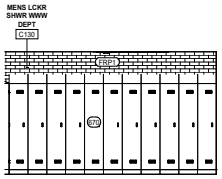
D1 C130-4
1/4" = 1'-0"



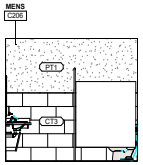
D3 C206-4
1/4" = 1'-0"



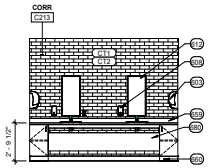
D4 C118-4
1/4" = 1'-0"



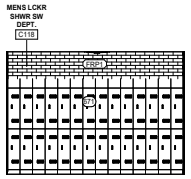
C2 C130-3
1/4" = 1'-0"



C3 C206-3
1/4" = 1'-0"



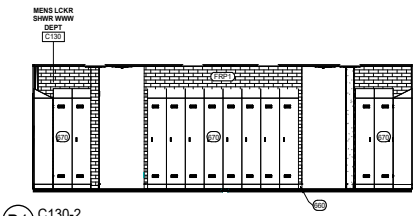
C4 C205/C206
1/4" = 1'-0"



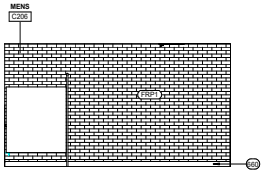
C5 C118-3
1/4" = 1'-0"

KEY NOTES
AS INDICATED BY: #

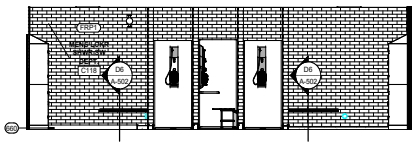
551	FEC
603	PAPER TOWEL DISPENSER (PTD)
604	WASTE RECEPTACLE
608	SOAP DISPENSER (SD)
612	MIRROR (M1)
622	TLT PARTITION
659	REF INT
660	BASE, AS SCHED
670	LOCKERS (L1)
671	LOCKERS (L2)
680	MILLWORK
800	REF PLUMBING
860	REF ELECT
861	LIGHT FIXTURE, REF ELECT



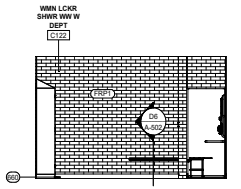
B1 C130-2
1/4" = 1'-0"



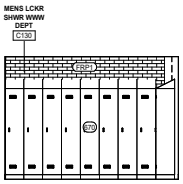
B3 C206-2
1/4" = 1'-0"



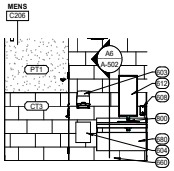
B4 C118-2
1/4" = 1'-0"



B6 C122-2
1/4" = 1'-0"



A2 C130-1
1/4" = 1'-0"



A3 C206-1
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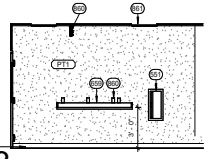
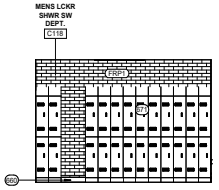
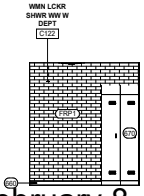


A4 B100 - 01
1/4" = 1'-0"



A5 C118-1
1/4" = 1'-0"



A6 C122-1
1/4" = 1'-0"

PACKET 7.873 February 8, 2022

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01/25/2022
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Midland Utilities Service Center
Water/Wastewater, Solid Waste, and Vehicle Services

CLIENT
City of Midland

401 N Carver St
Midland, TX 79701

PROJECT NO.
6077.21

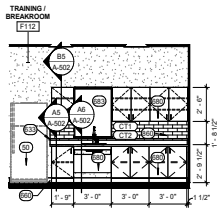
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

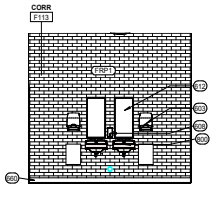
Interior Elevations Area B. C & D

A-212

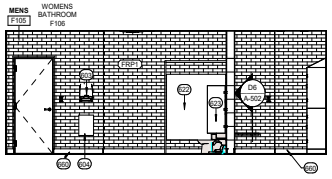
1/26/2022 10:36:43 AM



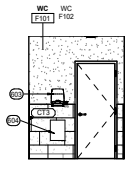
E2 F112 INTERIOR ELEVATION - 01
1/4" = 1'-0"



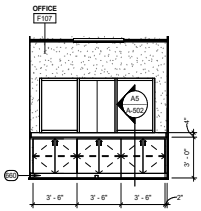
E3 F113 INTERIOR ELEVATION - 01
1/4" = 1'-0"



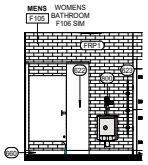
E4 F105 & F106 INT ELEV- 04
1/4" = 1'-0"



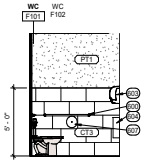
E5 F101 INTERIOR ELEVATION - 03
1/4" = 1'-0"



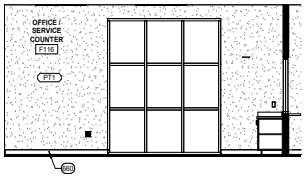
D3 F107 INTERIOR ELEVATION - 01
1/4" = 1'-0"



D4 F105 & F106 INT ELEV- 03
1/4" = 1'-0"



D5 F101 INTERIOR ELEVATION - 02
1/4" = 1'-0"



C2 F116 INTERIOR ELEVATION - 03
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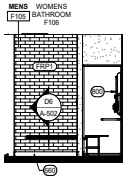
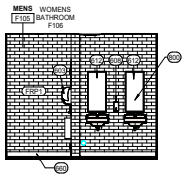
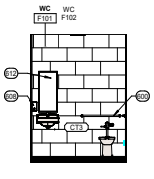


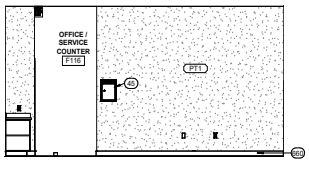
C3 F105 & F106 INT ELEV- 06
1/4" = 1'-0"



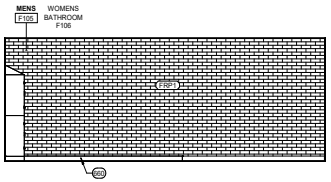
C4 F105 & F106 INT ELEV- 02
1/4" = 1'-0"



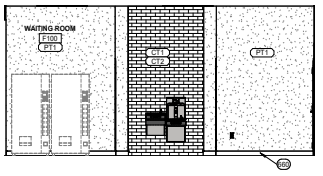
C5 F101 INTERIOR ELEVATION - 01
1/4" = 1'-0"



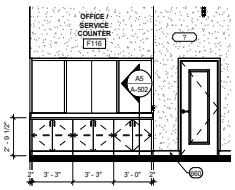
B2 F116 INTERIOR ELEVATION - 02
1/4" = 1'-0"



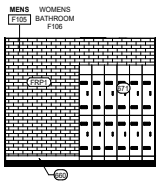
B3 F105 & F106 INT ELEV - 01
1/4" = 1'-0"



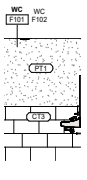
B5 F100 INTERIOR ELEVATION -02
1/4" = 1'-0"



A2 F116 INTERIOR ELEVATION - 01
1/4" = 1'-0"



A3 F105 & F106 INT ELEV- 05
1/4" = 1'-0"



A4 F105 INTERIOR ELEVATION - 04
1/4" = 1'-0"

A5 F100 INTERIOR ELEVATION -01
1/4" = 1'-0"

KEY NOTES

AS INDICATED BY: (#)

45	LOCKING KEY BOX
50	REF & VENDING, NIC, OFOI
54	FRAMELESS GLASS LOCKING PASS-THRU WINDOW
600	GRAB BAR (GB)
603	PAPER TOWEL DISPENSER (PTD)
604	WASTE RECEPTACLE
607	TLT TISSUE DISPENSER (TTD-1)
608	SOAP DISPENSER (SD)
612	MIRROR (M1)
622	TLT PARTITION
623	URINAL SCREEN
633	ALIGN
636	LASER CUT METAL WALL SIGNAGE; REF SPECIFICATION
660	BASE, AS SCHED
671	LOCKERS (L2)
680	MILLWORK
683	TACK BOARD
800	REF PLUMBING
860	REF ELECT

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ARCHITECTURE

01/25/2022

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Midland Utilities Service Center

Water/Wastewater, Solid Waste, and Vehicle Services

MIDLAND
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CLIENT
City of Midland

401 N Carver St
Midland, TX 79701

PROJECT NO.
6077.21

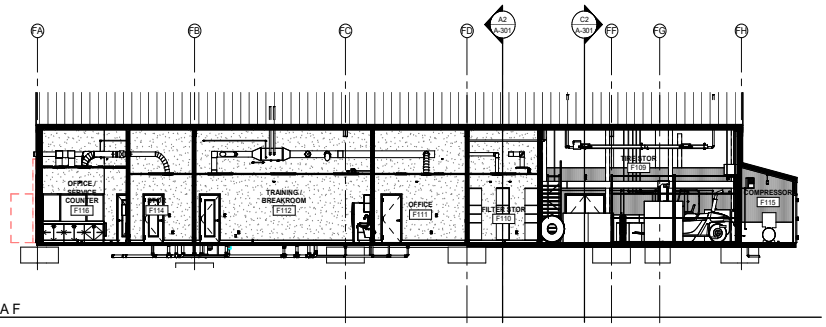
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

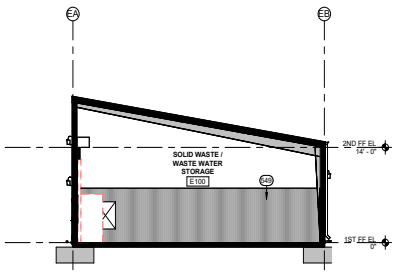
Interior Elevations Area F

A-213

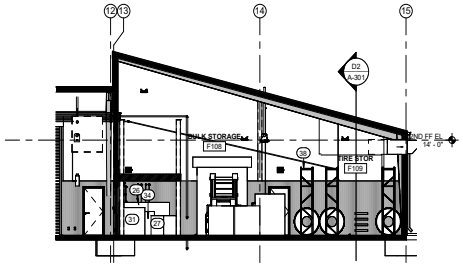
1/26/2022 10:36:00 AM



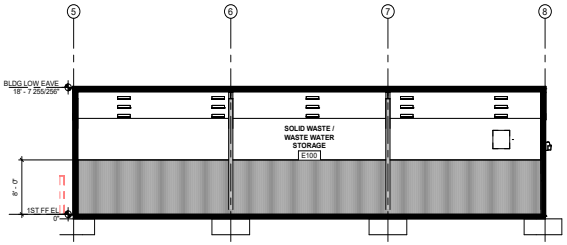
D2 BS - AREA F
1/8" = 1'-0"



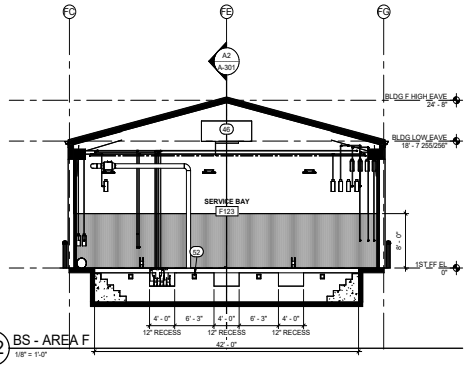
D5 BS - AREA E
1/8" = 1'-0"



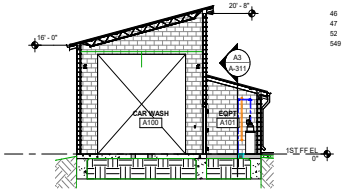
C2 BS - AREA F
1/8" = 1'-0"



C5 BS - AREA E
1/8" = 1'-0"



B2 BS - AREA F
1/8" = 1'-0"

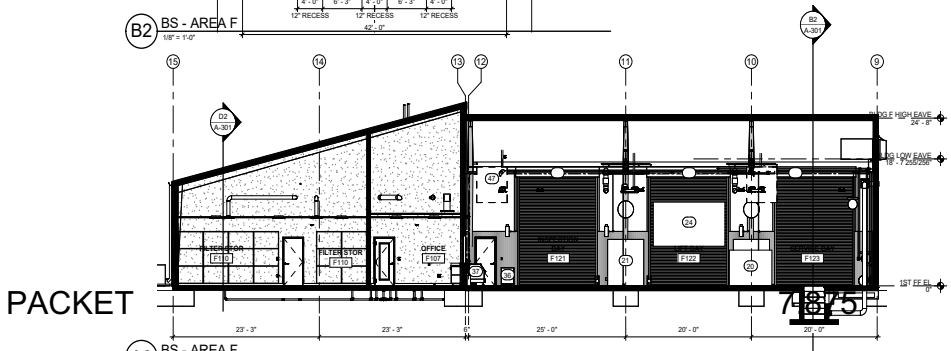


B5 BS- AREA A
1/8" = 1'-0"

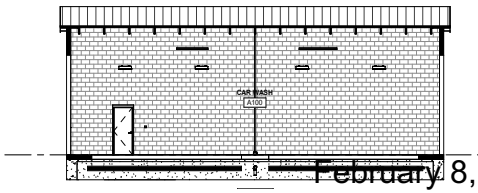
KEY NOTES

AS INDICATED BY: (#)

20	LARGE TIRE MACHINE, PRICE NEW OPPTION
21	SMALL TIRE MACHINE, OFCI
24	18,000 LB ROTARY VEHICLE LIFT (AR18EL); OFCI
26	1000 GAL USED OIL STORAGE, OFCI
27	OIL DRUM 55 GAL, 15W40, 5W30, 80-90W, HYDRAULIC, OFCI
31	500 GALLON OIL TANKS, OFCI
34	5/30 OIL WMI TANK, OFCI
36	INSPECTION STATION
37	MICRO FILTER, TANK & ICE MACHINE, OFCI
38	TIRE RACK, GLOBAL INDUSTRIAL TRUCK RACK 3 TIER BASIS OF DESIGN, 96"W X 24" DEEP X 120" H, CFCI, SECURED TO WALL AND EACH OTHER
46	EVAP COOLING
47	INFRARED HEAT
52	RECESSED LIGHTS IN SERVICE BAY TRENCH
549	METAL LINER PANEL



A2 BS - AREA F
1/8" = 1'-0"



A5 BS- AREA A
1/8" = 1'-0"

PACKET Page 75 of 75 February 8, 2022

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ARCHITECTURE

01/25/2022

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Midland Utilities Service Center

Water/Wastewater, Solid Waste, and Vehicle Services

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City of Midland

401 N Carver St
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

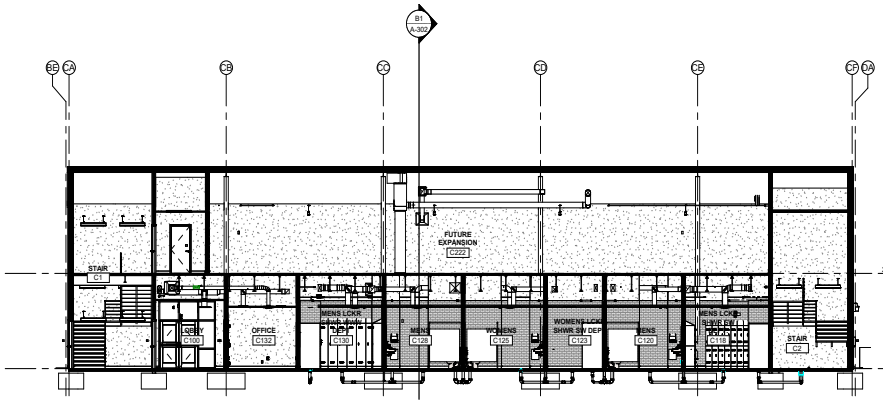
Building Sections Area A, Area E and Area F

A-301

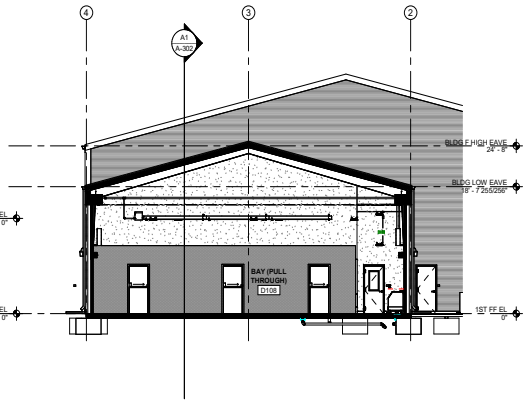
1/26/2022 10:36:16 AM

GENERAL NOTES

A. VERIFY DIMENSIONS.
B. BUILDING SECTION NOTES AS NEEDED.



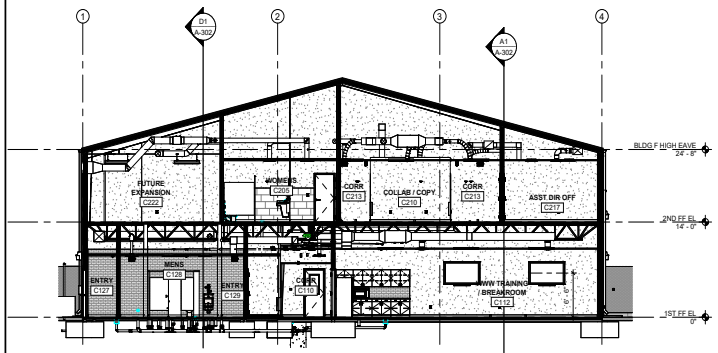
D1 AREA C - BS - 1
1/8" = 1'-0"



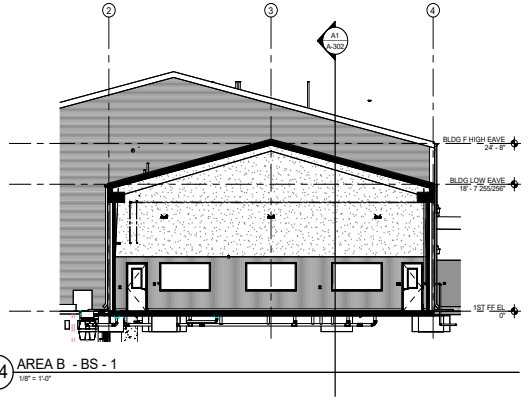
D4 AREA D - BS - 1
1/8" = 1'-0"

KEY NOTES

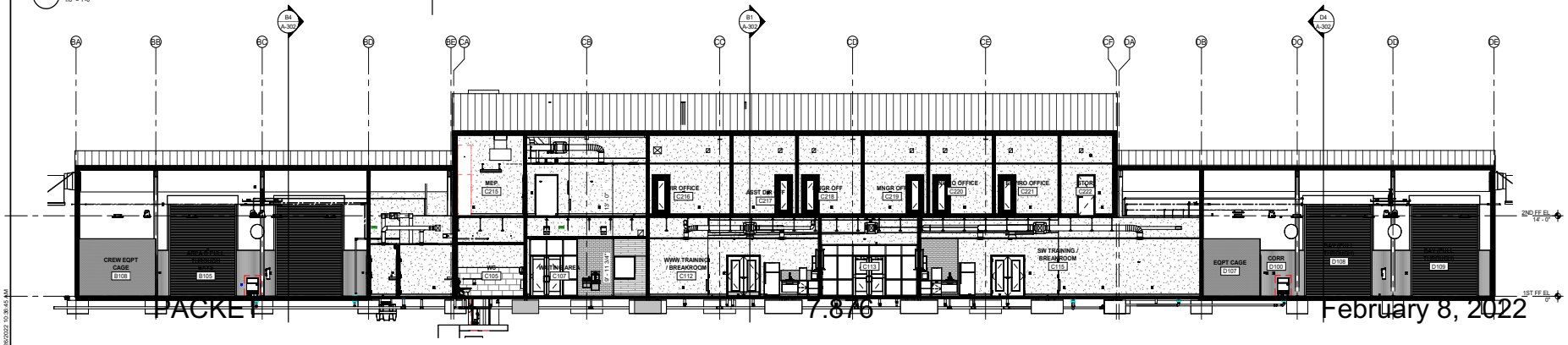
AS INDICATED BY: (#)



B1 AREA C - BS - 2
1/8" = 1'-0"



B4 AREA B - BS - 1
1/8" = 1'-0"



A1 AREA B, C, D - BS - 1
1/8" = 1'-0"

PACKET 7.876 February 8, 2022

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ARCHITECTURE

01/25/2022

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Water/Wastewater, Solid Waste, and Vehicle Services

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Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

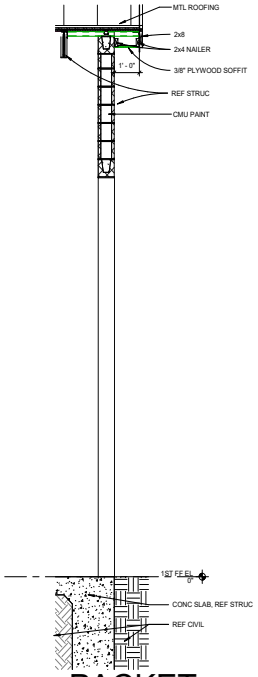
Building Sections Area B, C & D

A-302

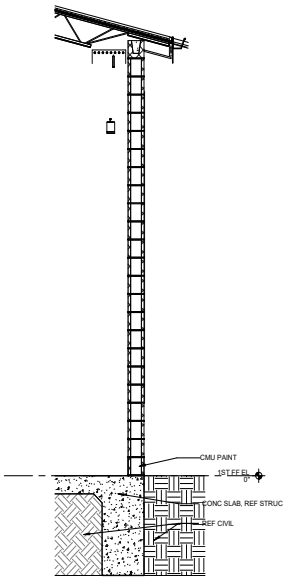
1/26/2022 10:36:45 AM

GENERAL NOTES

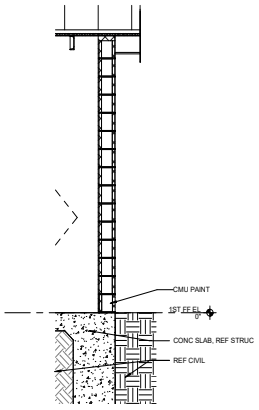
A. WALL SECTION NOTES AS NEEDED.



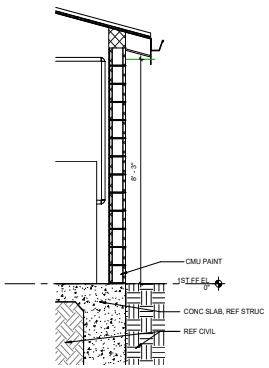
A1 BLDG A - 05
1/2" = 1'-0"



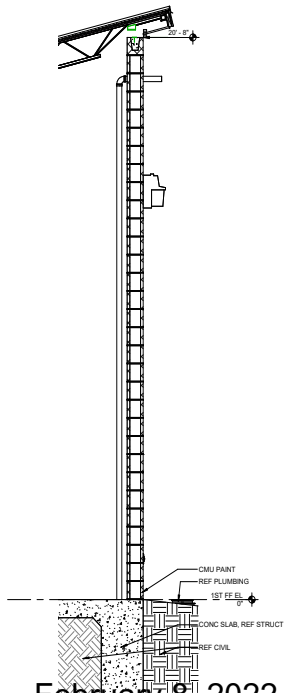
A2 BLDG A - 04
1/2" = 1'-0"



A3 BLDG A - 03
1/2" = 1'-0"



A4 BLDG A - 02
1/2" = 1'-0"



A5 BLDG A - 01
1/2" = 1'-0"

PACKET 7.877 February 8, 2022

1/26/2022 10:36:49 AM

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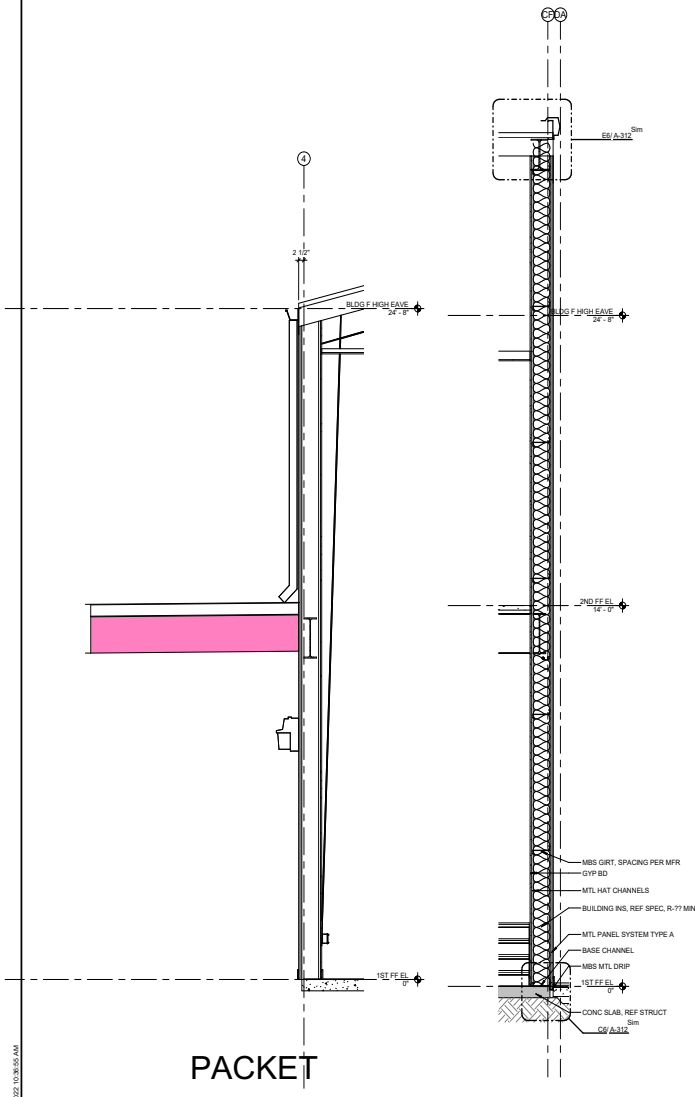
PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

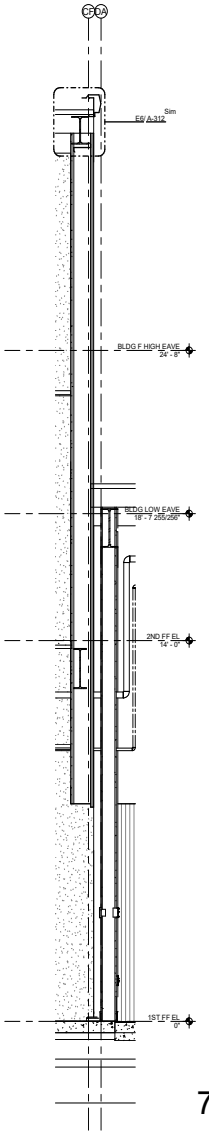
#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Wall Sections
Bldg A

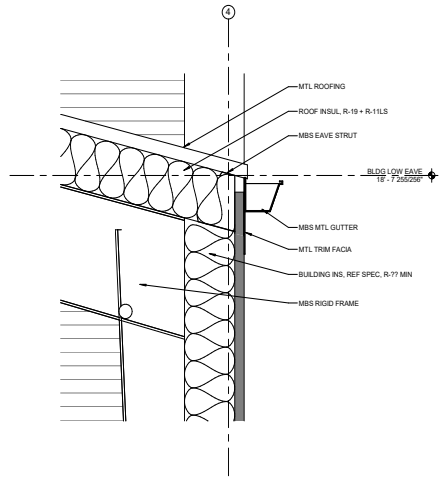
A-311



A1 FRONT CANOPY SECTION
1/2" = 1'-0"

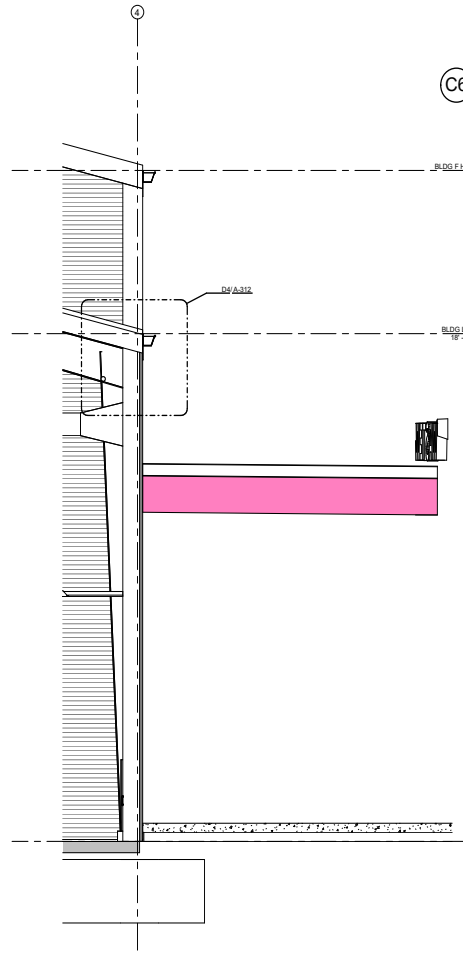


A2 BLDG C- 02
1/2" = 1'-0"

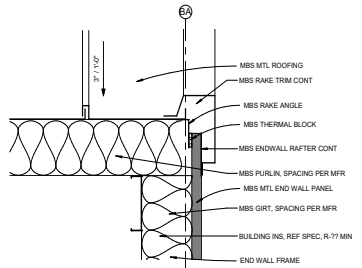


D4 DETAIL - MBS EAVE
1 1/2" = 1'-0"

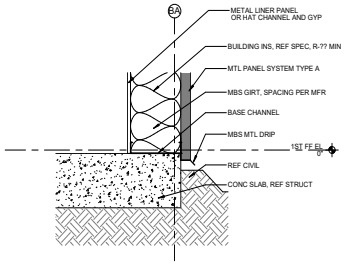
A3 BLDG C- 01
1/2" = 1'-0"



A4 BLDG B- 03
1/2" = 1'-0"



E6 DETAIL - MBS RAKE
1 1/2" = 1'-0"



C6 DETAIL - EXT WALL BASE
1 1/2" = 1'-0"

A6 BLDG B- 01
1/2" = 1'-0"

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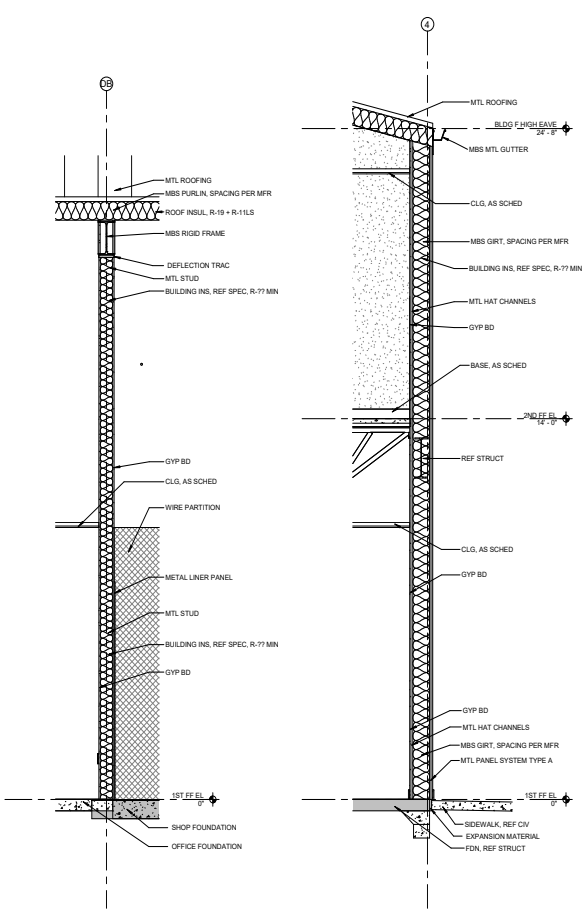
PROJECT NO.
6077.21

KEY PLAN
B C

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

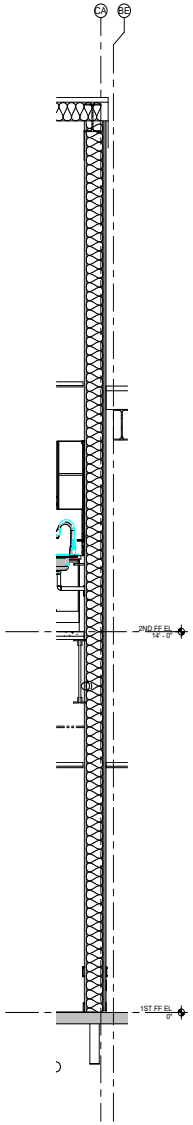
Wall Sections
Area B & C

A-312

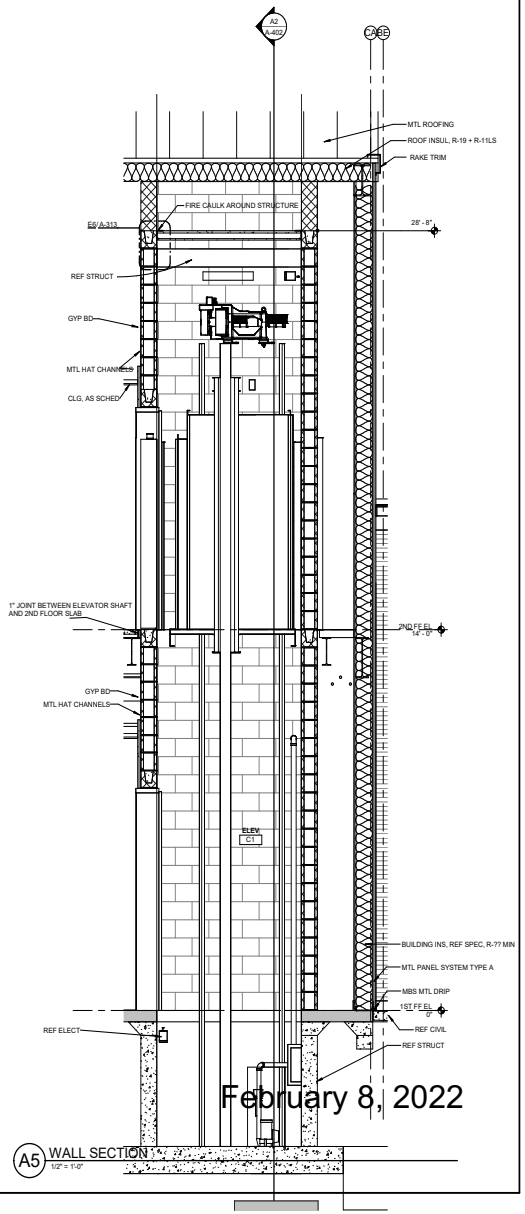


A2 WALL SECTION 1/2" = 1'-0"

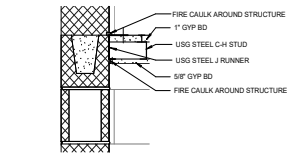
A3 WALL SECTION 1/2" = 1'-0"



A4 WALL SECTION 1/2" = 1'-0"



A5 WALL SECTION 1/2" = 1'-0"



E6 WALL DETAIL 1 1/2" = 1'-0"

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PROJECT NO.
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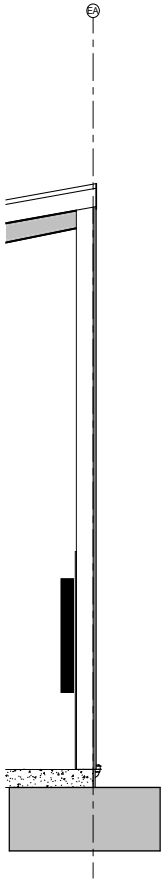
KEY PLAN
A B C D
E F

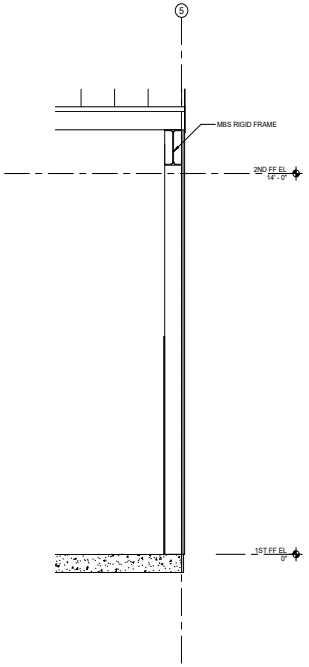
#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

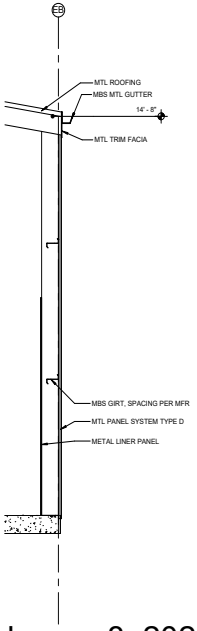
Wall Sections Area C and Area D

A-313

1/26/2022 10:37:04 AM







PACKET

7.880

February 8, 2022

A2 BLDG E - 04
1/2" = 1'-0"

A4 BLDG E - 02
1/2" = 1'-0"

A5 BLDG E - 01
1/2" = 1'-0"

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PROJECT NO.
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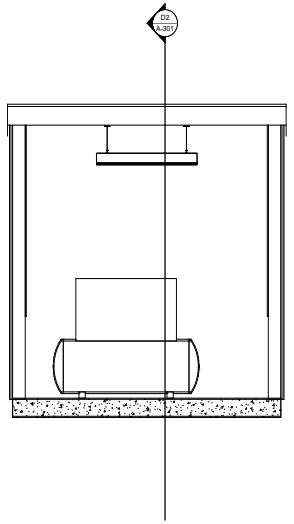
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

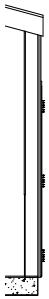
Wall Sections
Bldg E

A-314

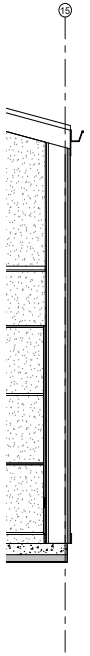
1/26/2022 10:37:07 AM



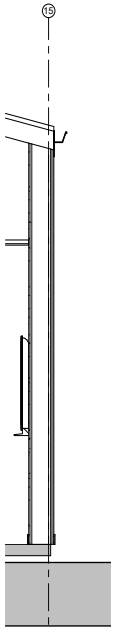
D4 BLDG F - 13
1/2" = 1'-0"



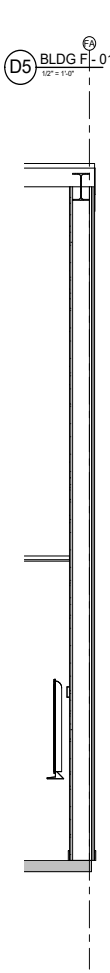
D5 BLDG F - 01
1/2" = 1'-0"



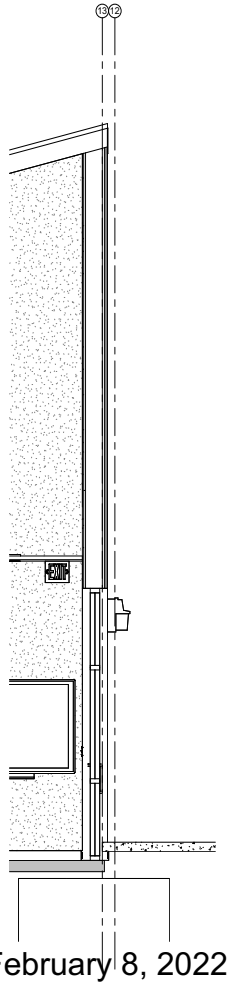
A3 BLDG F - 12
1/2" = 1'-0"



A4 BLDG F - 10
1/2" = 1'-0"



A5 BLDG F - 08
1/2" = 1'-0"



A6 BLDG F - 07
1/2" = 1'-0"

PACKET

7.881

February 8, 2022

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PROJECT NO.
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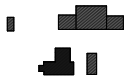
KEY PLAN
A B C D
E **F**

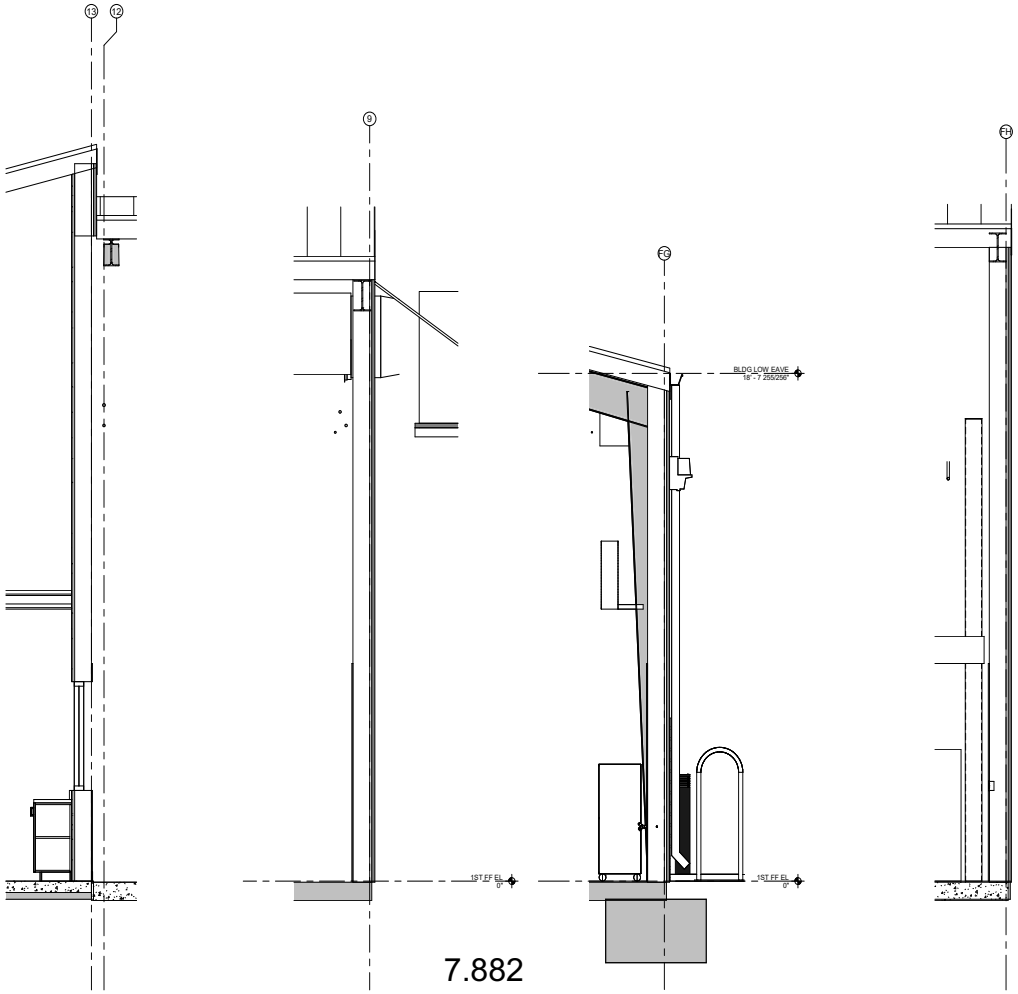


#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Wall Sections
Bldg F

A-315

1/26/2022 10:38:12 AM



A2 BLDG F - 06 1/2" = 1'-0"

A3 BLDG F - 05 1/2" = 1'-0"

A4 BLDG F - 04 1/2" = 1'-0"

A5 BLDG F - 02 1/2" = 1'-0"

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PROJECT NO.
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KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Wall Sections
Bldg F

A-316

1/26/2022 10:37:15 AM

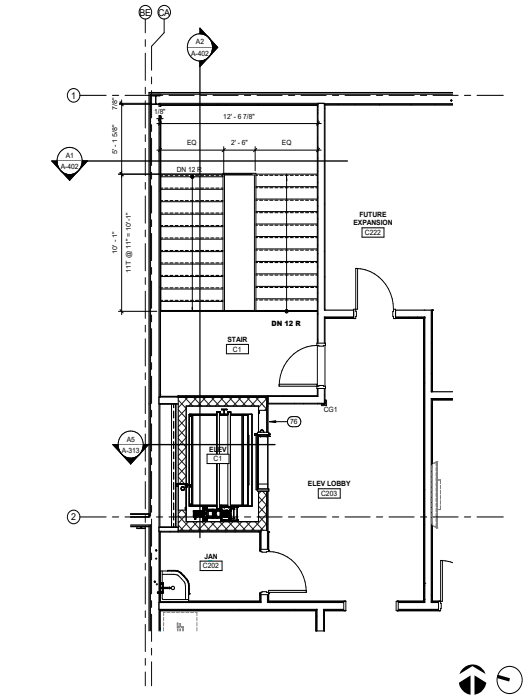
GENERAL NOTES

A. REFER TO ACCESSIBILITY STANDARDS SHEETS FOR TYPICAL MOUNTING HEIGHTS/LOCATIONS FOR TOILET ROOM ACCESSORIES.
B. ALL INTERIOR WALLS ARE A5e UNLESS NOTED OTHERWISE. REFER TO SHEET A-002 FOR INTERIOR PARTITION SCHEDULE.

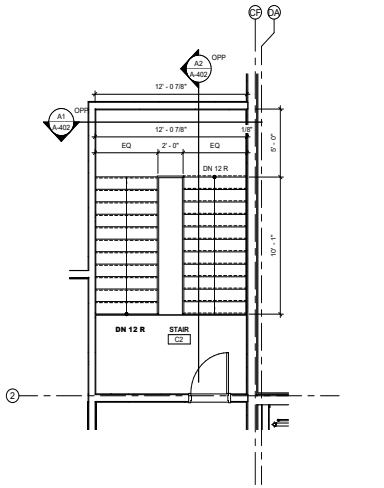
KEY NOTES

AS INDICATED BY: (#)

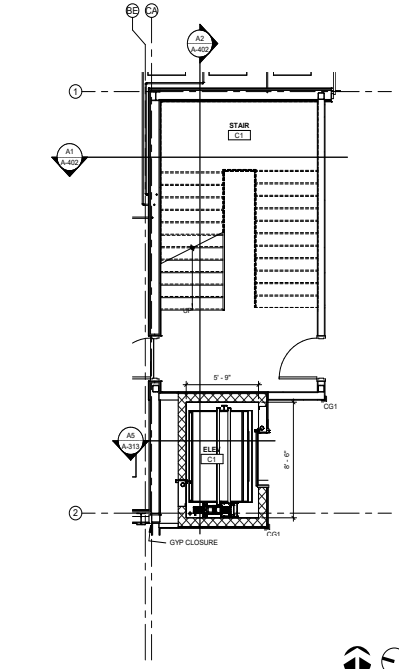
76 1" JOINT BETWEEN ELEVATOR SHAFT AND 2ND FLOOR SLAB



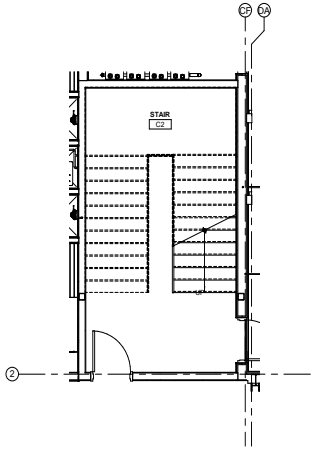
C2 2ND FLOOR PLAN - STAIR C101/C200
1/4" = 1'-0"



C4 2ND FLOOR PLAN - STAIR C116/C208
1/4" = 1'-0"



A2 1ST FLOOR PLAN - STAIR C101/C200
1/4" = 1'-0"



A4 1ST FLOOR PLAN - STAIR C116/C208
1/4" = 1'-0"

PACKET

7.883

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PROJECT NO.
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KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

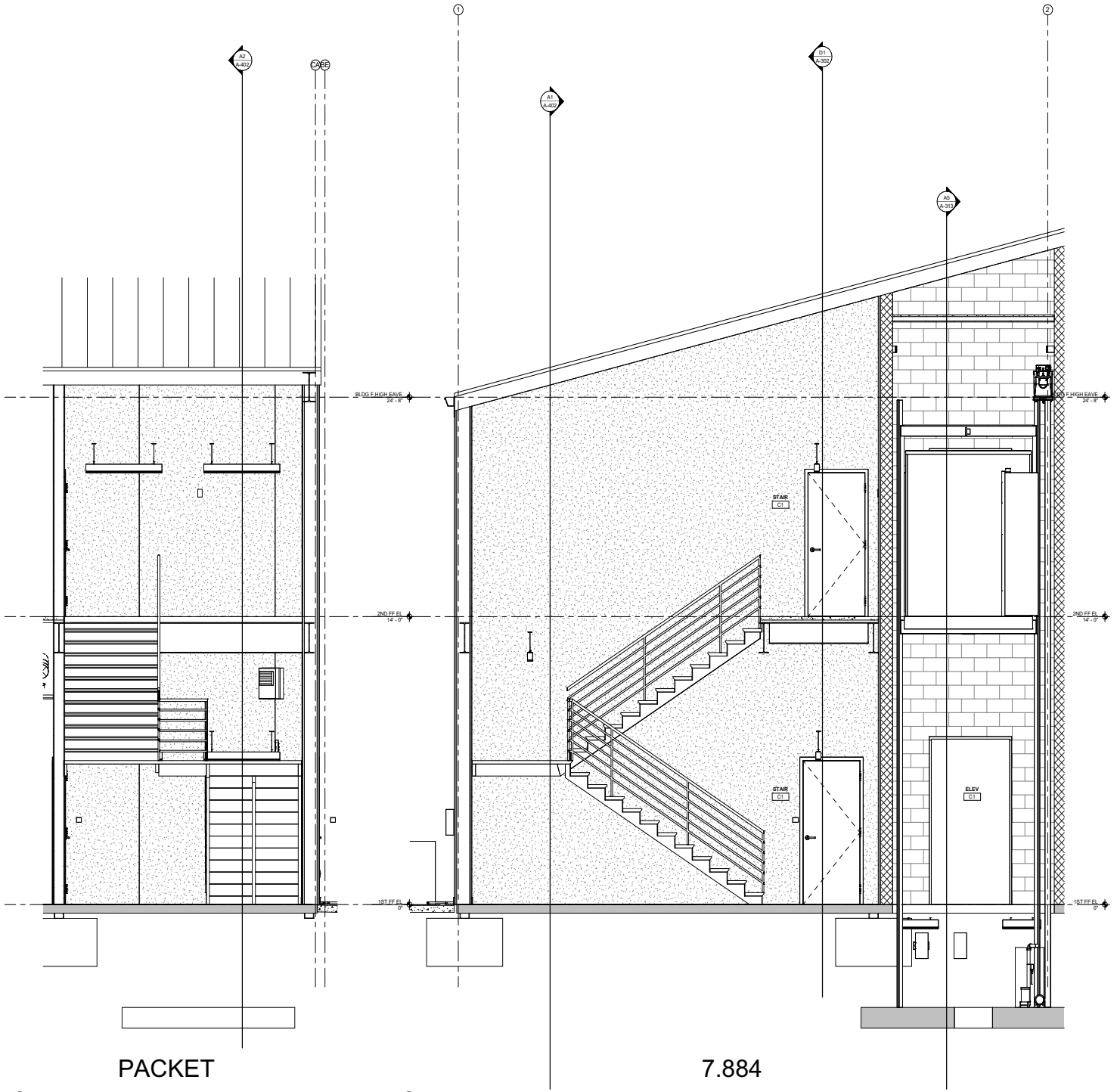
Enlarged Plans Area C Stairs & Elevator

A-401

1/26/2022 10:37:20 AM

GENERAL NOTES

A. VERIFY DIMENSIONS.
B. BUILDING SECTION NOTES AS NEEDED.



KEY NOTES

AS INDICATED BY: (#)

PACKET

7.884

February 8, 2022

A1 BLDG C- 1 - STAIR
1/2" = 1'-0"

A2 BLDG C - STAIR - 09
1/2" = 1'-0"

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PROJECT NO.
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KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

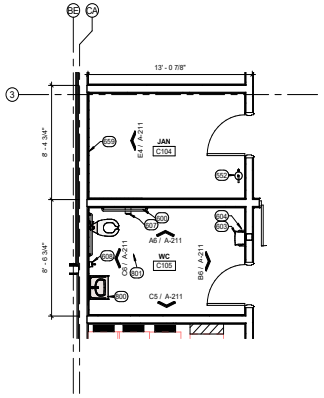
Stair Section
Building Area C

A-402

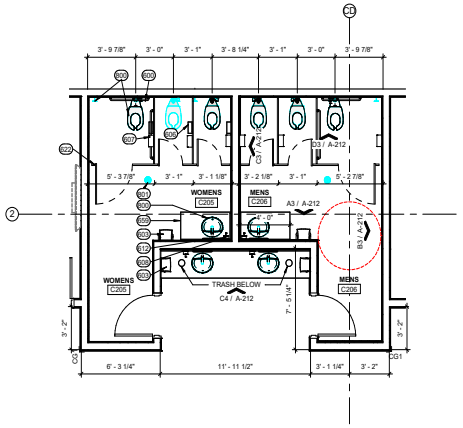
1/26/2022 10:37:24 AM

GENERAL NOTES

A. REFER TO ACCESSIBILITY STANDARDS SHEETS FOR TYPICAL MOUNTING HEIGHTS/LOCATIONS FOR TOILET ROOM ACCESSORIES.
B. ALL INTERIOR WALLS ARE A5e UNLESS NOTED OTHERWISE. REFER TO SHEET A-002 FOR INTERIOR PARTITION SCHEDULE.



C2 C105 & C104 PLAN
1/4" = 1'-0"

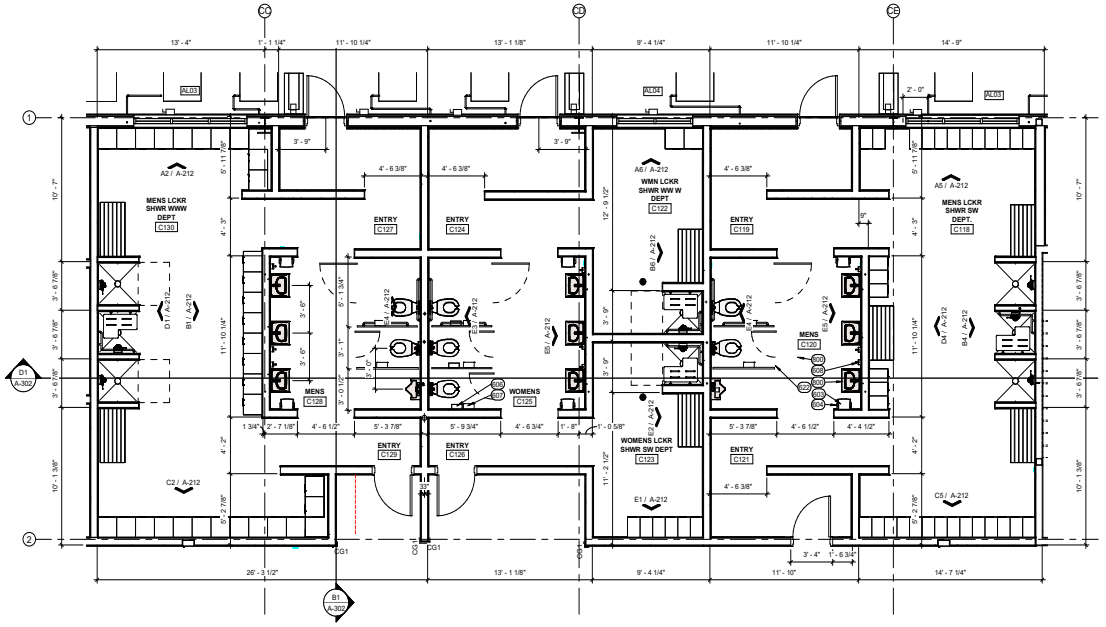


C4 FLR 2 - PLAN - AREA C - 05
1/4" = 1'-0"

KEY NOTES

AS INDICATED BY: (#)

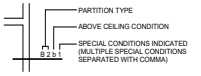
552	FEB
600	GRAB BAR (GB)
603	PAPER TOWEL DISPENSER (PTD)
604	WASTE RECEPTACLE
606	SANITARY NAPKIN DISPOSAL (SND)
607	TLT TISSUE DISPENSER (TTD-1)
608	SOAP DISPENSER (SD)
612	MIRROR (M1)
622	TLT PARTITION
659	REF INT
800	REF PLUMBING
801	FD. REF PLUMBING



A2 FLR 1 - PLAN AREA C - 02
1/4" = 1'-0"

PARTITION GENERAL NOTES

THE FOLLOWING PARTITION GRAPHIC SYMBOL AND THREE OR MORE PART NOTATION SYSTEM IS USED IN THE CONSTRUCTION DOCUMENTS FOR THIS PROJECT. NOTE: THE PARTITION CONSTRUCTION WILL MAINTAIN ITS DESIGNATION TO THE POINT OF AN INTERSECTING PARTITION. IF NO CHANGE IN DESIGNATION IS SHOWN BEYOND THE INTERSECTION, THE PREVIOUS PARTITION CONSTRUCTION DESIGNATION APPLIES. REFER TO CODE PLAN G-101 FOR RATED WALLS.



PACKET 7.885 February 8, 2022

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KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

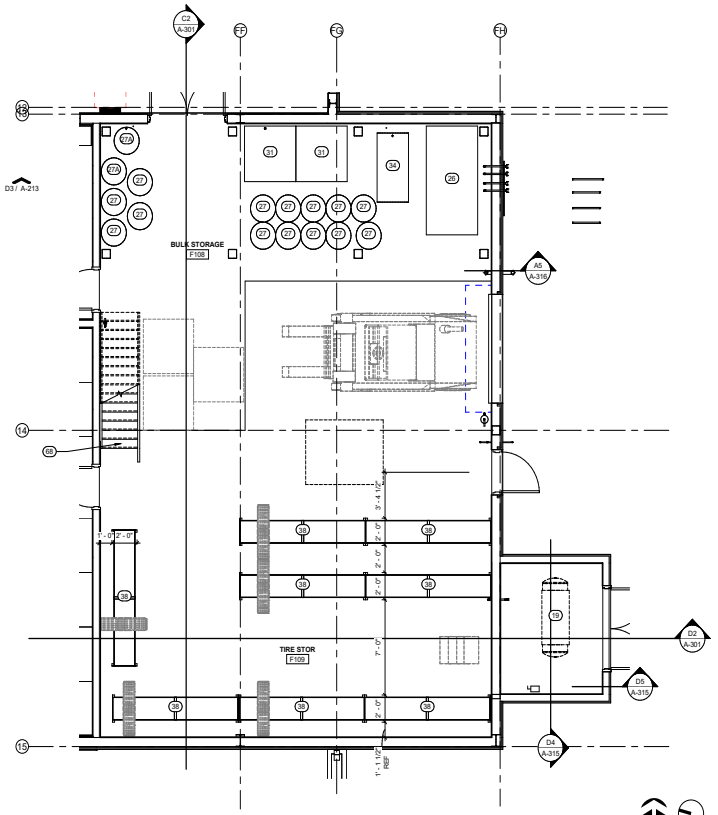
Enlarged Plans Area C

A-403

1/26/2022 10:38:33 AM

GENERAL NOTES

A. ENLARGED PLAN NOTES AS NEEDED.



C2 ENLARGED PLAN AREA F - TIRE/BULK STORAGE
1/4" = 1'-0"

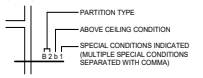
KEY NOTES

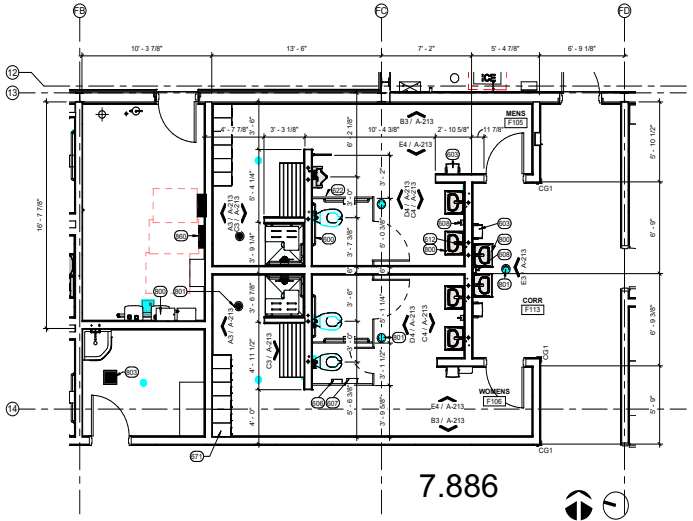
AS INDICATED BY: (#)

19	120 GAL AIR COMPRESSOR, OFCI
26	1000 GAL USED OIL STORAGE, OFCI
27	OIL DRUM 55 GAL, 15W40, 5W30, 80-90W, HYDRAULIC, OFCI
27A	OIL DRUM 55 GAL, 15W40, 5W30, 80-90W, HYDRAULIC, W/ HOSES, OFCI
31	500 GALLON OIL TANKS, OFCI
34	5/30 OIL WMI TANK, OFCI
38	TIRE RACK, GLOBAL INDUSTRIAL TRUCK RACK 3 TIER BASIS OF DESIGN, 96"W X 24" DEEP X 120" H, CFCI, SECURED TO WALL AND EACH OTHER
68	OPTION A MEZZANINE, STAIR AND SUPPORT COLS
600	GRAB BAR (GB)
603	PAPER TOWEL DISPENSER (PTD)
606	SANITARY NAPKIN DISPOSAL (SND)
607	TLT TISSUE DISPENSER (TTD-1)
608	SOAP DISPENSER (SD)
612	MIRROR (M1)
622	TLT PARTITION
671	LOCKERS (L2)
800	REF PLUMBING
801	FD. REF PLUMBING
803	FLOOR SINK, REF PLUMBING
860	REF ELECT

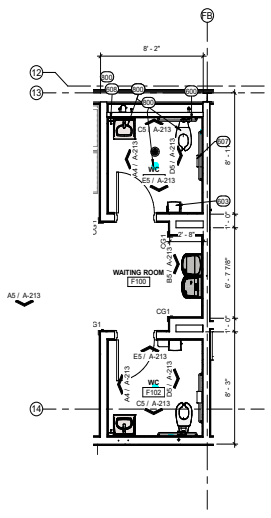
PARTITION GENERAL NOTES

THE FOLLOWING PARTITION GRAPHIC SYMBOL AND THREE OR MORE PART NOTATION SYSTEM IS USED IN THE CONSTRUCTION DOCUMENTS FOR THIS PROJECT. NOTE: THE PARTITION CONSTRUCTION WILL MAINTAIN ITS DESIGNATION TO THE POINT OF AN INTERSECTING PARTITION. IF NO CHANGE IN DESIGNATION IS SHOWN BEYOND THE INTERSECTION, THE PREVIOUS PARTITION CONSTRUCTION DESIGNATION APPLIES. REFER TO CODE PLAN G-101 FOR RATED WALLS.





A2 ENLARGED BATHROOM AREA F - SERVICE
1/4" = 1'-0"



A5 ENLARGED BATHROOM AREA F - FRONT
1/4" = 1'-0"

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ARCHITECTURE

01/25/2022

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City of Midland

401 N Carver St
Midland, TX 79701

PROJECT NO.
6077.21

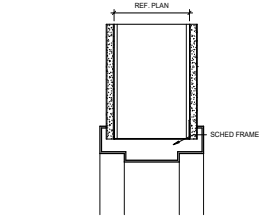
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

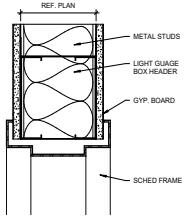
Enlarged Plans Area F

A-404

1/26/2022 10:37:40 AM



D4 HEAD -MTL STUD -SNGL
3" = 1'-0"



D5 HEAD -MTL STUD -DBL
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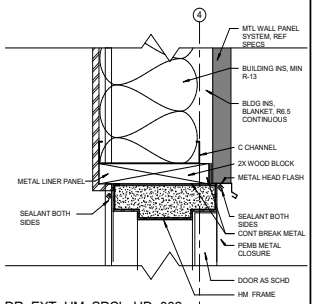
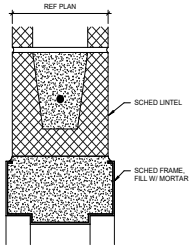


D6 DR_EXT_HM_SPCL_HD_002
3" = 1'-0"



C4 HEAD
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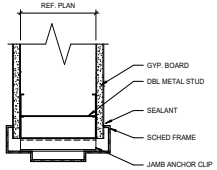
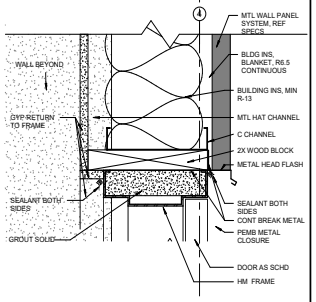


C5 JAMB -MTL STUD -SNGL
3" = 1'-0"



C6 DR_EXT_HM_SPCL_HD_001
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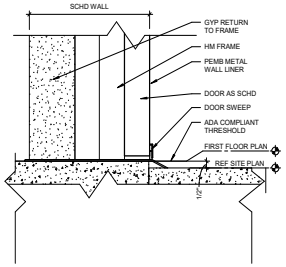
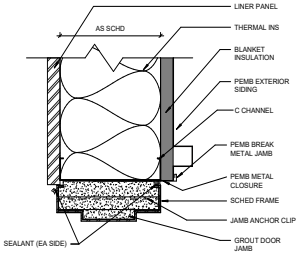


B1 SILL AT EXTERIOR DOOR
3" = 1'-0"



B3 JAMB
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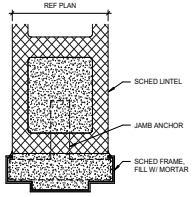

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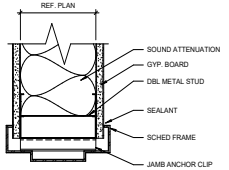
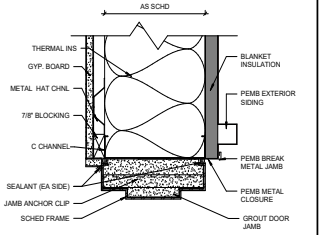
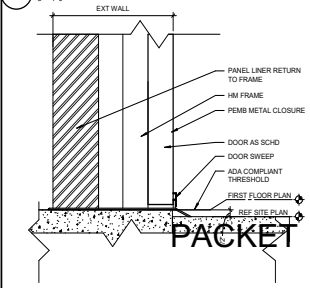


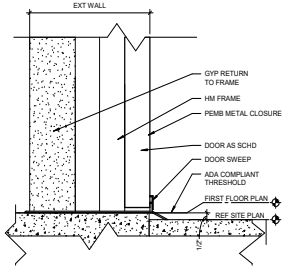
B5 JAMB -MTL STUD -SNGL
3" = 1'-0"



B6 JAMB
3" = 1'-0"



A1 SILL AT EXTERIOR DOOR
3" = 1'-0"



A2 SILL AT EXTERIOR DOOR
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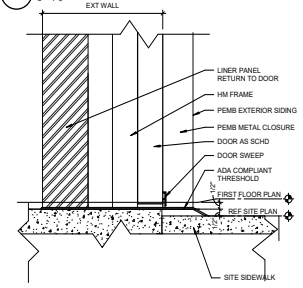

A3 SILL AT EXTERIOR DOOR
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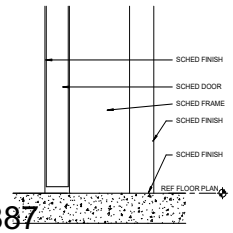
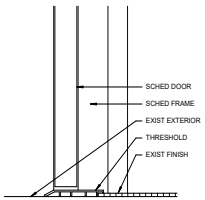
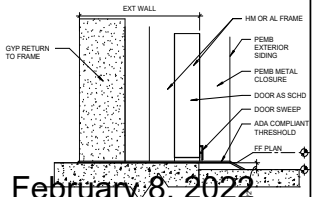


A4 SILL
3" = 1'-0"



A5 SILL
3" = 1'-0"



A6 SILL AT EXTERIOR DOOR
3" = 1'-0"

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01/25/2022

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Midland, TX 79701

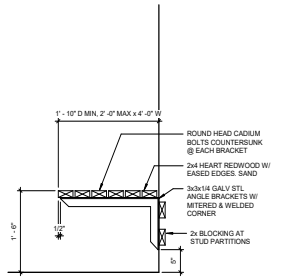
PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

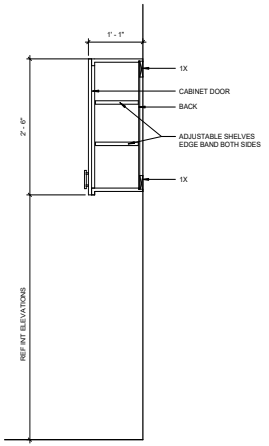
#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Door Details

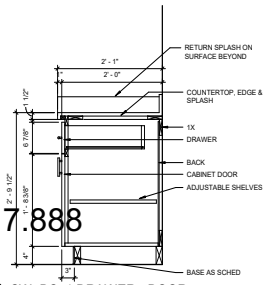
A-501



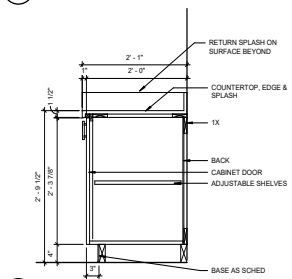
D6 ADA-TRANSFER BENCH
1" = 1'-0"



B5 CW_UC_DOOR
1" = 1'-0"



A4 CW_BC_1 DRAWER - DOOR
1" = 1'-0"



A5 CW_BC_1 DOOR
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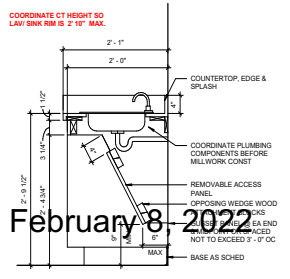

A6 CW_BC_SINK ADA_ADULT
1" = 1'-0"

PACKET

7.888

February 8, 2022

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Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

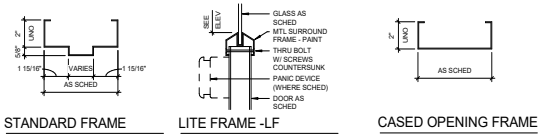
#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Millwork Sections

A-502

1/26/2022 10:37:46 AM

STANDARD DOOR DETAILS



STANDARD FRAME | LITE FRAME -LF | CASED OPENING FRAME

DOOR SCHEDULE FOOTNOTES X=EXISTING

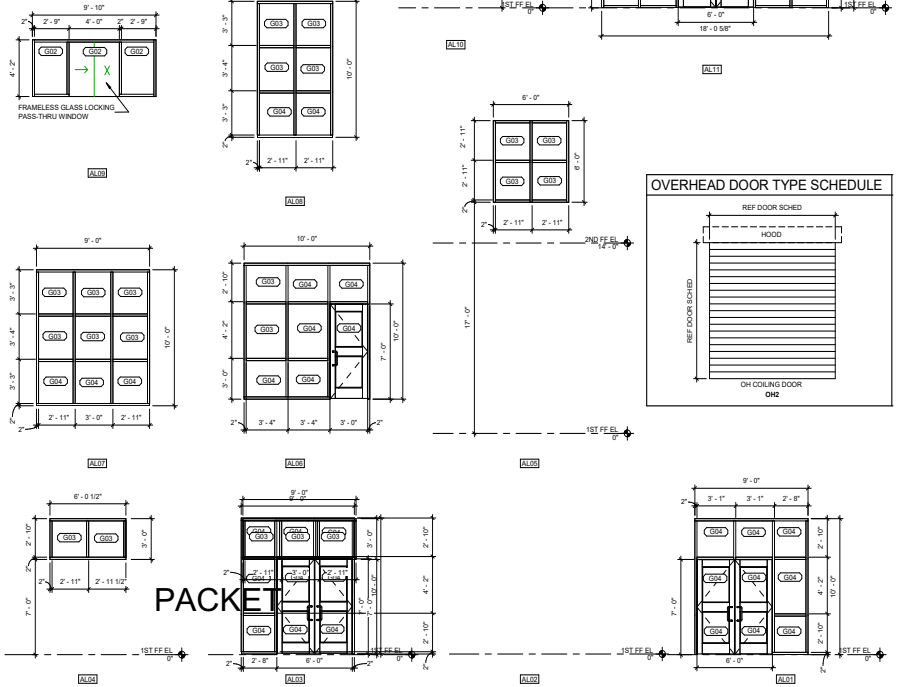
1. DOOR SIZE (INDICATED IN INCHES)
   SIZE INDICATED IS NOMINAL. REDUCTION SHALL BE MADE FOR THRESHOLD & EDGE CLEARANCES. ALL DOORS ARE 1 3/4" THICK UNO.
2. DOOR CONSTRUCTION/VENEER (## - REF TO I-001)
   SCTF = SOLID CORE WOOD, TRANSPARENT FINISH
   SCPF = SOLID CORE WOOD, PAINT FINISH
   SCLP = SOLID CORE WOOD, LAMINATED PLASTIC COVER
   SCR = SOLID CORE WOOD, IMPACT RESISTANT
   HM = HOLLOW METAL
   HMLP = HOLLOW METAL, LAMINATED PLASTIC COVER
   HMPF = HOLLOW METAL, PAINT FINISH
   OHCD = OVERHEAD DOOR
   CL = CHAIN LINK SLIDING GATE
3. DOOR TYPE
   REFER TO DOOR TYPE SCHEDULE
4. FRAME CONSTRUCTION
   REFER TO DOOR FRAME SCHEDULES
   HM = HOLLOW METAL
   HMPF = HOLLOW METAL, PAINT FINISH
   ALUM = ALUMINUM
   WDTF = SOLID WOOD, TRANSPARENT FINISH
   WDPF = SOLID WOOD, PAINT FINISH
5. DETAIL # —A1/A-701— SHEET #
   " = SIMILAR
6. REMARKS
   MISCELLANEOUS (GENERAL NOTES)
   M1 = VERIFY ROUGH OPENINGS
   M2 = DOOR TRIM TO MATCH EXISTING
   M3 = LEAD LINED DOOR & FRAME
   M4 = VERIFY FINISH OPENING SIZE
   M5 = PROVIDE HOSPITAL STOP ON FRAME. SEE STANDARD DOOR DETAILS (THIS SHEET)
   M6 = CASED OPENING FRAME
   M7 = SEE STANDARD DOOR DETAILS (THIS SHEET) FOR DOOR HEAD / TRANSOM PANEL DETAILS
   M8 = CARD ACCESS REQUIRED
7. TRANSOM
   T1 = WOOD TRANSOM TO MATCH DOOR, SIZE AS NOTED
   T2 = HOLLOW METAL TRANSOM TO MATCH EXISTING

GLAZING SCHEDULE

MARK	TYPE
	CHANGE GLASS TYPE
G01	CLEAR GLASS
G02	CLEAR FULLY TEMPERED GLASS
G03	TINTED GLASS
G04	TINTED FULLY TEMPERED GLASS

ALUMINUM FRAME SCHEDULE AL00

NOTE: FRAME FACES ARE 2" UNO

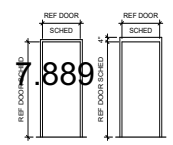


DOOR SCHEDULE

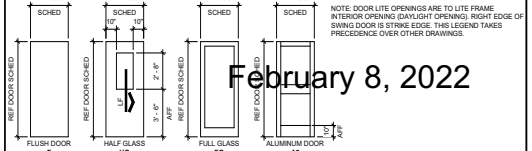
MARK	PR	DOOR WIDTH¹	DOOR WIDTH²	DOOR HEIGHT¹	DOOR CONST¹	DOOR TYPE¹	DOOR GLAZING	FIRE RATING	FRAME CONST¹	FRAME SIZE²	DETAILS³ HEAD	DETAILS³ JAMB	DETAILS³ SILL	AAOS Shared HW Set	REMARKS⁴
		3' - 0"		7' - 0"	HMPF	F	-		HM01	9"					
A100A		3' - 0"		7' - 0"	HMPF	F	-		HM02	8 1/4"	C4/A-501	B4/A-501	A4/A-501		M8
B100A		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	C6/A-501	B6/A-501	A6/A-501		M8
B101A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
B102A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
B103A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
B105A		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
B105B		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
B105C		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
B105D		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
B105E		3' - 0"		7' - 0"	HMPF	HG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
B105F		3' - 0"		7' - 0"	HMPF	HG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
B105G		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	D6/A-501	B3/A-501			sill to asphalt, M8
B106		3' - 0"		7' - 0"											M8, CL
B107		3' - 0"		7' - 0"											M8, CL
B108		3' - 0"		7' - 0"											M8, CL
C1A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
C1B		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	D5/A-501	B6/A-501	A6/A-501		M8
C2A		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	C6/A-501		A6/A-501		M8
C2B		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
C100A		3' - 0"		7' - 0"	HMLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
C100B	*	3' - 0"	3' - 0"	7' - 0"	ALUM	A2	G04		ALUM				A6/A-501		M8
C103A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
C104A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
C106A		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	C6/A-501	B6/A-501	A6/A-501		M8
C107A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		
C107B	*	3' - 0"	3' - 0"	7' - 0"	ALUM	A1	G04		ALUM						M8
C107C	*	3' - 0"	3' - 0"	7' - 0"	ALUM	A2	G04		ALUM				A6/A-501		
C109A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
C112A	*	3' - 0"	3' - 0"	7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		
C112B	*	3' - 0"	3' - 0"	7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		
C112C	*	3' - 0"	3' - 0"	7' - 0"	ALUM	A2	G04		ALUM				A6/A-501		M8
C113A	*	3' - 0"	3' - 0"	7' - 0"	ALUM	A2	G04		ALUM				A6/A-501		M8
C113B	*	3' - 0"	3' - 0"	7' - 0"	ALUM	A2	G02		ALUM						
C115A	*	3' - 0"	3' - 0"	7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		
C115B	*	3' - 0"	3' - 0"	7' - 0"	HMPF	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		
C115C	*	3' - 0"	3' - 0"	7' - 0"	ALUM	A2	G04		ALUM				A6/A-501		M8
C115D	*	3' - 0"	3' - 0"	7' - 0"	ALUM	A2	G04		ALUM				A6/A-501		M8
C117A		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	C6/A-501				M8
C119A		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	C6/A-501	B6/A-501	A2/A-501		M8
C121A		3' - 0"		7' - 0"	SCTF	F	-		HM01	8 1/4"					M6
C124A		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	C6/A-501	B6/A-501	A3/A-501		M8
C126A		3' - 0"		7' - 0"	SCTF	F	-		HM01	8 1/4"					
C127A		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	C6/A-501	B6/A-501	A3/A-501		M8
C129A		3' - 0"		7' - 0"	SCTF	F	-		HM01	8 1/4"					
C131A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
C132A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
C133A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
D100A		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	D6/A-501	B3/A-501			M8,
D100B		3' - 0"		7' - 0"											M8, CL
D100C		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	D6/A-501	B3/A-501			sill to asphalt, M8
D100D		3' - 0"		7' - 0"											M8, CL
D100E		3' - 0"		7' - 0"	HMLP	HG	-		HM01	8 1/4"					M8
D101A		3' - 0"		7' - 0"	HMLP	F	-		HM01	8 1/4"					M8
D107A		3' - 0"		7' - 0"											M8, CL
D108A		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
D108B		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
D109A		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
D109B		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
E100A		14' - 0"		14' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
E100B		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	D6/A-501	B3/A-501	A1/A-501		M8
E100C		14' - 0"		14' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
E100D		14' - 0"		14' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
E100E		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	D6/A-501	B3/A-501	A1/A-501		M8
F100A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
F100B		3' - 0"		7' - 0"	ALUM	A2	G04		ALUM				A6/A-501		
F101A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"					
F102A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"					
F103A		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"			A2/A-501		M8
F104A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
F105A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		
F106A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		
F107A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
F108A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"					M8
F108B	*	3' - 0"	3' - 0"	7' - 0"	HMPF	F	-		HM01	5 7/8"			B1/A-501		M8
F109A				10' - 0"											COILING OVERHEAD DOOR
F109B		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	D6/A-501	B3/A-501			sill to asphalt, M8
F110A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"					M8
F110B		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
F111A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		M8
F112A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A4/A-501		
F114A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501 (D6/A-501@ oxHeader ?)	B5/A-501	A4/A-501		M8
F115A	*	3' - 0"	3' - 0"	7' - 0"	HMPF	F	-		HM01	8 1/4"		B3/A-501 SIM			sill to asphalt, M8
F117		3' - 0"		7' - 0"	HMPF	F	-		HM01	5 7/8"			A5/A-501		DEMO EXISTING DOOR AND REPLACE, M8
F120A		3' - 0"		7' - 0"	HMPF	HG	-		HM01	8 1/4"			B1/A-501		M8
F120B		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	D6/A-501	B3/A-501			M8
F120C		3' - 0"		7' - 0"	HMPF	F	-		HM01	8 1/4"	D6/A-501	B3/A-501	A3/A-501		M8
F121A		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
F121B		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
F122A		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
F122B		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
F123A		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
F123B		12' - 0"		16' - 0"	OHCD	OH2			OVHD						COILING OVERHEAD DOOR
C1C		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C2C		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C203A		4' - 0"		7' - 0"					HM01	8 1/4"					M6
C203B		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C204A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		
C204B		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		
C205A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		
C206A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		
C207A		4' - 0"		7' - 0"					HM01	8 1/4"					M6
C209A		4' - 0"		7' - 0"					HM01	8 1/4"					M6
C209B		4' - 0"		7' - 0"					HM01	8 1/4"					M6
C211A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C212A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C214A		3' - 0"		7' - 0"					HM01	8 1/4"					M8
C214B		3' - 0"		7' - 0"					HM01	8 1/4"					M8
C215A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C216A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C217A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C218A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C219A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C220A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C221A		3' - 0"		7' - 0"	SCLP	FG	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C222A		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8
C222B		3' - 0"		7' - 0"	SCLP	F	-		HM01	8 1/4"	D5/A-501	B5/A-501	A5/A-501		M8

HOLLOW METAL FRAME SCHEDULE HM00

NOTE: FRAME FACES ARE 2" UNO



DOOR TYPE SCHEDULE



NOTE: DOOR LITE OPENINGS ARE TO LITE FRAME INTERIOR OPENING (DAYLIGHT OPENING). RIGHT EDGE OF SWING DOOR IS STRIKE EDGE. THIS LEGEND TAKES PRECEDENCE OVER OTHER DRAWINGS.

PACKET 7.889 February 8, 2022

12/6/2022 10:38:00 AM

Parkhill

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ARCHITECTURE

01/25/2022

Parkhill.com

Midland Utilities Service Center
Water/Wastewater, Solid Waste, and Vehicle Services

MIDLAND Feel the Energy!

CLIENT
City of Midland

401 N Carver St
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Door & Glazing Schedule

A-601

INTERIOR MATERIAL ABBREVIATIONS

A
ACT — ACOUSTICAL TILE CEILING
AWT — ACOUSTICAL WALL TREATMENT

B
BG — BUMPER GUARD

C
CB — COVE BASE
CG — CORNER GUARD
CHR — CHAIR RAIL
CPT — CARPET
CT — CERAMIC TILE
CURT — CUBICAL CURTAIN (PRIVACY, STAGE)

D
DLS — DIMENSIONAL LETTERS
DRS — DOUBLE ROLLER SHADE

F
FLS — FLUID APPLIED SPORTS FLOORING
FP — FOLDING PARTITION
FWP — FABRIC WRAPPED PANELS
FBP — FIBER REINFORCED PLASTIC

G
GLS — ARCHITECTURAL TILE
GLT — GLASS TILE
GF — GLASS FILM
GT — GROUT

H
HIC — HIGH IMPACT WALLCOVERING
HLB — HORIZONTAL LOUVER BLIND
HPC — HIGH-PERFORMANCE COATING
HR — HANDRAIL

K
KPI — KICKPLATE

L
LINO — LINOLEUM
LKR — LOCKER
LVT — LUXURY VINYL TILE

M
MT — METAL THRESHOLD
MTL — METAL TRANSITION
MTLB — METAL BASE

P
PB — PAINTED BASE
PC — POLISHED CONCRETE
PF — PLASTIC FABRICATIONS
PLAM — PLASTIC LAMINATE
PMTL — PAINTED METAL
PT — PAINT

Q
QT — QUARRY TILE
QTZ — QUARTZ SLAB

R
RACC — RESILIENT ACCESSORY
RB — RESILIENT BASE (VINYL, RUBBER, TP)
RBR — RUBBER (TILE AND SHEET)
RES — RESIN PANEL
RFS — RESINOUS FLOORING SYSTEMS
RSN — PLASTIC RESIN PANEL
RVL — REVEAL

S
SCN — SEALED CONCRETE
SCB — SELF COVE BASE
SGN — SIGNAGE
SRF — SLIP RESISTANT PROTECTIVE FLOORING
SRS — SINGLE ROLLER SHADE
SSM — SOLID SURFACE MATERIAL
SST — STAINLESS STEEL
SWS — SPECIAL WALL SURFACES
SV — SHEET VINYL

T
TC — TOILET COMPARTMENTS
TER — TERRAZZO
TKBD — TACKBOARD
TPF — TRANSPARENT FINISH
TS — TRANSITION STRIP

V
VCT — VINYL COMPOSITION TILE
VWC — VINYL WALL COVERING

W
WD — WOOD DOOR
WDF — WOOD FLOORING
WF — WINDOW FILM
WPC — WOOD PANEL CEILING

INTERIOR MATERIAL LEGEND

MARK	DESCRIPTION	MANUFACTURER	STYLE	COLOR	REMARKS
06 05 00 - RECLAIMED WOOD WALL PANELING					
SWS1	SPECIAL WALL SURFACES	STIKWOOD		VANDYKE	
06 41 16 - PLASTIC LAMINATE CLAD ARCHITECTURAL CABINETS					
PLAM1	PLASTIC LAMINATE UPPER AND LOWER CABINETS	WILSONART		Y0762 | SOCIAL CHERRY	
08 14 23.16 PLASTIC LAMINATE FACED WOOD DOORS					
PLAM1	PLASTIC LAMINATE DOOR	WILSONART		Y0762 | SOCIAL CHERRY	
09 30 13 - CERAMIC TILING					
CT1	CERAMIC TILE SIZE: 3" X 6" GROUT	DALTILE CUSTOM BUILDING PRODUCTS	CLASSIC CEG-LITE 100% SOLIDS EPOXY	WHITE 381 | BRIGHT WHITE	INSTALLATION: RUNNING BOND
CT2	CERAMIC TILE SIZE: 3" X 6" GROUT	DALTILE CUSTOM BUILDING PRODUCTS	CLASSIC CEG-LITE 100% SOLIDS EPOXY	SEA BREEZE 381 | BRIGHT WHITE	INSTALLATION: RUNNING BOND
CT3	CERAMIC TILE SIZE: 12" X 24" GROUT	DESIGN AND DIRECT SOURCE CUSTOM BUILDING PRODUCTS	VOLARE | LOOM CEG-LITE 100% SOLIDS EPOXY	TAUPE | TEXTURED MATTE 386 | OYSTER GRAY	INSTALLATION: RUNNING BOND
CT4	CERAMIC TILE SIZE: 12" X 24" GROUT	DALTILE CUSTOM BUILDING PRODUCTS	VOLUME 1.0 CEG-LITE 100% SOLIDS EPOXY	INTENSITY PEBBLE 09 | NATURAL GRAY	INSTALLATION: STACKED
MTL1	METAL TRANSITION	SCHLUTER SYSTEMS	QUADEC	SATIN ANODIZED ALUMINUM	CAP WALL TILE AND CORNERS
MTL2	METAL TRANSITION	SCHLUTER SYSTEMS SCHLUTER SYSTEMS	RENO-TK RENO-U	SATIN ANODIZED ALUMINUM SATIN ANODIZED ALUMINUM	TILE TO LVT LVT TO RFS
09 51 13 - ACOUSTIC PANEL CEILINGS					
ACT1	ACOUSTIC CEILING TILE (FIELD) SIZE: 24" X 24"	ARMSTRONG	ULTIMA	WHITE	
09 65 13 - RESILIENT BASE AND ACCESSORIES					
RB1	RESILIENT BASE 4" 4" COVE WITH TOE	TARKETT		29 | MOON ROCK	
RACC1	RESILIENT TRANSITION	TARKETT	SLT-29-F	29 | MOON ROCK	LVT TO RUBBER
RACC2	RESILIENT TRANSITION	TARKETT	SLT-179-L	179 | STEEL	LVT TO SEALED CONCRETE
09 65 19 - RESILIENT TILE FLOORING					
LVT1	LUXURY VINYL TILE SIZE: 9" X 48" X 13/64"	J&J	POWER PLAY 5MM	INFORMATION	INSTALLATION: RUNNING BOND
LVT2	LUXURY VINYL TILE SIZE: 9" X 48" X 13/64"	J&J	POWER PLAY 5MM	LEVERAGE	INSTALLATION: RUNNING BOND
LVT3	LUXURY VINYL TILE SIZE: 6" X 36" X 3/32"	ARMSTRONG	EXCHANGE	CATHODE GRAY	INSTALLATION: RUNNING BOND
09 65 66 - RESILIENT ATHLETIC FLOORING					
RBR1	RUBBER TILE SIZE: 25" X 25" x 5/16"	SURVIVOR SPORTFLOOR	BIG CHIP	GREY	INSTALLATION: STACKED
RBR2	RUBBER TILE SIZE: 25" X 25" x 5/16"	SURVIVOR SPORTFLOOR	BIG CHIP	BLUE	INSTALLATION: STACKED
09 67 23 - RESINOUS FLOORING					
RFS1	SEAMLESS EPOXY FLOORING	FLOROCK	FLOROCHIP	PURE GRANITE	
CB1	COVE BASE 6" COVE BASE	INTEGRAL		(RFS1)	METAL TRIM CAP
RFS2	RESINOUS FLOORING SYSTEM	FLOOR COATINGS ETC	ECONOSURF | ES-2065 65-MIL BROADCAST	SC-001 OXFORD GRAY	
CB2	COVE BASE 6" COVE BASE	INTEGRAL		(RFS2)	METAL TRIM CAP
09 68 13 - TILE CARPETING					
CPT1	CARPET TILE SIZE: 18" X 36" X 13/64"	J&J	KINETEX | TIMBER DEMI-PLANK	CATALPA	INSTALLATION: PARQUET
CPT2	CARPET TILE SIZE: 24" X24" X 19/64"	PATCRAFT	CONNECTING	SAUNTER	INSTALLATION: MONOLITHIC
09 77 20 - DECORATIVE FIBERGLASS REINFORCED WALL PANELS					
FRP1	FIBER REINFORCED PLASTIC PANELS	MARLITE	SYMMETRIX	P100 | WHITE	
09 91 23 - INTERIOR PAINTING					
PT1	PAINT	SHERWIN WILLIAMS		7008 | ALABASTER	
PT2	PAINT	SHERWIN WILLIAMS		7029 | AGREEABLE GRAY	
PT3	PAINT	SHERWIN WILLIAMS		PANTONE 301	
PT4	PAINT	SHERWIN WILLIAMS		7031 | MEGA GREIGE	
SCN1	SEALED CONCRETE		REFERENCE SPECIFICATION	CLEAR	
09 96 00 - HIGH-PERFORMANCE COATINGS					
HPC1	HIGH PERFORMANCE COATING		REFERENCE SPECIFICATION	7008 | ALABASTER	
10 21 13.16 - PLASTIC LAMINATE CLAD TOILET COMPARTMENTS					
TC1	TOILET COMPARTMENTS	WILSONART		BLACKBIRD	
10 26 00 - WALL AND DOOR PROTECTION					
CG1	CORNER GUARD	INPRO		STAINLESS STEEL	
10 51 13 - METAL LOCKERS					
LKR1	METAL LOCKERS	REPUBLIC		94 | JET BLACK	
12 24 13 - ROLLER WINDOW SHADES					
SRS1	SINGLE ROLLER SHADE 3% OPENNESS	DRAPER	E SCREEN DECO	POPLAR	FASCIA FINISH: CLEAR ANODIZED
DRS2	DOUBLE ROLLER SHADE BLACKOUT	DRAPER	E SCREEN DECO EQUINOX BLACKOUT 0100 SERIES	POPLAR FLAX	FASCIA FINISH: CLEAR ANODIZED
12 36 61.16 SOLID SURFACING COUNTERTOPS					
SSM1	SOLID SURFACE MATERIAL	LIVING STONE		APOLLO	

GENERAL NOTES

A. THE INTERIOR MATERIAL LEGEND LISTS THE COLORS, PATTERNS AND TEXTURES REQUIRED FOR INTERIOR FINISHES, INCLUDING BOTH FACTORY APPLIED COLORS THAT ARE EXPOSED TO VIEW IN THE FINISHED CONSTRUCTION. SPECIFIC LOCATIONS WHERE THE VARIOUS MATERIALS ARE REQUIRED ARE INDICATED IN DRAWING. WHEN COLOR IS NOT DESIGNATED FOR ITEMS, THE CONTRACTOR SHALL ASK FOR A COLOR SELECTION.
B. ALL DISSIMILAR FLOORING SHALL BE TERMINATED IN THE CENTERLINE OF THE DOOR UNO, AND WITH AN ADA COMPLIANT TRANSITION IN HEIGHT REQUIRED TO ACCOMMODATE HEIGHT OF MATERIAL AS SPECIFIED IN THE PROJECT MANUAL.
C. CEILING COLORS SHALL APPLY TO CEILING SURFACES INCLUDING SOFFITS, FURRED DOWN AREAS, GRILLES, DIFFUSERS, REGISTERS, AND ACCESS PANELS. CEILING COLOR SHALL ALSO APPLY TO JOIST, CONDUIT AND PIPING WHERE JOISTS AND DECK ARE EXPOSED AND REQUIRED TO BE PAINTED.

GENERAL FINISH NOTES

FLOORS:
A. REFERENCE FLOOR FINISH PLANS.

BASE:
A. BASE SHALL BE (RB1) UNO.
B. WHERE WALL TILE IS SCHEDULED IN RESTROOMS, WALL TILE SHALL SERVE AS BASE IN RESTROOMS, UNO.
C. WHERE RESINOUS FLOORING IS SCHEDULED, THERE SHALL BE A RESINOUS COVE BASE.

WALLS:
A. ALL WALLS SHALL BE PAINTED (PT1) UNO.
B. WHERE (FRP1) IS DENOTED, MATERIAL SHALL BE FULL HEIGHT ABOVE SCHEDULED FLOORING AND BASE.
C. EXPOSED WALL TILE EDGES AND CORNERS SHALL RECEIVE A METAL EDGE CAP (MTL1).

CEILINGS:
A. ACOUSTICAL CEILING SHALL BE (ACT1).
B. DRYWALL CEILINGS SHALL BE PAINTED (PT1).
C. EXPOSED DECK, STRUCTURAL STEEL, MECHANICAL DUCTWORK AND ELECTRICAL CONDUIT SHALL BE PAINTED (PT4).

MILLWORK:
A. UPPER AND LOWER MILLWORK SHALL BE (PLAM1).
B. COUNTERTOPS SHALL BE (SSM1).

MISCELLANEOUS:
A. DOOR AND WINDOW TRIM SHALL BE (PT2).
B. HANDRAILS SHALL BE (PT2).
C. WINDOW STOOLS SHALL BE (PLAM1).
D. WALL COLOR SHALL EXTEND TO CEILING AND BE APPLIED TO ALL WALLS.

WALL FINISH LEGEND

1 RESTROOM WALL TILE

PAINT ABOVE	PT1
METAL TRIM	MTL1
TILE TO 5'-0" AFF	CT3

2 ACCENT WALL TILE

TILE @ 25% RANDOM MIX	CT2
TILE @ 75% RANDOM MIX	CT3
REFERENCE ELEVATION A-211: A4, B4, C4 , E5	
A-212: C4 A-213: B5, E2	

3 SPECIAL WALL SURFACE

TOP OF BASE TO FULL HEIGHT	SWS1
4" COVE BASE	RB1

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PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
-	01/10/2022	Architectural Site Plan

Interior Legends & Abbreviations

I-001

1/25/2022 7:50:44 PM
R_I-001

GENERAL NOTES

A. REFERENCE INTERIOR MATERIAL LEGEND FOR LIST OF COLORS, PATTERNS AND TEXTURES REQUIRED FOR INTERIOR FINISHES, INCLUDING BOTH FACTORY APPLIED COLORS THAT ARE EXPOSED TO VIEW IN THE FINISHED CONSTRUCTION. WHEN COLOR IS NOT DESIGNATED FOR ITEMS, THE CONTRACTOR SHALL ASK FOR A COLOR SELECTION.
B. ALL DISSIMILAR FLOORING SHALL BE TERMINATED IN THE CENTERLINE OF THE DOOR UNO, AND WITH AN ADA COMPLIANT TRANSITION IN HEIGHT REQUIRED TO ACCOMMODATE HEIGHT OF MATERIAL AS SPECIFIED IN THE PROJECT MANUAL.
C. LENGTH OF FLOORING PRODUCT SHALL BE INSTALLED AS INDICATED BY THE DIRECTION OF ARROWS UNO.

GENERAL FINISH NOTES

FLOORS:
A. REFERENCE FLOOR FINISH PLANS.

BASE:
A. BASE SHALL BE (RB1) UNO.
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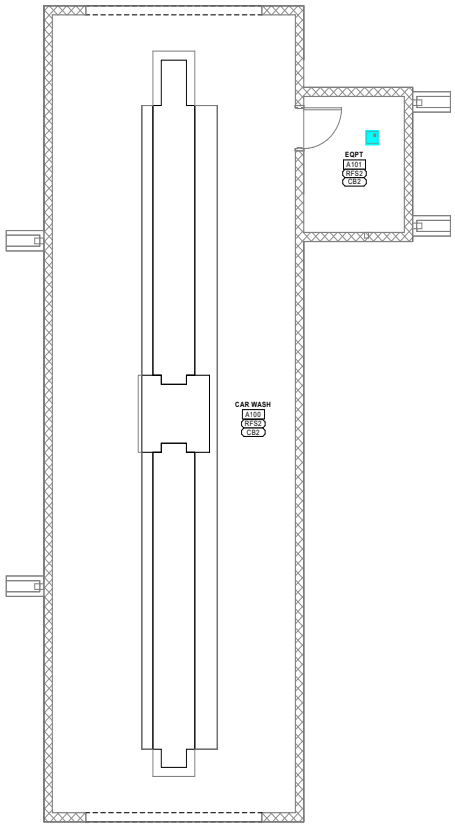

PLAN NORTH TRUE NORTH

A1 FLOOR FINISH PLAN - AREA A
1/4" = 1'-0"

0 4' 8' 20'

PACKET 7.891 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/10/2022	Architectural Site Plan

Floor Finish Plan - Area A

I-111

1/25/2022 7:50:44 PM

GENERAL NOTES

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C. LENGTH OF FLOORING PRODUCT SHALL BE INSTALLED AS INDICATED BY THE DIRECTION OF ARROWS UNO.

KEY NOTES

AS INDICATED BY: (#)

632 INSTALLATION: (RBR1) AT 75%, (RBR2) AT 25% RANDOM MIX

633 ALIGN

GENERAL FINISH NOTES

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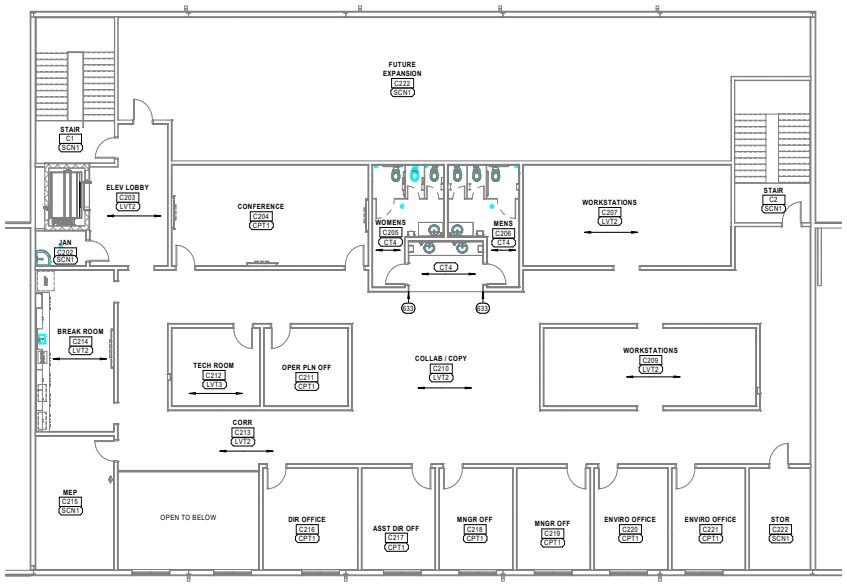
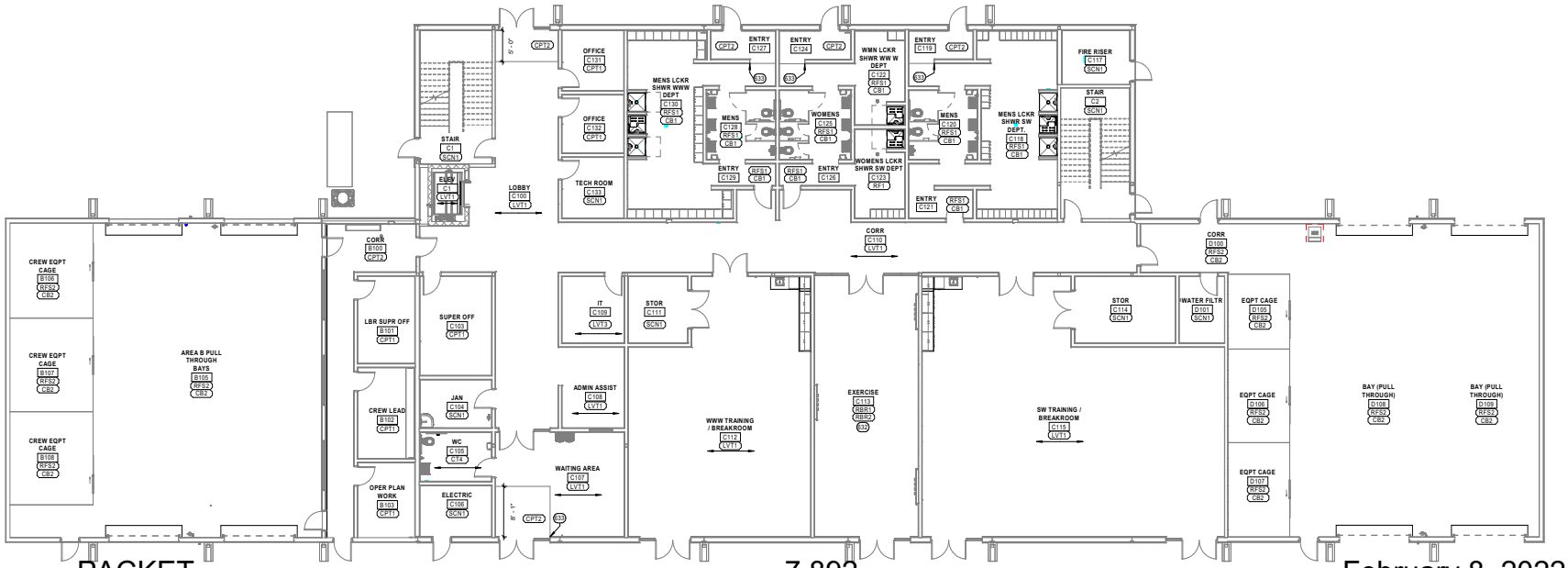


PLAN NORTH TRUE NORTH

C2 FLOOR FINISH PLAN - AREA C
1/8" = 1'-0"

0 4' 8' 20'



PACKET 7.892 February 8, 2022

PLAN NORTH TRUE NORTH

A1 FLOOR FINISH PLAN - AREA BCD
1/8" = 1'-0"

0 4' 8' 20'

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/10/2022	Architectural Site Plan

Floor Finish Plan - Area BCD

I-112

1/25/2022 7:50:53 PM

GENERAL NOTES

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KEY NOTES

AS INDICATED BY: (#)

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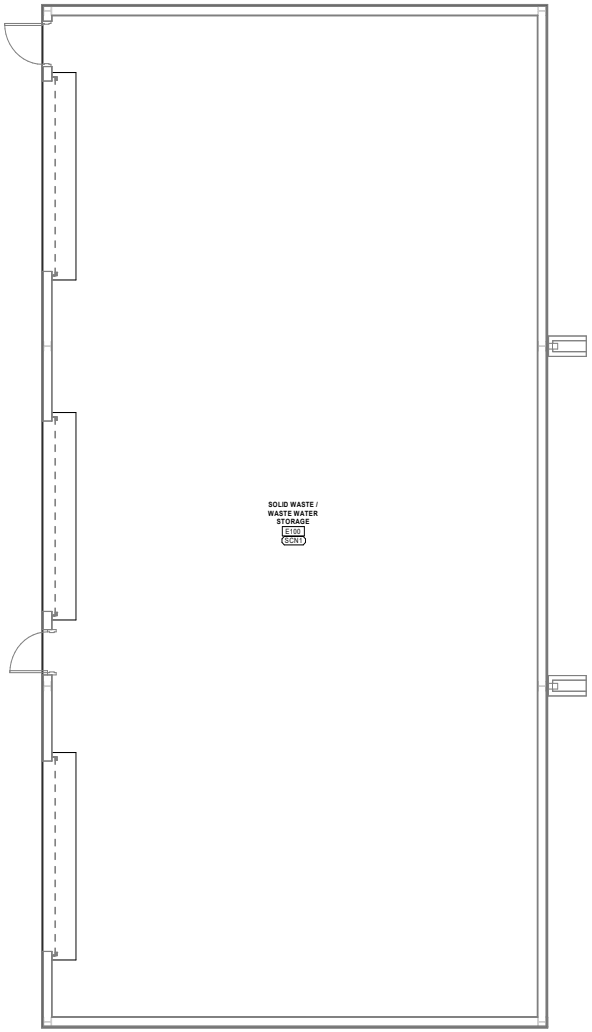

PLAN NORTH TRUE NORTH

A1 FLOOR FINISH PLAN - AREA E
1/4" = 1'-0"

0 4' 8' 20'

PACKET 7.893 February 8, 2022

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PROJECT NO.
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KEY PLAN
A B C D
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#	DATE	DESCRIPTION
-	01/10/2022	Architectural Site Plan

Floor Finish Plan - Area E

I-113

1/26/2022 7:05:53 PM

GENERAL NOTES

A. REFERENCE INTERIOR MATERIAL LEGEND FOR LIST OF COLORS, PATTERNS AND TEXTURES REQUIRED FOR INTERIOR FINISHES, INCLUDING BOTH FACTORY APPLIED COLORS THAT ARE EXPOSED TO VIEW IN THE FINISHED CONSTRUCTION. WHEN COLOR IS NOT DESIGNATED FOR ITEMS, THE CONTRACTOR SHALL ASK FOR A COLOR SELECTION.
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KEY NOTES

AS INDICATED BY (#)

633 ALIGN

GENERAL FINISH NOTES

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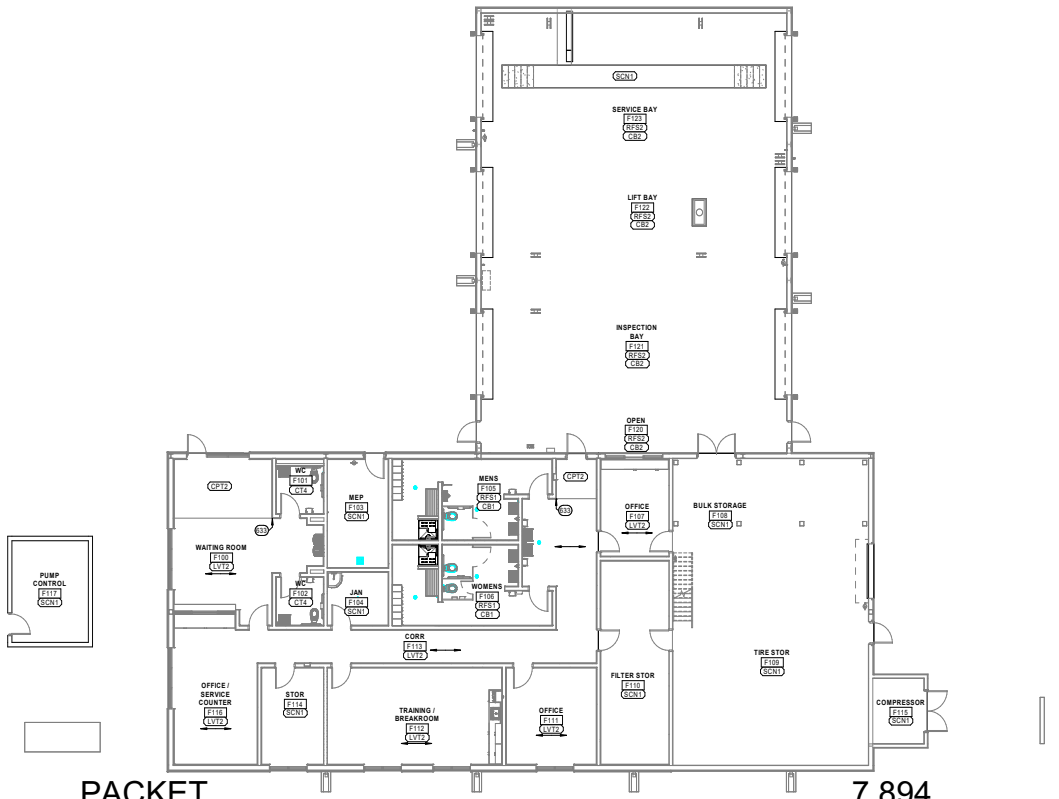

PACKET 7.894

February 8, 2022

PLAN NORTH TRUE NORTH

A1 FLOOR FINISH PLAN - AREA F
1/8" = 1'-0"

0 4' 8' 20'

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PROJECT NO.
6077.21

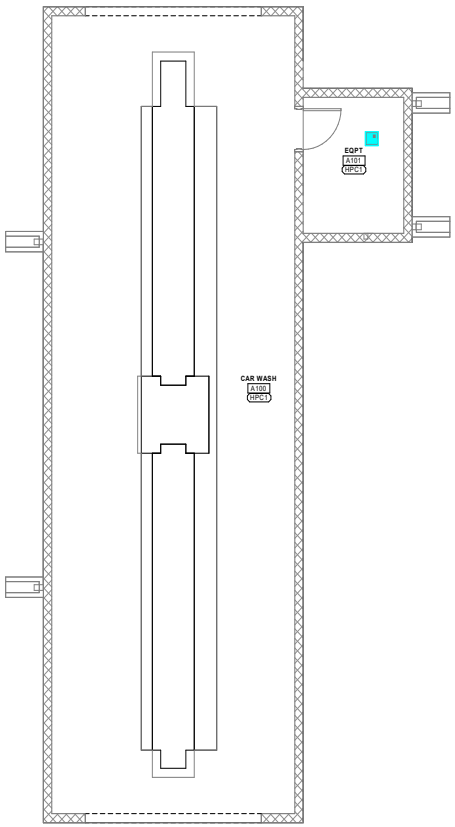
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/10/2022	Architectural Site Plan

Floor Finish Plan - Area F

I-114

1/25/2022 7:30:56 PM



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WALL FINISH LEGEND

1	RESTROOM WALL TILE	
	PAINT ABOVE	PT1
	METAL TRIM	MTL1
	TILE TO 5'-0" AFF	CT3
2	ACCENT WALL TILE	
	TILE @ 25% RANDOM MIX	CT2
	TILE @ 75% RANDOM MIX	CT3
	REFERENCE ELEVATION A-211: A4, B4, C4 , E5 A-212: C4 A-213: B5, E2	
3	SPECIAL WALL SURFACE	
	TOP OF BASE TO FULL HEIGHT	SWS1
	4" COVE BASE	RB1

PACKET 7.895 February 8, 2022

PLAN NORTH TRUE NORTH

A1 WALL FINISH PLAN - AREA A
1/4" = 1'-0"

0 4' 8' 20'

1/25/2022 7:30:56 PM

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/10/2022	Architectural Site Plan

Wall Finish Plan - Area A

I-121

GENERAL NOTES

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B. REFERENCE INTERIOR ELEVATIONS FOR CLARIFICATION OF WALL FINISHES.

KEY NOTES

AS INDICATED BY: (#)

633 ALIGN
634 STOP (FRP1)
635 LEAVE WALL SUBSTRATES FREE FROM PAINTED FINISHES
636 LASER CUT METAL WALL SIGNAGE; REF SPECIFICATION

GENERAL FINISH NOTES

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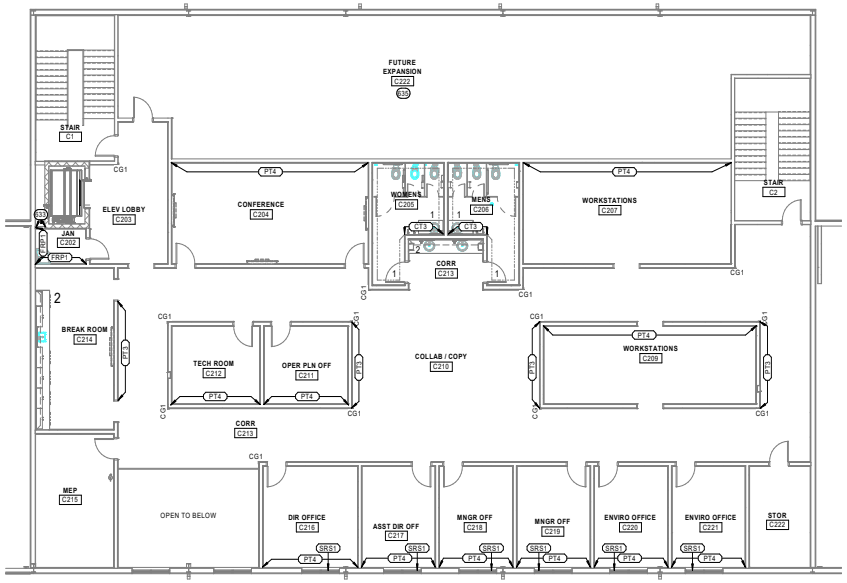


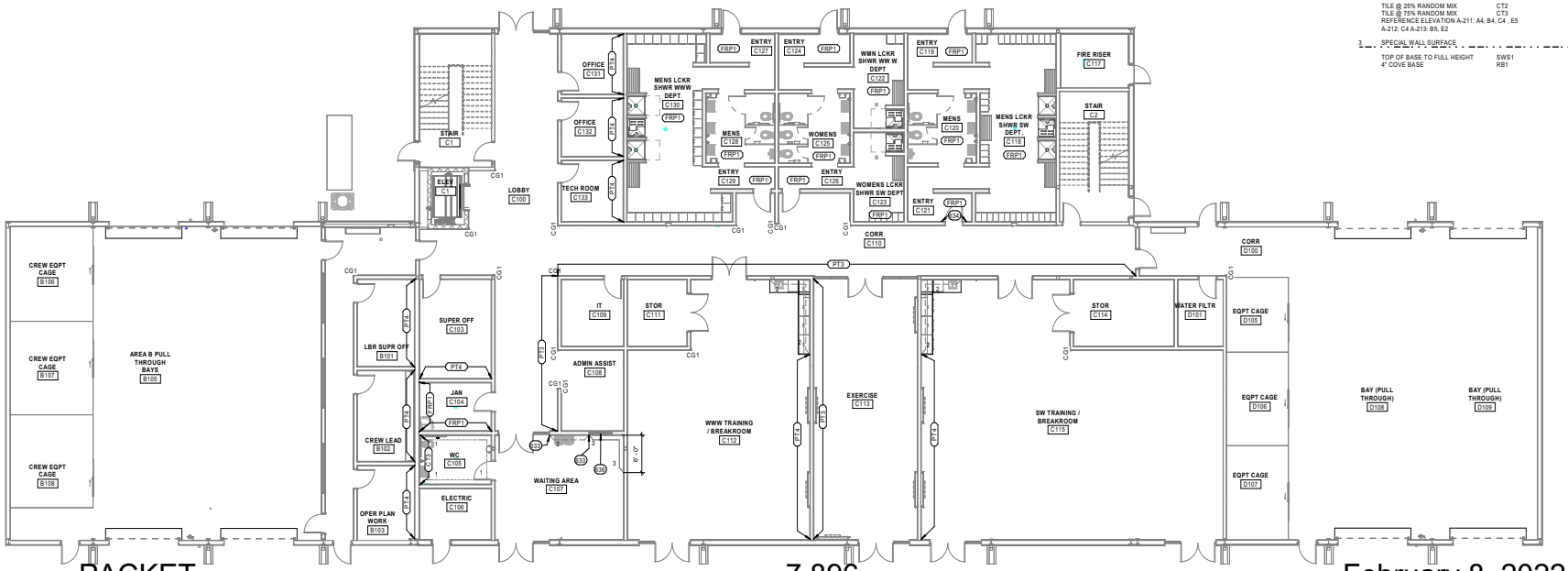
C2 WALL FINISH PLAN - AREA C
1/8" = 1'-0"

WALL FINISH LEGEND

1 RESTROOM WALL TILE
PAINT ABOVE METAL TRIM — PT1, MTL1
TILE TO 5'-0" AFF — CT3

2 ACCENT WALL TILE
TILE @ 25% RANDOM MIX — CT2
TILE @ 75% RANDOM MIX — CT3
REFERENCE ELEVATION A-211: A4, B4, C4 , E5
A-212: C4 A-213: B5, E2

3 SPECIAL WALL SURFACE
TOP OF BASE TO FULL HEIGHT — SWS1
4" COVE BASE — RB1



A1 WALL FINISH PLAN - AREA BCD
1/8" = 1'-0"

PACKET 7.896 February 8, 2022

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KEY PLAN
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E F

#	DATE	DESCRIPTION
-	01/10/2022	Architectural Site Plan

Wall Finish Plan - Area BCD

I-122

1/25/2022 7:51:01 PM

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A. BASE SHALL BE (RB1) UNO.
B. WHERE WALL TILE IS SCHEDULED IN RESTROOMS, WALL TILE SHALL SERVE AS BASE IN RESTROOMS, UNO.
C. WHERE RESINOUS FLOORING IS SCHEDULED, THERE SHALL BE A RESINOUS COVE BASE.

WALLS:
A. ALL WALLS SHALL BE PAINTED (PT1) UNO.
B. WHERE (FRP1) IS DENOTED, MATERIAL SHALL BE FULL HEIGHT ABOVE SCHEDULED FLOORING AND BASE.
C. EXPOSED WALL TILE EDGES AND CORNERS SHALL RECEIVE A METAL EDGE CAP (MTL1).

CEILINGS:
A. ACOUSTICAL CEILING SHALL BE (ACT1).
B. DRYWALL CEILINGS SHALL BE PAINTED (PT1).
C. EXPOSED DECK, STRUCTURAL STEEL, MECHANICAL DUCTWORK AND ELECTRICAL CONDUIT SHALL BE PAINTED (PT4).

MILLWORK:
A. UPPER AND LOWER MILLWORK SHALL BE (PLAM1).
B. COUNTERTOPS SHALL BE (SSM1).

MISCELLANEOUS:
A. DOOR AND WINDOW TRIM SHALL BE (PT2).
B. HANDRAILS SHALL BE (PT2).
C. WINDOW STOOLS SHALL BE (PLAM1).
D. WALL COLOR SHALL EXTEND TO CEILING AND BE APPLIED TO ALL WALLS.

WALL FINISH LEGEND

1 RESTROOM WALL TILE

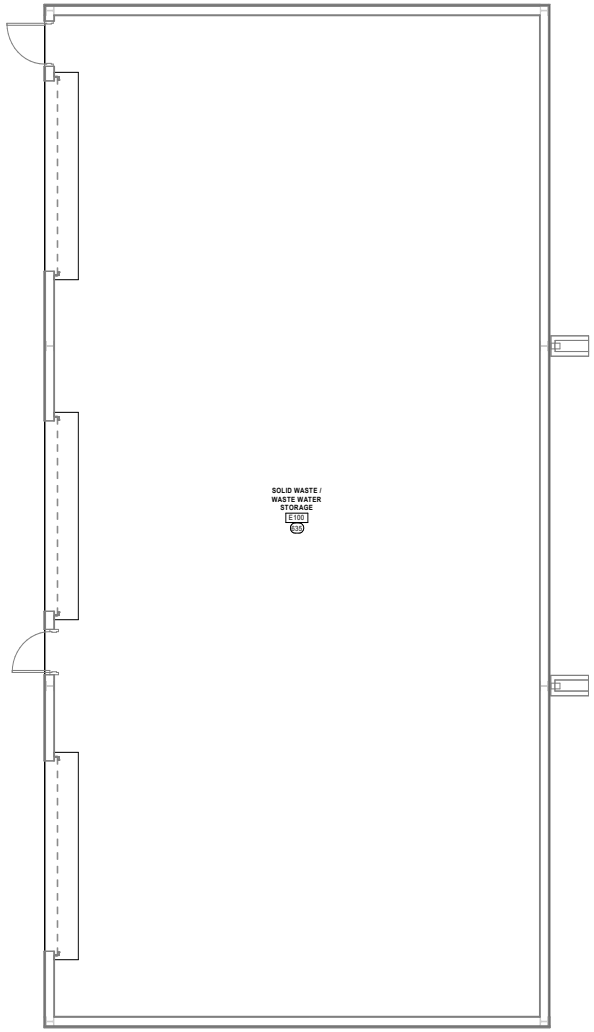
PAINT ABOVE	PT1
METAL TRIM	MTL1
TILE TO 5'-0" AFF	CT3

2 ACCENT WALL TILE

TILE @ 25% RANDOM MIX	CT2
TILE @ 75% RANDOM MIX	CT3
REFERENCE ELEVATION A-211: A4, B4, C4 , E5 A-212: C4 A-213: B5, E2	

3 SPECIAL WALL SURFACE

TOP OF BASE TO FULL HEIGHT	SWS1
4" COVE BASE	RB1



PACKET 7.897 February 8, 2022

PLAN NORTH TRUE NORTH

A1 WALL FINISH PLAN - AREA E
1/4" = 1'-0"

0 4' 8' 20'

1/25/2022 7:51:01 PM

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01/25/2022

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Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/10/2022	Architectural Site Plan

Wall Finish Plan - Area E

I-123

GENERAL NOTES

A. REFERENCE THE INTERIOR MATERIAL LEGEND FOR THE COLORS, PATTERNS AND TEXTURES REQUIRED FOR INTERIOR FINISHES, INCLUDING BOTH FACTORY APPLIED COLORS THAT ARE EXPOSED TO VIEW IN THE FINISHED CONSTRUCTION. WHEN COLOR IS NOT DESIGNATED FOR ITEMS, THE CONTRACTOR SHALL ASK FOR A COLOR SELECTION.
B. REFERENCE INTERIOR ELEVATIONS FOR CLARIFICATION OF WALL FINISHES.

KEY NOTES

AS INDICATED BY: (#)

636 LASER CUT METAL WALL SIGNAGE; REF SPECIFICATION

GENERAL FINISH NOTES

FLOORS:
A. REFERENCE FLOOR FINISH PLANS.

BASE:
A. BASE SHALL BE (RB1) UNO.
B. WHERE WALL TILE IS SCHEDULED IN RESTROOMS, WALL TILE SHALL SERVE AS BASE IN RESTROOMS, UNO.
C. WHERE RESINOUS FLOORING IS SCHEDULED, THERE SHALL BE A RESINOUS COVE BASE.

WALLS:
A. ALL WALLS SHALL BE PAINTED (PT1) UNO.
B. WHERE (FRP1) IS DENOTED, MATERIAL SHALL BE FULL HEIGHT ABOVE SCHEDULED FLOORING AND BASE.
C. EXPOSED WALL TILE EDGES AND CORNERS SHALL RECEIVE A METAL EDGE CAP (MTL1).

CEILINGS:
A. ACOUSTICAL CEILING SHALL BE (ACT1).
B. DRYWALL CEILINGS SHALL BE PAINTED (PT1).
C. EXPOSED DECK, STRUCTURAL STEEL, MECHANICAL DUCTWORK AND ELECTRICAL CONDUIT SHALL BE PAINTED (PT4).

MILLWORK:
A. UPPER AND LOWER MILLWORK SHALL BE (PLAM1).
B. COUNTERTOPS SHALL BE (SSM1).

MISCELLANEOUS:
A. DOOR AND WINDOW TRIM SHALL BE (PT2).
B. HANDRAILS SHALL BE (PT2).
C. WINDOW STOOLS SHALL BE (PLAM1).
D. WALL COLOR SHALL EXTEND TO CEILING AND BE APPLIED TO ALL WALLS.

WALL FINISH LEGEND

1 RESTROOM WALL TILE

PAINT ABOVE	PT1
METAL TRIM	MTL1
TILE TO 5'-0" AFF	CT3

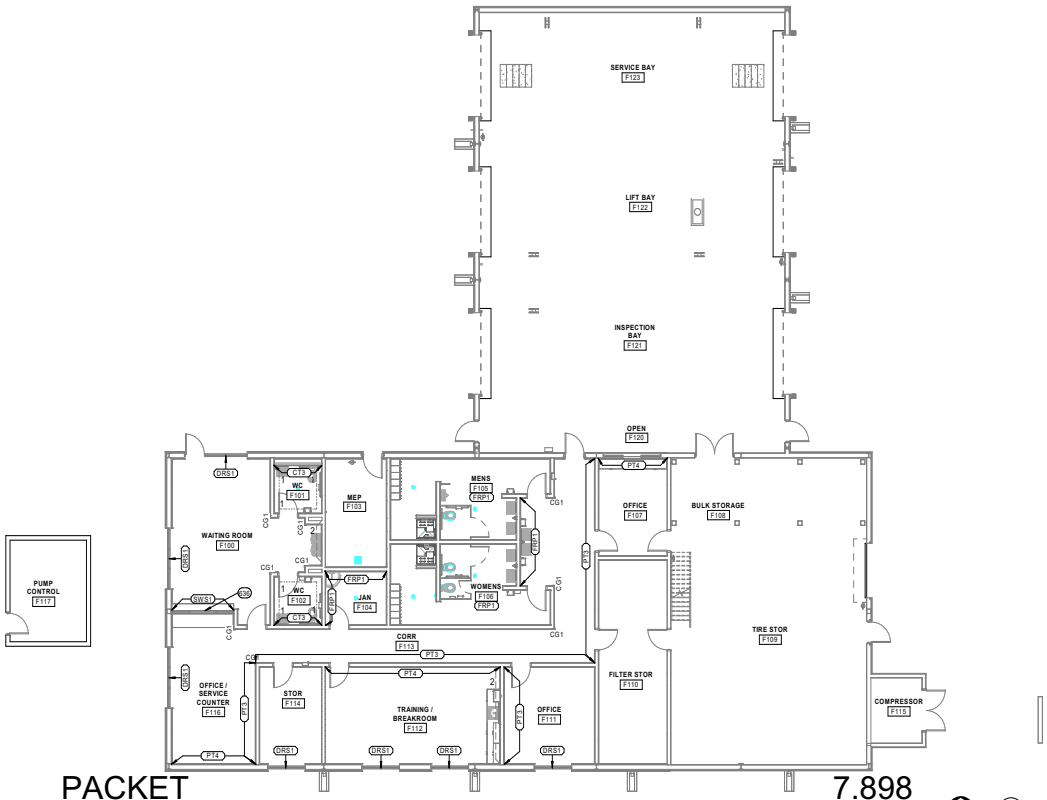
2 ACCENT WALL TILE

TILE @ 25% RANDOM MIX	CT2
TILE @ 75% RANDOM MIX	CT3

REFERENCE ELEVATION A-211: A4, B4, C4 , E5
A-212: C4 A-213: B5, E2

3 SPECIAL WALL SURFACE

TOP OF BASE TO FULL HEIGHT	SWS1
4" COVE BASE	RB1



A1 WALL FINISH PLAN - AREA F
1/8" = 1'-0"

PLAN NORTH TRUE NORTH

0 4' 8' 20'

PACKET 7.898 February 8, 2022

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PROJECT NO.
6077.21

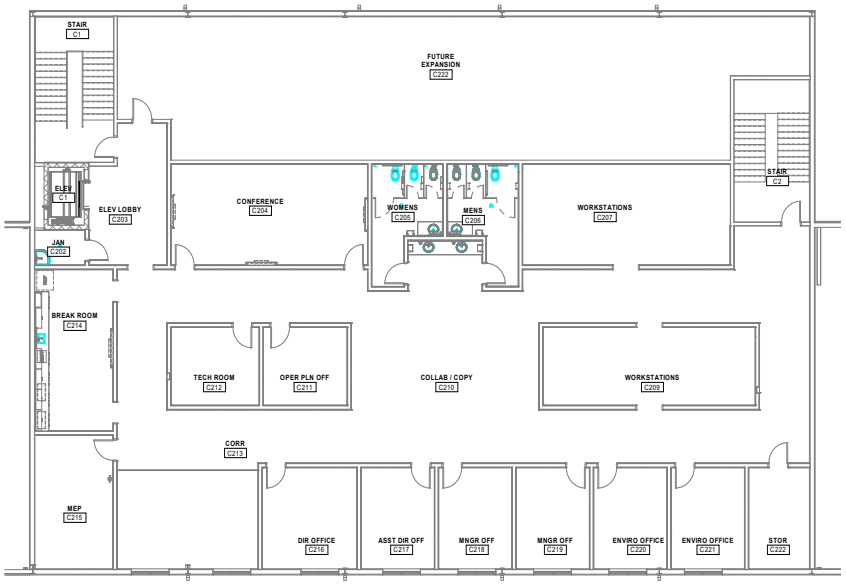
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/10/2022	Architectural Site Plan

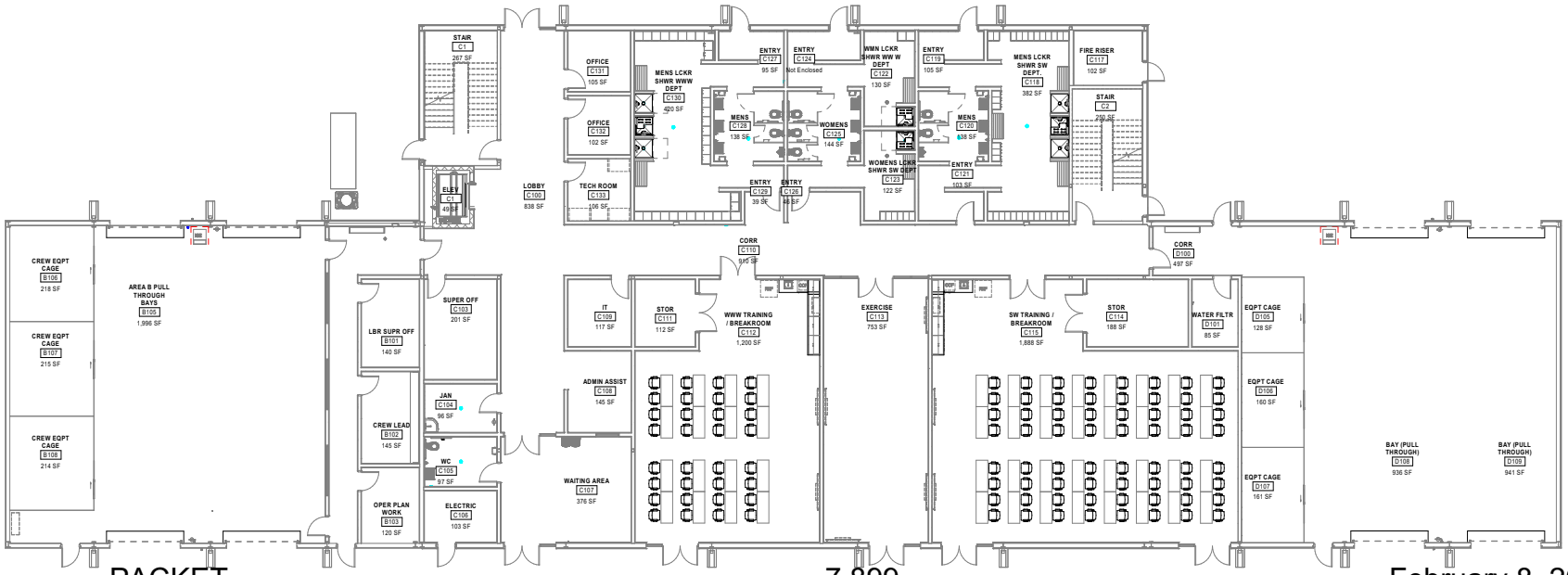
Wall Finish Plan - Area F

I-124

1/25/2022 7:51:01 PM



C3 FURNITURE PLAN - AREA C
1/8" = 1'-0"



A1 FURNITURE PLAN - AREA BCD
1/8" = 1'-0"

PACKET 7.899 February 8, 2022

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PROJECT NO.
6077.21

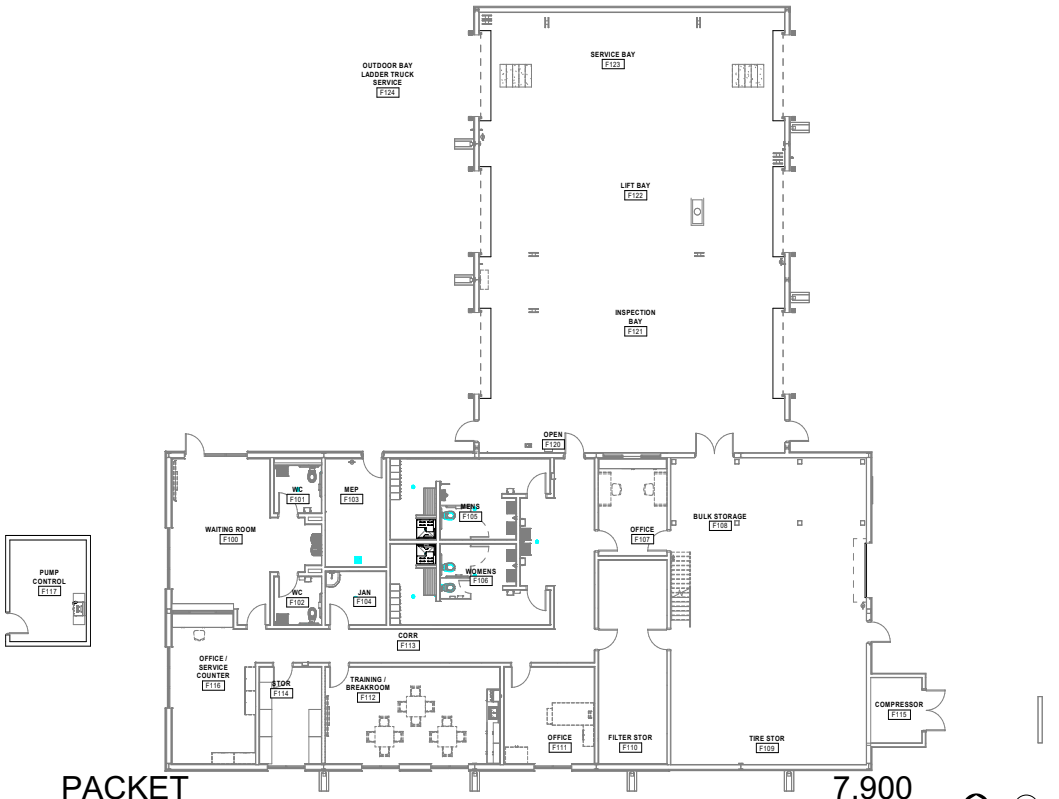
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/10/2022	Architectural Site Plan

Furniture Plan Area BCD

I-131

1/26/2022 2:56:01 PM



PACKET 7.900 February 8, 2022

PLAN NORTH TRUE NORTH

A1 FURNITURE PLAN - AREA F
1/8" = 1'-0"

0 4' 8' 16'

1/25/2022 7:55:05 PM

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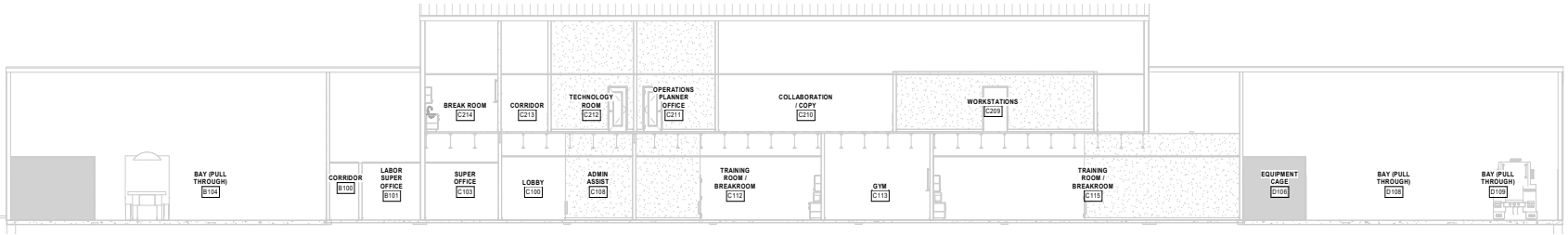
PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

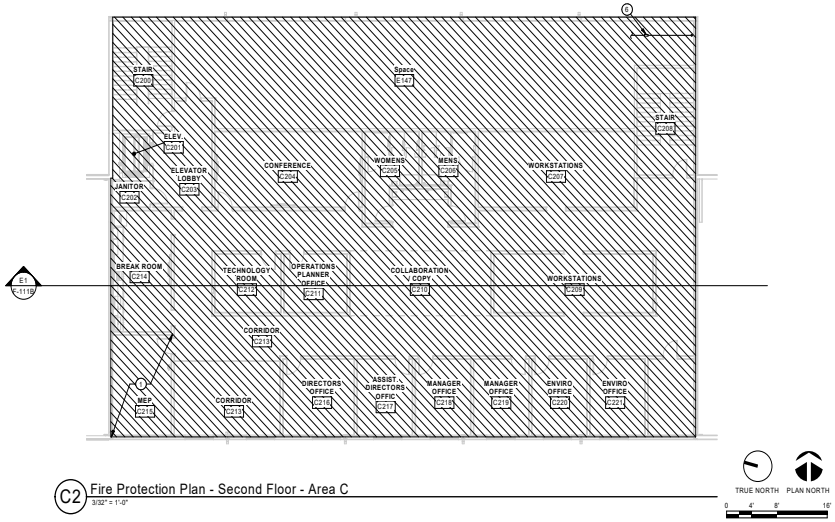
#	DATE	DESCRIPTION
-	01/10/2022	Architectural Site Plan

Furniture Plan
Area F

I-132

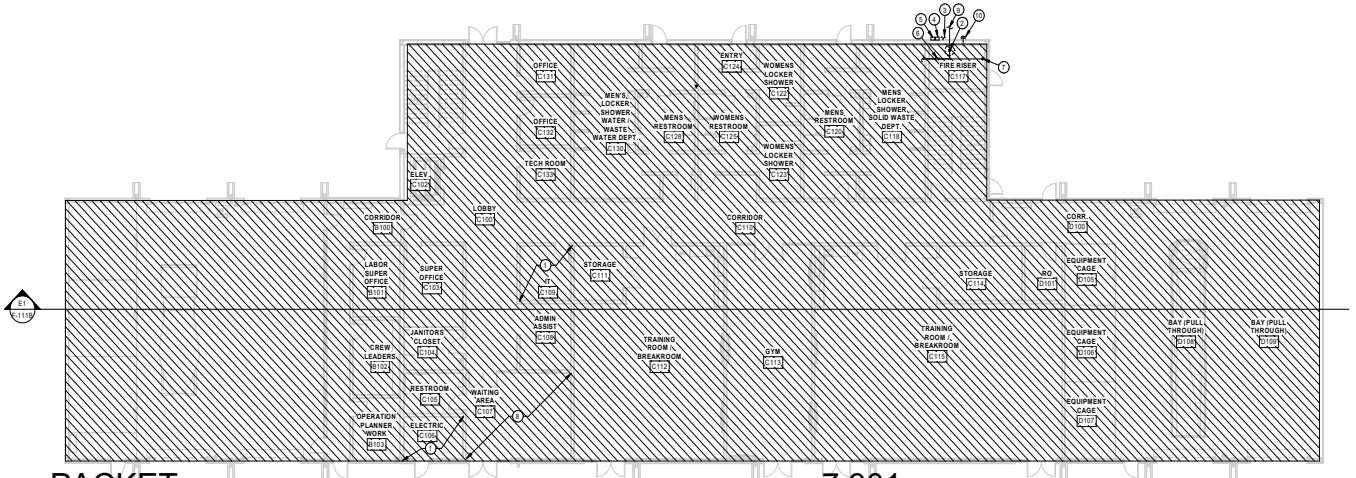


E1 Area B, C, D Section
1/8" = 1'-0"



C2 Fire Protection Plan - Second Floor - Area C
3/32" = 1'-0"

TRUE NORTH PLAN NORTH
0 4' 8' 16'



A1 Fire Protection Plan - First Floor - Area B,C, D
3/32" = 1'-0"

TRUE NORTH PLAN NORTH
0 4' 8' 16'

GENERAL FIRE PROTECTION NOTES

A. PIPING AND HANGERS SHALL COMPLY WITH CURRENT NFPA STANDARDS, LOCAL CODES AND REQUIREMENTS.
B. PIPING SHALL BE HYDROSTATICALLY TESTED AT 200 PSI FOR TWO HOURS.
C. UNDERGROUND PIPING SHALL HAVE A MINIMUM BURY DEPTH OF 3'-0" O TOP OF PIPE UNLESS NOTED OTHERWISE.
D. NEW THRUST BLOCKING SHALL BE PER NFPA 24 TABLES.
E. SLOPE ALL PIPING TO ALLOW FOR PIPE DRAINAGE AS REQUIRED.
F. COORDINATE ALL ROUTING OF PIPING WITH ARCHITECTURAL REFLECTED CEILING PLAN AND ROUTE ALL PIPING AROUND CLEAR STORY AREAS. PROVIDE PROPOSED ROUTING FOR APPROVAL BY ARCHITECT AND/OR MECHANICAL ENGINEER PRIOR TO INSTALLATION.
G. VERIFY WITH ARCHITECTURAL REFLECTED CEILING PLAN FOR LOCATION OF ALL CLERESTORY AREAS CEILING HEIGHTS, HARD/GYP CEILING, AND AREAS THAT ARE EXPOSED TO ROOF DECK.
H. ONLY MAIN PIPING RUNS ARE SHOWN. CONTRACTOR SHALL FOLLOW THIS ROUTING CLOSE AS POSSIBLE.
I. CONTRACTOR SHALL ENSURE THAT ALL PIPING IS CONCEALED EXCEPT WHERE PROTECTION OF EXPOSED STRUCTURE IS REQUIRED.
J. COORDINATE PIPE ROUTING WITH ALL OTHER TRADES. DUCTWORK, HVAC PIPING, AND PLUMBING PIPING HAVE PRIORITY OVER SPRINKLER PIPING. RE-ROUTE SPRINKLER PIPING AS REQUIRED TO PREVENT CONFLICT.
K. ENSURE SPRINKLER HEADS AND PIPING IN LAN OR ELECTRICAL ROOMS ARE NOT LOCATED DIRECTLY OVER AND EQUIPMENT.
L. GENERAL ROUTING OF FIRE MAINS ARE SHOWN COORDINATE WITH OTHER TRADES.
M. FINAL SYSTEM DESIGNER SHALL OBTAIN ACTUAL TESTED WATER VOLUME AND PRESSURE FOR INCOMING WATER SUPPLY FOR ALL HYDRAULIC CALCULATIONS USED FOR THE SPRINKLER SYSTEM DESIGN. "ESTIMATED" OR "MUNICIPALITY CALCULATED DATA" IS NOT ALLOWED TO BE USED FOR FINAL HYDRAULIC CALCULATIONS. THE ONUS IS ON THE LICENSED FIRE SPRINKLER SYSTEM DESIGNER/CONTRACTOR TO OBTAIN ACCURATE AVAILABLE WATER VOLUME AND PRESSURE AT THE SITE.
N. BEFORE A/E WILL REVIEW SUBMITTALS, FIRE PROTECTION DESIGNER MUST PROVIDE DOCUMENTATION THAT THE AHJ HAS APPROVED AND SUBMIT ANY CHANGES TO THE DESIGN THAT THE AHJ WILL ACCEPT.
O. PROVIDE SIGNAGE FOR FIRE PROTECTION SYSTEM AS INDICATED IN SECTION 509 AND 912 OF THE INTERNATIONAL FIRE CODE.

FIRE PROTECTION PIPING NOTES

A. THE AREAS INDICATED (SHOWN HATCHED) SHALL BE FULLY SPRINKLED. THE ENTIRE PROTECTION SYSTEM SHALL MEET ALL FEDERAL, STATE, AND LOCAL CODES AND ORDINANCES, AND MUST BE APPROVED BY THE LOCAL AUTHORITY HAVING JURISDICTION AND INSURANCE SERVICES.
B. REFER TO THE FIRE PROTECTION SPECIFICATIONS FOR ADDITIONAL INFORMATION REGARDING THE FIRE PROTECTION SYSTEM.
C. SIZING OF ALL PIPE, SPRINKLER HEADS, AND ACCESSORIES (UNLESS NOTED OTHERWISE), SHALL BE THE RESPONSIBILITY OF THE SPRINKLER SUBCONTRACTOR.
D. MATERIALS AND INSTALLATION SHALL BE PER NFPA STANDARDS (CURRENT EDITION) AND LOCAL CODES. SEE GENERAL PIPING NOTES.
E. ALL INSPECTORS TEST CONNECTIONS AND LOW POINT DRAINS SHALL BE PER NFPA 13 AND SHALL BE DISPLAYED ON SHOP DRAWINGS. COORDINATE WITH ARCHITECT FOR ACCEPTABLE MOUNTING HEIGHTS AND LOCATION. INSTALL INSPECTORS TEST CONNECTION IN A CONCEALED LOCATION. IF CONCEALED LOCATION IS NOT AVAILABLE, COORDINATE LOCATION WITH ARCHITECT.
F. ACCEPTANCE TEST SHALL BE PERFORMED BY THE CONTRACTOR, WITNESSED AND APPROVED BY THE LOCAL FIRE MARSHAL PRIOR TO ISSUANCE AND OCCUPANCY.
G. PROGRESS INSPECTIONS MUST BE MADE DURING THE INSTALLATION OF THE SYSTEM. REQUEST FOR INSPECTIONS MUST BE INITIATED BY THE CONTRACTOR. INSPECTIONS SHALL INCLUDE, BUT ARE NOT LIMITED TO: (1) UNDERGROUND MAIN AND LEAD LINES, (2) SYSTEM RISERS, (3) OVERHEAD PIPING, (4) ACCEPTANCE TESTS, (5) FIRE DEPARTMENT CONNECTION, (6) FINAL INSPECTION
H. APPROVED SPRINKLER PLANS MUST BE AVAILABLE ON THE PROJECT SITE DURING THE INSTALLATION AND INSPECTION OF THE WORK.
I. PROVIDE SIGNAGE FOR ALL CONTROL, DRAIN, AND TEST VALVES PER NFPA STANDARDS UPON INSPECTION BY AUTHORITY HAVING JURISDICTION.
J. ALARM AND/OR MONITORING SYSTEMS SHALL BE DONE BY OTHERS.
K. ALL DEVICES SHALL BE UL LISTED FOR FIRE PROTECTION USES.
L. PROVIDE SIDEWALL SPRINKLERS IN ALL CLERESTORY AREAS.
M. PROVIDE UPRIGHT PENDANTS IN ALL AREAS WHERE THERE IS NO CEILING AND ROOF STRUCTURE IS EXPOSED.
N. REFER TO ARCHITECTURAL DRAWINGS FOR ALL INFORMATION ON ARCHITECTURAL FEATURES, AND CONSTRUCTION TYPES.
O. CONTRACTOR MAY UTILIZE COMMERCIAL FLEXIBLE SPRINKLER RUNOUTS IF ALLOWED BY LOCAL AHJ. EXAMPLE: VIKING 'FLEXHEAD' SYSTEM WITH MOUNTING BRACKETS FOR SPECIFIED TYPE OF CEILING WHERE THE SPRINKLER HEAD IS BEING INSTALLED, COORDINATE WITH ARCHITECTURAL RCP.

KEY NOTES

AS INDICATED BY: (#)

1 ONLY FIRE SPRINKLER PIPING SPECIFICALLY SERVING THIS ROOM MAY BE ROUTED IN THIS AREA.
2 ROUTE FIRE LINE UP IN RISER ROOM. PROVIDE DOUBLE CHECK BACKFLOW PREVENTER. PROVIDE NECESSARY CLEARANCES.
3 FIRE DEPARTMENT CONNECTION
4 PROVIDE HORNSTROBE. COORDINATE EXACT LOCATION WITH AHJ.
5 PROVIDE KNOX BOX. COORDINATE EXACT LOCATION WITH AHJ.
6 PROVIDE FLOOR CONTROL VALVE. ROUTE DRAIN TO FLOOR SINK IN RISER ROOM.
7 FIRE PIPING TO TURN UP TO SECOND FLOOR.
8 WAITING AREA HAS 2 STORY ROOM HEIGHT.
9 REFER TO CIVIL FOR CONTINUATION.
10 PROVIDE INSPECTORS TEST STATION.

PROVIDE FIRE SPRINKLER SYSTEM.

PACKET 7.901 February 8, 2022

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Midland, TX 79701

PROJECT NO.
6077.21

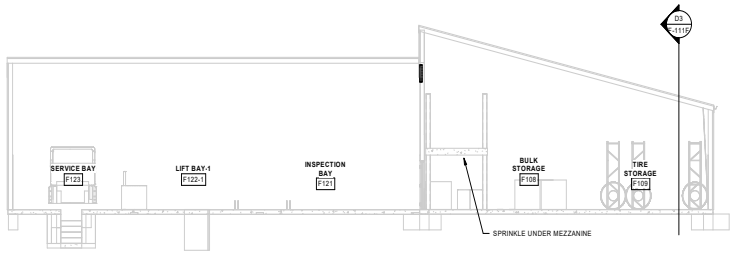
KEY PLAN
B C D

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

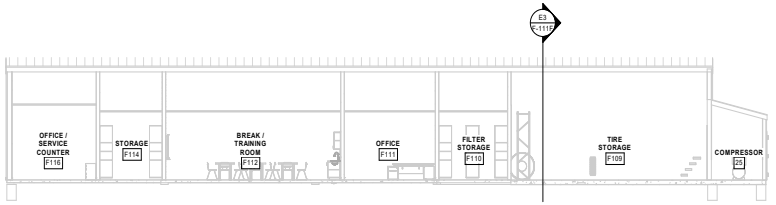
Fire Protection Plan - Areas B, C, D

F-111B

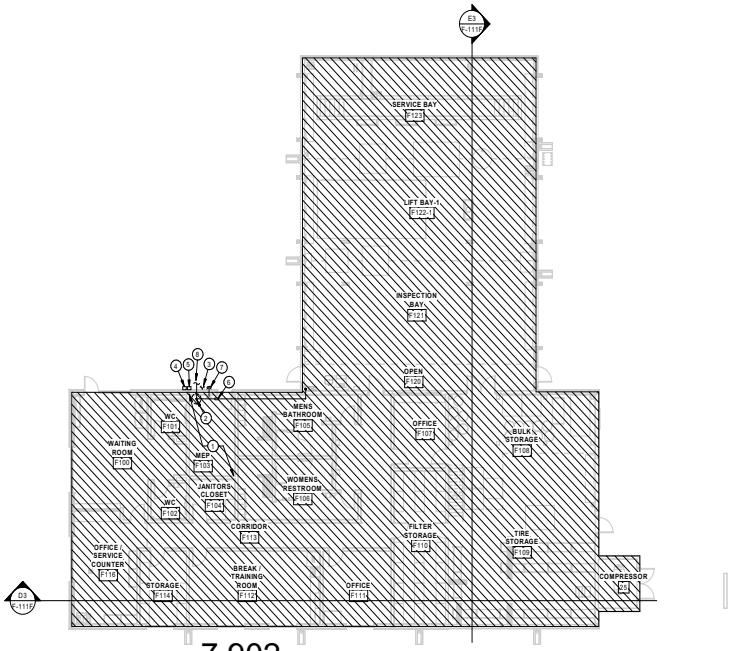
R_v21 1/26/2022 4:54:50 PM



E3 Building F Section 1
1/8" = 1'-0"



D3 Building F Section 2
1/8" = 1'-0"



A3 Fire Protection Plan - First Floor - Area F
3/32" = 1'-0"

TRUE NORTH PLAN NORTH
0 4' 8' 16'

GENERAL FIRE PROTECTION NOTES

A. PIPING AND HANGERS SHALL COMPLY WITH CURRENT NFPA STANDARDS, LOCAL CODES AND REQUIREMENTS.
B. PIPING SHALL BE HYDROSTATICALLY TESTED AT 200 PSI FOR TWO HOURS.
C. UNDERGROUND PIPING SHALL HAVE A MINIMUM BURY DEPTH OF 3'-0" O TOP OF PIPE UNLESS NOTED OTHERWISE.
D. NEW THRUST BLOCKING SHALL BE PER NFPA 24 TABLES.
E. SLOPE ALL PIPING TO ALLOW FOR PIPE DRAINAGE AS REQUIRED.
F. COORDINATE ALL ROUTING OF PIPING WITH ARCHITECTURAL REFLECTED CEILING PLAN AND ROUTE ALL PIPING AROUND CLEAR STORY AREAS. PROVIDE PROPOSED ROUTING FOR APPROVAL BY ARCHITECT AND/OR MECHANICAL ENGINEER PRIOR TO INSTALLATION.
G. VERIFY WITH ARCHITECTURAL REFLECTED CEILING PLAN FOR LOCATION OF ALL CLERESTORY AREAS CEILING HEIGHTS, HARD/GYP CEILING, AND AREAS THAT ARE EXPOSED TO ROOF DECK.
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K. ENSURE SPRINKLER HEADS AND PIPING IN LAN OR ELECTRICAL ROOMS ARE NOT LOCATED DIRECTLY OVER AND EQUIPMENT.
L. GENERAL ROUTING OF FIRE MAINS ARE SHOWN COORDINATE WITH OTHER TRADES.
M. FINAL SYSTEM DESIGNER SHALL OBTAIN ACTUAL TESTED WATER VOLUME AND PRESSURE FOR INCOMING WATER SUPPLY FOR ALL HYDRAULIC CALCULATIONS USED FOR THE SPRINKLER SYSTEM DESIGN. "ESTIMATED" OR "MUNICIPALITY CALCULATED DATA" IS NOT ALLOWED TO BE USED FOR FINAL HYDRAULIC CALCULATIONS. THE ONUS IS ON THE LICENSED FIRE SPRINKLER SYSTEM DESIGNER/CONTRACTOR TO OBTAIN ACCURATE AVAILABLE WATER VOLUME AND PRESSURE AT THE SITE.
N. BEFORE AHJ WILL REVIEW SUBMITTALS, FIRE PROTECTION DESIGNER MUST PROVIDE DOCUMENTATION THAT THE AHJ HAS APPROVED AND SUBMIT ANY CHANGES TO THE DESIGN THAT THE AHJ WILL ACCEPT.
O. PROVIDE SIGNAGE FOR FIRE PROTECTION SYSTEM AS INDICATED IN SECTION 509 AND 912 OF THE INTERNATIONAL FIRE CODE.

FIRE PROTECTION PIPING NOTES

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F. ACCEPTANCE TEST SHALL BE PERFORMED BY THE CONTRACTOR WITNESSED AND APPROVED BY THE LOCAL FIRE MARSHAL PRIOR TO ISSUANCE AND OCCUPANCY.
G. PROGRESS INSPECTIONS MUST BE MADE DURING THE INSTALLATION OF THE SYSTEM. REQUEST FOR INSPECTIONS MUST BE INITIATED BY THE CONTRACTOR. INSPECTIONS SHALL INCLUDE, BUT ARE NOT LIMITED TO: (1) UNDERGROUND MAIN AND LEAD LINES, (2) SYSTEM RISERS, (3) OVERHEAD PIPING, (4) ACCEPTANCE TESTS, (5) FIRE DEPARTMENT CONNECTION, (6) FINAL INSPECTION
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M. PROVIDE UPRIGHT PENDANTS IN ALL AREAS WHERE THERE IS NO CEILING AND ROOF STRUCTURE IS EXPOSED.
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O. CONTRACTOR MAY UTILIZE COMMERCIAL FLEXIBLE SPRINKLER RUNOUTS IF ALLOWED BY LOCAL AHJ. EXAMPLE: VIKING 'FLEXHEAD' SYSTEM WITH MOUNTING BRACKETS FOR SPECIFIED TYPE OF CEILING WHERE THE SPRINKLER HEAD IS BEING INSTALLED. COORDINATE WITH ARCHITECTURAL RCP.

KEY NOTES

AS INDICATED BY: ⑧

1 ONLY FIRE SPRINKLER PIPING SPECIFICALLY SERVING THIS ROOM MAY BE ROUTED IN THIS AREA.
2 ROUTE FIRE LINE UP IN RISER ROOM. PROVIDE DOUBLE CHECK BACKFLOW PREVENTER. PROVIDE NECESSARY CLEARANCES.
3 FIRE DEPARTMENT CONNECTION
4 PROVIDE HORN/STROBE. COORDINATE EXACT LOCATION WITH AHJ.
5 PROVIDE KNOX BOX. COORDINATE EXACT LOCATION WITH AHJ.
6 PROVIDE FLOOR CONTROL VALVE.
7 PROVIDE INSPECTORS TEST STATION.
8 REFER TO CIVIL FOR CONTINUATION.

PROVIDE FIRE SPRINKLER SYSTEM

PACKET 7.902 February 8, 2022

Parkhill

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City of Midland

401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Fire Protection Plan - Area F

F-111F

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GENERAL NOTES

1. GENERAL NOTES ON THIS SHEET ARE APPLICABLE TO EACH MECHANICAL DRAWING OF THIS SET OF CONSTRUCTION DOCUMENTS. NOTES SPECIFIC TO INDIVIDUAL MECHANICAL DRAWINGS WILL BE SHOWN ON THE RESPECTIVE MECHANICAL DRAWING.
2. THE CONTRACTOR SHALL PROVIDE A COMPLETE HVAC SYSTEM TO INCLUDE ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT FOR A COMPLETE AND FUNCTIONAL SYSTEM INCLUDING ALL NECESSARY APPURTENANCES CUSTOMARILY INCLUDED IF NOT SPECIFICALLY CALLED OUT.
3. ENTIRE INSTALLATION, INCLUDING MATERIALS, EQUIPMENT AND WORKMANSHIP SHALL CONFORM WITH ALL APPLICABLE LAWS, CODES AND REGULATIONS.
4. THIS PROJECT SHALL CONFORM TO APPLICABLE ASHRAE, NFPA AND SMACNA STANDARDS AND OTHER REGULATORY BODIES HAVING JURISDICTION OVER THE CLASS OF WORK.
5. MATERIAL AND EQUIPMENT SHALL HAVE STAMPS OR SEALS OF AHRI, ASME, UL OR ASTM.
6. THE CONTRACTOR SHALL MAKE TESTS FOR ACCEPTANCE AND APPROVAL AS REQUIRED BY CODE AND THE REQUIREMENTS OF APPLICABLE REGULATORY AGENCIES. REQUIRED TESTS SHALL BE PERFORMED IN THE PRESENCE OF THE ENGINEER OF RECORD AND/OR OWNER UNLESS OTHERWISE WAIVED IN WRITING.
7. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES, DOCUMENTS AND SERVICES RELATED TO INSTALLATION OF THE WORK.
8. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE OTHER TRADES IN ORDER TO RESOLVE ANY CONFLICTS THAT MIGHT ARISE DUE TO THE LOCATION OF EQUIPMENT OR THE USE OF SPACE.
9. EQUIPMENT OF DIFFERENT ELECTRICAL CHARACTERISTICS MAY BE FURNISHED PROVIDED SUCH PROPOSED EQUIPMENT IS APPROVED IN WRITING AND CONNECTING ELECTRICAL SERVICE, CIRCUIT BREAKERS AND CONDUIT ARE APPROPRIATELY MODIFIED AT NO COST TO THE OWNER.
10. RUN ALL HORIZONTAL PIPING AND DUCTWORK ABOVE THE CEILING UNLESS OTHERWISE NOTED.
11. MAKE DUCT PENETRATIONS OF ALL WALLS WITH SHEET METAL DUCTS. FLEXIBLE DUCT PENETRATION OF WALLS ARE NOT ACCEPTABLE.
12. ALL ELBOWS IN DUCTWORK SHALL BE RADIUS ELBOWS UNLESS OTHERWISE NOTED. MINIMUM CENTERLINE RADIUS OF CURVATURE SHALL BE 1.5 TIMES THE DUCT WIDTH OR DIAMETER. WHERE SQUARE ELBOWS ARE SHOWN, INSTALL TURNING VANES.
13. DO NOT INSTALL EQUIPMENT, PIPING OR DUCTWORK OVER ANY ELECTRICAL EQUIPMENT OR ELECTRICAL SERVICE SPACE.
14. LAYOUT OF PIPING AND DUCTWORK IS DIAGRAMMATIC. RUN ALL EXPOSED PIPING AND DUCTWORK AS HIGH AS POSSIBLE UNLESS OTHERWISE NOTED. ALLOW FOR RISES, DROPS AND OFFSETS AS REQUIRED.
15. INSTALL MECHANICAL EQUIPMENT TO FACILITATE SERVICING, MAINTENANCE AND REPAIR OR REPLACEMENT OF ELECTRICAL COMPONENTS. AS MUCH AS PRACTICAL, CONNECT EQUIPMENT FOR EASE OF DISCONNECTING, WITH A MINIMUM OF INTERFERENCE WITH OTHER INSTALLATIONS. PIPING SHALL NOT INTERFERE WITH FILTER PULL.
16. MECHANICAL CONTRACTORS SHALL PROVIDE AUTOMATIC CONTROL DEVICES SUCH AS STARTERS, VARIABLE FREQUENCY DRIVES (VFD), TEMPERATURE SENSORS, RELAYS, PRESSURE SWITCHES THAT ARE ASSOCIATED WITH MECHANICAL EQUIPMENT AND ASSOCIATED CONTROL WIRING FROM CONTROL POWER LOCATION TO THE CONTROL DEVICE/ ELECTRICAL CONTRACTOR SHALL PROVIDE CONDUIT AND WIRING FROM POWER SOURCE TO DISCONNECT SWITCH, FROM DISCONNECT SWITCH TO STARTER OR VFD, AND FROM STARTER OR VFD TO THE EQUIPMENT.
17. FLASHING DETAILS FOR PIPES PENETRATING THE ROOF SHALL BE COORDINATED WITH ARCHITECTURE DETAILS.
18. LOCATE TEMPERATURE SENSORS AND CO2 SENSORS 48" ABOVE FINISHED FLOOR OR AS NOTED ON PLANS.
19. COORDINATE CURBS AND SIZE OF CURBS IN ACCORDANCE WITH ACTUAL EQUIPMENT PURCHASED.
20. CONTRACTOR IS TO PROVIDE AN ADJUSTABLE ROOF CURB OR TAPER AT CURB TO MATCH ROOF SLOPE FOR CURB MOUNTED EQUIPMENT. THE USE OF SHIMS TO LEVEL EQUIPMENT IS NOT ACCEPTABLE UNLESS THE CURB DIMENSIONS ARE SMALLER THAN 36"x36".
21. CONTRACTOR TO VERIFY ALL ACCESS PANEL LOCATIONS. NOT ALL ACCESS PANELS REQUIRED ARE SHOWN. REFER TO SPECIFICATIONS FOR ACCESS PANEL REQUIREMENTS.
22. CONTRACTOR SHALL INSTALL ALL PLUMBING VENTS AND EXHAUST AIR OUTLETS A MINIMUM OF 10'-0" AWAY (PER CODE) FROM ALL OUTSIDE AIR INTAKES, OPERABLE DOORS AND/ OR WINDOWS. CONSTRUCTION DRAWINGS ARE DIAGRAMMATIC BY NATURE, FINAL MEASUREMENTS SHOULD BE MADE AT THE PROJECT SITE.
23. NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED.

SYMBOL LEGEND

- AUTOMATIC AIR VENT
- MANUAL AIR VENT
- P/T PLUG
- VENTURI FLOW METER
- AUTOMATIC FLOW CONTROL
- BUTTERFLY VALVE
- BALL VALVE
- CHECK VALVE
- GLOBE VALVE
- GATE VALVE
- ANGLE GATE VALVE
- PRESSURE REDUCING VALVE
- AUTOMATIC VALVE, 2-WAY
- AUTOMATIC VALVE, 3-WAY
- FLANGE
- UNION
- STRAINER
- GAS METER
- AUTOMATIC AIR VENT
- ELECTRIC MOTOR
- CENTRIFUGAL FAN
- THERMOMETER
- EXPANSION VALVE
- FLOW SWITCH
- PRESSURE SWITCH
- PUMP

PIPING SYMBOLS

- CHS — CHILLED WATER SUPPLY
- CHR — CHILLED WATER RETURN
- HWS — HEATING WATER SUPPLY
- HWR — HEATING WATER RETURN
- CS — CONDENSING WATER SUPPLY
- CR — CONDENSING WATER RETURN
- CD — CONDENSATE DRAIN
- R — REFRIGERANT LIQUID & SUCTION
- FLUID FLOW DIRECTION
- PIPE TURNED UP
- PIPE TURNED DOWN

MECHANICAL/PLUMBING ABBREVIATIONS

A/C	AIR CONDITIONING
AVG	AVERAGE
AFF	ABOVE FINISHED FLOOR
BOJ	BOTTOM OF JOIST
BTUH	BRITISH THERMAL UNIT PER HOUR
MBU	BRITISH THERMAL UNIT DIVIDED BY 1,000
CFM	CUBIC FEET PER MINUTE
CHR	CHILLED WATER RETURN PIPING
CHS	CHILLED WATER SUPPLY PIPING
CR	CONDENSING WATER RETURN PIPING
CS	CONDENSING WATER SUPPLY PIPING
DEG	DEGREE
°F	DEGREES FAHRENHEIT
DIA	DIAMETER
ID	DIAMETER, INSIDE
OD	DIAMETER, OUTSIDE
DDC	DIRECT DIGITAL CONTROLS
DB	DRY BULB TEMPERATURE
EER	ENERGY EFFICIENCY RATIO
EAT	ENTERING AIR TEMPERATURE
EWT	ENTERING WATER TEMPERATURE
EA	EXHAUST AIR
ET	EXPANSION TANK
ESP	EXTERNAL STATIC PRESSURE
FT	FEET
FPI	FINS PER INCH
FD	FIRE DAMPER
FSD	FIRE/SMOKE DAMPER
FO	FLAT OVAL
GAL	GALLONS
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
GBD	GRAVITY BACKDRAFT DAMPER
HWP	HEATING WATER PUMP
HWR	HEATING WATER RETURN PIPING
HWS	HEATING WATER SUPPLY PIPING
HP	HORSEPOWER
HUM	HUMIDITY
IN	INCHES
inHG	INCHES OF MERCURY
inH2O	INCHES OF WATER
IAQ	INDOOR AIR QUALITY
kW	KILOWATT
LAT	LEAVING AIR TEMPERATURES
LWT	LEAVING WATER TEMPERATURES
MBD	MANUAL BALANCING DAMPER
MAT	MIXED AIR TEMPERATURE
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
OA	OUTSIDE AIR
OAT	OUTSIDE AIR TEMPERATURE
PH	PHASE
LBS	POUNDS
LBS/HR	POUNDS PER HOUR
PSI	POUNDS PER SQUARE INCH
PRV	PRESSURE REDUCED VALVE
RL	REFRIGERANT LIQUID
RS	REFRIGERANT SUCTION
RPZ	REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY
RH	RELATIVE HUMIDITY
RA	RELIEF AIR
RPM	REVOLUTIONS PER MINUTE
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SH	SENSIBLE HEAT
SHR	SENSIBLE HEAT RATIO
SD	SMOKE DAMPER
SQ.FT.	SQUARE FEET
SP	STATIC PRESSURE
T&P	TEMPERATURE AND PRESSURE VALVE
k	THERMAL CONDUCTIVITY
R	THERMAL RESISTANCE
TOJ	TOP OF JOIST
TDH	TOTAL DYNAMIC HEAD
TSP	TOTAL STATIC PRESSURE
UF	UNDERFLOOR
UG	UNDERGROUND
U	U-FACTOR, HEAT TRANSFER COEFFICIENT
VAV	VARIABLE AIR VOLUME
VFD	VARIABLE FREQUENCY DRIVE
VEL	VELOCITY
V	VOLTS
WB	WET BULB TEMPERATURE

DUCTWORK SYMBOLS

- MANUAL BALANCING DAMPER
- CEILING MOUNTED SUPPLY GRILLE
- CEILING MOUNTED RETURN GRILLE
- CEILING MOUNTED EXHAUST GRILLE
- WALL MOUNTED SUPPLY GRILLE
- WALL MOUNTED RETURN/EXHAUST GRILLE
- FIRE/SMOKE DAMPER
- FIRE DAMPER
- SMOKE DAMPER
- LINED RETURN DUCT
- SUPPLY DUCT TURNED UP
- SUPPLY DUCT TURNED DOWN
- RETURN DUCT TURNED UP
- RETURN DUCT TURNED DOWN
- EXHAUST DUCT TURNED UP
- EXHAUST DUCT TURNED DOWN
- ROUND DUCT TURNED UP
- ROUND DUCT TURNED DOWN
- T — THERMOSTAT
- H — HUMIDISTAT
- S — SENSOR
- FLEXIBLE CONNECTION
- FLEX DUCT
- CONNECT TO EXISTING
- POINT OF DISCONNECT (P.O.D.)

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401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Mechanical Abbreviations & Legends

M-001

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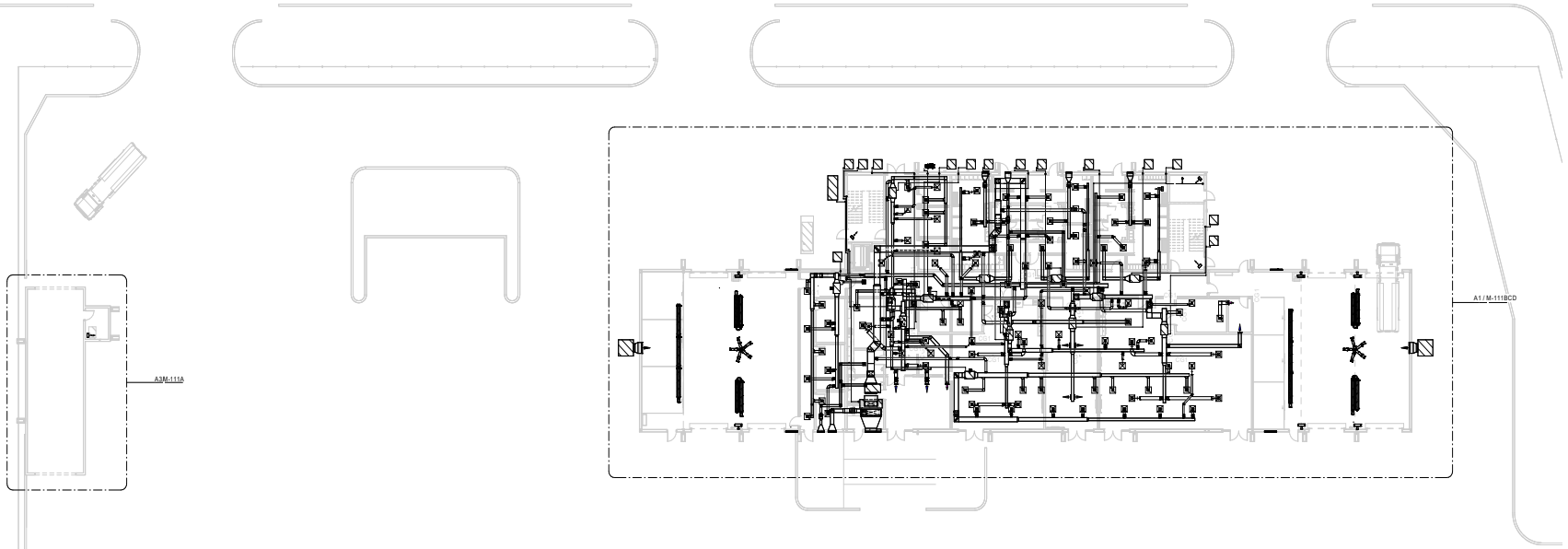
GENERAL NOTES

A. REFER TO GENERAL NOTES ON M-001.
B. THE DUCT RUNOUTS SHALL BE SIZED SAME AS GRILLE UNLESS NOTED OTHERWISE.



PACKET 7.904 February 8, 2022

TRUE NORTH PLAN NORTH

0 8' 16' 32'

A1 Mechanical Plan - Overall
1/16" = 1'-0"

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Mechanical Plan - Overall

M-111

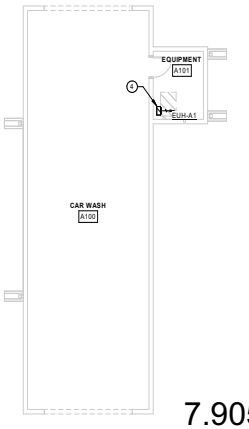
GENERAL NOTES

A. REFER TO GENERAL NOTES ON M-001.
B. THE DUCT RUNOUTS SHALL BE SIZED SAME AS GRILLE UNLESS NOTED OTHERWISE.

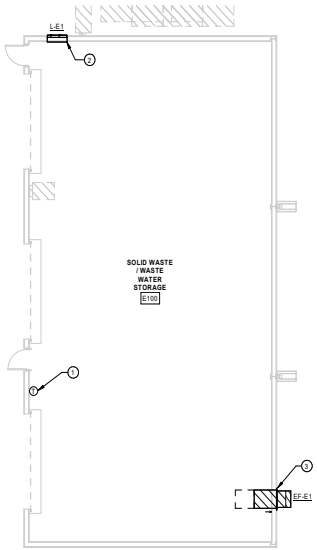
KEY NOTES

AS INDICATED BY: (#)

1 LOCATION FOR THERMOSTAT. PROVIDE OVERRIDE SWITCH TO OPERATE FAN ADJACENT TO THERMOSTAT.
2 MOUNT LOUVER 4'-0" A.F.F.
3 MOUNT EXHAUST FAN 11'-0" A.F.F.
4 MOUNT ELECTRIC UNIT HEATER 8'0" A.F.F.



A3 Mechanical Plan - Area A
1/8" = 1'-0"
TRUE NORTH PLAN NORTH
0 8' 16' 32'



A4 Mechanical Plan - Area E
1/8" = 1'-0"
TRUE NORTH PLAN NORTH
0 8' 16' 32'

PACKET 7.905 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN
A
E

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Mechanical Plan - Area A, E

M-111A

R_v21 1/26/2022 4:56:06 PM

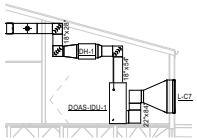
GENERAL NOTES

A. REFER TO GENERAL NOTES ON M-001.
B. THE DUCT RUNOUTS SHALL BE SIZED SAME AS GRILLE UNLESS NOTED OTHERWISE.

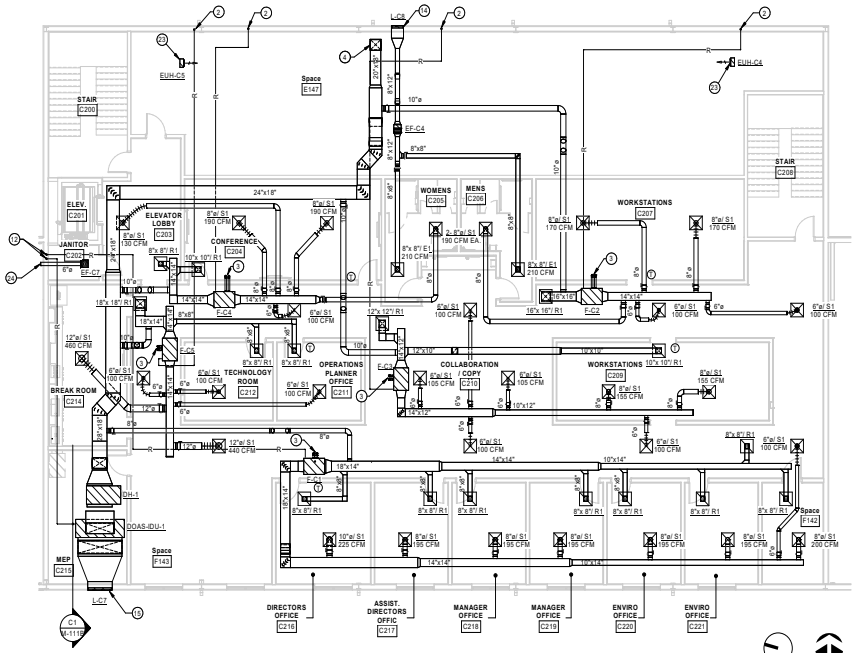
KEY NOTES

AS INDICATED BY: (2)

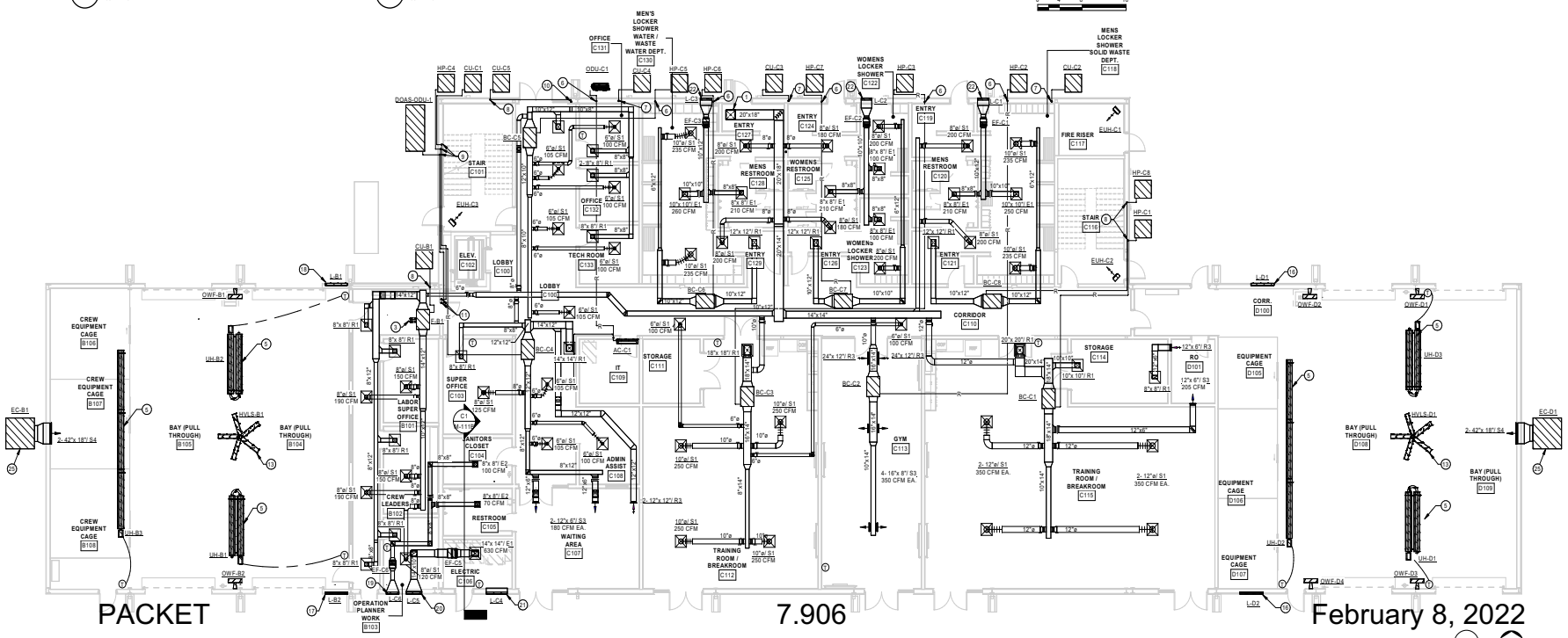
1 ROUTE OUTSIDE AIR SUPPLY DUCT DOWN FROM SECOND FLOOR TO FIRST FLOOR CEILING SPACE.
2 ROUTE REFRIGERANT PIPING UP IN WALL TO SECOND FLOOR CEILING SPACE.
3 ROUTE COMBUSTION AIR INTAKE AND FLUE UP AND CONNECT TO CONCENTRIC VENT AND PENETRATE ROOF. SIZE PER MANUFACTURERS RECOMMENDATIONS.
4 ROUTE OUTSIDE AIR SUPPLY DUCT DOWN TO FIRST FLOOR CEILING SPACE. PROVIDE FIRE/SMOKE DAMPER AT FLOOR PENETRATION.
5 MOUNT INFRARED GAS FIRED TUBULAR HEATER 14'-0" A.F.F.
6 ROUTE REFRIGERANT PIPING UP IN WALL TO FIRST FLOOR CEILING SPACE.
7 ROUTE REFRIGERANT PIPING UP IN WALL TO SECOND FLOOR CEILING SPACE.
8 ROUTE REFRIGERATE PIPING UP IN WALL TO APPROXIMATELY12' AFF AND ROUTE OVER IN WALL.
9 ROUTE REFRIGERATE PIPING UP IN WALL TO APPROXIMATELY12' AFF AND ROUTE OVER IN WALL. ROUTE PIPING TO AVOID STRUCTURE IN WALLS.
10 CONTINUE REFRIGERANT PIPING FROM ABOVE DOOR AND ROUTE UP TO SECOND FLOOR CEILING SPACE.
11 ROUTE REFRIGERANT LINES UP IN SECOND FLOOR WALL FROM FIRST FLOOR CEILING SPACE TO SECOND FLOOR CEILING SPACE.
12 REFRIGERANT LINES UP FROM FIRST FLOOR CEILING SPACE TO SECOND FLOOR CEILING SPACE.
13 MOUNT FAN 18'-0" A.F.F.
14 MOUNT LOUVER 8'-0" ABOVE SECOND FLOOR ELEVATION.
15 MOUNT LOUVER 4'-0" ABOVE SECOND FLOOR ELEVATION.
16 MOUNT LOUVER 12'-6" ABOVE GRADE.
17 MOUNT LOUVER 12'-3" ABOVE GRADE.
18 MOUNT LOUVER 12'-0" ABOVE GRADE.
19 MOUNT LOUVER ABOVE GRADE.
20 MOUNT LOUVER ABOVE GRADE.
21 MOUNT LOUVER 10'-9" ABOVE GRADE.
22 MOUNT LUCVER 11'-8" ABOVE GRADE.
23 MOUNT ELECTRIC UNIT HEATER 10'-0" A.F.F.
24 PROVIDE EXHAUST AIR WALL CAP.
25 EVAP COOLER SHALL BE SUSPENDED FROM THE METAL BUILDING. REFER TO ARCH TO MOUNTING HEIGHT.



C1 MEP C215 Section
1/8" = 1'-0"



C2 Mechanical Plan - Second Floor - Area C
1/8" = 1'-0"



A1 Mechanical Plan - First Floor - Area B, C, D
1/8" = 1'-0"

PACKET 7.906 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN
B C D

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Mechanical Plan - Areas B, C, D

M-111B

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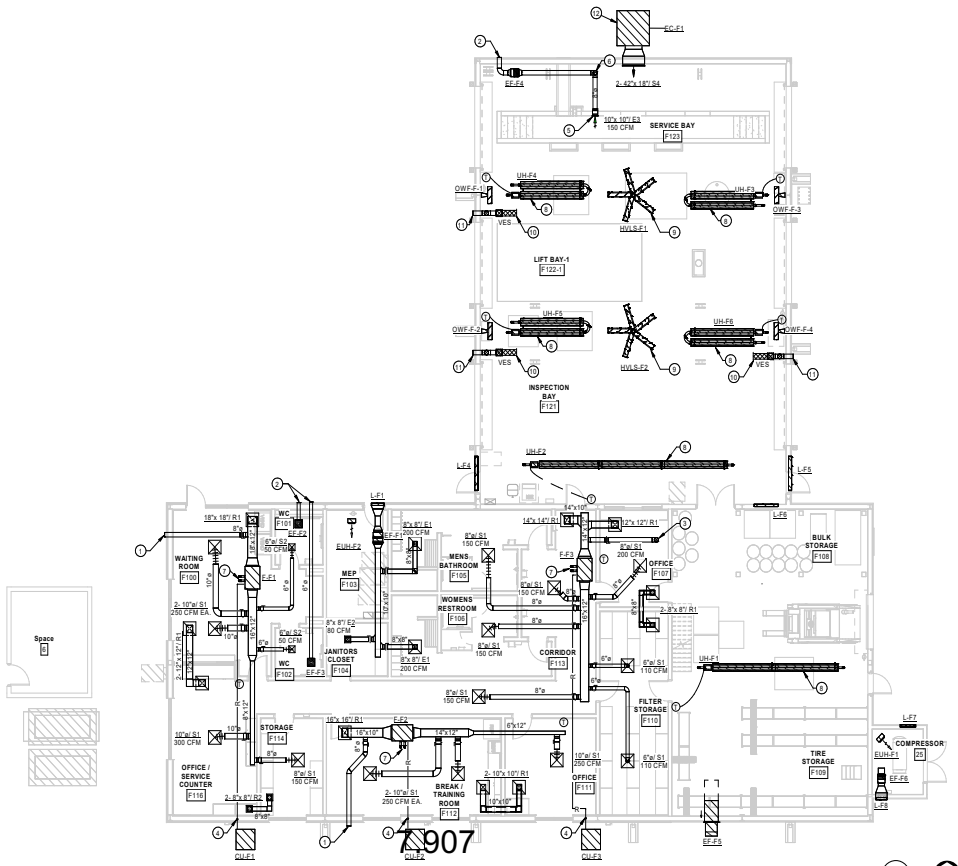

GENERAL NOTES

A. REFER TO GENERAL NOTES ON M-001.
B. THE DUCT RUNOUTS SHALL BE SIZED SAME AS GRILLE UNLESS NOTED OTHERWISE.

KEY NOTES

AS INDICATED BY: (#)

1 PROVIDE FRESH AIR INLET WALL CAP. BROAN 643FA OR EQUIVALENT.
2 PROVIDE EXHAUST AIR WALL CAP.
3 8" DIAMETER OUTSIDE AIR SUPPLY DUCT PENETRATES THRU ROOF AND TERMINATES IN A GOOSENECK.
4 ROUTE REFRIGERANT PIPING UP IN WALL TO FIRST FLOOR CEILING SPACE.
5 BOTTOM OF EXHAUST GRILLE SHALL BE MOUNTED NO HIGHER THAN 12" A.F.F. OF THE PIT.
6 TURN DUCTWORK UP NEXT TO FOUNDATION AND ROUTE UP TO 15'-0" A.F.F. AND CONTINUE TO EXHAUST FAN EF-F4.
7 ROUTE COMBUSTION AIR INTAKE AND FLUE UP AND CONNECT TO CONCENTRIC VENT AND PENETRATE ROOF. SIZE PER MANUFACTURERS RECOMMENDATIONS.
8 MOUNT INFRARED GAS FIRED TUBULAR HEATER 14'-0" A.F.F.
9 MOUNT FAN 20'-0" A.F.F.
10 INSTALL A VEHICLE EXHAUST SYSTEM (VES) APPROXIMATELY 15' AFF. PROVIDE A SPRING OPERATED STORAGE REEL FOR VES BY CARMON MODEL TSRP-P36. PROVIDE A 1.5 HP DIRECT DRIVE EXHAUST FAN, 208V/3 PHASE, (EXAMPLE: CMW-13) MOUNTED TO THE HOSE REEL ASSEMBLY. SUPPORT VES FROM STRUCTURE ABOVE WITH UNISTRUT OR AS RECOMMENDED BY MANUFACTURER. VENT AS SHOWN. PROVIDE 33' OF 6" DIAMETER NXT HOSE ON HOSE REEL. PROVIDE A CARMON CTA-6 TAILPIPE ADAPTER. CONFIRM EXACT TAILPIECE DIAMETER REQUIRED WITH OWNER. PROVIDE AND INSTALL A CONTROL PANEL FOR THE VES ON THE WALL NEAR THE ASSEMBLY.
11 ROUTE 8" DIAMTER EXHAUST DUCT OFF OF VES EXHAUST FAN. TURN UP AND ROUTE OUT WALL APPROXIMATELY 17' AFF. INSTALL WALL CAP ON EXTERIOR.
12 EVAP COOLER SHALL BE SUSPENDED FROM THE METAL BUILDING. REFER TO ARCH TO MOUNTING HEIGHT.

PACKET

1907

February 8, 2022

A2 Mechanical Plan - Area F
1/8" = 1'-0"

TRUE NORTH PLAN NORTH
0 4' 8' 16'

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KEY PLAN

F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Mechanical Plan - Area F

M-111F

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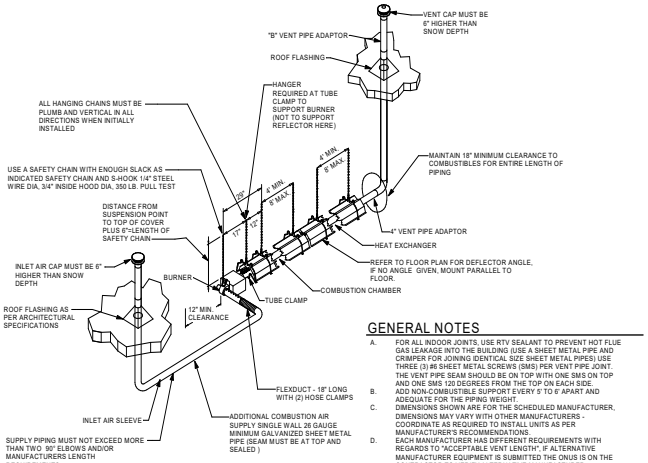


GENERAL NOTES

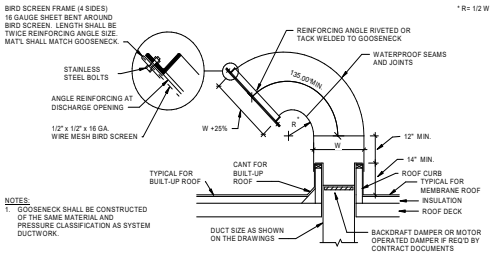
A. FOR ALL INDOOR JOINTS, USE RTV SEALANT TO PREVENT HOT FLUE GAS LEAKAGE INTO THE BUILDING (USE A SHEET METAL PIPE AND CRIMPER FOR JOINING IDENTICAL SIZE SHEET METAL PIPES) USE THREE (3) #8 SHEET METAL SCREWS (SMS) PER VENT PIPE JOINT. THE VENT PIPE SEAM SHOULD BE ON TOP WITH ONE SMS ON TOP AND ONE SMS 120 DEGREES FROM THE TOP ON EACH SIDE.

B. ADD NON-COMBUSTIBLE SUPPORT EVERY 5' TO 6' APART AND ADEQUATE FOR THE PIPING WEIGHT.

C. DIMENSIONS SHOWN ARE FOR THE SCHEDULED MANUFACTURER, DIMENSIONS MAY VARY WITH OTHER MANUFACTURERS - COORDINATE AS REQUIRED TO INSTALL UNITS AS PER MANUFACTURER'S RECOMMENDATIONS.

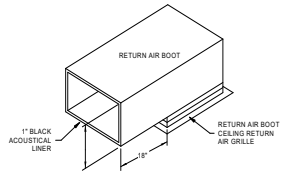
D. EACH MANUFACTURER HAS DIFFERENT REQUIREMENTS WITH REGARDS TO "ACCEPTABLE VENT LENGTH", IF ALTERNATIVE MANUFACTURER EQUIPMENT IS SUBMITTED THE ONUS IS ON THE CONTRACTOR TO VERIFY ALTERNATIVE MANUFACTURER REQUIREMENTS AND SUPPLY, MODIFY, OR ALTER INSTALLATION TO ACCOMMODATE ALTERNATE MANUFACTURERS INSTALLATION REQUIREMENTS AFTER RECEIVING ENGINEER OF RECORD APPROVAL.

C1 LOW INTENSITY INFRARED HEATER (IRUH)
NTS

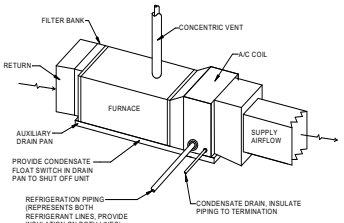


NOTES:
1. GOOSENECK SHALL BE CONSTRUCTED OF THE SAME MATERIAL AND PRESSURE CLASSIFICATION AS SYSTEM DUCTWORK.

C4 GOOSENECK
NTS

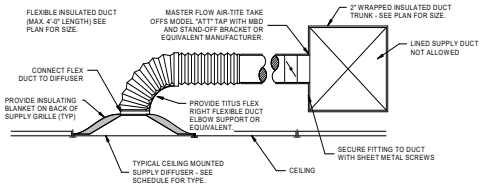


B1 RETURN AIR BOOT
NTS

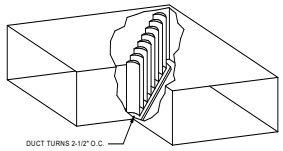


NOTE: THIS DETAIL APPLIES TO THE BLOWER COILS ALSO

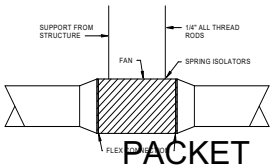
B2 HORIZONTAL FURNACE DETAIL
NTS



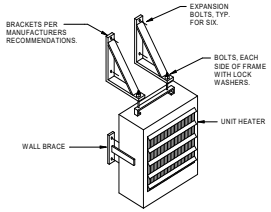
B4 SUPPLY AIR DIFFUSER MOUNTING FLEX
NTS



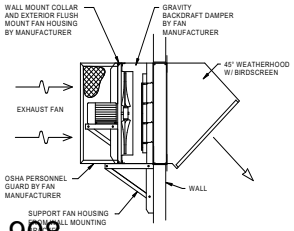
B5 ELBOW WITH TURNING VANES TYPICAL
NTS



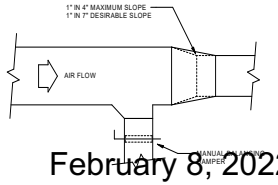
A1 EXHAUST FAN - INLINE
NTS



A2 ELECTRIC UNIT HEATER MOUNT
NTS



A4 EXHAUST PROP FAN WALL MOUNT DETAIL
NTS



A5 DUCT TAP DETAIL
NTS

PACKET 7.908 February 8, 2022

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Midland Utilities Service Center
Water/Wastewater, Solid Waste, and Vehicle Services

MIDLAND
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CLIENT
City of Midland

401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Mechanical Details

M-501

R_v21 1/26/2022 4:45:03 PM

LOUVER SCHEDULE

SYMBOL	SERVES	LOUVER FUNCTION	WIDTH	HEIGHT	MAX FACE VELOCITY	MIN FREE AREA	AIRFLOW	FRAME TYPE	ACTUATOR VOLTAGE	FAIL POSITION	BIRDSCREEN	MANUFACTURER	MODEL NO.
L-B1	AREA B	EXHAUST	49"	76"	750 FPM	10.04	7550 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-B2	AREA B	EXHAUST	49"	76"	750 FPM	10.04	7550 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-C1	EF-C1	EXHAUST	25"	21"	750 FPM	0.57	460 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-C2	EF-C2	EXHAUST	23"	21"	730 FPM	0.52	410 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-C3	EF-C3	EXHAUST	25"	21"	750 FPM	0.57	460 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-C4	ELECTRIC C106	INTAKE	46"	23"	490 FPM	1.27	630 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-C5	EF-C5	EXHAUST	34"	21"	730 FPM	.80	630 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-C6	EF-C6	EXHAUST	28"	20.25"	480 FPM	0.35	170 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-C7	MEP C215	INTAKE	69"	44"	500 FPM	6.84	3420 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-C8	EF-C4	EXHAUST	23"	21"	750 FPM	0.52	420 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-D1	AREA D	EXHAUST	51"	76"	740 FPM	10.47	7825 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-D2	AREA D	EXHAUST	51"	76"	740 FPM	10.47	7825 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-E1	AREA E	INTAKE	38"	48"	500 FPM	4.21	2130 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-F1	EF-F1	EXHAUST	25	22"	750 FPM	0.66	480 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-F4	AREA F SHOP	EXHAUST	61"	71"	750 FPM	11.22	8440 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-F5	AREA F SHOP	EXHAUST	61"	71"	750 FPM	11.22	8440 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-F6	EF-F4, EF-F5	INTAKE	47"	30"	500 FPM	2.52	1300 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-F7	EF-F6	INTAKE	32"	20.25"	490 FPM	0.4	200 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401
L-F8	EF-F6	EXHAUST	22"	20.25"	740 FPM	0.27	200 CFM	CHANNEL	120 V	CLOSED	YES	GREENHECK	EACC-401

NOTES:
1. UNITS ARE SCHEDULED TO BE MANUFACTURED BY GREENHECK. RUSKIN AND CESCO ARE CONSIDERED EQUIVALENT.
2. COORDINATE FRAME TYPE WITH ARCHITECT. COORDINATE EXACT SIZE WITH ARCHITECTURAL DETAILS AND CMU BLOCK OR BRICK DIMENSIONS.
3. COORDINATE LOUVER COLOR WITH ARCHITECT.
4. LOUVERS L-B1 AND L-B2 ARE TO OPERATE WITH EVAPORATIVE COOLER EC-B1.
5. LOUVER L-C1 IS TO OPERATE WITH EXHAUST FAN EF-C1.
6. LOUVER L-C2 IS TO OPERATE WITH EXHAUST FAN EF-C2.
7. LOUVER L-C3 IS TO OPERATE WITH EXHAUST FAN EF-C3.
8. LOUVERS L-C4 AND L-C5 ARE TO OPERATE WITH EXHAUST FAN EF-C5.
9. LOUVER L-C6 IS TO OPERATE WITH EF-C6.
10. LOUVER L-C7 IS TO OPERATE WITH DEDICATED OUTSIDE AIR UNIT DOAS-IDU-1.
11. LOUVER L-C8 IS TO OPERATE WITH EXHAUST FAN EF-C4.
12. LOUVERS L-D1 AND L-D2 ARE TO OPERATE WITH EVAPORATIVE COOLER EC-D1.
13. LOUVER L-E1 IS TO OPERATE WITH EF-E1.
14. LOUVER L-F1 TO OPERATE WITH EXHAUST FAN EF-F1.
15. LOUVER L-F6 TO OPERATE WITH EXHAUST FAN EF-F5.
16. LOUVERS L-F4 AND L-F5 ARE TO OPERATE WITH EVAPORATIVE COOLER EC-F1.
17. LOUVERS L-F7 AND L-F8 ARE TO OPERATE WITH EXHAUST FAN EF-F6.

INFRARED GAS FIRED UNIT HEATER SCHEDULE

SYMBOL	TUBE LENGTH (FT.)	INPUT, MBH	GAS SUPPLY PRESSURE (in w.c.)	REFLECTOR PANELS	COMBUSTION AIR VENT KIT	FLUE AIR VENT KIT	VOLTAGE	PHASE	AMPS	MANUFACTURER	MODEL NO
UH-B1	20' - 0"	75	5"	HORIZONTAL	4"	4"	120 V	1	1.8	SPACE-RAY	PTU75-20-N5
UH-B2	20' - 0"	75	5"	HORIZONTAL	4"	4"	120 V	1	1.8	SPACE-RAY	PTU75-20-N5
UH-B3	30' - 0"	100	5"	HORIZONTAL	4"	4"	120 V	1	1.8	SPACE-RAY	PTS100-30-N5
UH-D1	20' - 0"	75	5"	HORIZONTAL	4"	4"	120 V	1	1.8	SPACE-RAY	PTU75-20-N5
UH-D2	30' - 0"	100	5"	HORIZONTAL	4"	4"	120 V	1	1.8	SPACE-RAY	PTS100-30-N5
UH-D3	20' - 0"	75	5"	HORIZONTAL	4"	4"	120 V	1	1.8	SPACE-RAY	PTU75-20-N5
UH-F1	20' - 0"	75	5"	HORIZONTAL	4"	4"	120 V	1	1.8	SPACE-RAY	PTS75-20-N5
UH-F2	30' - 0"	100	5"	30 DEGREE ANGLE	4"	4"	120 V	1	1.8	SPACE-RAY	PTS100-30-N5
UH-F3	20' - 0"	75	5"	HORIZONTAL	4"	4"	120 V	1	1.8	SPACE-RAY	PTU75-20-N5
UH-F4	20' - 0"	75	5"	HORIZONTAL	4"	4"	120 V	1	1.8	SPACE-RAY	PTU75-20-N5
UH-F5	20' - 0"	75	5"	HORIZONTAL	4"	4"	120 V	1	1.8	SPACE-RAY	PTU75-20-N5
UH-F6	20' - 0"	75	5"	HORIZONTAL	4"	4"	120 V	1	1.8	SPACE-RAY	PTU75-20-N5

NOTES:
1. UNITS ARE SCHEDULED TO BE MANUFACTURED BY SOLARONICS. OTHER MANUFACTURERS MAY BE ACCEPTABLE.
2. UNITS SHALL INCLUDE REFLECTOR GAP COVERS, END COVERS, AND HANGER KIT.
3. GAS PIPING SHALL HAVE SHUTOFF PLUG VALVE AND 6" DIRT LEG.
4. UNITS SHALL BE DERATED FOR JOB SITE ELEVATION AT LOCAL ALTITUDE.
5. PROVIDE 24V HEATING ONLY THERMOSTAT WITH SUB BASE TO ALLOW HEATING MODE, SET AT 50°F, ADJUSTABLE.

OSCILLATING WALL FAN SCHEDULE

SYMBOL	SPEEDS	CFM (HIGH SPEED)	DRIVE	SOUND LEVEL dBA	FAN MOTOR POWER - HP	NOMINAL FAN RPM	ELECTRICAL			WEIGHT, LBS	MANUFACTURER	MODEL NO
							VOLTAGE	PHASE	METHOD OF CONTROL			
OWF-B1	2	7900 CFM	DIRECT	66	1/4	1100/800	120 V	1	PULL CORD	51	COOK	30CAC-ACHO
OWF-B2	2	7900 CFM	DIRECT	66	1/4	1100/800	120 V	1	PULL CORD	51	COOK	30CAC-ACHO
OWF-D1	2	7900 CFM	DIRECT	66	1/4	1100/800	120 V	1	PULL CORD	51	COOK	30CAC-ACHO
OWF-D2	2	7900 CFM	DIRECT	66	1/4	1100/800	120 V	1	PULL CORD	51	COOK	30CAC-ACHO
OWF-D3	2	7900 CFM	DIRECT	66	1/4	1100/800	120 V	1	PULL CORD	51	COOK	30CAC-ACHO
OWF-D4	2	7900 CFM	DIRECT	66	1/4	1100/800	120 V	1	PULL CORD	51	COOK	30CAC-ACHO
OWF-F-1	2	7900 CFM	DIRECT	66	1/4	1100/800	120 V	1	PULL CORD	51	COOK	30CAC-ACHO
OWF-F-2	2	7900 CFM	DIRECT	66	1/4	1100/800	120 V	1	PULL CORD	51	COOK	30CAC-ACHO
OWF-F-3	2	7900 CFM	DIRECT	66	1/4	1100/800	120 V	1	PULL CORD	51	COOK	30CAC-ACHO
OWF-F-4	2	7900 CFM	DIRECT	66	1/4	1100/800	120 V	1	PULL CORD	51	COOK	30CAC-ACHO

NOTES:
1. FANS ARE SCHEDULED TO BE MANUFACTURED BY COOK.
2. AIRFLOW CONDITIONS RATED AT LOCAL ALTITUDE.
3. OSCILLATING FAN HEAD TO MOVE IN A 90°ARC OR BE LOCKED IN POSITION WITH UP TO 30° DOWNWARD TILT.
4. PROVIDE WITH WALL MOUNTING BRACKET, STEEL WIRE GUARD, TWO SPEEDS, TEC MOTOR WITH PULL CORD OPERATING SWITCH.

DEDICATED OUTSIDE AIR SYSTEM INDOOR UNIT SCHEDULE

SYMBOL	INDOOR UNIT		TOTAL CFM	COOLING				ELECTRICAL		MANUFACTURER	MODEL NO.
	BLOWER MOTOR HP / DRIVE	ESP (in W.G.)		MINIMUM TOTAL CAPACITY, BTUIH	MINIMUM SENSIBLE CAPACITY, BTUIH	COOLING OUTDOOR AIR TEMPS (DB/WB)	MINIMUM COOLING IEER	VOLTAGE	PHASE		
DOAS-IDU-1	2.22 / BELT	0.85	3865 CFM	237.1	204.5	105/71	11.9	208 V	3	TRANE	TWE240E3

DEDICATED OUTSIDE AIR SYSTEM OUTDOOR UNIT SCHEDULE

SYMBOL	SERVES	ELECTRICAL				REFRIGERANT TYPE	MANUFACTURER	MODEL NO.
		VOLTAGE	PHASE	MCA	MOCP			
DOAS-ODU-1	DOAS-IDU-1	208 V	3	70	100 A	R410A	TRANE	TTA240J3

NOTES:
1. SCHEDULED UNITS ARE TRANE MORGANIZER OUTSIDE AIR UNITS.
2. EXTERNAL STATIC PRESSURE INCLUDES DUCTWORK, DAMPERS, AIR DEVICES, ETS. PRESSURE DROP FOR WET COIL AND FILTERS IS INCLUDED AS INTERNAL PRESSURE DROP.
3. OUTDOOR UNIT SHALL BE EQUIPPED ON CONCRETE AND INCLUDE A HAIL GUARD FOR THE CONDENSER COIL, HIGH PRESSURE SWITCH, CYCLE TIMER, SERVICE VALVES AND INDOOR BLOWER RELAY KIT.
4. PROVIDE UNIT WITH FACTORY INSTALLED CONTROLLER. REFER TO SPECS.
5. SIZE REFRIGERANT LINES ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

GAS FIRED DUCT HEATER

SYMBOL	SERVES	TOTAL CFM	MINIMUM INPUT, MBH	MINIMUM OUTPUT, MBH	FLUE SIZE	COMBUSTION AIR INLET	VOLTAGE	PHASE	WEIGHT, LBS	MANUFACTURER	MODEL NO
DH-1	DOAS-IDU-1	3865 CFM	350	287	6"	6"	115 V	1	454	TRANE	GUNE035ANA20

NOTES:
1. UNITS ARE SCHEDULED TO BE MANUFACTURED BY TRANE. CARRIER AND GREENHECK ARE CONSIDERED EQUIVALENT.
2. GAS PIPING SHALL HAVE SHUTOFF PLUG VALVE AND 6" DIRT LEG.
3. PROVIDE CONCENTRIC INTAKE/FLUE.

EXHAUST FAN SCHEDULE

SYMBOL	TYPE	CFM	DRIVE	E.S.P. (in W.G.)	SOUND LEVEL IN SONES	FAN MOTOR POWER	NOMINAL FAN RPM	ELECTRICAL			WEIGHT, LBS	MANUFACTURER	MODEL NO
								VOLTAGE	PHASE	METHOD OF CONTROL			
EF-C1	INLNE	460 CFM	DIRECT	0.40	8.1	1/10 HP	1635	115 V	1	DDC	49	GREENHECK	SQ-90-VG
EF-C2	INLNE	410 CFM	DIRECT	0.40	7.6	1/10 HP	1572	115 V	1	DDC	49	GREENHECK	SQ-90-VG
EF-C3	INLNE	470 CFM	DIRECT	0.40	8.1	1/10 HP	1635	115 V	1	DDC	49	GREENHECK	SQ-90-VG
EF-C4	INLNE	420 CFM	DIRECT	0.55	8.8	1/10 HP	1725	115 V	1	DDC	49	GREENHECK	SQ-90-VG
EF-C5	INLNE	630 CFM	DIRECT	0.35	8.5	1/6 HP	1596	115 V	1	THERMOSTAT	50	GREENHECK	SQ-95-VG
EF-C6	INLNE	170 CFM	DIRECT	0.45	10.8	1/4 HP	1446	115 V	1	DDC	58	GREENHECK	SQ-97-VG
EF-C7	CEILING MOUNT	50 CFM	DIRECT	.15	0.3	6 W	808	115 V	1	DDC	12	GREENHECK	SP-A50-90-VG
EF-E1	SIDEWALL	2130 CFM	DIRECT	0.1	6.4	1/4 HP	696	115 V	1	THERMOSTAT	105	GREENHECK	AER-E24C-320-VG
EF-F1	INLNE	480 CFM	DIRECT	0.4	8.3	1/10 HP	1663	115 V	1	DDC	49	GREENHECK	SQ-90-VG
EF-F2	CEILING MOUNT	70 CFM	DIRECT	0.15	0.5	6 W	838	115 V	1	DDC	12	GREENHECK	SP-A50-90-VG
EF-F3	CEILING MOUNT	70 CFM	DIRECT	0.15	0.5	6 W	838	115 V	1	DDC	12	GREENHECK	SP-A50-90-VG
EF-F4	INLINE	150 CFM	DIRECT	0.2	4.1	1/15 HP	1493	115 V	1	SWITCH	32	GREENHECK	SQ-70-VG
EF-F5	SIDEWALL	1055 CFM	DIRECT	0.1	4.3	1/4 HP	597	115 V	1	THERMOSTAT	90	GREENHECK	AER-E20C-620-VG
EF-F6	INLINE	200 CFM	DIRECT	0.2	4.8	1/15 HP	1548	115 V	1	THERMOSTAT	32	GREENHECK	SQ-70-VG

NOTES:
1. FANS ARE SCHEDULED TO BE MANUFACTURED BY GREENHECK. TWIN CITY AND COOK ARE CONSIDERED EQUIVALENT MANUFACTURERS.
2. AIRFLOW CONDITIONS RATED AT LOCAL ALTITUDE.
3. PROVIDE AND INSTALL FLEXIBLE CONNECTION ON FAN INLET DUCT CONNECTION.
4. FANS SHALL HAVE MOTOR VIBRATION ISOLATION, BACK DRAFT DAMPER AT UNIT AND LOCAL DISCONNECT SWITCH AT UNIT.
5. FAN SELECTIONS SHALL BE SUBMITTED TO ALLOW FOR A MINIMUM +/- 10% IN SCHEDULED EXTERNAL STATIC AND CFM WITHIN THE PARAMETERS OF THE SCHEDULED MOTOR HP.

FURANCE SPLIT SYSTEM SCHEDULE

SYMBOL	TYPE	EXTERNAL S.P. (in W.G.)	BLOWER MOTOR HP/ DRIVE	TOTAL CFM	OUTSIDE AIR CFM	COOLING					HEATING			ELECTRICAL				WEIGHT, LBS	MANUFACTURER	FURANCE MODEL NUMBER
						MINIMUM TOTAL CAPACITY, MBH	MINIMUM SENSIBLE CAPACITY, MBH	ENTERING RETURN AIR TEMPERATURE, DB / WB	MINIMUM COOLING SEER	OUTDOOR AMBIENT TEMPERATURE , F	COOLING COIL MODEL NUMBER	MINIMUM INPUT, MBH	CAPACITY, MBH	AFUE(%)	VOLTAGE	PHASE	MCA	MOCP			
F-B1	HORIZONTAL	0.65	.5 / DIRECT	800 CFM	65	23.4	16.3	70	15	100	4TXCB003DS3	40	25.0	96	120 V	1	8.8	15	114 lb	TRANE	S9X1B0401P3SBA
F-C1	HORIZONTAL	0.70	.75 / DIRECT	1500 CFM	100	44.5	31.9	70	15	100	4TXCB006DS3	80	47	96	120 V	1	10.3	15	127 lb	TRANE	S9X1B0801P4SBA
F-C2	HORIZONTAL	0.85	.75 / DIRECT	730 CFM	365	23.1	15.6	70	15	100	4TXCB003DS3	40	25	96	120 V	1	8.8	15	114 lb	TRANE	S9X1B0401P3SBA
F-C3	HORIZONTAL	0.65	.5 / DIRECT	820 CFM	245	23.5	16.6	70	15	100	4TXCB003DS3	40	25.0	96	120 V	1	8.8	15	114 lb	TRANE	S9X1B0401P3SBA
F-C4	HORIZONTAL	0.60	.5 / DIRECT	800 CFM	325	23.7	17.2	70	15	100	4TXCB003DS3	40	25.0	96	120 V	1	8.8	15	114 lb	TRANE	S9X1B0401P3SBA
F-C5	HORIZONTAL	0.55	.75 / DIRECT	1200 CFM	200	32.7	23.3	70	15	100	4TXCB004DS3	60	34.4	96	120 V	1	10.3	15	122 lb	TRANE	S9X1B0601P4SBA
F-F1	HORIZONTAL	1.00	.75 / DIRECT	1050 CFM	135	27.6	23.4	74	15	100	4TXCB003DS3	60	29.2	96	120 V	1	10.3	15	122 lb	TRANE	S9X1B0601P4SBA
F-F2	HORIZONTAL	0.85	.5 / DIRECT	750 CFM	150	23.5	18.6	76	15	100	4TXCB003DS3	40	25	96	120 V	1	8.8	15	114 lb	TRANE	S9X1B0401P3SBA
F-F3	HORIZONTAL	0.50	.5 / DIRECT	1020 CFM	100	31.9	21.4	75	15	100	4TXCB004DS3	60	34.4	96	120 V	1	10.3	15	122 lb	TRANE	S9X1B0601P4SBA

NOTES FOR FURNACE AND ASSOCIATED AIR-COOLED CONDENSING UNIT SCHEDULES:
1. SCHEDULED UNITS ARE MANUFACTURED BY TRANE. CARRIER AND LENNOX ARE CONSIDERED EQUIVALENT.
2. EXTERNAL STATIC PRESSURE INCLUDES DUCTWORK, DAMPERS AND AIR DEVICES. PRESSURE DROP FOR WET COIL AND FILTERS IS CONSIDERED AS INTERNAL PRESSURE DROP.
3. COOLING CAPACITIES AND SEER/EER RATINGS ARE COMBINATION RATINGS WITH OUTDOOR UNITS. CAPACITIES ARE RATED AT ENTERING AIR TEMPERATURE AND AMBIENT AS LISTED; SEER RATINGS ARE AT AHRI CONDITIONS. AIRFLOW CONDITIONS ARE RATED AT 2,780 FEET ALTITUDE.
4. EACH OUTDOOR UNIT SHALL BE EQUIPPED WITH A HIGH PRESSURE SWITCH, HARD START KIT ON SINGLE PHASE UNITS, ANTI-SHORT CYCLE TIMER, SERVICE VALVES AND INDOOR BLOWER RELAY KIT.
5. ELECTRICAL CONTRACTOR IS TO PROVIDE AND INSTALL ALL DISCONNECTS FOR EACH DEVICE IN THE SPLIT SYSTEM PACKAGE. ELECTRICAL CONTRACTOR IS TO MAKE ALL CONNECTIONS AS PER DIVISION 26 SPECIFICATIONS.
6. PROVIDE SWITCH IN AUXILLARY DRAIN PAN TO SHUT DOWN UNIT.

CONDENSING UNIT SPLIT SYSTEM SCHEDULE

SYMBOL	SERVES	ELECTRICAL				TYPE OF REFRIGERANT	MANUFACTURER	MODEL NO.
		VOLTAGE	PHASE	MCA	MOCP			
CU-B1	F-B1	208 V	1	14	20	R-410A	TRANE	4TTR4024L1
CU-C1	F-C1	208 V	1	24	40	R-410A	TRANE	4TTR4048L1
CU-C2	F-C2	208 V	1	14	20	R-410A	TRANE	4TTR4024L1
CU-C3	F-C3	208 V	1	14	20	R-410A	TRANE	4TTR4024L1
CU-C4	F-C4	208 V	1	14	20	R-410A	TRANE	4TTR4024L1
CU-C5	F-C5	208 V	1	18	30	R-410A	TRANE	4TTR4036L1
CU-F1	F-F1	208 V	1	17	25	R-410A	TRANE	4TTR4030L1
CU-F2	F-F2	208 V	1	14	20	R-410A	TRANE	4TTR4024L1
CU-F3	F-F3	208 V	1	18	30	R-410A	TRANE	4TTR4036L1

BLOWER COIL SPLIT SYSTEM SCHEDULE

SYMBOL	INDOOR UNIT		TOTAL CFM	COOLING			HP HEATING		ELECTRICAL		SUPPLEMENTAL HEAT		MANUFACTURER
	BLOWER MOTOR HP / DRIVE	E.S.P (in W.G.)		MINIMUM TOTAL CAPACITY, BTUH	MINIMUM SENSIBLE CAPACITY, BTUH	MINIMUM COOLING SEER	HEATING CFM	CAPACITY, MBH AT 47 F	HEAT PUMP MODEL NUMBER	VOLTAGE	PHASE	CAPACITY (kW)	VOLTS / PHASE	
BC-C1	.75 / DIRECT	.75	1610 CFM	42666	30058	14	1610	46.5	TEM4A0C48S41	208 V	1	7.21	208 / 1	TRANE
BC-C2	.5 / DIRECT	.35	1400 CFM	38321	27663	14	1400	39.0	TEM4A0C42S41	208 V	1	5.77	208 / 1	TRANE
BC-C3	.5 / DIRECT	.85	1200 CFM	36183	23907	14	1200	34.6	TEM4A0C42S41	208 V	1	5.77	208 / 1	TRANE
BC-C4	.25 / DIRECT	.55	795 CFM	21490	15426	14	795	22.4	TEM4A0B24S21	208 V	1	3.6	208 / 1	TRANE
BC-C5	.25 / DIRECT	.55	615 CFM	16072	12399	14	615	17.2	TEM4A0B18S21	208 V	1	2.88	208 / 1	TRANE
BC-C6	.25 / DIRECT	.55	470 CFM	15688	11372	14	525	17.2	TEM4A0B18S21	208 V	1	2.88	208 / 1	TRANE
BC-C7	.25 / DIRECT	.55	490 CFM	15688	11372	14	525	17.2	TEM4A0B18S21	208 V	1	2.88	208 / 1	TRANE
BC-C8	.25 / DIRECT	.55	470 CFM	15688	11372	14	525	17.2	TEM4A0B18S21	208 V	1	2.88	208 / 1	TRANE

NOTES :
1. SCHEDULED UNITS ARE MANUFACTURED BY TRANE. CARRIER AND LENNOX ARE CONSIDERED EQUIVALENT.
2. EXTERNAL STATIC PRESSURE INCLUDES DUCTWORK, DAMPERS, EVAPORATICE COOLING COIL, AND AIR DEVICES. PRESSURE DROP FOR WET COIL AND FILTERS IS CONSIDERED AS INTERNAL PRESSURE DROP.
3. COOLING CAPACITIES AND SEER/EER RATINGS ARE COMBINATION RATINGS WITH OUTDOOR UNITS. CAPACITIES ARE RATED AT ENTERING AIR TEMPERATURE AND AMBIENT AS LISTED; SEER RATINGS ARE AT AHRI CONDITIONS. AIRFLOW CONDITIONS ARE RATED AT 2,780 FEET ALTITUDE.
4. EACH OUTDOOR UNIT SHALL BE EQUIPPED WITH A HIGH PRESSURE SWITCH, HARD START KIT ON SINGLE PHASE UNITS, ANTI-SHORT CYCLE TIMER, SERVICE VALVES AND INDOOR BLOWER RELAY KIT.

HEAT PUMP SPLIT SYSTEM SCHEDULE

SYMBOL	SERVES	ELECTRICAL				TYPE OF REFRIGERANT	MANUFACTURER	MODEL NO.
		VOLTAGE	PHASE	MCA	MOCP			
HP-C1	BC-C1	208 V	1	26	45	R-410A	TRANE	4TWR4048G1
HP-C2	BC-C2	208 V	1	25	40	R-410A	TRANE	4TWR4042G1
HP-C3	BC-C3	208 V	1	27	40	R-410A	TRANE	4TWR4036G1
HP-C4	BC-C4	208 V	1	14	25	R-410A	TRANE	4TWR4024G1
HP-C5	BC-C5	208 V	1	12	20	R-410A	TRANE	4TWR4018G1
HP-C6	BC-C6	208 V	1	12	20	R-410A	TRANE	4TWR4018G1
HP-C7	BC-C7	208 V	1	12	20	R-410A	TRANE	4TWR4018G1
HP-C8	BC-C8	208 V	1	12	20	R-410A	TRANE	4TWR4018G1

CEILING FANS SCHEDULE

SYMBOL	SERVES	AIRFOILS	SOUND LEVEL	MOTOR	FAN RPM	VOLTAGE	PHASE	WEIGHT, LBS	MANUFACTURER	MODEL
HVLS-B1	AREA B SHOP	5 - 8'Ø	48 dBA	175 W	159	115 V	1	86	GREENHECK	DC-5-8-13LV
HVLS-D1	AREA D SHOP	5 - 8'Ø	48 dBA	175 W	159	115 V	1	86	GREENHECK	DC-5-8-13LV
HVLS-F1	AREA F SHOP	5 - 8'Ø	48 dBA	175 W	159	115 V	1	86	GREENHECK	DC-5-8-13LV
HVLS-F2	AREA F SHOP	5 - 8'Ø	48 dBA	175 W	159	115 V	1	86	GREENHECK	DC-5-8-13LV

NOTES:
1. VERIFY EXTENSION TUBE LENGTH AND MOUNTING BRACKET WITH MANUFACTURER PRIOR TO ORDERING.
2. SUPPLY WITH PERMANENT MAGNET DIRECT DRIVE MOTOR.

ELECTRIC UNIT HEATER

SYMBOL	AIR FLOW	TEMP RISE	MINIMUM INPUT, kW	VOLTAGE	PHASE	AMPS	WEIGHT, LBS	MANUFACTURER	MODEL NO
EUH-A1	400 CFM	40	5	208 V	1	24.1	36	MARKEL	F1FUH05003
EUH-C1	400 CFM	40	5	208 V	1	24.1	36	MARKEL	F1FUH05003
EUH-C2	400 CFM	40	5	208 V	1	24.1	36	MARKEL	F1FUH05003
EUH-C3	400 CFM	40	5	208 V	1	24.1	36	MARKEL	F1FUH05003
EUH-C4	400 CFM	40	5	208 V	1	24.1	36	MARKEL	F1FUH05003
EUH-C5	400 CFM	40	5	208 V	1	24.1	36	MARKEL	F1FUH05003
EUH-F1	400 CFM	40	5	208 V	1	24.1	36	MARKEL	F1FUH05003
EUH-F2	400 CFM	40	5	208 V	1	24.1	36	MARKEL	F1FUH05003

NOTES:
1. UNITS ARE SCHEDULED TO BE MANUFACTURED BY MARKEL. INDECCO, REZNOR AND TRANE ARE CONSIDERED EQUIVALENT MANUFACTURERS. OTHERS BY PRIOR APPROVAL.
2. ELECTRICAL UNIT HEATER AS SCHEDULED SHALL HAVE BUILT-IN CONTROL TRANSFORMER, OVERHEAT PROTECTION, INTERNAL 24V THERMOSTAT, AND MOUNTING BRACKET. MOUNT THERMOSTAT TO BACK OF UNIT HEATER.
3. MANUFACTURER TO PROVIDE A LOCAL DISCONNECT THAT IS TO BE FIELD INSTALLED.

EVAPORATIVE COOLER SCHEDULE

SYMBOL	CFM	MOTOR HP / SPEED	CONFIGURATION	MEDIA TYPE	WATER FEED SIZE	VOLTAGE / PHASE	AMPS	MANUFACTURER	MODEL NO.	WEIGHT (LBS)
EC-B1	15,100 CFM	5 / 1	SIDE DISCHARGE	ASPEN	1/2"	208 / 3	16.7	CHAMPION COOLERS	14/21 SD	1087
EC-D1	15,650 CFM	5 / 1	SIDE DISCHARGE	ASPEN	1/2"	208 / 3	16.7	CHAMPION COOLERS	14/21 SD	1087
EC-F1	16,680 CFM	5 / 1	SIDE DISCHARGE	ASPEN	1/2"	208 / 3	16.7	CHAMPION COOLERS	14/21 SD	1087

1. UNITS ARE SCHEDULED TO BE MANUFACTURED BY CHAMPION COOLERS. OTHER MANUFACTURERS MAY BE ACCEPTABLE WITH PRIOR APPROVAL.
2. AIRFLOW CONDITIONS RATED AT LOCAL ALTITUDE.
3. EVAPORATIVE COOLER UNITS AS SCHEDULED HAVE PVC OR SS RESERVOIR, WATER CONNECTION SHUTOFF VALVE, WATER DISTRIBUTION HEADER, SIDE DISCHARGE, GALVANIZED SHEET-METAL HOUSING, RECIRCULATION PUMP, ADJUSTABLE FLOAT VALVE, BLEED OFF TUBING SYSTEM, AND V-BELT DRIVE SUPPLY MOTOR.
4. FAN SELECTIONS SHALL BE SUBMITTED TO ALLOW FOR A MINIMUM +/- 10% IN SCHEDULED EXTERNAL STATIC AND CFM WITHIN THE PARAMETERS OF THE SCHEDULED MOTOR HP.

DUCTLESS SPLIT SYSTEM OUTDOOR UNIT SCHEDULE

SYMBOL	NOMINAL TONS	ENTERING CONDENSER AIR TEMPERATURE F	MINIMUM COOLING SEER	REFRIGERANT TYPE	ELECTRICAL		MANUFACTURER	MODEL NO.
					VOLTAGE	PHASE		
ODU-C1	1	105	14	R410A	208 V	1	MITSUBISHI ELECTRIC	PUY-A12NKA7

DUCTLESS SPLIT SYSTEM INDOOR UNIT SCHEDULE

SYMBOL	TYPE	COOLING		ELECTRICAL		MANUFACTURER	MODEL NO.
		COOLING AIRFLO

PLUMBING FIXTURE MOUNTING HEIGHT

* ALL DIMENSIONS ARE IN INCHES AND FROM FINISHED FLOOR	AGES: 3 & 4		AGES: 5 THROUGH 8		AGES: 9 THROUGH 12		AGES: 13 THROUGH ADULTS	
	ADA/TAS	STANDARD (4)	ADA/TAS	STANDARD (4)	ADA/TAS	STANDARD (4)	ADA/TAS	STANDARD (4)
WATER CLOSETS								
TOP OF SEAT	11 - 12 MAX	11 - 12 MAX	11 - 15 MAX	11 - 15 MAX	15 - 17 MAX	15 - 17 MAX	17 - 19 MAX	16 - 18 MAX
FLUSH CONTROLS (HANDLE HEIGHT)	30 MAX	30 MAX	30 MAX	30 MAX	30 MAX	30 MAX	30 MAX	30 MAX
URINALS								
RIM OF BASIN	14 MAX	14 MAX	14 MAX	14 MAX	14 MAX	24 MAX	17 MAX	24 MAX
MINIMUM DEPTH (5)	13 1/2 MIN	13 1/2 MIN	13 1/2 MIN	13 1/2 MIN	13 1/2 MIN	13 1/2 MIN	13 1/2 MIN	13 1/2 MIN
FLUSH CONTROLS (HANDLE HEIGHT)	36 MAX	36 MAX	40 MAX	40 MAX	44 MAX	44 MAX	46 MAX	46 MAX
LAVATORIES AND SINKS								
RIM (10)	31 MAX	31 MAX	31 MAX	31 MAX	31 MAX	31 MAX	34 MAX	34 MAX
KNEE CLEARANCE	24 MAX	24 MAX	24 MAX	24 MAX	24 MAX	24 MAX	27 MIN	27 MIN
FRONT EDGE TO WALL/FAUCET HANDLE	20 MAX	20 MAX	20 MAX	20 MAX	20 MAX	20 MAX	20 -25 MAX	20 -25 MAX
DRINKING FOUNTAINS AND ELECTRIC WATER COOLERS								
SPOUT OUTLETS								
HEIGHT (LOW)	30 MAX	- - -	30 MAX	- - -	30 MAX	- - -	36 MAX	- - -
HEIGHT (HIGH)	38 - 43 MAX	- - -	38 - 43 MAX	- - -	38 - 43 MAX	- - -	38 - 43 MAX	- - -
DISTANCE FROM FRONT EDGE	3 1/2 MAX	- - -	3 1/2 MAX	- - -	3 1/2 MAX	- - -	5 MAX	- - -
SHOWERS								
FIXED HEAD (NON-MEDICAL APPLICATION)	48 MAX	48"	48 MAX	48"	48 MAX	60"	48 MAX	60"
ADJUSTABLE HEAD (9)	48 MAX	48"	48 MAX	48"	48 MAX	60"	48 MAX	60"
HOSE LENGTH	59 MIN	- - -	59 MIN	- - -	59 MIN	- - -	59 MIN	- - -

NOTES:

1. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS FOR LOCATIONS OF PLUMBING FIXTURES, GRAB BARS, DISPENSERS, ETC, WITH RESPECT TO WALLS, STALLS, ETC.
2. ACCESSIBILITY GUIDELINES SHOWN ARE FOR INFORMATIONAL PURPOSES ONLY, AND INTENDED TO SERVE AS A GUIDE FOR CONSTRUCTION PROFESSIONALS AND OWNERS.
3. SOME OF THE INFORMATION SHOWN HERE MAY NOT BE APPLICABLE TO THIS PROJECT.
4. STANDARD HEIGHT INFORMATION IS OBTAINED FROM ASPE (AMERICAN SOCIETY OF PLUMBING ENGINEERS), HEIGHTS NOT NOTED BY INFORMATION ON DRAWINGS.
5. DEPTH TO BE MEASURED FROM THE OUTER FACE OF THE URINAL RIM TO THE BACK OF THE FIXTURE.
6. KNEE CLEARANCE FOR LAVATORIES AND SINKS SHALL COMPLY WITH TAS.
7. REFER TO DETAIL FOR COUNTER MOUNTED SINKS WITH BUBBLERS FOR DIMENSIONS, ON ARCHITECTURAL DRAWINGS.
8. DRINKING FOUNTAINS AND ELECTRIC WATER COOLER DISTANCES FROM FRONT EDGE INCLUDES BUMPERS. KNEE CLEARANCES MUST BE MAINTAINED THROUGH THE MIN./MAX. RANGE HEIGHT FOR THE SPOUT.
9. THE 30" SLIDE BAR SHALL BE MOUNTED AT A HEIGHT SO THE HAND HELD SHOWER WAND SHALL BE MOUNTED NO HIGHER THAN 48" ABOVE SHOWER FINISHED FLOOR.
10. THE CONTRACTOR SHALL COORDINATE WITH THE COUNTER TOP/BASE CABINET MANUFACTURER TO VERIFY THAT THE RIM OF THE LAVATORY/SINK IS INSTALLED AT NO MORE THAN THE MAXIMUM HEIGHT ALLOWED.
11. KNEE CLEARANCE MAY BE LOWERED FROM 27 INCHES TO 24 INCHES, IF THE RIM HEIGHT IS SET AT 31 INCHES.

GENERAL NOTES

1. GENERAL NOTES ON THIS SHEET ARE APPLICABLE TO EACH PLUMBING DRAWING OF THIS SET OF CONSTRUCTION DOCUMENTS. NOTES SPECIFIC TO INDIVIDUAL PLUMBING DRAWINGS WILL BE SHOWN ON THE RESPECTIVE PLUMBING DRAWING.
2. THE CONTRACTOR SHALL PROVIDE A COMPLETE PLUMBING SYSTEM TO INCLUDE ALL LABOR, MATERIALS, TOOLS AND EQUIPMENT FOR A COMPLETE AND FUNCTIONAL SYSTEM INCLUDING ALL NECESSARY APPURTENANCES CUSTOMARILY INCLUDED IF NOT SPECIFICALLY CALLED OUT.
3. ENTIRE INSTALLATION, INCLUDING MATERIALS, EQUIPMENT AND WORKMANSHIP SHALL CONFORM WITH ALL APPLICABLE LAWS, CODES AND REGULATIONS.
4. APPLICABLE STANDARDS AND REGULATORY BODIES HAVE JURISDICTION OVER THE CLASS OF WORK.
5. MATERIAL AND EQUIPMENT SHALL HAVE STAMPS OR SEALS OF AHRI, ASME, UL OR ASTM.
6. THE CONTRACTOR SHALL MAKE TESTS FOR ACCEPTANCE AND APPROVAL AS REQUIRED BY CODE AND THE REQUIREMENTS OF APPLICABLE REGULATORY AGENCIES. REQUIRED TESTS SHALL BE PERFORMED IN THE PRESENCE OF THE ENGINEER OF RECORD AND/OR OWNER UNLESS OTHERWISE WAIVED IN WRITING.
7. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, LICENSES, DOCUMENTS AND SERVICES RELATED TO INSTALLATION OF THE WORK.
8. THE CONTRACTOR SHALL COORDINATE HIS WORK WITH THE OTHER TRADES IN ORDER TO RESOLVE ANY CONFLICTS THAT MIGHT ARISE DUE TO THE LOCATION OF EQUIPMENT OR THE USE OF SPACE.
9. EQUIPMENT OF DIFFERENT ELECTRICAL CHARACTERISTICS MAY BE FURNISHED PROVIDED SUCH PROPOSED EQUIPMENT IS APPROVED IN WRITING AND CONNECTING ELECTRICAL SERVICE, CIRCUIT BREAKERS AND CONDUIT ARE APPROPRIATELY MODIFIED AT NO COST TO THE OWNER.
10. RUN ALL HORIZONTAL DOMESTIC COLD WATER, DOMESTIC HOT WATER, AND VENT PIPING ABOVE THE CEILING UNLESS OTHERWISE NOTED.
11. MAKE PIPE PENETRATIONS OF ALL WALLS WITH SLEEVES AS NOTED IN THE SPECIFICATIONS.
12. DO NOT INSTALL EQUIPMENT, PIPING OR DUCTWORK OVER ANY ELECTRICAL EQUIPMENT OR ELECTRICAL SERVICE SPACE.
13. LAYOUT OF PIPING IS DIAGRAMMATIC. RUN ALL EXPOSED PIPING AS HIGH AS POSSIBLE UNLESS OTHERWISE NOTED. ALLOW FOR RISES, DROPS AND OFFSETS AS REQUIRED.
14. EXTEND CONDENSATE DRAIN LINES AS INDICATED. ALL CONDENSATE DRAIN PIPING SHALL BE TRAPPED AND PITCHED DOWN IN DIRECTION OF FLOW A MINIMUM OF 1/8 INCH PER 1 FOOT.
15. INSTALL EQUIPMENT TO FACILITATE SERVICING, MAINTENANCE AND REPAIR OR REPLACEMENT OF ELECTRICAL COMPONENTS. AS MUCH AS PRACTICAL, CONNECT EQUIPMENT FOR EASE OF DISCONNECTING, WITH A MINIMUM OF INTERFERENCE WITH OTHER INSTALLATIONS.
16. FLASHING DETAILS FOR PIPES PENETRATING THE ROOF SHALL BE COORDINATED WITH ARCHITECTURE DETAILS.
17. CONTRACTOR SHALL INSTALL ALL PLUMBING VENTS AND EXHAUST AIR OUTLETS A MINIMUM OF 10'-0" AWAY (PER CODE) FROM ALL OUTSIDE AIR INTAKES, OPERABLE DOORS AND/ OR WINDOWS. CONSTRUCTION DRAWINGS ARE DIAGRAMMATIC BY NATURE, FINAL MEASUREMENTS SHOULD BE MADE AT THE PROJECT SITE.
18. CONTRACTOR TO PROVIDE MEANS TO CLEAR CONDENSATE DRAIN LINE WITHOUT CUTTING THE DRAIN LINE.
19. NOT ALL SYMBOLS OR ABBREVIATIONS ARE USED.

PLUMBING ABBREVIATIONS

AUX	AUXILIARY CONDENSATE DRAIN PIPING
AVG	AVERAGE
AFF	ABOVE FINISHED FLOOR
BOJ	BOTTOM OF JOIST
BTUH	BRITISH THERMAL UNIT PER HOUR
MBU	BRITISH THERMAL UNIT DIVIDED BY 1,000
CD	CONDENSATE DRAIN PIPING
DEG	DEGREE
°F	DEGREES FAHRENHEIT
DIA	DIAMETER
ID	DIAMETER, INSIDE
OD	DIAMETER, OUTSIDE
DDC	DIRECT DIGITAL CONTROLS
DCW	DOMESTIC COLD WATER
DHW	DOMESTIC HOT WATER
DHWR	DOMESTIC HOT WATER RETURN
EWT	ENTERING WATER TEMPERATURE
ECW	EXISTING DOMESTIC COLD WATER
EHW	EXISTING DOMESTIC HOT WATER
EHWR	EXISTING DOMESTIC HOT WATER RETURN
ES	EXISTING SEWER
ET	EXPANSION TANK
FT	FEET
GAL	GALLONS
GPD	GALLONS PER DAY
GPH	GALLONS PER HOUR
GPM	GALLONS PER MINUTE
HP	HORSEPOWER
IN	INCHES
inHG	INCHES OF MERCURY
inH2O	INCHES OF WATER
kW	KILOWATT
LWT	LEAVING WATER TEMPERATURES
MPG	MEDIUM PRESSURE NATURAL GAS
G	NATURAL GAS
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
PH	PHASE
LBS	POUNDS
PSI	POUNDS PER SQUARE INCH
PRV	PRESSURE REDUCED VALVE
RPZ	REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY
RPM	REVOLUTIONS PER MINUTE
SA	SHOCK ABSORBER / ARRESTOR
SQ.FT.	SQUARE FEET
T&P	TEMPERATURE AND PRESSURE VALVE
TOJ	TOP OF JOIST
TDH	TOTAL DYNAMIC HEAD
UF	UNDERFLOOR
UG	UNDERGROUND
VFD	VARIABLE FREQUENCY DRIVE
VEL	VELOCITY
VTR	VENT THROUGH ROOF
V	VOLTS

PIPING LEGEND

- DOMESTIC COLD WATER
- DOMESTIC HOT WATER
- DOMESTIC HOT WATER RETURN
- SEWER
- VENT
- CD — CONDENSATE DRAIN
- AUX — AUXILIARY DRAIN
- G — NATURAL GAS
- RD — ROOF DRAIN PIPING
- OD — OVERFLOW DRAIN PIPING
- A — MEDICAL AIR
- NOX — NITROUS OXIDE
- N — NITROGEN
- O — OXYGEN
- V — VACUUM
- WAGD — WASTE ANESTHETIC GAS DISPOSAL
- INDICATES DEMOLITION
- FLUID FLOW DIRECTION
- PIPE TURNED UP
- PIPE TURNED DOWN

EXISTING PIPING IS INDICATED SAME AS ABOVE, EXCEPT IN A LIGHTER PEN WEIGHT.

PLUMBING SYMBOL LEGEND

- BUTTERFLY VALVE
- BALL VALVE
- CHECK VALVE
- GATE VALVE
- PRESSURE REDUCING VALVE
- FLANGE
- UNION
- STRAINER
- PLUG VALVE
- GAS REGULATOR
- CONNECT TO EXISTING
- POINT OF DISCONNECT P.O.D

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401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Plumbing Abbreviations & Legends

P-001

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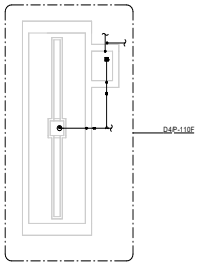
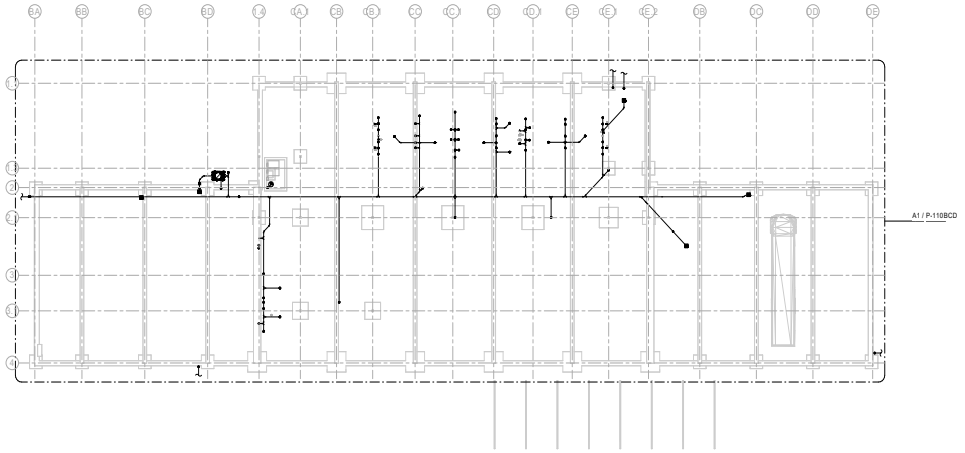
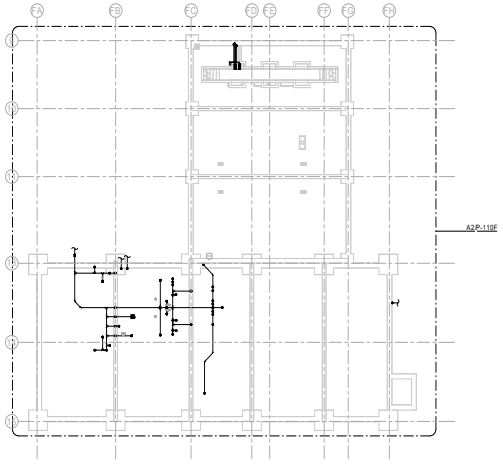
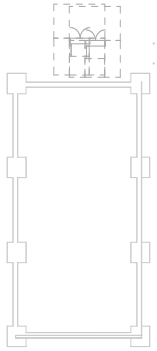
GENERAL NOTES

A. REFER TO GENERAL NOTES ON P-001.
B. NATURAL GAS ON SITE SHALL BE RUN AT 5 PSI. REGULATE TO LOW PRESSURE AT EACH BUILDING ENTRANCE. LOW PRESSURE SHALL BE COORDINATED WITH EQUIPMENT BEING SERVED.
C. THE LUBE SYSTEM PIPING SHALL BE SIZED AND DESIGNED BY THE INSTALLING CONTRACTOR. THE INSTALLING CONTRACTOR MUST BE CERTIFIED TO DESIGN AND INSTALL OF HIGH PRESSURE PIPING.
D. ALL HOSE REELS AND DISPENSING GUNS SHALL BE OWNER FURNISHED AND CONTRACTOR INSTALLED. THIS INCLUDES AIR, OIL, HYDRAULIC, WATER, AND GREASE REELS.
E. EXACT LOCATION OF HOSE REELS TO BE COORDINATED WITH OWNER BEFORE INSTALLATION.
F. CONNECTIONS TO SERVICE EQUIPMENT AND PUMPS SHALL BE COORDINATED WITH EQUIPMENT ON SITE.
G. AIR REELS SHALL HAVE A 1/2" COMPRESSED AIR CONNECTION.
H. REFER TO ARCHITECTURAL EQUIPMENT PLAN FOR EXACT LOCATIONS OF SHOP EQUIPMENT.









PACKET

7.911

February 8, 2022

A1 Plumbing Plan - Below Grade Overall
1/16" = 1'-0"

TRUE NORTH PLAN NORTH

0 8' 16' 32'

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Plumbing Plan - Below Grade - Overall

P-110

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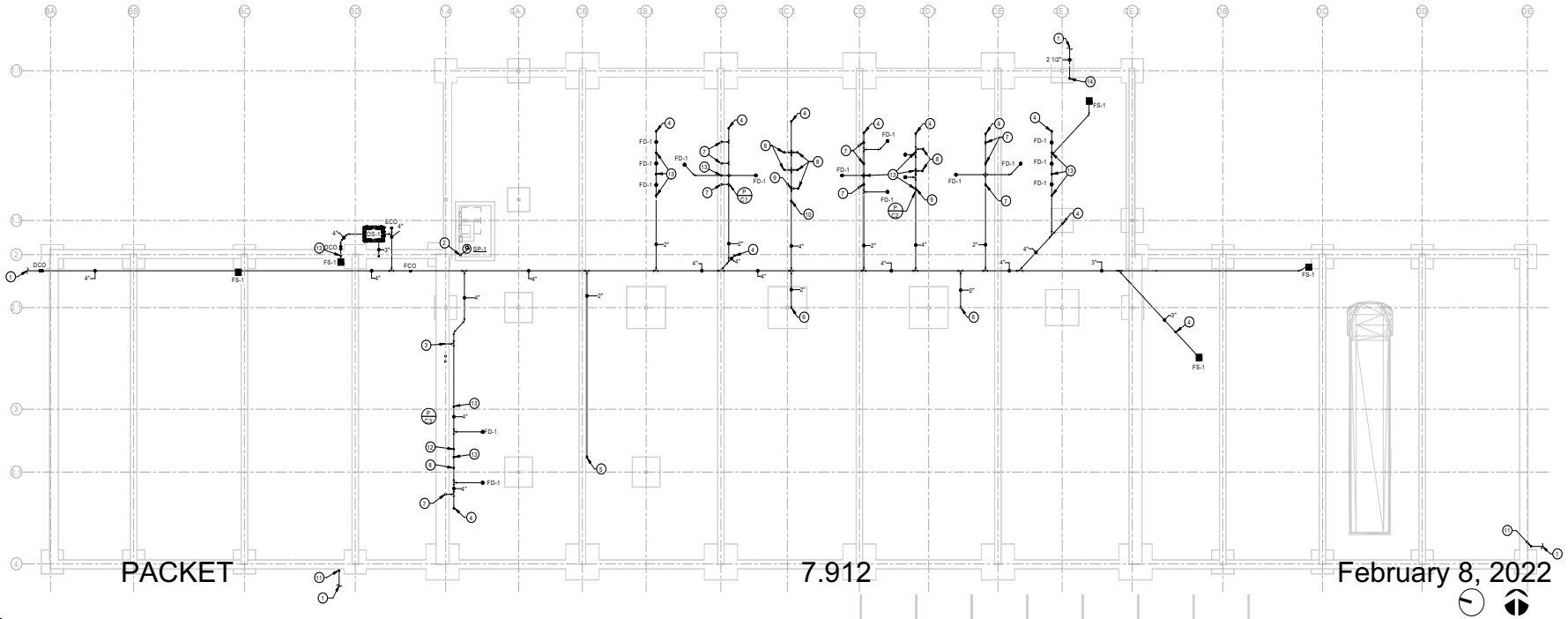
GENERAL NOTES

A. REFER TO GENERAL NOTES ON P-001.

KEY NOTES

AS INDICATED BY: (#)

1. REFER TO CIVIL UTILITIES DRAWINGS FOR CONTINUATION.
2. ROUTE 2" PIPE UP IN CORNER OF ELEVATOR SHAFT TO ABOVE CEILING OF CORRIDOR. COORDINATE LOCATION OF PIPING IN SHAFT WITH ELEVATOR EQUIPMENT TO MAINTAIN CLEARANCES.
3. CONNECT 3" SEWER LINE FROM FIRST FLOOR CEILING SPACE.
4. STUB UP FOR WALL CLEAN-OUT, REFER TO SHEET P-111BCD.
5. STUB UP FOR DRINKING FOUNTAIN, REFER TO SHEET P-111BCD.
6. STUB UP FOR SINK, REFER TO SHEET P-111BCD.
7. STUB UP FOR LAVATORY, REFER TO SHEET P-111BCD.
8. STUB UP FOR WATER CLOSET, REFER TO SHEET P-111BCD.
9. STUB UP FOR URINAL, REFER TO SHEET P-111BCD.
10. CONNECT 4" SEWER LINE FROM FIRST FLOOR CEILING SPACE. SEE SHEET P-111BCD.
11. ROUTE NATURAL GAS LINE UP FROM BELOW GRADE. REFER TO CIVIL UTILITIES DRAWINGS FOR SIZING BELOW GRADE. REFER TO SHEET P-121BCD FOR CONTINUATION OF GAS LINE ABOVE GRADE.
12. STUB UP FOR SERVICE SINK, REFER TO SHEET P-111BCD.
13. STUB UP VENT, REFER TO SHEET P-111BCD.
14. 2 1/2" WATER LINE UP THRU SLAB.



PACKET 7.912 February 8, 2022

A1 Plumbing Plan - Below Grade - Area B, C, D
1/8" = 1'-0"

TRUE NORTH PLAN NORTH

0 4' 8' 16'

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PROJECT NO.
6077.21

KEY PLAN
B C D

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Plumbing Plan - Below Grade - Areas B, C, D

P-110B

R_v21 1/26/2022 4:56:43 PM

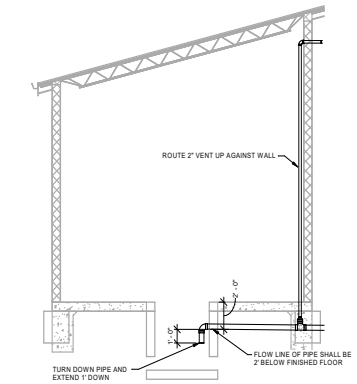
GENERAL NOTES

A. REFER TO GENERAL NOTES ON P-001.
B. NATURAL GAS ON SITE SHALL BE RUN AT 5 PSI. REGULATE TO LOW PRESSURE AT EACH BUILDING ENTRANCE. LOW PRESSURE SHALL BE COORDINATED WITH EQUIPMENT BEING SERVED.
C. THE LUBE SYSTEM PIPING SHALL BE SIZED AND DESIGNED BY THE INSTALLING CONTRACTOR. THE INSTALLING CONTRACTOR MUST BE CERTIFIED TO DESIGN AND INSTALL OF HIGH PRESSURE PIPING.
D. ALL HOSE REELS AND DISPENSING GUNS SHALL BE OWNER FURNISHED AND CONTRACTOR INSTALLED. THIS INCLUDES AIR, OIL, HYDRAULIC, WATER, AND GREASE REELS.
E. EXACT LOCATION OF HOSE REELS TO BE COORDINATED WITH OWNER BEFORE INSTALLATION.
F. CONNECTIONS TO SERVICE EQUIPMENT AND PUMPS SHALL BE COORDINATED WITH EQUIPMENT ON SITE.
G. AIR REELS SHALL HAVE A 1/2" COMPRESSED AIR CONNECTION.
H. REFER TO ARCHITECTURAL EQUIPMENT PLAN FOR EXACT LOCATIONS OF SHOP EQUIPMENT.

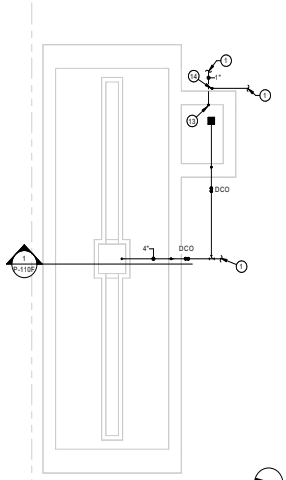
KEY NOTES

AS INDICATED BY: (2)

1 REFER TO CIVIL UTILITIES DRAWINGS FOR CONTINUATION.
2 ROUTE LINES FOR COMPRESSED AIR, GREASE AND GEAR OIL DOWN TO TRENCH AND ROUTE OVER TO PIT IN TRENCH. USED OIL LINE TO BE ROUTED OVER IN PIT AND THEN UP AGAINST WALL. LOCATE DROPS TO AVOID CONFLICT WITH FOOTING.
3 MOUNT GREASE HOSE REEL IN PIT CUBBY. CONTRACTOR TO SUPPLY REEL.
4 MOUNT GEAR OIL HOSE REEL IN PIT CUBBY. CONTRACTOR TO SUPPLY REEL.
5 PROVIDE USED OIL LINE AND COMPRESSED AIR LINE TO SERVE EXISTING DIAPHRAGM PUMP THAT IS TO BE RELOCATED.
6 STUB UP FOR WALL CLEAN-OUT, REFER TO SHEET P-111F.
7 STUB UP FOR LAVATORY, REFER TO SHEET P-111F.
8 STUB UP FOR SINK, REFER TO SHEET P-111F.
9 STUB UP FOR WATER CLOSET, REFER TO SHEET P-111F.
10 STUB UP FOR URINAL, REFER TO SHEET P-111F.
11 STUB UP FOR SERVICE SINK, REFER TO SHEET P-111F.
12 STUB UP FOR DRINKING FOUNTAIN, REFER TO SHEET P-111F.
13 ROUTE 1" DOMESTIC COLD WATER UP FROM BELOW GRADE. AVOID ROUTING THROUGH CONTINUOUS FOOTING. SEE P-111F FOR CONTINUATION OF ROUTING.
14 ROUTE NATURAL GAS LINE UP FROM BELOW GRADE. REFER TO CIVIL UTILITIES DRAWINGS FOR SIZING BELOW GRADE. REFER TO SHEET P-121BCD FOR CONTINUATION OF GAS LINE ABOVE GRADE.
16 VENT UP IN WALL.
17 PIPING SHALL BE RUN OVER TOP OF FOOTING.
18 DOMESTIC WATER LINE UP IN MECH ROOM.
19 2" SEWER UP TO SERVE P-TRAP FOR RO SYSTEM.

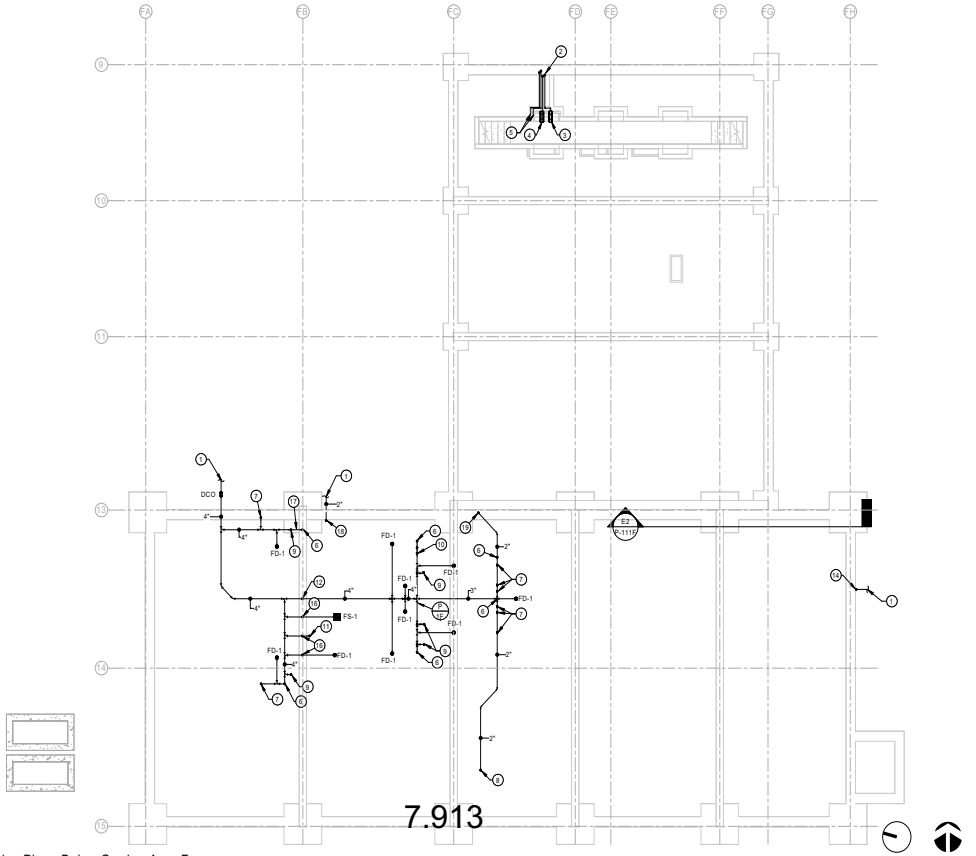


1 WASH BAY PIT
1/4" = 1'-0"



D4 Plumbing Plan - Below Grade - Area A
1/8" = 1'-0"

TRUE NORTH PLAN NORTH
0 4' 8' 16'



A2 Plumbing Plan - Below Grade - Area F
1/8" = 1'-0"

TRUE NORTH PLAN NORTH
0 4' 8' 16'

PACKET 7.913 February 8, 2022

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Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

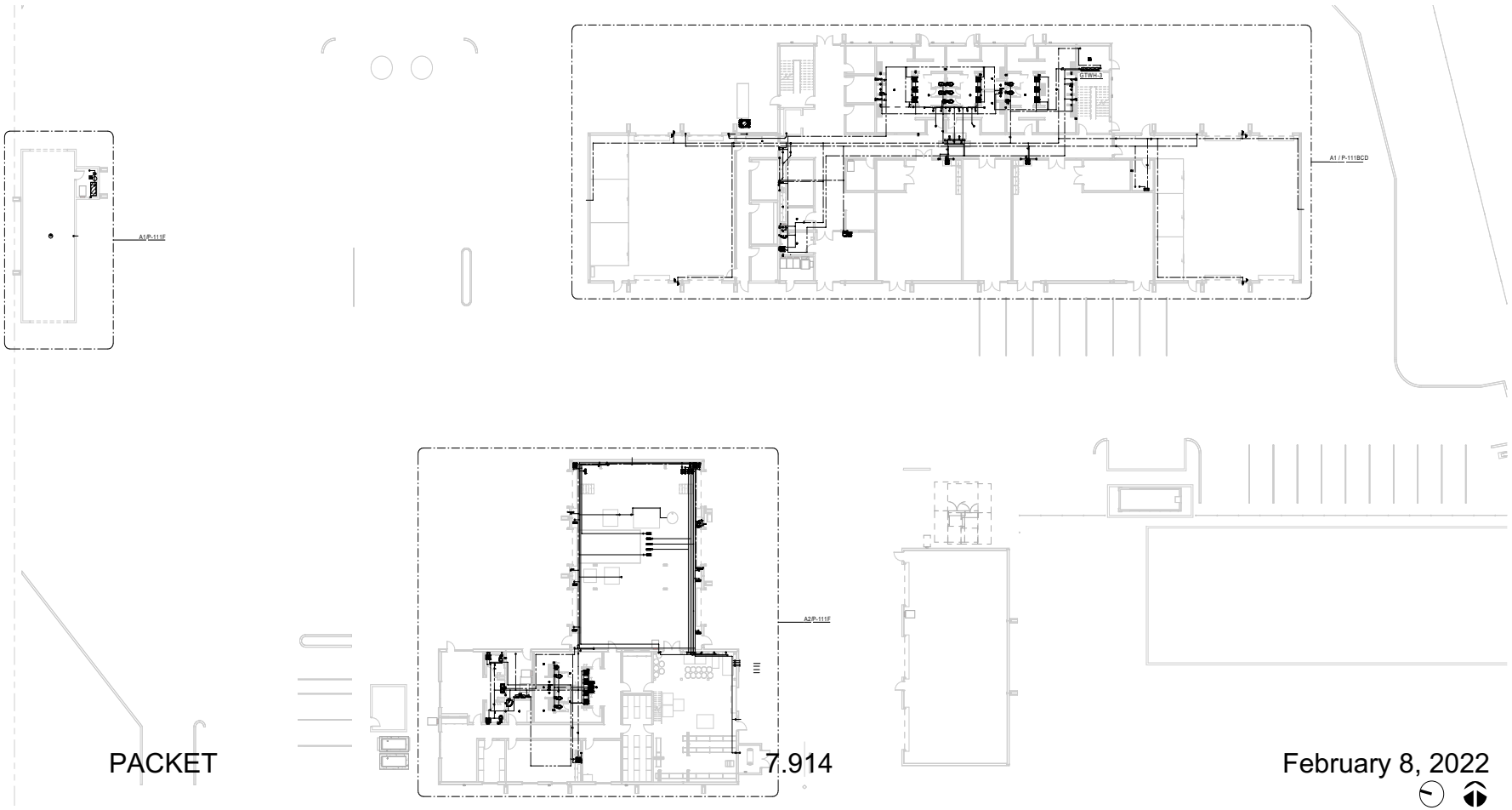
Plumbing Plan - Below Grade - Area F, A

P-110F

R_v21 1/26/2022 6:09:03 AM

GENERAL NOTES

A. REFER TO GENERAL NOTES ON P-001.
B. NATURAL GAS ON SITE SHALL BE RUN AT 5 PSI. REGULATE TO LOW PRESSURE AT EACH BUILDING ENTRANCE. LOW PRESSURE SHALL BE COORDINATED WITH EQUIPMENT BEING SERVED.
C. THE LUBE SYSTEM PIPING SHALL BE SIZED AND DESIGNED BY THE INSTALLING CONTRACTOR. THE INSTALLING CONTRACTOR MUST BE CERTIFIED TO DESIGN AND INSTALL OF HIGH PRESSURE PIPING.
D. ALL HOSE REELS AND DISPENSING GUNS SHALL BE OWNER FURNISHED AND CONTRACTOR INSTALLED. THIS INCLUDES AIR, OIL, HYDRAULIC, WATER, AND GREASE REELS.
E. EXACT LOCATION OF HOSE REELS TO BE COORDINATED WITH OWNER BEFORE INSTALLATION.
F. CONNECTIONS TO SERVICE EQUIPMENT AND PUMPS SHALL BE COORDINATED WITH EQUIPMENT ON SITE.
G. AIR REELS SHALL HAVE A 1/2" COMPRESSED AIR CONNECTION.
H. REFER TO ARCHITECTURAL EQUIPMENT PLAN FOR EXACT LOCATIONS OF SHOP EQUIPMENT.



PACKET 7.914 February 8, 2022

A1 Plumbing Plan - First Floor Overall
1/16" = 1'-0"

TRUE NORTH PLAN NORTH
0 8' 16' 32'

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PROJECT NO.
6077.21

KEY PLAN
A B C D
F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Plumbing Plan - Overall

P-111

R_v21 1/26/2022 4:56:50 PM

GENERAL NOTES

A. REFER TO GENERAL NOTES ON P-001.
B. NATURAL GAS ON SITE SHALL BE RUN AT 5 PSI. REGULATE TO LOW PRESSURE AT EACH BUILDING ENTRANCE. LOW PRESSURE SHALL BE COORDINATED WITH EQUIPMENT BEING SERVED.
C. THE LUBE SYSTEM PIPING SHALL BE SIZED AND DESIGNED BY THE INSTALLING CONTRACTOR. THE INSTALLING CONTRACTOR MUST BE CERTIFIED TO DESIGN AND INSTALL OF HIGH PRESSURE PIPING.
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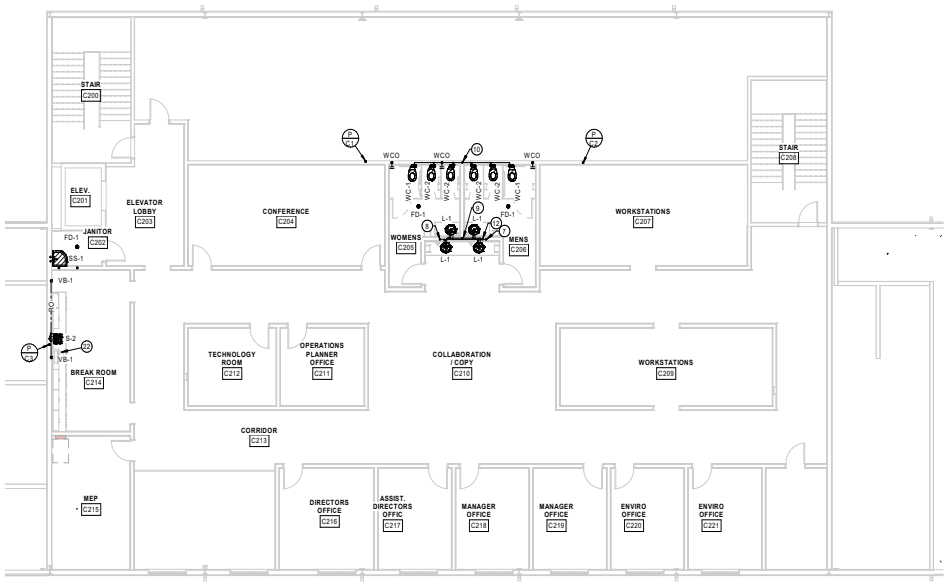
G. AIR REELS SHALL HAVE A 1/2" COMPRESSED AIR CONNECTION.
H. REFER TO ARCHITECTURAL EQUIPMENT PLAN FOR EXACT LOCATIONS OF SHOP EQUIPMENT.

KEY NOTES

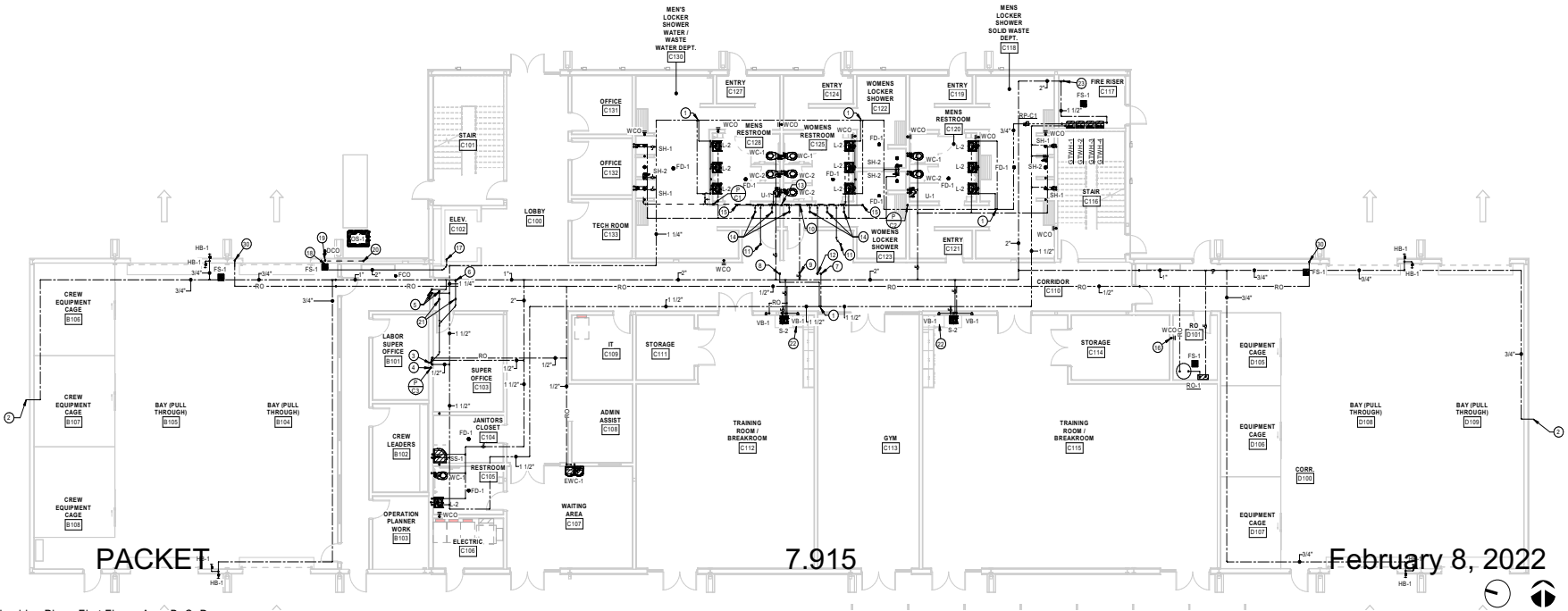
AS INDICATED BY: (#)

1 PROVIDE 1" KEMPER FLOW SPLITTER FIXTURE VALVE WITH ISOLATION BALL VALVES ON EACH SIDE OF FIXTURE. INSULATE FIXTURE AS PER MANUFACTURERS REQUIREMENTS. PROVIDE EACH OPENING IN FIXTURE AT A 3/4" SIZE. REFER TO MANUFACTURERS INFORMATION ON PROPER INSTALLATION. PROVIDE LABEL ON CEILING TILE MARKING FIXTURE LOCATION, IF ABOVE A LAY-IN CEILING, OR PROVIDE A LABELED ACCESS PANEL IF ABOVE A GYP-BOARD CEILING.
2 WATER SUPPLY FOR EVAPORATIVE COOLER.
3 ROUTE DCW, DHW AND RO WATER UP FROM FIRST FLOOR CEILING SPACE TO SUPPLY SECOND FLOOR SINK. 2" SEWER DWON FROM SINK ON SECOND FLOOR COMBINE WITH SEWER LINE SHOWN AND CONTINUE 3" SEWER TO BELOW GRADE.
4 3" VENT LINE UP FROM BELOW GRADE TO SECOND FLOOR.
5 ROUTE 3" SEWER LINE DOWN FROM SECOND FLOOR SERVICE SINK TO FIRST FLOOR CEILING SPACE. ROUTE DCW AND DHW UP FROM FIRST FLOOR CEILING SPACE TO SUPPLY SECOND FLOOR SERVICE SINK.
6 ROUTE 3" SEWER LINE DOWN FROM SECOND FLOOR, SINK TO FIRST FLOOR CEILING SPACE.
7 ROUTE 3/4" DOMESTIC HOT WATER UP FROM FIRST FLOOR CEILING SPACE TO SECOND FLOOR WALL SPACE TO SUPPLY DOMESTIC HOT WATER TO LAVATORIES.
8 ROUTE 3/4" DOMESTIC HOT WATER DOWN FROM SECOND FLOOR WALL SPACE TO FIRST FLOOR CEILING SPACE.
9 ROUTE 3/4" DOMESTIC COLD WATER UP FROM FIRST FLOOR CEILING SPACE TO SECOND FLOOR WALL SPACE TO SUPPLY DOMESTIC COLD WATER TO LAVATORIES.
10 ROUTE 2" DOMESTIC COLD WATER UP FROM FIRST FLOOR CEILING SPACE TO SECOND FLOOR WALL SPACE TO SUPPLY DOMESTIC COLD WATER TO WATER CLOSETS.
11 ROUTE 4" SEWER DOWN FROM SECOND FLOOR FLOOR, DRAIN TO FIRST FLOOR CEILING SPACE.
12 ROUTE 1 1/2" SEWER DOWN FROM SECOND FLOOR WALL SPACE TO FIRST FLOOR CEILING SPACE.
13 ROUTE 4" SEWER DOWN FROM FIRST FLOOR CEILING SPACE TO BELOW GRADE.
14 ROUTE 4" SEWER DOWN FROM SECOND FLOOR WATER CLOSET TO FIRST FLOOR CEILING SPACE.
15 ROUTE 4" SEWER DOWN FROM SECOND FLOOR WALL CLEANOUT TO FIRST FLOOR CEILING SPACE.
16 ROUTE 2" VENT UP THRU ROOF.
17 2" LINE UP FROM SUMP PUMP TO ABOVE CORRIDOR CEILING.
18 ROUTE 2" LINE DOWN TO FLOOR SINK. PROVIDE 2" AIR GAP OVER FLOOR SINK.
19 ROUTE 2" AND OVER TO VTR AS SHOWN.
20 3" VENT UP FROM GREASE TRAP, ROUTE UP THRU ROOF.
21 2" VENT UP TO SECOND FLOOR.
22 PROVIDE RPZ BACKFLOW PREVENTER FOR COFFEE MACHINE. ROUTE DRAIN TO SINK.
23 PROVIDE RPZ BACKFLOW PREVENTER FOR DOMESTIC COLD WATER INTO BUILDING.
30 RO WATER LINE DOWN TO SERVE ICE MACHINE.



C2 Plumbing Plan - Second Floor - Area C
1/8" = 1'-0"

TRUE NORTH PLAN NORTH
0 4' 8' 16'



A1 Plumbing Plan - First Floor - Area B, C, D
1/8" = 1'-0"

TRUE NORTH PLAN NORTH
0 4' 8' 16'

PACKET 7.915 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN
B C D

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Plumbing Plan - Areas B, C, D

P-111B

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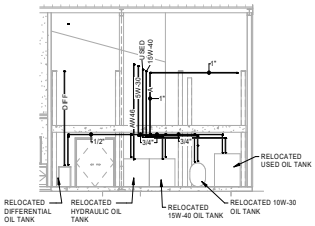
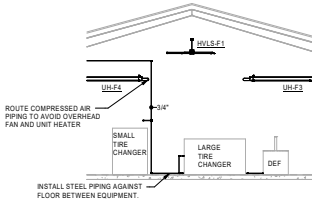
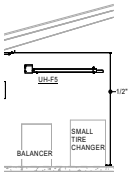


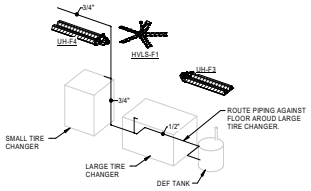
E2 BULK STORAGE SECTION
1/8" = 1'-0"



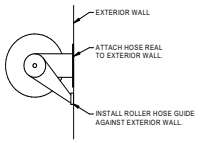
E3 DEF and Tire Machines Air Supply
1/8" = 1'-0"



E4 Small Tire Changer Air Supply
1/8" = 1'-0"



D3 AIR DROP 3D



D4 HOSE REEL SERVING EXTERIOR
NTS

GENERAL NOTES

A. REFER TO GENERAL NOTES ON P-001.
B. NATURAL GAS ON SITE SHALL BE RUN AT 5 PSI. REGULATE TO LOW PRESSURE AT EACH BUILDING ENTRANCE. LOW PRESSURE SHALL BE COORDINATED WITH EQUIPMENT BEING SERVED.
C. THE LUBE SYSTEM PIPING SHALL BE SIZED AND DESIGNED BY THE INSTALLING CONTRACTOR. THE INSTALLING CONTRACTOR MUST BE CERTIFIED TO DESIGN AND INSTALL OF HIGH PRESSURE PIPING.
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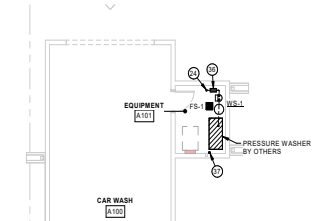
G. AIR REELS SHALL HAVE A 1/2" COMPRESSED AIR CONNECTION.
H. REFER TO ARCHITECTURAL EQUIPMENT PLAN FOR EXACT LOCATIONS OF SHOP EQUIPMENT.

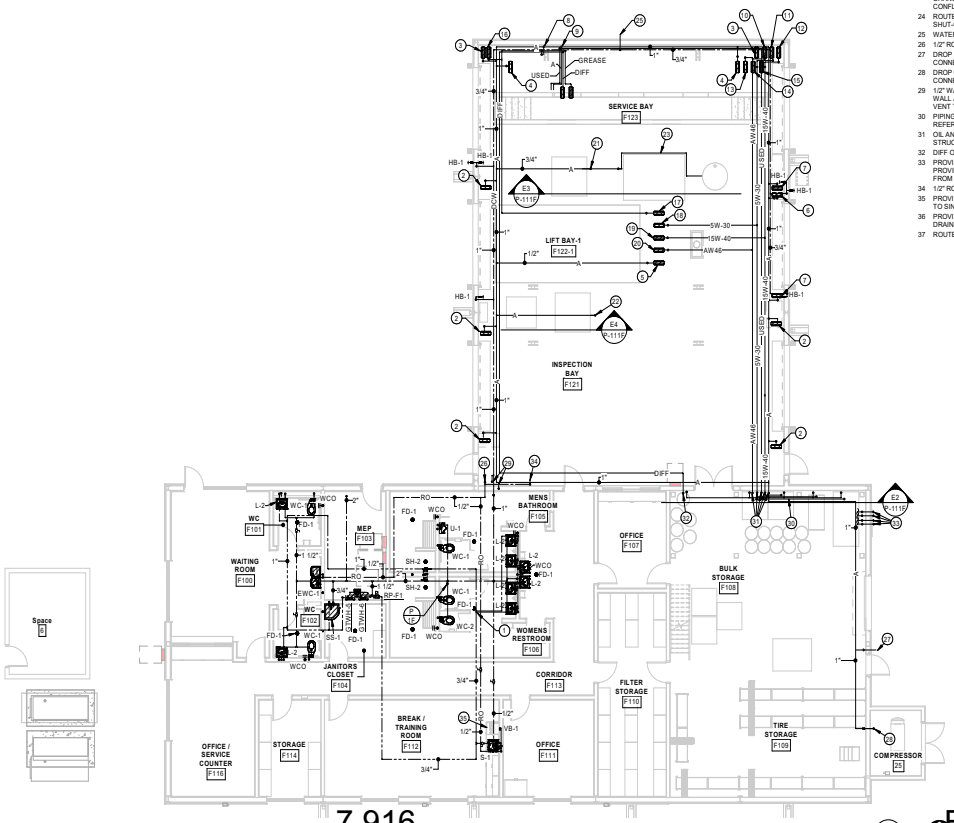
KEY NOTES

AS INDICATED BY: (#)

1 PROVIDE 1" KEMPER FLOW SPLITTER WITH ISOLATION BALL VALVES. PROVIDE UNIONS AND BALL VALVES ON EACH SIDE OF FLOW SPLITTER. INSULATE FIXTURE AS PER MANUFACTURERS REQUIREMENTS. REFER TO MANUFACTURERS INFORMATION ON PROPER INSTALLATION.
2 MOUNT 3/8" AIR HOSE REEL 8'-0" A.F.F.
3 MOUNT 3/8" AIR HOSE REEL 4'-0" A.F.F. TO SUPPLY COMPRESSED AIR TO EXTERIOR OF BUILDING.
4 MOUNT 3/8" AIR HOSE REEL 12'-0" A.F.F.
5 MOUNT 3/8" AIR HOSE REEL 15'-0" A.F.F.
6 MOUNT TWO 3/8" AIR HOSE REELS. ONE AT 8'-0" TO SUPPLY COMPRESSED AIR INSIDE THE BUILDING AND ONE AT 4'-0" TO SUPPLY COMPRESSED AIR TO EXTERIOR OF BUILDING.
7 MOUNT 1/2" AIR HOSE REEL 8'-0" A.F.F.
8 DROP AIR LINE DOWN AGAINST WALL AND TO SUPPLY AIR TO PUMP ON GREASE DRUM.
9 DROP DOWN AIR LINE, GREASE LINE, AND GEAR OIL LINE AGAINST WALL TO BELOW GRADE AND RUN LINES THROUGH TRENCH TO PIT CUBBY. ROUTE USED OIL LINE UP AGAINST WALL TO 17'-3" A.F.F. AND CONTINUE ROUTING TO USED OIL TANK. THE AIR LINE WILL SUPPLY THE USED OIL DIAPHRAGM PUMP WHILE THE GEAR OIL AND GREASE LINES WILL SUPPLY HOSE REELS. CONTRACTOR TO RELOCATE EXISTING DIAPHRAGM PUMP.
10 MOUNT HYDRAULIC OIL HOSE REEL 4'-0" A.F.F. TO SUPPLY HYDRAULIC OIL TO EXTERIOR OF BUILDING.
11 MOUNT 5W-30 OIL HOSE REEL 4'-0" A.F.F. TO SUPPLY 5W-30 OIL OUTSIDE BUILDING.
12 MOUNT 15W-40 OIL HOSE REEL 4'-0" A.F.F. TO SUPPLY 15W-40 OIL OUTSIDE BUILDING.
13 MOUNT HYDRAULIC OIL HOSE REEL 12'-0" A.F.F.
14 MOUNT 5W-30 OIL HOSE REEL 12'-0" A.F.F.
15 MOUNT 15W-40 OIL HOSE REEL 12'-0" A.F.F.
16 MOUNT GREASE HOSE REEL 4'-0" A.F.F. TO SUPPLY GREASE TO EXTERIOR OF BUILDING.
17 MOUNT GREASE HOSE REEL 17'-0" A.F.F.
18 MOUNT 5W-30 OIL HOSE REEL 15'-0" A.F.F.
19 MOUNT 15W-40 OIL HOSE REEL 15'-0" A.F.F.
20 MOUNT HYDRAULIC OIL HOSE REEL 15'-0" A.F.F.
21 DROP STEEL COMPRESSED AIR LINE DOWN TO FLOOR AND CONNECT TO EQUIPMENT.
22 DROP STEEL COMPRESSED AIR LINE DOWN TO SERVE TIRE CHANGER. VERIFY CONNECTION REQUIREMENTS WITH EQUIPMENT.
23 ROUTE 1/2" COMPRESSED AIR LINE AGAINST THE FLOOR AROUND TIRE CHANGER TO DEF TANK. COORDINATE ROUTING TO ENSURE THERE IS NO CONFLICT WITH EQUIPMENT.
24 ROUTE 1" DOMESTIC COLD WATER UP FROM BELOW GRADE. PROVIDE SHUT-OFF VALVE IN VERTICAL PIPE RUN.
25 WATER SUPPLY FOR EVAPORATIVE COOLER.
26 1/2" RO WATER LINE UP AGAINST WALL TO SERVE BUILDING.
27 DROP STEEL COMPRESSED AIR LINE DOWN AND PROVIDE QUICK CONNECTIONS.
28 DROP COMPRESSED AIR LINE DOWN AGAINST WALL RUN THRU WALL AND CONNECT TO RELOCATED AIR COMPRESSOR.
29 1/2" WATER LINE TO RELOCATED RO WATER SYSTEM AND ROUTE 2" LINE UP IN WALL AND PROVIDE P-TRAP TO SERVE RELOCATED RO SYSTEM. ROUTE 2" VENT TO NEAREST VTR.
30 PIPING CONNECTED TO BULK STORAGE TANKS TO BE RUN UNDER MEZZANINE. REFER TO SECTION.
31 OIL AND AIR LINES AGAINST WALL FROM BELOW MEZZANINE TO HIGHER STRUCTURE OF SHOP AREA.
32 DIFF OIL PIPE UP AGAINST WALL TO HIGHER ELEVATION OF SHOP AREA.
33 PROVIDE 2" REMOTE FILL CONNECTIONS FOR 10W-30, 15W40, AND AW-46. PROVIDE REMOTE SUCTION CONNECTION FOR USED OIL TANK. ROUTE PIPING FROM REMOTE CONNECTIONS TO TANKS BELOW MEZZANINE.
34 1/2" RO WATER LINE TO SERVE ICE MACHINE.
35 PROVIDE RPZ BACKFLOW PREVENTER FOR COFFEE MACHINE. ROUTE DRAIN TO SINK.
36 PROVIDE RPZ BACKFLOW PREVENTER. PROVIDE AIR GAP FITTING AND ROUTE DRAIN THRU EXTERIOR WALL. WATTS LF009 OR EQUIVALENT.
37 ROUTE 2" VENT UP THRU ROOF.



A1 Plumbing Plan - First Floor - Area A
1/8" = 1'-0"



A2 Plumbing Plan - First Floor - Area F
1/8" = 1'-0"

PACKET 7.916 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN
A F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Plumbing Plan - Area F, A

P-111F

R_v21 1/26/2022 6:09:07 AM

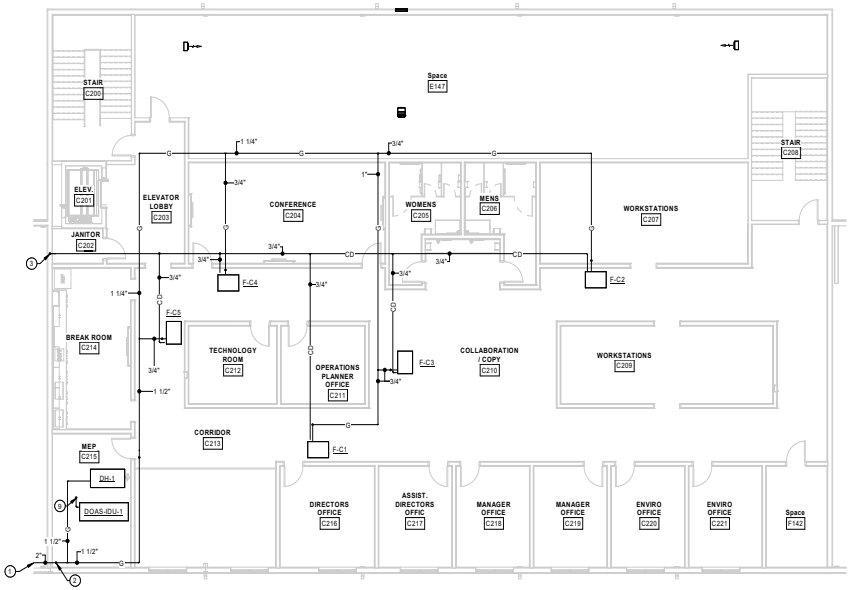
GENERAL NOTES

A. REFER TO GENERAL NOTES ON P-001.
B. NATURAL GAS TO BE PIPED AT 5 PSI FROM METER AND DROP TO LESS THAN 2 PSI AT BUILDING.

KEY NOTES

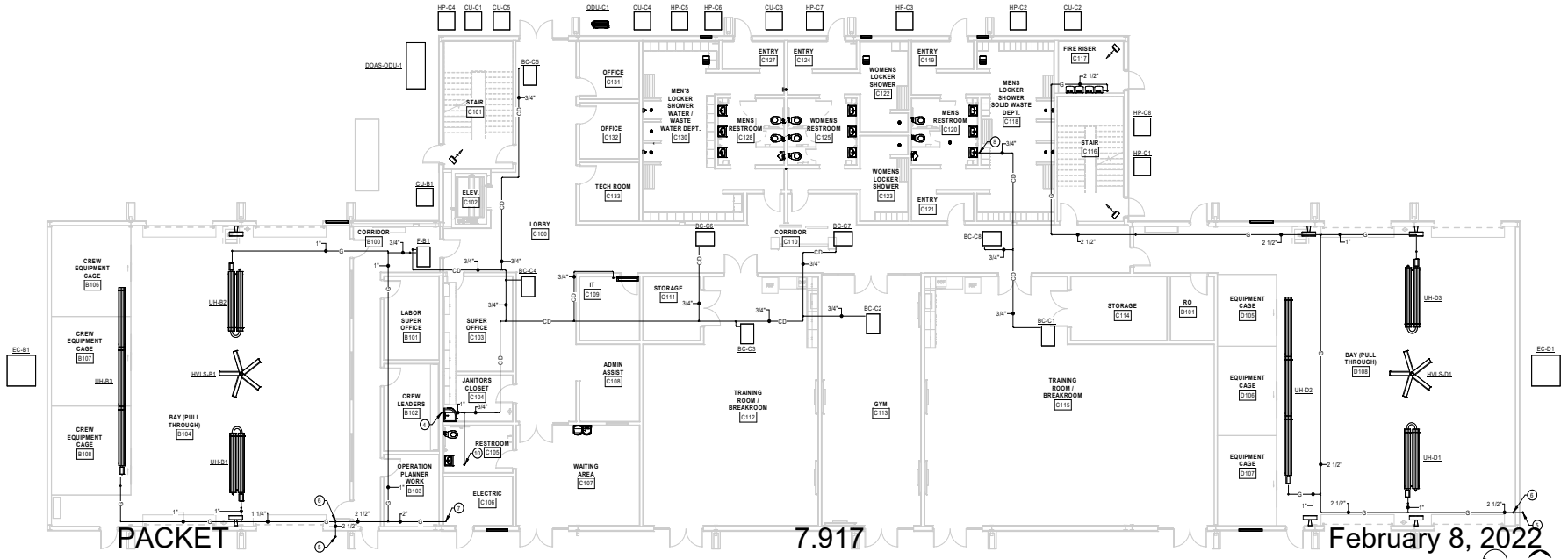
AS INDICATED BY: (2)

1. 2" NATURAL GAS PIPING CONTINUED FROM AREA B FIRST FLOOR CEILING SPACE.
2. ROUTE 2" NATURAL GAS PIPING FROM AREA B FIRST FLOOR CEILING SPACE UP AGAINST WALL IN SPACE MEP C215 TO SECOND FLOOR CEILING SPACE.
3. ROUTE 3/4" CONDENSATE LINE DOWN IN WALL. ROUTE CONDENSATE LINE OUT OF WALL AND TURN DOWN TO DRAIN INTO SERVICE SINK. SEE SHEET P-501 FOR DETAIL.
4. ROUTE 1" CONDENSATE LINE DOWN IN WALL. ROUTE CONDENSATE LINE OUT OF WALL AND TURN DOWN TO DRAIN INTO SERVICE SINK. SEE SHEET P-501 FOR DETAIL.
5. PROVIDE PRESSURE REGULATOR IN VERTICAL PIPE RUN ABOVE GRADE, PROVIDE BUILDING ISOLATION VALVE, AND 6" DIRT LEG, THEN ENTER BUILDING.
6. ROUTE 2 1/2" NATURAL GAS LINE UP NEXT TO WALL TO 17'-0" A.F.F.
7. CONTINUE 2" GAS LINE THROUGH WALL INTO SPACE MEP C215, THEN ROUTE UP NEXT TO WALL TO SECOND FLOOR CEILING SPACE. REFER TO KEYNOTE 2 ON THIS SHEET.
8. ROUTE 3/4" CONDENSATE LINE INTO WALL AND TERMINATE IN OPEN SITE DRAIN. PROVIDE ACCESS PANEL FOR ACCESS.
9. ROUTE 3/4" CONDENSATE LINE DOWN THROUGH FLOOR TO FIRST FLOOR CEILING SPACE.
10. ROUTE 3/4" CONDENSATE LINE DOWN FROM SECOND FLOOR.



C2 Gas and Condensate Plan - Second Floor - Area C
1/8" = 1'-0"

TRUE NORTH PLAN NORTH
0 8' 16' 32'



A1 Gas and Condensate Plan - First Floor - Area B, C, D
1/8" = 1'-0"

TRUE NORTH PLAN NORTH
0 8' 16' 32'

PACKET 7.917 February 8, 2022

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Water/Wastewater, Solid Waste, and Vehicle Services

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CLIENT
City of Midland

401 N. Carver St.
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN
B C D

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Gas and Condensate Plan - Areas B, C, D

P-121B

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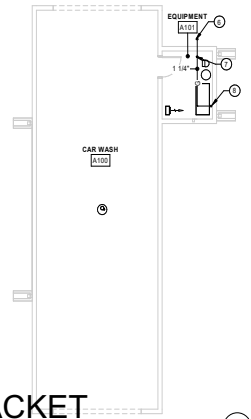
GENERAL NOTES

A. REFER TO GENERAL NOTES ON P-001.
B. NATURAL GAS ON SITE SHALL BE RUN AT 5 PSI. REGULATE TO LOW PRESSURE AT EACH BUILDING ENTRANCE. LOW PRESSURE SHALL BE COORDINATED WITH EQUIPMENT BEING SERVED.
C. THE LUBE SYSTEM PIPING SHALL BE SIZED AND DESIGNED BY THE INSTALLING CONTRACTOR. THE INSTALLING CONTRACTOR MUST BE CERTIFIED TO DESIGN AND INSTALL OF HIGH PRESSURE PIPING.
D. ALL HOSE REELS AND DISPENSING GUNS SHALL BE OWNER FURNISHED AND CONTRACTOR INSTALLED. THIS INCLUDES AIR, OIL, HYDRAULIC, WATER, AND GREASE REELS.
E. EXACT LOCATION OF HOSE REELS TO BE COORDINATED WITH OWNER BEFORE INSTALLATION.
F. CONNECTIONS TO SERVICE EQUIPMENT AND PUMPS SHALL BE COORDINATED WITH EQUIPMENT ON SITE.
G. AIR REELS SHALL HAVE A 1/2" COMPRESSED AIR CONNECTION.
H. REFER TO ARCHITECTURAL EQUIPMENT PLAN FOR EXACT LOCATIONS OF SHOP EQUIPMENT.

KEY NOTES

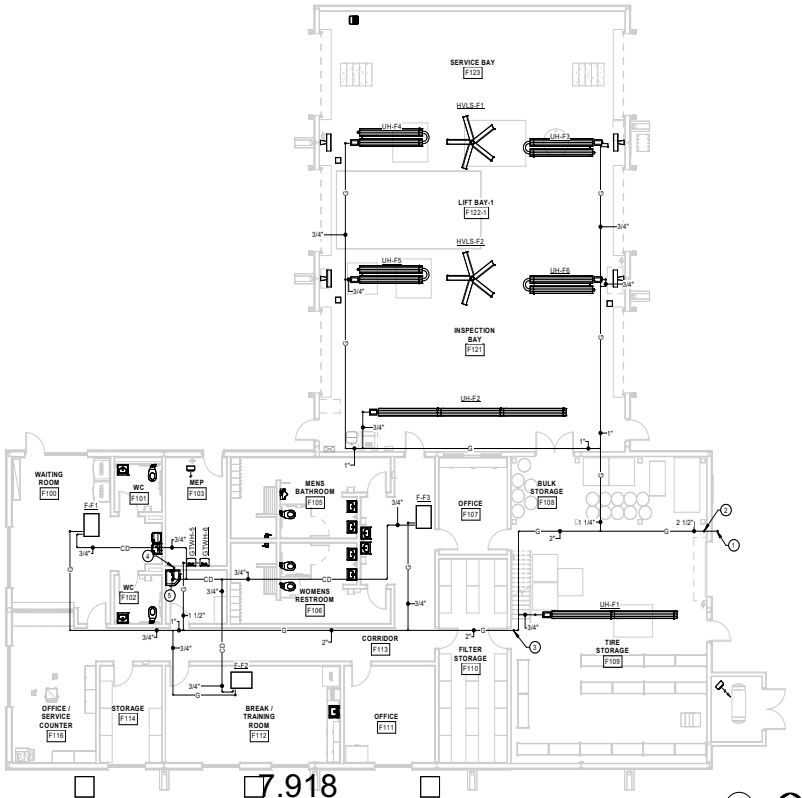
AS INDICATED BY: ⓪

1 PROVIDE PRESSURE REGULATOR IN VERTICAL PIPE RUN ABOVE GRADE, PROVIDE BUILDING ISOLATION VALVE, AND 6" DIRT LEG, THEN ENTER BUILDING.
2 ROUTE 2 1/2" NATURAL GAS PIPING UP AGAINST WALL TO 17'-6" A.F.F.
3 ROUTE 2" NATURAL GAS PIPING DOWN FROM 17'-6" ELEVATION TO 15' ELEVATION.
4 ROUTE 3/4" CONDENSATE DRAIN LINE DOWN IN WALL.
5 ROUTE 3/4" CONDENSATE DRAIN LINE OUT OF WALL AND TURN DOWN TO DRAIN INTO SERVICE SINK. SEE SHEET P-501 FOR DETAIL.
6 PROVIDE PRESSURE REGULATOR IN VERTICAL PIPE RUN ABOVE GRADE, PROVIDE BUILDING ISOLATION VALVE, AND 6" DIRT LEG, THEN ENTER BUILDING.
7 ROUTE GAS PIPING UP AGAINST WALL TO JUST BELOW STRUCTURE AND ROUTE TO PRESSURE WASHER LOCATION.
8 ROUTE GAS PIPING DOWN AGAINST WALL TO SUPPLY GAS TO HEATED PRESSURE WASHER.



A1 Condensate Plan - First Floor - Area A
1/8" = 1'-0"

TRUE NORTH PLAN NORTH
0 8' 16' 32'



A2 Condensate Plan - First Floor - Area F
1/8" = 1'-0"

TRUE NORTH PLAN NORTH
0 8' 16' 32'

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6077.21

KEY PLAN

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Gas and Condensate Plan - Area F, A

P-121F

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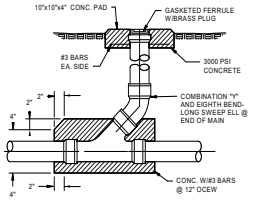
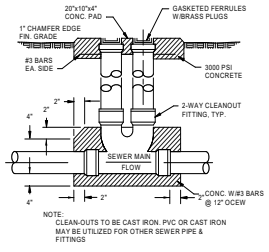
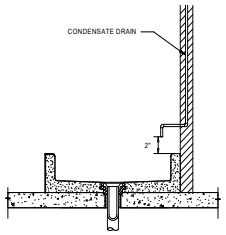


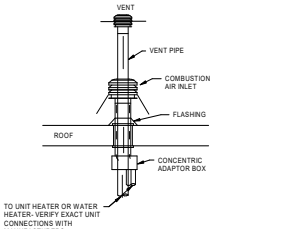
C1 SINGLE CLEANOUT
NTS



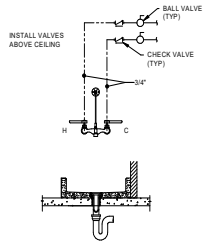
C2 DOUBLE CLEANOUT
NTS



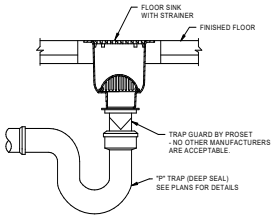
C3 CONDENSATE DRAIN TO MOP SINK
NTS



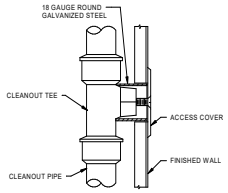
B1 CENCENTRIC VENT
NTS



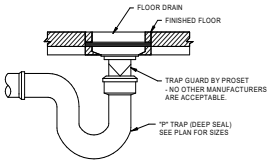
B2 SERVICE SINK PIPING
NTS



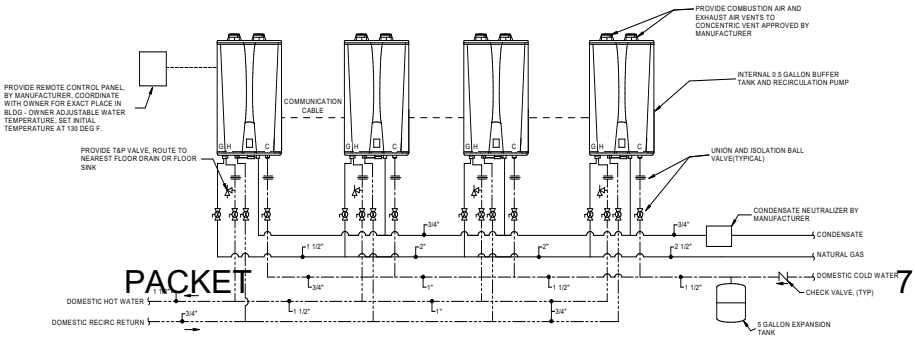
B3 FLOOR SINK
NTS



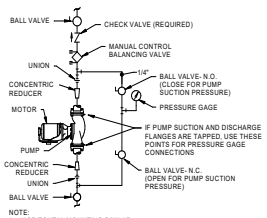
B4 WALL CLEANOUT
NTS



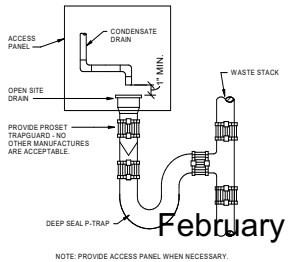
B5 FLOOR DRAIN
NTS



A1 TANKLESS GAS WATER HEATERS
NTS



A4 HOT WATER RECIRCULATING PUMP
NTS



NOTE: PROVIDE ACCESS PANEL WHEN NECESSARY.

A5 OPEN SITE DRAIN
NTS

PACKET 7.919 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Plumbing Details

P-501

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PLUMBING FIXTURE SCHEDULE

SYMBOL	MINIMUM CONNECTIONS				DESCRIPTION	MANUFACTURER	MODEL NO.	OPTIONS
	CW	HW	VENT	SEWER				
WC-1	1"	--	2"	4"	FLOOR MOUNTED FLUSH VALVE WATER CLOSET, ELONGATED CHINA BOWL WITH EVERCLEAN. BOTTOM OUTLET, SIPHON JET FLUSHING ACTION, TOP SPUD, EXPOSED BATTERY SENSOR OPERATED FLUSH VALVE WITH VANDAL RESISTANT STOP CAP, 1.28 GALLONS PER FLUSH. EXTRA HEAVY DUTY OPEN FRONT WHITE SEAT WITH EVERCLEAN. 17" TO TOP OF RIM TO MEET ADULT TAS HEIGHT REQUIREMENTS.	AMERICAN STANDARD	3461.001 "MADERA FLOWISE"	VALVE - SLOAN G2 8111-1.28 SEAT- AMERICAN STANDARD 5901.110T
WC-2	1"	--	2"	4"	FLOOR MOUNTED FLUSH VALVE WATER CLOSET, ELONGATED CHINA BOWL WITH EVERCLEAN. BOTTOM OUTLET, SIPHON JET FLUSHING ACTION, TOP SPUD, EXPOSED BATTERY SENSOR OPERATED FLUSH VALVE WITH VANDAL RESISTANT STOP CAP, 1.28 GALLONS PER FLUSH. EXTRA HEAVY DUTY OPEN FRONT WHITE SEAT WITH EVERCLEAN. 15" TO TOP OF RIM.	AMERICAN STANDARD	3451.001 "MADERA FLOWISE"	VALVE - SLOAN OPTIMA PLUS 8111-1.28 SEAT- AMERICAN STANDARD 5901.110T
U-1	3/4"	--	2"	2"	WALL MOUNTED HIGH EFFICIENCY VITREOUS CHINA URINAL WITH EVERCLEAN. BATTERY POWERED SENSOR OPERATED FLUSH VALVE WITH MANUAL OVERRIDE, 1/8 GALLON PER FLUSH, 3/4" TOP SPUD, AND VANDAL RESISTANT OUTLET STRAINER. REFER TO P-001 FOR TAS MOUNTING HEIGHT REQUIREMENTS.	AMERICAN STANDARD	WASHBROOK FLOWISE 6590.001EC	VALVE - SLOAN G2 8186-0.125 CARRIER - WATTS CA311
L-1	1/2"	1/2"	1-1/2"	1-1/2"	COUNTERTOP TAS COMPLIANT LAVATORY, VITREOUS CHINA, NOMINAL 20"x17" SELF-RIMMING, FRONT OVERFLOW, RECESSED FAUCET LEDGE, SINGLE FAUCET HOLE. TAS COMPLIANT BATTERY POWERED SENSOR OPERATED FAUCET 0.5 GPM, DRAIN OUTLET WITH GRID STRAINER. PROVIDE THERMOSTATIC MIXING VALVE BELOW COUNTER.	AMERICAN STANDARD	0475.047 AQUALYN	FAUCET - SLOAN BASYS - EFX 350 DRAIN - AMERICAN STANDARD 7723.018 (PROVIDE REQUIRED BATTERIES)
L-2	1/2"	1/2"	1-1/2"	1-1/2"	WALL MOUNTED TAS COMPLIANT LAVATORY, VITREOUS CHINA, NOMINAL 20" x 18", BACK AND SIDE SPLASHES, FOR CONCEALED ARM CARRIER, SINGLE CENTERED FAUCET HOLE. TAS COMPLIANT SINGLE LEVER BATTERY POWERED SENSOR OPERATED FAUCET 0.5 GPM, DRAIN OUTLET WITH GRID STRAINER. PROVIDE THERMOSTIC MIXING VALVE BELOW LAVATORY. REFER TO P-001 FOR TAS MOUNTING HEIGHTS.	AMERICAN STANDARD	0356.421 LUCERNE	FAUCET - SLOAN BASYS - EFX 350 CARRIER - WATTS TCA-411 DRAIN - AMERICAN STANDARD 7723.018 (PROVIDE REQUIRED BATTERIES)
S-1	1/2"	1/2"	1-1/2"	1-1/2"	COUNTERTOP SINGLE COMPARTMENT 22" x 19" x 6" SINK, 18 GAUGE 304 STAINLESS STEEL WITH A LUSTERTONE FINISH, REAR CENTER DRAIN PLACEMENT; FULL SPRAY SIDES AND BOTTOM, NOMINAL 18" x 14" BOWL, 6" DEEP. TAS COMPLIANT SINGLE HANDLE HIGH ARC PULLDOWN FAUCET, PULLOUT SPRAY WITH A 68" BRAIDED HOSE, LEVER STYLE HANDLE, 1.5 GPM. DRAIN OUTLET WITH 304 STAINLESS STEEL BODY AND GRID STRAINER, POLISHED FINISH. PROVIDE RO WATER SPOUT ON SINK.	ELKAY	LRAD221960	FAUCET - MOEN 7594 DRAIN - ELKAY LK18B RO SPOUT - WATTS PWFCT905CH
S-2	1/2"	1/2"	1-1/2"	1-1/2"	COUNTERTOP SINGLE COMPARTMENT 17" x 16" x 6" SINK, 18 GAUGE 304 STAINLESS STEEL WITH A LUSTERTONE FINISH, REAR CENTER DRAIN PLACEMENT, FULL SPRAY SIDES AND BOTTOM, NOMINAL 14" x 10" BOWL, 6" DEEP. TAS COMPLIANT SINGLE HANDLE HIGH ARC PULLDOWN FAUCET, PULLOUT SPRAY WITH A 68" BRAIDED HOSE, LEVER STYLE HANDLE, 1.5 GPM. DRAIN OUTLET WITH 304 STAINLESS STEEL BODY AND GRID STRAINER, POLISHED FINISH. PROVIDE RO WATER SPOUT ON SINK.	ELKAY	LRAD171660	FAUCET - MOEN 7594 DRAIN - ELKAY LK18B RO SPOUT - WATTS PWFCT905CH
SH-1	3/4"	3/4"	2"	3"	WALL MOUNTED SINGLE STATION SURFACE MOUNT SHOWER, MOUNT SHOWER HEAD AT 6'-0". PROVIDE PRESSURE BALANCING MIXING VALVE, LEVER HANDLER, 1.5 GPM, TOP SUPPLY WITH SHROUD TO HIDE PIPING, SOAP DISH, CONSTRUCTED FROM 304 STAINLESS STEEL.	BRADLEY	WS-1X	FLOOR DRAIN: WATTS FD-100A
SH-2	3/4"	3/4"	2"	3"	WALL MOUNTED SINGLE STATION SURFACE MOUNT SHOWER, MOUNT SHOWER HEAD AT 6'-0", PROVIDE PRESSURE BALANCING MIXING VALVE, LEVER HANDLER, 1.5 GPM, TOP SUPPLY WITH SHROUD TO HIDE PIPING, SOAP DISH, CONSTRUCTED FROM 304 STAINLESS STEEL, AND TAS COMPLIANT. REFER TO P-001 FOR TAS MOUNTING HEIGHTS.	BRADLEY	WS-1WCA-ADA	FLOOR DRAIN: WATTS FD-100A
SS-1	3/4"	3/4"	2"	3"	FLOOR MOUNTED ENAMELED CAST IRON CORNER SERVICE SINK - 28"x28"x13", WITH WALL MOUNTED 8" CENTER FAUCET WITH VACUUM BREAKER, TOP BRACE, INTEGRAL STOPS, HOSE THREADED SPOUT, 12.90 GPM. PROVIDE 3" DRAIN OUTLET WITH DOME STRAINER, MOP HANGER, HOSEBRACKET COMBINATION. PROVIDE THERMOSTATIC MIXING VALVE.	AMERICAN STANDARD	7745.811 "FLORWELL"	FAUCET - T&S BRASS B-0665-BSTR MOP HANGER - PROFLO PF245 HOSE AND WALL HOOK- PROFLO PF296 SPLASH CATCHER PANELS - PROFLO PFWG24S MIXING VALVE: BRADLEY S59-4016
HB-1	3/4"	--	--	--	INTERIOR HOSE BIBB - ANTI-SIPHON VACUUM BREAKER, ROUGH BRASS FINISH, HAND WHEEL, 3/4" INLET WITH 3/4" THREADED OUTLET, PROVIDE APPROPRIATE ESCUTCHEON / FLANGE.	WOODFORD	24	(BR)
SA	3/4"	3/4"	--	--	SHOCK ABSORBER - PISTON - TYPE SHOCK STOP, SPUN SEAMLESS COPPER, PROVIDE ISOLATION BALL VALVE WITH ACCESS DOOR (IF REQUIRED) AT INLET SIZE, AND LOCATE ACCORDING TO PDI STANDARDS AND MANUFACTURERS RECOMMENDATIONS.	WATTS	SERIES 15M2 PISTON TYPE	
FD-1	--	--	2"	2"	FLOOR DRAIN - 6" DIA. ADJUSTABLE POLISHED NICKEL BRONZE STRAINER, CAST IRON BODY WITH REVERSIBLE CLAMPING COLLAR. P-TRAP SHALL BE DEEP SEAL TYPE. COORDINATE FLOORING TYPE WITH ARCHITECTURE.	WATTS	<varies>	<varies>
FS-1	--	--	2"	3"	FLOOR SINK - 12" x 12" x 8" DEEP CAST IRON BODY, SQUARE SLOTTED MEDIUM DUTY 3/4 GRATING, WHITE ACID RESISTANT PORCELAIN ENAMEL INTERIOR AND NICKEL BRONZE TOP, ALUMINUM ANTI SPLASH INTERIOR WITH BOTTOM DOME STRAINER, SS MESH SEDIMENT BASKET.	WATTS	FS-740-175	TRAP GUARD - PROSET
FCO	--	--	---	AS SHOWN ON DWG	FLOOR CLEANOUT - CAST IRON BODY WITH ROUND ADJUSTABLE SCORIATED NICKEL BRONZE TOP, GASKET SEAL BRASS THREADED PLUG WITH RECESSED SOCKET.	WATTS	CO-200-R	
WCO	--	--	---	AS SHOWN ON DWG	WALL CLEANOUT - NO-HUB PVC CLEANOUT TEE WITH ROUND STAINLESS STEEL COVER AND CENTER SCREW, GASKETED SEAL BRASS THREADED PLUG WITH RECESSED SOCKET.	WATTS	CO-460-RD	
ECO	--	--	---	AS SHOWN ON DWG	EXTERIOR CLEANOUT - CAST IRON CLEANOUT WITH ROUND ADJUSTABLE SCORIATED SECURED CAST IRON TOP, GASKET SEAL. CAST IRON PLUG WITH RECESSED SOCKET. INSTALL IN MINIMUM OF 12" x 12" x 4" REINFORCED CONCRETE PAD WITH BEVELED EDGES.	WATTS	CO-200-RX	
EWC-1	1/2"	--	1-1/4"	1-1/2"	WALL MOUNTED TWO LEVEL TAS COMPLIANT WATER COOLER WITH BOTTLE FILLER STATION. NO LEAD, INLINE FILTER, SINGLE COMPRESSOR, STAINLESS STEEL FINISH. CAPACITY OF 8 GPH WITH 50 DEG F COOLING AT 90 DEG AIR TEMPERATURE. WALL MOUNTED CARRIER POWER - 4.5 AMPS @ 120V/60hz/1PH. REFER TO P-001 FOR TAS MOUNTING HEIGHTS.	ELKAY	LZSTL8WSSP	CARRIER - WATTS CA-431-1 PROVIDE CANE APRON
DCO	--	--	---	AS SHOWN ON DWG	EXTERIOR DOUBLE CLEANOUT - CAST IRON CLEANOUT WITH ROUND ADJUSTABLE SCORIATED SECURED CAST IRON TOP, GASKET SEAL. CAST IRON PLUG WITH RECESSED SOCKET. INSTALL IN MINIMUM OF 24" x 12" x 4" REINFORCED CONCRETE PAD WITH BEVELED EDGES.	WATTS	(QTY-2) CO-200-RX	
VB-1	1/2"	--	--	--	RECESSED VALVE BOX WITH VALVE. CHROME QUARTER TURN ADAPTER BALL VALVE, 1/2" SWEAT CONNECTION AND WATER HAMMER ARRESTOR.	IPS CORPORATION	MODEL AB9700 HA	
OS-1	--	--	3"	4"	LIFETIME GUARANTEED AND MADE IN USA OF SEAMLESS, ROTATIONALLY-MOLDED POLYETHYLENE. SEPARATOR SHALL BE FURNISHED FOR ABOVE OR BELOW GRADE INSTALLATION, WITH FIELD ADJUSTABLE RISER SYSTEM, SNAP-IN FLOW CONTROL AND (2) VENT CONNECTIONS. SEPARATOR FLOW RATE SHALL BE 75 GPM. SEPARATOR OIL CAPACITY SHALL BE 93 GALLONS. SAND CAPACITY SHALL BE 11 GALLONS. COVERS SHALL PROVIDE WATER/GAS-TIGHT SEAL AND HAVE A MAXIMUM 16,000 LBS LOAD CAPACITY.	STRIEM	OS-75	PROVIDE EXTENSIONS AS NEEDED

NOTES:
1. MANUFACTURERS WITH MODEL NUMBERS ARE BASE ITEMS. OTHER MANUFACTURERS MUST BE EQUIVALENT MANUFACTURERS UNLESS NOTED OTHERWISE.
2. FOR MOUNTING HEIGHTS OF INDIVIDUAL WALL-MOUNTED FIXTURES, REFER TO P-001 SHEET.
3. EACH UNDER SLAB OR CONCEALED P-TRAP SHALL BE A DEEP-SEAL TYPE.
4. PROVIDE EACH WALL MOUNTED PLUMBING FIXTURE, SUCH AS SINKS, LAVATORIES, ELECTRIC WATER COOLERS, DRINKING FOUNTAINS, ETC., WITH A FLOOR MOUNTED SUPPORT CARRIER WITH RECTANGULAR LEGS.
5. UNLESS SCHEDULED OTHERWISE, PROVIDE EACH LAVATORY, SINK, WATER COOLER, ETC. WITH A P-TRAP ASSEMBLY CONSISTING OF A CHROME-PLATED (C.P.) CAST BRASS TRAP WITH CLEANOUT PLUG, C.P. TUBING OUTLET (MIN. 17 GA.), AND C.P. CAST BRASS ESCUTCHEON WITH SETSCREW.
6. PROVIDE EACH FIXTURE WHICH REQUIRES COLD AND/OR HOT WATER (EXCEPT FLUSH VALVES) WITH A SUPPLY/STOP ASSEMBLY CONSISTING OF A C.P. BRASS STOP VALVE (MIN. 1/2") WITH QUARTER STOPS AND LOCK SHIELD, STAINLESS STEEL FLEXIBLE RISER, C.P. BRASS NIPPLE, AND C.P. CAST BRASS ESCUTCHEON WITH SETSCREW.
7. FOR EACH PUBLIC LAVATORY OR SINK WITH EXPOSED DRAIN AND BOTH COLD AND HOT SUPPLY COMPONENTS, PROVIDE A MANUFACTURED INSULATION KIT MADE FROM MOLDED CLOSED CELL VINYL THAT IS ANTI-MICROBIAL AND SEAMLESS. EACH KIT SHALL COVER THE TAILPIECE, P-TRAP, WALL BEND, BOTH WATER SUPPLY STOPS, AND BOTH WATER RISERS. KITS SHALL BE EQUAL OR EQUIVALENT TO "PROWRAP" BY McGUIRE OR LAV-GUARD BY TRUEBRO.
8. WHERE ARCHITECTURAL PLANS SHOW WATER CLOSETS AND URINALS, PROVIDE AND INSTALL FLUSHING VALVE SUCH THAT FLUSH HANDLE IS ON WIDE SIDE OF WATER CLOSET.
9. PROVIDE WATER HAMMER ARRESTORS LOCATED AND SIZED ACCORDING TO PDI RECOMMENDATIONS.
10. PROVIDE ISOLATION VALVES IN CW, HW AND HWR PIPING AS NEED OR AS SHOWN FOR ALL GROUPS OF FIXTURES.
11. INSTALL PLUMBING FIXTURES IN ACCORDANCE WITH LATEST ADA AND TAS STANDARDS.

REVERSE OSMOSIS SYSTEM SCHEDULE

SYMBOL	SERVES	GALLONS PER DAY	MEMBRANE QTY & SIZE	MINIMUM INLET PRESSURE	MOTOR HP	ELECTRICAL			MANUFACTURER	MODEL NO.	STORAGE TANK PACKAGE					
						VOLTAGE	PHASE	MCA			TANK SIZE (GAL)	TANK DIAMETER	TANK HEIGHT	PUMP	MANUFACTURER	MODEL NO.
RO-1	BUILDING BCD	150	1 - 2.5" x 14"	20 psi	1/2	120 V	1	8	WATTS	PWR25111011	165	31"	56"	GRUNDFOS MQ3	WATTS	PWTNK165PKG

NOTES:
1. INSTALL RO SYSTEM PER MANUFACTURER'S RECOMMENDATIONS.
2. TANK PACKAGE SHALL INCLUDE ATMOSPHERIC TANK, PUMP AND AUTOMATIC CONTROLS TO PRESSURIZE THE RO SYSTEM SERVING THE BUILDING. SPECIFICATIONS: STORAGE TANK MANUFACTURED FROM FDA APPROVED POLYETHYLENE MATERIALS, UV INHIBITORS ADDED TO STORAGE TANK, TANK WALLS ARE TRANSLUCENT FOR LEVEL VIEWING, GALLON INDICATORS ON SIDE WALL, PRE-INSTALLED FLOAT SWITCH AND JUNCTION BOX, JUNCTION BOX CONNECTS THE FLOAT SWITCH TO RO SYSTEM, PRE-INSTALLED BULKHEAD FITTINGS, AND BASIC INSTALLATION FITTINGS INCLUDED FROM STORAGE TANK TO PUMP

WATER SOFTENER SCHEDULE

SYMBOL	SERVES	LOCATION	TANK SIZE (INCHES)		SALT CAPACITY, LBS	PIPE SIZE, INCHES	CONTINUOUS SERVICE		RESIN PER UNIT FT^3	LBS. SALT PER REGENERATION	METHOD OF CONTROL	WEIGHT, LBS	MANUFACTURER	MODEL NUMBER
			MINERAL DIAMETER x HEIGHT	BRINE DIAMETER x HEIGHT			FLOW RATE, GPM	PRESSURE DROP, PSI						
WS-1	CAR WASH	EQUIPMENT A101	12	18	400	1"	15	15 psi	2	30	FLOW METER	196	WATTS	PWS10111C11

NOTES:
1. WATER SOFTENER IS SCHEDULED TO BE MANUFACTURED BY WATTS. OTHER MANUFACTURERS MAY BE ACCEPTABLE WITH PRIOR APPROVAL.
2. INSTALL WATER SOFTENER PER MANUFACTURER'S RECOMMENDATIONS.
3. PROVIDE FULL SIZE BYPASS WITH BALL VALVE.

RECIRCULATION PUMP SCHEDULE

SYMBOL	SERVES	PUMP TYPE	CONNECTION SIZE	FLOW GPM	HEAD (FT)	MOTOR HP	VOLTAGE	PHASE	MANUFACTURER	MODEL NO
RP-C1	AREA BCD	INLINE	1"	3	15	1/6	120 V	1	ARMSTRONG	ASTRO 250SS
RP-F1	AREA F	INLINE	1"	3	15	1/6	120 V	1	ARMSTRONG	ASTRO 250SS

NOTES:
1. PUMP IS SCHEDULED TO BE ARMSTRONG. B&G, TACO, AND GRUNDFOS SHALL BE CONSIDERED EQUIVELANT MANUFACTURERS.
2. PROVIDE WITH TORK TIME CLOCK AND AQUASTAT.
3. PUMP SHALL BE PROVIDED WITH MULTIPLE SPEEDS.

ELEVATOR SUMP PUMP SCHEDULE

SYMBOL	PUMP TYPE	FLOW	MOTOR HP	HEAD (FT)	VOLTAGE	PHASE	MANUFACTURER	MODEL NO
SP-1	SUBMERSIBLE	50 GPM	1/2	25	115 V	1	BELL AND GOSSETT	ELKT2EC0511

NOTES:
1. SUMP PUMPS SCHEDULED TO BE BY B & G. GRUNDFOS IS CONSIDERED EQUIVALENT.
2. ELEVATOR SUMP PUMP SYSTEM SHALL INCLUDE CONTROL PANEL, OIL SMART SWITCH, LIQUID SMART ALARM SENSOR AND PUMP.
3. PROVIDE SPRING LOADED CHECK VALVE ON DISCHARGE OF PUMP.
4. COORDINATE PUMP AND PIPING INSTALLATION WITH ELEVATOR EQUIPMENT AND MAINTAIN ALL NECESSARY CLEARANCES.

TANKLESS GAS WATER HEATER

SYMBOL	SERVES	GAS TYPE	INLET TEMPERATURE	TEMPERATURE RISE	MINIMUM INPUT, MBH	FLOW RATE	MANUFACTURER	MODEL NO
GTWH-1	AREAS B, C, D	NATURAL	62	67	199	5.6	NAVIEN	NPE-240A2
GTWH-2	AREAS B, C, D	NATURAL	62	67	199	5.6	NAVIEN	NPE-240A2
GTWH-3	AREAS B, C, D	NATURAL	62	67	199	5.6	NAVIEN	NPE-240A2
GTWH-4	AREAS B, C, D	NATURAL	62	67	199	5.6	NAVIEN	NPE-240A2
GTWH-5	AREA F	NATURAL	62	67	199	5.6	NAVIEN	NPE-240A2
GTWH-6	AREA F	NATURAL	62	67	199	5.6	NAVIEN	NPE-240A2

NOTES:
1. TANKLESS GAS WATER HEATERS ARE SCHEDULED TO BE MANUFACTURED BY NAVIEN.
2. WATER HEATER SHALL BE PROVIDED WITH FULLY MODULATING BURNER, COMMERCIAL GRADE COPPER HEAT EXCHANGER, PROVIDE A CONCENTRIC VENT KIT, FLAME SENSOR, OVERHEAT PROTECTION DEVICE, REMOTE CONTROL THERMOSTAT, AND BUILT IN CONTROLS TO MAKE UNITS OPERATE TOGETHER.
3. PROVIDE FIVE YEAR WARRANTY ON HEAT EXCHANGER AND PARTS. WATER CUTOFF, DRAIN VALVE, DRAFT REGULATOR, AND FACTORY AUTHORIZED START-UP.
4. PROVIDE CONDENSATE NEUTRALIZER FOR SYSTEM, EXAMPLE NAVIEN MODEL NUMBER: GXXXXXX
5. PROVIDE NAVIEN COMMERCIAL RACK SYSTEM AS REQUIRED PER MANUFACTURER'S RECOMMENDATIONS.

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Midland, TX 79701

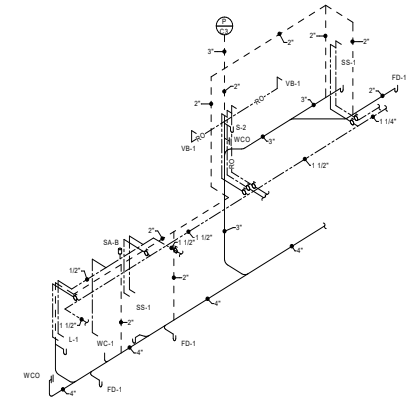
PROJECT NO.
6077.21

KEY PLAN

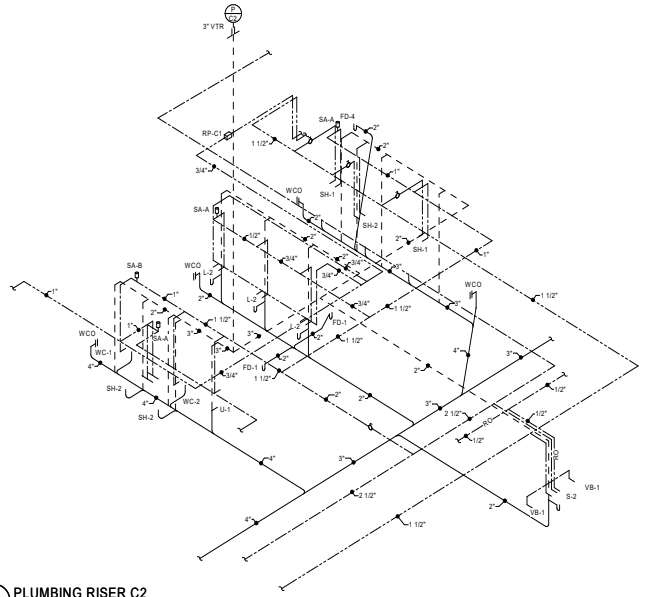
#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Plumbing Schedules

P-601



P C3 PLUMBING RISER C3
SCHEMATIC ONLY



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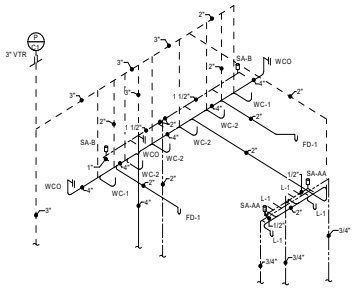

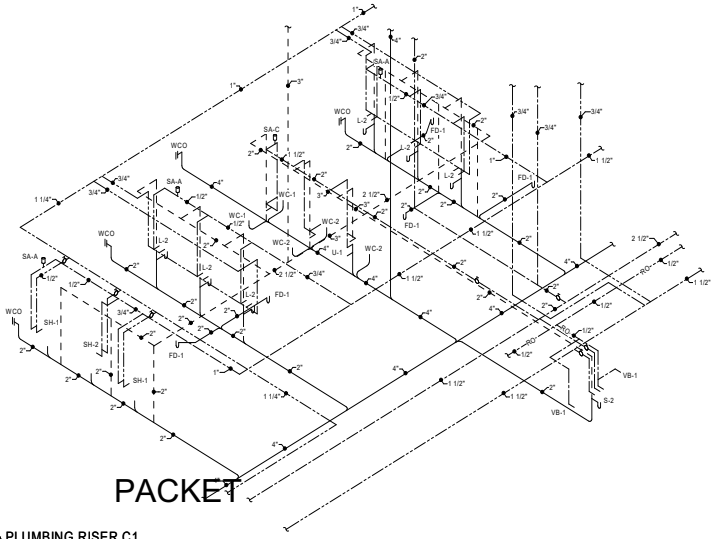

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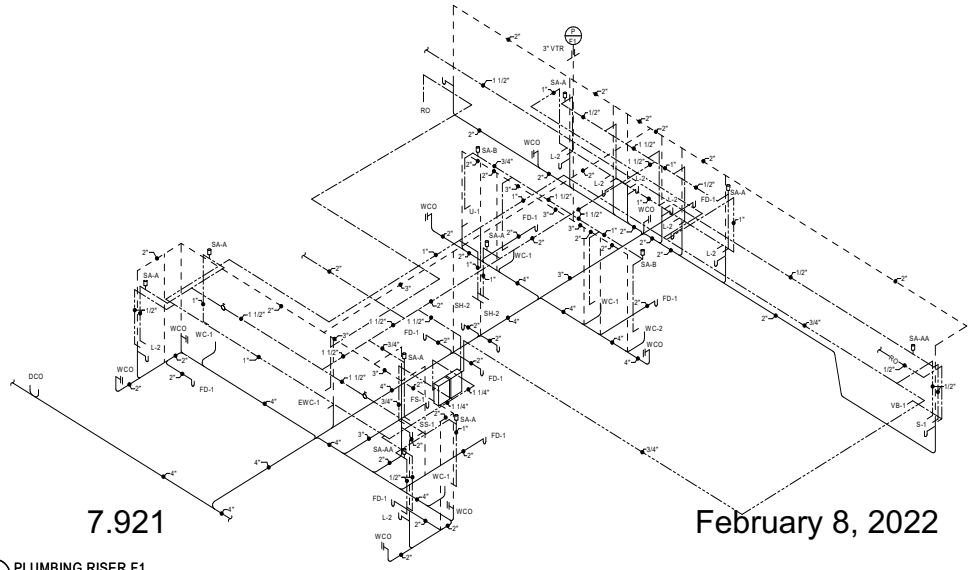
SCHEMATIC ONLY



P F1 PLUMBING RISER F1
SCHEMATIC ONLY

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

Riser Diagrams

P-901

ELECTRICAL ABBREVIATIONS

ABOVE COUNTER	AC	GAUGE	GA
ABOVE FINISHED FLOOR	AFF	GENERATOR	GEN
ALARM	ALM	GROUND	GND
ALARM ANNUNCIATOR PANEL	AAP	GROUND FAULT CIRCUIT INTERRUPTER	GFCI
ALTERNATING CURRENT	AC		
AMERICAN NATIONAL STANDARDS INSTITUTE	ANSI	HEAVY DUTY	HD
AMERICAN SOCIETY FOR TESTING AND MATERIALS	ASTM	HIGH OUTPUT	HO
AMERICAN STEEL WIRE GAUGE	ASWG	HIGH VOLTAGE	HV
AMERICAN WIRE GAUGE	AWG	HORSEPOWER	HP
AMPERE	AMP		
AMPHOUR	AH	ILLUMINATION ENGINEERING SOCIETY OF NORTH AMERICA	IESNA
AMPERE INTERRUPTING CAPACITY	AIC	INTERMEDIATE METAL CONDUIT	IMC
AMPLIFIER	AMPL		
AMPS SHORT CIRCUIT	ASC	KILOVOLT	kV
ANNUNCIATOR	ANN	KILOVOLT AMP	kVA
ANTENNA	ANT	KILOWATT	kW
ARCHITECT	ARCH	KILOWATT HOUR	kWH
ARMORED CABLE	ARMC		
AUDIO FREQUENCY	AF	LIQUIDTIGHT FLEXIBLE METAL CONDUIT	LFMC
AUDIO VISUAL	AV	LIQUIDTIGHT FLEXIBLE NONMETALLIC CONDUIT	LFNC
AUTHORITY HAVING JURISDICTION	AHJ	LOW VOLTAGE	LV
AUTO TRANSFORMER	AUTO XFMR	LUMEN	LM
AUTOMATIC CONTROL PANEL	ACP	LUMENS PER WATT	LPW
AUTOMATIC DOOR CLOSER	ADC		
AUTOMATIC FREQUENCY CONTROL	AFC	MAIN CIRCUIT BREAKER	MCB
AUTOMATIC TRANSFER SWITCH	ATS	MAIN LUGS ONLY	MLO
AUXILIARY	AUX	MANUFACTURER	MFR
AUXILIARY POWER UNIT	APU	MINIMUM	MIN
		MINIMUM CIRCUIT AMPS	MCA
BACKBOARD	BKBD	MOTOR CONTROL CENTER	MCC
BALLAST	BLST	MOTOR STARTER	MS
BATTERY	BAT		
BRAKE HORSEPOWER	BHP	NATIONAL ELECTRICAL CODE	NEC
BUCK-BOOST TRANSFORMER	BB XFMR	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION	NEMA
BUILDING AUTOMATION SYSTEM	BAS	NATIONAL FIRE CODE	NFC
		NATIONAL FIRE PROTECTION ASSOCIATION	NFPA
CABLE TELEVISION	CTV	NIGHT LIGHT	NL
CANDLE POWER	CP	NORMALLY CLOSED	NC
CAPACITOR	CAP	NORMALLY OPEN	NO
CIRCUIT	CKT	NOTIFICATION APPLIANCE CIRCUIT	NAC
CIRCUIT BREAKER	CB		
CLOSED CIRCUIT TELEVISION	CCTV	PANELBOARD	PB
COAXIAL CABLE	COAX	PHASE	PH
COEFFICIENT OF UTILIZATION	CU	PHOTOELECTRIC	PE
COLOR RENDERING INDEX	CRI	PHOTOELECTRIC CELL	PEC
COMMON GROUND	CG	POLY VINYL CHLORIDE	PVC
COMMUNICATIONS	COMM	POWER	PWR
CONDUIT	C	POWER AMPLIFIER	PA
CONTROL	CTRL	POWER FACTOR	PF
CONTROL CONTRACTOR	CC		
CONTROL PANEL	CP	RECEPTACLE	RECEPT
CONTROL POWER TRANSFORMER	CPT	RIGID GALVANIZED STEEL	RGS
CONTROL RELAY	CR	RIGID NONMETALLIC CONDUIT	RNC
CONTROL SWITCH	CS		
COORDINATE	COORD	SCHEDULE	SCH
COPPER	CU	SERVICE ENTRANCE	SE
COVER PLATE	COV PL	SINGLE PHASE	1
CURRENT	CUR	SINGLE POLE, DOUBLE THROW	SPDT
CURRENT LIMITING FUSE	CLF	SINGLE POLE, SINGLE THROW	SPST
CURRENT TRANSFORMER.	CT	SWITCHBOARD	SWBD
DECIBEL	dB	THREE PHASE	3
DEMOLITION	DEMO	TWISTED SHIELDED PAIR	TSP
DETAIL	DET		
DIRECT CURRENT	DC	UNINTERRUPTIBLE POWER SUPPLY	UPS
DISCONNECT SWITCH	DS	UNLESS NOTED OTHERWISE	UNO
DOUBLE POLE, DOUBLE THROW	DPDT		
DOUBLE POLE, SINGLE THROW	DPST	VARIABLE FREQUENCY DRIVE	VFD
		VERY HIGH OUTPUT	VHO
EACH	EA	VOLT, VOLTS, VOLTAGE	V
EASEMENT	ESMT	VOLT AMPERE	VA
ELECTRIC	ELEC	VOLTAGE DROP	VD
ELECTRICAL METALLIC TUBING	EMT		
ELECTRICAL NONMETALLIC TUBING	ENT	WEATHERPROOF	WP
ENCLOSURE	ENCL	WIREWAY	WW
FIRE ALARM	FA		
FIRE ALARM ANNUNCIATOR PANEL	FAAP		
FIRE ALARM CONTROL PANEL	FACP		
FIXTURE	FIXT		
FLEXIBLE METALLIC CONDUIT	FMC		
FLUORESCENT	FLUOR		
FLUORESCENT FIXTURE	FLUOR FIXT		
FLUORESCENT LIGHTING	FLUOR LGHT		
FOOTCANDLE	FC		
FREQUENCY	FREQ		
FULL LOAD AMPS	FLA		

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	2'x4' RECESSED LIGHT FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		1'x4' RECESSED LIGHT FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.
	2'x4' RECESSED LIGHT FIXTURE. DIAGONAL MARKING INDICATES EGRESS FIXTURE CONNECTED TO EMERGENCY POWER SUPPLY. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		1'x4' RECESSED LIGHT FIXTURE. DIAGONAL MARKING INDICATES EGRESS FIXTURE CONNECTED TO EMERGENCY POWER SUPPLY. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.
	2'x2' RECESSED LIGHT FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		SURFACE/PENDANT/WALL MOUNTED FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.
	2'x2' RECESSED LIGHT FIXTURE. DIAGONAL MARKING INDICATES EGRESS FIXTURE CONNECTED TO EMERGENCY POWER SUPPLY. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		SURFACE/PENDANT/ WALL MOUNTED FIXTURE. DIAGONAL MARKING INDICATES EGRESS FIXTURE CONNECTED TO EMERGENCY POWER SUPPLY. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.
	1'x1' RECESSED LIGHT FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		RECESSED COMPACT FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.
	1'x1' RECESSED LIGHT FIXTURE. DIAGONAL MARKING INDICATES EGRESS FIXTURE CONNECTED TO EMERGENCY POWER SUPPLY. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		RECESSED COMPACT FIXTURE. DIAGONAL MARKING INDICATES EGRESS FIXTURE CONNECTED TO EMERGENCY POWER SUPPLY. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.
	PENDANT MOUNTED LOW-BAY OR HI-BAY FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		RECESSED COMPACT WALL WASH FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.
	PENDANT MOUNTED LOW-BAY OR HI-BAY FIXTURE. DIAGONAL MARKING INDICATES QUARTZ RESTRIKE OR EMERGENCY BATTERY BACKUP. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		WALL MOUNTED SCONCE FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.
	2' UNDER COUNTER FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		WALL MOUNTED COMPACT FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.
	4' UNDER COUNTER FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		WALL MOUNTED CUBE FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.
	TRACK LIGHT. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		WALL MOUNTED FIXTURE. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.
	EMERGENCY WALL PACK CONNECTED TO EMERGENCY LIGHTING POWER SUPPLY. UPPER CASE INDICATES TYPE IN SCHEDULE.		EMERGENCY WALL PACK WITH EXIT SIGN CONNECTED TO EMERGENCY LIGHTING POWER SUPPLY. UPPER CASE INDICATES TYPE IN SCHEDULE.
	EXIT SIGN AS SCHEDULED. CONNECTED TO EMERGENCY LIGHTING POWER SUPPLY. ARROWS INDICATE DIRECTIONAL ARROWS. PROVIDE SINGLE OR DOUBLE FACE AS REQUIRED OR INDICATED. UPPER CASE INDICATES TYPE IN SCHEDULE. "WG" INDICATES WIRE GUARD.		WALL MOUNTED EXIT SIGN AS SCHEDULED. CONNECTED TO EMERGENCY LIGHTING POWER SUPPLY. ARROWS INDICATE DIRECTIONAL ARROWS. PROVIDE SINGLE OR DOUBLE FACE AS REQUIRED OR INDICATED. UPPER CASE INDICATES TYPE IN SCHEDULE. "WG" INDICATES WIRE GUARD.
	CEILING FAN. UPPER CASE INDICATES TYPE IN SCHEDULE. LOWER CASE INDICATES SWITCH.		POLE MOUNTED AREA LIGHT FIXTURE UPPER CASE INDICATES TYPE IN SCHEDULE. ROMAN NUMERAL INDICATES DISTRIBUTION.
	GROUND LIGHT. UPPER CASE INDICATES TYPE IN SCHEDULE.		LIGHT BOLLARD. UPPER CASE INDICATES TYPE IN SCHEDULE.
	WALL SWITCH, REFER TO LIGHTING CONTROL MATRIX SCHEDULE FOR ALL CONTROL REQUIREMENTS.	M	CEILING MOUNTED OCCUPANCY SENSOR.
P	PHOTOCELL.	LC	LIGHTING CONTACTOR.
	125V, 20A, 2P, 3W. GROUNDING TYPE DUPLEX RECEPTACLE. "GFCI" DENOTES GROUND FAULT INTERRUPTER, "WP" DENOTES WEATHERPROOF COVER, "AC" DENOTES ABOVE COUNTER MOUNTING, "USB" DENOTES COMBINATION USB DEVICE.		DOUBLE DUPLEX RECEPTACLE CONSISTING OF TWO 125V, 20A, 2P, 3W. GROUNDING TYPE DUPLEX RECEPTACLES MOUNTED IN A 2-GANG BOX AND CONNECTED TO THE SAME CIRCUIT.
	125V, 20A, 2P, 3W. GROUNDING TYPE DUPLEX RECEPTACLE MOUNTED IN FLOOR BOX. "GFCI" DENOTES GROUND FAULT INTERRUPTER.		DOUBLE DUPLEX RECEPTACLE CONSISTING OF TWO 125V, 20A, 2P, 3W. GROUNDING TYPE DUPLEX RECEPTACLES MOUNTED IN A 2-GANG FLOOR BOX AND CONNECTED TO THE SAME CIRCUIT.
	125V, 20A, 2P, 3W. GROUNDING TYPE EMERGENCY DUPLEX RECEPTACLE. "GFCI" DENOTES GROUND FAULT INTERRUPTER, "WP" DENOTES WEATHERPROOF COVER, "AC" DENOTES ABOVE COUNTER MOUNTING.		EMERGENCY DOUBLE DUPLEX RECEPTACLE CONSISTING OF TWO 125V, 20A, 2P, 3W. GROUNDING TYPE DUPLEX RECEPTACLES MOUNTED IN A 2-GANG BOX AND CONNECTED TO THE SAME CIRCUIT.
	THREE PHASE RECEPTACLE OF TYPE NOTED.		SURFACE MOUNTED RACEWAY.
	240V OR 208V RECEPTACLE AS NOTED.	PP	POWER POLE.
	DISCONNECT. AMPERAGE, POLES, AND FUSING AS NOTED.	J	JUNCTION BOX.
	STARTER/DISCONNECT. AMPERAGE, POLES, AND FUSING AS NOTED.	T	THERMOSTAT.
M	MOTOR		WEATHERHEAD.
	CONDUCTORS IN CONDUIT. MINIMUM NUMBER IS (2) #12 AWG + #12 GND. PROVIDE NUMBER OF CONDUCTORS AS REQUIRED FOR SWITCHING INDICATED AND CONTINUING CIRCUITS.		HOMERUN TO PANELBOARD. REFER TO SPECIFICATIONS FOR LIMITING NUMBER OF CONDUCTORS PER HOMERUN.
	SURFACE MOUNTED SINGLE SECTION PANELBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.		SURFACE MOUNTED DOUBLE SECTION PANELBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.
	RECESSED MOUNTED SINGLE SECTION PANELBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.		RECESSED MOUNTED DOUBLE SECTION PANELBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.
	EXISTING SURFACE MOUNTED SINGLE SECTION PANELBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.		EXISTING SURFACE MOUNTED DOUBLE SECTION PANELBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.
	EXISTING RECESSED MOUNTED SINGLE SECTION PANELBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.		EXISTING RECESSED MOUNTED DOUBLE SECTION PANELBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.
	SURFACE MOUNTED DISTRIBUTION PANELBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.		PAD MOUNTED SINGLE SECTION SWITCHBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.
	PAD MOUNTED DRY-TYPE TRANSFORMER. LABEL INDICATES TRANSFORMER NAME. REFER TO TRANSFORMER SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.		PAD MOUNTED DOUBLE SECTION SWITCHBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.
	PAD MOUNTED UTILITY TRANSFORMER. LABEL INDICATES TRANSFORMER NAME. REFER TO TRANSFORMER SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.		PAD MOUNTED TRIPLE SECTION SWITCHBOARD. LABEL INDICATES PANEL NAME. REFER TO PANEL SCHEDULE AND RISER DIAGRAM FOR ADDITIONAL INFORMATION.
	PULL BOX.		MANHOLE.
UGE	UNDERGROUND ELECTRICAL.	EUGE	EXISTING UNDERGROUND ELECTRICAL.
OHE	OVERHEAD ELECTRICAL.	EOHE	EXISTING OVERHEAD ELECTRICAL.
UGC	UNDERGROUND COMMUNICATIONS CABLE.		SURFACE MOUNTED COMMUNICATIONS TERMINAL BOARD.
C	CEILING MOUNTED WIRELESS ACCESS POINTS.	D	DATA OUTLET MOUNTED IN FLOOR BOX.
C	CEILING MOUNTED WIRELESS ACCESS POINTS.	T	TELEPHONE OUTLET MOUNTED IN FLOOR BOX.
	TELEPHONE OUTLET.	C	COMBINATION DATA/TELEPHONE OUTLET MOUNTED IN FLOOR BOX.
	COMBINATION DATA/TELEPHONE OUTLET.		BELL.
CEIL	CEILING MOUNTED SPEAKER.		BUZZER.
SPKR	WALL MOUNTED SPEAKER.		PUSH BUTTON.
	VOLUME SWITCH.	TV	WALL MOUNTED TELEVISION OUTLET.
	SECONDARY CLOCK WITH DOUBLE FACE.	CCTV	SECURITY CAMERA OUTLET.
	FIRE ALARM CONTROL PANEL.	F	ADDRESSABLE FIRE ALARM PULL STATION.
	REMOTE FIRE ALARM ANNUNCIATOR PANEL.	S	SMOKE DETECTOR.
	FIRE ALARM COMBINATION SPEAKER/STROBE UNIT DEVICE. "WG" INDICATES WIRE GUARD.		DUCT MOUNTED SMOKE DETECTOR.
	FIRE ALARM STROBE UNIT DEVICE. "WG" INDICATES WIRE GUARD.	H	HEAT DETECTOR.
	FIRE ALARM HORN UNIT DEVICE. "WG" INDICATES WIRE GUARD.		
DH	DOOR HOLD OPEN.	CR	SECURITY CARD READER.

NOTE:
ITEMS SHOWN AS DASHED INDICATE ITEMS WHICH ARE TO BE REMOVED.

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ELECTRICAL

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PROJECT NO.
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KEY PLAN

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-	01/25/2022	Owner Review

ELECTRICAL ABBREVIATIONS & LEGEND

E-001

1/26/2022 5:32:21 PM

SEQUENCE OF OPERATION LIGHTING CONTROL SCHEDULE			
TAG	BUILDING	TIME OF OPERATION	NOTE CONTENT
A	SITE	DUSK TO DAWN	•LIGHTS SHALL TURN ON AND OFF AUTOMATICALLY FROM DUSK TO DAWN. •LIGHTS SHALL AUTOMATICALLY TURN OFF WHEN SUFFICIENT DAYLIGHT IS PRESENT. •LIGHTS SHALL BE REDUCED TO 30% WHEN SENSORS ARE NOT ACTIVATED.
B	B, D	7AM - 5PM	•LIGHTS SHALL BE CONTROLLED BY TIME SWITCH THAT PROVIDES THE FOLLOWING -HAVE A 7 DAY CLOCK – CAPABLE OF SETTING DIFFERENT DAY TYPES PER WEEK – AUTOMATIC HOLIDAY "SHUTOFF" THEN RESUME REGULAR NORMAL SCHEDULE. – BACK UP CAPABILITIES FOR AT LEAST 10HRS •OVERRIDE SWITCH WITH THE FOLLOWING: -SWITCH SHALL BE MANUAL CONTROL. -SWITCH SHALL PERMIT THE CONTROLLED LIGHTING TO REMAIN ON FOR NOT MORE THAN 2HRS.
C	F: SERVICE BAYS ONLY	5AM - 11PM	•LIGHTS SHALL BE CONTROLLED BY TIME SWITCH THAT PROVIDES THE FOLLOWING -HAVE A 7 DAY CLOCK – CAPABLE OF SETTING DIFFERENT DAY TYPES PER WEEK – AUTOMATIC HOLIDAY "SHUTOFF" THEN RESUME REGULAR NORMAL SCHEDULE. – BACK UP CAPABILITIES FOR AT LEAST 10HRS •OVERRIDE SWITCH WITH THE FOLLOWING: -SWITCH SHALL BE MANUAL CONTROL. -SWITCH SHALL PERMIT THE CONTROLLED LIGHTING TO REMAIN ON FOR NOT MORE THAN 2HRS.
D	A	DUSK TO DAWN	•LIGHTS SHALL TURN ON AND OFF AUTOMATICALLY FROM DUSK TO DAWN. •LIGHTS SHALL AUTOMATICALLY TURN OFF WHEN SUFFICIENT DAYLIGHT IS PRESENT. • LIGHTS SHALL BE CONTROLLED BY TIME SWITCH THAT PROVIDES THE FOLLOWING -HAVE A 7 DAY CLOCK – CAPABLE OF SETTING DIFFERENT DAY TYPES PER WEEK – AUTOMATIC HOLIDAY "SHUTOFF" THEN RESUME REGULAR NORMAL SCHEDULE. – BACK UP CAPABILITIES FOR AT LEAST 10HRS

NOTE:
- THE ABOVE INFORMATION WAS DERIVED FROM IECC 2015.

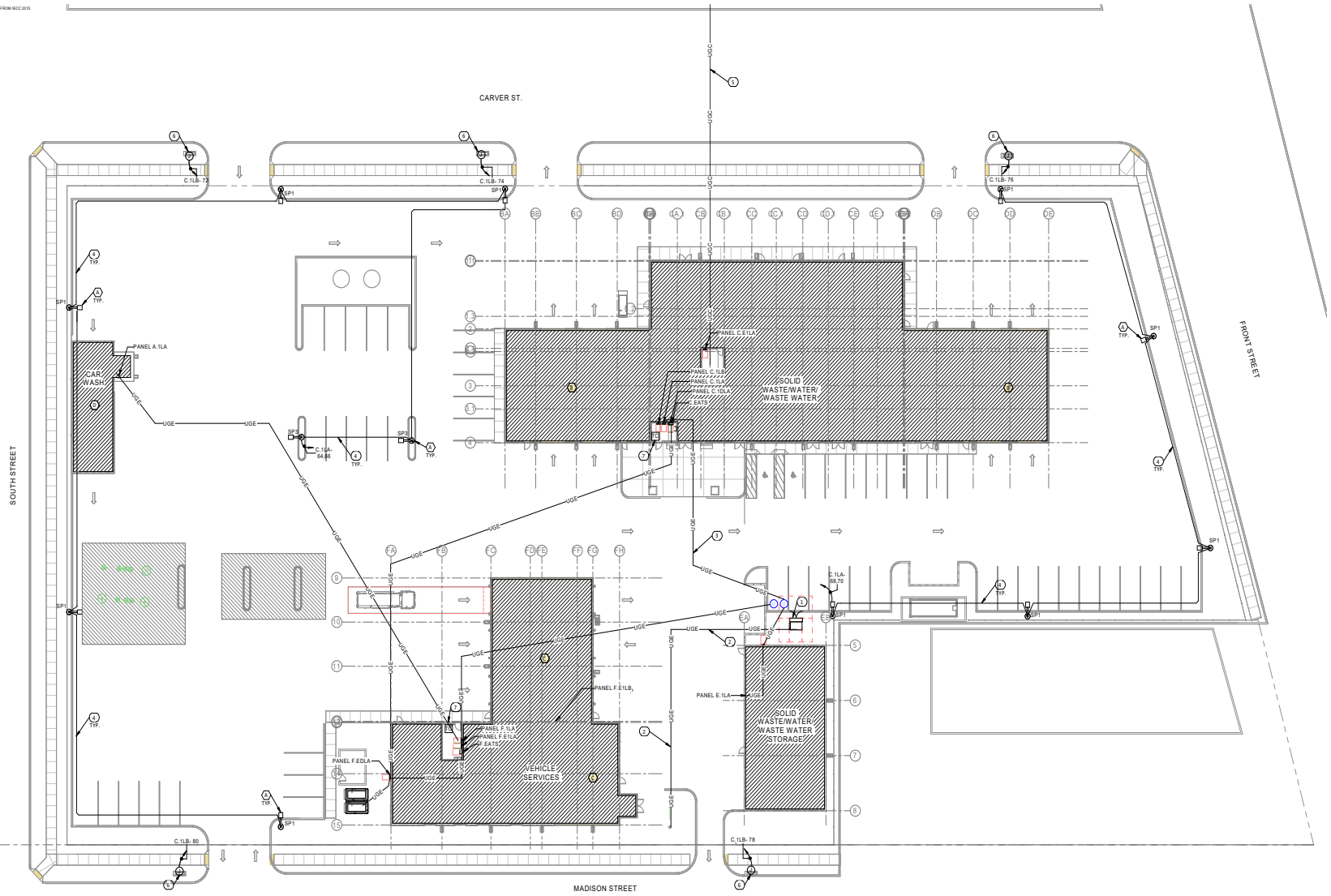
KEY NOTES

AS INDICATED BY (#)

1. NEW PAD MOUNT UTILITY TRANSFORMER PROVIDED BY ONCOR ELECTRIC DELIVERY. CONTRACTOR SHALL PROVIDE CONCRETE PAD, KWH METER ETC. COORDINATE WITH ONCOR FOR ALL REQUIREMENTS.
2. UNDERGROUND ELECTRICAL PRIMARY LINE BY ONCOR. ELECTRICAL CONTRACTOR SHALL PROVIDE CONDUIT, TRENCH, BACKFILL, ETC. PER ONCOR.
3. UNDERGROUND ELECTRICAL SERVICE ENTRANCE. REFER TO RISER DIAGRAM FOR ADDITIONAL INFORMATION.
4. PROVIDE (2)#8AWG, #10GND, 3/4"C FOR SITE POLE LIGHTING. (TYPICAL)
5. PROVIDE (3) 2" CONDUITS FOR COMMUNICATION SERVICES FROM EXISTING OVERHEAD COMMUNICATION LINES. ROUTE UNDERGROUND TO I.T. ROOM. COORDINATE WITH OWNER FOR COMMUNICATIONS PROVIDER AND COORDINATE EXACT LOCATION OF DEMARCATION. PROVIDE FOR THE BORE UNDER CARVER STREET.
6. PROVIDE 2#8, #10GND, IN A 3/4"C AND A 1" SPARE CONDUIT FOR POWER TO GATE OPENERS.
7. PROVIDE PROGRAMMABLE TIME CLOCK WITH ASTRONOMIC FEATURE FOR EXTERIOR POLE MOUNTED SITE LIGHTING CIRCUITS. REFER TO SITE LIGHTING CONTROL SCHEDULE AND THIS SHEET FOR SEQUENCE OF OPERATION.

GENERAL NOTES

A. COORDINATE WITH THE UTILITY SERVICE PROVIDERS FOR ALL REQUIREMENTS FOR DELIVERING POWER AND COMMUNICATION SERVICE TO THE NEW BUILDING.
B. VERIFY THE LINE OF DEMARCATION FOR THE TELEPHONE SERVICE CONDUITS. PREPARE TO EXTEND THE (3)-4" CONDUITS TO THE PROPERTY LINE AT A LOCATION TO BE DETERMINED BY THE SERVICE PROVIDER.
C. REFER TO THE LIGHT FIXTURE SCHEDULE FOR FIXTURE TYPES. PROVIDE THE NUMBER OF FIXTURES AND ORIENTATION NOTED FOR POLE-MOUNTED FIXTURES. POLE EPA RATINGS SHALL BE FOR THE NUMBER OF FIXTURES SHOWN.
D. CONTRACTOR SHALL VERIFY LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO ANY EARTH WORK.



1 Electrical Site Plan
1" = 20'-0"

0 20' 40'

PLAN NORTH

PACKET 7.923 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL - SITE PLAN

E-100

1/25/2022 5:24:51 PM

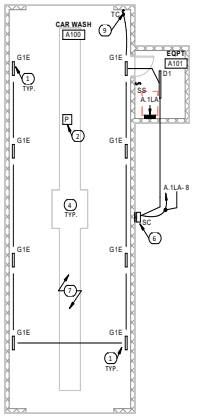
GENERAL NOTES

A. COORDINATE LOCATION OF LIGHT FIXTURES WITH ARCHITECTURAL AND MECHANICAL.
B. ALL EMERGENCY AND EGRESS LIGHTING SHALL BE CONNECTED TO THE SAME BRANCH CIRCUIT SERVING THE NORMAL LIGHTS AND SHALL BE ON THE LINE SIDE OF RELAYS OR SWITCHING DEVICES.
C. REFER TO KEYED NOTES FOR CONTROL OF ADDITIONAL EMERGENCY LIGHTING. ALL EXIT SIGNS SHALL BE CONNECTED FOR CONTINUOUS OPERATION.
D. AT LOCATIONS WHERE ROOM LIGHT FIXTURES ARE CONTROLLED THROUGH THE USE OF OCCUPANCY SENSORS, PROVIDE THE NUMBER OF SENSORS AND LOCATE THE UNITS AS REQUIRED FOR COMPLETE ROOM COVERAGE. WHERE MORE THAN ONE SENSOR IS LOCATED IN A COMMON SPACE, CONNECT THE UNITS SUCH THAT DETECTION OF OCCUPANCY FROM EITHER UNIT WILL ENERGIZE THE LIGHTING. WHERE SWITCHES ARE SHOWN IN CONJUNCTION WITH OCCUPANCY SENSORS, CONNECT THE SWITCHES TO DE-ENERGIZE THE LIGHTING INDICATED REGARDLESS OF OCCUPANCY. ADJUST ALL SENSOR TIME DELAYS AND MOTION SENSITIVITIES DURING PROJECT CLOSEOUT TO MEET THE OPERATIONAL FUNCTION OF THE OWNER.
E. EXACT LOCATION AND PLACEMENT OF EXIT LIGHTING SHALL BE FIELD DETERMINED TO ENSURE PROPER LINES OF SIGHT.
F. RECESSED DOWN LIGHT FIXTURES INSTALLED IN LAY-IN CEILINGS SHALL BE PROVIDED WITH ADJUSTABLE T-BAR ATTACHMENT ARMS MANUFACTURED BY THE LIGHT FIXTURE COMPANY.
G. PROVIDE DEDICATED NEUTRAL WIRE FOR ALL 120V OR 277V BRANCH CIRCUITS. NO MULTI-WIRE BRANCH CIRCUITS SHALL BE ALLOWED.

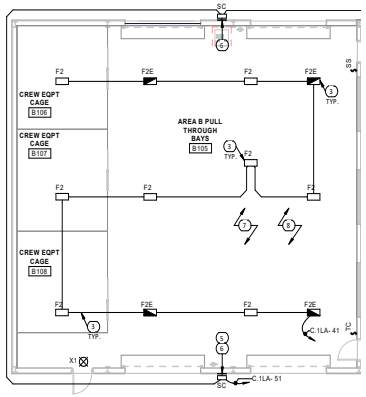
KEY NOTES

AS INDICATED BY: (#)

1 FIXTURES SHALL BE WALL MOUNTED WHERE LIGHT DISTRIBUTION IS FACING OUT TOWARDS THE OPPOSITE WALL. MOUNT FIXTURES AT 12'-0" AFF.
2 PROVIDE PHOTOCELL MOUNTED ON ROOF FACING NORTH AWAY FROM THE SUN. CONTRACTOR SHALL COORDINATE BEST LOCATION OF PHOTOCELL. IF TIME-CLOCK IS ALSO NEEDED. PROVIDE CONNECTION TO TIME CLOCK CONTROL INPUT.
3 BOTTOM OF FIXTURE SHALL BE MOUNTED AT 15'-0".
4 ALL ELECTRICAL DEVICES, AND FIXTURES, AND EQUIPMENT INCLUDING CONDUIT, WIRING AND BOXES IN CAR WASH AREA SHALL BE SUITABLE FOR INSTALLATION AND SUBJECT TO DIRECT HOSE DOWN.
5 ALL EXTERIOR WALL PACK FIXTURES FOR BUILDING B, C, & D SHALL BE CONNECTED TO CIRCUIT C:1LA-51.
6 MOUNT FIXTURES AT 15'-0" AFF.
7 REFER TO SEQUENCE OPERATION CONTROL SCHEDULE, SHEET E-101 FOR LIGHTING CONTROL REQUIREMENTS FOR THIS AREA.
8 CONTRACTOR SHAL COORDINATE EXACT PLACEMENT OF LIGHT FIXTURES TO AVOID CONFLICT WITH OTHER CEILING MOUNTED EQUIPMENT SUCH AS, BUT NOT LIMITED TO FANS AND HEATERS. MAINTAIN REQUIRED DISTANCE FROM HEATERS BASED ON HEATER INSTALLATION CRITERIA. COORDINATE WIT
9 CONTRACTOR SHALL VERIFY THAT DEVICE SHALL BE CAPABLE TO WITHSTAND CAR WASH ENVIRONMENT.



1 ELECTRICAL - LIGHTING PLAN FIRST FLOOR AREA A
1/8" = 1'-0"



2 ELECTRICAL - LIGHTING PLAN FIRST FLOOR AREA B
1/8" = 1'-0"

PACKET

7.924

0 4' 8' 16'
PLAN NORTH

February 8, 2022

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KEY PLAN
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E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL - LIGHTING PLAN FIRST FLOOR AREA A & B

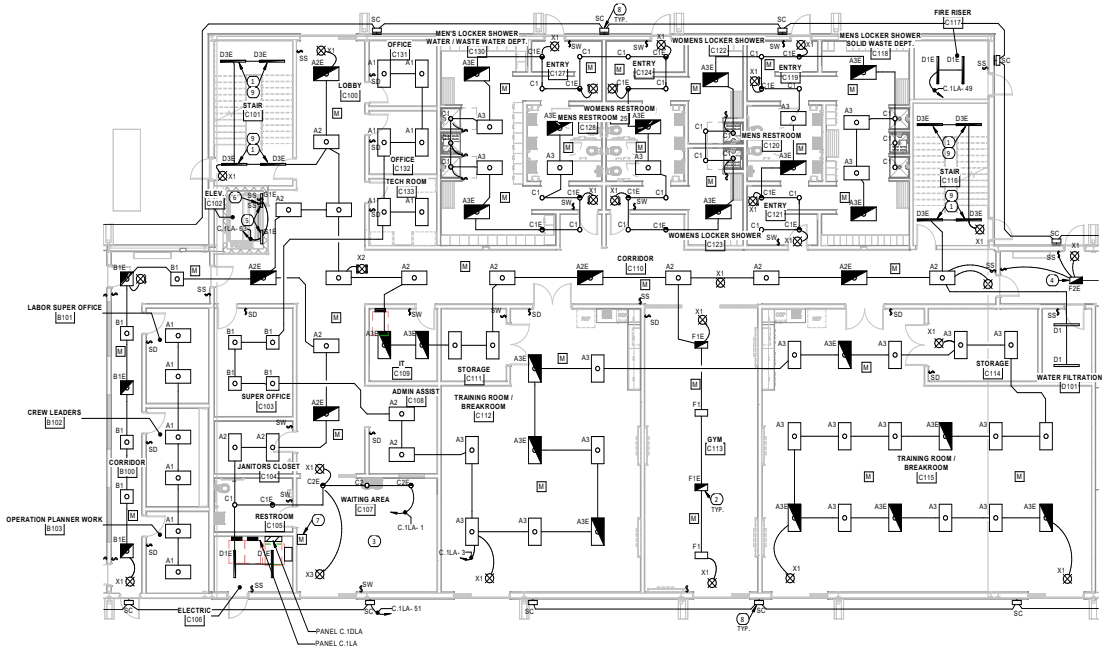
E-101

1/25/2022 5:19:54 PM

KEY NOTES

AS INDICATED BY: (#)

1. MOUNT FIXTURES AT 7'-0" AFF FROM LANDING.
2. BOTTOM OF FIXTURE SHALL BE MOUNTED AT 13'-0".
3. SEE SHEET E-105 FOR LIGHT FIXTURE LAYOUT.
4. BOTTOM OF FIXTURE SHALL BE MOUNTED AT 14'-6".
5. PROVIDE (2) WALL MOUNTED G1E FIXTURES IN ELEVATOR PIT CONNECTED TO A DEDICATED 20A CIRCUIT. FIXTURES SHALL BE MOUNTED NEAR THE ELEVATOR CONTROLLER LOCATED AT THE FIRST FLOOR LANDING. COORDINATE EXACT LOCATION OF LIGHT FIXTURE WITH ELEVATOR MANUFACTURER. MOUNT LIGHT SWITCH IN A READILY ACCESSIBLE LOCATION.
6. PROVIDE (1) LIGHT SWITCH 4-0" ABOVE BOTTOM LANDING NEXT TO THE TOP RUNG OF THE LADDER AND (1) LIGHT SWITCH 4'-0" ABOVE THE CONTROLLER LANDING FLOOR. REFER TO ELEVATOR MANUFACTURER FOR ADDITIONAL INFORMATION.
7. OCCUPANCY SENSOR SHALL BE WALL MOUNTED AT 8'-0"AFF. CONTRACTOR SHALL COORDINATE BEST LOCATION FOR SENSOR ACTIVATION.
8. MOUNT FIXTURES AT 9'-0" AFF.
9. DIM FIXTURES TO 50% AFTER 30 MINUTES OF NO OCCUPANCY



1 ELECTRICAL - LIGHTING PLAN FIRST FLOOR AREA C
1/8" = 1'-0"

PLAN NORTH

PACKET 7.925 February 8, 2022

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KEY PLAN
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E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL - LIGHTING PLAN FIRST FLOOR AREA C

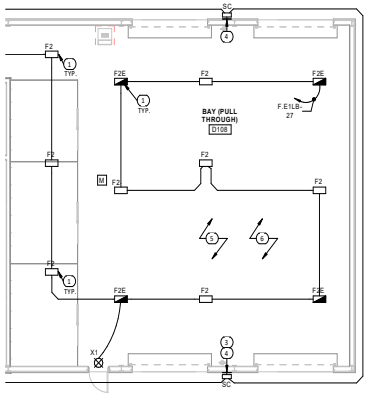
E-102

1/25/2022 5:24:59 PM

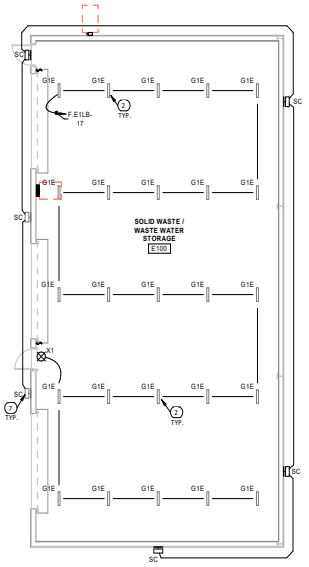
KEY NOTES

AS INDICATED BY: (#)

1. BOTTOM OF FIXTURE SHALL BE MOUNTED AT 13'-8" AFF. KEEP CLEARANCE OF 22" AWAY FROM CEILING HEATERS. COORDINATE WITH MECHANICAL PLANS FOR LOCATION OF HEATERS.
2. BOTTOM OF FIXTURE SHALL BE MOUNTED AT 14'-0" AFF.
3. ALL EXTERIOR FIXTURES FOR BUILDING B, C, & D SHALL BE CONNECTED TO CIRCUIT C.1LA-51.
4. MOUNT FIXTURES AT 15'-0" AFF.
5. REFER TO SEQUENCE OPERATION CONTROL SCHEDULE, SHEET E-101 FOR LIGHTING CONTROL REQUIREMENTS FOR THIS AREA.
6. CONTRACTOR SHAL COORDINATE EXACT PLACEMENT OF LIGHT FIXTURES TO AVOID CONFLICT WITH OTHER CEILING MOUNTED EQUIPMENT SUCH AS, BUT NOT LIMITED TO FANS AND HEATERS. MAINTAIN REQUIRED DISTANCE FROM HEATERS BASED ON HEATER INSTALLATION CRITERIA. COORDINATE WITH MECHANICAL PRIOR TO INSTALLATION OF LIGHTING.
7. MOUNT FIXTURES AT 9'-0" AFF.



1 ELECTRICAL - LIGHTING PLAN FIRST FLOOR AREA D
1/8" = 1'-0"



2 ELECTRICAL - LIGHTING PLAN FIRST FLOOR AREA E
1/8" = 1'-0"

0 4' 8' 16'

PLAN NORTH

PACKET 7.926 February 8, 2022

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KEY PLAN
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E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL - LIGHTING PLAN FIRST FLOOR AREA D & E

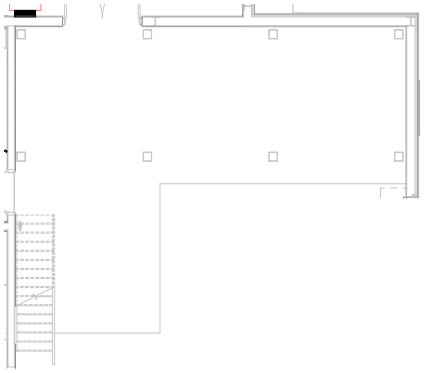
E-103

1/25/2022 5:34:40 PM

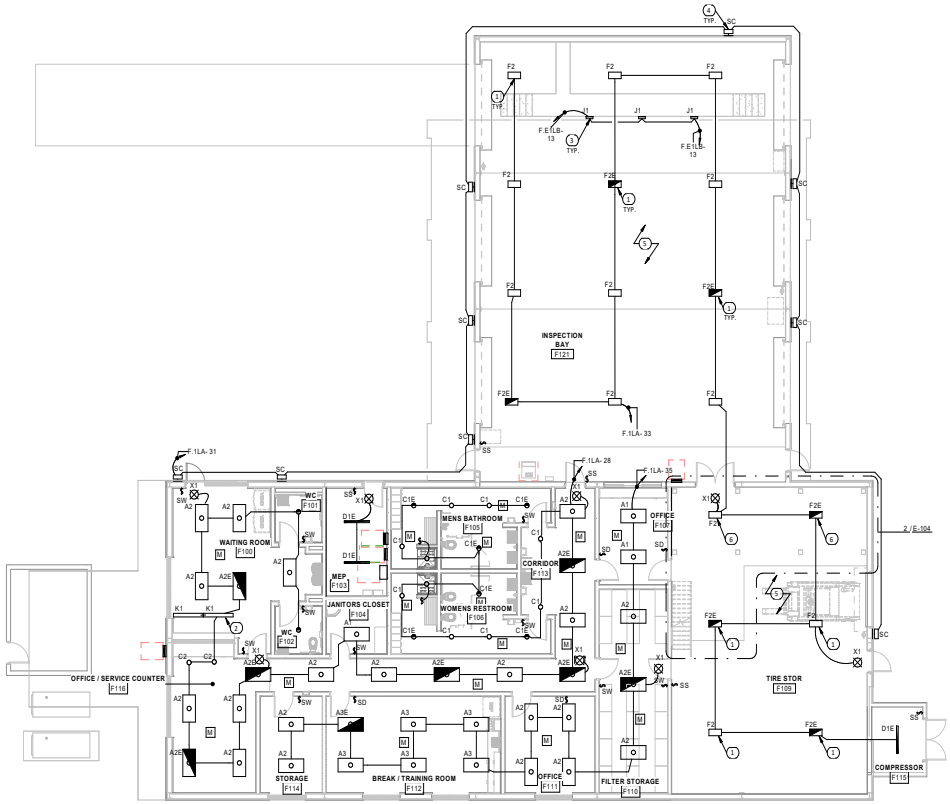
KEY NOTES

AS INDICATED BY: (#)

1. BOTTOM OF FIXTURE SHALL BE MOUNTED AT 14-0".
2. FIXTURES TO RUN FULL LENGTH OF RECEPTION AREA. CONTRACTOR TO COORDINATE EXACT LENGTH.
3. FIXTURES SHALL BE MOUNTED BELOW FLOOR LEVEL, RECESSED IN PIT WALL FOR SERVICE PIT. COORDINATE WITH OWNER/ARCHITECT FOR FINAL LOCATION.
4. MOUNT FIXTURES AT 15'-0" AFF.
5. REFER TO SEQUENCE OPERATION CONTROL SCHEDULE, SHEET E-101 FOR LIGHTING CONTROL REQUIREMENTS FOR THIS AREA.
6. BOTTOM OF FIXTURE SHALL BE MOUNTED AT 12' AFF FROM MEZZANINE.



2 ELECTRICAL – ALT. 1 MEZZANINE LIGHTING PLAN – AREA F
1/4" = 1'-0"



1 ELECTRICAL - LIGHTING PLAN FIRST FLOOR AREA F
1/8" = 1'-0"

PLAN NORTH

PACKET 7.927 February 8, 2022

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KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL - LIGHTING PLAN FIRST FLOOR AREA F

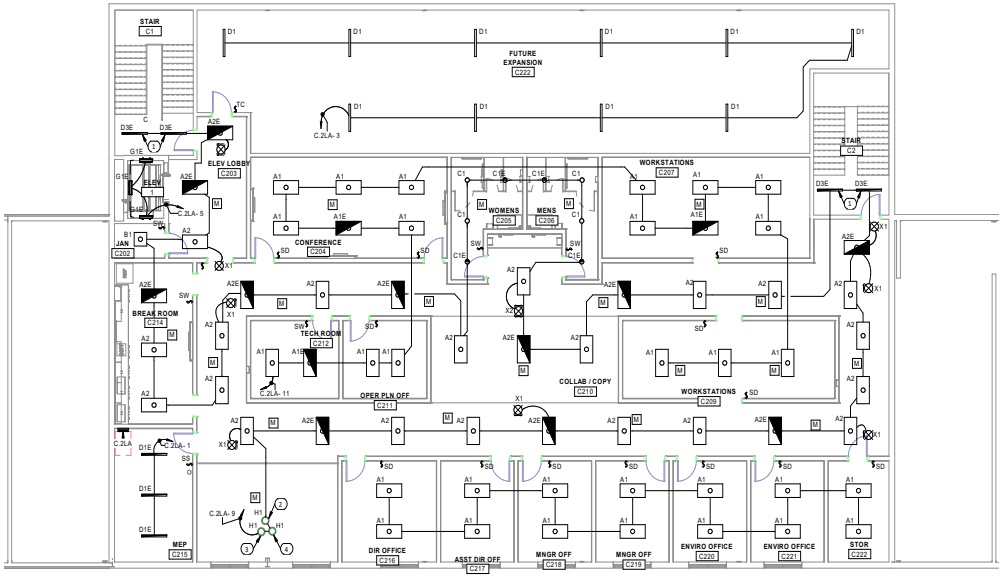
E-104

1/25/2022 5:39:44 PM

KEY NOTES

AS INDICATED BY: (#)

1 MOUNT FIXTURES AT 7'-0" AFF FROM LANDING.
2 MOUNT FIXTURE AT 16'-0" AFF. COORDINATE WITH ARCHITECTURE SHEETS FOR FINAL PLACEMENT.
3 MOUNT FIXTURE AT 15'-0" AFF. COORDINATE WITH ARCHITECTURE SHEETS FOR FINAL PLACEMENT.
4 MOUNT FIXTURE AT 17'-0" AFF. COORDINATE WITH ARCHITECTURE SHEETS FOR FINAL PLACEMENT.



1 ELECTRICAL - LIGHTING PLAN SECOND FLOOR AREA C
1/8" = 1'-0"

PACKET 7.928 February 8, 2022

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KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL - LIGHTING PLAN SECOND FLOOR AREA C

E-105

1/25/2022 5:34:46 PM

GENERAL NOTES

A. PROVIDE FOR THE CONNECTION OF ALL FIRE/SMOKE DAMPERS. PROVIDE 120 VOLT POWER AND FOR CONNECTIONS TO THE FIRE ALARM PANEL AS REQUIRED FOR PROPER OPERATION. REFER TO THE MECHANICAL PLANS FOR LOCATION AND NUMBER OF DAMPERS. CIRCUIT THE DAMPERS FOR A MAXIMUM OF TEN DAMPERS PER CIRCUIT AND EXTEND TO SPARE CIRCUIT BREAKERS AS REQUIRED. PROVIDE FOR ALL NECESSARY CONTROL MODULES AND RELAYS FOR OPERATION.

B. REFER TO THE MECHANICAL DRAWINGS FOR THE LOCATION AND NUMBER OF SUPPLY AND RETURN AIR DUCTS. FOR UNITS THAT ARE INDICATED TO HAVE SMOKE DETECTION COVERAGE, PROVIDE THE NUMBER OF DETECTORS AS REQUIRED TO COVER ALL OF THE DUCTS.

C. AT LOCATIONS WHERE A COMMON EXHAUST FAN IS CONTROLLED THROUGH INDEPENDENT WALL SWITCHES, CONNECT THE SWITCHES IN PARALLEL TO ALLOW EITHER SWITCH TO OPERATE THE FAN.

D. REFER TO THE COMMUNICATIONS/FIRE ALARM SHEETS FOR ADDITIONAL POWER REQUIREMENTS TO INCLUDE INFRARED FLUSH VALVES, HOOD SUPPRESSION SYSTEM, INTERCOM SYSTEMS, ETC.

E. REFER TO THE MECHANICAL EQUIPMENT ELECTRICAL SCHEDULE FOR BRANCH CIRCUIT REQUIREMENTS FOR ALL MECHANICAL EQUIPMENT.

F. TOILET ROOM EXHAUST FANS SHALL BE CONTROLLED BY THE BUILDING'S DDC SYSTEM. ELECTRICAL ROOM EXHAUST FANS SHALL BE CONTROLLED BY A TEMPERATURE SENSOR.

G. PROVIDE 120V POWER FOR ALL DDC CONTROLLERS AS REQUIRED. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.

H. COORDINATE WITH SECURITY CONTRACTOR FOR ALL POWER REQUIREMENTS. REFER TO COMMUNICATION SHEETS FOR JUNCTION BOXES FOR MOTION DETECTORS, KEYPADS, DOOR CONTACTORS, ETC.

I. CONTRACTOR IS RESPONSIBLE FOR PROVIDING CONNECTION OF ALL HVAC AND PLUMBING EQUIPMENT (BUT NOT LIMITED TO RTU'S, AHU'S, FANS, DAMPERS, LOUVERS, PUMPS AND CONTROLS).

J. FLOOR BOX LOCATIONS AND TYPES OF CONNECTIONS SHALL BE FIELD DETERMINED AND COORDINATED WITH THE EQUIPMENT ON SITE.

K. PROVIDE DEDICATED NEUTRAL WIRE FOR ALL 120V OR 277V BRANCH CIRCUITS. NO MULTI-WIRE BRANCH CIRCUITS SHALL BE ALLOWED.

KEY NOTES

AS INDICATED BY: (#)

1 PROVIDE POWER TO CEILING MOUNTED FAN. COORDINATE WITH ARCHITECTURE SHEETS FOR EXACT LOCATION.

2 PROVIDE POWER TO ICE MACHINE.

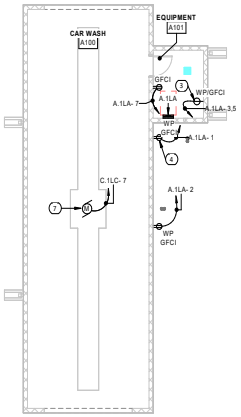
3 CONTRACTOR SHALL VERIFY CONNECTION TYPE AND PROVIDE CORRECT NEMA CONFIGURATION FOR PRESSURE WASHER. PROVIDE ENCLOSURE BOX THAT IS LISTED AND IDENTIFIED AS "EXTRA DUTY" PER ANSI/UL514D. PROVIDE (2)#8AWG, #10GND, IN A 3/4"C FOR POWER TO PRESSURE WASHER. COORDINATE FINAL LOCATION WITH OWNER/ARCHITECTURE SHEETS.

4 PROVIDE (2)#12AWG, #10GND, IN A 3/4"C FOR POWER TO COMMERCIAL VACUUM. PROVIDE WEATHERPROOF, WHILE-IN-USE COVER TO GFCI RECEPTACLE.

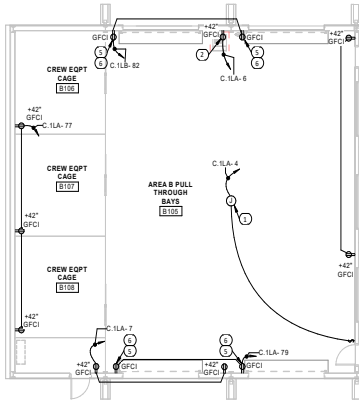
5 PROVIDE POWER TO GARAGE DOOR OPENER. CONTRACTOR SHALL COORDINATE FINAL/BEST LOCATION FOR OUTLET. COORDINATE LOCATIONS AND CONNECTION REQUIREMENTS FOR CONTROLS AND PROVIDE CONNECTION ACCORDINGLY. COORDINATE WITH GARAGE DOOR CONTRACTOR AND INSTALLATION REQUIREMENTS.

6 PROVIDE (2)#10, #10GND. IN A 3/4"C FOR POWER TO OVERHEAD DOOR.

7 PROVIDE A 20A/1P BREAKER IN PANEL A.1LA. EXTEND (3)#10 AWG, #10 GND INA. 3/4"CONDUIT.



1 ELECTRICAL - POWER PLAN FIRST FLOOR AREA A
1/8" = 1'-0"



2 ELECTRICAL - POWER PLAN FIRST FLOOR AREA B
1/8" = 1'-0"

0 4' 8' 16'

PLAN NORTH

PACKET

7.929

February 8, 2022

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KEY PLAN
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-	01/25/2022	Owner Review

ELECTRICAL - POWER PLAN FIRST FLOOR AREA A & B

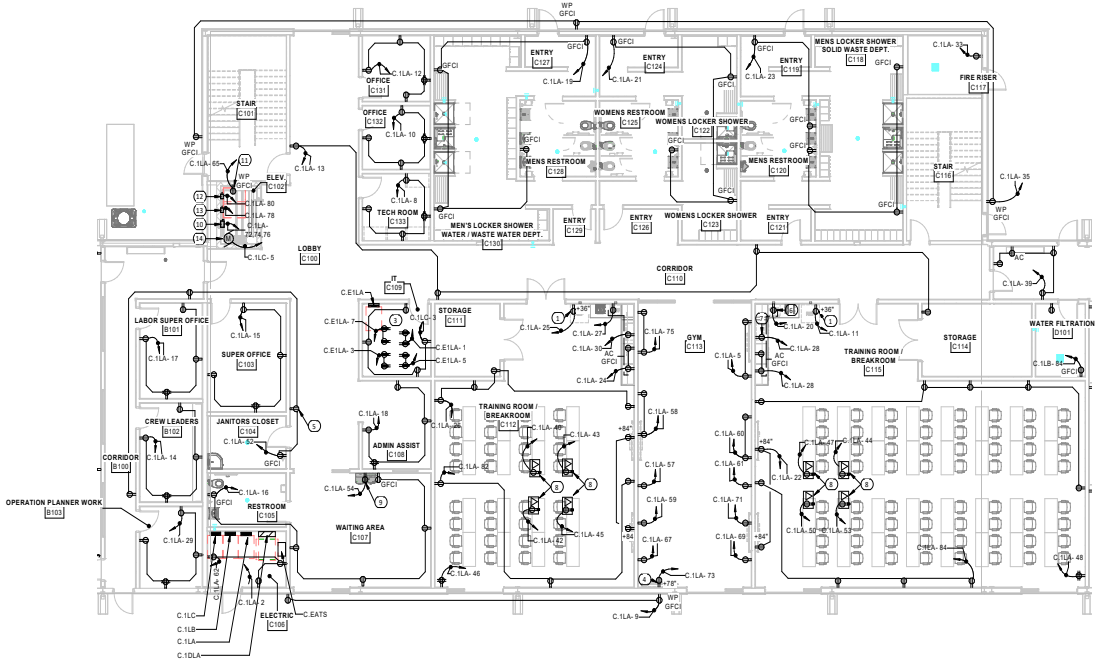
E-201

1/25/2022 5:29:41 PM

KEY NOTES

AS INDICATED BY: (#)

1 PROVIDE GFI BREAKER TO REFRIGERATOR.
3 CONTRACTOR SHALL COORDINATE FINAL LOCATION OF OUTLETS WITH OWNER.
4 PROVIDE POWER TO WALL MOUNTED TV. COORDINATE WITH ARCHITECTURE SHEETS FOR EXACT HIGHT AND LOCATION.
5 CONNECT NON-GFCI RECEPTACLES FROM THE LINE SIDE OF THE GFCI BREAKER. RECEPTACLES SHALL NOT LOOSE POWER WHEN GFCI OUTLET TRIPS.
6 PROVIDE POWER TO COFFEE MAKER.
7 PROVIDE POWER TO MICROWAVE.
8 PROVIDE HUBBELL 4 GANG FLOOR BOX PRODUCT NUMBER: CF4G30CR WITH TWO OUTLETS AND TWO DATA PORTS. COORDINATE WITH ARCHITECTURE FURNITURE FOR EXACT LOCATION.
9 PROVIDE POWER TO ELECTRIC DRINKING WATER FOUNTAIN. PROVIDE GFI CIRCUIT BREAKER IN PANEL INDICATED.
10 PROVIDE A 60A/3P ENCLOSED CIRCUIT BREAKER FOR USE WITH TWO-STOP ELEVATOR. PROVIDE AUXILIARY CONTACTS FOR COORDINATION WITH BATTERY LOWERING SYSTEM. PROVIDE (3)#4 AWG, #8 GND. IN A 1" CONDUIT TO CIRCUIT INDICATED. VERIFY LOCATION WITH ELEVATOR RATING OF ELEVATOR MOTOR AND NOTIFY ENGINEER OF ANY CHANGES PRIOR TO ORDERING AND INSTALLING ENCLOSED CIRCUIT BREAKER, WIRE, CONDUIT, AND CIRCUIT BREAKER PANEL.
11 DEDICATED WP/GFCI RECEPTACLE LOCATED IN ELEVATOR PIT, MOUNT 36" AFF. COORDINATE EXACT LOCATION WITH ELEVATOR MANUFACTURER.
12 PROVIDE POWER FOR SECONDARY HYDRAULIC POWER SOURCE. COORDINATE CONNECTION REQUIREMENTS AND EXACT LOCATION WITH ELEVATOR MANUFACTURER AND INSTALLER. EXTEND AND CONNECT TO CIRCUIT AS INDICATED.
13 PROVIDE 15A/1P LOCKABLE DISCONNECT OR ENCLOSED CIRCUIT BREAKER FOR ELEVATOR CAB LIGHTING AND FAN. COORDINATE EXACT LOCATION WITH ELEVATOR MANUFACTURE AND INSTALLER. EXTEND AND CONNECT TO CIRCUIT AS INDICATED. EXTEND (2)#12 AWG, #12 GND. IN A 3/4" CONDUIT.
14 20A/1P ENCLOSED CIRCUIT BREAKER WITH SHUNT-TRIP AND AUXILIARY CONTACTS. PROVIDE A 20A/1P BREAKER IN PANEL C 1LC. EXTEND (3)#10 AWG, #10 GND INA 3/4"CONDUIT. ELECTRICAL CONTRACTOR SHALL VERIFY HORSEPOWER RATING OF ELEVATOR MOTOR AND NOTIFY ENGINEER OF ANY CHANGES PRIOR TO ORDERING AND INSTALLING EQUIPMENT. COORDINATE WITH ELEVATOR MANUFACTURER FOR ADDITIONAL REQUIREMENTS AND EXACT LOCATION.



1 ELECTRICAL - POWER PLAN FIRST FLOOR AREA C
1/8" = 1'-0"

PACKET 7.930 February 8, 2022

0 4' 8' 16'
PLAN NORTH

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL - POWER PLAN FIRST FLOOR AREA C

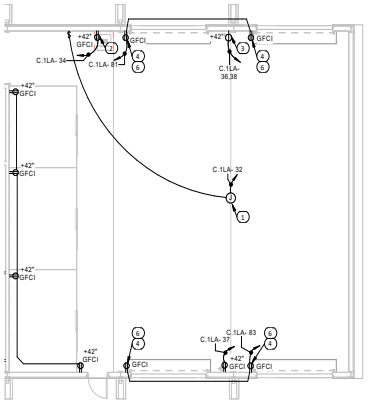
E-202

1/25/2022 5:34:54 PM

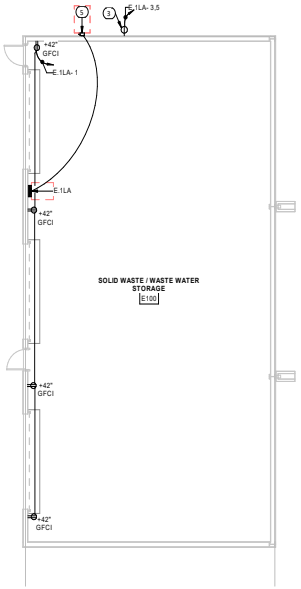
KEY NOTES

AS INDICATED BY: (#)

1. PROVIDE POWER TO CEILING MOUNTED FAN. COORDINATE WITH ARCHITECTURE SHEETS FOR EXACT LOCATION. COORDINATE WITH MECHANICAL FOR CONTROL REQUIREMENTS.
2. PROVIDE POWER TO ICE MACHINE.
3. POWER FOR PORTABLE WELDER. PROVIDE NEMA 6-50R OUTLET WITH (3) #8 AWG, #10 GND IN 3/4" CONDUIT. COORDINATE WITH MANUFACTURER FOR OTHER ELECTRICAL REQUIREMENTS.
4. PROVIDE POWER TO GARAGE DOOR OPENER. CONTRACTOR SHALL COORDINATE FINAL/BEST LOCATION FOR OUTLET. COORDINATE LOCATIONS AND CONNECTION REQUIREMENTS FOR CONTROLS AND PROVIDE CONNECTION ACCORDINGLY. COORDINATE WITH GARAGE DOOR CONTRACTOR AND INSTALLATION REQUIREMENTS.
5. PROVIDE MAIN 100A FUSED DISCONNECT FOR PANEL E.1LA.
6. PROVIDE (2)#10, #10GND. IN A 3/4" C FOR POWER TO OVERHEAD DOOR.



1 ELECTRICAL - POWER PLAN FIRST FLOOR AREA D
1/8" = 1'-0"



2 ELECTRICAL - POWER PLAN FIRST FLOOR AREA E
1/8" = 1'-0"

0 4' 8' 16'

PLAN NORTH

PACKET 7.931 February 8, 2022

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KEY PLAN
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E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL - POWER PLAN FIRST FLOOR AREA D & E

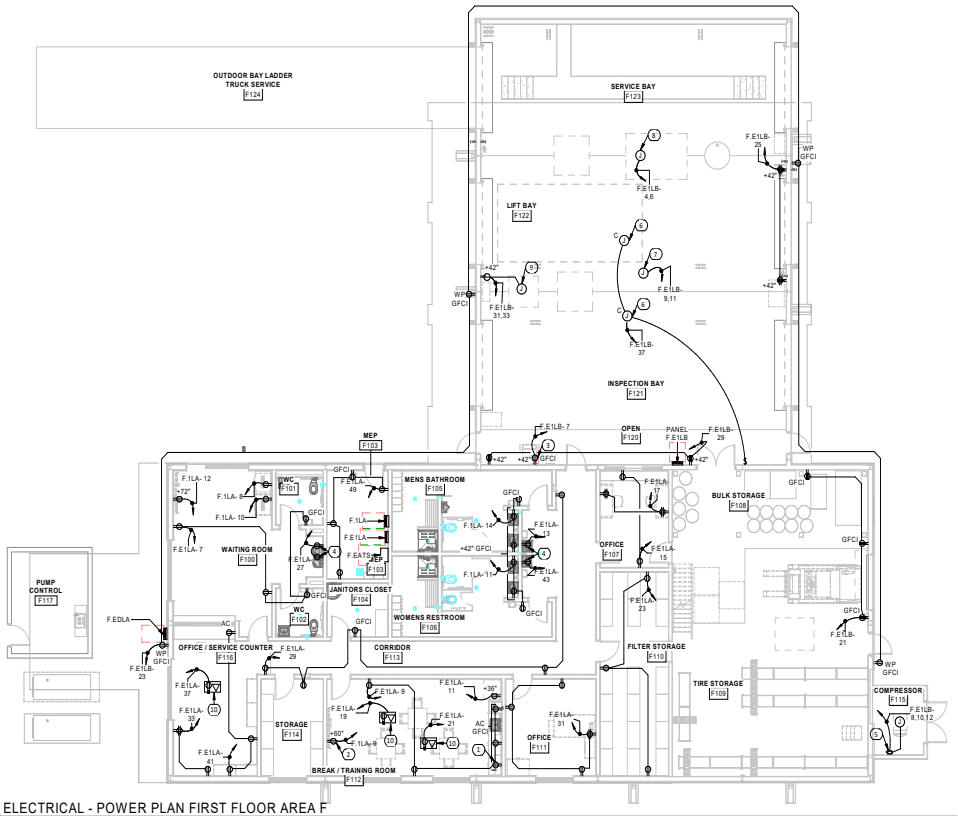
E-203

1/25/2022 5:34:55 PM

KEY NOTES

AS INDICATED BY: #

1. PROVIDE POWER TO MICROWAVE.
2. PROVIDE POWER TO TV MONITOR. COORDIATE WITH ARCHITECTURE PLANS FOR EXACT HEIGHT.
3. PROVIDE POWER TO ICE MACHINE.
4. PROVIDE GFI BREAKER FOR ELECTRIC WATER COOLER.
5. PROVIDE 208V, 100A, 3PH, FUSED DISCONNECT FUSED AT 100A TO AIR COMPRESSOR. PROVIDE (3)#3 AWG, #8 GND, IN A 1 1/4"C.
6. PROVIDE POWER TO CEILING MOUNTED FAN. COORDINATE WITH ARCHITECTURE SHEETS FOR EXACT LOCATION.
7. PROVIDE NEMA L6-20R OUTLET FOR ROTARY LIFT. COORDINATE WITH OWNER/ARCHITECT FOR FINAL LOCATION OF OUTLET.
8. PROVIDE NEMA L6-30R OUTLET, WITH A 30A, 3P CIRCUIT BREAKER FOR LARGE TIRE CHANGER. CONTRACTOR SHALL COORDINATE BEST LOCATION FOR OUTLET.
9. PROVIDE NEMA L6-20R OUTLET WITH A 20A, 2P CIRCUIT BREAKER FOR WHEEL BALANCER.
10. PROVIDE HUBBELL 4 GANG FLOOR BOX PRODUCT NUMBER: CF4G30CR WITH TWO OUTLETS AND TWO DATA PORTS. COORDINATE WITH ARCHITECTURE FURNITURE FOR EXACT LOCATION. IN ADDITION TO THE POWER CIRCUIT AND CONDUIT INDICATED, PROVIDE A 1" CONDUIT FROM FLOOR BOX (WITH PULL WIRE) FOR DATA CABLING FROM FLOOR BOX DATA COMPARTMENT TO THE IT ROOM. REFER TO COMMUNICATION PLANS FOR ADDITIONAL INFORMATION.



1 ELECTRICAL - POWER PLAN FIRST FLOOR AREA F
1/8" = 1'-0"

0 4' 8' 16'
PLAN NORTH

PACKET 7.932 February 8, 2022

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KEY PLAN
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#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL - POWER PLAN FIRST FLOOR AREA F

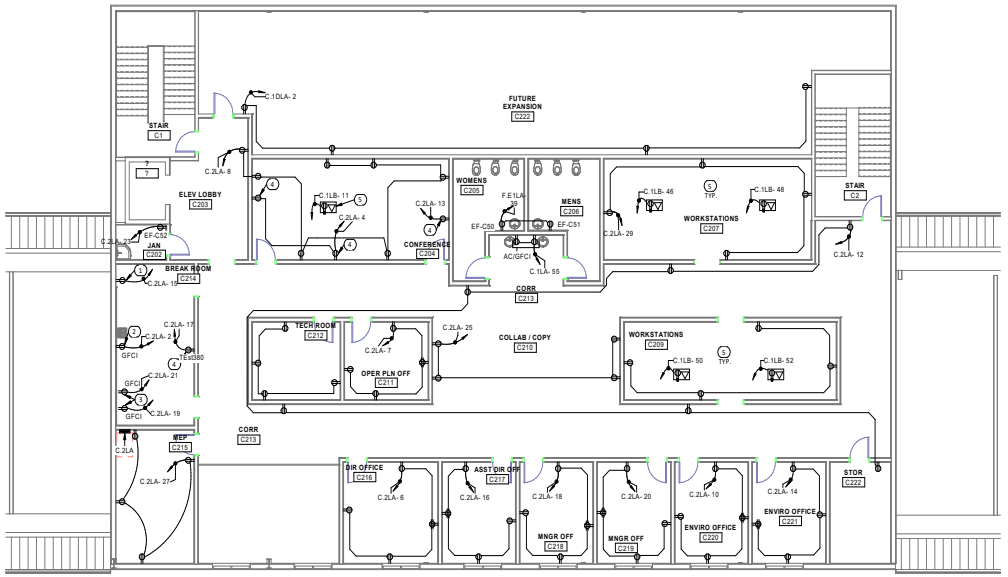
E-204

1/25/2022 5:25:01 PM

KEY NOTES

AS INDICATED BY: (#)

1. PROVIDE AN GFI CIRCUIT BREAKER FOR POWER TO REFRIGERATOR.
2. PROVIDE POWER TO COFFEE MAKER.
3. PROVIDE POWER TO MICROWAVE.
4. PROVIDE POWER TO TV MONITOR. COORDINATE EXACT HEIGHT AND LOCATION WITH ARCHITECTURE SHEETS.
5. PROVIDE HUBBELL 4 GANG FLOOR BOX PRODUCT NUMBER: CF4G30CR WITH TWO OUTLETS AND TWO DATA PORTS. COORDINATE WITH ARCHITECTURE FURNITURE FOR EXACT LOCATION. IN ADDITION TO THE POWER CIRCUIT AND CONDUIT INDICATED, PROVIDE A 1" CONDUIT FROM FLOOR BOX (WITH PULL WIRE) FOR DATA CABLING FROM FLOOR BOX DATA COMPARTMENT TO THE IT ROOM. REFER TO COMMUNICATION PLANS FOR ADDITIONAL INFORMATION.



1 ELECTRICAL - POWER PLAN SECOND FLOOR AREA C
1/8" = 1'-0"

PACKET 7.933 February 8, 2022

0 4' 8' 16'
PLAN NORTH

1/25/2022 5:05:01 PM

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KEY PLAN
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E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL - POWER PLAN SECOND FLOOR AREA C

E-205

GENERAL NOTES

A. PROVIDE DUCT MOUNTED SMOKE DETECTORS/SAMPLING TUBES IN THE SUPPLY AIR DUCT OF ALL OF THE ROOF TOP UNITS OPERATING OVER 2000 CFM. THE CONTRACTOR SHALL FIELD VERIFY THE NUMBER AND LOCATION OF THE UNITS. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

B. CONNECT DUCT DETECTORS TO SHUT DOWN INDIVIDUAL HVAC UNIT UPON DETECTOR ALARM. PROVIDE FIRE ALARM CONNECTION TO SMOKE DETECTORS AND FIRE/SMOKE DAMPERS. REFER TO MECHANICAL FOR SMOKE AND FIRE/SMOKE DAMPER LOCATIONS AND SHUT DOWN FANS REGARDLESS OF UNIT CFM. REFER TO MECHANICAL EQUIPMENT ELECTRICAL SCHEDULE FOR HVAC UNITS REQUIRING DUCT MOUNTED SMOKE DETECTORS.

C. PROVIDE REMOTE POWER SUPPLIES AND 120 VOLT POWER FOR POWER SUPPLIES AS REQUIRED FOR PROPER OPERATION OF THE SYSTEM.

D. PROVIDE 120V CONNECTION TO ALL FIRE/SMOKE DAMPERS. EXTEND AND CONNECT FIRE/SMOKE DAMPER TO FACP FOR CONTROL. CONTRACTOR SHALL PROVIDE ALL REQUIRED POWER SUPPLIES, CONTROL MODULES, RELAYS, WIRING AND CONDUIT.

E. PROVIDE A DUCT MOUNTED SMOKE DETECTOR FOR EACH FIRE/SMOKE DAMPER. DUCT DETECTOR SHALL BE LOCATED IN UPSTREAM DUCTWORK WITHIN 5'-0" OF FIRE /SMOKE DAMPER. WHERE FIRE/SMOKE DAMPER IS LOCATED IN OPEN AIR PLENUM, CONTRACTOR SHALL PROVIDE A SPOT TYPE SMOKE DETECTOR WITHIN 5'-0" OF DAMPER (UPSTREAM SIDE). CONNECT DETECTOR TO SHUT DOWN CORRESPONDING HVAC UNIT AND FIRE/SMOKE DAMPER. PROVIDE REMOTE TEST/RESET SWITCH ADJACENT TO DUCT DETECTOR IN CEILING OR IN MECHANICAL ROOM.

F. REFER TO THE MECHANICAL DRAWINGS FOR THE LOCATION AND NUMBER OF SUPPLY AND RETURN AIR DUCTS. FOR UNITS THAT ARE INDICATED TO HAVE SMOKE DETECTION COVERAGE, PROVIDE THE NUMBER OF DETECTORS AS REQUIRED TO COVER ALL OF THE DUCTS.

G. AT LOCATIONS WHERE SMOKE DETECTORS ARE REQUIRED FOR FIRE FIGHTER'S SERVICE, THE CONTRACTOR SHALL COORDINATE ACTUAL LOCATION AND NUMBER OF DEVICES.

H. PROVIDE CONNECTION OF ALL FLOW AND TAMPER SWITCHES TO FIRE ALARM CONTROL PANEL. COORDINATE EXACT NUMBER OF FLOW AND TAMPER SWITCHES WITH FIRE SUPPRESSION CONTRACTOR.

I. THE FEEDER CONDUIT AND ASSOCIATED BREAKERS SERVING THE "FIRE PUMP" ARE BASED ON AN ASSUMED HORSEPOWER FOR THE MOTOR. AS PART OF THIS PROJECT, THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE FIRE SUPPRESSION CONTRACTOR THROUGH THE SUBMITTAL PROCESS AND ADJUST THE SIZE OF THE INDIVIDUAL COMPONENTS OF THE ELECTRICAL SERVICE.

J. PROVIDE 120V CONNECTION TO ELECTRIC DOOR LOCK MECHANISM AND CONTROLLER CONDUITS/ CONNECTIONS. CONNECT TO RELEASE WITH ACCESS CONTROL.

K. PROVIDE 120V CONNECTION TO ALL PTZ CAMERAS. EXTEND AND CONNECT TO NEAREST AVALABLE CIRCUIT.

L. COORDINATE LOCATIONS OF ALL DEVICES PRIOR TO ROUGH-IN TO AVOID CONFLICTS WITH MILL WORK, MARKERBOARD, ETC.

M. PROVIDE TELEPHONE OUTLET IN ELEVATOR SERVICE ROOM. EXTEND TWO 4 PAIR #22 AWG TELEPHONE CABLES IN 3/4" CONDUIT FROM THE ELEVATOR COMMUNICATION EQUIPMENT TO THE BUILDING'S TELEPHONE TERMINAL BOARD.

N. PROVIDE OUTLET BOX FOR DATA. EXTEND 1" WITH PULL-WIRE TO ACCESSIBLE LOCATION ABOVE CEILING FOR FUTURE DATA CABLING. PROVIDE INSULATED BUSHING ON CONDUIT END.

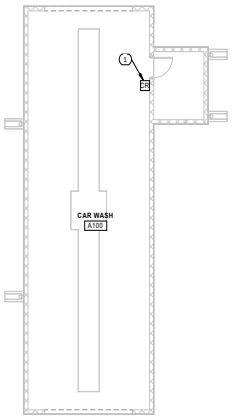
KEY NOTES

AS INDICATED BY: (#)

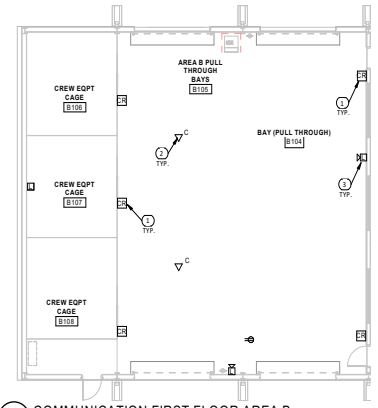
1 ACCESS CONTROL CARD READER INTEGRATED WITH DOOR HARDWARE AND PROVIDED WITH DOOR HARDWARE. ELECTRICAL CONTRACTOR SHALL PROVIDE 3/4" CONDUIT TO DOOR FRAME TO A LOCATION ABOVE CEILING FOR DATA CABLING TO ACCESS CONTROL HARDWARE. LOW VOLTAGE CABLE TO DOOR HARDWARE TO POWER SUPPLY. COORDINATE ALL REQUIREMENTS WITH S2 SYSTEM AND OWNER'S INTEGRATOR (TYPICAL FOR ALL ACCESS CONTROL CARD READER LOCATIONS INDICATED).

2 TYPICAL CEILING MOUNTED DATA DROP FOR WIRELESS ACCESS POINT. PROVIDE A SINGLE GANG BACK BOX, WITH ONE CAT 6 CABLE AND A 3/4" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. ROUTE CAT 6 CABLE IN CABLE TRAY TO NEAREST LAN ROOM. PROVIDE INSULATED BUSHING ON CONDUIT END.

3 TYPICAL FIRE ALARM DEVICE.



1 COMMUNICATION FIRST FLOOR AREA A
1/8" = 1'-0"



2 COMMUNICATION FIRST FLOOR AREA B
1/8" = 1'-0"

0 4' 8' 16'

PLAN NORTH

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PROJECT NO.
6077.21

KEY PLAN
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E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

COMMUNICATIONS PLAN FIRST FLOOR AREA A & B

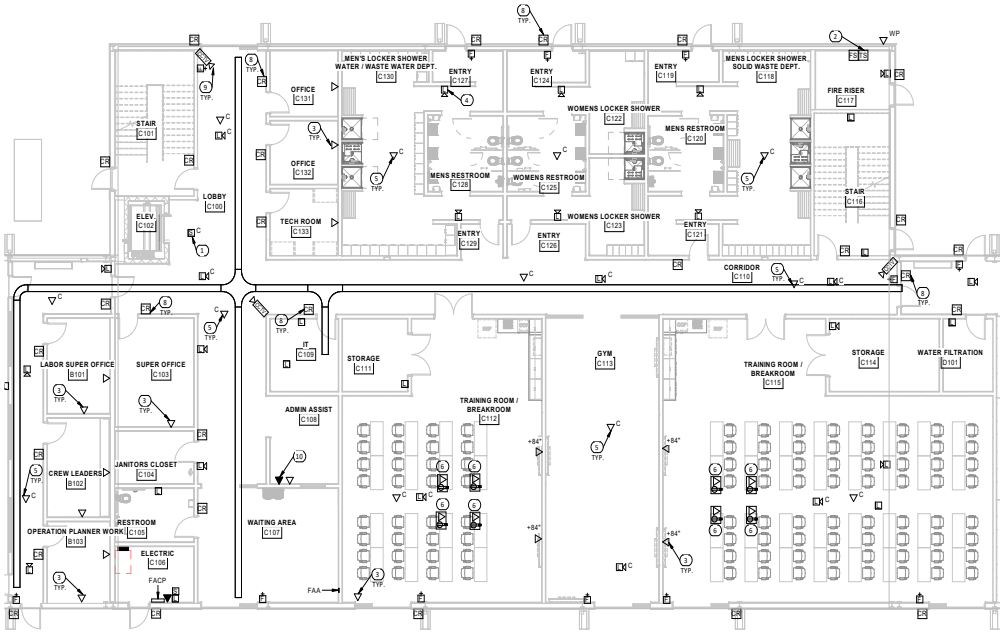
E-301

1/25/2022 5:05:01 PM

KEY NOTES

AS INDICATED BY: (#)

1. SMOKE DETECTOR LOCATED AT ELEVATOR LANDING. CONNECT TO ELEVATOR RECALL SYSTEM.
2. TAMPER AND FLOW SWITCHES. COORDINATE WITH FIRE SUPPRESSION.
3. TYPICAL DATA DROP. PROVIDE A SINGLE GANG BACK BOX, WITH TWO CAT 6 CABLES AND A 3/4" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. ROUTE CAT 6 CABLE IN CABLE TRAY TO NEAREST LAN ROOM. PROVIDE INSULATED BUSHING ON CONDUIT END.
4. TYPICAL FIRE ALARM DEVICE.
5. TYPICAL CEILING MOUNTED DATA DROP FOR WIRELESS ACCESS POINT. PROVIDE A SINGLE GANG BACK BOX, WITH ONE CAT 6 CABLE AND A 3/4" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. ROUTE CAT 6 CABLE IN CABLE TRAY TO NEAREST LAN ROOM. PROVIDE INSULATED BUSHING ON CONDUIT END.
6. COORDINATE FINAL LOCATION OF COMBINATION POWER/COMMUNICATION FLOOR BOX WITH OWNER AND ARCHITECT PRIOR TO ROUGH IN. PROVIDE (2) 1" CONDUITS TO NEAREST WALL.
8. ACCESS CONTROL CARD READER INTEGRATED WITH DOOR HARDWARE AND PROVIDED WITH DOOR HARDWARE. ELECTRICAL CONTRACTOR SHALL PROVIDE 3/4" CONDUIT TO DOOR FRAME TO A LOCATION ABOVE CEILING FOR DATA CABLING TO ACCESS CONTROL HARDWARE. LOW VOLTAGE CABLE TO DOOR HARDWARE TO POWER SUPPLY. COORDINATE ALL REQUIREMENTS WITH S2 SYSTEM AND OWNER'S INTEGRATOR (TYPICAL FOR ALL ACCESS CONTROL CARD READER LOCATIONS INDICATED).
9. TYPICAL SECURITY CAMERA LOCATION. PROVIDE SINGLE GANG BACK BOX FOR MOUNTING OF CAMERA AND 1" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. PROVIDE INSULATED BUSHING ON CONDUIT END. CAMERA TO BE PROVIDED BY OWNER'S INTEGRATOR (TYPICAL FOR ALL CAMERA LOCATIONS INDICATED).
10. LOCATION OF TWO WAY COMMUNICATIONS CONSOLE/HANDSET FOR AREA OF REFUGE SYSTEM. PROVIDE SINGLE GANG TELEPHONE DROP. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION. COORDINATION EXACT LOCATION OF HANDSET WITH OWNER.



1 COMMUNICATION FIRST FLOOR AREA C
1/8" = 1'-0"

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PROJECT NO.
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KEY PLAN
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E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

COMMUNICATIONS PLAN FIRST FLOOR AREA C

E-302

1/25/2022 5:05:05 PM

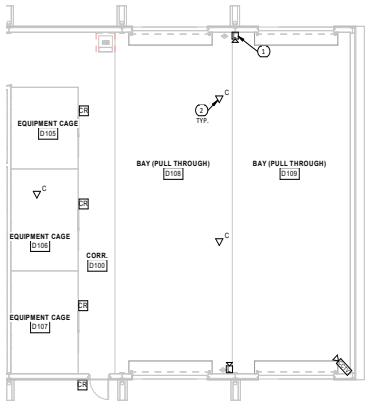
KEY NOTES

AS INDICATED BY: (#)

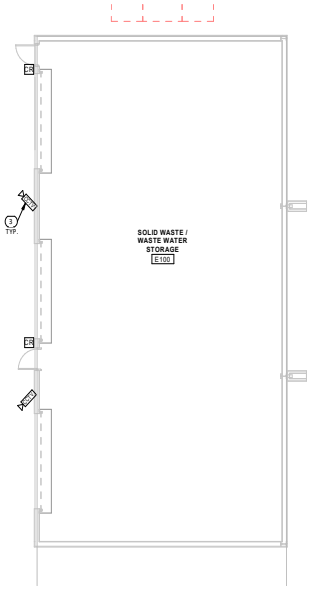
1 TYPICAL FIRE ALARM DEVICE.

2 TYPICAL CEILING MOUNTED DATA DROP FOR WIRELESS ACCESS POINT. PROVIDE A SINGLE GANG BACK BOX, WITH ONE CAT 6 CABLE AND A 3/4" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. ROUTE CAT 6 CABLE IN CABLE TRAY TO NEAREST LAN ROOM. PROVIDE INSULATED BUSHING ON CONDUIT END.

3 TYPICAL SECURITY CAMERA LOCATION. PROVIDE SINGLE GANG BACK BOX FOR MOUNTING OF CAMERA AND 1" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. PROVIDE INSULATED BUSHING ON CONDUIT END. CAMERA TO BE PROVIDED BY OWNER'S INTEGRATOR (TYPICAL FOR ALL CAMERA LOCATIONS INDICATED).



1 COMMUNICATION FIRST FLOOR AREA D
1/8" = 1'-0"



2 COMMUNICATION FIRST FLOOR AREA E
1/8" = 1'-0"

0 4' 8' 16'

PLAN NORTH

PACKET 7.936 February 8, 2022

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KEY PLAN
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#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

COMMUNICATIONS PLAN FIRST FLOOR AREA D & E

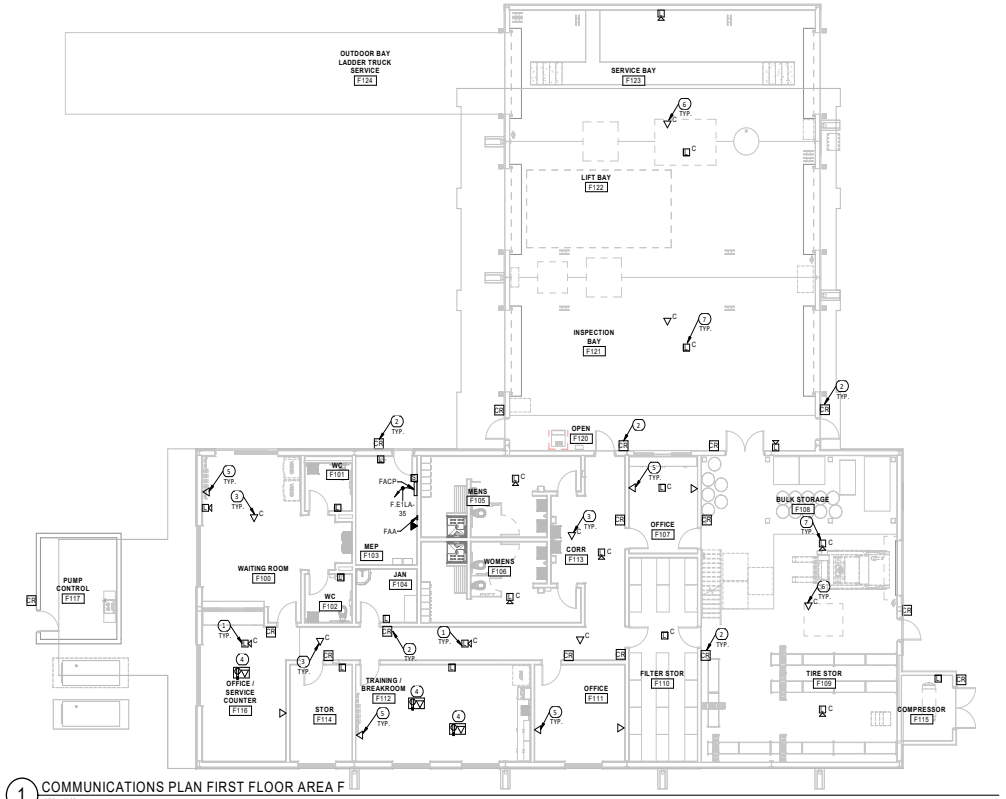
E-303

1/25/2022 5:05:09 PM

KEY NOTES

AS INDICATED BY: (#)

1. TYPICAL FIRE ALARM DEVICE. PROVIDE A SINGLE GANG BACK BOX, WITH ONE CAT 6 CABLE AND A 3/4" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. ROUTE CAT 6 CABLE IN 3/4" CONDUIT TO NEAREST LAN ROOM. PROVIDE INSULATED BUSHING ON CONDUIT END.
2. ACCESS CONTROL CARD READER INTEGRATED WITH DOOR HARDWARE AND PROVIDED WITH DOOR HARDWARE. ELECTRICAL CONTRACTOR SHALL PROVIDE 3/4" CONDUIT TO DOOR FRAME TO A LOCATION ABOVE CEILING FOR DATA CABLING TO ACCESS CONTROL HARDWARE. LOW VOLTAGE CABLE TO DOOR HARDWARE TO POWER SUPPLY. COORDINATE ALL REQUIREMENTS WITH S2 SYSTEM AND OWNER'S INTEGRATOR (TYPICAL FOR ALL ACCESS CONTROL CARD READER LOCATIONS INDICATED).
3. TYPICAL CEILING MOUNTED DATA DROP FOR WIRELESS ACCESS POINT. PROVIDE A SINGLE GANG BACK BOX, WITH ONE CAT 6 CABLE AND A 3/4" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. ROUTE CAT 6 CABLE IN CABLE TRAY TO NEAREST LAN ROOM. PROVIDE INSULATED BUSHING ON CONDUIT END.
4. COORDINATE FINAL LOCATION OF COMBINATION POWER/COMMUNICATION FLOOR BOX WITH OWNER AND ARCHITECT PRIOR TO ROUGH IN. PROVIDE (2) 1" CONDUITS TO NEAREST WALL.
5. TYPICAL DATA DROP. PROVIDE A SINGLE GANG BACK BOX, WITH TWO CAT 6 CABLES AND A 3/4" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. ROUTE CAT 6 CABLE IN CABLE TRAY TO NEAREST LAN ROOM. PROVIDE INSULATED BUSHING ON CONDUIT END.
6. TYPICAL CEILING MOUNTED DATA DROP FOR WIRELESS ACCESS POINT. PROVIDE A SINGLE GANG BACK BOX, WITH ONE CAT 6 CABLE AND A 3/4" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. ROUTE CAT 6 CABLE IN 3/4" CONDUIT TO NEAREST LAN ROOM. PROVIDE INSULATED BUSHING ON CONDUIT END.
7. TYPICAL FIRE ALARM DEVICE. PROVIDE A SINGLE GANG BACK BOX, WITH ONE CAT 6 CABLE AND A 3/4" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. ROUTE CAT 6 CABLE IN 3/4" CONDUIT TO NEAREST LAN ROOM. PROVIDE INSULATED BUSHING ON CONDUIT END.



1 COMMUNICATIONS PLAN FIRST FLOOR AREA F
1/8" = 1'-0"

PACKET 7.937 February 8, 2022

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PROJECT NO.
6077.21

KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

COMMUNICATIONS PLAN FIRST FLOOR AREA F

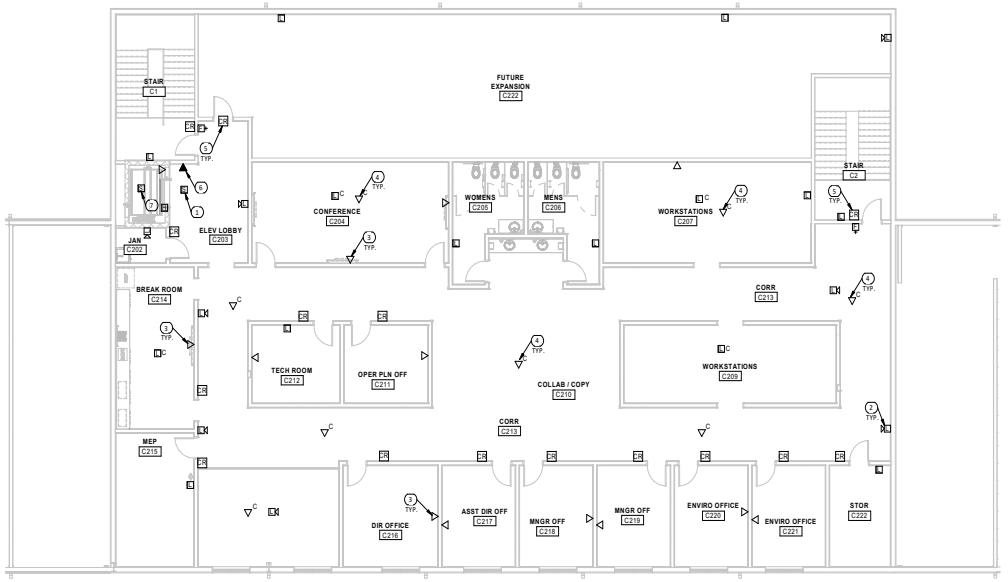
E-304

1/25/2022 5:05:13 PM

KEY NOTES

AS INDICATED BY: (#)

1. SMOKE DETECTOR LOCATED AT ELEVATOR LANDING. CONNECT TO ELEVATOR RECALL SYSTEM.
2. TYPICAL FIRE ALARM DEVICE.
3. TYPICAL DATA DROP. PROVIDE A SINGLE GANG BACK BOX, WITH TWO CAT 6 CABLES AND A 3/4" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. ROUTE CAT 6 CABLE IN CABLE TRAY TO NEAREST LAN ROOM. PROVIDE INSULATED BUSHING ON CONDUIT END.
4. TYPICAL CEILING MOUNTED DATA DROP FOR WIRELESS ACCESS POINT. PROVIDE A SINGLE GANG BACK BOX, WITH ONE CAT 6 CABLE AND A 3/4" CONDUIT TO AN ACCESSIBLE LOCATION ABOVE CEILING. ROUTE CAT 6 CABLE IN CABLE TRAY TO NEAREST LAN ROOM. PROVIDE INSULATED BUSHING ON CONDUIT END.
5. ACCESS CONTROL CARD READER INTEGRATED WITH DOOR HARDWARE AND PROVIDED WITH DOOR HARDWARE. ELECTRICAL CONTRACTOR SHALL PROVIDE 3/4" CONDUIT TO DOOR FRAME TO A LOCATION ABOVE CEILING FOR DATA CABLING TO ACCESS CONTROL HARDWARE. LOW VOLTAGE CABLE TO DOOR HARDWARE TO POWER SUPPLY. COORDINATE ALL REQUIREMENTS WITH S2 SYSTEM AND OWNER'S INTEGRATOR (TYPICAL FOR ALL ACCESS CONTROL CARD READER LOCATIONS INDICATED).
6. PROVIDE SINGLE GANG TELEPHONE DRIP FOR AREA OF REFUGE TWO WAY COMMUNICATION SYSTEM. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
7. SMOKE AND HEAT DETECTOR MOUNTED AT THE TOP OF THE ELEVATOR SHAFT.



1 ELECTRICAL - COMMUNICATIONS PLAN SECOND FLOOR AREA C
1/8" = 1'-0"

PACKET 7.938 February 8, 2022

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KEY PLAN
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E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

COMMUNICATIONS PLAN SECOND FLOOR AREA C

E-305

1/25/2022 5:28:14 PM

GENERAL NOTES

A. PROVIDE THE CONNECTIONS OF ALL FIRE/SMOKE DAMPERS. PROVIDE 120 VOLT POWER AND FOR CONNECTIONS TO THE FIRE ALARM PANELS AS REQUIRED FOR PROPER OPERATION. REFER TO THE MECHANICAL PLANS FOR LOCATIONS AND NUMBER OF DAMPERS. CIRCUIT THE DAMPERS FOR A MAXIMUM OF THEN DAMPERS PER CIRCUIT AND EXTEND TO SPARE CIRCUIT BREAKERS AS REQUIRED. PROVIDE FOR ALL NECESSARY CONTROL MODULES AND RELAYS FOR OPERATION.

B. AT LOCATIONS WHERE A COMMON EXHAUST FAN IS CONTROLLED THROUGH INDEPENDENT WALL SWITCHES, CONNECT THE SWITCHES IN PARALLEL TO ALLOW EITHER SWITCH TO OPERATE THE FAN.

C. REFER TO THE COMMUNICATIONS/FIRE SHEETS FOR ADDITIONAL REQUIREMENTS TO INCLUDE INFRARED FLUSH VALVES, HOOD POWER SUPPRESSIONS SYSTEM, INTERCOM SYSTEM, ETC.

D. REFER TO THE MECHANICAL EQUIPMENT ELECTRICAL SCHEDULE FOR BRANCH CIRCUIT REQUIREMENTS FOR ALL MECHANICAL EQUIPMENT.

E. TOILET ROOM EXHAUST FANS SHALL BE CONTROLLED BY SWITCH. ELECTRICAL ROOM EXHAUST FANS SHALL BE CONTROLLED BY A TEMPERATURE SENSORS.

F. COORDINATE WITH SECURITY CONTRACTOR FOR ALL POWER REQUIREMENTS. REFER TO COMMUNICATIONS SHEET FOR JUNCTION BOXES FOR MOTION DETECTORS, KEYPADS, DOOR CONTRACTORS, ETC.

G. CONTRACTOR IS RESPONSIBLE FOR PROVIDING CONNECTION OF ALL HVAC AND PLUMBING EQUIPMENT (BUT NOT LIMITED TO RTU'S, AHU'S, FANS, DAMPERS, LOUVERS, PUMPS AND CONTROLS).

H. FLOOR BOX LOCATIONS AND TYPES ON CONNECTIONS SHALL BE FIELD DETERMINED AND COORDINATED WITH THE EQUIPMENT ON SITE.

I. PROVIDE DEDICATED NEUTRAL WIRE FOR ALL 120V BRANCH CIRCUITS. NO MULTI-WIRE BRANCH CIRCUIT SHALL BE ALLOWED.

J. PROVIDE 120V POWER FOR ALL DDC CONTROLLERS AS REQUIRED. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.

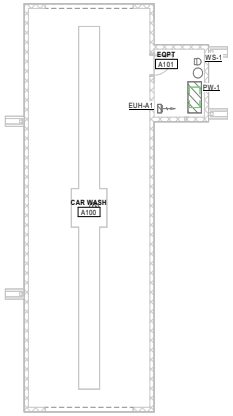
KEY NOTES

AS INDICATED BY: (#)

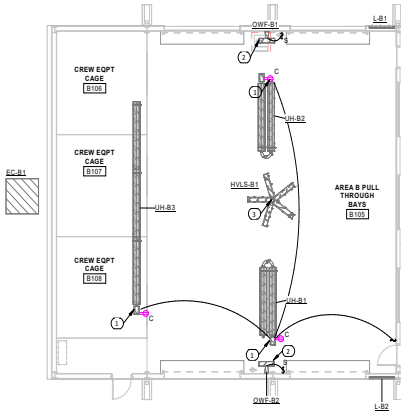
1 CONTRACTOR SHALL COORDINATE LOCATION AND TYPE OF RECEPTACLE/DISCONNECT AND ASSOCIATED CONNECTIONS WITH HEATER INSTALLATION CONTRACTOR. MOUNT RECEPTACLE READILY ACCEPTABLE NEAR DEVICE.

2 CONTRACTOR SHALL COORDINATE LOCATION AND TYPE OF RECEPTACLE/DISCONNECT AND ASSOCIATED CONNECTIONS WITH OSCILLATING FAN INSTALLATION CONTRACTOR.

3 SEE SHEET. E-201 FOR POWER REQUIREMENTS TO FAN.



1 ELECTRICAL - MECHANICAL POWER PLAN FIRST FLOOR AREA A
1/8" = 1'-0"



2 ELECTRICAL - MECHANICAL POWER PLAN FIRST FLOOR AREA B
1/8" = 1'-0"

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KEY PLAN
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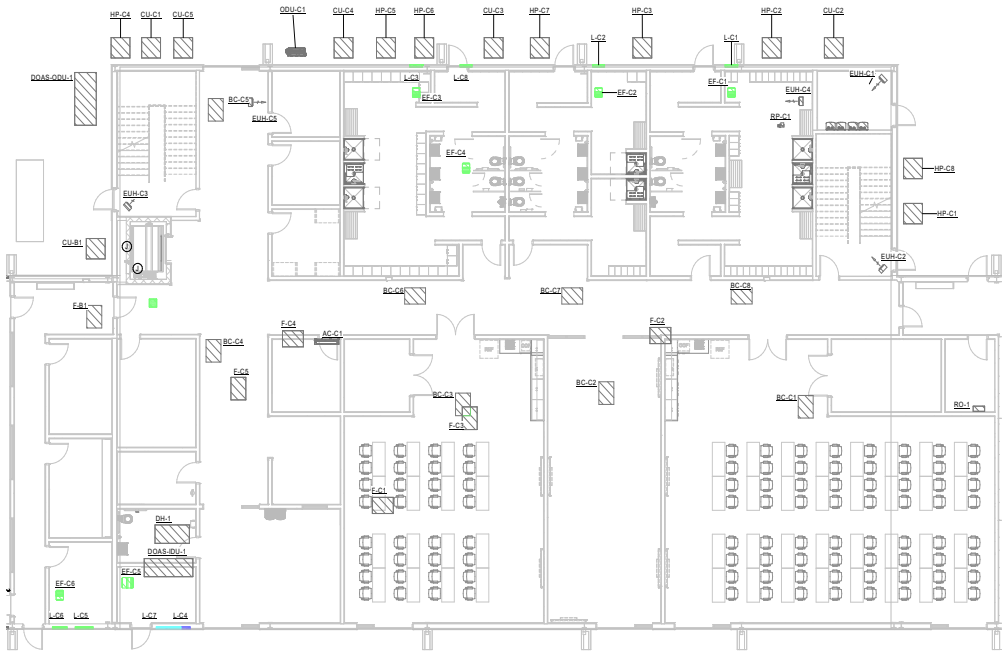
#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

MECHANICAL POWER PLAN FIRST FLOOR - AREA A & B

E-401

1/26/2022 5:26:16 PM



1 ELECTRICAL - MECHANICAL POWER PLAN FIRST FLOOR AREA C
1/8" = 1'-0"

PACKET

7.940

0 4" 8" 16"
PLAN NORTH

February 8, 2022

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KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

MECHANICAL POWER PLAN FIRST & SECOND FLOOR AREA C

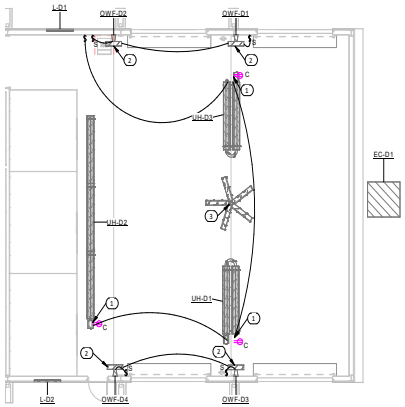
E-402

1/25/2022 5:05:01 PM

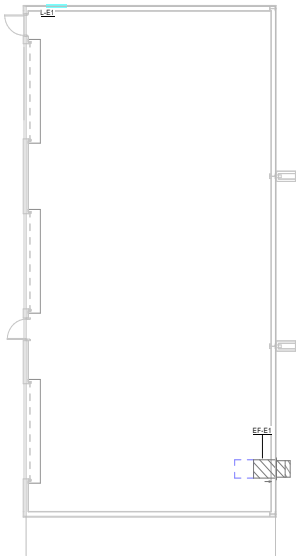
KEY NOTES

AS INDICATED BY (#)

1. CONTRACTOR SHALL COORDINATE LOCATION AND TYPE OF RECEPTACLE/DISCONNECT AND ASSOCIATED CONNECTIONS WITH HEATER INSTALLATION CONTRACTOR.
2. CONTRACTOR SHALL COORDINATE LOCATION AND TYPE OF RECEPTACLE/DISCONNECT AND ASSOCIATED CONNECTIONS WITH OSCILLATING FAN INSTALLATION CONTRACTOR.
3. SEE SHEET. E-203 FOR POWER REQUIREMENTS TO FAN.



1 ELECTRICAL - MECHANICAL POWER PLAN FIRST FLOOR AREA D
1/8" = 1'-0"



2 ELECTRICAL - MECHANICAL POWER PLAN FIRST FLOOR AREA E
1/8" = 1'-0"

PACKET 7.941 February 8, 2022

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KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

MECHANICAL POWR PLAN FIRST FLOOR AREA D & E

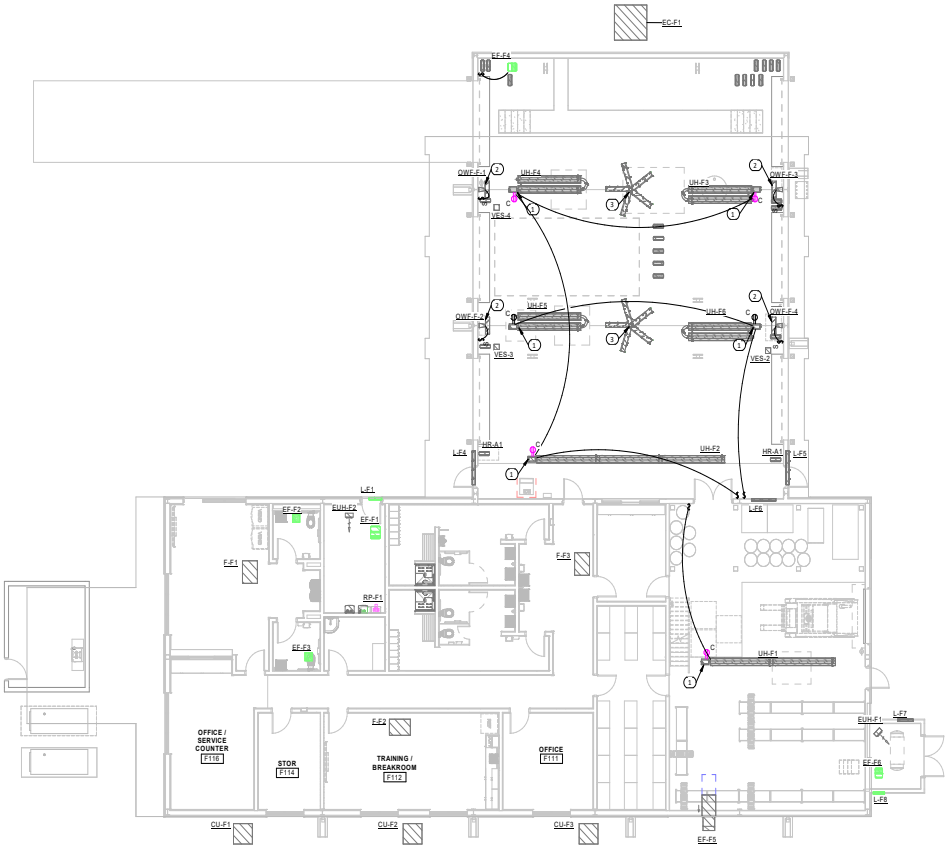
E-403

1/26/2022 5:05:23 PM

KEY NOTES

AS INDICATED BY (#)

1. CONTRACTOR SHALL COORDINATE LOCATION AND TYPE OF RECEPTACLE/DISCONNECT AND ASSOCIATED CONNECTIONS WITH HEATER INSTALLATION CONTRACTOR. MOUNT RECEPTACLE READILY ACCEPTABLE NEAR DEVICE.
2. CONTRACTOR SHALL COORDINATE LOCATION AND TYPE OF RECEPTACLE/DISCONNECT AND ASSOCIATED CONNECTIONS WITH OSCILLATING FAN INSTALLATION CONTRACTOR.
3. SEE SHEET. E-204 FOR POWER REQUIREMENTS TO FAN.



1 ELECTRICAL - MECHANICAL POWER PLAN FIRST FLOOR AREA F
1/8" = 1'-0"

0 4' 8' 16'

PLAN NORTH

PACKET 7.942 February 8, 2022

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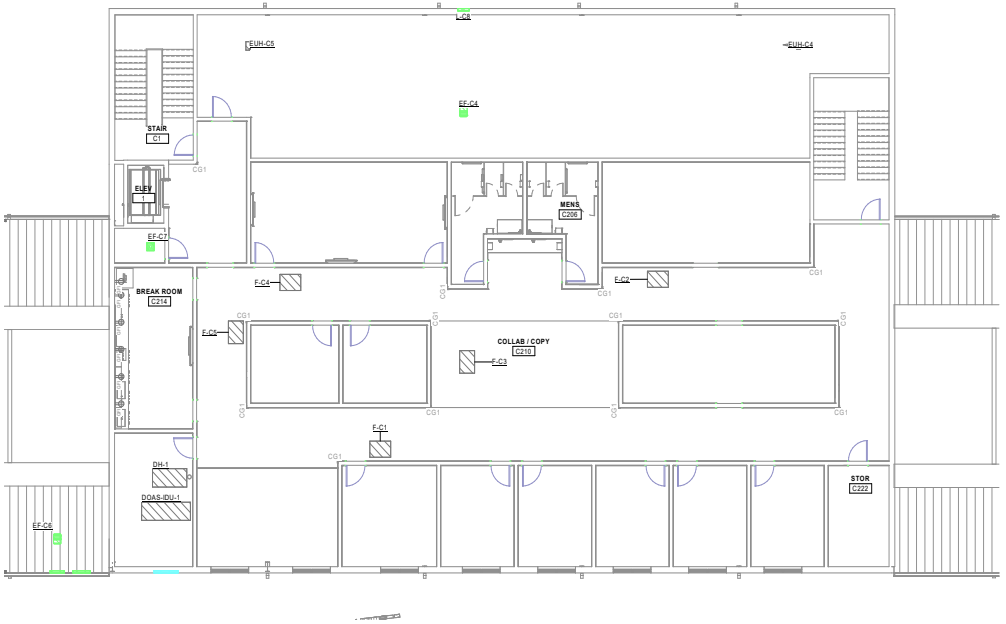
KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

MECHANICAL POWER PLAN FIRST FLOOR AREA F

E-404

1/26/2022 5:29:29 PM



1 ELECTRICAL - MECHANICAL POWER PLAN SECOND FLOOR AREA C
1/8" = 1'-0"

1/25/2022 5:05:05 PM

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KEY PLAN
A B C D
E F

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

MECHANICAL POWER PLAN SECOND FLOOR AREA C

E-405

KEY NOTES

AS INDICATED BY: (#)

1 NEW UTILITY PAD MOUNT TRANSFORMER AND KWH METER. COORDINATE WITH ONCOR FOR ALL REQUIREMENTS.
2 NEW GENERATOR.
3 PROVIDE GROUNDING ELECTRODE BY DETAIL ON SHEET E-502.
4 PROVIDE GROUNDING ELECTRODE WITH NO NEUTRAL GROUND BOND.

PANEL LABEL

A..B..C..D..E..F.. ## D,H,L A,B,...

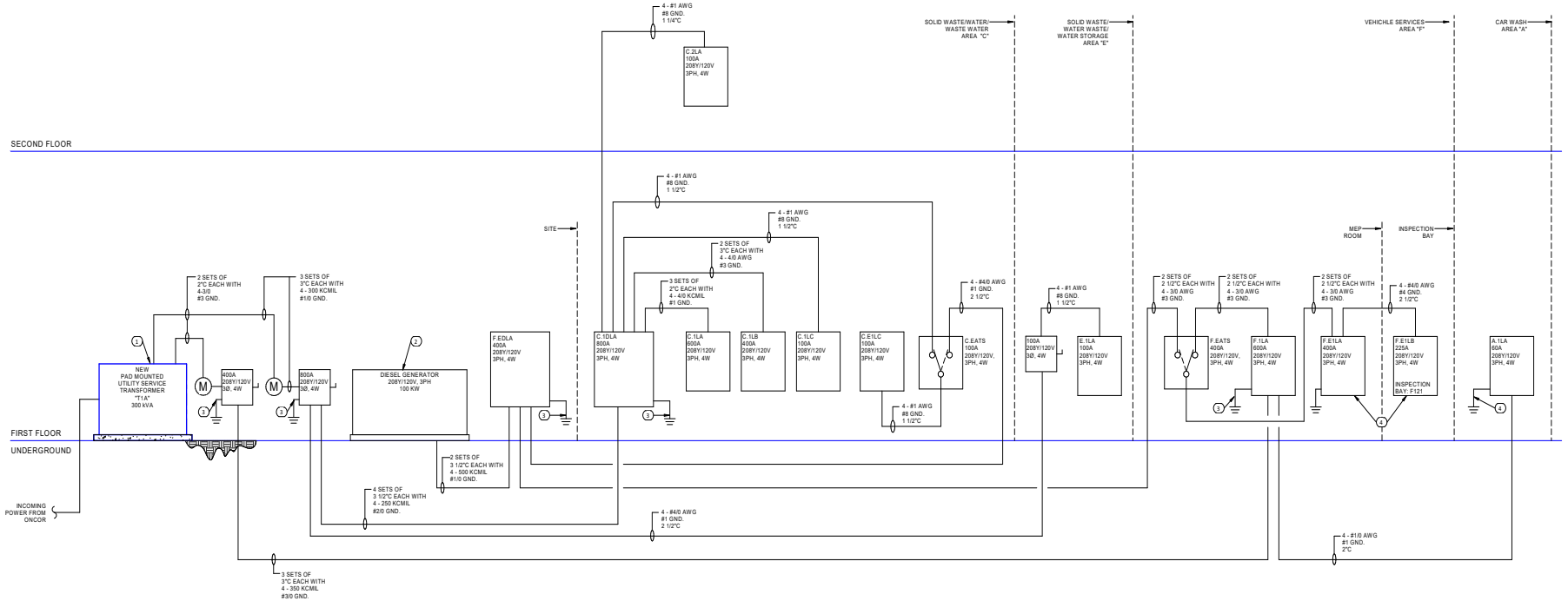
EXAMPLE:
F.1EDHA

A. - BUILDING AREA

- FLOOR NUMBER

E - EMERGENCY
SB - STAND BY
D - DISTRIBUTION PANEL
H - HIGH VOLTAGE PANEL 480Y/277V
L - LOW VOLTAGE PANEL 208Y/120V

A,B... DESCRIPTION



1 ELECTRICAL RISER DIAGRAM
NTS

1/25/2022 5:05:05 PM

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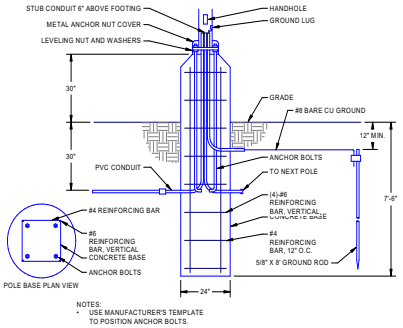
ELECTRICAL RISER DIAGRAM

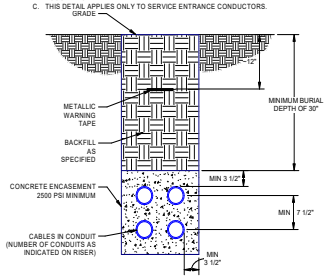
E-501



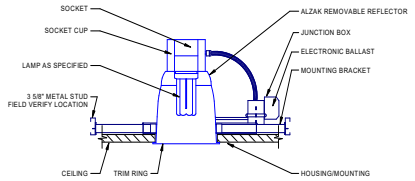
1 POLE BASE DETAIL
NTS

GENERAL NOTES

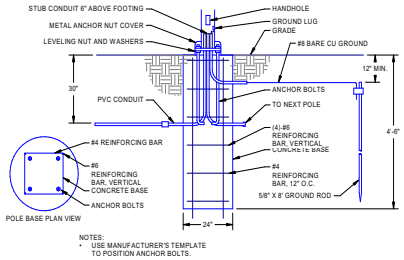
A. DETAIL INDICATES CONDITIONS IN A NON-PAVED AREA. IN PAVED AREAS, PROVIDE BASE AND PAVEMENT SECTION TO MATCH EXISTING CONDITIONS.
B. THE NUMBER OF CONDUCTS, INCLUDING ANY SPARES, SHALL BE COORDINATED WITH THE RISER DIAGRAM AND ADJUSTED ACCORDINGLY
C. THIS DETAIL APPLIES ONLY TO SERVICE ENTRANCE CONDUCTORS.



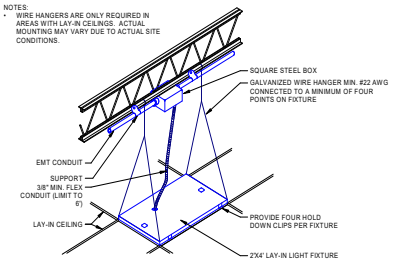
2 CONCRETE ENCASEMENT DETAIL
NTS



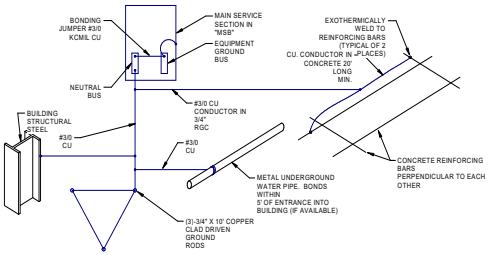
3 RECESSED DOWNLIGHT INSTALLATION DETAIL
NTS



4 PEDESTRIAN POLE BASE DETAIL
NTS



5 RECESSED LIGHT FIXTURE INSTALLATION DETAIL
NTS



6 GROUNDING DETAIL
NTS

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KEY PLAN

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL DETAILS

E-502

1/25/2022 5:25:27 PM

LIGHTING FIXTURE SCHEDULE

TYPE	MOUNTING	ELECTRICAL DATA	MANUFACTURER	MODEL	WATTS	DESCRIPTION
A1	T-GRID	120 V/1-43 VA	LITHONIA	2BLT4-RB-A-30L-SDSM-277-EZ1-LP840	32W	2X4 LED FIXTURE WITH 3000 LUMEN OUTPUT.
A1E	T-GRID	120 V/1-43 VA	LITHONIA	2BLT4-RB-A-30L-SDSM-277-EZ1-LP840	32W	SAME AS "A1" BUT WITH BATTERY PACK.
A2	T-GRID	120 V/1-43 VA	LITHONIA	2BLT4-RB-A-40L-SDSM-277-EZ1-LP840	32W	2X4 LED FIXTURE WITH 4000 LUMEN OUTPUT.
A2E	T-GRID	120 V/1-43 VA	LITHONIA	2BLT4-RB-A-40L-SDSM-277-EZ1-LP840-EL14LSD	32W	SAME AS "A2" BUT WITH BATTERY PACK.
A3	DRYWALL	120 V/1-43 VA	LITHONIA	2BLT4-RB-A-40L-SDSM-277-EZ1-LP840-DGA24	32W	2X4 LED FIXTURE WITH 4000 LUMEN OUTPUT AND DRYWALL ADAPTERS.
A3E	DRYWALL	120 V/1-43 VA	LITHONIA	2BLT4-RB-A-40L-SDSM-277-EZ1-LP840-DGA24-EL14L	32W	SAME AS "A3" BUT WITH BATTERY PACK.
B1	T-GRID	120 V/1-33 VA	LITHONIA	2BLT2-33L-SDSM-EZ1-LP835	27W	2X2 FIXTURE WITH 3300 LUMEN OUTPUT.
B1E	T-GRID	120 V/1-33 VA	LITHONIA	2BLT2-33L-SDSM-EZ1-LP835-EL14LSD	27W	2X2 FIXTURE WITH 3300 LUMEN OUTPUT.
C1	RECESSED	120 V/1-14 VA	LITHONIA	EV04SH-35K-15-DFFAMF-SMO-277	14W	4" REGRESSED DOWNLIGHT WITH 1500 LUMEN OUTPUT, NSF2 SPLASH PROOF.
C1E	DRY WALL	120 V/1-14 VA	LITHONIA	EV04SH-35K-15-DFFAMF-SMO-277-ELR	14W	4" REGRESSED DOWNLIGHT WITH 1500 LUMEN OUTPUT, NSF2 SPLASH PROOF.
C2	<varies>	120 V/1-14 VA	LITHONIA	EV04-35K-15-DFFAMF-SMO-277	14W	4" REGRESSED DOWNLIGHT WITH 1500 LUMEN OUTPUT.
C2E	DRYWALL	120 V/1-14 VA	LITHONIA	EV04-35K-15-DFFAMF-SMO-277-ELR	14W	SAME AS "C2" BUT WITH BATTERY PACK.
D1	CHAIN HANGERS	120 V/1-35 VA	LITHONIA	ZL1D-L48-3000LM-FST-120-35K-80CRI-HC36M12	30W	4' LED STRIP LIGHT, CHAIN HUNG, WITH 3000 LUMEN PACKAGE.
D1E	CHAIN HANGERS	120 V/1-35 VA	LITHONIA	ZL1D-L48-3000LM-FST-120-35K-80CRI-HC36M12-WGZ48-E19WLCP	30W	SAME AS "D1" BUT WITH BATTERY PACK.
D3E	CHAIN HANGERS	120 V/1-35 VA	LITHONIA	ZL1D-L48-7000LM-FST-120-35K-80CRI-HC36-M12-LBHOSZU-E15WLCP	30W	4' LED STRIP LIGHT, CHAIN HUNG, 7000 LUMEN PACKAGE, WITH BATTERY PACK AND MOUNTED OCCUPANCY SENSOR.
F1	SUSPENDED	120 V/1-96 VA	LITHONIA	CPHB-9000LM-HEF-GLC-WD-277-GZ10-35K-80CRI-ZACVH	61W	LED HIGH BAY FIXTURE WITH HANGER CHAIN AND 9000 LUMEN OUTPUT.
F1E	SUSPENDED	120 V/1-96 VA	LITHONIA	CPHB-9000LM-HEF-GLC-WD-277-GZ10-35K-80CRI-ZACVH-E15WMCP	61W	SAME AS "F1" BUT WITH BATTERY PACK.
F2	SUSPENDED	120 V/1-96 VA	LITHONIA	CPHB-12000LM-HEF-GLC-WD-277-GZ10-35K-80CRI-ZACVH	88W	LED HIGH BAY FIXTURE WITH HANGER CHAIN AND 12000 LUMEN OUTPUT.
F2E	SUSPENDED	120 V/1-96 VA	LITHONIA	CPHB-12000LM-HEF-GLC-WD-277-GZ10-35K-80CRI-ZACVH-E15WMCP	88W	SAME AS "F2" BUT WITH BATTERY PACK.
G1E	WALL MOUNTED	120 V/1-50 VA	LITHONIA	DMW2-L24-2000LM-ACL-WD-120V-40K-80CRI-E10WMCP-WLFEND2	50W	48" LOW PROFILE ENCLOSED AND GASKETED INDUSTRIAL FIXTURES. IP67 RATED AND CERTIFIED TO MEET SPLASH ZONE AND EQUIPPED WITH BATTERY PACK.
H1	PENDANT	120 V/1-35 VA	OCL	P1CF-14-SGP-LED2-35K-UNV-100-DM1-ULD	35	14" DIAMETER PENDANT WITH A STEEL GRAY FINISH.
J1	CONCRETE / POUR	120 V/1-0 VA	COLE LIGHTING	L215SGW-HO-2-4K-EM	22W	NON LOUVERED CONCRETE POUR WALL CONSTRUCTION LED DESIGNED FOR INTERIOR CONDITIONS.
K1	RECESSED	120 V/1-0 VA	ARCHITECTURAL LIGHTING	SL4L-4FT-FLP-TG-80CRI-35K- 600LMF-WW-S80CRI-S35K-120	35W	48" FLUSH LENS RECESSED LED WITH A WALL WASH DISTRIBUTION.
SC	WALL PACK	120 V/1-11 VA	LITHONIA	WPX1-LED-P1-30K-MVOLT-E4WH-DBLXD	11W	WALL PACK LED, DELIVERS 1537 LUMEN OUTPUT, WITH EMERGENCY BATTERY PACK.
SP1	POLE	208 V/2-228 VA	LITHONIA	RSX2_LED_P4_40K_R4_MVOLT_SPA_FAO_DBLXD	217W	SITE POLE LED FIXTURE WITH A FORWARD THROW DISTRIBUTION.
SP3	POLE	208 V/2-228 VA	LITHONIA	RSX2_LED_P4_40K_R5_MVOLT_SPA_FAO_DBLXD	217	SITE POLE LED FIXTURE WITH A 360° LIGHT THROW.
X1	SURFACE	120 V/1-7 VA	BEGHELLI	FME-HT-LR-1-M-120SA	7W	SINGLE FACED EXIT SIGN WITH BATTERY PACK
X2	SURFACE	120 V/1-7 VA	BEGHELLI	FME-HT-LR-2-M-120SA	7W	DOUBLE FACED EXIT SIGN WITH BATTERY PACK
X3	SURFACE	120 V/1-10 VA	BEGHELLI	FRMC-C-LR-1-B-B-RC	10W	SINGLE FACED LED EXIT SIGN THAT HAS TWO BOTTOM MOUNTED 3W LED LAMPS THAT DELIVER 170 LUMENS AND WITH BATTERY PACK.

LIGHTING CONTROL SEQUENCE MATRIX

DESIGNATION	TYPICAL SPACES	DIMMING	MULTI ZONE	OCCUPANCY (VACANCY)	OCCUPANCY (AUTO ON)	STAND ALONE	TIME CLOCK	WIRELESS	DESCRIPTION OF LIGHT CONTROL DEVICES WITHIN THE SPACE
	<varies>	<varies>	<varies>	<varies>	<varies>	<varies>	<varies>	<varies>	<varies>
S	•OSCILLATING WALL FANS	No	No	No	No	No	No	No	•WALL SWITCH FOR OSCILLATING FANS.
SD	•OFFICES •CONFERENCE ROOMS •WORK ROOMS •LOUNGE	Yes	Yes	No	Yes	No	No	No	•WALL STATION WITH ON/OFF AND 0-10V DIMMING CAPABILITIES. PROVIDE CONNECTION FOR CONTROL OF LIGHTING THROUGH MULTIPLE SWITCH LOCATIONS. •ALL LUMINAIRES SHALL COME TO 50% ON WHEN SENSOR IS ACTIVATED. •CEILING MOUNTED OCCUPANCY SENSOR SHALL TURN ALL LUMINAIRES OFF AFTER TIMEOUT (20 MIN.) EXPIRES.
SS	•ELECTRICAL ROOMS •MECHANICAL ROOMS	No	No	Yes	No	Yes	No	No	•ON/OFF WALL SWITCH CONTROL (ONLY) TO AVOID POSSIBLE SAFETY CONCERN OF INADVERTENT OFF THAT COULD BE CAUSED BY OCCUPANCY SENSING DEVICES. •(NETWORK CONTROLS NOT REQUIRED. STAND-ALONE CONTROLS ONLY FOR THIS SPACE.)
SW	•RESTROOMS •STAIRWELLS •LOBBIES •BUILDING ENTRANCE •STORAGE •WAITING ROOMS	No	No	No	Yes	Yes	No	No	•ON/OFF SWITCH WITH OCCUPANCY SENSOR. •ALL LUMINAIRES SHALL BE FULL-AUTOMATIC ON WHEN SENSOR IS ACTIVATED. •OCCUPANCY SENSOR SHALL TURN ALL LUMINAIRES OFF AFTER (20 MIN.) EXPIRES. •(NETWORK CONTROLS NOT REQUIRED. STAND-ALONE CONTROLS ONLY FOR THIS SPACE.)
TC	•RESTROOMS •STORAGE ROOMS •JANITORS CLOSETS	No	No	No	Yes	Yes	No	No	•ON/OFF WALL SWITCH WITH CEILING MOUNTED OCCUPANCY SENSOR. (OCCUPANCY) SENSOR SHALL TURN ALL LUMINAIRES OFF AFTER (20 MIN.) EXPIRES. •(NETWORK CONTROLS NOT REQUIRED. STAND-ALONE CONTROLS ONLY FOR THIS SPACE.)\

NOTES:

A. REFER TO PLANS FOR LIGHTING DEVICE LOCATIONS AND OTHER INFORMATION.
B. SYMBOLS PROVIDED IN EACH SPACE (INDICATED IN THE LIGHTING CONTROLS SEQUENCE MATRIX SCHEDULE) ARE INTENDED TO DENOTE THE TYPES OF CONTROLS REQUIRED FOR EACH ASSOCIATED SPACES. THE SWITCH SYMBOLS DENOTE REQUIRED LOCATIONS FOR THE CONTROL DEVICES IN EACH ASSOCIATED SPACE.
C. IN ADDITION TO CONTROL TYPES INDICATED. PROVIDE DAYLIGHT CONTROLS IN ALL AREAS SHOWN WITH DAYLIGHTING ZONES (INDICATED BY HATCHED AREAS ON PLANS). DIMMABLE DRIVERS IN EACH DAYLIGHT ZONE TO BE DIMMED SEPARATELY BY ZONE (CURRENT LIGHT LEVEL TO OFF, CONTINUOUS DIMMING, NO STEP DIMMING). DIMMING FUNCTION IN EACH DAYLIGHT ZONE IS TO MAINTAIN EVEN ILLUMINATION ACROSS THE ZONE, BASED ON THE SETTINGS OF THE SWITCH.
D. PROVIDE NUMBER OF RELAY PACKS, DIMMING RELAY PACKS, OCCUPANCY SENSORS AND PHOTOCELLS FOR COMPLETE AND PROPER OPERATION OF THE LIGHTING SYSTEM.
E. IN COMMON USE SPACES SUCH AS CORRIDORS,LOBBIES, AND BREAKROOMS. PROVIDE CONNECTION TO FIRE ALARM TO BRING LIGHTING IN THESE AREAS/SPACES TO FULL "ON" IN THE EVENT OF AN ALARM.
F. LIGHTING CONTROLS SHALL COMPLY WITH THE REQUIREMENTS OF THE IECC 2015 AND SHALL BE COMMISIONED IN ACCORDANCE WITH THE REQUIREMENTS OF IECC 408.
G. REFER TO SPECIFICATION SECTION 26 09 43 NETWORKED LIGHTING CONTROLS FOR ADDITIONAL REQUIREMENTS.

MECHANICAL EQUIPMENT ELECTRICAL SCHEDULE

MARK	VOLTAGE	PHASE	NUMBER OF POLES	PANEL	CIRCUIT	BREAKER	CONDUIT	CONDUCTOR	DISCONNECT	FUSE SIZE	NOTE	MCA	FLA	LOAD
AC-C1	208 V	1	2	C.1LB	69,71	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A		1 A	1 A	208 VA
BC-C1	208 V	1	2	C.1LB	81,83	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	8 A	6 A	1248 VA
BC-C2	208 V	1	2	C.1LB	77,79	20 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	5 A	4 A	832 VA
BC-C3	208 V	1	2	C.1LB	77,79	20 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	5 A	4 A	832 VA
BC-C4	208 V	1	2	C.1LB	2,4	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	2 A	2 A	416 VA
BC-C5	208 V	1	2	C.1LB	2,4	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	2 A	2 A	416 VA
BC-C6	208 V	1	2	C.1LB	2,4	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	2 A	2 A	416 VA
BC-C7	208 V	1	2	C.1LB	2,4	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	2 A	2 A	416 VA
BC-C8	208 V	1	2	C.1LB	2,4	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	2 A	2 A	416 VA
CU-B1	208 V	1	2	C.1LB	68,70	20 A	3/4"	(2) #12 AWG + #12 GND	30 A	20 A		14 A	11 A	2288 VA
CU-C1	208 V	1	2	C.1LB	6,8	40 A	3/4"	(2) #8 AWG + #10 GND	60 A	40 A		24 A	19 A	3952 VA
CU-C2	208 V	1	2	C.1LB	10,12	20 A	3/4"	(2) #12 AWG + #12 GND	30 A	20 A		14 A	11 A	2288 VA
CU-C3	208 V	1	2	C.1LB	14,16	20 A	3/4"	(2) #12 AWG + #12 GND	30 A	20 A		14 A	11 A	2288 VA
CU-C4	208 V	1	2	C.1LB	18,20	20 A	3/4"	(2) #12 AWG + #12 GND	30 A	20 A		14 A	11 A	2288 VA
CU-C5	208 V	1	2	C.1LB	22,24	30 A	3/4"	(2) #10 AWG + #10 GND	30 A	30 A		18 A	14 A	2912 VA
CU-F1	208 V	1	2	F.E1LB	40,42	25 A	3/4"	(2) #10 AWG + #10 GND	30 A	25 A		17 A	14 A	2912 VA
CU-F2	208 V	1	2	F.1LA	30,32	20 A	3/4"	(2) #12 AWG + #12 GND	30 A	20 A		14 A	11 A	2288 VA
CU-F3	208 V	1	2	F.1LA	5,7	30 A	3/4"	(2) #10 AWG + #10 GND	30 A	30 A		18 A	14 A	2912 VA
DH-1	120 V	1	1	C.1LB	29	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A		1 A	1 A	120 VA
DOAS-DU-1	208 V	3	3	C.1LB	23,25,27	15 A	3/4"	(2) #12 AWG + #12 GND	30 A	15 A		10 A	8 A	2880 VA
DOAS-ODU-1	208 V	3	3	C.1LB	32,34,36	100 A	3"	(3)#3 AWG + #8 GND	100 A	100 A		70 A	56 A	20160 VA
EC-B1	208 V	3	3	C.1LB	1,3,5	40 A	3/4"	(3)8 AWG + #10 GND	60 A	40 A		22 A	17 A	3536 VA
EC-D1	208 V	3	3	C.1LB	54,56,58	40 A	3/4"	(3)8 AWG + #10 GND	60 A	40 A		22 A	18 A	3536 VA
EF-C1	120 V	1	1	C.1LB	21	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-C2	120 V	1	1	C.1LB	21	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-C3	120 V	1	1	C.1LB	21	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-C4	120 V	1	1	C.1LB	21	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-C5	120 V	1	1	C.1LB	21	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-C6	120 V	1	1	C.1LB	21	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-C7	120 V	1	1	C.1LB	21	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	6 VA
EF-E1	120 V	1	1	E.1LA	7	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-F1	120 V	1	1	F.E1LB	2	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-F2	120 V	1	1	F.E1LA	47	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-F3	120 V	1	1	F.E1LA	47	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-F4	120 V	1	1	F.E1LB	39	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-F5	120 V	1	1	F.E1LA	45	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	3 A	2 A	240 VA
EF-F6	120 V	1	1	F.E1LA	47	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	15 A	12 A	1440 VA
EUF-C4	208 V	1	2	F.E1LA	12,14	30 A	3/4"	(2) #10 AWG + #10 GND	30 A	30 A		24 A	19 A	3952 VA
EUH-A1	208 V	1	2	A.1LA	13,15	30 A	3/4"	(2) #10 AWG + #10 GND	30 A	30 A		24 A	19 A	3952 VA
EUH-C1	208 V	1	2	C.1LB	48,51	30 A	3/4"	(2) #10 AWG + #10 GND	30 A	30 A		24 A	19 A	3952 VA
EUH-C2	208 V	1	2	C.1LB	45,47	30 A	3/4"	(2) #10 AWG + #10 GND	30 A	30 A		24 A	19 A	3952 VA
EUH-C3	208 V	1	2	C.1LB	41,43	30 A	3/4"	(2) #10 AWG + #10 GND	30 A	30 A		24 A	19 A	3952 VA
EUH-C4	208 V	0	2	F.E1LA	8,8	30 A	3/4"	(2) #10 AWG + #10 GND	30 A	30 A		24 A	19 A	3952 VA
EUH-F1	208 V	1	2	F.E1LB	16,18	30 A	3/4"	(2) #10 AWG + #10 GND	30 A	30 A		24 A	19 A	5000 VA
F-B1	208 V	1	2	C.1LB	38,40	15 A	3/4"	(2) #12 AWG + #12 GND	30 A	15 A		9 A	7 A	1456 VA
F-C1	120 V	1	1	C.1LB	31	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	13 A	10 A	2080 VA
F-C2	120 V	1	1	C.1LB	26	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	11 A	9 A	1080 VA
F-C3	120 V	1	1	C.1LB	28	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	11 A	9 A	1080 VA
F-C4	120 V	1	1	C.1LB	30	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	11 A	9 A	1080 VA
F-C5	120 V	1	1	C.1LB	35	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	13 A	10 A	1200 VA
F-F1	120 V	1	1	F.E1LA	5	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	13 A	10 A	1236 VA
F-F2	120 V	1	1	F.E1LA	1	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	11 A	9 A	1080 VA
F-F3	120 V	1	1	F.E1LA	3	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	1	13 A	10 A	1236 VA
HP-C1	208 V	1	2	C.1LB	60,62	45 A	3/4"	(2) #8 AWG + #10 GND	60 A	45 A		26 A	21 A	4534 VA
HP-C2	208 V	1	2	C.1LB	57,59	40 A	3/4"	(2) #8 AWG + #10 GND	60 A	40 A		25 A	20 A	4160 VA
HP-C3	208 V	1	2	C.1LB	73,75	40 A	3/4"	(2) #8 AWG + #10 GND	60 A	40 A		19 A	15 A	2496 VA
HP-C4	208 V	1	2	C.1LB	37,39	25 A	3/4"	(2) #10 AWG + #10 GND	30 A	25 A		14 A	11 A	2288 VA
HP-C5	208 V	1	2	C.1LB	65,67	20 A	3/4"	(2) #12 AWG + #12 GND	30 A	20 A		12 A	10 A	2080 VA
HP-C6	208 V	1	2	C.1LB	53,55	20 A	3/4"	(2) #12 AWG + #12 GND	30 A	20 A		12 A	10 A	2080 VA
HP-C7	208 V	1	2	C.1LB	61,63	20 A	3/4"	(2) #12 AWG + #12 GND	30 A	20 A		12 A	10 A	2080 VA
HP-C8	208 V	1	2	C.1LB	64,66	20 A	3/4"	(2) #12 AWG + #12 GND	30 A	20 A		12 A	10 A	2080 VA
L-B1	120 V	1	1	C.1LB	17	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-B2	120 V	1	1	C.1LB	17	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-C1	120 V	1	1	C.1LB	19	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-C2	120 V	1	1	C.1LB	19	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-C3	120 V	1	1	C.1LB	19	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-C4	120 V	1	1	C.1LB	33	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-C5	120 V	1	1	C.1LB	33	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-C6	120 V	1	1	C.1LB	33	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-C7	120 V	1	1	C.1LB	33	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-C8	120 V	1	1	C.1LB	19	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-D1	120 V	1	1	C.1LB	15	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-D2	120 V	1	1	C.1LB	15	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-E1	120 V	1	1	E.1LA	9	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-F1	120 V	1	1	F.E1LB	2	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-F4	120 V	1	1	F.E1LB	2	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-F5	120 V	1	1	F.E1LB	2	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-F6	120 V	1	1	F.E1LB	2	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-F7	120 V	1	1	F.E1LB	15	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
L-F8	120 V	1	1	F.E1LB	15	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	7	3 A	2 A	240 VA
ODU-C1	208 V	1	2	C.1LB	69,71	25 A	3/4"	(2) #10 AWG + #10 GND	30 A	25 A		11 A	9 A	1872 VA
OWF-B1	120 V	1	1	C.1LB	13	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	6 A	5 A	600 VA
OWF-B2	120 V	1	1	C.1LB	13	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	6 A	5 A	600 VA
OWF-D1	120 V	1	1	C.1LB	42	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	6 A	5 A	600 VA
OWF-D2	120 V	1	1	C.1LB	42	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	6 A	5 A	600 VA
OWF-D3	120 V	1	1	C.1LB	44	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	6 A	5 A	600 VA
OWF-D4	120 V	1	1	C.1LB	44	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	6 A	5 A	600 VA
OWF-F-1	120 V	1	1	F.1LA	4	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	6 A	5 A	600 VA
OWF-F-2	120 V	1	1	F.1LA	13	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	6 A	5 A	600 VA
OWF-F-3	120 V	1	1	F.1LA	6	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	6 A	5 A	600 VA
OWF-F-4	120 V	1	1	F.1LA	15	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	6 A	5 A	600 VA
RP-C1	120 V	1	1	C.1LC	1	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A		0 A	0 A	0 VA
RP-F1	120 V	1	1	F.1LA	16	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A		0 A	0 A	0 VA
UH-B1	120 V	1	1	C.1LB	7	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	2 A	240 VA
UH-B2	120 V	1	1	C.1LB	7	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	2 A	240 VA
UH-B3	120 V	1	1	C.1LB	7	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	2 A	240 VA
UH-D1	120 V	1	1	C.1LB	9	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	2 A	240 VA
UH-D2	120 V	1	1	C.1LB	9	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	2 A	240 VA
UH-D3	120 V	1	1	C.1LB	9	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	2 A	240 VA
UH-F1	120 V	1	1	F.E1LB	14	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	1 A	240 VA
UH-F2	120 V	1	1	F.E1LB	19	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	2 A	240 VA
UH-F3	120 V	1	1	F.E1LB	19	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	2 A	240 VA
UH-F4	120 V	1	1	F.E1LB	19	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	2 A	240 VA
UH-F5	120 V	1	1	F.1LA	2	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	2 A	240 VA
UH-F6	120 V	1	1	F.1LA	2	15 A	3/4"	(2) #12 AWG + #12 GND	0 A	0 A	6	2 A	2 A	240 VA
VES-2	208 V	3	3	F.1LA	18,20,22	20 A	3/4"	(3)#12 AWG, #12GND.	0 A	0 A		0 A	0 A	4784 VA
VES-2-1	120 V	1	1	F.1LA	23	15 A	0"	(2) #12 AWG + #12 GND	0 A	10 A	1	12 A	10 A	1176 VA
VES-3	208 V	3	3	F.1LA	23,25,27	20 A	3/4"	(3)#12 AWG, #12GND.	0 A	0 A		0 A	0 A	4784 VA
VES-3-1	120 V	1	1	F.1LA	24	15 A	0"	(2) #12 AWG + #12 GND	0 A	10 A	1	12 A	10 A	1176 VA
VES-4	208 V	3	3	F.1LA	17,19,21	20 A	3/4"	(3)#12 AWG, #12GND.	0 A	0 A		0 A	0 A	4784 VA
VES-4-1	120 V	1	1	F.1LA	26	15 A	0"	(2) #12 AWG + #12 GND	0 A	10 A	1	12 A	10 A	1176 VA
VES-6	208 V	0	2	F.E1LB	1,3	30 A	0"		0 A	0 A		0 A	0 A	5000 VA

NOTES:

1. PROVIDE A MOTOR RATED SWITCH. OVERLOADS SHALL MATCH MOTOR RATING.
2. PROVIDE ROOF-MOUNTED WP/GFCI RECEPTACLE MOUNTED ONNEAR HVAC EQUIPMENT.
3. PROVIDE AND INSTALL A DUCT-MOUNTED SMOKE DETECTOR ON THE RETURN AND SUPPLY SIDE OF UNIT. EXTEND AND CONNECT TO FACP AND COORDINATE WITH MECHANICAL FOR AUTOMATIC SHUTOFF OF UNIT AS REQUIRED.
4. PROVIDE CONCRETE ENCASED CONDUIT SERVING FIRE PUMP.
5. PROVIDE 3/4" CONDUIT FROM INDOOR UNIT TO OUTDOO

PANELBOARD SCHEDULE

PANELBOARD: A.1LA
DISTRIBUTION: 208Y/120V, 3 PHASE, 4 WIRE
SUPPLY FROM: F.1LA
LOCATION: EQUIPMENT A101
MIN AIC RATING: 10000
MCB 60 A
ENCLOSURE: NEMA 1
MOUNTING: SURFACE

C...	TRIP AMPS	POLES	CIRCUIT DESCRIPTION	A	B	C	A	B	C	CIRCUIT DESCRIPTION	POLES	TRIP AMPS	C...
1	20 A	1	COMMERCIAL VACUUM	180 VA			180 VA			OTHER	1	20 A	2
3	35 A	2	MOTOR EQUIPMENT A101		3000 VA								4
5						3000 VA							6
7	20 A	1	OTHER EQUIPMENT A101	180 VA			445 VA			LTG, CAR WASH	1	20 A	8
9								--		SPACE	1	--	10
11									--	SPACE	1	--	12
13	20 A	2	EUH-A1	1976 VA			--			SPACE	1	--	14
15					1976 VA			--		SPACE	1	--	16
17									--	SPACE	1	--	18

PHASE TOTALS	LOAD	CURRENT
PHASE A	2961 VA	25 A
PHASE B	4976 VA	42 A
PHASE C	3000 VA	25 A

TOTAL CONNECTED LOAD	10937 VA
ESTIMATED DEMAND LOAD	10940 VA
DEMAND LINE AMPS	30 A

NOTES:

PANELBOARD SCHEDULE

PANELBOARD: C.1DLA
DISTRIBUTION: 208Y/120V, 3 PHASE, 4 WIRE
SUPPLY FROM:
LOCATION: ELECTRIC C106
MIN AIC RATING: 30,831
MCB 800 A
ENCLOSURE: NEMA 1
MOUNTING: SURFACE

C...	TRIP AMPS	POLES	CIRCUIT DESCRIPTION	A	B	C	A	B	C	CIRCUIT DESCRIPTION	POLES	TRIP AMPS	C...
1				25066...			720 VA			OTHER SPACE E147	1	20 A	2
3	200 A	3	C.1LA		19307...			960 VA					4
5						23609...			4192 VA	E.1LA	3	60 A	6
7				5324 VA			3952 VA						8
9	100 A	3	C.2LA		5308 VA			39736...					10
11						5356 VA			35807...	C.1LB	3	400 A	12
13				10000...			36292...						14
15	20 A	3	C.1LA		720 VA			720 VA					16
17						360 VA			360 VA	C.1LC	3	80 A	18
19							360 VA						20
21													22
23													24
25													26
27													28
29													30
31													32
33													34
35													36
37													38
39													40
41													42

PHASE TOTALS	LOAD	CURRENT
PHASE A	81714 VA	685 A
PHASE B	66750 VA	556 A
PHASE C	69684 VA	584 A

TOTAL CONNECTED LOAD	218148 VA
ESTIMATED DEMAND LOAD	218184 VA
DEMAND LINE AMPS	606 A

NOTES:

PANELBOARD SCHEDULE

PANELBOARD: C.1LA
DISTRIBUTION: 208Y/120V, 3 PHASE, 4 WIRE
SUPPLY FROM: C.1DLA
LOCATION: ELECTRIC C106
MIN AIC RATING: 24535
MCB 250 A
ENCLOSURE: NEMA 1
MOUNTING: SURFACE

C...	TRIP AMPS	POLES	CIRCUIT DESCRIPTION	A	B	C	A	B	C	CIRCUIT DESCRIPTION	POLES	TRIP AMPS	C...
1	20 A	1	CORRIDOR LIGHTING	1996 VA			1000 VA			POWER ELECTRIC C106	1	20 A	2
3	20 A	1	OFFICE/TRAINING ROOMS		1584 VA			1000 VA		BIG ASS FAN AREA "B"	1	15 A	4
5	20 A	1	OTHER GYM C113			360 VA			180 VA	ICE MACHINE	1	20 A	6
7	20 A	1	OTHER ROOM B105, B104	720 VA			540 VA			OTHER TECH ROOM C133	1	20 A	8
9	20 A	1	OTHER		360 VA			540 VA		OTHER OFFICE C132	1	20 A	10
11	20 A	1	OTHER TRAINING ROOM / BREAKROO...			180 VA			540 VA	OTHER OFFICE C131	1	20 A	12
13	20 A	1	OTHER ROOM C100, C104, C105, C113...	720 VA			540 VA			OTHER CREW LEADERS B102	1	20 A	14
15	20 A	1	OTHER SUPER OFFICE C103		540 VA			900 VA		OTHER ROOM C104, C105, C100, B100	1	20 A	16
17	20 A	1	OTHER LABOR SUPER OFFICE B101			540 VA			540 VA	OTHER ADMIN ASSIST C108	1	20 A	18
19	20 A	1	OTHER ROOM C128, C130	720 VA			1080 VA			OTHER TRAINING ROOM / BREAKROO...	1	20 A	20
21	20 A	1	OTHER ROOM C125, C123, C122, C124		720 VA			360 VA		OTHER TRAINING ROOM / BREAKROO...	1	20 A	22
23	20 A	1	OTHER ROOM C118, C120, C119			900 VA			360 VA	OTHER TRAINING ROOM / BREAKROO...	1	20 A	24
25	20 A	1	OTHER TRAINING ROOM / BREAKROO...	180 VA			720 VA			OTHER ROOM C112, C111	1	20 A	26
27	20 A	1	OTHER TRAINING ROOM / BREAKROO...		180 VA			540 VA		OTHER TRAINING ROOM / BREAKROO...	1	20 A	28
29	20 A	1	OTHER OPERATION PLANNER WORK...			540 VA			180 VA	OTHER TRAINING ROOM / BREAKROO...	1	20 A	30
31	20 A	1	TV MONITORS	360 VA			1000 VA			BIG ASS FAN AREA "D"	1	20 A	32
33	20 A	1	OTHER FIRE RISER C117		180 VA			180 VA		ICE MACHINE	1	20 A	34
35	20 A	1	OTHER			540 VA			3952 VA	PPORTABLE WELDER	2	40 A	36
37	20 A	1	OTHER ROOM D108, D100, D107, D106...	900 VA			3952 VA						38
39	20 A	1	OTHER CORR. D100		720 VA			180 VA		FLOOR BOX (C112)	1	20 A	40
41	20 A	1	OTHER			1159 VA			180 VA	FLOOR BOX (C112)	1	20 A	42
43	20 A	1	FLOOR BOX (C112)	180 VA			180 VA			FLOOR BOX (C115)	1	20 A	44
45	20 A	1	FLOOR BOX (C112)		180 VA			360 VA		QUAD. ROOM C112	1	20 A	46
47	20 A	1	FLOOR BOX (C115)			180 VA			360 VA	QUAD. ROOM C115	1	20 A	48
49	20 A	1	OTHER FIRE RISER C117	69 VA			180 VA			FLOOR BOX (C115)	1	20 A	50
51	20 A	1	LIGHTING - EXTERIOR		154 VA			720 VA		OTHER ROOM C100, B100	1	20 A	52
53	20 A	1	FLOOR BOX (C115)			180 VA			180 VA	OTHER WAITING AREA C107	1	20 A	54
55	20 A	1	OTHER SPACE E142	360 VA			1208 VA			RESTROOM LIGHTING	1	20 A	56
57	20 A	1	TREADMILL		180 VA			360 VA		OTHER GYM C113	1	20 A	58
59	20 A	1	TREADMILL			180 VA			360 VA	OTHER GYM C113	1	20 A	60
61	20 A	1	TREADMILL	180 VA			540 VA			OTHER ELECTRIC C106	1	20 A	62
63	20 A	1	OTHER		100 VA			798 VA		LIGHTING EXTERIOR	2	15 A	64
65	20 A	1	RECEPTACLE ELEV. C102			360 VA			798 VA				66
67	20 A	1	TREADMILL	180 VA			570 VA			LIGHTING EXTERIOR	2	15 A	68
69	20 A	1	TREADMILL		180 VA			570 VA					70
71	20 A	1	TREADMILL			180 VA			6468 VA				72
73	20 A	1	OTHER GYM C113	180 VA			6468 VA			ELEVATOR	3	60 A	74
75	20 A	1	GENERAL RCPT. GYM		360 VA			6468 VA					76
77	20 A	1	OTHER ROOM B106, B107, B108			540 VA			2592 VA	ELEVATOR LIGHTING/POWER	1	15 A	78
79	20 A	1	GARAGE DOOR OPENER	360 VA			0 VA			ELEVATOR HYDRAULIC	1	15 A	80
81	20 A	1	GARAGE DOOR OPENER		360 VA			540 VA		GENERAL RCPT. ROOM C112	1	20 A	82
83	20 A	1	GARAGE DOOR OPENER			360 VA			720 VA	OTHER TRAINING ROOM / BREAKROO...	1	20 A	84

PHASE TOTALS	LOAD	CURRENT
PHASE A	25066 VA	214 A
PHASE B	19307 VA	161 A
PHASE C	23609 VA	202 A

TOTAL CONNECTED LOAD	67981 VA
ESTIMATED DEMAND LOAD	68018 VA
DEMAND LINE AMPS	189 A

NOTES:
1. PROVIDE PANEL IN A SINGLE ENCLOSURE.

PANELBOARD SCHEDULE

PANELBOARD: C.1LB
DISTRIBUTION: 208Y/120V, 3 PHASE, 4 WIRE
SUPPLY FROM: C.1DLA
LOCATION: ELECTRIC C106
MIN AIC RATING: 24535
MCB 400 A
ENCLOSURE: NEMA 1
MOUNTING: SURFACE

C...	TRIP AMPS	POLES	CIRCUIT DESCRIPTION	A	B	C	A	B	C	CIRCUIT DESCRIPTION	POLES	TRIP AMPS	C...
1								1040 VA					2
3	40 A	3	EC-B1	1179 VA				1040 VA					4
5					1179 VA		1179 VA						6
7	15 A	1	UH-B3	1260 VA			1976 VA			BC-C4 - C8	2	20 A	8
9	20 A	1	COOLING ROOM D100, D109		1260 VA			1144 VA					10
11	20 A	1	FLOOR BOX (C204)			180 VA			1144 VA	CU-C1	2	40 A	12
13	15 A	1	OWF-B1 & OWF-B2	1200 VA				1144 VA					14
15	20 A	1	L-D1 & L-D2		480 VA			1144 VA		COOLING	2	20 A	16
17	15 A	1	L-B1 & L-B2			480 VA			1144 VA				18
19	20 A	1	L-C1, C2, C3 & L=C8	960 VA			1144 VA			COOLING	2	20 A	20
21	20 A	1	EF-C1-C5		1446 VA			1456 VA					22
23						960 VA			1456 VA	CU-C5	2	20 A	24
25	15 A	3	DOAS-IDU-1	960 VA			1080 VA			F-C2	1	15 A	26
27					960 VA			1080 VA		F-C3	1	20 A	28
29	15 A	1	DH-1			120 VA			1080 VA	F-C4	1	20 A	30
31	15 A	1	F-C1	2080 VA			6720 VA						32
33	20 A	1	COOLING		960 VA			6720 VA		DOAS-ODU-1	3	100 A	34
35	15 A	1	F-C5			1200 VA			6720 VA				36
37	20 A	2	HP-C4	1144 VA			728 VA			F-B1	2	20 A	38
39					1144 VA			728 VA					40
41	30 A	2	EUH-C3			1976 VA			1200 VA	OWF-D1 & OWF-D2	1	15 A	42
43				1976 VA			1200 VA			OWF-D3 & OWF-D4	1	15 A	44
45	30 A	2	EUH-C2		1976 VA			180 VA		FLOOR BOX (C207)	1	20 A	46
47						1976 VA			180 VA	FLOOR BOX (C207)	1	20 A	48
49	30 A	2	EUH-C1	1976 VA			180 VA			FLOOR BOX (C209)	1	20 A	50
51					1976 VA			180 VA		FLOOR BOX (C209)	1	20 A	52
53	20 A	2	HP-C6			1040 VA			1179 VA	EC-D1	3	20 A	54
55				1040 VA			1179 VA						56
57	40 A	2	HP-C2		2080 VA			1179 VA					58
59						2080 VA			2267 VA	HP-C1	2	40 A	60
61	20 A	2	HP-C7	1040 VA			2267 VA						62
63					1040 VA			1040 VA		HP-C8	2	20 A	64
65	15 A	2	BC-C5	1040 VA				1040 VA					66
67						1040 VA	1144 VA			CU-B1	2	20 A	68
69	20 A	2	ODU-C1		1040 VA			1144 VA					70
71							1040 VA		1000 VA	RECEPTACLE FULL	1	20 A	72
73	30 A	2	HP-C3	1248 VA			1000 VA			GATE OPENER	1	20 A	74
75					1248 VA			1000 VA		GATE OPENER	1	20 A	76
77	20 A	2	BC-C2 & C3			832 VA			1000 VA	GATE OPENER	1	20 A	78
79				832 VA			1000 VA			GATE OPENER	1	20 A	80
81	15 A	2	BC-C1		624 VA			360 VA		GARAGE DOOR OPENER	1	20 A	82
83						624 VA			180 VA	RO-1	1	20 A	84

PHASE TOTALS	LOAD	CURRENT
PHASE A	39736 VA	332 A
PHASE B	35807 VA	298 A
PHASE C	36292 VA	303 A

TOTAL CONNECTED LOAD	111836 VA
ESTIMATED DEMAND LOAD	111836 VA
DEMAND LINE AMPS	310 A

NOTES:
1. PROVIDE PANEL IN SINGLE SECTION ENCLOSURE.

PANELBOARD SCHEDULE

PANELBOARD: C.1LC
DISTRIBUTION: 208Y/120V, 3 PHASE, 4 WIRE
SUPPLY FROM: C.1DLA
LOCATION: ELECTRIC C106
MIN AIC RATING: 10000
MCB 100 A
ENCLOSURE: NEMA 1
MOUNTING: SURFACE

C...	TRIP AMPS	POLES	CIRCUIT DESCRIPTION	A	B	C	A	B	C	CIRCUIT DESCRIPTION	POLES	TRIP AMPS	C...
1	20 A	1	COOLING MENS LOCKER SHOWER...	0 VA			--			SPACE	1	--	2
3	20 A	1	IT ROOM		720 VA			--		SPACE	1	--	4
5	20 A	1	SUMP PUMP			360 VA			--	SPACE	1	--	6
7	20 A	1	SUMP PUMP	10000...			--			SPACE	1	--	8
9	20 A	1	SPARE		0 VA			--		SPACE	1	--	10
11	20 A	1	SPARE			0 VA			--	SPACE	1	--	12
13	20 A	1	SPARE	0 VA			--			SPACE	1	--	14
15	20 A	1	SPARE		0 VA			--		SPACE	1	--	16
17	20 A	1	SPARE			0 VA			--	SPACE	1	--	18
19	--	1	SPACE	--			--			SPACE	1	--	20
21	--	1	SPACE		--			--		SPACE	1	--	22
23	--	1	SPACE			--			--	SPACE	1	--	24
25	--	1	SPACE	--			--			SPACE	1	--	26
27	--	1	SPACE		--			--		SPACE	1	--	28
29	--	1	SPACE			--			--	SPACE	1	--	30

PHASE TOTALS	LOAD	CURRENT
PHASE A	10000 VA	84 A
PHASE B	720 VA	6 A
PHASE C	360 VA	3 A

TOTAL CONNECTED LOAD	11080 VA
ESTIMATED DEMAND LOAD	11080 VA
DEMAND LINE AMPS	31 A

NOTES:

PANELBOARD SCHEDULE

PANELBOARD: C.2LA
DISTRIBUTION: 208Y/120V, 3 PHASE, 4 WIRE
SUPPLY FROM: C.1DLA
LOCATION: Space E134
MIN AIC RATING: 10000
MLO 100 A
ENCLOSURE: NEMA 1
MOUNTING: SURFACE

C...	TRIP AMPS	POLES	CIRCUIT DESCRIPTION	A	B	C	A	B	C	CIRCUIT DESCRIPTION	POLES	TRIP AMPS	C...
1	20 A	1	OTHER SPACE E134	104 VA				180 VA		COFFEE MAKER (C214)	1	20 A	2
3	20 A	1	OTHER SPACE E147		347 VA				360 VA	OTHER SPACE E138	1	20 A	4
5	20 A	1	OTHER SPACE E128			150 VA			900 VA	OTHER SPACE E129	1	20 A	6
7	20 A	1	OTHER SPACE E105	900 VA				1260 VA		OTHER SPACE E138	1	20 A	8
9	20 A	1	LIGHTING SPACE E142		1723 VA				900 VA	OTHER SPACE E133	1	20 A	10
11	20 A	1	LIGHTING ROOM E129, E130, E131, E13...			1426 VA			900 VA	OTHER SPACE E142	1	20 A	12
13	20 A	1	OTHER SPACE E138	180 VA				900 VA		OTHER SPACE E144	1	20 A	14
15	20 A	1	REFRIGERATOR (C214)		180 VA			900 VA		OTHER SPACE E130	1	20 A	16
17	20 A	1	TV MONITOR (C214)			180 VA			900 VA	OTHER SPACE E131	1	20 A	18
19	20 A	1	MICROWAVE (C214)	180 VA				900 VA		OTHER SPACE E132	1	20 A	20
21	20 A	1	MICROWAVE (C214)		180 VA				--	SPACE	1	--	22
23	20 A	1	OTHER SPACE E136			180 VA			--	SPACE	1	--	24
25	20 A	1	OTHER SPACE E106	720 VA				--		SPACE	1	--	26
27	20 A	1	OTHER SPACE E134		720 VA				--	SPACE	1	--	28
29	20 A	1	OTHER SPACE E139			720 VA			--	SPACE	1	--	30

PHASE TOTALS	LOAD	CURRENT
PHASE A	5324 VA	44 A
PHASE B	5308 VA	44 A
PHASE C	5356 VA	45 A

TOTAL CONNECTED LOAD	15987 VA
ESTIMATED DEMAND LOAD	15987 VA
DEMAND LINE AMPS	44 A

NOTES:

A.1LA	A.2LB
C.D1LA	C.1LC
C.1LA	C.E1LA

Parkhill

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ELECTRICAL

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Midland Utilities Service Center
Water/Wastewater, Solid Waste, and Vehicle Services

MIDLAND Feel the Energy!

CLIENT
City of Midland
Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL PANEL SCHEDULE

E-602

1/26/2022 5:29:54 PM

PANELBOARD SCHEDULE

PANELBOARD: C.2LA — **MIN AIC RATING:** 10000
DISTRIBUTION: 208Y/120V, 3 PHASE, 4 WIRE — **MLO** 100 A
SUPPLY FROM: C.1DLA — **ENCLOSURE:** NEMA 1
LOCATION: Space E134 — **MOUNTING:** SURFACE

C...	TRIP AMPS	POLES	CIRCUIT DESCRIPTION	A	B	C	A	B	C	CIRCUIT DESCRIPTION	POLES	TRIP AMPS	C...
1	20 A	1	OTHER SPACE E134	104 VA			180 VA			COFFEE MAKER (C214)	1	20 A	2
3	20 A	1	OTHER SPACE E147		347 VA			360 VA		OTHER SPACE E138	1	20 A	4
5	20 A	1	OTHER SPACE E128			150 VA			900 VA	OTHER SPACE E129	1	20 A	6
7	20 A	1	OTHER SPACE E105	900 VA			1260 VA			OTHER SPACE E138	1	20 A	8
9	20 A	1	LIGHTING SPACE E142		1723 VA			900 VA		OTHER SPACE E133	1	20 A	10
11	20 A	1	LIGHTING ROOM E129, E130, E131, E13...			1426 VA			900 VA	OTHER SPACE E142	1	20 A	12
13	20 A	1	OTHER SPACE E138	180 VA			900 VA			OTHER SPACE E144	1	20 A	14
15	20 A	1	REFRIGERATOR (C214)		180 VA			900 VA		OTHER SPACE E130	1	20 A	16
17	20 A	1	TV MONITOR (C214)			180 VA			900 VA	OTHER SPACE E131	1	20 A	18
19	20 A	1	MICROWAVE (C214)	180 VA			900 VA			OTHER SPACE E132	1	20 A	20
21	20 A	1	MICROWAVE (C214)		180 VA			--	--	SPACE	1	--	22
23	20 A	1	OTHER SPACE E136			180 VA			--	SPACE	1	--	24
25	20 A	1	OTHER SPACE E106	720 VA			--		--	SPACE	1	--	26
27	20 A	1	OTHER SPACE E134		720 VA			--	--	SPACE	1	--	28
29	20 A	1	OTHER SPACE E139			720 VA			--	SPACE	1	--	30

PHASE TOTALS	LOAD	CURRENT
PHASE A	5324 VA	44 A
PHASE B	5308 VA	44 A
PHASE C	5356 VA	45 A

TOTAL CONNECTED LOAD	15987 VA
ESTIMATED DEMAND LOAD	15987 VA
DEMAND LINE AMPS	44 A

NOTES:

PANELBOARD SCHEDULE

PANELBOARD: E.1LA — **MIN AIC RATING:** 10000
DISTRIBUTION: 208Y/120V, 3 PHASE, 4 WIRE — **MCB** 100 A
SUPPLY FROM: C.1DLA — **ENCLOSURE:** NEMA 1
LOCATION: SOLID WASTE / WASTE WATER STORAGE E100 — **MOUNTING:** SURFACE

C...	TRIP AMPS	POLES	CIRCUIT DESCRIPTION	A	B	C	A	B	C	CIRCUIT DESCRIPTION	POLES	TRIP AMPS	C...
1	20 A	1	RECEPTACLES IN BLDG. 'E'	720 VA			--			SPACE	1	--	2
3					3952 VA			--		SPACE	1	--	4
5	40 A	2	PORTABLE WELDER			3952 VA			--	SPACE	1	--	6
7	20 A	1	EF-E1	240 VA			--			SPACE	1	--	8
9	15 A	1	L-E1		240 VA			--		SPACE	1	--	10
11									--	SPACE	1	--	12
13							--			SPACE	1	--	14
15								--		SPACE	1	--	16
17									--	SPACE	1	--	18

PHASE TOTALS	LOAD	CURRENT
PHASE A	960 VA	8 A
PHASE B	4192 VA	39 A
PHASE C	3952 VA	37 A

TOTAL CONNECTED LOAD	9104 VA
ESTIMATED DEMAND LOAD	9104 VA
DEMAND LINE AMPS	25 A

NOTES:

PANELBOARD SCHEDULE

PANELBOARD: F.1LA — **MIN AIC RATING:** 18451
DISTRIBUTION: 208Y/120V, 3 PHASE, 4 WIRE — **MCB** 600 A
SUPPLY FROM: — **ENCLOSURE:** NEMA 1
LOCATION: MEP F103 — **MOUNTING:** SURFACE

C...	TRIP AMPS	POLES	CIRCUIT DESCRIPTION	A	B	C	A	B	C	CIRCUIT DESCRIPTION	POLES	TRIP AMPS	C...
1							840 VA			UH-F2, F3, F4, F5, F6	1	15 A	2
3								600 VA		OWF-F-1 & 2	1	20 A	4
5	20 A	2	CU-F3			1456 VA			600 VA	OWF-F-3 & 4	1	20 A	6
7				1456 VA			1600 VA			VENDING MACHINE	1	20 A	8
9	20 A	1	OTHER BREAK / TRAINING ROOM F112		300 VA			1600 VA		VENDING MACHINE	1	20 A	10
11	20 A	1	OTHER WOMENS RESTROOM F106			540 VA			180 VA	OTHER WAITING ROOM F100	1	20 A	12
13	20 A	1	COOLING INSPECTION BAY F121	600 VA			540 VA			OTHER MENS BATHROOM F105	1	20 A	14
15	20 A	1	COOLING INSPECTION BAY F121		600 VA			0 VA		COOLING MEP F103	1	20 A	16
17						1595 VA			1595 VA				18
19	20 A	3	VES	1595 VA			1595 VA			COOLING INSPECTION BAY F121	3	20 A	20
21					1595 VA			1595 VA					22
23						1595 VA			1176 VA	COOLING INSPECTION BAY F121	1	20 A	24
25	20 A	3	COOLING INSPECTION BAY F121	1595 VA			1176 VA			COOLING LIFT BAY F122	1	20 A	26
27					1595 VA			1094 VA		CORRIDOR/RRSTOR	1	20 A	28
29	20 A	1	COOLING INSPECTION BAY F121			1176 VA			1144 VA	CU-F2	2	20 A	30
31	20 A	1	LIGHTING - EXTERIOR	99 VA			1144 VA						32
33	25 A	1	INSPECTION BAY/TIRE STOR		1873 VA			--	--	SPACE	1	--	34
35	20 A	1	ROOM F112, F111, F114, F107, F110			741 VA			--	SPACE	1	--	36
37				26247...			2961 VA						38
39	400 A	3	F.E1LA		27051...			4976 VA		A.1LA	3	60 A	40
41						29124...			3000 VA				42

PHASE TOTALS	LOAD	CURRENT
PHASE A	41442 VA	346 A
PHASE B	42871 VA	359 A
PHASE C	43921 VA	368 A

TOTAL CONNECTED LOAD	128234 VA
ESTIMATED DEMAND LOAD	128276 VA
DEMAND LINE AMPS	356 A

NOTES:

PANELBOARD SCHEDULE

PANELBOARD: F.E1LA — **MIN AIC RATING:** 12476
DISTRIBUTION: 208Y/120V, 3 PHASE, 4 WIRE — **MLO** 400 A
SUPPLY FROM: F.1LA — **ENCLOSURE:** NEMA 1
LOCATION: MEP F103 — **MOUNTING:** SURFACE

C...	TRIP AMPS	POLES	CIRCUIT DESCRIPTION	A	B	C	A	B	C	CIRCUIT DESCRIPTION	POLES	TRIP AMPS	C...
1	15 A	1	F-F2	1080 VA									2
3	20 A	1	F-F3		1236 VA								4
5	15 A	1	F-F1			1236 VA			1976 VA	EUH-C5	2	20 A	6
7	20 A	1	OTHER ROOM F101, F102, F100	720 VA			1976 VA						8
9	20 A	1	OTHER BREAK / TRAINING ROOM F112		900 VA								10
11	20 A	1	REFRIGERATOR (F112)			250 VA			1976 VA	EUH-C4	2	20 A	12
13	20 A	1	OTHER CORRIDOR F113	370 VA			1976 VA						14
15	20 A	1	OTHER OFFICE F107		360 VA								16
17	20 A	1	OTHER OFFICE F107			0 VA							18
19	20 A	1	RECEPTACLE BREAK / TRAINING ROO...	180 VA									20
21	20 A	1	RECEPTACLE BREAK / TRAINING ROO...		180 VA								22
23	20 A	1	OTHER FILTER STORAGE F110			540 VA							24
25	20 A	1	LIGHTING - EXTERIOR	66 VA									26
27	20 A	1	OTHER WAITING ROOM F100		360 VA								28
29	20 A	1	OTHER ROOM F104, F105, F106, F114,...			900 VA							30
31	20 A	1	OTHER OFFICE F111	900 VA				--		SPACE	1	--	32
33	20 A	1	OTHER OFFICE / SERVICE COUNTER...		540 VA				--	SPACE	1	--	34
35	20 A	1	FIRE ALARM CONTROL PANEL			1000 VA			--	SPACE	1	--	36
37	20 A	1	RECEPTACLE OFFICE / SERVICE...	180 VA				--		SPACE	1	--	38
39	20 A	1	OTHER ROOM E141, E140		360 VA				--	SPACE	1	--	40
41	20 A	1	OTHER OFFICE / SERVICE COUNTER...			540 VA			--	SPACE	1	--	42
43	20 A	1	OTHER CORRIDOR F113	370 VA				--		SPACE	1	--	44
45	15 A	1	EF-F5		240 VA				--	SPACE	1	--	46
47	15 A	1	EF-F1, F2, F3,F6			1920 VA			--	SPACE	1	--	48
49	20 A	1	OTHER MEP F103	720 VA				--		SPACE	1	--	50
51									--	SPACE	1	--	52
53										SPACE	1	--	54
55							17712...						56
57								22875...		F.E1LB	3	250 A	58
59									18786...				60

PHASE TOTALS	LOAD	CURRENT
PHASE A	26247 VA	219 A
PHASE B	27051 VA	226 A
PHASE C	29124 VA	244 A

TOTAL CONNECTED LOAD	82422 VA
ESTIMATED DEMAND LOAD	82437 VA
DEMAND LINE AMPS	229 A

NOTES:
1. PROVIDE PANEL IN A SINGLE ENCLOSURE.

PANELBOARD SCHEDULE

PANELBOARD: F.E1LB — **MIN AIC RATING:** 11837
DISTRIBUTION: 208Y/120V, 3 PHASE, 4 WIRE — **MCA** 250 A
SUPPLY FROM: F.E1LA — **ENCLOSURE:** NEMA 1
LOCATION: OPEN F120 — **MOUNTING:** SURFACE

C...	TRIP AMPS	POLES	CIRCUIT DESCRIPTION	A	B	C	A	B	C	CIRCUIT DESCRIPTION	POLES	TRIP AMPS	C...
1										L-F1, F4, F5, F6, F7	1	15 A	2
3	20 A	2	COOLING MEP F103	2500 VA			1200 VA						4
5	20 A	1	SPARE			0 VA			2800 VA	LARGE TIRE CHANGER	2	20 A	6
7	20 A	1	OTHER OPEN F120	180 VA			7932 VA						8
9	20 A	2	ROTARY LIFT		1768 VA				7932 VA	AIR COMPRESSOR	3	100 A	10
11						1768 VA			7932 VA				12
13	20 A	1	SERVICE PIT LIGHTING	0 VA			420 VA			UH-F1	1	20 A	14
15	15 A	1	L-F8		480 VA				2500 VA	EUH-F1	2	30 A	16
17	20 A	1	OTHER SPACE E123			1250 VA			2500 VA				18
19	20 A	1	COOLING OPEN F120	1260 VA				--		SPACE	1	--	20
21	20 A	1	OTHER ROOM F109, F108		540 VA				--	SPACE	1	--	22
23	20 A	1	OTHER			720 VA			--	SPACE	1	--	24
25	20 A	1	RECEPTACLE LIFT BAY F122	720 VA				--		SPACE	1	--	26
27	20 A	1	OTHER		1159 VA				--	SPACE	1	--	28
29	20 A	1	OTHER OPEN F120			360 VA			--	SPACE	1	--	30
31	20 A	2	TIRE BALANCER	1500 VA				--		SPACE	1	--	32
33					1500 VA				--	SPACE	1	--	34
35	20 A	1	SPARE			0 VA			--	SPACE	1	--	36
37	20 A	1	CEILING FANS	2000 VA				--		SPACE	1	--	38
39	15 A	1	EF-F4		240 VA				1456 VA	CU-F1	2	25 A	40
41	20 A	1	SPARE			0 VA			1456 VA				42

PHASE TOTALS	LOAD	CURRENT
PHASE A	17712 VA	148 A
PHASE B	22875 VA	192 A
PHASE C	18786 VA	158 A

TOTAL CONNECTED LOAD	59373 VA
ESTIMATED DEMAND LOAD	59373 VA
DEMAND LINE AMPS	165 A

NOTES:

E.1LA	F.2LA
F.1LA	F.E1LB
F.E1LA	

Parkhill

THIS DOCUMENT IS RELEASED ON 01-05-2022 FOR THE PURPOSE OF INTERIM REVIEW UNDER THE AUTHORITY OF ISAAC N. AGUILAR P.E., LICENSE #117619. IT IS NOT TO BE USED FOR REGULATORY APPROVAL, CONSTRUCTION, BIDDING OR PERMIT PURPOSES.

ELECTRICAL

Parkhill.com

Midland Utilities Service Center
Water/Wastewater, Solid Waste, and Vehicle Services

MIDLAND
Feel the Energy!

CLIENT
City of Midland

Midland, TX 79701

PROJECT NO.
6077.21

KEY PLAN

#	DATE	DESCRIPTION
-	01/25/2022	Owner Review

ELECTRICAL PANEL SCHEDULE

E-603

1/26/2022 5:29:56 PM

Parkhill

Midland Utility Service Center (Opinion of Probable Cost)

Date: 1/19/2022 | City: Midland
Owner: COM | State: TX | Bld Area (sf): 41,282
Architect: Ashley Coco | Schedule (mo): 14 | Site Area (sf): 150,000
Estimator: jb | Bond Rate: 1.50% | Site Area (Acres): 3.44

Code	Description	Subcontractor/Vendor			Subs	Matl's	Labor	Total	$/Sf	%Job	Sub Bond
1	General Conditions					232,117	276,643	508,761	12.32	3.02%	$0
2	Building Permit	By Owner						0	0.00	0.00%	$0
3	Testing	By Owner						0	0.00	0.00%	$0
4	Surveying	In General Conditions						0	0.00	0.00%	$0
5	Power Company Charges				25,000			25,000	0.61	0.15%	$375
6	Gas Company Charges				25,000			25,000	0.61	0.15%	$375
7	Sewer/Water Charges				25,000			25,000	0.61	0.15%	$375
8								0	0.00	0.00%	$0
9	SWPPP		1	ls	32,500			32,500	0.79	0.19%	$488
10								0	0.00	0.00%	$0
11	Labor Crew						**414,000**	414,000	10.03	2.46%	$0
12								0	0.00	0.00%	$0
13	**Market Volitility, Contingency, Inflation (Civil and Site)**		**0.075**	**%**	**194,729**			194,729	4.72	1.16%	$2,921
14	**AV Allowance**		**1**	**ls**	**100,000**			100,000	2.42	0.59%	$1,500
15	Landscape/ Hardscape :							0	0.00	0.00%	$0
16	Bermuda		6743	sf	15,172			15,172	0.37	0.09%	$228
17	3/4"diameter -4" depth Rock Mulch		30000	sf	45,000			45,000	1.09	0.27%	$675
18	4" Diameter Rock Mulch at 5" Depth		117	sf	819			819	0.02	0.00%	$12
19	Shrubs		470	ea	21,150			21,150	0.51	0.13%	$317
20	Trees		91	ea	113,750			113,750	2.76	0.68%	$1,706
21	Sprinkler System		40000	sf	50,000			50,000	1.21	0.30%	$750
22	Chain Link Fencing		1545	lf	92,700			92,700	2.25	0.55%	$1,391
23	Bollards (exterior)		58	ea	43,500			43,500	1.05	0.26%	$653
24	Chain Link Gates		5	ea	7,500			7,500	0.18	0.04%	$113
25					0			0	0.00	0.00%	$0
26	Sitework / Utilities:							0	0.00	0.00%	$0
27	Water		750	lf	30,000			30,000	0.73	0.18%	$450
28	Gas Line		737	lf	29,480			29,480	0.71	0.18%	$442
29	Sewer		524	lf	26,200			26,200	0.63	0.16%	$393
30	Fire Protection Water Line (Service Line)		500	lf	20,000			20,000	0.48	0.12%	$300
31	FiberGlass Manhole (none shown on prints, only detailed)		1	ea	3,500			3,500	0.08	0.02%	$53
32	Manhole Covers (none shown on prints, only detailed)		1	ea	2,500			2,500	0.06	0.01%	$38
33	Electrical Underground / Switchgear		2148	lf	357,400			357,400	8.66	2.12%	$5,361
34	Site Clearing		150000	sf	112,500			112,500	2.73	0.67%	$1,688
35	6" Select Fill (Subgrade Fill) Parking and Drives	1800 cy	1800	cy	63,000			63,000	1.53	0.37%	$945
36	4" TXDOT Base Parking and Drives	1250 cy	1250	cy	43,750			43,750	1.06	0.26%	$656
37	8" Concrete Paving Parking and Drives		80443	sf	1,045,759			1,045,759	25.33	6.21%	$15,686
38	Curb and Gutter		2000	lf	50,000			50,000	1.21	0.30%	$750
39	Sidewalks Perimeter Site and Bldg.		8335	sf	62,513			62,513	1.51	0.37%	$938
40	Parking Signage / Stanchions and Base		3	ea	3,750			3,750	0.09	0.02%	$56
41	Fire Lane Markings		1842	lf	6,447			6,447	0.16	0.04%	$97
42	Parking Lot Striping, Markings / HC Designation		1	ls	12,500			12,500	0.30	0.07%	$188
43	Parking Bumpers		3	ea	750			750	0.02	0.00%	$11
44	HC Ramps / Truncated Dome Tile		10	ea	12,500			12,500	0.30	0.07%	$188
45	Fire Hydrants		1	ea	10,000			10,000	0.24	0.06%	$150
46	Concrete Entry Drives		5	ea	25,000			25,000	0.61	0.15%	$375
47	NA				NA	NA	NA	0	0.00	0.00%	$0
48	Site Lighting / Concrete Sonotube Base		15	ea	112,500			112,500	2.73	0.67%	$1,688
49	Flagpole		1	ea	4,250			4,250	0.10	0.03%	$64
50	Dumpster Enclosures		2	ea	40,000			40,000	0.97	0.24%	$600
51	Directional / Bldg Signage		1	ls	25,000			25,000	0.61	0.15%	$375
52	**Water / Wastewater and Solid Waste (Area BCD)**	**28,032 sf**						0	0.00	0.00%	$0
53		**$9,305,537.60 Bldg Breakdown**						0	0.00	0.00%	$0
54	**Market Volitility, Contingency, Inflation (Construction Cost Area BCD)**		**0.1**		722,447			722,447	17.50	4.29%	$10,837
55	Building Pad (1.5 depth)		1000	cy	50,000			50,000	1.21	0.30%	$750
56	Concrete Foundation / Slab (Floor 1 / floor 2 included)		28032	sf	840,960			840,960	20.37	5.00%	$12,614
57	PEMB		28032	sf	2,102,400			2,102,400	50.93	12.49%	$31,536
58	Joist / Deck		17735	sf	266,025			266,025	6.44	1.58%	$3,990

PACKET
7.949
February 8, 2022

Owner:	COM			State:	TX					Bld Area (sf):		41,282				
Architect:	Ashley Coco			Schedule (mo):		14				Site Area (sf):		150,000				
Estimator:	jb			Bond Rate:		1.50%				Site Area (Acres):		3.44				
59	Standing Seam Roof		17735	sf		212,820						212,820	5.16	1.26%	$3,192
60	Pan Stairs		5	ea		22,500						22,500	0.55	0.13%	$338
61	Misc Metals (Bracing / Lintels / Etc.)		1	ls		45,000						45,000	1.09	0.27%	$675
62	2nd Floor Deck / Joist		10270	sf		In PEMB						0	0.00	0.00%	$0
63	NA					NA		NA			NA	0	0.00	0.00%	$0
64	Drywall Hard Ceilings)		3709	sf		37,090						37,090	0.90	0.22%	$556
65	Drywall (Partitions)		33840	sf		118,440						118,440	2.87	0.70%	$1,777
66	Perimeter Hat Channel / Drywall 1st floor with insulation		9800	sf		78,400						78,400	1.90	0.47%	$1,176
67	Perimeter Hat Channel / Drywall 2nd floor with insulation		4150	sf		33,200						33,200	0.80	0.20%	$498
66	TBTP		84530	sf		211,325						211,325	5.12	1.26%	$3,170
67	Lockers		58	ea		43,500						43,500	1.05	0.26%	$653
68	Flooring (simply averaging versus each indiviual component)		28032	sf		266,304						266,304	6.45	1.58%	$3,995
69	Corner Guards		20	ea		1,500						1,500	0.04	0.01%	$23
70	P-Lam Wall Panels (FRP at Gym / Locker Rooms) 120 lf		75	shts		18,750						18,750	0.45	0.11%	$281
71	Ceramic at Restrooms Wall Tile Only		4000	sf		40,000						40,000	0.97	0.24%	$600
72	Chain Link at Equipment Cages??		75	lf		7,500						7,500	0.18	0.04%	$113
73	Millwork / Tops		110	lf		60,500						60,500	1.47	0.36%	$908
74	Shower Stalls / Benches		6	ea		7,500						7,500	0.18	0.04%	$113
74	Breakroom Appliances		1	ls		10,000						10,000	0.24	0.06%	$150
75	Lay in Ceiling		14328	sf		71,640						71,640	1.74	0.43%	$1,075
76	Fire Caulking / Misc Caulk		1	ls				9,500		94,500		104,000	2.52	0.62%	$0
77	Aluminum Storefront / HM Entries - Doubles		9	ea		52,650						52,650	1.28	0.31%	$790
78	Single Man Doors Perimeter		8	ea				10,000		2,000		12,000	0.29	0.07%	$0
79	HM / Wood Doors / Hardware		40	ea				50,000		10,000		60,000	1.45	0.36%	$0
80	OH Doors		8	ea		100,000						100,000	2.42	0.59%	$1,500
81	Roller Shades		1	ls		7,500						7,500	0.18	0.04%	$113
82	Toilet Partitions		8	ea				12,000		2,800		14,800	0.36	0.09%	$0
83	Toilet Accessories / Shower Curtains		35	ea				7,000		1,750		8,750	0.21	0.05%	$0
84	Elevator		1	ea		80,000						80,000	1.94	0.48%	$1,200
85	Mechanical / Controls		40	ton		400,000						400,000	9.69	2.38%	$6,000
86	Plumbing		37	ea		166,500						166,500	4.03	0.99%	$2,498
87	Electrical		28032	sf		616,704						616,704	14.94	3.66%	$9,251
88	Generator (CFCI)		1	ea		850,000						850,000	20.59	5.05%	$12,750
88	Fire Sprinkler		28032	sf		91,104						91,104	2.21	0.54%	$1,367
89	Fire Alarm		28032	sf		91,104						91,104	2.21	0.54%	$1,367
90	Bollards at OH Doors (entry and exit)		32	ea		24,000						24,000	0.58	0.14%	$360
91												0	0.00	0.00%	$0
92	**Solid Waste / Waste Water Storage (Area E)**	**3075 sf**										0	0.00	0.00%	$0
93		**$1,976,687.50 Bldg Breakdown**										0	0.00	0.00%	$0
	Market Volitility, Contingency, Inflation (Construction Cost Area E)		**0.1**			56,188						56,188	1.36	0.33%	$843
94	Building Pad (1.5 depth)		200	cy		10,000						10,000	0.24	0.06%	$150
95	Concrete Foundation / Slab		3075	sf		92,250						92,250	2.23	0.55%	$1,384
96	PEMB With Interior Metal Liner Panels		3075	sf		230,625						230,625	5.59	1.37%	$3,459
97	Joist / Deck		3075	sf		46,125						46,125	1.12	0.27%	$692
97	OH Doors		3	ea		37,500						37,500	0.91	0.22%	$563
98	Interior Bollards		6	ea		4,500						4,500	0.11	0.03%	$68
99	Electrical		3075	sf		67,650						67,650	1.64	0.40%	$1,015
100	Mechanical		3075	ea		46,125						46,125	1.12	0.27%	$692
101	Sealed Concrete		3075	sf		6,150						6,150	0.15	0.04%	$92
102	Exterior Man Doors		2	ea		2,500						2,500	0.06	0.01%	$38
103	Dryfall at Deck		3075	sf		18,450						18,450	0.45	0.11%	$277
104												0	0.00	0.00%	$0
105	**Vehicle Serices (Area F)**	**8682 sf**										0	0.00	0.00%	$0
106		**$3,971,032.60 Bldg Breakdown**										0	0.00	0.00%	$0
	Market Volitility, Contingency, Inflation (Construction Cost Area F)		**0.1**			237,492						237,492	5.75	1.41%	$3,562
107	Building Pad (1.5 depth)		480	cy		24,000						24,000	0.58	0.14%	$360
108	Concrete Foundation / Slab (Floor 1)		7622	sf		228,660						228,660	5.54	1.36%	$3,430
109	Service Bay		1060	sf		42,400						42,400	1.03	0.25%	$636
109	PEMB		8682	sf		651,150						651,150	15.77	3.87%	$9,767
110	Joist / Deck		8682	sf		130,230						130,230	3.15	0.77%	$1,953
111	Standing Seam Roof		0	sf		In PEMB						0	0.00	0.00%	$0
112	Misc Metals (Bracing / Lintels / Etc.)		0	ls		45,000						45,000	1.09	0.27%	$675
113	Pan Stairs		2	ea		4,500						4,500	0.11	0.03%	$68
114	Drywall Hard Ceilings)		843	sf		8,430						8,430	0.20	0.05%	$126
115	Drywall (Partitions)		17980	sf		107,880						107,880	2.61	0.64%	$1,618
116	Perimeter Hat Channel / Drywall with insulation		11540	sf		69,240						69,240	1.68	0.41%	$1,039
117	TBTP		17980	sf		89,900						89,900	2.18	0.53%	$1,349

PACKET
7.950
February 8, 2022

Owner:	COM	State:	TX				Bld Area (sf):	41,282				
Architect:	Ashley Coco	Schedule (mo):	14				Site Area (sf):	150,000				
Estimator:	jb	Bond Rate:	1.50%				Site Area (Acres):	3.44				
118	FRP	1800	sf	9,000			9,000	0.22	0.05%	$135		
119	Lockers	11	ea	8,250			8,250	0.20	0.05%	$124		
120	Flooring (simply averaging versus each indiviual component)	8682	sf	82,479			82,479	2.00	0.49%	$1,237		
121	Corner Guards	10	ea	750			750	0.02	0.00%	$11		
122	Ceramic at Restrooms Wall Tile Only	1380	sf	4,830			4,830	0.12	0.03%	$72		
123	Millwork / Tops	45	lf	15,750			15,750	0.38	0.09%	$236		
124	Shower Stalls / Benches	4	ea	5,000			5,000	0.12	0.03%	$75		
125	Breakroom Appliances	1	ls	10,000			10,000	0.24	0.06%	$150		
126	Lay in Ceiling	2596	sf	12,980			12,980	0.31	0.08%	$195		
127	Fire Caulking / Misc Caulk	1	ls		6,500	4,500	11,000	0.27	0.07%	$0		
128	Aluminum Storefront / HM Entries - Doubles	2	ea	9,000			9,000	0.22	0.05%	$135		
129	Windows Alum / HM	600	sf	27,000			27,000	0.65	0.16%	$405		
129	Single Man Doors Perimeter	7	ea		8,750	1,750	10,500	0.25	0.06%	$0		
130	HM / Wood Doors / Hardware	15	ea		18,750	3,750	22,500	0.55	0.13%	$0		
131	OH Doors	6	ea	75,000			75,000	1.82	0.45%	$1,125		
132	Roller Shades	1	ls	8,500			8,500	0.21	0.05%	$128		
133	Toilet Partitions	4	ea		6,000	1,400	7,400	0.18	0.04%	$0		
134	Toilet Accessories / Shower Curtains	20	ea		4,000	1,000	5,000	0.12	0.03%	$0		
135	Mechanical / Controls	10	ton	100,000			100,000	2.42	0.59%	$1,500		
136	Plumbing	16	ea	72,000			72,000	1.74	0.43%	$1,080		
137	Electrical	8682	sf	191,004			191,004	4.63	1.13%	$2,865		
138	OFCI Generator	1	ls	75,000			75,000	1.82	0.45%	$1,125		
138	Fire Sprinkler	8682	sf	28,217			28,217	0.68	0.17%	$423		
139	Fire Alarm	8682	sf	28,217			28,217	0.68	0.17%	$423		
140	Bollards at OH Doors (entry and exit)	12	ea	9,000			9,000	0.22	0.05%	$135		
141	Tire Racks	28	ea	14,000			14,000	0.34	0.08%	$210		
142	Warehouse Shelving	18	ea	9,900			9,900	0.24	0.06%	$149		
143	OFCI Equipment (labor / lifts / etc.)	1	ls	75,000			75,000	1.82	0.45%	$1,125		
144	Lock Key Box	1	ea	1,250			1,250	0.03	0.01%	$19		
145	Misc. Metals / Trench Covers Etc.	1	ls	45,000			45,000	1.09	0.27%	$675		
146	**Truch Wash E (Area A)**	**1493**	**sf**				0	0.00	0.00%	$0		
147	**$1,710,136.60 Bldg Breakdown**						0	0.00	0.00%	$0		
	Market Volitility, Contingency, Inflation (Construction Cost Area A)	**0.1**		31,956			31,956	0.77	0.19%	$479		
147	Building Pad (1.5 depth)	85	cy	4,250			4,250	0.10	0.03%	$64		
148	Concrete Foundation / Slab (Floor 1)	1496	sf	44,880			44,880	1.09	0.27%	$673		
149	CMU	1800	sf	63,000			63,000	1.53	0.37%	$945		
150	Epoxy Coating interior	1800	sf	18,000			18,000	0.44	0.11%	$270		
151	Epoxy Coating Exterior / Logo	1800	sf	27,000			27,000	0.65	0.16%	$405		
151	Joist / Deck	1493	sf	22,395			22,395	0.54	0.13%	$336		
152	Standing Seam Roof	1493	sf	29,860			29,860	0.72	0.18%	$448		
153	Wash Equipment	1	ls	25,000			25,000	0.61	0.15%	$375		
154	Grate at Pit / Misc Lintels / / Misc Steel	1	ls	15,000			15,000	0.36	0.09%	$225		
155	Resinous Poured Flooring	1493	sf	11,944			11,944	0.29	0.07%	$179		
156	Electrical	1493	sf	32,846			32,846	0.80	0.20%	$493		
157	Mechanical	1493	sf	25,381			25,381	0.61	0.15%	$381		
158							0	0.00	0.00%	$0		
159							0	0.00	0.00%	$0		
160							0	0.00	0.00%	$0		
161							0	0.00	0.00%	$0		
162							0	0.00	0.00%	$0		
163							0	0.00	0.00%	$0		
164							0	0.00	0.00%	$0		
165							0	0.00	0.00%	$0		
166							0	0.00	0.00%	$0		
167							0	0.00	0.00%	$0		
168							0	0.00	0.00%	$0		
	AddCheck -->	OK		14,164,063	364,617	814,093	15,342,773	371.66	91.13%	$212,461		
	Percent Cost:			92.3%	2.4%	5.3%		0.00	0.00%			
	(MISC)			LAB BURDEN	35.00%	40.00%	311,805	7.55	1.85%			
	Bldrs. Risk	$16,876		Sales Tax		0.00%	0	0.00	0.00%			
	Gen. Liab.	$62,618		Sub Total			15,654,578	379.21	92.99%			
	OPL	$0		B.R./G.L./OPL			79,494	1.93	0.47%			
	P&P Bond	$125,430		Fee		7.0%	1,101,385	26.68	6.54%			
						Total	16,835,457	407.82	100.00%			
					P & P Bond (Time Adjusted)		127,939	0.760%				

PACKET
7.951
February 8, 2022

Owner:	COM	State:	TX	Bld Area (sf):	41,282
Architect:	Ashley Coco	Schedule (mo):	14	Site Area (sf):	150,000
Estimator:	jb	Bond Rate:	1.50%	Site Area (Acres):	3.44

		Total With Bond	**16,963,397**
Verify tax rate!!!	**Gross Receipts Tax Rate**	**Gross Receipts Tax Add**	**0**
		Total W Gross Receipts Tax	**16,963,397**

Departments:	Percentages	Building	Building Proper / Site / General Conditions
Water / Wastewater	30%	B,C,& D	$2,792,979
Water / Wastewater	67%	E	$1,317,792
Water / Wastewater	100%	A	$1,711,455
Solid Waste	70%	B,C,& D	$6,515,194
Solid Waste	33%	E	$653,625
Vehicle Services	100%	F	$3,972,351

Summary	**Total**
Water / Wastewater	5,822,226
Solid Waste	7,168,819
Vehicle Services	3,972,351

PACKET
7.952
February 8, 2022

City Council Meeting

Item Number: 8

Meeting Date: February 8, 2022

To: City Council / City Manager

From: Mark Widmann, Director

Subject: **RESOLUTION AUTHORIZING THE EXECUTION OF THE SIXTH AMENDMENT TO THE INTERLOCAL MANAGEMENT SERVICES AGREEMENT BETWEEN THE CITY OF MIDLAND, TEXAS AND MIDLAND COUNTY HOSPITAL DISTRICT, DOING BUSINESS AS MIDLAND MEMORIAL HOSPITAL, FOR CERTAIN MEDICAL AND WELL-BEING SERVICES; SAID AMENDMENT ADJUSTING THE ANNUAL FEE AND PROVIDING FOR THE HOSTING OF INFLUENZA CLINICS; AND AUTHORIZING PAYMENT (DISTRICT: ALL) (ADMINISTRATIVE SERVICES)**

Purpose:

To extend the current interlocal Management Services Agreement between the City of Midland and Midland Memorial Hospital with a three-percent (3%) fee increase.

Recommended City Council Action:

Approve

Fiscal Impact:

The annual fee for the Health & Wellness Center (Clinic) will remain at the current cost of $698,189.88. Payment from funds available in the Group Health Fund.

Discussion:

This amendment will provide continued quality healthcare at the Health & Wellness Center located at 709 W Louisiana Avenue to our plan members. The services provided include:
• Walk-in services or Appointment basis.
• Episodic Care: Assessment and treatment of medical conditions that are episodic in nature and short duration.

• Management of chronic conditions.
• Routine annual exams and screenings.
• Lab Draws.
• Biometric screenings.
• Flu shot clinics
• Health Maintenance and Disease Prevention Chronic Condition Coaching

Tina Jaug

City Manager's Office

SIXTH AMENDMENT TO MANAGEMENT SERVICES AGREEMENT

THIS SIXTH AMENDMENT TO MANAGEMENT SERVICES AGREEMENT ("Amendment") is made and entered into as of April 1, 2022 for and in consideration of the covenants and agreements contained herein, and in order to obtain the mutual benefits provided herein, this Amendment is made and entered by and between the City of Midland (hereafter referred to as the "City") and Midland County Hospital District dba Midland Memorial Hospital ("Hospital"), a political subdivision of the State of Texas.

Recitals:

WHEREAS, the City and Hospital entered into that certain Management Services Agreement on the 16th day of December 2015 ("Agreement") wherein Hospital agreed, pursuant to the Agreement, to arrange for the provision of physician and medical personnel support of Medical & Well-Being Services (as defined in the Agreement), through its various nonprofit health organizations, to eligible employees of the City and/or their eligible dependents participating in the City's qualified health plan; and

WHEREAS, the City and Hospital have amended the Agreement: the First Amendment with an effective date of February 1, 2017; the Second Amendment with an effective date of April 1, 2018; the Third Amendment with an effective date of April 1, 2019; the Fourth Amendment with an effective date of April 1, 2020; and the Fifth Amendment with an effective date of April 1, 2021; and

WHEREAS, the City and Hospital desire to amend the Agreement as hereinafter set forth.

NOW, THEREFORE, for good and valuable consideration, the receipt and the sufficiency of which are hereby acknowledged, the City and Hospital hereby agree to amend the Agreement as follows:

Amendments:

1. **Amendment to Section 2.01**. Section 2.01 "Monthly Fee" of the Agreement is amended to incorporate rate increases as permitted under Section 2.03 "Rate Increases" and shall be replaced in its entirety with the following:

"2.01 Monthly Fee. An annual fee of $698,189.88 will be billed in twelve (12) equal monthly installments of $58,182.49. Within thirty (30) days of receipt of the Hospital monthly invoices, City shall pay to Hospital the amount invoiced. Hospital will notify the City immediately in writing if the City fails to pay Hospital as required herein. Failure to pay Hospital will result in loss of Health & Wellness Center access commencing sixty (60) days after the nonpayment from the date of the outstanding invoice. Hospital shall deduct $2,083.34 per month from April 1, 2022 to March 31, 2023 for the difference in cost between a Medical Doctor and an Advanced Practitioner.

The City shall not be responsible for the compensation of Hospital's employees and agents for the provision of Medical & Well-Being Services, and other costs and expenses incurred

by Hospital under this Agreement, except those items, or similar items that are the City's responsibility as otherwise provided for herein or that are mutually agreed to that are beyond the scope of services or items provided under this Agreement.

2. **Amendment to Exhibit A – "Scope of Services".** Exhibit A "Scope of Services" of the Agreement is amended to include the addition of influenza clinics to the listing of primary care services. The following shall be added to the section titled "Primary care" in Exhibit A following the "Travel Medicine" subsection to read as follows:

" • Influenza Clinics

° Midland Health will conduct two influenza clinics in locations as directed by the City of Midland. The cost of the influenza injections and accompanying costs of conducting clinics will be in addition to monthly costs shown in Section 2.01."

3. **Counterparts.** This Amendment may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. The delivery of an executed counterpart of the Amendment by facsimile or electronic transmission will be deemed to be an original counterpart of the Amendment so transmitted.

4. **Headings.** The headings contained in this SIXTH Amendment have been inserted for convenience only and shall not be deemed to limit or otherwise affect the construction of any provisions thereof or hereof. Terms used but not defined herein shall have the meanings assigned to them in the Agreement.

5. **Effect of SIXTH Amendment**. The Agreement shall be modified only by the express provisions of this SIXTH Amendment and the Agreement as amended hereby shall otherwise remain in full force and effect.

6. **Entire Agreement.** The Agreement as amended by the First Amendment, the Second Amendment, the Third Amendment, the Fourth Amendment, the Fifth Amendment, and this Sixth Amendment constitute the full and entire understanding and agreement between the parties with respect to the subject matter hereof.

[Remainder of page intentionally left blank. Signature pages follow.]

SIGNATURE PAGE OF

SIXTH Amendment to Management Services Agreement

IN WITNESS WHEREOF, the undersigned have executed this Amendment as of the day and year first written above.

City of Midland

By: _____
Name: _____
Title: _____

Midland County Hospital District dba Midland Memorial Hospital

By: _____
Name: Russell Meyers
Title: President & CEO

RESOLUTION NO. _____

RESOLUTION AUTHORIZING THE EXECUTION OF THE SIXTH AMENDMENT TO THE INTERLOCAL MANAGEMENT SERVICES AGREEMENT BETWEEN THE CITY OF MIDLAND, TEXAS AND MIDLAND COUNTY HOSPITAL DISTRICT, DOING BUSINESS AS MIDLAND MEMORIAL HOSPITAL, FOR CERTAIN MEDICAL AND WELL-BEING SERVICES; SAID AMENDMENT ADJUSTING THE ANNUAL FEE AND PROVIDING FOR THE HOSTING OF INFLUENZA CLINICS; AND AUTHORIZING PAYMENT

WHEREAS, the City Council, by Resolution No. 2015-385, authorized the execution of an interlocal management services agreement with Midland County Hospital District, doing business as Midland Memorial Hospital, to provide certain medical and well-being services (the "Agreement"); and

WHEREAS, the City Council, by Resolution No. 2017-057, authorized the execution of the first amendment to the Agreement; and

WHEREAS, the City Council, by Resolution No. 2018-287, authorized the execution of the second amendment to the Agreement; and

WHEREAS, the City Council, by Resolution No. 2019-089, authorized the execution of the third amendment to the Agreement; and

WHEREAS, the City Council, by Resolution No. 2020-063, authorized the execution of the fourth amendment to the Agreement; and

WHEREAS, the City Council, by Resolution No. 2021-023, authorized the execution of the fifth amendment to the Agreement; and

WHEREAS, the City Council finds it to be in the public interest to authorize the execution of a sixth amendment (the "Amendment") to the Agreement to adjust the annual fee to $698,189.88 and to provide for the hosting of influenza clinics;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the City Manager is hereby authorized and directed to

execute, on behalf of the City of Midland, the Amendment to the Agreement with Midland County Hospital District, doing business as Midland Memorial Hospital. Said Amendment shall be in a form substantially similar to that attached hereto and incorporated herein as Exhibit "A".

SECTION TWO. That the City Comptroller is hereby authorized and directed to pay Midland County Hospital District, doing business as Midland Memorial Hospital, pursuant to the terms of the Agreement, as amended, from funds available in the Group Health Fund upon receipt of proper invoices or statements approved by the Administrative Services Director.

On motion of Council member _____, seconded by Council member _____, the above and foregoing resolution was adopted by the City Council of the City of Midland at a regular meeting on the _____ day of _____, A.D., 2022, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

RECOMMENDED AND APPROVED:

_____
Robert Patrick, City Manager

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Mark Widmann, Administrative Services Director

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

EXHIBIT "A"

SIXTH AMENDMENT TO MANAGEMENT SERVICES AGREEMENT

THIS SIXTH AMENDMENT TO MANAGEMENT SERVICES AGREEMENT ("Amendment") is made and entered into as of April 1, 2022 for and in consideration of the covenants and agreements contained herein, and in order to obtain the mutual benefits provided herein, this Amendment is made and entered by and between the City of Midland (hereafter referred to as the "City") and Midland County Hospital District dba Midland Memorial Hospital ("Hospital"), a political subdivision of the State of Texas.

Recitals:

WHEREAS, the City and Hospital entered into that certain Management Services Agreement on the 16th day of December 2015 ("Agreement") wherein Hospital agreed, pursuant to the Agreement, to arrange for the provision of physician and medical personnel support of Medical & Well-Being Services (as defined in the Agreement), through its various nonprofit health organizations, to eligible employees of the City and/or their eligible dependents participating in the City's qualified health plan; and

WHEREAS, the City and Hospital have amended the Agreement: the First Amendment with an effective date of February 1, 2017; the Second Amendment with an effective date of April 1, 2018; the Third Amendment with an effective date of April 1, 2019; the Fourth Amendment with an effective date of April 1, 2020; and the Fifth Amendment with an effective date of April 1, 2021; and

WHEREAS, the City and Hospital desire to amend the Agreement as hereinafter set forth.

NOW, THEREFORE, for good and valuable consideration, the receipt and the sufficiency of which are hereby acknowledged, the City and Hospital hereby agree to amend the Agreement as follows:

Amendments:

1. **Amendment to Section 2.01**. Section 2.01 "Monthly Fee" of the Agreement is amended to incorporate rate increases as permitted under Section 2.03 "Rate Increases" and shall be replaced in its entirety with the following:

"2.01 Monthly Fee. An annual fee of $698,189.88 will be billed in twelve (12) equal monthly installments of $58,182.49. Within thirty (30) days of receipt of the Hospital monthly invoices, City shall pay to Hospital the amount invoiced. Hospital will notify the City immediately in writing if the City fails to pay Hospital as required herein. Failure to pay Hospital will result in loss of Health & Wellness Center access commencing sixty (60) days after the nonpayment from the date of the outstanding invoice. Hospital shall deduct $2,083.34 per month from April 1, 2022 to March 31, 2023 for the difference in cost between a Medical Doctor and an Advanced Practitioner.

The City shall not be responsible for the compensation of Hospital's employees and agents for the provision of Medical & Well-Being Services, and other costs and expenses incurred

by Hospital under this Agreement, except those items, or similar items that are the City's responsibility as otherwise provided for herein or that are mutually agreed to that are beyond the scope of services or items provided under this Agreement.

2. **Amendment to Exhibit A – "Scope of Services".** Exhibit A "Scope of Services" of the Agreement is amended to include the addition of influenza clinics to the listing of primary care services. The following shall be added to the section titled "Primary care" in Exhibit A following the "Travel Medicine" subsection to read as follows:

" • Influenza Clinics

° Midland Health will conduct two influenza clinics in locations as directed by the City of Midland. The cost of the influenza injections and accompanying costs of conducting clinics will be in addition to monthly costs shown in Section 2.01."

3. **Counterparts.** This Amendment may be executed in one or more counterparts, each of which shall be deemed an original, but all of which together shall constitute one and the same instrument. The delivery of an executed counterpart of the Amendment by facsimile or electronic transmission will be deemed to be an original counterpart of the Amendment so transmitted.

4. **Headings.** The headings contained in this SIXTH Amendment have been inserted for convenience only and shall not be deemed to limit or otherwise affect the construction of any provisions thereof or hereof. Terms used but not defined herein shall have the meanings assigned to them in the Agreement.

5. **Effect of SIXTH Amendment**. The Agreement shall be modified only by the express provisions of this SIXTH Amendment and the Agreement as amended hereby shall otherwise remain in full force and effect.

6. **Entire Agreement.** The Agreement as amended by the First Amendment, the Second Amendment, the Third Amendment, the Fourth Amendment, the Fifth Amendment, and this Sixth Amendment constitute the full and entire understanding and agreement between the parties with respect to the subject matter hereof.

[Remainder of page intentionally left blank. Signature pages follow.]

SIGNATURE PAGE OF

SIXTH Amendment to Management Services Agreement

IN WITNESS WHEREOF, the undersigned have executed this Amendment as of the day and year first written above.

City of Midland

By: _____
Name: _____
Title: _____

Midland County Hospital District dba Midland Memorial Hospital

By: _____
Name: Russell Meyers
Title: President & CEO

City Council Meeting

Item Number: **10**

Meeting Date: **February 8, 2022**

To: **City Council / City Manager**

From: **Justine Ruff, Director**

Subject: **Motion authorizing the execution of Amendment No. 2 to the Professional Services Agreement with Parkhill, Smith & Cooper, Inc., DBA Parkhill; said Amendment providing for the Reconstruct Asphalt Air Carrier Apron Pavement with Concrete Project, the Airfield Wildlife Fence Improvements Project, and the Spaceport Business Park Environmental Project; authorizing the appropriation of $265,000.00 from the Airport Fund Unappropriated Fund Balance to the Reconstruct Asphalt Air Carrier Apron Pavement with Concrete Project in Fund 505; authorizing the appropriation of $290,000.00 from the Airport Fund Unappropriated Fund Balance to Project 900345, MAF Airfield Wildlife Fence Improvements Project in Fund 506; and authorizing the appropriation of $180,650.00 from the Airport Fund Unappropriated Fund Balance to Project 900111, Development Park Programmatic EA (District 4) (Airports)**

Purpose:

Motion authorizing the execution of Amendment No. 2 to the Professional Services Agreement with Parkhill for the following projects: Reconstruct Asphalt Air Carrier Apron Pavement with Concrete; Airfield Wildlife Fence Improvements; and Spaceport Business Park Environmental, and authorizing the appropriation of funds for said projects.

Recommended City Council Action:

Approve

Fiscal Impact:

RECONSTRUCT ASPHALT AIR CARRIER APRON PAVEMENT WITH CONCRETE

Airport/City Share 100%	$ 265,000.00

Breakout of Costs:

Design Phase Administrative Costs – Airport	$ 10,000.00
Preliminary Engineering Report Phase Fee	$ 25,000.00
Preliminary Design Phase Fee	$ 65,000.00
Final Design Phase Fee	$ 75,000.00
Bidding Phase Fee	$ 20,000.00
Design Phase Geotechnical Testing	$ 25,000.00
Design Phase Surveying	$ 25,000.00
Design Phase Hourly and Reimbursable Costs	$ 20,000.00
Total Recommended Design/Bidding Phase Appropriation	$ 265,000.00

Appropriation Language:

Funding is available in the Airport Fund Unappropriated Fund Balance and is hereby appropriated and will be transferred to a Project in Fund 505.

MAF AIRFIELD WILDLIFE FENCE IMPROVEMENTS

Financial Impact:

Airport/City Share 100% (100% PFC Reimbursable)	$ 290,000.00

Breakout of Costs:

Design Phase Fee	$ 265,000.00
Design Phase Surveying	$ 25,000.00
Total Recommended Additional Design Phase Appropriation	$ 290,000.00

Appropriation Language:

Funding is available in the Airport Fund Unappropriated Fund Balance and is hereby appropriated and will be transferred to Project 900345, MAF Airfield Wildlife Fence Improvement Project in Fund 506.

SPACEPORT BUSINESS PARK ENVIRONMENTAL

Financial Impact:

Airport/City Share 100%	$ 180,650.00

Breakout of Costs:

Sub-Consultant Services (Terracon)	$ 160,650.00
Parkhill services for review of Terracon Reports and TCEQ response letters	$ 20,000.00
Total Recommended additional Appropriation	$ 180,650.00

Appropriation Language:
Funding is available in the Airport Fund Unappropriated Fund Balance and is hereby appropriated and will be transferred to Project 900111, Development Park Programmatic EA.

Discussion:

The City of Midland, Texas and Parkhill entered into an Agreement for Professional Services dated March 23, 2021, for improvements contained in the Airport's 5-year Airport Capital Improvement Program (ACIP). This is the second amendment to that agreement and adds the following:

Reconstruct Asphalt Air Carrier Apron Pavement with Concrete:
The section of the main apron located immediately north of the Terminal Building was constructed in 1999 with an asphalt surface pavement section as part of the construction of the concrete apron to serve the newly constructed Terminal Building. At that time, this area of the apron was anticipated to only serve smaller turbo prop commuter air carrier aircraft via ground loading and was thus constructed of asphalt surface course pavement. Over the last few years the larger jet air carrier aircraft are now using the pavement and the pavement has begun to deteriorate. This project will reconstruct this section of the apron with a concrete pavement section to support the current and forecasted large air carrier aircraft. The Airport is upfronting the cost of this project and expects to reimburse at least 90% of the cost with future FAA funding.

MAF Airfield Wildlife Fence Improvements:
The existing airfield security chain link fence was installed in 1982 when a 6' high fence was standard and primarily for security of the airfield. However, wildlife has become an increasing aircraft hazard on the airfield from animals that have both jumped over and burrowed under the existing fenceline. An 8' high chain link is now standard to deter jumping over the fence and a concrete barrier strip that extends down into the ground approximately 24" is used to deter burrowing. This project has been previously approved for Passenger Facility Charge (PFC) funding, and this amendment is needed to furnish additional scope. This amendment adds the following to the project:

a. Relocation of vehicle access control gates NV4 and NV 11 – including new concrete pavement, concrete flat work, Airport security access controls, and new electromagnetic gate operators.

b. Modification to all airfield automated vehicle gates to new cantilever structural frame gates.

c. Replacement of select automated vehicle gates to new electromagnetic gate operators, including modification of electrical panels and gate operator pads.

d. Installation of wildlife or range fence to the new east side property acquisition. This will include fence and manual swing gates.

e. Relocation of airfield security communication cable from on the fence to below ground in conduit.

The cost of these additional items will be reimbursed by 100% Passenger Facility Charge funding.

Spaceport Business Park Environmental:
This portion of the amendment involves the appropriation of additional funds for the cost associated with the continued environmental remediation in the Spaceport Business Park. The costs associated cover the TCEQ required groundwater monitoring, product recovery and reporting related to the Spaceport Business Park Environmental for the next year. All charges related to this environmental remediation are paid from the Airport Operating Fund.

The Airport Planning and Development Board unanimously approved this amendment during their January 2022 meeting.

City Manager's Office

AMENDMENT NO. 2
TO
AGREEMENT

BETWEEN THE CITY OF MIDLAND, TEXAS
AND
PARKHILL
FOR
PROFESSIONAL SERVICES

WHEREAS, the City of Midland, Texas and Parkhill have entered into an Agreement for professional services dated March 23, 2021, for improvements contained in the Airport Capital Improvement Program; as amended April 13, 2021 (Amendment 1);

AND WHEREAS, the City of Midland, Texas desires to perform the improvements listed in the Recitals of the Agreement as Item 2 Reconstruct Asphalt Air Carrier Apron Pavement with Concrete, Item 11 MAF Airfield Wildlife Fence Improvements and Item 12 Spaceport Business Park Environmental:

THIS AGREEMENT WITNESSETH:

A. The Recitals of the Agreement shall be amended to include the following items:

11. MAF Airfield Wildlife Fence Improvements
12. Spaceport Business Park Environmental

B. Exhibit B, Article 4 – PAYMENTS TO THE ENGINEER, the following shall be added to paragraph B 4.01:

"Item 2 Reconstruct Asphalt Air Carrier Apron Pavement with Concrete

A Lump Sum amount of $272,500 based on the following distribution of compensation:

a.	Preliminary Engineering Report Phase	$ 25,000
b.	Preliminary Design Phase	$ 65,000
c.	Final Design Phase	$ 75,000
d.	Bidding Phase	$ 20,000
e.	Construction Phase	$ 87,500

* Scope of Project and Work Attached"

"Item 11 MAF Airfield Wildlife Fence Improvements

A lump sum amount of $265,000 based on the following distribution of compensation:

a.	Design Phase	$265,000

* Scope of Project and Work Attached"

C. Exhibit B, Article 4 – PAYMENTS TO THE ENGINEER, the following shall be added to paragraph B 4.02:

"Item 2 Reconstruct Asphalt Air Carrier Apron Pavement with Concrete

Additional Services under Item 2 of the Recitals on Page 1 shall be compensated at the Standard Hourly Rates Method of Payment plus Direct Expenses and Engineer's Consultant's charges on the basis of cost times a factor of 1.15.

a. Design Phase Reimbursable $20,000
b. Design Surveying & Testing $50,000"

"Item 11 MAF Airfield Wildlife Fence Improvements

Additional Services under Item 11 of the Recitals on Page 1 shall be compensated at the Standard Hourly Rates Method of Payment plus Direct Expenses and Engineer's Consultant's charges on the basis of cost times a factor of 1.15.

a. Design Surveying $25,000"

"Item 12 Spaceport Business Park Environmental

The total compensation for Professional Services under Item 12 of the Recitals on Page 1 shall be compensated at the Standard Hourly Rates Method of Payment plus Direct Expenses and Engineer's Consultant's charges on the basis of cost times a factor of 1.05.

Total compensation for Item 12 under this Amendment shall not exceed $180,650 without written authorization from the Owner.

* Scope of Project and Work Attached. The above not to exceed amount includes Parkhill services for review of Terracon reports, TCEQ response letters and meetings."

IN WITNESS WHEREOF, the City of Midland, Texas and Parkhill have hereto set their hands this 8th day of February, 2022.

OWNER:	ENGINEER:
CITY OF MIDLAND, TEXAS	PARKHILL
By:	By:
Patrick Payton	Danny G. Winchester
Title: Mayor	Title: Principal
Date Signed:	Date Signed: February 8, 2022
Address for giving notices:	Address for giving notices:
P.O. Box 1152 Midland, Texas 79702 Phone: (432) 685-7357	1700 W. Wall Midland, Texas 79701 Phone: (432) 697-1447

IN DUPLICATE

MIDLAND INTERNATIONAL AIR & SPACE PORT
ITEM 2 RECONSTRUCT ASPHALT AIR CARRIER APRON PAVEMENT WITH CONCRETE

SCOPE OF PROJECT IMPROVEMENTS AND SCOPE OF PROFESSIONAL SERVICES

1. Project history and objective - The section of the main apron located immediately north of the Terminal Building was constructed in 1999 with an asphalt surface pavement section as part of the construction of the concrete apron to serve the newly constructed Terminal Building. At the time of the opening of the new Terminal Building, this area of the apron was anticipated to only serve the smaller turbo prop commuter air carrier aircraft via ground loading and was thus constructed of asphalt surface course pavement section. Over the past few years, the larger jet air carrier aircraft are now using this portion of the apron to board passengers regularly. The typical life expectancy of asphalt pavement is approximately 20 years. The pavement has begun to deteriorate due to age and the use by the heavier aircraft. This project will reconstruct this section of the apron with a concrete pavement section to support the current and forecasted large air carrier aircraft.

2. Anticipated Scope of Improvements - This project will design, bid and construct improvements to replace the existing asphalt surface pavement section with a concrete pavement section to support the forecasted aircraft size. The pavement will be reconstructed to full depth with new subgrade course, base course, and concrete surface. The aircraft parking envelope will be painted onto the new concrete pavement.

   The project will include the design, bidding and construction phase professional services costs.

3. PSC will prepare bid documents for use in bidding the construction of the improvements.

4. Assist in the Bidding process of the project.

5. Provide Construction Phase Administration and Resident Project Representative (RPR).

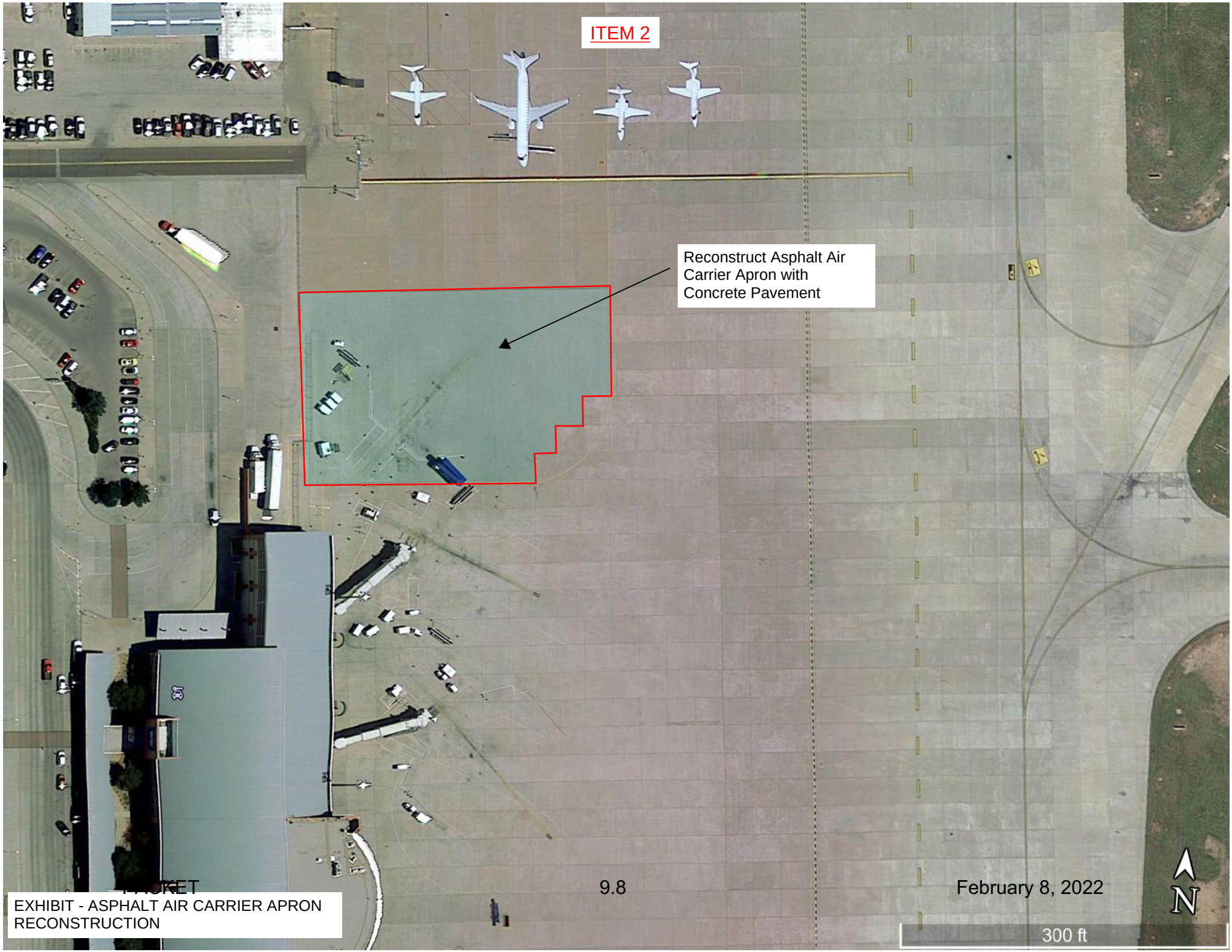


EXHIBIT - ASPHALT AIR CARRIER APRON RECONSTRUCTION

MIDLAND INTERNATIONAL AIR & SPACE PORT
ITEM 11 MAF AIRFIELD WILDLIFE FENCE IMPROVEMENTS

SCOPE OF PROJECT IMPROVEMENTS AND SCOPE OF PROFESSIONAL SERVICES

1. Project history and objective - The existing airfield security chain link fence was installed in 1982. At that time, 6' high fence was the standard height, primarily for security of the airfield. However, wildlife has become an increasing aircraft hazard issue on the airfield from animals that have both jumped over the 6' high fence or burrowed under the fence. For wildlife control at airports with low deer activity, 8' high chain link fence and gates is used to reduce the potential for wildlife to jump over the fence and continue to provide the required security control to the airfield. To control burrowing under the fence, a concrete barrier strip that extends down into the ground approximately 24" is used along the fence line, centered with the chain link fabric.

2. Anticipated scope of improvements for Amendment 2 – The scope of improvements for this project has changed to include, in addition to the prior scope of improvements, the following:

   a. Relocation of vehicle access control gates NV4 and NV11 – including new concrete pavement, concrete flat work, airport security access controls, new electromagnetic gate operators, relocating communication cable and relocation of electrical service and panels.
   b. Modification to all airfield automated vehicle gates to new cantilever structural frame gates.
   c. Replacement of select automated vehicle gates to new electromagnetic gate operators, including modification of electrical panels and gate operator pads.
   d. Installation of wildlife or range fence to the new east side property acquisition. This will include fence and manual swing gates.
   e. Relocation of airfield security communication cable from on the fence to below ground in conduit.

3. The professional services for the above scope of improvements will include the development of the design and preparation of the bid documents.

January 6, 2022

Mr. Danny G. Winchester
Parkhill
1700 West Wall Street, Suite 100
Midland, TX 79701

Phone: (432) 697-1447
Fax: (432) 697-9758
Email: dwinchester@parkhill.com

Re: Proposal for 2021-2022 Groundwater Monitoring, Product Recovery, and Reporting
Aerospace Development Park
NEC of La Force Boulevard and Highway 80 East
Midland, Midland County, Texas 79706
Terracon Proposal No. P94227003

Dear Mr. Winchester:

Terracon Consultants, Inc. (Terracon) appreciates the opportunity to submit this proposal to Parkhill (client) to conduct groundwater and light non-aqueous phase liquid (LNAPL) monitoring, LNAPL removal and reporting, and transmissivity testing along with plume analysis and closure criteria evaluation at the above-referenced site. The site is located in the southwest portion of the Midland International Air & Space Port located at 9506 La Force Blvd. in Midland, Texas.

Scope of Services (see Section 2.0 of attached Proposal Detail)	Task 1: Semi-Annual Groundwater Sampling and Reporting Conduct two semi-annual groundwater gauging and sampling events on a semi-annual basis in August 2021 and February 2022. Development of an Annual Groundwater Monitoring Report for TCEQ submittal in April 2021. Task 2: Product Recovery, Reporting, and Waste Management Perform product recovery using a manual LNAPL recovery pump on a weekly basis between November 2021 and October 2022. Development of a quarterly product recovery summary reports for submittal to the TCEQ. Collect removed product and purge water in drums and dispose according to applicable Texas regulations.

	Task 3: LNAPL Transmissivity Testing and Evaluation of Plume Stability and Closure Criteria Conduct transmissivity testing for LNAPL in up to 10 monitoring wells with LNAPL. Determine LNAPL transmissivity based on the results and incorporate the results in LNAPL and dissolved-phase plume stability analysis and evaluate site closure criteria for leaking petroleum storage tanks with LNAPL published in TCEQ publication RG-523/PST-03.
Schedule (see Section 3.0 of attached Proposal Detail)	Task 1: Semi-Annual Groundwater Sampling and Reporting Groundwater sampling is planned for August 2021 and February 2022. Delivery of draft Annual Groundwater Monitoring Report within 60 business days following receipt of sample analytical results from the February 2021 sampling event. Analytical results are expected within two weeks of delivery of the samples to the analytical laboratory. Annual Groundwater Monitoring Report is due to the TCEQ by April 30, 2022. Task 2: Product Recovery, Reporting, and Waste Management Delivery of Product Recovery Reports within 20 business days following completion of LNAPL recovery during the previous quarter. The to-date Product Recovery data will be included in the quarterly Product Recovery Report requested by the TCEQ. Generated waste will be deposited in drums staged just outside the airport southern fence line. The drums will be labeled and the waste profiled and disposed. Because waste is generated routinely, we plan on disposing of drums one time during the next period. Task 3: LNAPL Transmissivity Testing and Evaluation of Plume Stability and Closure Criteria This assessment will be completed after the second semi-annual sampling results are obtained and could be submitted with the groundwater monitoring report or as a standalone document.

Compensation (see Section 3.0 of attached Proposal Detail)	Task 1: Semi-Annual Groundwater Sampling and Reporting Time and materials $48,000. Task 2: Product Recovery, Reporting, and Waste Management Time and materials $88,000. Task 3: LNAPL Transmissivity Testing and Evaluation of Plume Stability and Closure Criteria Time and materials $17,000.

We have attached a Supplement to Agreement for Services that is incorporated into this proposal and that you must sign to authorize us to do this work. This proposal is valid for 60 days from the date of this proposal. We appreciate the opportunity to provide this proposal and look forward to working with you on this project. If this proposal meets with your approval, please sign the attached Supplement to Agreement for Services and return a copy to our Midland office. Project initiation may be expedited by emailing a signed copy to the undersigned.

If you should have any questions or comments regarding this proposal, please contact either of the undersigned at 214-630-1010.

Sincerely,
Terracon Consultants, Inc.

Marwan Salameh, P.E.
Senior Environmental Engineer

Erin Loyd, P.G.
Principal - Office Manager

Attachments: Proposal Detail
Supplement to Agreement for Services

1.0 PROJECT INFORMATION

The site consists of Midland International Air and Space Port, an approximate 1,429-acre tract of land located on the north side of West Highway 80 East in Midland, Midland County, Texas. The affected portion of the site is located within the southwest portion of the Midland International Air and Space Port and is improved with an approximate 13,500-square foot (sf) commercial building and concrete paved parking areas.

2.0 SCOPE OF SERVICES

The proposed scope of work is provided in response to the Texas Commission on Environmental Quality (TCEQ) Petroleum Storage Tank (PST) Division correspondence dated May 28, 2019 and May 22, 2020. The TCEQ PST Division made comments and recommendations in the correspondence dated May 28, 2019 including the following:

- *Non-Aqueous Phase Liquid (NAPL) must be recovered to the maximum extent practicable before the case can be evaluated for closure.*
- *Additional groundwater monitoring activities are necessary to document plume stability and delineation. Please begin conducting semi-annual groundwater monitoring events using all existing wells. Please analyze groundwater samples for BTEX/MTBE, arsenic, barium, TPH and PAHs (if warranted).*

In the correspondence dated May 22, 2020, the TCEQ provided the following:

- *Recent sampling results indicated that dissolved-phase arsenic is no longer delineated to 0.01 mg/L to the west of monitoring well MW-16. Therefore, it will be necessary to begin analyzing monitoring well MW-4 for arsenic during future monitoring events.*
- *Based on previous analytical results for polycyclic aromatic hydrocarbons (PAHs), we concur with your request to discontinue TPH and PAH analysis at this time.*
- *As previously indicated, NAPL must be recovered to the maximum extent practicable. At a minimum monthly well gauging and product recovery events should be conducted for 12 months. Upon completion of these activities, recovery methods and trends should be evaluated to determine if further corrective action is necessary. Please begin submitting quarterly Product Recovery Reports to document these activities.*

In the correspondence dated October 15, 2020, the TCEQ provided the following:

- *At this time, since NAPL recovery will continue, we request that recovery occur from all wells were NAPL is observed.*
- *To further support NAPL transmissivity calculations, we recommend that NAPL recovery testing be conducted to determine NAPL removal and recharge rates within a 24-hour*

period. An example of such testing is found in the Minnesota Pollution Control Agency guidance document 2-02 "Light Non-Aqueous Phase Liquid Management Strategy"

In the correspondence dated July 28, 2021, the TCEQ provided the following:

- *NAPL must be recovered to the maximum extent practicable.*
- *While groundwater elevations are low, please implement more aggressive NAPL recovery methods, such as Mobile Dual Phase Extraction (MDPE), to maximize NAPL recovery.*

The scope of work revolves around these requests and ongoing activities at the site.

2.1 Objectives

The objective of this proposal is to respond to comments and recommendations made by the TCEQ PST Division in the above-noted correspondence and to evaluate plume stability and closure criteria by performing the following:

Task 1: Semi-Annual Groundwater Sampling and Reporting
Semi-annual groundwater sampling is proposed to be conducted to continue meeting the requirements of the TCEQ PST Divisions request for continued monitoring of COCs in groundwater to demonstrate plume stability and delineation. Terracon's objective is to evaluate the presence of BTEX, and arsenic/barium in groundwater. Sampling and analysis for TPH and PAHs is no longer required. One annual report will be prepared based on the two sampling events.

Task 2: Product Recovery, Reporting, and Waste Management
The product recovery approach will be to remove LNAPL from all LNAPL monitoring wells with a manually-operated LNAPL pump or sorbent socks, when necessary. Use of the recovery pump (Spill Buddy™) was initiated in early November 2021 and the early results indicate that more LNAPL is removed compared to the sorbent socks. Observations will continue to be made as to the efficiency of utilizing this manual method of LNAPL recovery. At this time, the pump has been borrowed from another Terracon office while we evaluate efficacy of using this type of pump or whether other similar pumps offer better performance. Eventually, we will need to purchase a pump dedicated to this project. Thus, the cost for a manual portable pump is included in this proposal. Use of a recovery pump compared to sorbent socks eliminates the purchase cost of the socks and reduces the amount of waste generated while improving recovered volume of LNAPL. We believe the payback period is approximately 1 year, while we are able to remove more volume than can be removed using sorbent socks. At this time we are using a pump borrowed from another office on a trial basis but eventually we would need to purchase a pump for this project if we decided to continue with this approach. The current scope includes the purchase price of a new pump. Use of the pump will also result in an increased volume of recovered LNAPL and the ensuing disposal cost.

While the TCEQ is requesting use of more aggressive recovery methods such as use of MDPE, we believe understanding the trends using the LNAPL recovery pump is important before determining whether more aggressive methods would be needed. The cost of implementing MDPE is much greater than using the manual pump due to higher equipment and disposal costs. Additional methodologies will be considered throughout the duration of these gauging and product removal events. Groundwater and LNAPL removed will be managed according to applicable regulations. Quarterly LNAPL recovery reports will be prepared and submitted to the TCEQ.

Task 3: LNAPL Transmissivity Testing and Evaluation of Plume Stability and Closure Criteria

The TCEQ has requested in their October 15, 2020 correspondence that LNAPL recovery and recharge rates be determined as a mechanism for evaluating potential LNAPL recovery or lack of. Since a product recovery pump is currently in use, it is now possible to implement this method without the need for additional equipment. Based on the results, we will evaluate plume stability to establish the basis for completing an evaluation of the closure criteria established in the TCEQ guidance document RG-523. The goal is to determine if conditions at the site meet the established closure criteria for sites with LNAPL.

2.2 Commitment to Safety

Terracon has a commitment to the safety of all its employees. As such, and in accordance with our *Incident and Injury Free*® safety culture, Terracon will develop a Project Safety Plan to be used by our personnel during field services. Prior to commencement of on-site activities, Terracon will hold a tailgate safety meeting to review site-specific job hazards and health and safety needs for this specific project. In addition, prior to engaging in new on-site activities or tasks, we will re-evaluate potential job hazards and appropriate safe working procedures as part of our Pre-Task Planning process. At this time, we anticipate performing fieldwork in a U.S. EPA Level D work uniform consisting of safety glasses, protective gloves, and hard-toed boots. It may become necessary to upgrade this level of protection, at additional cost, while sampling activities are being conducted in the event that petroleum or chemical constituents are encountered in soils or groundwater that present an increased risk for personal exposure.

2.3 Task 1: Semi-Annual Groundwater Sampling and Reporting

Terracon currently conducts semi-annual groundwater sampling at the site. Based on TCEQ's request, Terracon proposes conducting two groundwater sampling events on a semi-annual schedule. Results will be summarized in a single Groundwater Monitoring Report to be submitted to the TCEQ PST Division in April 2022.

Monitoring well gauging events will utilize an interface probe to measure the depth to water and depth to product within each of the Terracon-installed groundwater monitoring wells. Well gauging will be conducted prior to groundwater sampling. Before gauging the wells, sorbent socks (if used) will be

removed at least one week prior to allow stabilization of the fluids in the wells.

2.3.1 Sampling and Laboratory Analytical Program

Terracon's sampling program will consist of the collection of one groundwater sample from each Terracon-installed groundwater monitoring well with the exception of monitoring wells MW-5 and MW-6, which are located west of the previously agreed upon "line of demarcation". These two wells are west and up gradient of the groundwater contaminant source area. MW-4 was one of the upgradient wells that was excluded from the sampling program. However, based on arsenic exceedance in MW-16 in February 2020, the TCEQ requested we monitor MW-4 for arsenic in groundwater. Groundwater samples will be collected during each sampling event utilizing low-flow sampling equipment and analyzed for BTEX (EPA method 8260B), and arsenic/barium (EPA method 6020). TPH and PAHs will no longer be analyzed based on TCEQ's acceptance of the request to discontinue analyzing for these parameters.

In addition to the constituents of concern, monitored natural attenuation (MNA) parameters including dissolved methane, dissolved iron, nitrate, and sulfate will be collected from a subset of wells to evaluate the occurrence of natural attenuation at the site. These parameters provide a secondary line of evidence of occurrence of natural attenuation mechanisms. The targeted wells include MW-11, MW-15, MW-17, MW-23 through MW-29.

Monitoring wells exhibiting measurable thicknesses of LNAPL will not be sampled. The client will be notified of any significant modifications to the sampling and analytical program.

2.3.2 Preparation of Annual Groundwater Monitoring Report

Upon receipt of the laboratory analytical results, an Annual Groundwater Monitoring Report will be prepared by April 30, 2022 that will include the following:

- Documentation of field activities;
- Site plan showing pertinent site features;
- Analytical laboratory results;
- Data evaluation and presentation of findings; and
- Recommendations concerning further action, if necessary.

The report tables and graphics will be generated using the EQuIS database and GIS tools. The final written report will reflect results, findings, and recommendations, and, as such, will take precedence over any verbal reports that Terracon personnel may have provided. The analysis, comments and recommendations presented in the final written report will be based on the information collected as discussed in this proposal.

2.4 Task 2: Product Recovery, Reporting, and Waste Management

2.4.1 Product Recovery

Terracon will remove LNAPL from monitoring wells MW-2, MW-3, MW-7, MW-8, MW-9, MW-10, MW-12, MW-13, MW-14, MW-18, MW-37, MW-38, and MW-39 with a manually operated, floating LNAPL pump. The Spill Buddy™ is a combination of a manually operated LNAPL pump and an interface probe that uses sensors to determine the LNAPL/water interface and then pump LNAPL only from the monitoring wells.

Terracon will initially mobilize to the site on a weekly basis to remove product from each of the monitoring wells. Each monitoring well will first be gauged with an interface probe to record the LNAPL in-well thickness. Terracon will then calculate the estimated volume of LNAPL contained in each well and within the well boring annulus to estimate the volume of LNAPL to be recovered from each monitoring well. LNAPL will be evacuated from each monitoring well until LNAPL has been removed to the extent of the pump capability. The volume of LNAPL removed from each monitoring well will be recorded to within 0.25 gallons. Even though the Spill Buddy™ is designed to only recover LNAPL, care will be taken to assure that water is not included in the estimated volume of LNAPL recovered. We will continue with weekly product recovery except during sampling events.

The weekly frequency may be adjusted to a lesser recovery frequency based on recovery data analysis described in Section 2.4.2. This proposal assumes 12 months of LNAPL recovery.

2.4.2 Product Recovery Reporting

The LNAPL recovery data will be analyzed to demonstrate declining rates (diminishing returns). However, this method can only be successful if recovery occurs on a set interval (e.g., weekly or biweekly) because it is not only the cumulative recovery that matters but also the recovery rate. Hence, the time interval between LNAPL recovery is important to determine the recovery rate.

Terracon will prepare quarterly Product Recovery Reports to the Client within 20 business days following completion of the previous quarter's recovery efforts. The product recovery reports will include the following:

- Estimated thickness of LNAPL observations measured in wells during each recovery event;
- Estimated quantity of LNAPL removed from each well during each recovery event;
- Documentation and description of LNAPL recovery methods and volumes;
- LNAPL Decline Curve graphs for each well to demonstrate declining recovery rates; and
- Presentation of findings and recommendations concerning further action including recovery curve analysis and interpretation, as appropriate.

The quarterly reports will be submitted to the TCEQ based on their request in the letter dated May 22, 2020.

The final written reports will reflect results, findings, and recommendations, and, as such, will take precedence over any verbal reports that Terracon personnel may have provided. The analysis, comments and recommendations presented in the final written reports will be based on the information collected as discussed in this proposal.

2.4.3 Investigation Derived Waste (IDW) Loading, Transportation and Disposal

For the purposes of this proposal and cost estimate, we have selected the receiving facility and transportation provider for the product and water waste (assuming Class II non-hazardous equivalent waste). If you have a receiving facility and/or transportation service provider that you prefer to utilize, please contact Terracon regarding your choice of subcontractors. Terracon will prepare and/or review waste characterization data forms and manifests for signature by the generator.

For scoping purposes, it is estimated that twenty 55-gallon drums containing LNAPL, purge water, and equipment cleaning water will be generated in the next 12 months including those already accumulated at the site as a result of groundwater sampling and LNAPL removal activities.

A total of one product and one water composite samples will be collected from the IDW drums for waste characterization purposes. Product and water waste samples will be collected and placed in laboratory-prepared glassware containing the appropriate preservative, labeled, and placed on ice in sample coolers. The sample coolers will be either released via chain-of-custody directly from the sampler to a representative of the analytical laboratory or secured with a custody seal and shipped to the selected analytical laboratory. Product and water waste samples will be analyzed for the following chemicals of concern:

SAMPLING AND ANALYTICAL PROGRAM	
REC / Area of Concern	**IDW**
Waste Product (Type)	IDW-Product-1 (composite)
Waste Water (Total Depth)	IDW-Water-1 (composite)
Product Analysis	1 sample for: BTEX – EPA 8260 TCLP for Lead – EPA 6020
Water Analysis	1 sample for: BTEX – EPA 8260 TPH – TX1005 RCRA Metals – EPA 6020 RCI

* BTEX – benzene, toluene, ethylbenzene, and total xylenes
* TPH – total petroleum hydrocarbons
*TCLP – toxicity characteristic leaching procedure
RCI – reactivity, corrosivity, and ignitability

2.5 Task 3: LNAPL Transmissivity Testing and Evaluation of Plume Stability and Closure Criteria

The TCEQ has requested that LNAPL be removed to the maximum extent practicable (MEP). MEP is not clearly defined by the regulations but the interpretation of the TCEQ case manager seems to imply that LNAPL removal is required as long as it is present in a monitoring well. However, the TCEQ has established certain criteria for evaluating closure for sites with LNAPL remaining in place. One of these criteria is establishment of plume stability and the other criteria is demonstration that adequate efforts to recover LNAPL are documented. The efforts documenting LNAPL removal is discussed under Task 2. Plume stability analysis will be demonstrated under this task. Two types of plume stability analyses will be demonstrated:

- Dissolved-phase plume stability analysis including well by well evaluation using methods utilizing Mann-Kendall statistics for plume modeling trends and plume mass stability utilizing methods such as mass zeroth and first order evaluations, and
- LNAPL-phase plume stability based on aerial distribution of LNAPL.

These analyses can be incorporated in the Annual Groundwater Monitoring Report or submitted as a standalone report.

To support plume stability analysis and based on request from the TCEQ in their October 15, 2020 correspondence, we proposed conducting transmissivity tests on the LNAPL wells. The use of the product recovery pump provides the best tool to implement transmissivity tests. These tests entail removal of LNAPL as quickly as possible and measuring recharge of LNAPL back into the well using an oil/water interface probe. Based on LNAPL recharge rate and well diameter, the LNAPL transmissivity can be determined.

In addition to plume stability and LNAPL transmissivity determinations, evaluation of the full closure criteria provided in the TCEQ guidance RG-523 (January 2017) will be made. Depending on the findings, the case for closure may be made or if the case for closure could not be made, identification of the reasons will be determined and evaluated and a means to address those causes will be advanced.

3.0 SCHEDULE AND FEE

If, as a result of these services, additional work is required outside the scope of this proposal, you will be contacted to discuss costs for additional work. Client authorization will be obtained prior to

commencement of any additional work outside the scope of services in this proposal. Schedule and fee breakdown by task is detailed below.

3.1 Task 1: Task 1: Semi-Annual Groundwater Sampling and Reporting

It is estimated that the Annual Groundwater Monitoring Report will be submitted to the client **within 60 business days following receipt of sample analytical results from the February 2022 sampling event**. The Annual Groundwater Monitoring Report is due to the TCEQ by April 30, 2022. If schedule delays are anticipated based on weather and/or encountered site conditions, the client will be contacted to discuss changes in the schedule. The Scope of Services outlined in this proposal will be performed on a time and materials basis for $48,000. Estimated Task 1 costs are summarized below:

Task 1 Estimated Fee	
Item	Estimated Fee
Consulting Labor	$38,300
Laboratory	$6,700
Equipment and Expenses	$3,000
Total	**$48,000**

* IDW disposal cost for groundwater is captured in Task 2.

3.2 Task 2: Product Recovery, Reporting, and Waste Management

It is estimated that the Product Recovery Reports will be submitted to the client **within 20 business days following completion of LNAPL recovery in the quarter prior to report due date**. These costs assume weekly site visits between November 1, 2021 through October 31, 2022. The Scope of Services outlined in this proposal will be performed on a time and materials basis for $83,000. Estimated Task 2 costs are summarized below:

Task 2 Estimated Fee	
Item	Estimated Fee
Consulting Labor	$74,300
Laboratory	$600
LNAPL & Purge GW Disposal*	$4,100
Equipment and Expenses**	$9,000
Total	**$88,000**

* Assumes 20 drums are generated
** Assumes a dedicated LNAPL removal pump is purchased in lieu of replacement socks

3.3 Task 3: LNAPL Transmissivity Testing and Evaluation of Plume Stability and Closure Criteria

The LNAPL transmissivity testing on the LNAPL wells and data analysis and reporting will be performed

on a time and materials basis for $17,000. The plume stability and closure criteria will be evaluated and the results incorporated in the annual groundwater monitoring report or as a standalone report. Estimated Task 3 costs are summarized below:

Task 3 Estimated Fee	
Item	Estimated Fee
Consulting Labor	$15,500
Equipment & Expenses	$1,500
Total	**$17,000**

4.0 GENERAL COMMENTS

The scope of services and estimated fee are based on the assumptions and limitations noted below. The Scope of Services outlined in this proposal will be performed on a time and materials basis for $153,000.

Assumptions

This proposal and cost estimate were prepared based on the following assumptions:

- Client will provide to Terracon, prior to mobilization, legal right of entry to the site (and other areas if required) to conduct the scope of services.
- Client will notify Terracon, prior to mobilization, of any restrictions, special site access requirements, or known potentially hazardous conditions at the site (e.g., hazardous materials or processes, specialized protective equipment requirements, unsound structural conditions, etc.)
- Traffic control services are not required.
- NAPL recovery work can be performed during normal business hours and will not require lighting for night time work.
- The site is readily accessible by truck.
- Product removal will be done either by a product pump.

If any of these assumptions or conditions is not accurate or changes during the project, the stated fee is subject to change. Please contact us immediately if you are aware of any inaccuracies in these assumptions and conditions, so we may revise the proposal or fee.

Limitations

Terracon's services will be performed in a manner consistent with generally accepted practices of the profession undertaken in similar studies in the same geographic area during the same period. Terracon makes no warranties, express or implied, regarding its services, findings, conclusions, or recommendations. Please note that Terracon does not warrant the work of laboratories, regulatory

agencies, or other third parties supplying information used in the preparation of the report. These services will be performed in accordance with the scope of work agreed with you, our client, as set forth in this proposal and are not intended to be in strict conformance with any specific guidance.

Findings, conclusions, and recommendations resulting from these services will be based upon information derived from on-site activities and other services performed under this scope of work; such information is subject to change over time. Certain indicators of the presence of hazardous substances, petroleum products, or other constituents may have been latent, inaccessible, unobservable, nondetectable, or not present during these services, and we cannot represent that the site contains no hazardous substances, toxic substances, petroleum products, or other latent conditions beyond those identified during these services. Subsurface conditions may vary from those encountered at specific borings or wells or during other surveys, tests, assessments, investigations or exploratory services; the data, interpretations, findings and our recommendations are based solely upon data obtained at the time and within the scope of these services.

Reliance

The various reports will be prepared for the exclusive use and reliance of Parkhill Smith & Cooper, Inc., (client) and the City of Midland, Texas (property owner). Reliance by any other party is prohibited without the written authorization of the client and Terracon. Reliance on these services by the client and all authorized parties will be subject to the terms, conditions, and limitations stated in the Agreement for Services with the client, sections of this proposal incorporated therein and the Reliance Agreement. The limitation of liability defined in the Agreement for Services with the client is the aggregate limit of Terracon's liability to the client and all relying parties.

Reference Number: P94227003

SUPPLEMENT TO AGREEMENT FOR SERVICES

CHANGE TO
SCOPE OF SERVICES AND FEES

This **SUPPLEMENT to AGREEMENT FOR SERVICES** to the original Agreement for Services (original Agreement dated 07/28/2014, Agreement reference number PA4140224) is between Parkhill Smith & Cooper Inc ("Client") and Terracon Consultants, Inc. ("Consultant") for additional or changed Services to be provided by Consultant for Client on the Project, as described in the Agreement for Services. This Supplement is incorporated into and part of the Agreement for Services.

1. **Scope of Services**. The scope of the additional or changed Services are described in the Scope of Services section of the Consultant's Supplemental Proposal, unless Services are otherwise described below or in Exhibit B to this Supplement (which section or exhibit are incorporated into the Supplement).

   Terracon's Scope of Services are detailed as Task 1: Semi-Annual Groundwater Sampling and Reporting; Task 2: Product Recovery, Reporting, and Waste Management; and Task 3: LNAPL Transmissivity Testing and Evaluation of Plume Stability and Closure Criteria in Section 2.0 of Terracon Proposal P94227003, dated January 06, 2022.

2. **Compensation.** Client shall pay compensation for the additional or changed Services performed at the fees stated in the Supplemental Proposal unless fees are otherwise stated below or in Exhibit C to this Supplement (which section or exhibit are incorporated into the Supplement).

   Terracon's compensation details are provided in Section 3.0 of Terracon Proposal P94227003, dated January 06, 2022

All terms and conditions of the **Agreement for Services** shall continue in full force and effect. This Supplement is accepted and Consultant is authorized to proceed.

Consultant:	**Terracon Consultants, Inc.**	Client:	**Parkhill Smith & Cooper Inc**
By:	Date: **1/6/2022**	By:	Date: 1/6/2022
Name/Title:	**Erin L. Loyd, P.G. / Office Manager / Principal**	Name/Title:	**Danny Winchester /**
Address:	**5847 50th St** **Lubbock, TX 79424-1103**	Address:	**1700 W Wall St Ste 100** **Midland, TX 79701-6579**
Phone:	**(806) 300-0140** Fax: **(806) 797-0947**	Phone:	**(432) 697-1447** Fax:
Email:	**Erin.Loyd@terracon.com**	Email:	**dwinchester@team-psc.com**

City Council Meeting

Item Number: 10

Meeting Date: February 8, 2022

To: City Council / City Manager

From: Jose Ortiz, Director

Subject: RESOLUTION AUTHORIZING THE CITY MANAGER TO NEGOTIATE AND EXECUTE AGREEMENTS FOR TRAFFIC MANAGEMENT-RELATED DONATIONS TO THE CITY OF MIDLAND; AND AUTHORIZING THE CITY MANAGER TO ACCEPT SAID DONATIONS ON BEHALF OF THE CITY (DISTRICT: NONE) (ENGINEERING SERVICES)

Purpose:

To authorize the City Manager to negotiate and execute traffic management-related donation agreements and accept the donations.

Recommended City Council Action:

Approve

Fiscal Impact:

None.

Discussion:

On occasion, developers, property owners, or homeowners' associations request that various traffic management improvements be installed on public streets within the City. In some of these cases, it is determined that such improvements may be beneficial to the safety or operation of the roadway and the installation of the improvements is supported by Engineering staff. However, the responsibility for funding such projects may more appropriately rest with the private party requesting the improvements, rather than with the City.

Examples of traffic management improvements funded by private parties on public roadways include small items like radar feedback ("YOUR SPEED") signs, as well as larger projects like pedestrian crossings or physical traffic calming features.

Currently, each such project requires a separate agreement to be approved by City Council before any private funds can be received. This includes any value of donation, even when the amount is as small as a couple thousand dollars for a single sign. This resolution authorizes the City Manager to negotiate and execute those donation agreements and to receive and appropriate funds for traffic management improvements when deemed appropriate.

Staff recommends approval.

City Manager's Office

RESOLUTION NO. _____

RESOLUTION AUTHORIZING THE CITY MANAGER TO NEGOTIATE AND EXECUTE AGREEMENTS FOR TRAFFIC MANAGEMENT-RELATED DONATIONS TO THE CITY OF MIDLAND; AND AUTHORIZING THE CITY MANAGER TO ACCEPT SAID DONATIONS ON BEHALF OF THE CITY

WHEREAS, from time to time, individuals and entities desire to make donations to the City of Midland to be used for traffic management purposes; and

WHEREAS, the City Council finds it to be in the public interest to authorize the City Manager to negotiate and execute agreements for traffic management-related donations to the City; and

WHEREAS, the City Council finds it to be in the public interest to authorize the City Manager to accept traffic management-related donations on behalf of the City;

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That to the extent permitted by law, the City Council hereby authorizes the City Manager to negotiate and execute agreements for traffic management-related donations to the City.

SECTION TWO. That the City Manager is hereby authorized to accept traffic management-related donations on behalf of the City.

SECTION THREE. That the City Treasurer or the City Comptroller, as appropriate, is hereby authorized and directed:

A. to deposit donated funds that have been accepted by the City Manager in accordance with Section Two of this resolution;

B. to appropriate or allocate said donated funds for traffic management-related projects; and

C. to issue refunds of donated funds pursuant to agreements executed in accordance with Section One of this resolution.

On motion of Council member _____, seconded by Council member _____, the above and foregoing resolution was adopted by the City Council of the

City of Midland at a regular meeting on the _____ day of _____, A.D., 2022, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

RECOMMENDED AND APPROVED:

_____
Robert Patrick, City Manager

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Jose Ortiz, Director of Engineering Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

S:\Resolutions\Engineering\2022\CM - Donation Agreement Authority.wpd

City Council Meeting

Item Number: 11

Meeting Date: January 25, 2022

To: City Council / City Manager

From: Cole Furqueron, Senior Planner

Subject: AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOT 12, BLOCK 50, EAST MIDLAND ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS, FROM HI, HEAVY INDUSTRIAL DISTRICT TO SF-3, SINGLE-FAMILY DWELLING DISTRICT (GENERALLY LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION OF TYLER STREET AND ORCHARD LANE); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (District 2) (Development Services)

Purpose:

The applicant, Sylvia Howard, is requesting a zone change from HI, Heavy Industrial District, to SF-3, Single-Family Dwelling District, for the construction of a new single-family residence.

Recommended City Council Action:

Approve

Fiscal Impact:

This proposal does not have a significant financial impact to the city.

Discussion:

Current Zoning:

HI, Heavy Industrial District.

Surrounding Zoning and Land Use:

The property to the north across Orchard Lane is zoned HI, Heavy Industrial District, and the location of Hidalgo Park. The properties to the east and south are zoned HI, Heavy Industrial District, and the location of single-family residences. The properties to the west across N. Tyler Street are zoned MF-22, Multiple-Family Dwelling District, and the location of a single-family residence and a vacant lot, respectively.

Analysis:

The property is located at 610 N. Tyler Street and is currently vacant. The applicant, Sylvia Howard, is requesting this zone change to allow for the construction of a single-family residence on the property. The current zoning of this property is HI, Heavy Industrial District. Per the previous zoning ordinance, single-family detached dwellings were allowed within this zoning district. As of July 1, 2019, the new zoning ordinance does not allow the use of single-family detached dwellings within the HI, Heavy Industrial District.

This proposed project has been circulated to and reviewed by respective City departments for internal review and their comments, conditions, and requirements are as follows:

Fire: (Approved)

No objections

Building: (Approved)

No issues. All future structures must adhere to the 2018 International Building Codes, the 2015 International Energy Code, the 2020 NEC requirements, the 2015 International Fire Codes, local city ordinances, zoning requirements, established setbacks, and floodplain requirements if necessary.

Engineering: (Approved)

No objection to zone change.

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

Oil & Gas: (Approved)

No Oil or Gas wells identified within 500 ft. permitted well radius or in the 135 ft. non-permitted well radius of location on plat. Please note if oil & gas wells are not identified or left off of plat, this could prevent receiving city permits for structures

Transportation: (Approved)

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during

construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

No objection to zone change.

Planning:

This proposed development fits with Chapter 3, An Integrated Land Use Vision, Future Land Use Map of the Tall City Tomorrow comprehensive plan as this area calls for Urban Medium Neighborhood Center uses. This designation offers small to moderate scale commercial development connected to an anchor store, such as a grocery store surrounding by a mix of housing types including townhomes and small lot single family. Therefore, the construction of single-family housing at this location is in conformance with the recommendations of the Tall City Tomorrow plan as it provides for the integration of uses. It would also support the existing neighborhood characteristics and uses of the area.

The Planning and Zoning Commission recommended approval of this request at the January 3, 2022 meeting.

Staff recommends approval of this zone change from HI, Heavy Industrial District, to SF-3, Single-Family Dwelling District, subject to condition A.

Conditions:

A. That the use and development of this property shall conform to the regulations of the SF-3, Single-Family Dwelling District.

Letters of Objection:

As of January 21, 2022, staff has not received any letters of objection.

Attachments:

Site Plan (Exhibit A)
Application
Maps

Robert Patrick

City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOT 12, BLOCK 50, EAST MIDLAND ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS, FROM HI, HEAVY INDUSTRIAL DISTRICT TO SF-3, SINGLE-FAMILY DWELLING DISTRICT (GENERALLY LOCATED AT THE SOUTHEAST CORNER OF THE INTERSECTION OF TYLER STREET AND ORCHARD LANE); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, in compliance with the City Charter, the City Code, and State law, have given the requisite notices by United States mail, publication and otherwise; and after a full and fair hearing to all of the property owners generally and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body finds that the public health, safety and general welfare will be best served by rezoning Lot 12, Block 50, East Midland Addition, City and County of Midland, Texas (the "Property") to SF-3, Single-Family Dwelling District, as set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Zoning District Map of the City of Midland, Texas, is hereby amended to rezone the Property from HI, Heavy Industrial District to SF-3, Single-Family Dwelling District.

SECTION TWO. That the definitions given in the zoning regulations contained in the City Code of the City of Midland, Texas, shall be applicable to such of those terms as are used herein.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances

inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2022; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2022, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2022.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

MIDLAND Planning Division

Zone Change/Planned District Amendment/Site Plan Approval

Project Number: Z-21-0269

Case Number:

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name: ~~G+S Electric Co~~ Sylvia Howard		Phone (432) 6611493 Email sylscountry@gmail.com	
Address 2505 W County Rd 130	City Midland	State TX	Zip 79706

Property Owner Printed Name: G+S Electric Co.		Phone (432) 6611493 Email sylscountry@gmail.com	
Address ~~610 N. Tyler~~ 2505 W. County Rd. 130	City Midland	State TX	Zip 79706

Representative *(if different from Applicant or Property Owner)* Firm: Printed Name:		Phone ( ) Email	
Address	City	State	Zip

Street Address: 610 N. Tyler, Midland TX, 79701

Legal Description
Lot: 12 Block: 50 Subdivision: East Midland Addition

Current Zoning: Commercial

Proposed Zone: Single family residential
(List by tracts if more than one district is requested)

Reason for Zone Change Request: change to residential to build a single ~~family~~ residential dwelling

Present Use of Property: vacant lot

Proposed Use of Property: build a house on the vacant lot

How would this zone change affect the public health, safety and welfare?

Describe how conditions affecting the property have changed since present zoning designation: None known

Submittal and Fees
Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Dimensioned Site Plan
- Digital Copies of Site Plan (PDF/JPEG)

RECEIVED
SEP 23 2021
BY: ....

Signature *(by property owner only – authorized agent must sign affidavit below)*	
Applicant (signature):	Date:
Applicant (printed):	
Property Owner (signature):	Date:
Property Owner (printed) :_____	

The Zone Change/Planned District Amendment/Site Plan Approval shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appear_____who, being by me duly sworn, upon oath says: That (s)he is the owner of _____or authorized by_____, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

_____
Authorized Agent (*signature*)

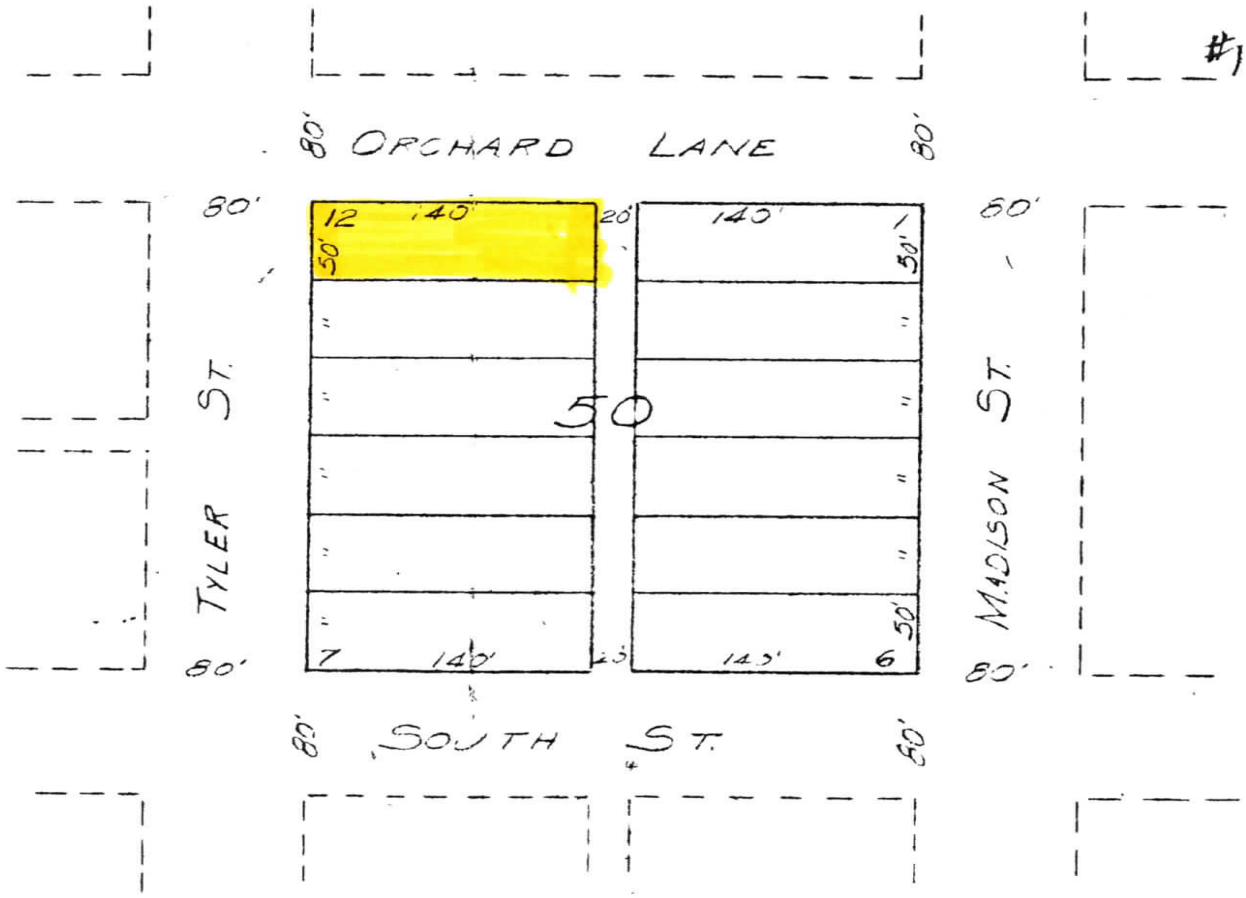
Subscribed and sworn to before me, this_____day of_____, 20____, to certify which witness my hand and seal of office.

_____
NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

FOR OFFICE USE ONLY	
☐ Property Owner Authorization	☐ Dimensioned Site Plan
☐ Application Fee	☐ Plans in Digital Format (PDF/JPEG)
Check #_____	
Received By:	Date:

Application will not be considered for scheduling until reviewed by a planner.

#14853



Approved 12-15-52
by City Planning
& Zoning Commission
W. B. Harkrider
Chairman.

Approved by action of
the City Council of
Midland, Texas, in
regular meeting held
Dec. 23, 1952.

Mayor

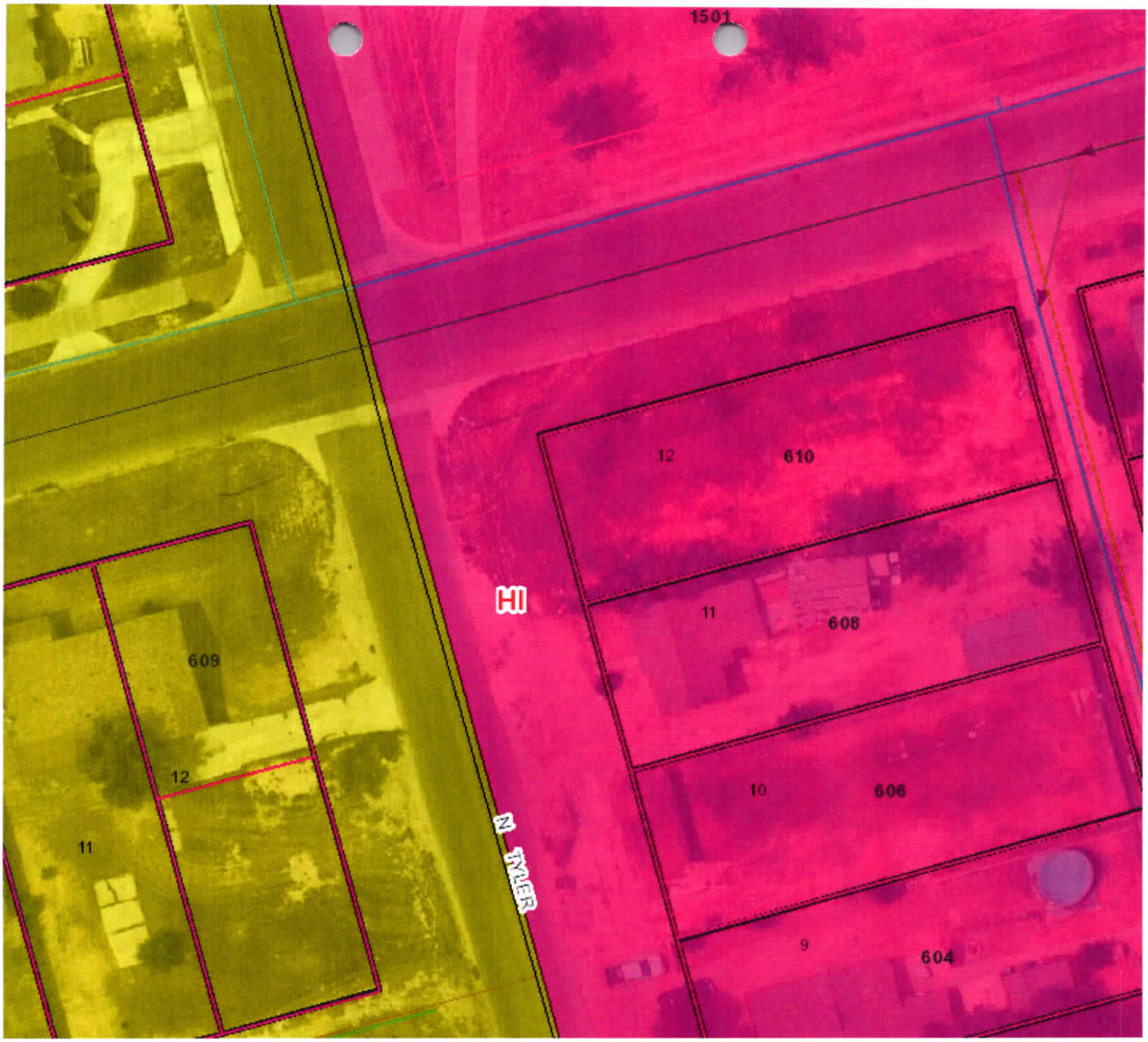
Secretary

City Planning Department
October 21, 1952

SKETCH SHOWING DEDICATION OF
AN ALLEY IN BLOCK 50,
EAST MIDLAND ADDITION TO THE
CITY OF MIDLAND, TEXAS
Scale: 1" - 100'

pg. 37

RECEIVED
SEP 23 2021
BY: .....



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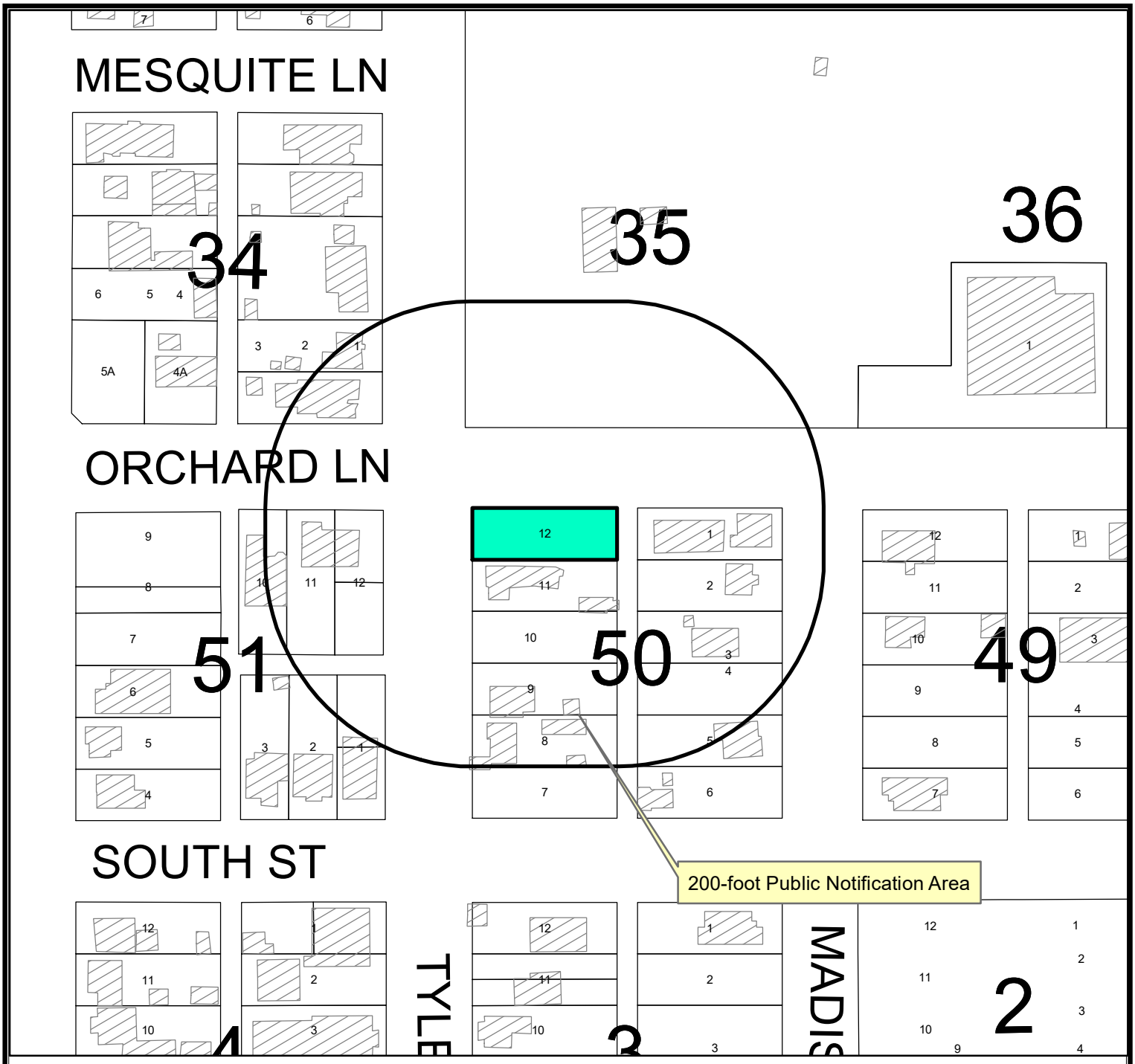


LOCATION MAP

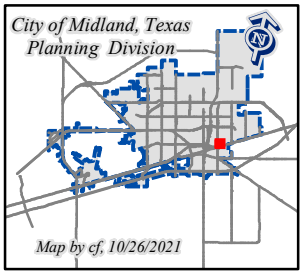
Z-21-0269 **Scale: 1" = 200'**

A request by Sylvia Howard for a Zone Change from HI, Heavy Industrial Distict to SF-3, Signle-Family Dwelling District on Lot 12, Block 50, East Midland Addition, City and County of Midland, Texas.

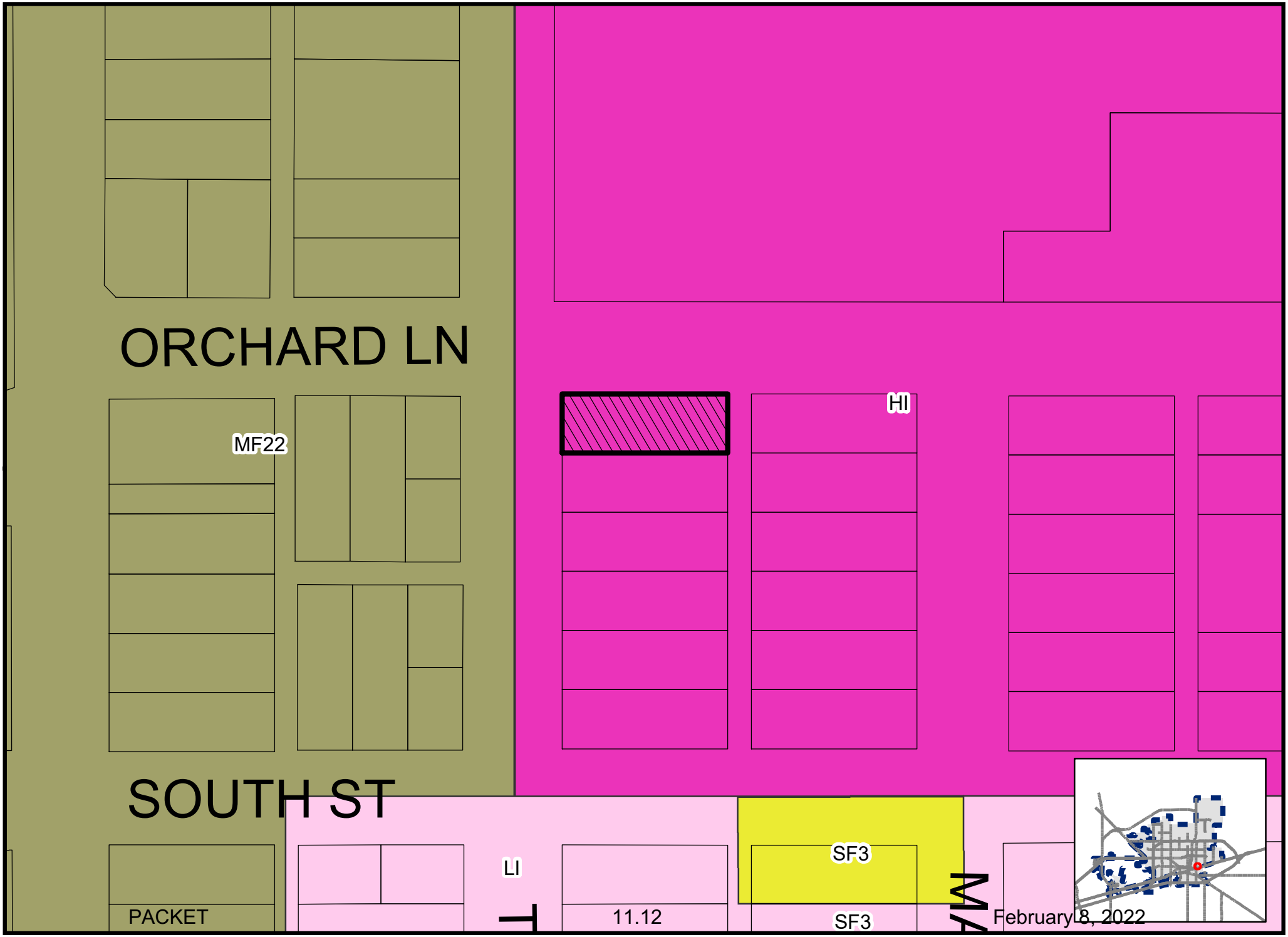
Generally located Southeast corner of the intersection of N. Tyler Street and Orchard Lane-(Council District 2)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



©THE CITY OF MIDLAND - 2021
THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY PRODUCT NOR IS IT DESIGNED TO BE USED AS A PRIMARY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN.
THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.



Map By CF, 11/4/2021

Z-21-0269

Scale: 1" = 200'

ZONING MAP

© THE CITY OF MIDLAND - 2021: THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY PRODUCT, NOR IS IT DESIGNED TO BE USED AS A PRIMARY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN. THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.

STOP

City Council Meeting

Item Number: 12

Meeting Date: January 25, 2021

To: City Council / City Manager

From: Cole Furqueron, Senior Planner

Subject: AN ORDINANCE GRANTING A SPECIAL EXCEPTION FOR LOT 8, BLOCK 6, ELMWOOD ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE NORTHEAST CORNER OF STOREY AVENUE AND PECOS STREET), BY PERMITTING A REDUCED MINIMUM SIDE YARD SETBACK ON THE WEST SIDE OF THE LOT; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); ORDERING RECORDATION BY THE CITY SECRETARY IN THE DEED RECORDS OF MIDLAND COUNTY, TEXAS; AND ORDERING PUBLICATION (District 3) (Development Services)

Purpose:

The applicant, Raphael Okugbere, is requesting Special Exception from the City of Midland Zoning Ordinance, Section 5.04 – Residential Zoning District Dimensional Regulations Chart, concerning the minimum side yard setbacks.

Recommended City Council Action

☐ Approve ☐ Deny ☒ Directional / Informational

Fiscal Impact:

No City funds are required to process this request.

Discussion:

The property is located at 512 Storey Avenue and is currently the location of a single-family dwelling and a detached accessory structure. The applicant is requesting a special exception to the minimum side yard setbacks for a corner lot to re-build the accessory structure. On 8/15/2018 the original structure was damaged in a fire related incident. The applicant is now

seeking to re-build on the original slab.

The property is currently zoned SF-2, Single-Family Dwelling District and does not meet the minimum lot dimensions for its proposed district.

> Per our City of Midland Zoning Ordinance, *Section 5.04 – Residential Zoning District Dimensional Regulations Chart:*
>
> *SF-3, Single Family Dwelling District*
> *Lot dimensions*
> *Minimum Side Yard Setback*
> *Corner Lot: 10 feet*

As shown on the site plan the front of the Detached accessory structure is 1.9 feet from the property line, which does not meet the minimum 10-foot setback requirement for a corner lot.

Additionally, the property does not fall within the maximum allowable timeframe for re-building damaged nonconforming structures, as set forth by City Zoning Ordinance, Section 4.08 – Restoration of Nonconforming Structures. The allowable timeframe for reconstruction is 12 months after the damage occurred.

As shown in the Midland Fire Department report, the initial fire incident occurred on 8/15/2018. The demolition permit was approved on 10/20/2021. The structure has been partially rebuilt; however, a building permit has not been issued by the City of Midland.

Several of the residents in the neighborhood have expressed their approval of this project because it has greatly improved the appearance of the property. The original accessory structure had visible signs of fire damage and had boards placed over the doors and windows. The main dwelling unit also had signs of smoke to the exterior. The proposed accessory structure is the best use of the existing concrete foundation. Also, the new building better reflects the characteristics of the surrounding neighborhood and the intended use for the area.

This request has been circulated to all pertinent City departments for review. Below are the departments' comments.

Engineering: (Approved)

No objections to zone change.

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations.

Transportation: (Approved)

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering

and Traffic Operations.

No objection to zone change.

Fire: (Approved)

No objections.

Code Compliance: (Approved)

No Oil and Gas issues.

Building: (Approved)

No issues. All future structures must adhere to the 2018 International Building Codes, the 2015 International Energy Code, the 2020 NEC requirements, the 2015 International Fire Codes, local city ordinances, zoning requirements, established setbacks, and floodplain requirements if necessary.

Planning Analysis:

While this request represents a deviation from the City Zoning Code, there are several unique characteristics that do show a hardship for this property. As there is an existing foundation present on the site, there is no other alternative than to build back on the existing footprint. Accordingly, Staff is providing this report for Directional / Informational Use to assist City Council in making an informed decision on this application for a Special Exception to the City of Midland Zoning Ordinance, *Section 5.04 – Residential Zoning District Dimensional Regulations Chart* concerning the minimum side yard setback for a corner lot.

Should the City Council approve this request, the property shall be subject to conditions A and B:

Conditions:

A. That the property shall significantly conform to the site plan shown in Exhibit "A", which is attached hereto and incorporated herein for all purposes.

B. That the minimum side yard setback for the proposed addition on this property shall be 1.9 feet

Letters of Objection:

As of January 18, 2022, staff has not received any letters of objection

Attachments:

Plat

Application
Proposed Site Plan (Exhibit A)
Floor Plan (Exhibit B)
Fire Department Report (Exhibit C)
Building Inspection Report (Exhibit D)
Maps

City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE GRANTING A SPECIAL EXCEPTION FOR LOT 8, BLOCK 6, ELMWOOD ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE NORTHEAST CORNER OF STOREY AVENUE AND PECOS STREET), BY PERMITTING A REDUCED MINIMUM SIDE YARD SETBACK ON THE WEST SIDE OF THE LOT; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); ORDERING RECORDATION BY THE CITY SECRETARY IN THE DEED RECORDS OF MIDLAND COUNTY, TEXAS; AND ORDERING PUBLICATION

WHEREAS, the City Council modified the authority of the Board of Adjustment in Title XI, Chapter 1, Section 7 ("Section 11-1-7") of the Midland City Code; and

WHEREAS, Section 11-1-7 provides for the consideration of requests for special exceptions to the Midland Zoning Ordinance; and

WHEREAS, the Council finds that satisfactory evidence has been presented that the use to be authorized by the granting of the special exception will not be detrimental to the health, safety, comfort and welfare of the occupants of the land area near the tract on which the use to be allowed by special exception will be located; and

WHEREAS, the Council finds that it is clearly and specifically authorized by the terms of Section 11-1-7 to grant such a special exception, and said exception will be in harmony with the general purposes and intent of the zoning provisions of the Midland City Code; and

WHEREAS, after a full and fair public hearing at which all parties in interest were offered an opportunity to be heard, all pursuant to law, the Council finds it to be in the public interest to grant a special exception to the Zoning Code, pursuant to Section 11-1-7, for the purposes herein stated, subject to special conditions;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That a special exception is hereby granted for the property described as Lot 8, Block 6, Elmwood Addition, City and County of Midland, Texas. Said special exception shall allow a reduced minimum side yard setback on the west side of the lot.

SECTION TWO. Said special exception is subject to the following special conditions:

A. That the minimum side yard setback on the west side of the lot shall be 1.9 feet.

B. That the property shall significantly conform to Exhibit "A", which is attached hereto and incorporated herein for all purposes.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to file this ordinance with the Office of the County Clerk for purposes of recordation.

SECTION SEVEN. The City Secretary is hereby authorized and directed to publish

the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2022; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2022, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2022.

_____
Patrick N. Payton, Mayor

ATTEST:

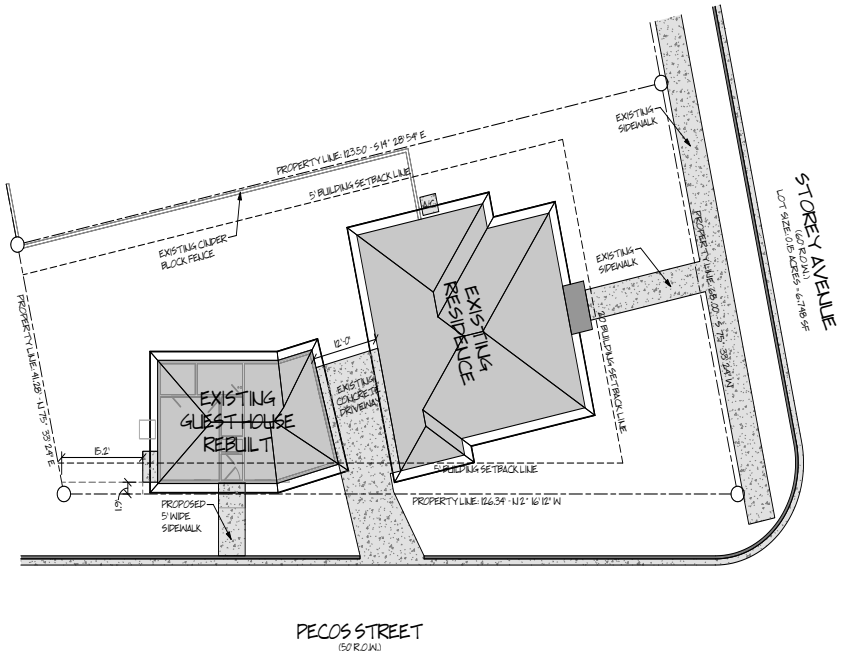
_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney



01 SITE PLAN
SCALE: 1" = 10'-0"

SITE PLAN GENERAL NOTES:

UNLESS OTHERWISE NOTED

A. DIMENSIONS ARE TO OUTSIDE OF PLATE. ALLOW 5 1/2" FOR BRICK OR STONE VENEER.
B. SITE SHALL BE INVESTIGATED DURING CLEARING AND EARTHWORK OPERATIONS FOR EXCAVATIONS OR BURIED STRUCTURES SUCH AS POOLS, CISTERNS, FOUNDATIONS, ETC. IF ANY SUCH ITEMS SHOULD BE FOUND, THE BUILDER SHALL NOTIFY THE OWNER IMMEDIATELY.
C. BUILDER/CONTRACTOR SHALL MAINTAIN A SITE CLEAR OF CONSTRUCTION RELATED TRASH AND DEBRIS. REMOVE ALL PRE-EXISTING TRASH, CONCRETE TAILINGS, ETC. PRIOR TO PROJECT CLOSE OUT.
D. VERIFY LOCATIONS OF ANY CONDUIT REQUIRED FOR ELECTRICAL, PLUMBING OR DRAINAGE UNDER SLAB POURING AND FLATWORK.
E. VERIFY LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CAUTION SHALL BE TAKEN UPON EXCAVATION AND FOUNDATION WORK TO AVOID UTILITY LINES.
F. BUILDER/CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING ALL FINAL FINISHED ELEVATIONS TO PERMIT THE PROPER DRAINAGE OF ALL FINISHED SURFACES.
G. COORDINATE LOCATION OF UTILITY METER TO MINIMIZE VISUAL IMPACT.
H. BUILDER/CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPORT OF ALL TEMPORARY EMBANKMENTS AND EXCAVATIONS AS REQUIRED.

LOT INFORMATION	
LOT	THE WEST 68 FEET OF LOT 8
BLOCK	6
SECTION	
SUBDIVISION	ELMWOOD ADDITION
CITY	MIDLAND
COUNTY	MIDLAND
STATE	TEXAS
LOT SIZE	015 ACRES ± 6,748 SQ. FT.

DATE
12/07/2021
REVISION
DRAWN BY
AUDY

CORNERSTONE DESIGN GROUP
PHONE: (432) 684-8025

SHEET TITLE
SITE PLAN

12/07/2021
REGISTERED ARCHITECT LOUIS DELVALLE 18680 STATE OF TEXAS

(432) 684-8025
4904 NORTH MIDKIFF ROAD
MIDLAND, TEXAS 79705

GUEST HOUSE REBUILD

512 STOREY AVE.
MIDLAND, TEXAS 79701
PROJECT NUMBER: 21115

SHEET NUMBER
A-1.1
SHEET 2 OF 10

12/8/2021 2:48:45 PM

GUEST HOUSE REBUILD

512 STOREY AVE.
MIDLAND, TEXAS 79701
CDG PROJECT #2115

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A-5.1	DETAILS

ABBREVIATIONS

A/C	AIR CONDITIONER	HVAC	HEAT, VENT & AIR CONDITION
ADA	AMERICANS WITH DISABILITIES ACT	J-BOX	JUNCTION BOX
AFF	ABOVE FINISHED FLOOR	LAV	LAVATORY
AFFL	ABOVE FINISHED FLOOR LINE	LIN	LINEN
AVG	AVERAGE	MECH	MECHANICAL
BF	BIFOLD	MC	MEDICINE CABINET
BNCH	BENCH	MICRO	MICROWAVE
BP	BYPASS	MIR	MIRROR
BRKFST	BREAKFAST	MSTR	MASTER
CAB	CABINET	NTS	NOT TO SCALE
CLG	CEILING	OBS	OBSCURED
CMU	CONCRETE MASONRY UNIT	OCEW	ON CENTER EACH WAY
CO	CASED OPENING	OHD	OVERHEAD DOOR
COL	COLUMN	OPNG	OPENING
CONC	CONCRETE	PD	POCKET DOOR
CPT	CARPET	PDR	POWDER
CVR	COVERED	PKT	POCKET
DBL	DOUBLE	QR	QUARTER ROUND
DH	DOUBLE HUNG	R & S	ROD AND SHELF
DISP	DISPOSAL	RA	RETURN AIR
DL	DIVIDED LITE	REF	REFRIGERATOR
DRW	DRAWER	RO	ROUGH OPENING
DRWS	DRAWERS	RT	ROUND TOP
DWG	DRAWING	SC	SOLID CORE
DRWGS	DRAWINGS	SH	SINGLE HUNG
DRY	DRYER	SHLVS	SHELVES
EB	EYEBROW	SL	SIDE LITE
ELEC	ELECTRICAL	SQ	SQUARE
ELEV	ELEVATION	SQ FT	SQUARE FEET
EQ	EQUAL	SR	SHEETROCK
FFL	FINISHED FLOOR LINE	SRO	SHEETROCK OPENING
FIX	FIXED	TC	TRASH COMPACTOR
FLR	FLOOR	TR	TRANSOM
FLUOR	FLUORESCENT	TRANS	TRANSOM
FP	FIREPLACE	TV	TELEVISION
FRZR	FREEZER	TAS	TX ACCESSIBILITY STANDARDS
FUR	FURNACE	TEMP	TEMPERED
GB	GLASS BLOCK	TV	TELEVISION
GFI	GROUND FAULT INTERRUPED	TYP	TYPICAL
GFCI	GROUND FAULT CIRCUIT INTERRUPTED	UCL	UNDER COUNTER LIGHTS
GYP	GYPSUM	UEL	UNEQUAL LEG
HB	HOSE BIB	VCT	VINYL COMPOSITION TILE
HH	HEADER HEIGHT	WASH	WASHER
HM	HOLLOW METAL	WP	WATER PROOF
HS	HORIZONTAL SLIDER	WS	WATER SOFTNER

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BUILDER/CONTRACTOR

WELL-SUITED PROPERTY SOLUTIONS, LLC

MIDLAND, TEXAS
PHONE: PHONE: (432) 553-8756
EMAIL: RALPH@WELLSUITEPPS.COM

GENERAL NOTES:

1. THE BUILDER/CONTRACTOR AND OWNER ARE RESPONSIBLE TO CHECK THESE PLANS AND SHALL NOTIFY THE DESIGN PROFESSIONAL OF ANY ERRORS OR OMISSIONS PRIOR TO THE START OF CONSTRUCTION.
2. THE SET OF DRAWINGS PROVIDED BY THE DESIGN PROFESSIONAL IS INTENDED TO BE READ AND USED AS A WHOLE. EACH DRAWING IN THE SET IS COMPLIMENTARY TO OTHERS. SELECTIVE SHEETS SHOULD NOT BE USED EXCLUSIVELY WITHOUT REGARD TO THE OTHERS.
3. THESE PLANS INDICATE THE GENERAL SCOPE OF THE PROJECT, AS SCOPE DOCUMENTS. THESE DRAWINGS DO NOT NECESSARILY INDICATE OR DESCRIBE ALL WORK REQUIRED FOR FULL COMPLETION OF THE PROJECT. THE BUILDER/CONTRACTOR AND OWNER HAVE ENLISTED THE SERVICES OF THE DESIGN PROFESSIONAL WITH THE UNDERSTANDING THAT THE SET OF DRAWINGS PROVIDED DO NOT DETAIL NOR DEPICT ALL POSSIBLE CONDITIONS.
4. USE OF THESE DRAWINGS BY THE OWNER, CONTRACTOR, SUBCONTRACTOR, AND/OR ANY OTHER PERSONS SHALL CONSTITUTE ACKNOWLEDGEMENT AND AGREEMENT THAT THE DESIGN PROFESSIONAL'S LIABILITY FOR NEGLIGENCE, ERRORS, OMISSIONS, OR BREACH OF WARRANTY IN THE PERFORMANCE OF SERVICES FOR EACH PROJECT SHALL IN NO EVENT EXCEED THE AMOUNT OF THE TOTAL COMPENSATION RECEIVED BY THE DESIGN PROFESSIONAL FOR SAID PROJECT.
5. NO CHANGES SHALL BE MADE TO THESE DOCUMENTS WITHOUT THE PERMISSION OF THE DESIGN PROFESSIONAL AND THE BUILDING OWNER.
6. ALL WORK PROVIDED BY CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE CODES, ORDINANCES AND REGULATIONS OF ALL GOVERNING BODIES INVOLVED. ANY MODIFICATIONS TO THESE DRAWINGS REQUIRED BY SUCH AUTHORITIES SHALL BE AT THE EXPENSE OF THE GENERAL CONTRACTOR.
7. ALL PERMITS AND LICENSES NECESSARY FOR PROPER EXECUTION OF THE WORK SHALL BE SECURED AND PAID FOR BY THE CONTRACTOR INVOLVED.
8. CONTRACTOR IS RESPONSIBLE FOR ALL WORK BEING DONE IN COMPLIANCE WITH ALL OSHA AND LOCAL SAFETY REGULATIONS.

VICINITY MAP

DESIGN, DRAFTING & VISUALIZATION

CORNERSTONE DESIGN GROUP

PHONE: (432) 684-8005
4904 NORTH MIDKIFF ROAD
MIDLAND, TEXAS 79705
WWW.CDGMIDLAND.COM

BUILDING DATA

LOT	THE WEST 68 FEET OF LOT 8
BLOCK	6
SECTION	
SUBDIVISION	ELMWOOD ADDITION
COUNTY	MIDLAND
CITY, STATE	MIDLAND, TEXAS
LOT SIZE	0.15 ACRES = 6,748 SQ. FT.
ZOUNING	SF2: SINGLE-FAMILY DWELLING DISTRICT

DATE
12/07/2021

REVISION

DRAWN BY
AUDY

CORNERSTONE DESIGN GROUP
PHONE: (432) 684-8005

SHEET TITLE
COVER

12/07/2021
REGISTERED ARCHITECTS DENNIS DEVANEY 18880 STATE OF TEXAS
(432) 684-8005
4904 NORTH MIDKIFF ROAD
MIDLAND, TEXAS 79705

GUEST HOUSE REBUILD
512 STOREY AVE.
MIDLAND, TEXAS 79701
PROJECT NUMBER: 2115

SHEET NUMBER
A-0.0
SHEET 1 OF 10

12/8/2021 2:48:44 PM

PACKET

12.10

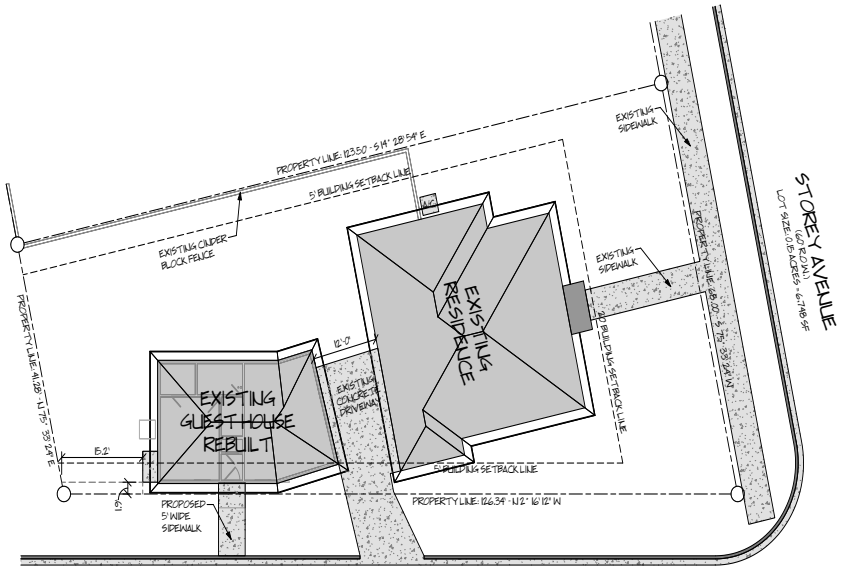
February 8, 2022

SITE PLAN GENERAL NOTES:

UNLESS OTHERWISE NOTED

A. DIMENSIONS ARE TO OUTSIDE OF PLATE. ALLOW 5 1/2" FOR BRICK OR STONE VENEER.
B. SITE SHALL BE INVESTIGATED DURING CLEARING AND EARTHWORK OPERATIONS FOR EXCAVATIONS OR BURIED STRUCTURES SUCH AS POOLS, CISTERNS, FOUNDATIONS, ETC. IF ANY SUCH ITEMS SHOULD BE FOUND, THE BUILDER SHALL NOTIFY THE OWNER IMMEDIATELY.
C. BUILDER/CONTRACTOR SHALL MAINTAIN A SITE CLEAR OF CONSTRUCTION RELATED TRASH AND DEBRIS. REMOVE ALL PRE-EXISTING TRASH, CONCRETE TAILINGS, ETC. PRIOR TO PROJECT CLOSE OUT.
D. VERIFY LOCATIONS OF ANY CONDUIT REQUIRED FOR ELECTRICAL, PLUMBING OR DRAINAGE UNDER SLAB POURING AND FLATWORK.
E. VERIFY LOCATION OF ALL UTILITIES PRIOR TO CONSTRUCTION. CAUTION SHALL BE TAKEN UPON EXCAVATION AND FOUNDATION WORK TO AVOID UTILITY LINES.
F. BUILDER/CONTRACTOR SHALL BE RESPONSIBLE FOR ESTABLISHING ALL FINAL FINISHED ELEVATIONS TO PERMIT THE PROPER DRAINAGE OF ALL FINISHED SURFACES.
G. COORDINATE LOCATION OF UTILITY METER TO MINIMIZE VISUAL IMPACT.
H. BUILDER/CONTRACTOR SHALL BE RESPONSIBLE FOR SUPPORT OF ALL TEMPORARY EMBANKMENTS AND EXCAVATIONS AS REQUIRED.

LOT INFORMATION	
LOT	THE WEST 68 FEET OF LOT 8
BLOCK	6
SECTION	
SUBDIVISION	ELMWOOD ADDITION
CITY	MIDLAND
COUNTY	MIDLAND
STATE	TEXAS
LOT SIZE	.015 ACRES ± 6,748 SQ. FT.



01 SITE PLAN
SCALE: 1" = 10'-0"

DATE
12/07/2021
REVISION
DRAWN BY
AMDY

CORNERSTONE DESIGN GROUP
PHONE: (432) 684-8025

SHEET TITLE
SITE PLAN

12/07/2021
REGISTERED ARCHITECT LOUIS DELVALLE 18680 STATE OF TEXAS
(432) 684-8025
4904 NORTH MIDKIFF ROAD
MIDLAND, TEXAS 79705

GUEST HOUSE REBUILD
512 STOREY AVE.
MIDLAND, TEXAS 79701
PROJECT NUMBER: 21115

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SHEET 2 OF 10

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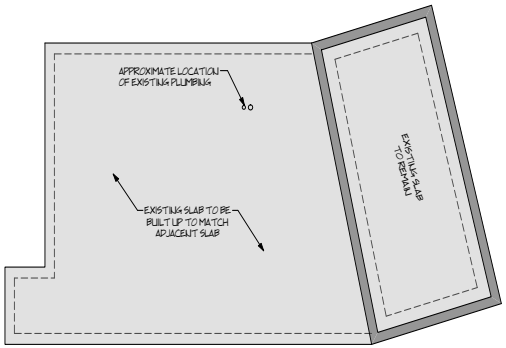
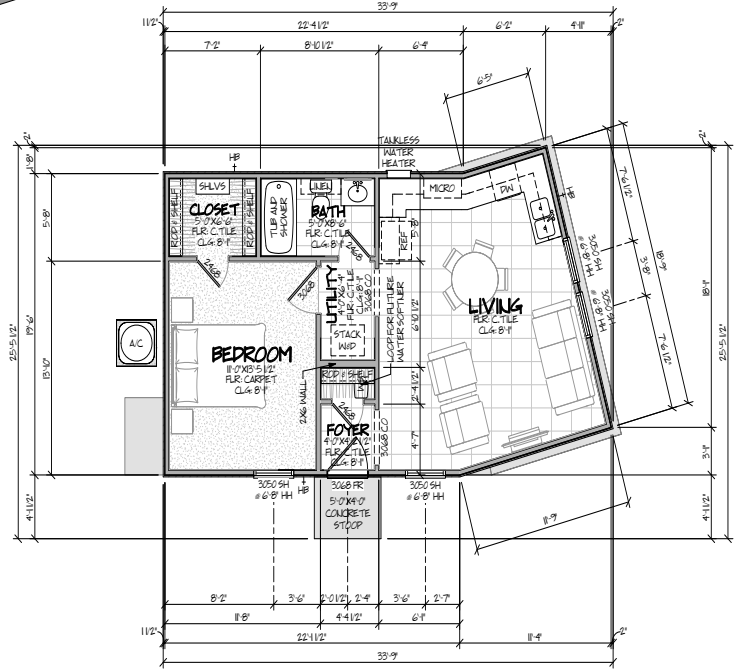


01 EXISTING FLOOR PLAN
SCALE: 1/4" = 1'-0"



02 NEW FLOOR PLAN
SCALE: 1/4" = 1'-0"

CONDITIONED FRAME	
NAME	AREA
CONDITIONED AREA	604.07 SF

FLOOR PLAN GENERAL NOTES:

UNLESS OTHERWISE NOTED

A. THE BUILDER/CONTRACTOR AND OWNER ARE RESPONSIBLE FOR CHECKING THESE PLANS AND SHALL NOTIFY THE DESIGNER OF ANY ERRORS OR OMISSIONS PRIOR TO THE START OF CONSTRUCTION.

B. THESE PLANS INDICATE THE GENERAL SCOPE OF THE PROJECT. AS SCOPE DOCUMENTS, THESE DRAWINGS DO NOT NECESSARILY INDICATE OR DESCRIBE ALL WORK REQUIRED FOR FULL COMPLETION AND PERFORMANCE OF THE CONTRACT FOR CONSTRUCTION. THE OWNER AND/OR CONTRACTOR HAS/HAVE ENLISTED THE SERVICES OF THE DESIGN PROFESSIONAL WITH THE UNDERSTANDING THAT THE SET OF DRAWINGS PROVIDED DO NOT DETAIL NOR DEPICT ALL CONDITIONS.

C. SUBCONTRACTORS SHALL VERIFY AND BE RESPONSIBLE FOR ALL DIMENSIONS AND CONDITIONS ON THE JOB. BUILDER/CONTRACTOR SHALL BE NOTIFIED IMMEDIATELY OF ANY VARIATIONS FROM THE DIMENSIONS AND CONDITIONS SHOWN ON THESE DRAWINGS.

D. THESE PLANS WERE DESIGNED USING STANDARD CONSTRUCTION PRACTICES. THEY CONFORM TO STANDARD BUILDING CODES. DUE TO VARIATIONS IN LOCAL CODES, SUBDIVISION RESTRICTIONS AND CONDITIONS REVISIONS MAY BE REQUIRED.

E. THE BUILDER/CONTRACTOR SHALL BE RESPONSIBLE FOR CONSTRUCTION METHODS, PROCEDURES AND CONDITIONS AND SHALL RIGIDLY ADHERE TO ALL LAWS, CODES AND ORDINANCES WHICH APPLY TO THIS WORK.

F. ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LOCAL CODES AND REGULATIONS. CONSULT WITH LOCAL STRUCTURAL ENGINEERS AND CODE OFFICIALS PRIOR CONSTRUCTION TO VERIFY COMPLIANCE WITH LOCAL CODES AND TO INSURE STRUCTURAL INTEGRITY. IN THE EVENT OF CONFLICT BETWEEN PERTINENT CODES AND LOCAL REQUIREMENTS THE MORE STRINGENT PROVISIONS SHALL GOVERN.

G. BUILDER/CONTRACTOR SHALL PROVIDE BARRICADES, FALL PROTECTION AND ANY OTHER REQUIRED MEANS TO PROTECT WORKERS AND THE PUBLIC DURING THE PROJECT.

H. WINDOW AND DOOR SIZES NOTED ARE NOMINAL AND ARE SUBJECT TO MANUFACTURERS SPECIFICATIONS. THE BUILDER/CONTRACTOR SHALL VERIFY WITH OWNER THE TYPE, STYLE AND BRAND OF WINDOWS AND DOORS TO BE USED PRIOR TO CONSTRUCTION.

I. THE BUILDER/CONTRACTOR SHALL PROVIDE ANY ADDITIONAL STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING OR OTHER DETAILS THAT MAY BE REQUIRED FOR PERMITTING AND/OR CONSTRUCTION.

J. ENERGY CALCULATIONS SHALL BE PROVIDED BY OTHERS AS REQUIRED BY LOCAL AND/OR GOVERNING CODES AND REGULATIONS.

K. THE BUILDER/CONTRACTOR WILL PROVIDE ALL LABOR AND MATERIALS AS INDICATED IN THESE DRAWINGS. ALL INSTALLATIONS SHALL BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATION OR IN COMPLIANCE WITH PROFESSIONAL OR TRADE ORGANIZATION STANDARDS.

L. WRITTEN DIMENSIONS ON THESE PLANS TAKES PRECEDENCE OVER SCALED DIMENSIONS.

M. ADJUST WALL THICKNESS WHERE REQUIRED TO ACCOMMODATE RECESSED BUILDING ACCESSORIES AND CONCEALED MECHANICAL, ELECTRICAL, PLUMBING, STRUCTURAL OR OTHER MISCELLANEOUS ITEMS.

N. DISAPPEARING STAIRS SHALL HAVE A MINIMUM OPENING OF 22"X30", A 350 LB. LADDER AND 30" MINIMUM UNOBSTRUCTED HEADROOM SHALL BE PROVIDED IN THE ATTIC SPACE AT SOME POINT ABOVE THE ACCESS OPENING.

O. ALL DIMENSIONS ARE FROM CUT TO CUT OF STUD.

P. ALL ANGLES ARE 45°.

Q. ROOM DIMENSIONS AND SQUARE FOOTAGES ARE APPROXIMATE.

R. ALL FLOOR COVERINGS SHALL BE VERIFIED WITH OWNER PRIOR TO ORDERING OR INSTALLATION.

S. CEILING HEIGHTS SHALL BE 8'-1"

T. WINDOW HEADER HEIGHTS SHALL BE 6'-8".

U. AT LEAST ONE WINDOW IN EACH BEDROOM SHALL HAVE A MINIMUM NET CLEAR OPENING HEIGHT OF 24", A MINIMUM NET CLEAR OPENING WIDTH OF 20", A MINIMUM NET CLEAR OPENING OF 5.7 SQ. FT. AND A MAXIMUM FINISH SILL HEIGHT OF 44" ABOVE FINISHED FLOOR.

V. ALL GLASS LOCATED WITHIN 60" OF FLOOR AT BATH TUBS, SHOWERS, WHIRLPOOLS, SAUNAS, STEAMROOMS OR HOT TUBS, WITHIN 2'-0" OF DOOR AND 18" OR LESS ABOVE FINISHED FLOOR SHALL BE TEMPERED SAFETY GLASS.

W. ALL DOORS, WINDOWS, ARCHES AND CASED OPENINGS ARE CENTERED ON WALLS WHEN THEY ARE NOT LOCATED NEAR WALLS AND/OR DIMENSIONS ARE NOT NOTED.

X. BUILDER/CONTRACTOR SHALL COORDINATE ALL CLOSET ROD, SHELVING AND BUILT-IN REQUIREMENTS WITH OWNER AND SHALL FIELD VERIFY ALL CABINET DIMENSIONS PRIOR TO FABRICATION.

Y. ATTIC HVAC UNITS SHALL BE LOCATED WITHIN 20'-0" OF ITS SERVICE OPENING. RETURN GRILLES SHALL NOT BE LOCATED WITHIN 10'-0" OF A GAS FIRED APPLIANCE.

DATE
12/07/2021
REVISION
DRAWN BY
AMDY

CORNERSTONE DESIGN GROUP
PHONE: (432) 684-8025

SHEET TITLE
FLOOR PLANS

12/07/2021
REGISTERED ARCHITECT
LOUIS DELVALLE
18680
STATE OF TEXAS
(432) 684-8025
4904 NORTH MERIDIAN ROAD
MIDLAND, TEXAS 79705

GUEST HOUSE REBUILD
512 STOREY AVE.
MIDLAND, TEXAS 79701
PROJECT NUMBER: 2115

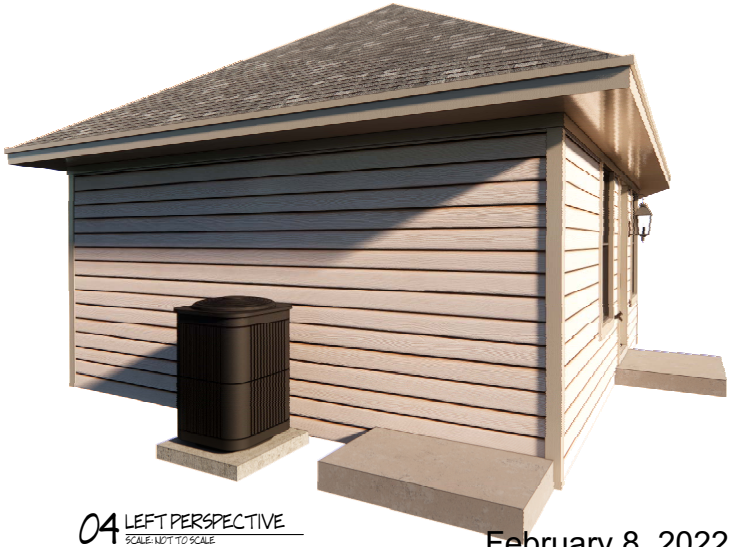
SHEET NUMBER
A-2.1
SHEET 3 OF 10

12/8/2021 2:48:48 PM

01 FRONT PERSPECTIVE
SCALE: NOT TO SCALE

02 RIGHT PERSPECTIVE
SCALE: NOT TO SCALE

03 REAR PERSPECTIVE
SCALE: NOT TO SCALE



04 LEFT PERSPECTIVE
SCALE: NOT TO SCALE

DATE
12/07/2021
REVISION
DRAWN BY
ANDY

CORNERSTONE DESIGN GROUP
PHONE: (432) 684-8025

SHEET TITLE
EXTERIOR PERSPECTIVES

12/07/2021
REGISTERED ARCHITECT
LOUIS DELVALLE
18680
STATE OF TEXAS
(432) 684-8025
4904 NORTH MIDKIFF ROAD
MIDLAND, TEXAS 79705

GUEST HOUSE REBUILD
512 STOREY AVE.
MIDLAND, TEXAS 79701
PROJECT NUMBER: 21115

SHEET NUMBER
A-3.2
SHEET 7 OF 10

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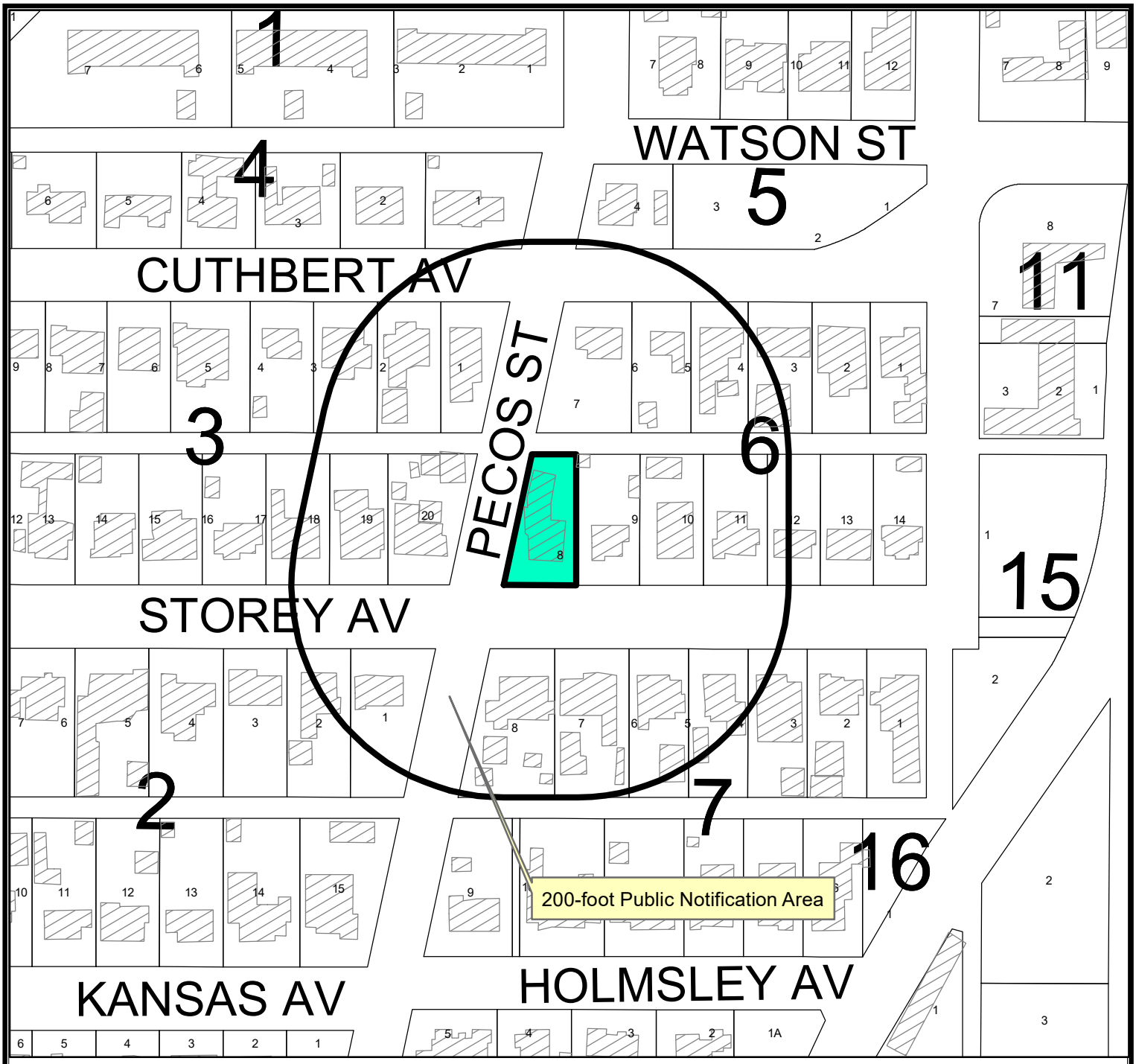


LOCATION MAP

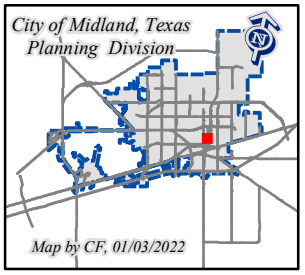
SUB-21-0458 **Scale: 1" = 130'**

Consider a request by Raphael Okugbere for a Special Exception from the City of Midland Zoning Ordinance, Section 5.04 – Residential Zoning District Dimensional Regulations Chart, concerning the minimum side yard setbacks and 4.08 – Restoration of Nonconforming Structures on Lot 8, Block 6, Elmwood Addition, City and County of Midland, Texas.

Generally located on the northeast corner of the intersection of Storey Avenue and Pecos Street. (Council District 3)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



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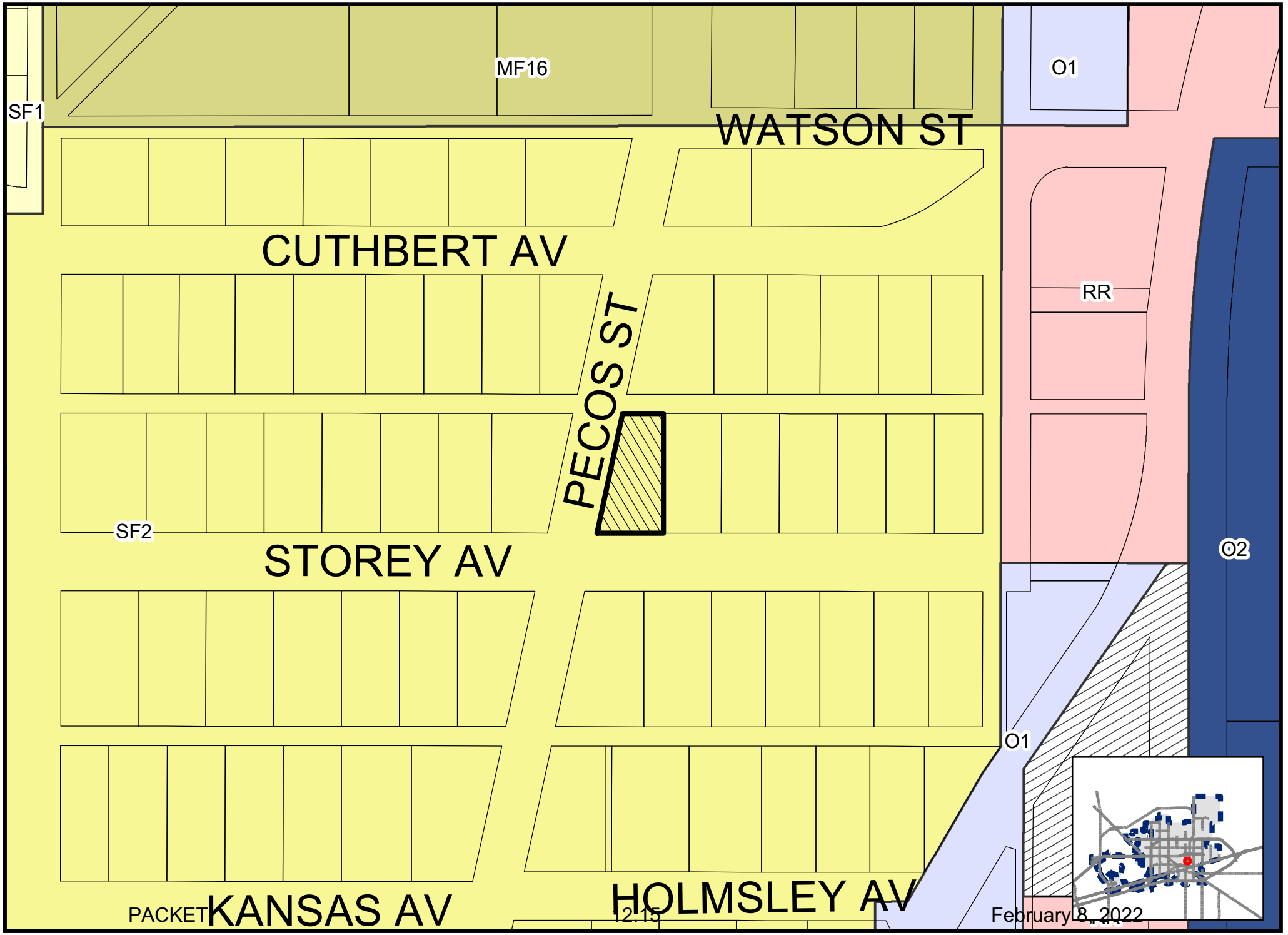

Map By CF, 1/3/2022

E-22--0066

Scale: 1" = 120'

ZONING MAP

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RESIDENTIAL PLAN REVIEW LETTER

Sent via Electronic Mail

December 16, 2021

Lighthouse General Contractors
108 Solomon Ln.
Midland, TX 79705

RE: 512 Storey Ave. Detached Accessory

Mr. Okugbere:

The plan review for the building permit for this project has been completed. The following comments or conditions must be addressed before completion of the review and issuance of the building permit. Should you or the design consultants need further clarification regarding these comments or conditions, please contact me.

This letter is not a letter of denial. The permit application is still under review but will not proceed through the review process until the following issues are addressed. A written response to each comment shall accompany revised plans, and all change/corrections shall be "clouded" on the resubmitted plans. All amended plans must be submitted simultaneously; no partial resubmittal will be accepted.

All code notations are in the 2018 International Residential Code unless otherwise noted.

General Plan Notes

Plans are not sealed
Due to incompleteness of plans, further comments may be required
Due to alteration requiring a permit, the entire structure must conform to smoke alarm and carbon monoxide alarm provisions for new construction under R314 and R315.

Sheet A1.1

1. **Section 1 Site Plan**
    a. **Setback**
        i. The side yard adjacent to Pecos Street requires a 10' setback under the current zoning code for SF2 zoning. Per section 4.08G of the Midland Zoning Code, nonconforming structures may be restored within 12 months of the date of the fire. Per Midland Fire Department records, the fire was reported on August 15, 2018. The 12 months have been exceeded. (Midland Zoning Code 4.08)

Sincerely,

James Rawls
Residential Plan Examiner
City of Midland, TX Code Administration
432-685-7396
jrawls@midlandtexas.gov

FireRECORDS LIVE

Incident Report

Incident Number: 1811041 **Number of Alarms:** 1 **Date:** 8/15/2018 **Time:** 20:30

Shift: A **District:** 013U **Exposure:** 000 **Station:** 01

Alarm Time: 8/15/2018 20:30 **Arrival Time:** 8/15/2018 20:35 **Controlled Time:** 8/15/2018 20:47 **Cleared Time:** 8/15/2018 21:50

Incident Address

Dispatch Address: 501 STOREY AV

Actual Address: 512 STOREY AVE Apt. A

Address Type: 1 - Street address

Property Use: 419 - 1 or 2 family dwelling

Insurance Carrier:

Common Name:

Latitude:

Longitude:

Phone:

Incident Classification

Incident: 2018-1811041-000 Version 41 of 41 Saved On: 6/21/2019 5:36:15 PM by Montgomery, Christine

Incident Type as Dispatched: 111 - Building fire

Actual Incident Type: 111B - Building fire-working fire

Mutual Aid: N - None

FDID:

State:

Incident Number:

Hazardous Materials Release:

Actions Taken:

11O - Extinguish-offensive fire

12 - Salvage & overhaul

21 - Search

Value - Property: 94080 **Contents:** 500

Loss - Property: 1500 **Contents:** 500

Authorities

Incident: 2018-1811041-000 Version 41 of 41 Saved On: 6/21/2019 5:36:15 PM by Montgomery, Christine

Member Making Report: F332

Officer In Charge: F062

Other Authorities:

Report Completed: Yes

Member Name:	Role:

Incident Property

Incident: 2018-1811041-000 Version 41 of 41 Saved On: 6/21/2019 5:36:15 PM by Montgomery, Christine

Area Of Origin: 14 - Common room, den, family room, living room, lounge

Heat Source: UU - Undetermined

Item First Ignited: 99 - Multiple items first ignited **Material First Ignited:** 99 - Multiple types of material first ignited

Cause of Ignition: U - Cause undetermined after investigation

Buildings: 2 **Residential Units:** 2 **Acres Burned:**

On Site Materials:

Human Factors	Factors Contributing to Ignition	Fire Suppression Factors
N - None	UU - Undetermined	NNN - None

Age:

Gender:

Incident Structure

Incident: 2018-1811041-000 Version 41 of 41 Saved On: 6/21/2019 5:36:15 PM by Montgomery, Christine

Structure Type: 1 - Enclosed building **Status:** 5 - Vacant and secured

Item Contributing to Flame Spread: 99 - Multiple items first ignited **Material Contributing to Flame Spread:** 99 - Multiple types of material first ignited

Fire Spread: 4 - Confined to building of origin

Main Floor -

Length: 0 **Width:** 0 **Area:** 400

Story of Origin: 1 **Floors Below Grade:** **Floors Above Grade:** 1

Floors Damaged -

Minor: **Significant:** 0 **Heavy:** 1 **Extreme:** 0 **Total:**

Incident Arson Investigation

Incident: 2018-1811041-000 Version 41 of 41 Saved On: 6/21/2019 5:36:15 PM by Montgomery, Christine

Case Status: **Avail. of Material 1st Ignited:** **Entry Method:**

Fire Involvement on Arrival: **Property Ownership:** **Apparent Group Involvement:**

Incendiary Devices -

Container: **Ignition/Delay Device:** **Fuel:**

Suspected Motivational Factors: **Other Investigative Info:** **Initial Observations:**

Laboratory Used:

Incident Arson Agencies

Agencies Referred To:

Incident Personnel

Incident: 2018-1811041-000 Version 41 of 41 Saved On: 6/21/2019 5:36:15 PM by Montgomery, Christine

Personnel ID	Last Name	First Name	Rank / Position
F301	Watkins	Lyndal	Capt
F479	Vargas	Christian	FF
F517	Zapata	Mark	FF
F500	Gentry	Jaren	FF
F249	Worsham	Robert	DR
F332	Mackey	Don	DR

F506	Rizo	Salvador	FF
F532	Rodriguez	Terry	FF
F062	Peters	Drew	BC
F477	Almance-Molinar	Jesus	FF
F418	Kiser	Matthew	FF
F267	Campa	Ricardo	DR
F524	Schauer	Dusty	FF
F418	Kiser	Matthew	FF
F288	Rivera	Joe Eric	FI
F356	Hoppman	Norman	FI

Personnel Actions Taken

Incident: 2018-1811041-000 Version 41 of 41 Saved On: 6/21/2019 5:36:15 PM by Montgomery, Christine

Action
11 - Extinguish
11O - Extinguish-offensive fire
12 - Salvage & overhaul
21 - Search
73 - Provide manpower
81 - Incident command
82 - Notify other agencies.
86 - Investigate
87 - Investigate fire out on arrival
921 - Standby-Level I Staging

Incident Apparatus and Resources

Incident: 2018-1811041-000 Version 41 of 41 Saved On: 6/21/2019 5:36:15 PM by Montgomery, Christine

Unit ID	Dispatched	En-route	Arrival	Cleared Scene	Arrive Facility	Cleared Facility	In Service	In Qtrs
TRK1	08/15 20:31	08/15 20:34	08/15 20:38			08/15 21:50		
SQ03	08/15 20:31	08/15 20:33	08/15 20:37			08/15 21:50		
EMS3	08/15 20:31	08/15 20:32	08/15 20:37			08/15 21:12		
E03	08/15 20:31	08/15 20:32	08/15 20:36			08/15 20:53		
E01	08/15 20:31	08/15 20:32	08/15 20:36			08/15 21:50		
BAT1	08/15 20:31	08/15 20:32	08/15 20:36			08/15 21:49		
EMS1	08/15 20:31	08/15 20:32	08/15 20:35			08/15 20:55		
655F	08/15 20:37	08/15 20:37	08/15 20:37			08/15 21:50		
653F	08/15 20:42	08/15 20:42	08/15 20:42			08/15 21:50		

Apparatus Actions Taken

Incident: 2018-1811041-000 Version 41 of 41 Saved On: 6/21/2019 5:36:15 PM by Montgomery, Christine

Action
11O - Extinguish-offensive fire
12 - Salvage & overhaul
21 - Search
73 - Provide manpower
81 - Incident command
82 - Notify other agencies.
86 - Investigate
87 - Investigate fire out on arrival
921 - Standby-Level I Staging

Incident Narrative

Incident: 2018-1811041-000 Version 41 of 41 Saved On: 6/21/2019 5:36:15 PM by Montgomery, Christine

Title: EMS3 **Type: 2 - Company** **Author: Christian Vargas**

Narrative Text:

On Wednesday, 15 August 2018 at 20:31:24, unit EMS3 responded to a reported 111 - Building fire at 501 STOREY AVE, Midland, TX 79701. Upon arrival at 512 STOREY AVE #A, Midland, TX 79701, a 111B - Building fire-working fire incident was found.

Unit EMS3 arrived at 20:37:20 with 2 personnel

The actions taken by this unit were: 73 - Provide manpower.

EMS3 responded along with several other units on a structure fire. Upon arrival, no patients were found and EMS3 personnel assisted in fire ground operations.

F479

Title: SQ03 **Type: 2 - Company** **Author: Ricardo Campa**

Narrative Text:

On Wednesday, 15 August 2018 at 20:31:24, unit SQ03 responded to a reported 111 - Building fire at 501 STOREY AVE, Midland, TX 79701. Upon arrival at 512 STOREY AVE #A, Midland, TX 79701, a 111B - Building fire-working fire incident was found.

Unit SQ03 arrived at 20:37:36 with 2 personnel

The actions taken by this unit were: 11O - Extinguish-offensive fire and 12 - Salvage & overhaul. SQ03 responded to 512 Storey in reference to structure fire along with several other units. SQ03 personnel assisted in fire ground operations. Ricardo Campa Driver.

Title: E03 **Type: 2 - Company** **Author: Robert Worsham**

Narrative Text:

On Wednesday, 15 August 2018 at 20:31:24, unit E03 responded to a reported 111 - Building fire at 501 STOREY AVE, Midland, TX 79701. Upon arrival at 512 STOREY AVE #A, Midland, TX 79701, a 111B - Building fire-working fire incident was found.

Unit E03 arrived at 20:36:52 with 2 personnel

The actions taken by this unit were: 12 - Salvage & overhaul.

E03 assisted with salvage and overhaul and returned to service when released by command.

Title: TRK1 **Type: 2 - Company** **Author: Lyndal Watkins**

Narrative Text:

On Wednesday, 15 August 2018 at 20:31:24, unit TRK1 responded to a reported 111 - Building fire at 501 STOREY AVE, Midland, TX 79701. Upon arrival at 512 STOREY AVE #A, Midland, TX 79701, a 111B - Building fire-working fire incident was found.

Unit TRK1 arrived at 20:38:15 with 2 personnel

The actions taken by this unit were: 11 - Extinguish and 21 - Search.

TRK1 performed a search on the primarry residence and the garage. TRK1 then assisted E01 with extinguishment.

Title: E01 **Type: 1 - Incident** **Author: Don Mackey**

Narrative Text:

On Wednesday, 15 August 2018 at 20:31:24, units TRK1, SQ03, EMS3, E03, E01, BAT1, EMS1 and 655F responded to a reported 111 - Building fire at 501 STOREY AVE, Midland, TX 79701. Upon arrival at 512 STOREY AVE #A, Midland, TX 79701, a 111B - Building fire-working fire incident was found.

The primary property use is 419 - 1 or 2 family dwelling.

Unit EMS1, the first arriving unit, arrived at 20:35:59. The last unit on scene, TRK1, cleared the scene at 21:50:09.

Actions taken by the primary responding units were: 11O - Extinguish-offensive fire; 12 - Salvage & overhaul and 21 - Search.

A total of 8 units and 15 personnel responded to this call.

Upon arrival detached shed was fully involved with main house exposure. Performed a quick hit and did an interior attack.

Title: Bat1 **Type: 2 - Company** **Author: Drew Peters**

Narrative Text:

On Wednesday, 15 August 2018 at 20:31:24, unit EMS1 responded to a reported 111 - Building fire at 501 STOREY AVE, Midland, TX 79701. Upon arrival at 512 STOREY AVE #A, Midland, TX 79701, a 111B - Building fire-working fire incident was found.

Unit EMS1 arrived at 20:35:59 with 2 personnel

The actions taken by this unit were: 921 - Standby-Level I Staging..Cause of fire possible arson, House was vacant called oncor service line from pole to house still energized, but no meter was in place....Drew Peters

Title: 653F **Type: 2 - Company** **Author: Norman Hoppman**

Narrative Text:

On Wednesday, 15 August 2018 at 20:42:00, unit 653F responded to a reported 111 - Building fire at 501 STOREY AVE, Midland, TX 79701. Upon arrival at 512 STOREY AVE #A, Midland, TX 79701, a 111B - Building fire-working fire incident was found.

Unit 653F arrived at 20:42:00 with 1 personnel

The actions taken by this unit were: 87 - Investigate fire out on arrival.

653F arrived on scene to assist F655. While 655 interviewed bystander, 653 began to investigate by taking additional photos inside of building with 655's camera.

Notation made that there was not currently a meter to the residence with no power supply to the apartment.
Fire appeared to start inside the main entrance to building.

No easily identifiable ignition source found. No injuries noted and no extension noted into main house on property.
Cause of fire undetermined. NMH 653F

Title: 655F **Type: 2 - Company** **Author: Joe Eric Rivera**

Narrative Text:

On Wednesday, 15 August 2018 at 20:37:17, unit 655F responded to a reported 111 - Building fire at 501 STOREY AVE, Midland, TX 79701. Upon arrival at 512 STOREY AVE #A, Midland, TX 79701, a 111B - Building fire-working fire incident was found.

Unit 655F arrived at 20:37:17 with 1 personnel

The actions taken by this unit were: 86 - Investigate.

On Wednesday, 15 August 2018 at 20:37:17, units with the Midland Fire Dept responded to 512 STOREY AVE #A, Midland, TX 79701, where a working structure was found. Fire ground operations started to extinguish fire of the apartment structure behind a vacant house.

655 responded to the structure and arrived during fire found operations and flames still coming out of structure. I noted fire and smoke coming from the windows and under the patio of the apt. I began to obtain photos and obtain information while bystanders still on scene.

The structure involved was a vacant apt type structure aprox 500 sq ft that sustained severe fire, heat and water damage. An aluminum patio covering was also damaged that was attached between the apt and the vacant house. The vacant house did not sustain any obvious damage from fire.

After full extinguishment of fire in apt, I continued my investigation and obtaining photos of incident. Burn patterns indicate that the fire originated just inside the doorway on the south end of the apt. The south door was located between the vacant house and apt. Upon entry was a room that sustained the most severe damage caused by fire, heat and water damage. Oncor was on site and stated that there was service going to the residence, but did not have any electricity in service at the time of the fire going to vacant house or the apt involved in fire. I noted a significant amount of rubbish such as food cans, furniture, clothing and appeared to be piled up in different areas of the apt and appeared to be vacant and not occupied on a normal basis.

The fire cause for this incident is undetermined. The ignition source is undetermined. Area of origin is south of the apt just inside the doorway on the floor. Point of origin not found. This incident will remain open and re-assessed should any other information be given to the FMO. Owners unknown and not on scene at time of fire. Unknown whether the structures were insured. No injuries noted at time of incident. Completed call without incident.....Joe Eric Rivera.....

Title: EMS1 **Type: 2 - Company** **Author: Jesus Almance-Molinar**

Narrative Text:

On Wednesday, 15 August 2018 at 20:31:24, unit EMS1 responded to a reported 111 - Building fire at 501 STOREY AVE, Midland, TX 79701. Upon arrival at 512 STOREY AVE #A, Midland, TX 79701, a 111B - Building fire-working fire incident was found.

Unit EMS1 arrived at 20:35:59 with 2 personnel

The actions taken by this unit were: 921 - Standby-Level I Staging.

Ems 01 responded to a fire, we level 01 staged and cleared the scene

MIDLAND FIRE DEPARTMENT
RELEASED TO:
Code Enforcement
James Rawls
C. Montgomery

DROP TINE
DISPOSAL
Midland, Texas
NO

Pecos
ROAD
WORK
AHEAD

ABC

Storey

ABC
ABC
ABC
ABC
ABC
ABC
ABC
ABC

ABC
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ABC

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ABC

City Council Meeting

Item Number: 13

Meeting Date: January 25, 2022

To: City Council / City Manager

From: Kelly Martinez, Senior Planner

Subject: AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 3,627-SQUARE FOOT PORTION OF LOT 1, BLOCK 6, BANKHEAD ADDITION, SECTION 7, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF WEST FRONT STREET AND BANKHEAD HIGHWAY), WHICH IS PRESENTLY ZONED C, COMMERCIAL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN AN AXE BAR FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES)

Purpose:

The applicant, Michael Smith is requesting a Specific Use Designation with term for the sale of alcoholic beverages for on-premises consumption in an axe bar at 3201 W. Front Street, Suite C and D, Midland, Texas 79701.

Recommended City Council Action:

Approve

Fiscal Impact:

This proposal does not have a significant financial impact to the City.

Current Zoning:

C, Commercial District

Surrounding Zoning and Land Use:

The properties to the north, east, south, and west are all zoned C, Commercial District, and the locations a tint shop, an auto body shop, a muffler shop, and a vacant building.

Discussion:

The applicant is requesting a Specific Use Designation to be able to sell all alcoholic beverages for on premises consumption, within an axe bar. The property is zoned C, Commercial District, which allows for the sale and on-premises consumption of alcoholic beverages with the approval of a Specific Use Designation.

Tall City Axe House is currently not in operation and does not have a specific use designation for the sale of all alcoholic beverages. The floor plan attached hereto as “Exhibit A” illustrates that the establishment will have a total square footage of 3,627 square feet, with an alcohol serviceable area of 1,833 square feet. Tall City Axe House will feature four (4) axe throwing lanes with two (2) targets per lane. All customers will have to sign a waiver whether participating in axe throwing or not. Alcohol will not be allowed in throwing lanes and all axe throwers will be limited to two drinks per one hour session of throwing. There will be coaches monitoring these lanes to ensure safety.

This site requires a minimum of 18 parking spaces. The site currently has 23 parking spaces, which are shared by all businesses on this lot. The adjacent businesses operate Monday through Friday and close at 5 p.m. This will allow Tall City Axe House to have access to all parking spaces after 5 p.m. Therefore, this site meets the required parking spaces. In addition, this site has adequate restroom facilities.

The axe bar will have the following hours of operation and alcohol service:

Monday through Thursday from 5:00 p.m. to 11:00 p.m.

Friday from 4:00 p.m. to 12:00 p.m. (midnight)

Saturday from 12:00 p.m. (noon) to 12:00 a.m. (midnight)

Sunday from 12:00 p.m. (noon) to 10:00 p.m.

Per Midland City Code 5.4.4. –Prohibited place of business

The sale of any alcoholic beverage is hereby prohibited by any person, where the place of business of any such dealer is within 300 feet of any church, public school, public school ground, athletic stadium used by any public school or public hospital, the measurements to be along the property lines of the street fronts and from front door to front door and in a direct line across intersections where they occur.

There are no churches or schools within 300 feet of the property.

This project has been circulated to all City departments for review. Below are the department comments.

Fire: (Approved)

No objections.

Engineering: (Approved)

No objection to zone change. [For the Applicant's information only.]

Transportation: (Approved)

No objection to zone change.

Building Code: (Approved with Conditions)

The previous use of this space was an Auto Mobile related occupancy, therefore a Building Permit is required to receive a Certificate of Occupancy for the new use.

Planning:

The request is compliant with the *Tall City Tomorrow Comprehensive Plan, Chapter 6-Character Plan Goal 4, which is to* "Encourage the development of places where Midland residents can gather and socialize to build connections." (Tall City Tomorrow page 137) Tall City Axe House will create a unique entertainment experience where Midland Residents can gather and socialize.

This request was approved at the January 3, Planning and Zoning Commission meeting.

This request meets all requirements; therefore, staff recommends approval of a Specific Use Designation with Term for the sale of all alcoholic beverages, for on-premises consumption, in an axe bar, subject to Conditions A through G.

Conditions:

A. **That the alcoholic serviceable area of the axe bar shall be limited to approximately 1,833 square feet as shown in Exhibit "A", which is attached hereto and incorporated herein for all purposes.**

B. **That the days and hours of alcoholic beverages sales and consumption shall be limited to:**

Monday through Thursday from 5:00 p.m. to 11:00 p.m.

Friday from 4:00 p.m. to 12:00 p.m. (midnight)

Saturday from 12:00 p.m. (noon) to 12:00 a.m. (midnight)

Sunday from 12:00 p.m. (noon) to 10:00 p.m.

C. **That the occupancy of the establishment shall not exceed the maximum occupancy determined by the Building Code and Fire Code.**

D. **That the establishment shall meet all requirements of the Fire Department and Code Administration.**

E. **That the sale and on-premises consumption of alcoholic beverages shall conform to applicable state and local laws.**

F. **That the applicant shall obtain a Certificate of Occupancy prior to the commencement of the sale of alcoholic beverages for on premises consumption to ensure that the conditions of this permit are satisfied.**

G. **That in accordance with Section 9.07.E.3 of the zoning ordinance, the establishment shall be in operation within 120 days from the final adoption date of this ordinance.**

Letters of Objection:

As of January 12, 2022, staff has not received any letters of objections.

Attachments:

Application
Floor Plan (Exhibit A)
Site Plan (Exhibit B)
Maps

Robert Patrick

City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 3,627-SQUARE FOOT PORTION OF LOT 1, BLOCK 6, BANKHEAD ADDITION, SECTION 7, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE SOUTHWEST CORNER OF THE INTERSECTION OF WEST FRONT STREET AND BANKHEAD HIGHWAY), WHICH IS PRESENTLY ZONED C, COMMERCIAL DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN AN AXE BAR FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, Texas, in compliance with the City Charter, the City Code, and State law, have given the requisite notices by United States mail, publication and otherwise; and after holding due hearings affording a full and fair hearing to all of the property owners generally, and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body of the City of Midland finds that the public convenience will be best served by granting a Specific Use Designation With Term for a 3,627-square foot portion of Lot 1, Block 6, Bankhead Addition, Section 7, City and County of Midland, Texas (the "Property"), as set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Zoning District Map of the City of Midland, Texas, is hereby amended to grant the Property a Specific Use Designation With Term for the sale of all alcoholic beverages in an axe bar (the "Establishment") for on-premises consumption, together with the uses permitted in the present C, Commercial District.

SECTION TWO. That the Property shall be subject to the following conditions and

restrictions:

A. That the serviceable area of the Establishment shall be limited to approximately 1,833 square feet as shown in Exhibit "A", which is attached hereto and incorporated herein for all purposes.

B. That the sale and on-premises consumption of alcoholic beverages shall conform to all applicable state and local laws.

C. That the days and hours of alcoholic beverage sales and consumption shall be limited to the following:

Monday through Thursday from 5:00 p.m. to 11:00 p.m.;
Friday from 4:00 p.m. to 12:00 a.m. (midnight);
Saturday from 12:00 p.m. (noon) to 12:00 a.m. (midnight); and
Sunday from 12:00 p.m. (noon) to 10:00 p.m.

D. That the occupancy of the Establishment shall not exceed the maximum occupancy determined by the Building Code and Fire Code.

E. That the Establishment shall meet the requirements of the Fire Department and the Code Administration Division.

F. That the operator of the Establishment shall obtain a Certificate of Occupancy prior to the commencement of the sale of alcoholic beverages for on-premises consumption to ensure that the conditions of this Specific Use Designation With Term are satisfied.

G. That in accordance with Section 11-1-9.07.E.3 of the City Code, the Establishment shall be in operation within 120 days from the final adoption date of this ordinance.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances, inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more

sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2022; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2022, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2022.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

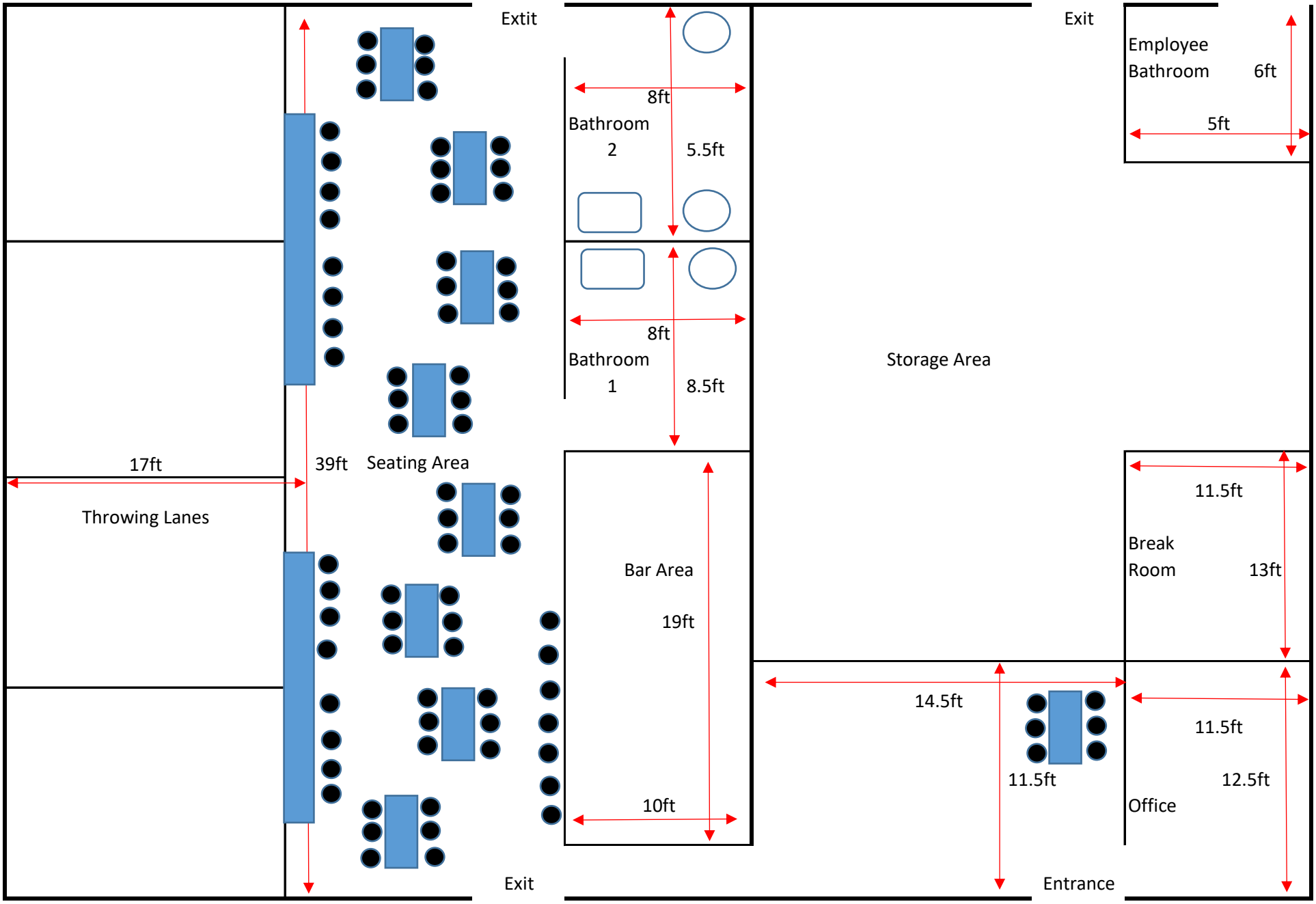
APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

EXHIBIT "A"



PACKET

(Serviceable) 1833 SF

13.9

February 8, 2022

MIDLAND
Planning Division

Specific Use Designation with Term for the Sale of Alcoholic Beverages for On-Premises Consumption

Project Number: SUD-21-0120

Case Number: _____

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name: Michael Smith		Phone (432) 703-6940 Email mikebsmith@hotmail.com	
Address 615 Dallas St.	City Big Spring	State TX	Zip 79720
Property Owner Printed Name: William Reinert		Phone (432) 967-3348 Email willreinert@benmark.com	
Address P.O. Box 198	City Midland	State TX	Zip 79702
Representative *(if different from Applicant or Property Owner)* Firm: _____ Printed Name:		Phone ( ) Email	
Address	City	State	Zip

Street Address: 3201 W Front Suite C & D

Business Name: Tall City Axe House

Legal Description
Lot: 001 Block: 006 Subdivision: Bankhead Sec. 7

Current Zoning: Commercial

Reason for Request: _____

Type of Business *(restaurant, bar, lounge, nightclub, etc.)*: Axe Bar

Proposed/Current Days and Hours of Operation: Mon.-Thurs 5pm-11pm Sun 12pm-10pm Fri-Sat. 12pm-12am

Proposed Days and Hours of Alcohol Service: Mon-Thurs- 5pm-11pm Sun 12pm-10pm Fri-Sat 12pm-12am

Total Square Footage of Business: 3627

Square Footage of Alcohol Serviceable Area: ~~3627~~ 1833

Restroom Fixtures:	*Men*	**Toilets/Urinals:**	1 / 1	**Bathroom Sinks:**	1
	Women	**Toilets:**	1	**Bathroom Sinks:**	1

RECEIVED
DEC 07 2021
BY: .....

Submittal and Fees

Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Dimensioned Floor Plan showing:
  - Seating
  - Exits
  - Restrooms
  - Kitchen (if applicable)
  - Total Square Footage
  - Serviceable Square Footage
- Dimensioned Site Plan showing:
  - Parking
  - Business Footprint
- Digital Copies of Floor Plan & Site Plan (PDF/JPEG)

Signatures

Applicant (signature):	Date:
Applicant (printed): Mike Smith	
Property Owner (signature):	Date:
Property Owner (printed): William Reinert Reinert Mgmt	

The Specific Use Designation with Term for the sale of all alcoholic beverages shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

If an agent is authorized by the property owner to file and execute the application on behalf of the property owner, the agent must complete the affidavit below.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appeared Michael Smith who, being by me duly sworn, upon oath says: That (s)he is authorized by William Reinert, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

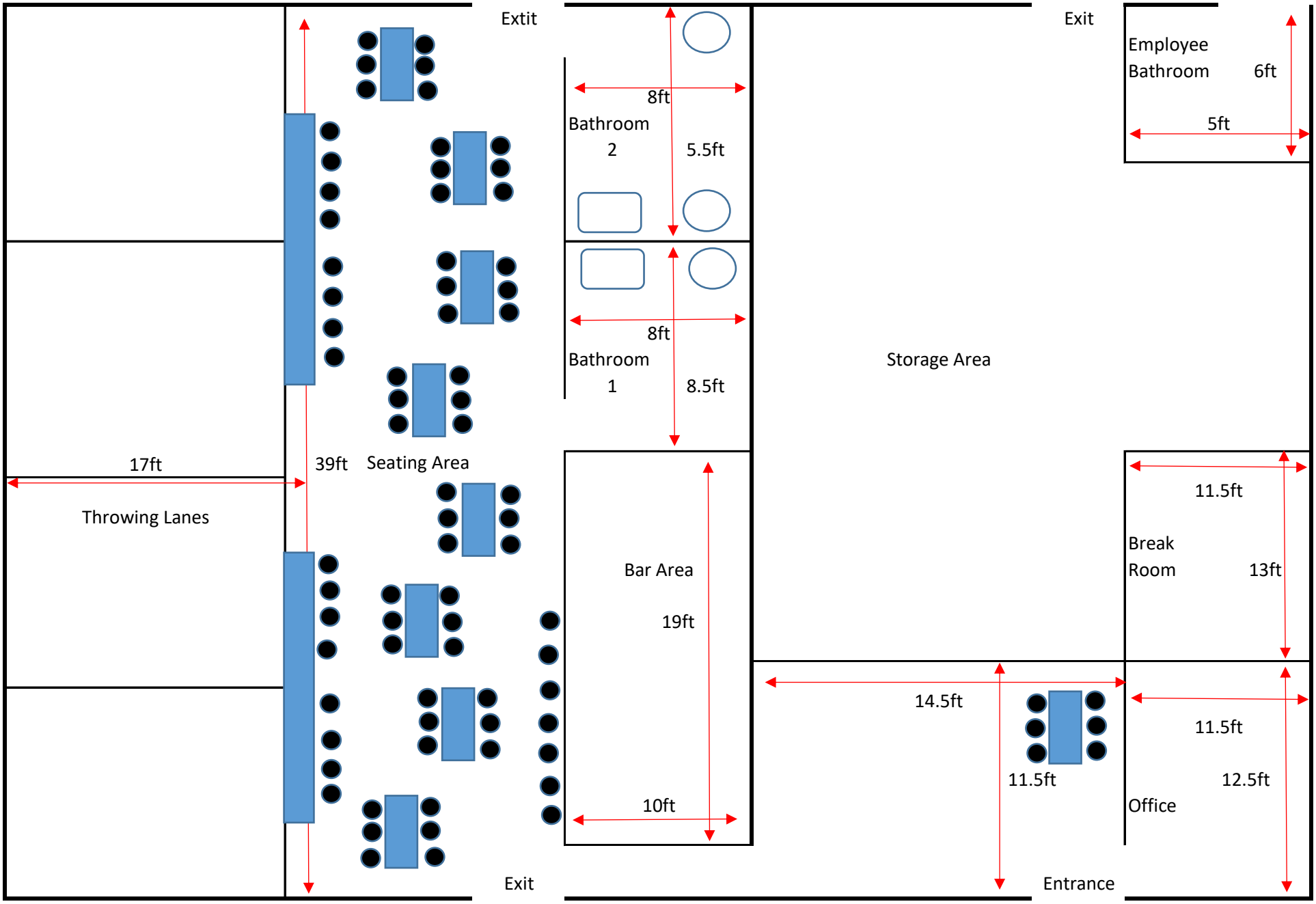
Authorized Agent (*signature*)

Subscribed and sworn to before me, this 7th day of Dec, 20 21, to certify which witness my hand and seal of office.

DALIA SALINAS
My Notary ID # 128541568
Expires March 9, 2023

NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

****Application will not be considered for scheduling until reviewed by a planner.****

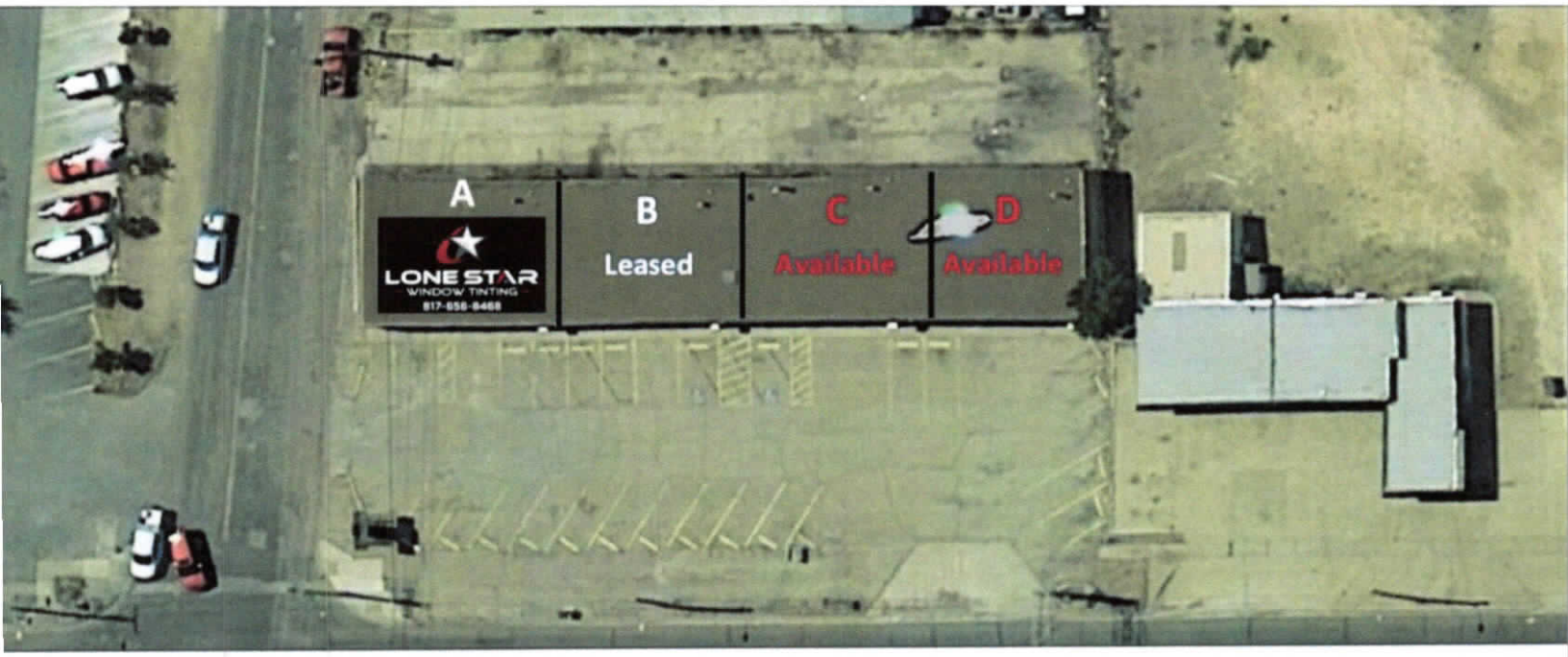


PACKET

(Serviceable) 1833 SF

13.12

February 8, 2022



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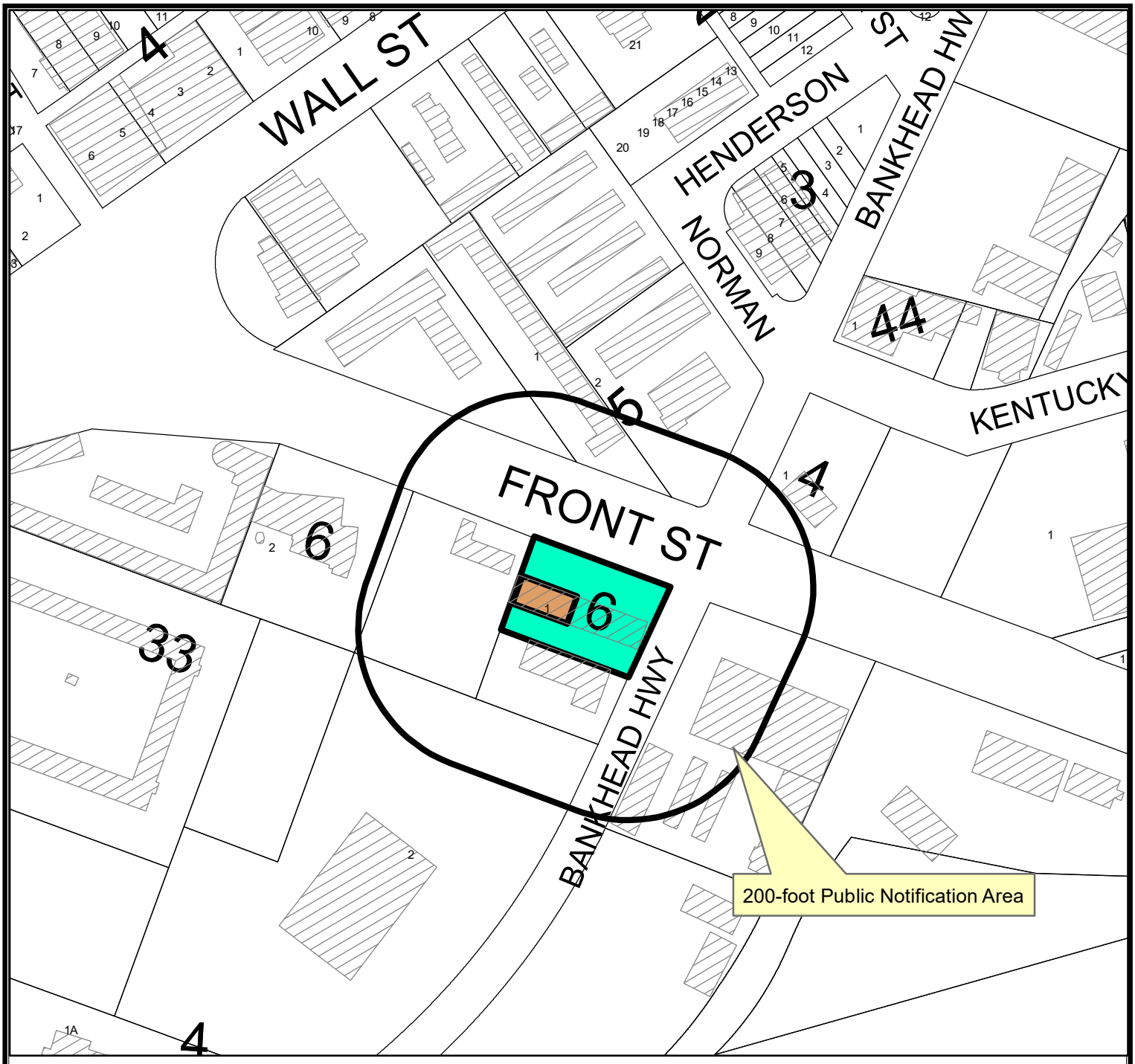
BY: .....



LOCATION MAP

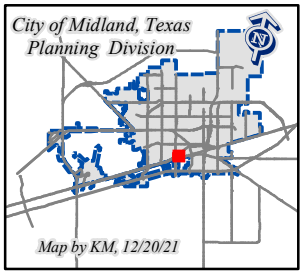
SUD-21-0120 **Scale: 1" = 200'**

Consider a request by Michael Smith for a Specific Use Designation with Term for the sale of all alcoholic beverages for on-premises consumption, in an axe bar, on a 3,627 square foot portion of Lot 1, Block 6, Bankhead Addition, Section 7, City and County of Midland, Texas.
Generally located on the southwest corner of the intersection of W. Front Street and Bankhead Highway. (Council District 2)

PACKET 13.14

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



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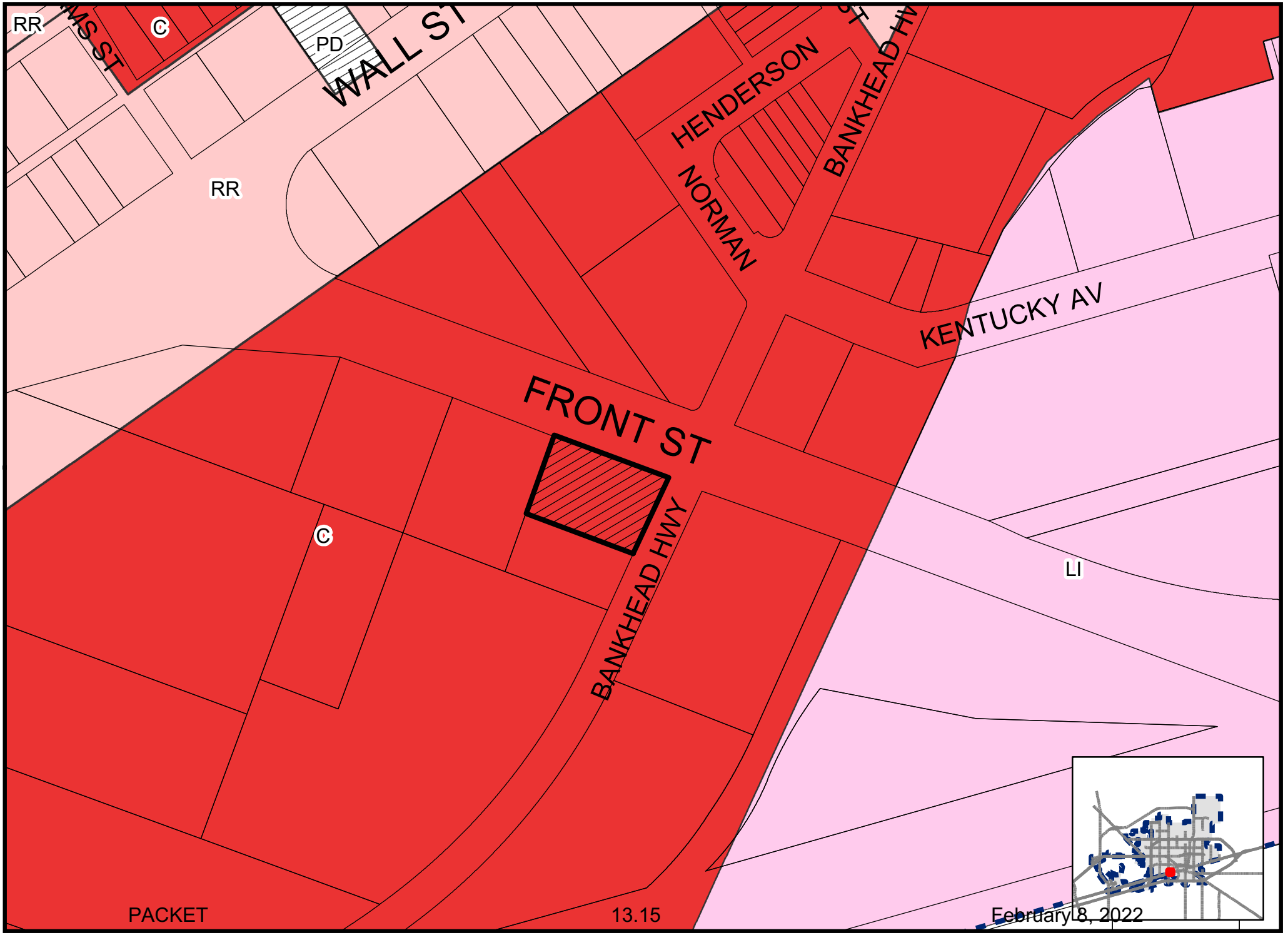
THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.

February 8, 2022



Map By KM, 12/20/21

SUD-21-0120

Scale: 1" = 200'

ZONING MAP

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West
Odessa
Williams
St
BUDGET
INN & SUITES
MIDLAND MUFFLER
BRAKE & ALIGNMENT

Windshields Etc
CALIBER COLLISION
Windshields Etc
WEST TEXAS
432-248-8996

Yuengling
WE'RE BRINGING THE GOODS
TO TEXAS
DOLLAR
GENERAL

City Council Meeting

Item Number: 14

Meeting Date: January 25, 2022

To: City Council / City Manager

From: Justin Smith, Planner

Subject: AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 4,011-SQUARE FOOT PORTION OF LOT 6A, BLOCK 62, BELMONT ADDITION, SECTION 23, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED ON THE NORTH SIDE OF EAST INTERSTATE 20, APPROXIMATELY 615 FEET NORTH OF WEST TERRELL STREET), WHICH IS PRESENTLY ZONED BP, I-20 BUSINESS PARK DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES)

Purpose:

The applicant, Samuel Leyva, is requesting a Specific Use Designation with term for the sale of alcoholic beverages for on-premises consumption in a restaurant at 503 E Interstate 20, Suite 124, Midland, Texas, 79701.

Recommended City Council Action:

Approve

Fiscal Impact:

This proposal does not have a significant financial impact to the City.

Current Zoning:

BP, I-20 Business Park District

Surrounding Zoning and Land Use:

The property is located at 503 E Interstate 20, Suite 124 in a BP, I-20 Business Park District. The property to the north is zoned PD, Planned Development District and the location of commercial buildings and single-family housing. The properties to the east are zoned RR, Regional Retail District, and BP, I-20 Business Park District. They are the location of retail shops and a Best Western Plus. The property to the west is zoned BP, I-20 Business Park District, and the location of vacant lots.

Discussion:

Samuel Leyva, a business owner of Garley's Mexican Restaurant, is requesting a Specific Use Designation to be able to sell alcoholic beverages for on premises consumption, within a restaurant. The property is zoned BP, I-20 Business Park District, which allows for the sale and on-premises consumption of alcoholic beverages with the approval of a Specific Use Designation.

Garely's Mexican Restaurant is currently in operation and does not have a Specific Use Designation for the sale of all alcoholic beverages. The floor plan attached hereto as "Exhibit A" illustrates that the establishment will have a total square footage of 4,011 square feet, with an alcohol serviceable area of 1,467 square feet inside of the establishment. The site currently has adequate parking and restroom facilities.

The restaurant will have the following hours of operation:

Monday through Thursday: 5:30 a.m. to 9:00 p.m.
Friday and Saturday: 5:30 a.m. to 10:00 p.m.
Sunday: 7:30 a.m. to 9 p.m.

The restaurant will have the following hours of alcohol service:

Monday through Thursday: 7:00 to 12:00 a.m. (midnight)
Friday and Saturday: 7:00 a.m. to 1:00 a.m.
Sunday: 10:00 a.m. to 12:00 a.m. (midnight)

Per Midland City Code 5.4.4. –Prohibited place of business

The sale of any alcoholic beverage is hereby prohibited by any person, where the place of business of any such dealer is within 300 feet of any church, public school, public school ground, athletic stadium used by any public school or public hospital, the measurements to be along the property lines of the street fronts and from front door to front door and in a direct line across intersections where they occur.

There are no churches or schools within 300 feet of the property.

This project has been circulated to all City departments for review. Below are the department comments.

Building Code: (Approved with Conditions)

The SUD for Garely's Restaurant is acceptable. The property must adhere to the maximum occupant load of 140. Occupancy loads must be posted in accordance with section 1004.3 of the 2015 International Fire Code.

Oil and Gas: (Approved)

No objections.

Engineering: (Approved)

No objection.

Fire: (Approved)

No objections

Transportation: (Approved with Conditions)

Patio appears to extend into City right-of-way. Separate ROW License required, if so.

No objections to use.

Planning:

The request is in compliance with the *Tall City Tomorrow Comprehensive Plan, Chapter 6-Character Plan Goal 4, which is to* "Encourage the development of places where Midland residents can gather and socialize to build connections." (Tall City Tomorrow page 137) Garley's Meixcan Restaurant will create a sophisticated atmosphere where Midland Residents can relax and enjoy drinks with their meal.

This request meets all requirements; therefore, staff recommends approval of a Specific Use Designation with Term for the sale of all alcoholic beverages, for on-premises consumption, in a restaurant, subject to Conditions A through G.

Conditions:

A. **That the alcoholic serviceable area of the restaurant shall be limited to approximately 1,467 square feet as shown in Exhibit "A", which is attached hereto and incorporated herein for all purposes.**

B. **That the days and hours of alcoholic beverages sales and consumption shall be limited to:**

Monday through Thursday: 7:00 to 12:00 a.m. (midnight)
Friday and Saturday: 7:00 a.m. to 1:00 a.m.
Sunday: 10:00 a.m. to 12:00 a.m. (midnight)

C. **That the occupancy of the establishment shall not exceed the maximum occupancy determined by the Building Code and Fire Code.**

D. **That the establishment shall meet all requirements of the Fire Department and Code Administration.**

E. **That the sale and on-premises consumption of alcoholic beverages shall conform to applicable state and local laws.**

F. **That the applicant shall obtain a Certificate of Occupancy prior to the commencement of the sale of alcoholic beverages for on premises consumption to ensure that the conditions of this permit are satisfied.**

G. **That in accordance with Section 9.07.E.3 of the zoning ordinance, the restaurant shall be in operation within 120 days from the final adoption date of this ordinance.**

Letters of Objection:

As of January 20, 2022, staff has not received any letters of objections.

Attachments:

Application
Floor Plan (Exhibit A)
Site Plan (Exhibit B)
Maps

Robert Patrick

City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO GRANT A SPECIFIC USE DESIGNATION WITH TERM FOR A 4,011-SQUARE FOOT PORTION OF LOT 6A, BLOCK 62, BELMONT ADDITION, SECTION 23, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED ON THE NORTH SIDE OF EAST INTERSTATE 20, APPROXIMATELY 615 FEET NORTH OF WEST TERRELL STREET), WHICH IS PRESENTLY ZONED BP, I-20 BUSINESS PARK DISTRICT, ALLOWING SAID PROPERTY TO BE USED FOR THE SALE OF ALL ALCOHOLIC BEVERAGES IN A RESTAURANT FOR ON-PREMISES CONSUMPTION; MAKING SAID DESIGNATION SUBJECT TO CERTAIN CONDITIONS AND RESTRICTIONS CONTAINED HEREIN; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, Texas, in compliance with the City Charter, the City Code, and State law, have given the requisite notices by United States mail, publication and otherwise; and after holding due hearings affording a full and fair hearing to all of the property owners generally, and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body of the City of Midland finds that the public convenience will be best served by granting a Specific Use Designation With Term for a 4,011-square foot portion of Lot 6A, Block 62, Belmont Addition, Section 23, City and County of Midland, Texas (the "Property"), as set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Zoning District Map of the City of Midland, Texas, is hereby amended to grant the Property a Specific Use Designation With Term for the sale of all alcoholic beverages in a restaurant (the "Establishment") for on-premises consumption, together with the uses permitted in the present BP, I-20 Business Park District.

SECTION TWO. That the Property shall be subject to the following conditions and

restrictions:

A. That the serviceable area of the Establishment shall be limited to approximately 1,467 square feet as shown in Exhibit "A", which is attached hereto and incorporated herein for all purposes.

B. That the sale and on-premises consumption of alcoholic beverages shall conform to all applicable state and local laws.

C. That the days and hours of alcoholic beverage sales and consumption shall be limited to the following:

Monday through Thursday from 7:00 a.m. to 12:00 a.m. (midnight);
Friday and Saturday from 7:00 a.m. to 1:00 a.m. of the following day; and
Sunday from 10:00 a.m. to 12:00 a.m. (midnight).

D. That the occupancy of the Establishment shall not exceed the maximum occupancy determined by the Building Code and Fire Code.

E. That the Establishment shall meet the requirements of the Fire Department and the Code Administration Division.

F. That the operator of the Establishment shall obtain a Certificate of Occupancy prior to the commencement of the sale of alcoholic beverages for on-premises consumption to ensure that the conditions of this Specific Use Designation With Term are satisfied.

G. That in accordance with Section 11-1-9.07.E.3 of the City Code, the Establishment shall be in operation within 120 days from the final adoption date of this ordinance.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances, inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2022; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2022, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2022.

_____
Patrick N. Payton, Mayor

ATTEST:

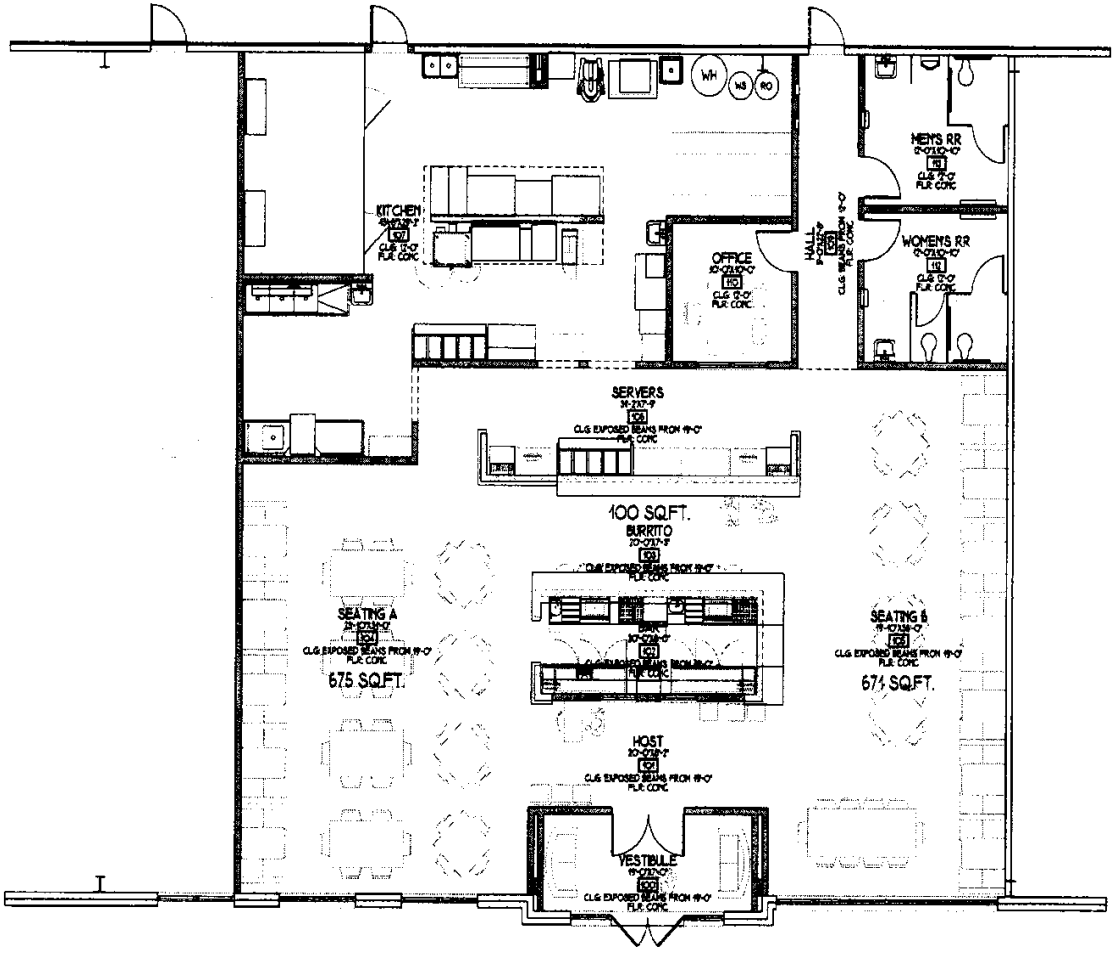
_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney



WALL LEGEND

EXISTING WALL TO REMAIN

NEW 2X WALL

NEW MASONRY WALL

SQUARE FOOTAGES	
NAME	FOOTAGE
SUITE 02	4,014 SQ.FT.

01 NEW FLOOR PLAN

SCALE: 1/4" = 1'-0"

EXHIBIT A

PRELIMINARY
NOT FOR CONSTRUCTION

REVISION

DRAWN BY
LUIS

DESIGN & DRAFTING BY:
CORNERSTONE DESIGN GROUP
PHONE: (432)664-6008

SHEET TITLE
NEW FLOOR PLAN

GAREL Y'S MEXICAN RESTAURANT
503 E INTERSTATE 20
MIDLAND, TEXAS
PROJECT NUMBER: 1838

SHEET NUMBER
A-2.2
SHEET 03 OF 12

36.9
XREF NA21-EXST.DWG

OCCUPANCY SCHEDULE

ROOM NUMBER	ROOM NAME	OCCUPANCY DESIGNATION	ALLOWANCE	SQUARE FOOTAGE	OCCUPANCY LOAD
100	VESTIBULE	ACCESSORY	300	133 SQ. FT.	0.4
101	HOST	ASSEMBLY UNCONCENTRATED	15	153 SQ. FT.	10.9
102	BAR	ASSEMBLY UNCONCENTRATED	15	150 SQ. FT.	10.7
103	BURRITO	KITCHEN	200	145 SQ. FT.	0.7
104	SEATING A	ASSEMBLY UNCONCENTRATED	15	733 SQ. FT.	48.9
105	SEATING B	ASSEMBLY UNCONCENTRATED	15	734 SQ. FT.	48.9
106	SERVERS	KITCHEN	200	236 SQ. FT.	1.2
107	KITCHEN	KITCHEN	200	1,000 SQ. FT.	5.0
109	HALL	ACCESSORY	300	113 SQ. FT.	0.4
110	OFFICE	BUSINESS	100	100 SQ. FT.	1.0
112	WOMEN'S RR	ACCESSORY	300	130 SQ. FT.	0.4
113	MEN'S RR	ACCESSORY	300	130 SQ. FT.	0.4
					120.9

PLUMBING FIXTURE COUNT

USE GROUP - A-2
TOTAL OCCUPANCY: 132 (66 MALE & 66 FEMALE)

	REQUIRED	PROVIDED
WATER CLOSETS (FEMALE)	1	2
WATER CLOSETS (MALE)	1	1
URINALS (MALE)	0	1
LAVATORIES	2	2
OTHER	REQUIRED	PROVIDED
SERVICE SINK	1	1

EGRESS CALCULATION:

OCCUPANCY: 132
REQUIRED EGRESS WIDTH: 0.2" X 132 = 26.4"
PROVIDED EGRESS WIDTH: 4 X 36" = 144"
NUMBER OF EXITS PROVIDED: 3

CODE REVIEW:

OCCUPANCY: A2 - RESTAURANT

100% AUTOMATIC FIRE-SPRINKLERED

NON-COMBUSTABLE WALLS (METAL STUD)

FIRE-RATED WALLS BETWEEN TENANT SPACES

MIDLAND Planning Division

Specific Use Designation Application (Non-Alcohol)

Case Number: SUP-21-0119

Ord. Number: _____

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name: Samuel Leyva Gavely's Mexican Restaurant		Phone (308) 233-7077 Email samuelleyva711@gmail.com	
Address 503 E I-20	City Midland	State TX	Zip 79701

Property Owner Printed Name: Belmont Realty		Phone (432) 570-9202 Email bobweidner@sbcglobal.net	
Address P.O. Box 2932	City Midland	State TX	Zip 79702

Representative *(if different from Applicant or Property Owner)* Firm: _____ Printed Name:		Phone ( ) Email	
Address	City	State	Zip

Type of Permit: Late hours 1:00 am

For Office Use Only ☐ with Term ☐without Term

Is there any Code Enforcement action pending on property? ☐ Yes ☐ No

Street Address: 503 E I-20 Midland, Tx 79701

Legal Description

Lot: 06A Block: 062 Subdivision: Belmont, Sec 23 Suites 1223 124

Current Zoning:

Maximum Floor Area: 60 x 60 **Maximum Occupancy:** 125

Proposed hours and days of use or operation: Monday - Sunday

M-Thurs 5:30 am - 11:00 pm Fri - Sunday 5:30 am - 1:00 am

Reason for request: Bar addition to restaurant

Applicant's opinion as to why the request will not adversely affect the public safety, health, morals, general welfare, and convenience: _____

Submittal and Fees

Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Dimensioned Site Plan showing
  - Parking (if applicable)
  - Building Footprint
- Digital Copies of Site Plan (PDF/JPEG)

Signatures	
Applicant (signature): Samuel Leyva	Date: 12-06-2021
Applicant (printed): Samuel Leyva	
Property Owner (signature): Robert B Weidner	Date: 12-06-2021
Property Owner (printed): Robert B Weidner	

The Specific Use Designation shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

If an agent is authorized by the property owner to file and execute the application on behalf of the property owner, the agent must complete the affidavit below.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appeared Samuel Leyva who, being by me duly sworn, upon oath says: That (s)he is authorized by Robert Weidner, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

Samuel Leyva
Authorized Agent (*signature*)

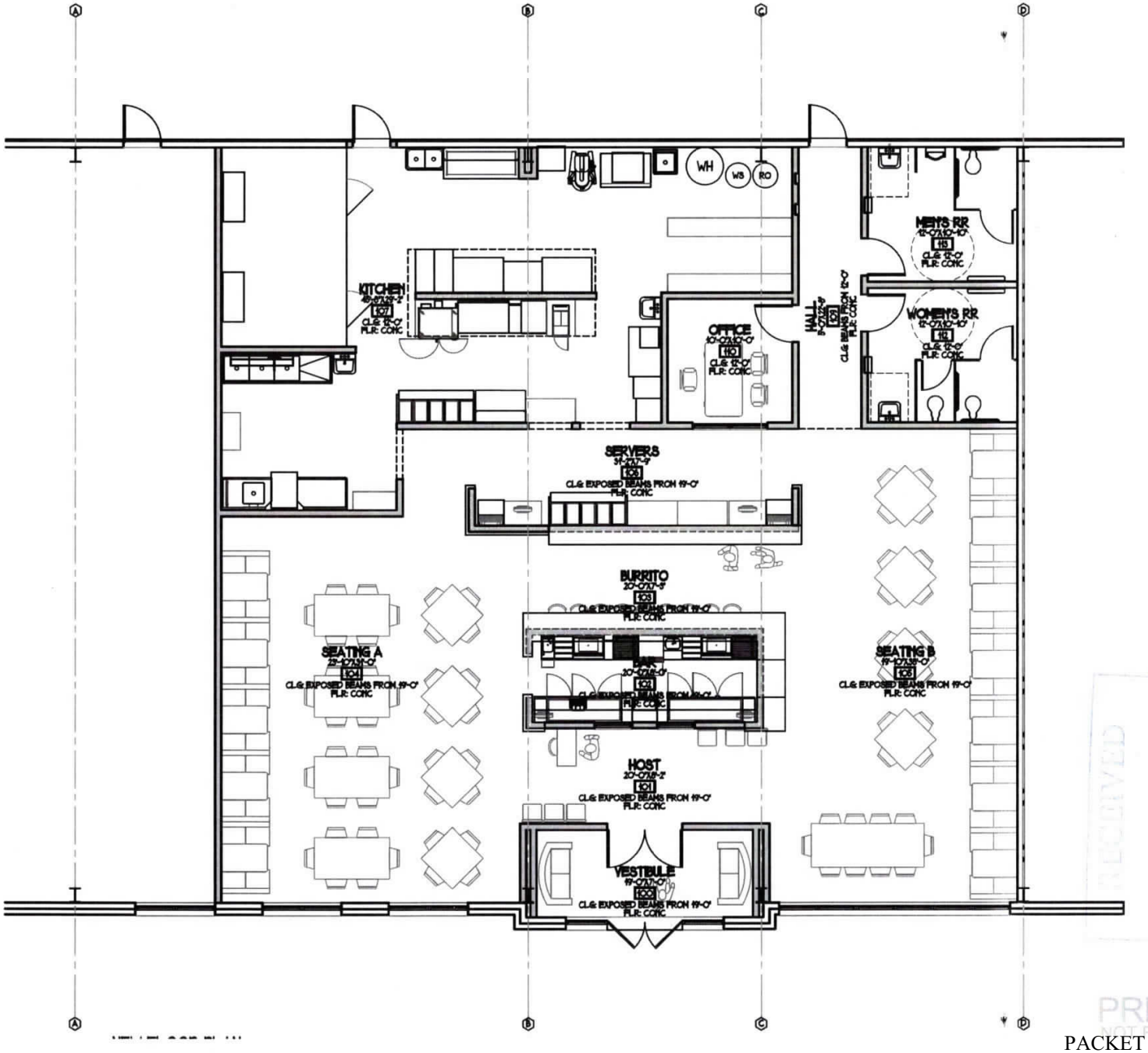
Subscribed and sworn to before me, this 6th day of December, 20 21, to certify which witness my hand and seal of office.

MELISSA ARMENDARIZ
Notary Public, State of Texas
Comm. Expires 07-05-2024
Notary ID 130726525

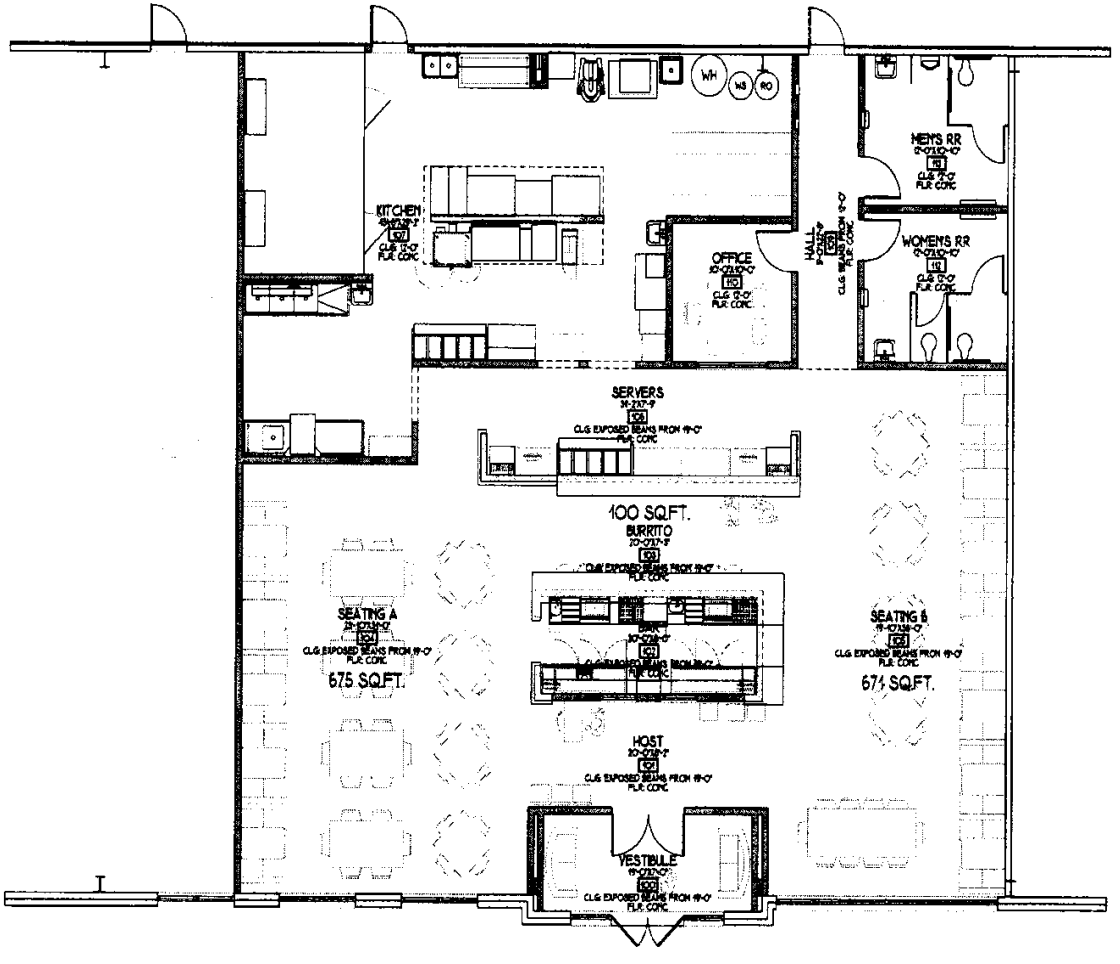
Melissa Ay
NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

FOR OFFICE USE ONLY	
☐ Property Owner Authorization	☐ Dimensioned Site Plan
☐ Application Fee	☐ Site Plan in Digital Format (PDF/JPEG)
Check #_____	
Received By:	Date:

****Application will not be considered for scheduling until reviewed by a planner.****



RECEIVED
SEP 30 2019
CITY OF ORLAND
COMMUNITY DEVELOPMENT DEPARTMENT



WALL LEGEND

EXISTING WALL TO REMAIN
NEW 2X WALL
NEW MASONRY WALL

SQUARE FOOTAGES	
NAME	FOOTAGE
SUITE 122	4011 SQ.FT.

01 NEW FLOOR PLAN
SCALE: 1/4" = 1'-0"

EXHIBIT A

PRELIMINARY
NOT FOR CONSTRUCTION

REVISION
DRAWN BY LUIS

DESIGN & DRAFTING BY:
CORNERSTONE DESIGN GROUP
PHONE (432)684-5005

SHEET TITLE
NEW FLOOR PLAN

GARELY'S MEXICAN RESTAURANT
503 E INTERSTATE 20
MIDLAND, TEXAS
PROJECT NUMBER: 16285

SHEET NUMBER
A-2.2
SHEET 03 OF 12

36.9
XREF NA21-EXST.DWG

OCCUPANCY SCHEDULE

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OCCUPANCY: 132
REQUIRED EGRESS WIDTH: 0.2" X 132 = 26.4"
PROVIDED EGRESS WIDTH: 4 X 36" = 144"
NUMBER OF EXITS PROVIDED: 3

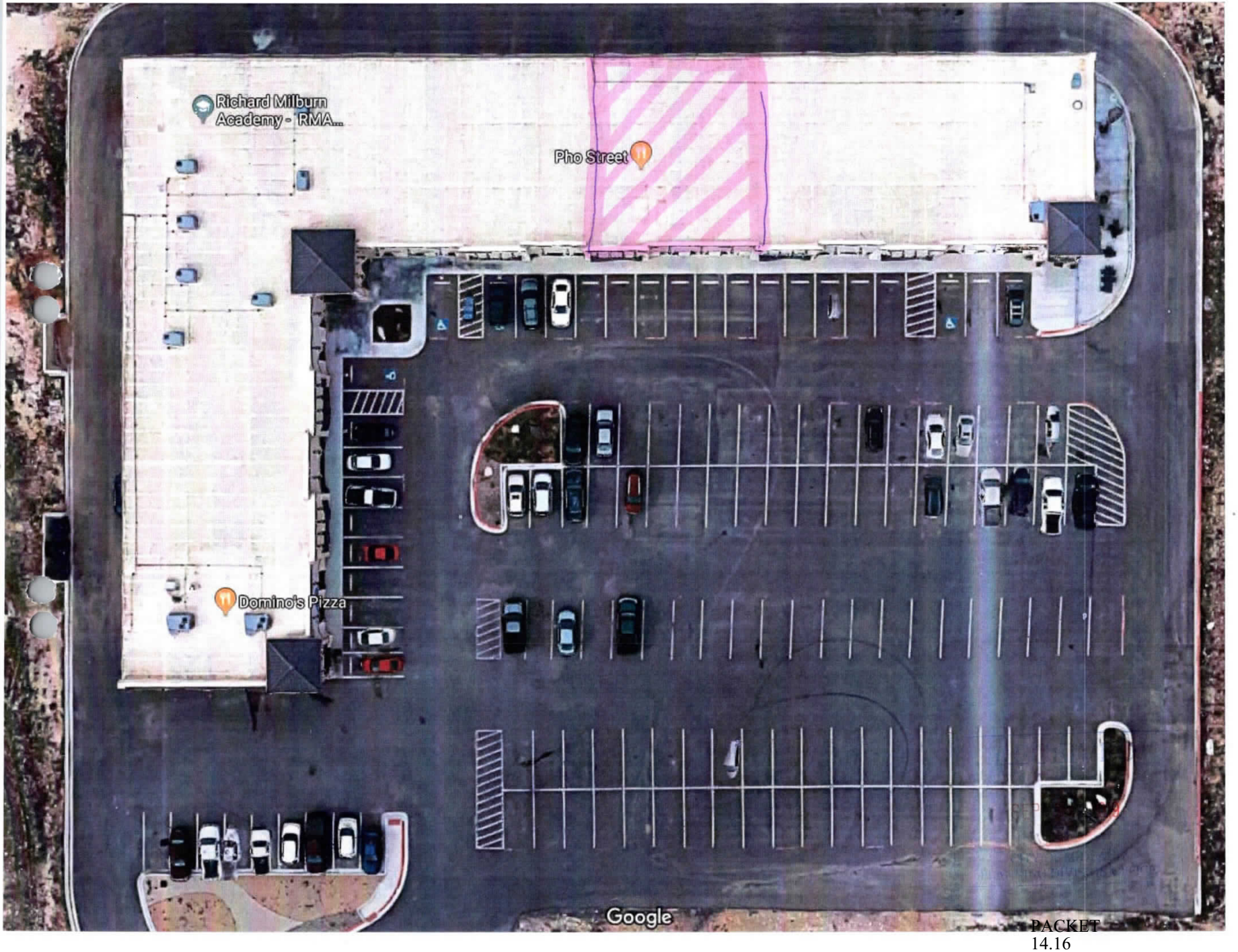
CODE REVIEW:

OCCUPANCY: A2 - RESTAURANT

100% AUTOMATIC FIRE-SPRINKLERED

NON-COMBUSTABLE WALLS (METAL STUD)

FIRE-RATED WALLS BETWEEN TENANT SPACES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Pho Street
Domino's Pizza
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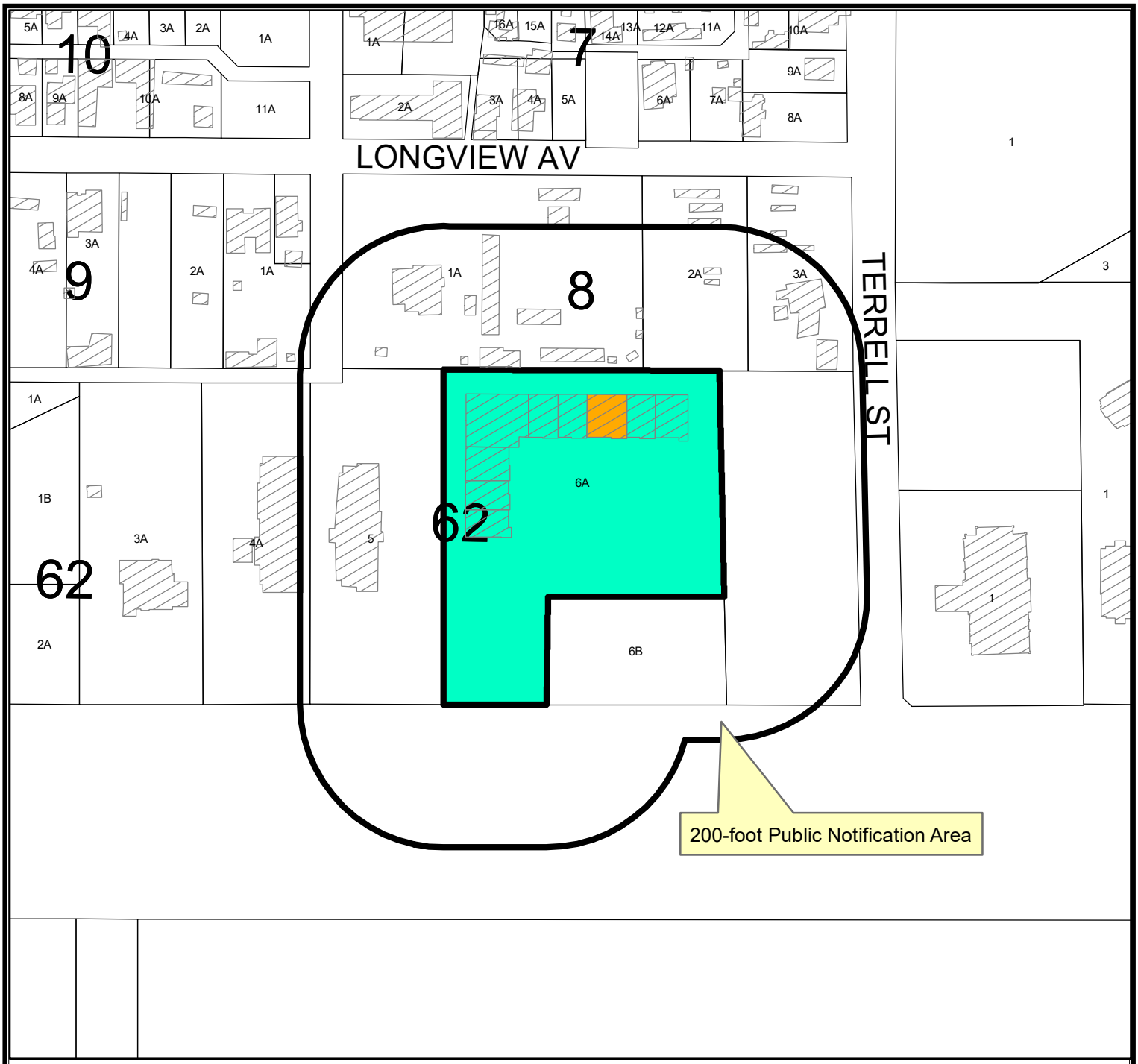


LOCATION MAP

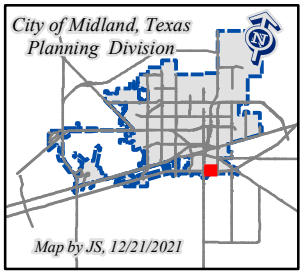
SUB-21-0119 **Scale: 1" = 2400'**

Consider a request by Garely's Mexican Restaurant, for a Specific Use Designation with Term for the sale of all alcoholic beverages for on-premises consumption, in a restaurant, on a 4,011 square foot portion of Lot 6A, Block 62, Belmont Adittion, Section 23, City and County of Midland, Texas.

Generally located on the north of E Interstate 20, approximately 615 feet west of S Terrrell Street. (Council District 2)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



©THE CITY OF MIDLAND - 2021
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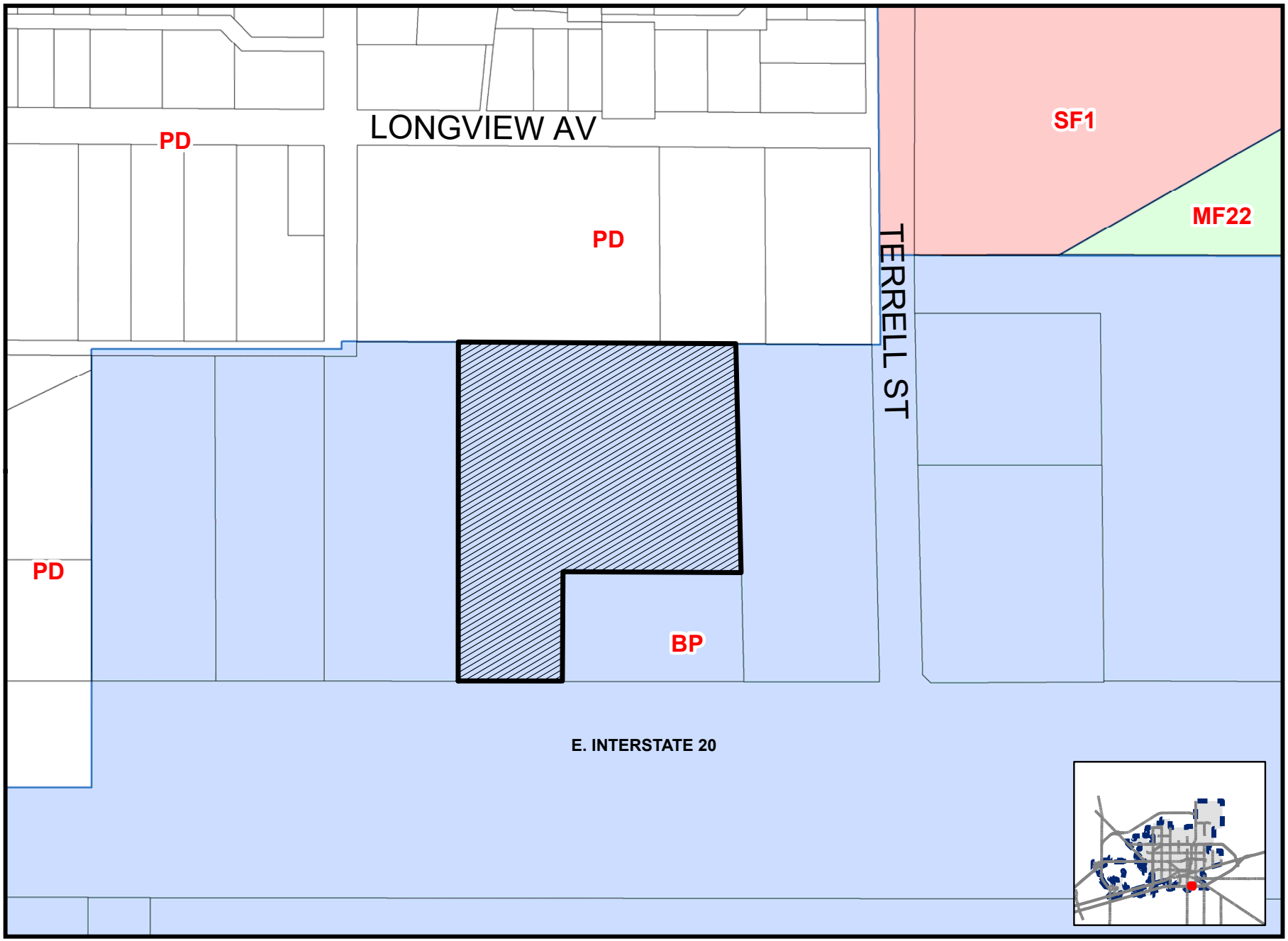
THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.



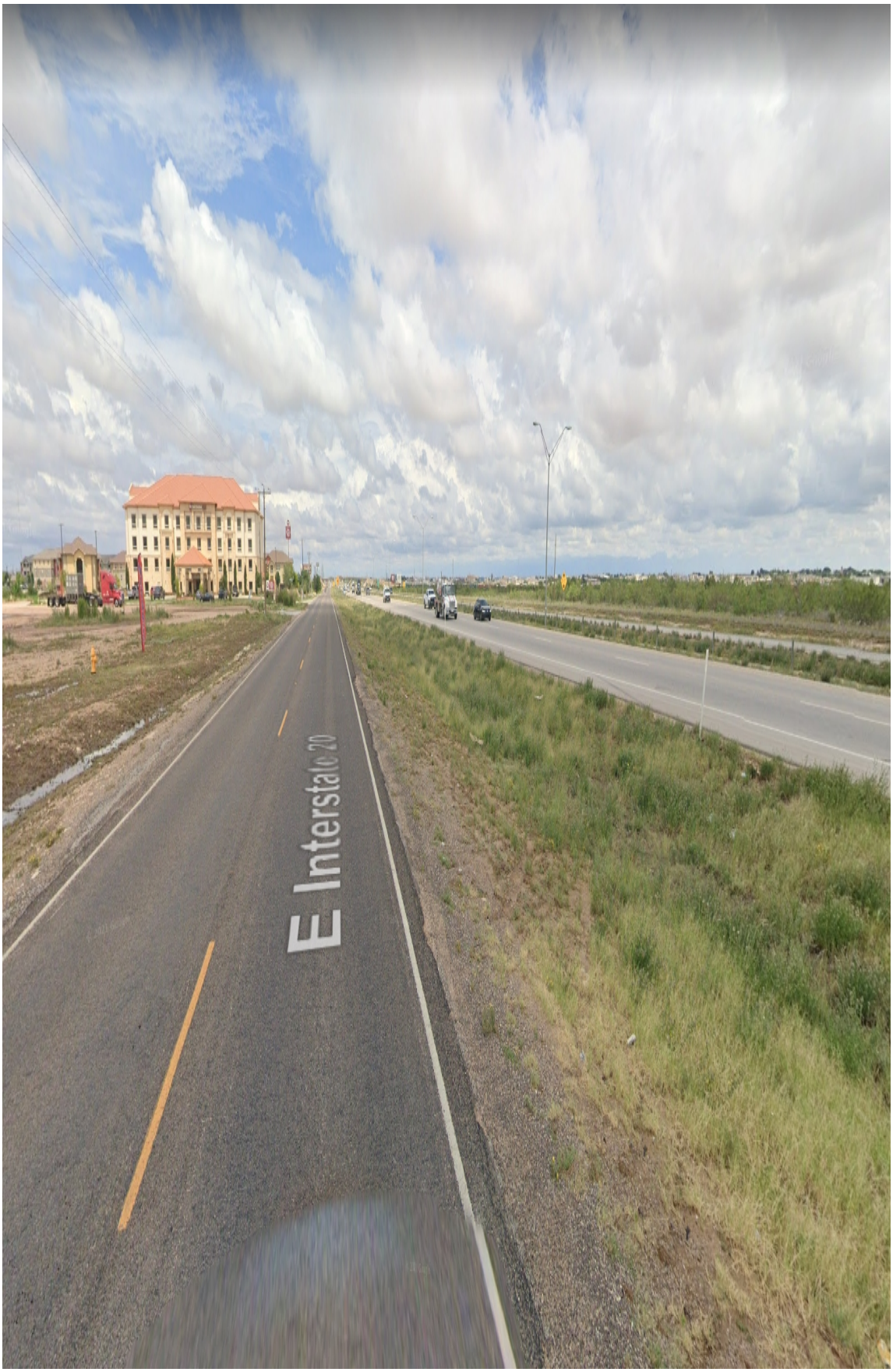
Map By ES, 12/21/2021

SUD-21-0119

Scale: 1" = 2,000'

ZONING MAP

PACKET
14.18
February 8, 2022


E Interstate 20

E Interstate 20

City Council Meeting

Item Number: **15**

Meeting Date: **February 8, 2022**

To: **City Council / City Manager**

From: **Ron Jenkins, Oil and Gas Coordinator**

Subject: **The proposed granting of an oil and gas well permit to Permian Deep Rock Oil Co., LLC for the drilling of the oil and gas well Mustang 110 MIPA Unit #H110WA; said well being generally located 2,395 feet east of Rankin Highway and 170 feet south of I-20 (DISTRICT 2) (DEVELOPMENT SERVICES)**

Purpose:

The proposed granting of oil and gas well permit to Permian Deep Rock Oil Co., LLC for the drilling of the oil and gas well Mustang 110 MIPA Unit #H110WA; said well being generally located 2,395 feet east of Rankin Highway and 170 feet south of I-20. Council may consider this permit following a 30-day public comment period and at a regularly scheduled meeting. No notices of objection received.

Recommended City Council Action:

Directional / Informational

Fiscal Impact:

There is no cost to the City to process this application.

Discussion:

The Oil and Gas Advisory Committee has reviewed the well site in detail and recommends approval with updated exhibits. This pad was approved for two permits on February 12, 2019 that have expired. A 16 ft. tall and 160 ft. long sound wall will be used during drilling and completion operations being located on the North perimeter of location. The tank battery will be in the county. The operator has a surface agreement with the surface owner. Receiving support of the Oil & Gas Advisory Committee, Permian Deep Rock Oil is requesting the following variances:

(1) Permian Deep Rock Oil Company requests to allow for twenty-four-hour fracing operations.
(2) Permian Deep Rock Oil Company requests variance for fence of the drill pad instead of individual well
(3) Permian Deep Rock Oil Company requests a variance to the requirement of landscaping and irrigation due to no city water is available.
(4) Permian Deep Rock Oil Company requests variance to the Road Repair Agreement due to no city streets will be used.

Attachments: Applications; Location maps; Exhibit - Drill site maps, Exhibit – Flow Line Location.

Robert Patrick

City Manager's Office

MIDLAND
Planning Division

APPLICATION FOR OIL AND GAS PERMIT

(Pursuant to Midland City Ordinance No. 8769)

I. General Information

Date	Operator Name (must match W-1)	Operator Address
12/01/2021	Permian Deep Rock Oil Co., LLC	P.O. Box 11405 Midland, TX 79702

Representative Name	Representative Address (within Midland City Limits)	Rep. Tele.
Keith E. Bucy	500 W. Wall St. Ste 300 Midland, TX 79701	432-682-6685 Rep. Fax 432-684-4519
Fee: $4,000.00 Rec'd Yes ✓ No___	NOTE: All attachments need to bound and put in a binder before submitting.	Pages 1-4

Permit Compliance Contact (Choose 1):

Option A:

24/7 Answering Services - No. 1 (Tele.): **No. 2 (Tele.):**

Option B:

Company Compliance Representative (Name, Address, Local Telephone) ***(ATTACH STATEMENT AS EXHIBIT A):*** See Exhibit "A"

Emergency Contact Representative (Name, Address, 24-Hour Tele. No.):

See Exhibit "A"

Other Permitted Wells in City ***(ATTACH EXHIBIT B*** **[see § J(26)]).** See Exhibit "B"

II. Mineral Ownership

Name(s) and Address(es) of Mineral Estate Lessors (under applicable lease):

1.

2.

3.

ATTACHED AS EXHIBIT C **is** List of subdivisions

See Exhibit "C"

III. Surface Ownership & Use

General Description of Current Surface Use (within 860 feet of proposed surface location):
Surface use: Undeveloped Rangeland, service company yards and apartment complex
Surface ownership: Two residences, apartment complex and service company yards:

See Exhibit "D"

ATTACHED AS EXHIBIT D **is**

Current Tax Roll from Midland Central Appraisal District)**, which lists**

the name(s) and address(es) of all surface owners within 860 feet of the surface well location. [See § J(7)].

ATTACHED AS EXHIBIT E **is a** ***(map/p lat/satellite/aerial photo)*** **depicting all Residences, commercial structures, public buildings, all publicly dedicated Streets and alleys, Rights of Way, and permanent accessory structures surrounding the proposed Drill Site. The** ***(map/p lat/satellite/aerial photo)*** **includes two circles, as required by the Ordinance—one depicting a 500 foot radius and one depicting an 860 foot radius from the proposed well's surface location. [See § J(10)].**

ATTACHED AS EXHIBIT F **is a copy of the notification letter(s) sent to 100 percent of the surface owners, Certified Mail, Return Receipt Requested. [See § J(36)].**

IV. Well & Operations Information

Proposed Well Name: Mustang 110 MIPA Unit #H110WA

Proposed Hole Size, Casing Program and Cementing Program (attach Exhibit as Necessary)[See § J(11) and § L(4)]:

See Exhibit "G"

Legal Description of Proposed Well Site: SHL: 110' FSL & 2,395' FWL, Section 2
Block 39, T-2-S, T&PRR Co. Survey, Midland County, Texas

ATTACHED AS EXHIBIT G **is the Location Site Plan [See § J(9)].**

ATTACHED AS EXHIBIT H **is the Map with the proposed transportation route(s) and road(s) for equipment, chemicals, or refuse products used or produced in the proposed oil and gas operations. [See § J(12)].**

ATTACHED AS EXHIBIT I **is a copy of the approved Texas Railroad Commission permit to drill (Form W-1), together with all attachments** ***(also file copy of W-1 with City Secretary before commencement of drilling operations).*** **[See § J(16) and (20)].**

ATTACHED AS EXHIBIT J **is a copy of the required TCEQ report as to depth of usable quality ground water. [See § J(17)].**

ATTACHED AS EXHIBIT K (if applicable) **is the list of alternative locations developed in consultation with the Oil & Gas Advisory Committee. [See § J(27)].**

ATTACHED AS EXHIBIT L **is the Fencing and Irrigation Plan. [See § J(30)].**

ATTACHED AS EXHIBIT M: **No city roads will be used**

ATTACHED AS EXHIBIT N **is the Concept Plan depicting the proposed Operations Site (which includes tanks, roads, power lines, and pipeline routes). [See § J(32)].**

Description of Public Utilities required during (1) drilling and (2) operations:

(1) Drilling: None

(2) Operations: Oncor

Description of water source to be used during Drilling: Water is to be piped in from our water wells, drill additional water wells or truck fresh water in. All brine water will be trucked in.

Description of all electric lines to production facilities (reference exhibits as necessary) [See § L(10)]:

See Exhibit "N"

Plan detailing construction, location, and closure of pits used for Drilling and Completion operations (attach exhibit if necessary) [See § J(35)]: Trench and encapsulate per TXRRC Rule 27(c)(10)(v)

See Exhibit "O"

V. Additional Required Exhibits

***ATTACHED AS EXHIBIT P* is the *Letter of Credit/Certificate of Deposit* in accordance with Subsection (K)(2). [See § J(18)].**

***ATTACHED AS EXHIBIT Q* : Tax certificates from Midland Central Appraisal District to be submitted indicating that all taxes on personal and real property, including minerals, owned by applicant are current. (See § J(29)**

***ATTACHED AS EXHIBIT R* is the required Insurance Certificate. [See § J(19) and § K(3)].**

***ATTACHED AS EXHIBIT S (if applicable)* is the Drainage Plan relating to Applicant's proposed operations. [See § J(21)].**

***ATTACHED AS EXHIBIT T* is Applicant's Emergency Action Response Plan. [See § J(22)].**

***ATTACHED AS EXHIBIT U* is Applicant's Hazardous Materials Management Plan, a copy of which has been submitted and is on file with the Midland Fire Department. [See § J(23)].**

ATTACHED AS EXHIBIT V: Applicants variances

Permian Deep Rock Oil Company LLC
[NAME OF COMPANY]

By _____
Its General Manager

State of Texas)

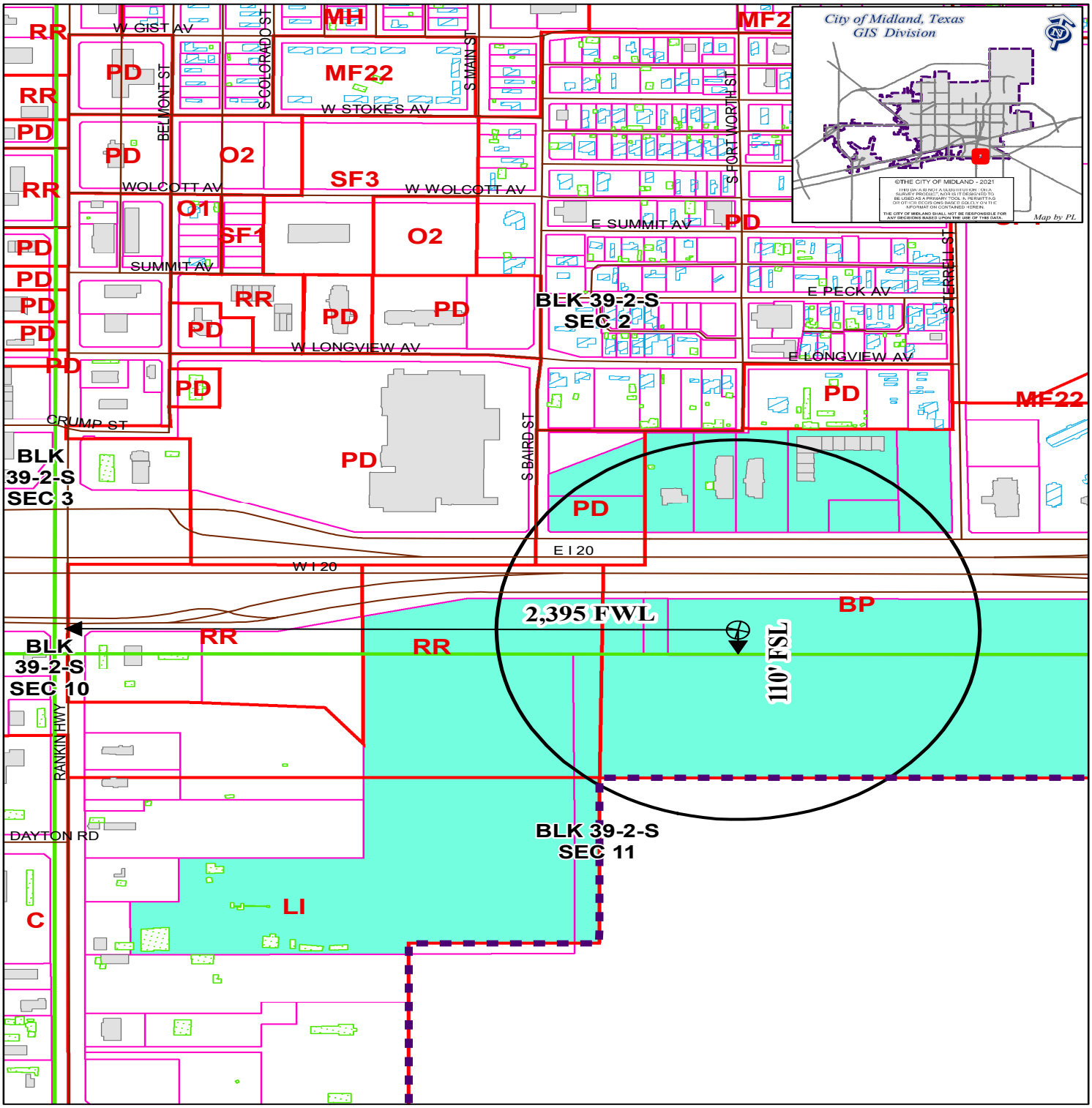
County of Midland)

Keith E Bury, personally appeared before me, and being first duly sworn declared he/she signed the application in the capacity designated, if any, and further states that he/she has read the above application and attached exhibits and the statements therein are true and correct to the best of their knowledge.

_____
Notary Public, State of Texas

CHRISTOPHER HALL
Notary Public, State of Texas
Comm. Expires 08-11-2019
Notary ID 128701314

[S E A L]



LOCATION AND ZONING MAP

Oil - 039825 - 2021 **Scale: 1" = 500'**

Consider a request for a Permit to drill an Oil and Gas Well within the City Limits located 110' FSL and 2,395' FWL, Section 2, Block 39, T-2-S, T&P RR CO Survey, Midland County, Texas.

Generally located 2,395 feet east of Rankin Highway and 170 feet south of I-20.

Mustang 110 MIPA Unit #H110WA

LEGEND

CITY PARCELS	PUBLIC BLDGS	CITY LIMITS
COUNTY PARCELS	PRIVATE BLDGS	860 FT. BUFFER
ZONING	ACCESSORY BLDGS	SURVEY SEC.

ZONING DISTRICTS:

FD	FUTURE DEVELOPMENT	BP	BUSINESS PARK
PD	PLANNED DISTRICT	P	PARKING
AE	AGRICULTURE ESTATE	O1, O2	OFFICE
CE	COUNTRY ESTATE	NS	NEIGHBORHOOD SERVICE
1F1, 1F2, 1F3	ONE-FAMILY DWELLING	GR	GENERAL RETAIL
MH	MOBILE HOME DWELLING	C1, C2, C3	COMMERCIAL
TH	TOWNHOUSE DWELLING	IP ,IP1, IP2, IP3	INDUSTRIAL PARK
2F	TWO-FAMILY DWELLING	LI	LIGHT INDUSTRY
MF1, MF2	MULTIPLE FAMILY DWELLING	HI	HEAVY INDUSTRY

SCALE: 1" = 300'

0' 150' 300'

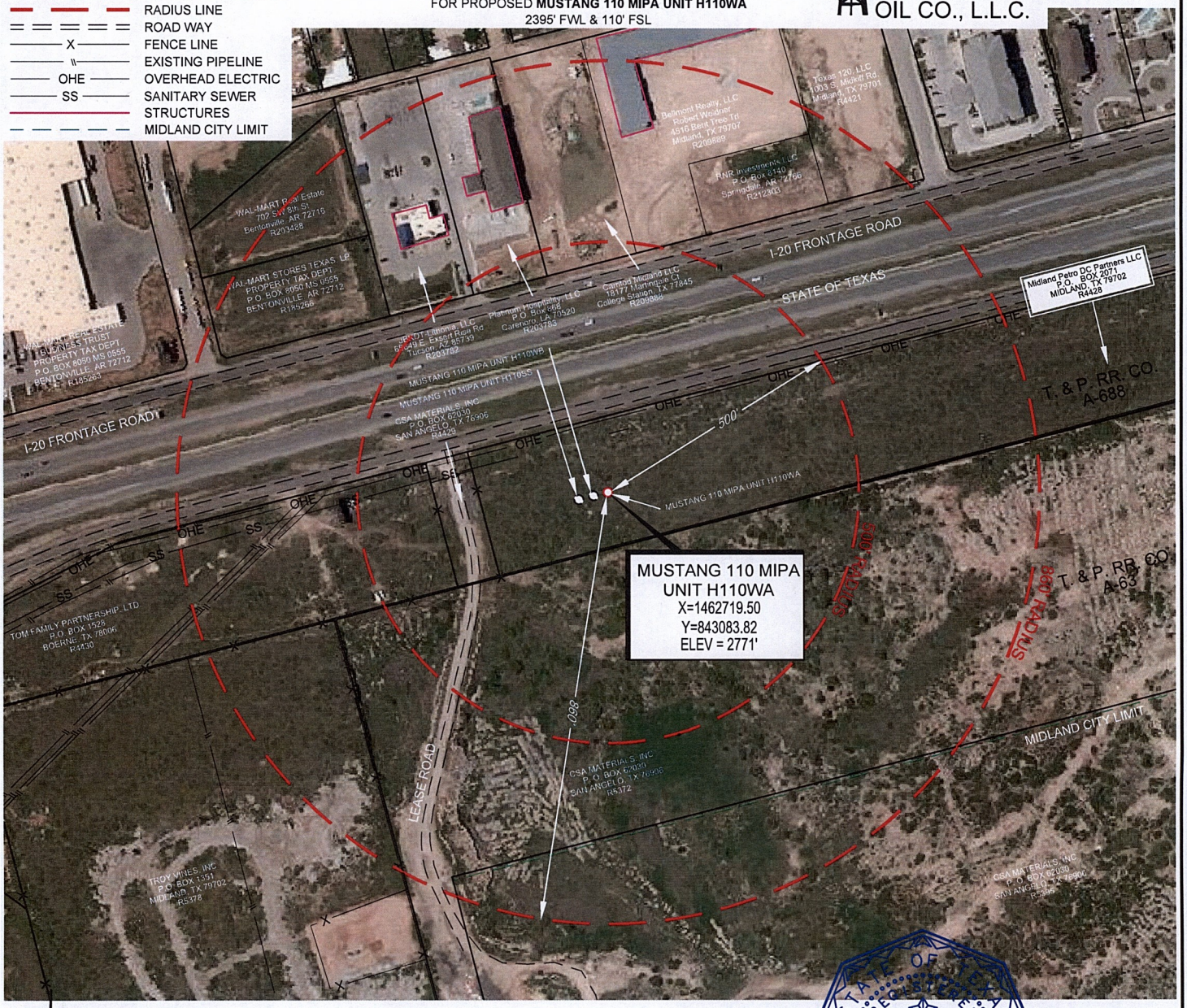
LEGEND

- SURVEY/SECTION LINE
- RADIUS LINE
- ROAD WAY
- FENCE LINE
- EXISTING PIPELINE
- OHE — OVERHEAD ELECTRIC
- SS — SANITARY SEWER
- STRUCTURES
- MIDLAND CITY LIMIT

T. & P. RR. CO. SURVEY, A-688
CITY OF MIDLAND, MIDLAND COUNTY, TEXAS

SHOWING STRUCTURES WITHIN 500' RADIUS
AND PROPERTY OWNERS WITHIN 860' RADIUS
FOR PROPOSED **MUSTANG 110 MIPA UNIT H110WA**
2395' FWL & 110' FSL

PERMIAN DEEP ROCK OIL CO., L.L.C.



STATE OF TEXAS
REGISTERED
JEFFREY N. LUEDERS
6512
PROFESSIONAL
LAND SURVEYOR

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY
1400 EVERMAN PARKWAY, Ste. 146 • FT. WORTH, TEXAS 76140
TELEPHONE: (817) 744-7512 • FAX (817) 744-7548
TEXAS FIRM REGISTRATION NO. 10042504
WWW.TOPOGRAPHIC.COM

Jeffrey N. Lueders, R.P.L.S. No. 6512
SEPTEMBER 20, 2021

MUSTANG 110 MIPA UNIT H110WA	REVISION:	
	INT	DATE
	DRH	12/13/2021
DATE: 11/10/2021		
FILE: CD_MUSTANG_H110WA_REV1		
DRAWN BY: EAH		
SHEET: ~~PACKET~~ 1 OF 2		

NOTES:
1. ORIGINAL DOCUMENT SIZE: 8.5" X 11"
2. ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREIN ARE GRID BASED UPON THE TEXAS COORDINATE SYSTEM OF 1927, CENTRAL ZONE, U.S. SURVEY FEET.
3. THIS PROPOSED LOCATION HAS BEEN CAREFULLY SURVEYED ON THE GROUND UNDER MY SUPERVISION AND IS TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE ACCORDING TO THE EVIDENCE, OFFICIAL SURVEY RECORDS, MAPS, AND OTHER DATA PROVIDED PERMIAN DEEP ROCK OIL CO., LLC. THIS PLAT WAS CREATED FOR THE SOLE PURPOSE OF FILING A PERMIT WITH THE CITY OF MIDLAND, MIDLAND COUNTY, TEXAS AND SHOULD NOT BE CONSTRUED AS A "BOUNDARY SURVEY" IN COMPLIANCE WITH T.B.P.L.S. MINIMUM STANDARDS OF PROCEDURES FOR BOUNDARY SURVEYS. THIS CERTIFICATION IS MADE AND LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE.
4. OWNERSHIP INFORMATION SHOWN HEREON WAS TAKEN FROM THE CITY OF MIDLAND, TEXAS GIS SITE.
5. DISTANCES SHOWN HEREON TO EXISTING STRUCTURES ARE SCALED PER AERIAL MAP.

15.8 February 8, 2022

S:\SURVEY\ARRINGTON\MUSTANG_UNIT\FINAL_PRODUCTS\CITY_PERMITS\NAD27\CD_MUSTANG_H110WA_REV1.DWG 12/14/2021 6:07:38 AM dharris

EXHIBIT "G"

SECTION 2, BLOCK 39, T2S, T. & P. RR. CO. SURVEY, A-688 &
SECTION 11, BLOCK 39, T2S, H. MCCLINTIC SURVEY, A-63
MIDLAND COUNTY, TEXAS

PERMIAN DEEP ROCK OIL CO., L.L.C.

TOPOGRAPHIC
LOYALTY INNOVATION LEGACY
1400 EVERMAN PARKWAY, Ste. 146 • FT. WORTH, TEXAS 76140
TELEPHONE: (817) 744-7512 • FAX (817) 744-7554
TEXAS FIRM REGISTRATION NO. 10042504
WWW.TOPOGRAPHIC.COM

MUSTANG
CITY PERMIT

DATE: 06/13/2018
FILE: SK_MUSTANG_CITY_PERMIT_REV9
DRAWN BY: AMD
SHEET : 3 OF 8

REVISION:	
JRH	10/30/18
DRH	09/23/21
DRH	09/28/21
DRH	09/29/21
DRH	10/29/21
DRH	11/30/21
DRH	12/10/21

NOTES:
1. ORIGINAL DOCUMENT SIZE: 11" X 8.5"
2. ALL BEARINGS, DISTANCES, AND COORDINATE VALUES CONTAINED HEREIN ARE GRID BASED UPON THE TEXAS STATE PLANE COORDINATE SYSTEM, CENTRAL ZONE, U.S. SURVEY FEET, NORTH AMERICAN DATUM 1927.
3. CERTIFICATION IS MADE ONLY FOR PROPOSED UTILITIES AND SITES, IN RELATION TO THE EVIDENCE FOUND DURING A FIELD SURVEY, MADE ON THE GROUND, UNDER MY SUPERVISION, AND USING DOCUMENTATION PROVIDED BY PERMIAN DEEP ROCK OIL CO., L.L.C. ONLY UTILITIES/EASEMENTS THAT WERE VISIBLE ON THE DATE OF THIS SURVEY, WITHIN/ADJOINING THIS EASEMENT, HAVE BEEN LOCATED AS SHOWN HEREON OF WHICH I HAVE KNOWLEDGE. THIS CERTIFICATION IS LIMITED TO THOSE PERSONS OR ENTITIES SHOWN ON THE FACE OF THIS PLAT AND IS NON-TRANSFERABLE, AND MADE FOR THIS TRANSACTION ONLY.
4. ALL PROPOSED INFRASTRUCTURE SHOWN HEREON IS SOLELY FOR THE PURPOSE OF APPLYING FOR A PERMIT WITH THE CITY OF MIDLAND, TEXAS. THIS IS EXHIBIT IS NOT TO BE CONSTRUED AS A "BOUNDARY SURVEY" IN COMPLIANCE WITH THE T.B.P.L.S. MINIMUM STANDARDS OF PROCEDURES FOR BOUNDARY SURVEYS. THESE ARE FOR PLANNING PURPOSES ONLY.
5. ADJOINER INFORMATION SHOWN FOR INFORMATIONAL PURPOSES ONLY.
6. D.R.M.C.T. = DEED RECORDS MIDLAND COUNTY, TEXAS
7. C.C.O.R.M.C.T. = C. C. OFFICIAL RECORDS MIDLAND COUNTY, TEXAS

STATE OF TEXAS
REGISTERED
JEFFREY N. LUEDERS
6512
LICENSED
LAND SURVEYOR

JEFFREY N LUEDERS, R.P.L.S. No. 6512
SURVEYED ON THE GROUND: SEPTEMBER 20, 2020

S:\SURVEY\ARRINGTON\MUSTANG_UNIT\FINAL_PRODUCTS\SKETCH\SK_MUSTANG_CITY_PERMIT_REV9.DWG 12/10/2021 10:22:09 AM dharris

City Council Meeting

Item Number: 16

Meeting Date: February 8, 2022

To: City Council / City Manager

From: Ron Jenkins, Oil and Gas Coordinator

Subject: The proposed granting of an oil and gas well permit to Pioneer Natural Resources, USA, Inc. for the drilling of the oil and gas well Nail C 3; said well being generally located 4,098 feet north of Occidental Parkway and 7,385 feet east of North State Highway 349 (DISTRICT 1) (DEVELOPMENT SERVICES)

Purpose:

The proposed granting of an oil and gas well permit to Pioneer Natural Resources, USA, Inc. for the drilling of the oil and gas well Nail C 3; said well being generally located 4,098 feet north of Occidental Parkway and 7,385 feet east of N SH 349. Council may consider this permit following a 30-day public comment period and at a regularly scheduled meeting. No notices of objection received.

Recommended City Council Action:

Directional / Informational

Fiscal Impact:

There is no cost to the City to process this application.

Discussion:

The Oil and Gas Advisory Committee has reviewed the well site in detail and recommends approval with updated exhibits. No sound walls being used due to the distance of well location from residential development. This is a vertical well and not a horizontal well and operator is not requesting 24-hour fracing operations. The fracing operations will follow ordinance guidelines of 7:00 a.m. to 7:00 p.m. The operator has a surface agreement with the surface owner. Receiving support of the Oil & Gas Advisory Committee, Pioneer Natural Resources is requesting the following variances:

(1) Pioneer Natural Resources requests variance to remove drill cuttings from surface location to be taken off site.
(2) Pioneer Natural Resources requests a variance to the requirement of landscaping and irrigation due to no city water is available.
(3) Pioneer Natural Resources requests variance to the Road Repair Agreement due to no city streets will be used.

Attachments: Applications; Location maps; Exhibit - Drill site maps, Exhibit – Flow Line Location.

Robert Patrick

City Manager's Office

MIDLAND
Planning Division

APPLICATION FOR OIL AND GAS PERMIT

(Pursuant to Midland City Ordinance No. 8769)

I. General Information

Date	Operator Name (must match W-1)	Operator Address
11/10/2021	Pioneer Natural Resources, USA, Inc.	777 Hidden Ridge Lane Irving, Texas 75038

Representative Name	Representative Address (within Midland City Limits)	Rep. Tele.
Matt Mathis, Field Production Operations Manager	3617 N Big Spring St Midland, Texas 79705	432-571-3086 Office 469-203-5174 Mobile Rep. Fax
Fee: $4,000.00 Rec'd Yes___ No___	**NOTE: All attachments need to bound and put in a binder before submitting.**	**Pages 1-4**

Permit Compliance Contact (Choose 1): Laura Wallace, Sr Staff Regulatory Specialist
972-969-1742 Office or 817-682-3483 Mobile

Option A:

24/7 Answering Services - No. 1 (Tele.): 432-571-2666 **No. 2 (Tele.):**

Option B:

Company Compliance Representative (Name, Address, Local Telephone) ***(ATTACH STATEMENT AS EXHIBIT A):*** Attached as Exhibit A

Emergency Contact Representative (Name, Address, 24-Hour Tele. No.):
Pioneer Remote Operations Hub
3617 N Big Spring St. Midland, Texas 79705
432-571-2666 (Available 24/7)

Other Permitted Wells in City ***(ATTACH EXHIBIT B*** **[see § J(26)]).** Attached as Exhibit B

II. Mineral Ownership

Name(s) and Address(es) of Mineral Estate Lessors (under applicable lease):

1. See Attached Exhibit C
2.
3.

ATTACHED AS EXHIBIT C **is (a** ***Title Opinion by*** Lynch, Chappel & Alsup ***, a licensed Texas Attorney/Title Commitment by Abstract Company/a Take-off from , a Certified Petroleum Landman/an opinion letter from ,***
a licensed Texas Attorney) **indicating that [Operator] has a legal right to develop the mineral estate that is the subject of this Application. [See § J(5)].**

III. Surface Ownership & Use

General Description of Current Surface Use (within 860 feet of proposed surface location):

Located in Section 6, Block 38, T1S, T&P RR Co., Abstract 671, Martin County, Texas

All property within 860' of proposed Surface Hole Location is owned by Jones Bros. Dirt & Pav. Contract
See attached Exhibit C for details.

Currently undeveloped and using partially existing oil and gas facilities.

ATTACHED AS EXHIBIT D **is a Current Tax Roll from Martin & Midland Central Appraisal District.**

ATTACHED AS EXHIBIT E **is a *(map/p lat/satellite/aerial photo)* depicting all Residences, commercial structures, public buildings, all publicly dedicated Streets and alleys, Rights of Way, and permanent accessory structures surrounding the proposed Drill Site. The *(map/p lat/satellite/aerial photo)* includes two circles, as required by the Ordinance—one depicting a 500 foot radius and one depicting an 860 foot radius from the proposed well's surface location. [See § J(10)].**

ATTACHED AS EXHIBIT F **is a copy of the notification letter(s) sent to 100 percent of the surface owners, Certified Mail, Return Receipt Requested. [See § J(36)].**

IV. Well & Operations Information

Proposed Well Name: Nail C 3

Proposed Hole Size, Casing Program and Cementing Program (attach Exhibit as Necessary)[See § J(11) and § L(4)]:

A wellbore schematic with the applicable information is attached as Exhibit V

Legal Description of Proposed Well Site: 1851' FSL, 2020' FWL

Located in Section 6, Block 38, T1S, T&P RR Co., Abstract 671, Martin County, Texas

ATTACHED AS EXHIBIT G **is the Location Site Plan [See § J(9)].**

ATTACHED AS EXHIBIT H **is the Map with the proposed transportation route(s) and road(s) for equipment, chemicals, or refuse products used or produced in the proposed oil and gas operations. [See § J(12)].**

ATTACHED AS EXHIBIT I **is a copy of the approved Texas Railroad Commission permit to drill (Form W-1), together with all attachments *(also file copy of W-1 with City Secretary before commencement of drilling operations).* [See § J(16) and (20)].**

ATTACHED AS EXHIBIT J **is a copy of the required TCEQ report as to depth of usable quality ground water. [See § J(17)].**

ATTACHED AS EXHIBIT K (if applicable) **is the list of alternative locations developed in consultation with the Oil & Gas Advisory Committee. [See § J(27)].**

ATTACHED AS EXHIBIT L **is the Fencing and Irrigation Plan. [See § J(30)].**

ATTACHED AS EXHIBIT M **is the Road Repair Agreement and *Letter of Credit/Certificate of Deposit/Surety Bond* in the amount of at least $25,000. *Option (if applicable): Applicant would further state that no City-owned streets or alleys will be used by the Operator in connection with its oil and gas operations and as a result, requests a waiver from the Council of this requirement. Option B (if applicable):* Because Applicant has three Road Repair Agreements in effect that have been approved by the Council, Applicant requests that the Council consolidate all agreements into one and is filing the necessary $75,000 *letter of credit/certificate of deposit/surety bond* in conjunction with this request. [See § J(31)].**

ATTACHED AS EXHIBIT N **is the Concept Plan depicting the proposed Operations Site (which includes tanks, roads, power lines, and pipeline routes). [See § J(32)].**

Description of Public Utilities required during (1) drilling and (2) operations:

(1) Drilling: N/A

(2) Operations: Electric is required to support production operations for this well.

Description of water source to be used during Drilling:

Water for drilling will be pulled from an existing fresh water pond located 2.4 miles SE of the proposed pad.

Description of all electric lines to production facilities (reference exhibits as necessary) [See § L(10)]:

The route for electric lines can be found on Exhibit N

Plan detailing construction, location, and closure of pits used for Drilling and Completion operations (attach exhibit if necessary) [See § J(35)]:

Pits will not be used for this well.

V. Additional Required Exhibits

ATTACHED AS EXHIBIT P **is the *Letter of Credit/Certificate of Deposit* in accordance with Subsection (K)(2). [See § J(18)].**

ATTACHED AS EXHIBIT Q **are Tax certificates from Midland Central Appraisal District to be submitted indicating that all taxes on personal and real property, including minerals, owned by Applicant are current. [See § J(29)].**

ATTACHED AS EXHIBIT R **is the required Insurance Certificate. [See § J(19) and § K(3)].**

ATTACHED AS EXHIBIT S (if applicable) **is the Drainage Plan approved by the City Engineer relating to Applicant's proposed operations. [See § J(21)].**

ATTACHED AS EXHIBIT T **is Applicant's Emergency Action Response Plan. [See § J(22)].**

ATTACHED AS EXHIBIT U **is Applicant's Hazardous Materials Management Plan, a copy of which has been submitted and is on file with the Midland Fire Department. [See § J(23)].**

Pioneer Natural Resources
[NAME OF COMPANY]

Laura E Wallace 11/4/21

By Laura Wallace
Its Regulatory Specialist

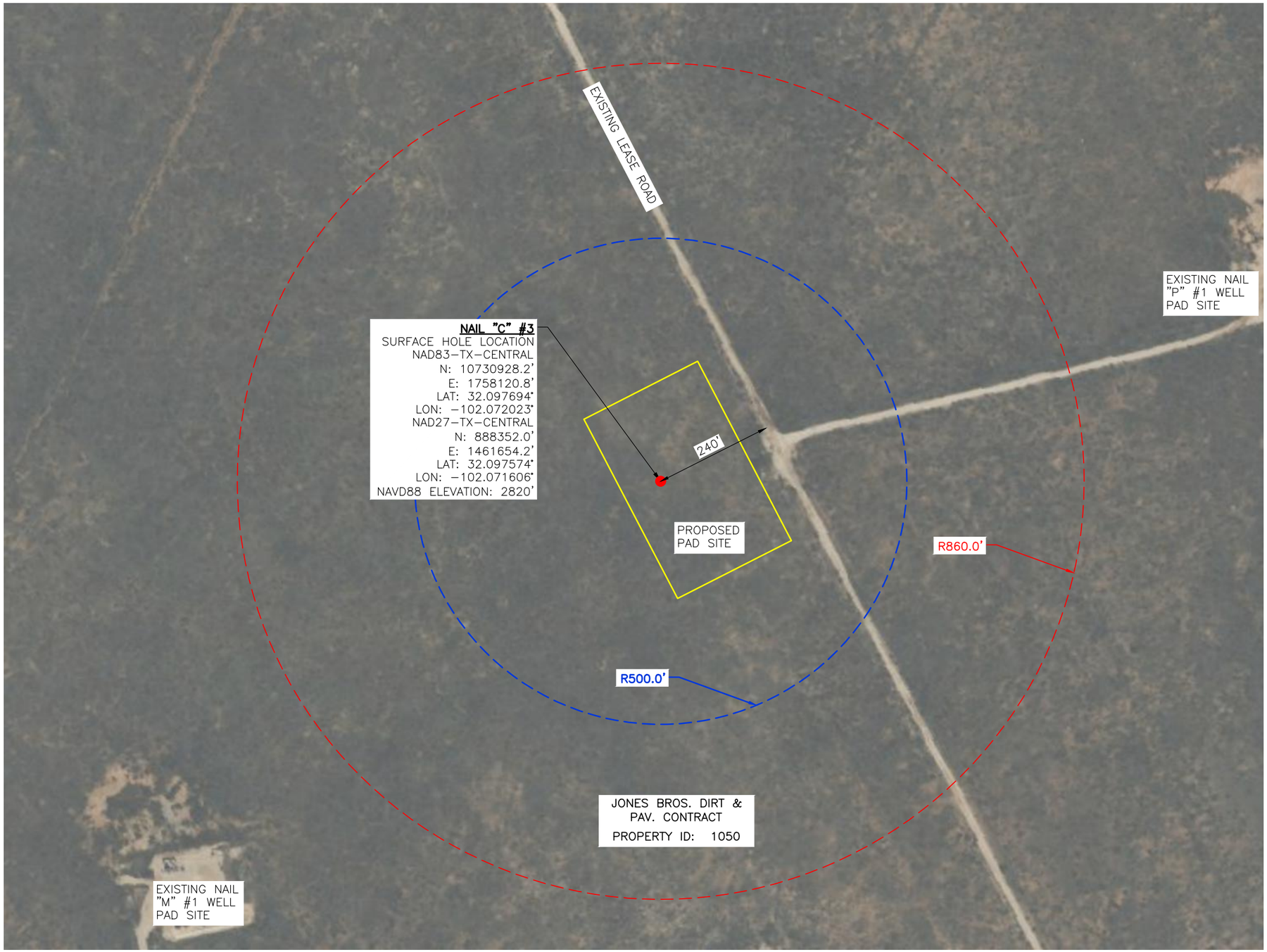
County of Dallas)

State of Texas)

, personally appeared before me, and being first duly sworn declared he/she signed the application in the capacity designated, if any, and further states that he/she has read the above application and attached exhibits and the statements therein are true and correct to the best of their knowledge.

HEATHER M BARCIA
NOTARY PUBLIC
ID# 11239288
State of Texas
Comm. Exp. 06-01-2022
[SEAL]

Notary Public, State of Texas



N

0' 200' 400'

SCALE: 1" = 200'

NOTES:

1. THIS DOES NOT CONSTITUTE A BOUNDARY SURVEY.
2. ANY ADJACENT WELLS ARE BASED SOLELY OFF RAILROAD COMMISSION (RRC) RECORDS AND ACCURACY CANNOT BE GUARANTEED.
3. ANY LEASE INFORMATION DEPICTED IS PROVIDED BY THE CLIENT.
4. WELL LOCATION IS APPROXIMATELY 5.0 MILES NORTH/ NORTHEAST OF MIDLAND, TEXAS.

LEGEND

- WELL SURFACE LOCATION
- 860-FOOT BUFFER/ HALO
- 500-FOOT BUFFER/ HALO
- PROPOSED WELL PAD SITE

HALFF®
3300 NORTH A STREET, BUILDING 2, SUITE 120
MIDLAND, TX 79705-5471
TEL (432) 253-3255
TBPELS SURVEYING FIRM #10193998

DATE: 7/26/2021
BY: J. ALVAREZ
AVO: 39678.610

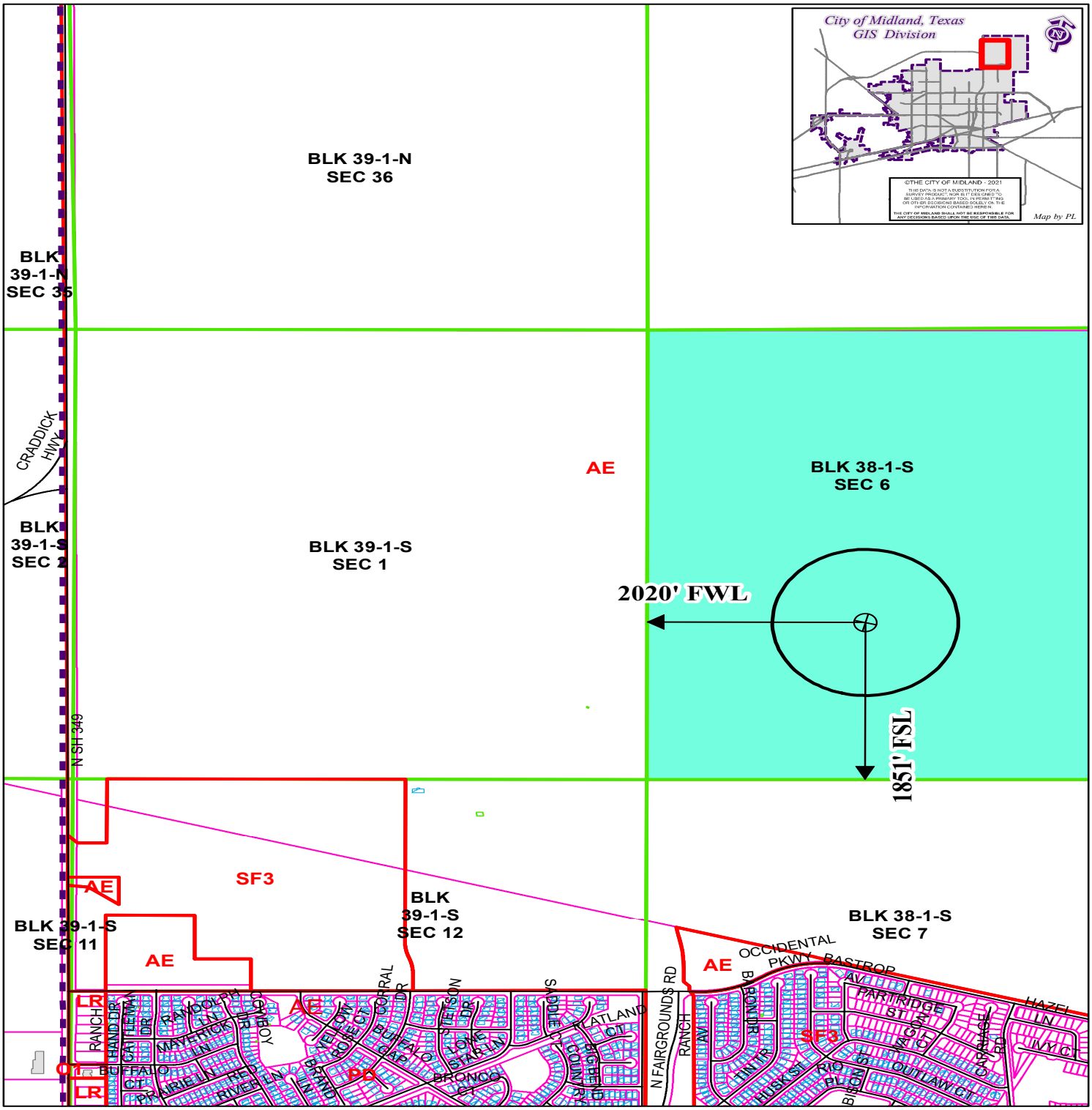
PIONEER NATURAL RESOURCES USA, INC.

EXHIBIT "E"
AERIAL SITE PLAN

NAIL "C" #3

LOCATED IN
SECTION 6, BLOCK 38,
TOWNSHIP-1-SOUTH,
T&P RR CO SURVEY,
ABSTRACT NO. 671,
MARTIN COUNTY, TEXAS

I:\39000s\39678\610\CADD\SheetsMLD\EXHIBIT_PLATS\039697.610_EXHIBIT_E_AERIAL_SITE_PLAN.dwg



LOCATION AND ZONING MAP

Oil-039383-2021 **Scale: 1" = 1,300'**

Consider a request for a Permit to drill an Oil and Gas Well within the City Limits located 1,851' FSL and 2,020' FWL, Section 6, Block 38-1-S, T&P RR CO Survey, Martin County, Texas.

Generally located 4,098 feet north of Occidental Parkway and 7,385 feet east of N SH 349.

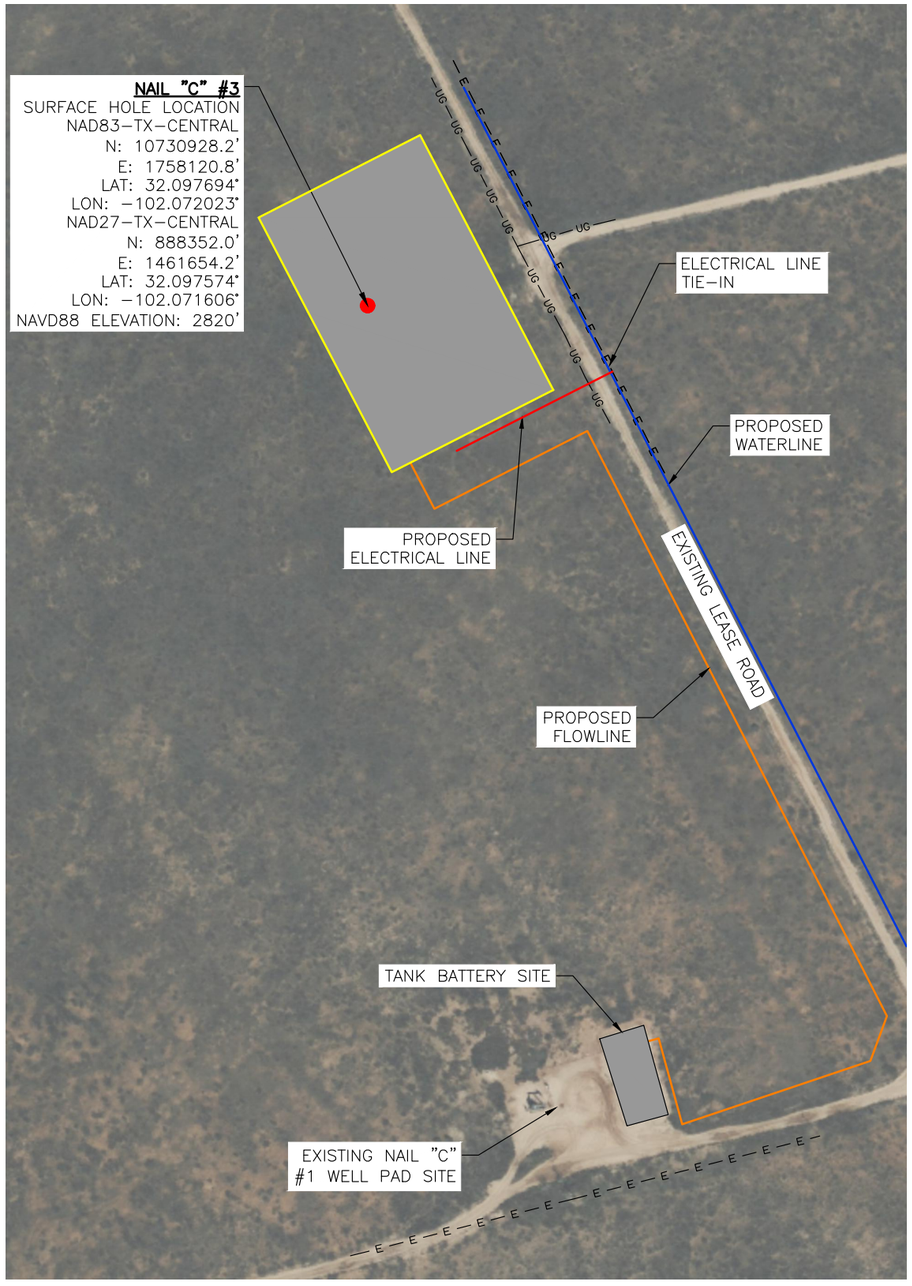
Nail C 3

LEGEND

CITY PARCELS	PUBLIC BLDGS	CITY LIMITS
COUNTY PARCELS	PRIVATE BLDGS	860 FT. BUFFER
ZONING	ACCESSORY BLDGS	SURVEY SEC.

ZONING DISTRICTS:

FD	FUTURE DEVELOPMENT	BP	BUSINESS PARK
PD	PLANNED DISTRICT	P	PARKING
AE	AGRICULTURE ESTATE	01, O2	OFFICE
CE	COUNTRY ESTATE	NS	NEIGHBORHOOD SERVICE
1F1, 1F2, 1F3	ONE-FAMILY DWELLING	[illegible]	[illegible] RETAIL
MH	MOBILE HOME DWELLING	C1, C2, C3	COMMERCIAL
TH	TOWNHOUSE DWELLING	IP ,IP1, IP2, IP3	INDUSTRIAL PARK
2F	TWO-FAMILY DWELLING	LI	LIGHT INDUSTRY
MF1, MF2	MULTIPLE FAMILY DWELLING	HI	HEAVY INDUSTRY



INSET "A"
SCALE: 1" = 200'

N

0' 2000' 4000'

SCALE: 1" = 2000'

NOTES:

1. THIS DOES NOT CONSTITUTE A BOUNDARY SURVEY.
2. ANY ADJACENT WELLS ARE BASED SOLELY OFF RAILROAD COMMISSION (RRC) RECORDS AND ACCURACY CANNOT BE GUARANTEED.
3. ANY LEASE INFORMATION DEPICTED IS PROVIDED BY THE CLIENT.
4. WELL LOCATION IS APPROXIMATELY 5.0 MILES NORTH/ NORTHEAST OF MIDLAND, TEXAS.

LEGEND

- WELL SURFACE LOCATION
- PROPOSED WELL PAD SITE
- TANK BATTERY SITE
- POND SITE
- PROPOSED FLOWLINE
- PROPOSED WATERLINE
- PROPOSED ELECTRICAL
- E — E — EXISTING OVERHEAD ELECTRICAL
- UG — UG — EXISTING BURIED PIPELINE

HALFF®
3300 NORTH A STREET, BUILDING 2, SUITE 120
MIDLAND, TX 79705-5471
TEL (432) 253-3255
TBPELS SURVEYING FIRM #10193998

DATE: 10/13/2021
BY: J. ALVAREZ
AVO: 39678.610

PIONEER NATURAL RESOURCES USA, INC.

EXHIBIT "N"
DRILL SITE, GATHERING LINES, ACCESS ROAD, ELECTRICAL

NAIL "C" #3

LOCATED IN
SECTION 6, BLOCK 38,
TOWNSHIP-1-SOUTH,
T&P RR CO SURVEY,
ABSTRACT NO. 671,
MARTIN COUNTY, TEXAS

I:\39000s\39678\610\CADD\SheetsMLD\EXHIBIT_PLATS\039678.610_EXHIBIT_N_DRILL_SITE.dwg

City Council Meeting

Item Number: 17

Meeting Date: February 8, 2022

To: City Council / City Manager

From: Ron Jenkins, Oil and Gas Coordinator

Subject: The proposed granting of an oil and gas well permit to Pioneer Natural Resources, USA, Inc. for the drilling of the oil and gas well Nail E 4; said well being generally located 3,172 feet north of Occidental Parkway and 2,135 feet east of North State Highway 349 (DISTRICT 1) (DEVELOPMENT SERVICES)

Purpose:

The proposed granting of an oil and gas well permit to Pioneer Natural Resources, USA, Inc. for the drilling of the oil and gas well Nail E 4; said well being generally located 3,172 feet north of Occidental Parkway and 2,135 feet east of N SH 349. Council may consider this permit following a 30-day public comment period and at a regularly scheduled meeting. No notices of objection received.

Recommended City Council Action:

Directional / Informational

Fiscal Impact:

There is no cost to the City to process this application.

Discussion:

The Oil and Gas Advisory Committee has reviewed the well site in detail and recommends approval with updated exhibits. No sound walls being used due to the distance of well location from residential development. This is a vertical well and not a horizontal well and operator is not requesting 24-hour fracing operations. The fracing operations will follow ordinance guidelines of 7:00 a.m. to 7:00 p.m. The operator has a surface agreement with the surface owner. Receiving support of the Oil & Gas Advisory Committee, Pioneer Natural Resources is requesting the following variances:

(1) Pioneer Natural Resources requests variance to remove drill cuttings from surface location to be taken off site.
(2) Pioneer Natural Resources requests a variance to the requirement of landscaping and irrigation due to no city water is available.
(3) Pioneer Natural Resources requests variance to the Road Repair Agreement due to no city streets will be used.

Attachments: Applications; Location maps; Exhibit - Drill site maps, Exhibit – Flow Line Location.

Robert Patrick

City Manager's Office

MIDLAND
Planning Division

APPLICATION FOR OIL AND GAS PERMIT

(Pursuant to Midland City Ordinance No. 8769)

I. General Information

Date	Operator Name (must match W-1)	Operator Address
11/10/2021	Pioneer Natural Resources, USA, Inc.	777 Hidden Ridge Lane Irving, Texas 75038

Representative Name	Representative Address (within Midland City Limits)	Rep. Tele.
Matt Mathis, Field Production Operations Manager	3617 N Big Spring St Midland, Texas 79705	432-571-3086 Office 469-203-5174 Mobile Rep. Fax
Fee: $4,000.00 Rec'd Yes___ No___	NOTE: All attachments need to bound and put in a binder before submitting.	Pages 1-4

Permit Compliance Contact (Choose 1): Laura Wallace, Sr Staff Regulatory Specialist

Option A: 972-969-1742 Office or 817-682-3483 Mobile

24/7 Answering Services - No. 1 (Tele.): 432-571-2666 **No. 2 (Tele.):**

Option B:

Company Compliance Representative (Name, Address, Local Telephone) ***(ATTACH STATEMENT AS EXHIBIT A):*** Attached as Exhibit A

Emergency Contact Representative (Name, Address, 24-Hour Tele. No.):
Pioneer Remote Operations Hub
3617 N Big Spring St. Midland, Texas 79705
432-571-2666 (Available 24/7)

Other Permitted Wells in City ***(ATTACH EXHIBIT B*** **[see § J(26)]).** Attached as Exhibit B

II. Mineral Ownership

Name(s) and Address(es) of Mineral Estate Lessors (under applicable lease):

1. See Attached Exhibit C
2.
3.

ATTACHED AS EXHIBIT C **is (a** ***Title Opinion by*** Lynch, Chappel & Alsup ***, a licensed Texas Attorney/Title Commitment by Abstract Company/a Take-off from , a Certified Petroleum Landman/an opinion letter from ,***
a licensed Texas Attorney) **indicating that [Operator] has a legal right to develop the mineral estate that is the subject of this Application. [See § J(5)].**

III. Surface Ownership & Use

General Description of Current Surface Use (within 860 feet of proposed surface location):

Located in Section 1, Block 39, T1S, T&P RR Co., Abstract 314, Martin County, Texas

All property within 860' of proposed Surface Hole Location is owned by Jones Bros. Dirt & Pav. Contract
See attached Exhibit C for details.

Currently undeveloped and using partially existing oil and gas facilities.

ATTACHED AS EXHIBIT D **is a Current Tax Roll from Martin & Midland Central Appraisal District.**

ATTACHED AS EXHIBIT E **is a** ***(map/p lat/satellite/aerial photo)*** **depicting all Residences, commercial structures, public buildings, all publicly dedicated Streets and alleys, Rights of Way, and permanent accessory structures surrounding the proposed Drill Site. The** ***(map/p lat/satellite/aerial photo)*** **includes two circles, as required by the Ordinance—one depicting a 500 foot radius and one depicting an 860 foot radius from the proposed well's surface location. [See § J(10)].**

ATTACHED AS EXHIBIT F **is a copy of the notification letter(s) sent to 100 percent of the surface owners, Certified Mail, Return Receipt Requested. [See § J(36)].**

IV. Well & Operations Information

Proposed Well Name: Nail E 4

Proposed Hole Size, Casing Program and Cementing Program (attach Exhibit as Necessary)[See § J(11) and § L(4)]:

A wellbore schematic with the applicable information is attached as Exhibit V

Legal Description of Proposed Well Site: 675' FSL, 2135' FWL

Located in Section 1, Block 39, T1S, T&P RR Co., Abstract 314, Martin County, Texas

ATTACHED AS EXHIBIT G **is the Location Site Plan [See § J(9)].**

ATTACHED AS EXHIBIT H **is the Map with the proposed transportation route(s) and road(s) for equipment, chemicals, or refuse products used or produced in the proposed oil and gas operations. [See § J(12)].**

ATTACHED AS EXHIBIT I **is a copy of the approved Texas Railroad Commission permit to drill (Form W-1), together with all attachments** ***(also file copy of W-1 with City Secretary before commencement of drilling operations).*** **[See § J(16) and (20)].**

ATTACHED AS EXHIBIT J **is a copy of the required TCEQ report as to depth of usable quality ground water. [See § J(17)].**

ATTACHED AS EXHIBIT K (if applicable) **is the list of alternative locations developed in consultation with the Oil & Gas Advisory Committee. [See § J(27)].**

ATTACHED AS EXHIBIT L **is the Fencing and Irrigation Plan. [See § J(30)].**

ATTACHED AS EXHIBIT M **is the Road Repair Agreement and** ***Letter of Credit/Certificate of Deposit/Surety Bond*** **in the amount of at least $25,000.** ***Option (if applicable): Applicant would further state that no City-owned streets or alleys will be used by the Operator in connection with its oil and gas operations and as a result, requests a waiver from the Council of this requirement. Option B (if applicable):*** **Because Applicant has three Road Repair Agreements in effect that have been approved by the Council, Applicant requests that the Council consolidate all agreements into one and is filing the necessary $75,000** ***letter of credit/certificate of deposit/surety bond*** **in conjunction with this request. [See § J(31)].**

ATTACHED AS EXHIBIT N **is the Concept Plan depicting the proposed Operations Site (which includes tanks, roads, power lines, and pipeline routes). [See § J(32)].**

Description of Public Utilities required during (1) drilling and (2) operations:

(1) Drilling: N/A

(2) Operations: Electric is required to support production operations for this well.

Description of water source to be used during Drilling:

Water for drilling will be pulled from an existing fresh water pond located 2.4 miles SE of the proposed pad.

Description of all electric lines to production facilities (reference exhibits as necessary) [See § L(10)]:

The route for electric lines can be found on Exhibit N

Plan detailing construction, location, and closure of pits used for Drilling and Completion operations (attach exhibit if necessary) [See § J(35)]:

Pits will not be used for this well.

V. Additional Required Exhibits

ATTACHED AS EXHIBIT P **is the** ***Letter of Credit/Certificate of Deposit*** **in accordance with Subsection (K)(2). [See § J(18)].**

ATTACHED AS EXHIBIT Q **are Tax certificates from Midland Central Appraisal District to be submitted indicating that all taxes on personal and real property, including minerals, owned by Applicant are current. [See § J(29)].**

ATTACHED AS EXHIBIT R **is the required Insurance Certificate. [See § J(19) and § K(3)].**

ATTACHED AS EXHIBIT S (if applicable) **is the Drainage Plan approved by the City Engineer relating to Applicant's proposed operations. [See § J(21)].**

ATTACHED AS EXHIBIT T **is Applicant's Emergency Action Response Plan. [See § J(22)].**

ATTACHED AS EXHIBIT U **is Applicant's Hazardous Materials Management Plan, a copy of which has been submitted and is on file with the Midland Fire Department. [See § J(23)].**

Pioneer Natural Resources
[NAME OF COMPANY]

Laura E Wallace 11/4/21

By Laura Wallace
Its Regulatory Specialist

County of Dallas)

State of Texas)

, personally appeared before me, and being first duly sworn declared he/she signed the application in the capacity designated, if any, and further states that he/she has read the above application and attached exhibits and the statements therein are true and correct to the best of their knowledge.

HEATHER M BARCIA
NOTARY PUBLIC
ID# 11239288
State of Texas
Comm. Exp. 06-01-2022

[S E A L]

Notary Public, State of Texas

N

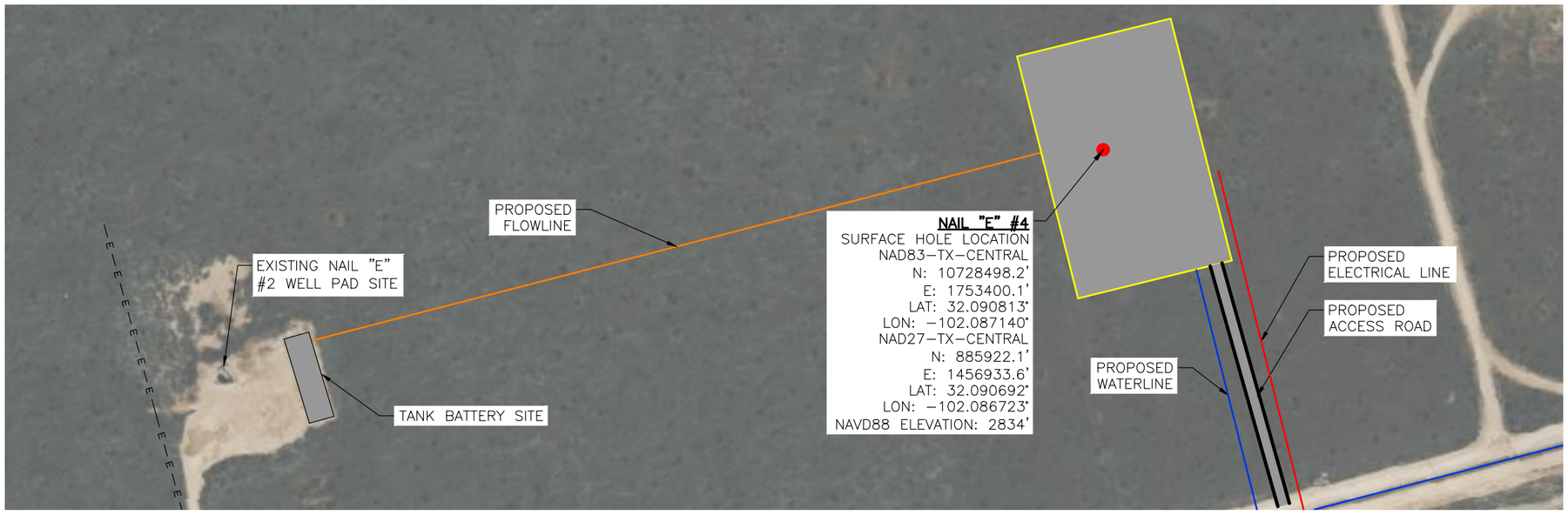
SCALE: N.T.S.

NOTES:

1. THIS DOES NOT CONSTITUTE A BOUNDARY SURVEY.
2. ANY ADJACENT WELLS ARE BASED SOLELY OFF RAILROAD COMMISSION (RRC) RECORDS AND ACCURACY CANNOT BE GUARANTEED.
3. ANY LEASE INFORMATION DEPICTED IS PROVIDED BY THE CLIENT.
4. WELL LOCATION IS APPROXIMATELY 3.5 MILES NORTH/ NORTHEAST OF MIDLAND, TEXAS.

LEGEND

- WELL SURFACE LOCATION
- PROPOSED WELL PAD SITE
- TANK BATTERY SITE
- POND SITE
- PROPOSED FLOWLINE
- PROPOSED WATERLINE
- PROPOSED ELECTRICAL
- E — E — EXISTING OVERHEAD ELECTRICAL



INSET "A"
SCALE: 1" = 200'

HALFF
3300 NORTH A STREET, BUILDING 2, SUITE 120
MIDLAND, TX 79705-5471
TEL (432) 253-3255
TBPELS SURVEYING FIRM #10193998

DATE: 10/12/2021
BY: J. ALVAREZ
AVO: 39678.647

PIONEER NATURAL RESOURCES USA, INC.

EXHIBIT "N"
DRILL SITE, GATHERING LINES, ACCESS ROAD, ELECTRICAL

NAIL "E" #4

LOCATED IN
SECTION 1, BLOCK 39,
TOWNSHIP-1-SOUTH,
T&P RR CO SURVEY,
ABSTRACT NO. 314,
MARTIN COUNTY, TEXAS

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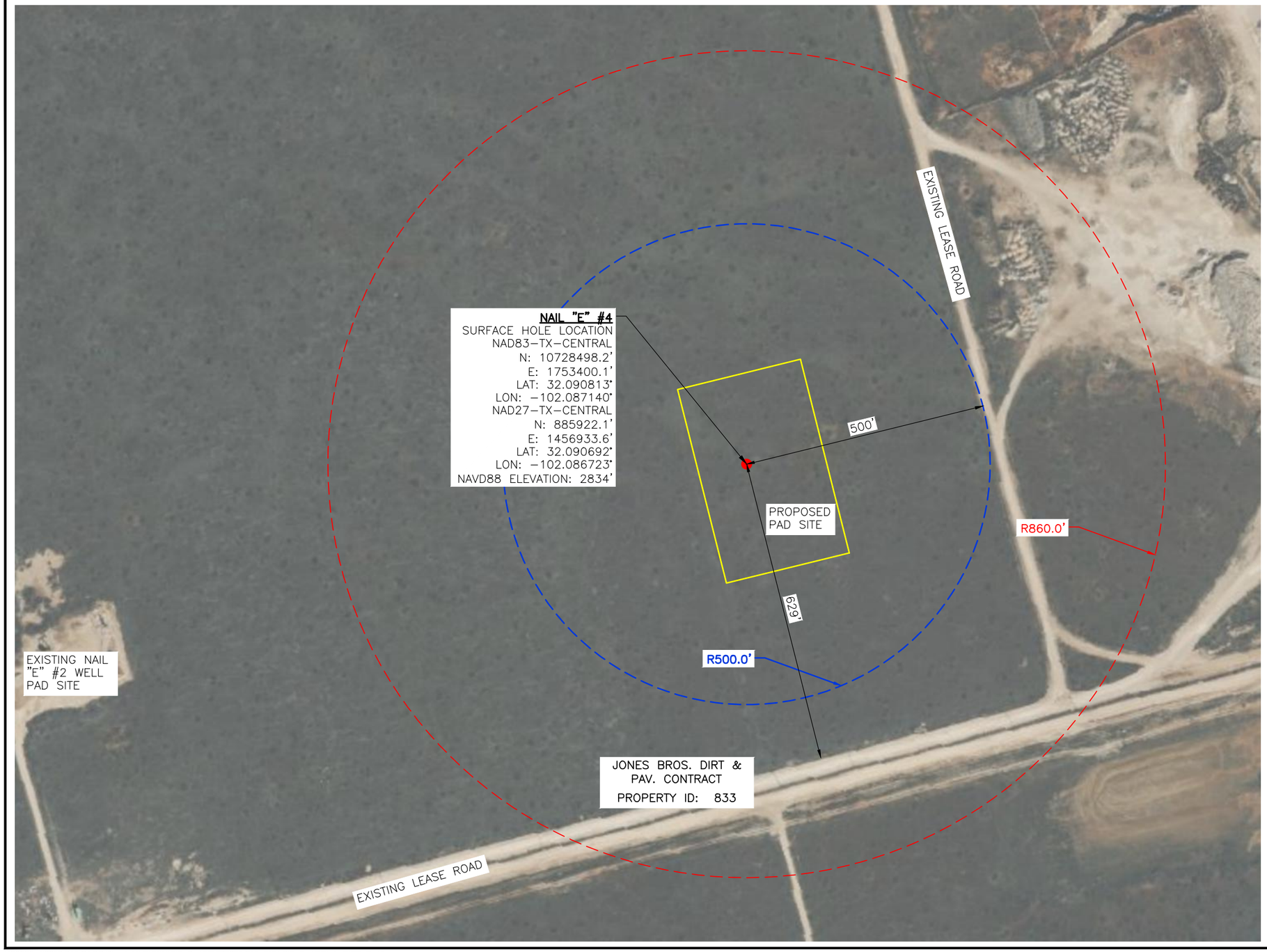

N

0' 200' 400'

SCALE: 1" = 200'

NOTES:

1. THIS DOES NOT CONSTITUTE A BOUNDARY SURVEY.
2. ANY ADJACENT WELLS ARE BASED SOLELY OFF RAILROAD COMMISSION (RRC) RECORDS AND ACCURACY CANNOT BE GUARANTEED.
3. ANY LEASE INFORMATION DEPICTED IS PROVIDED BY THE CLIENT.
4. WELL LOCATION IS APPROXIMATELY 3.5 MILES NORTH/ NORTHEAST OF MIDLAND, TEXAS.

LEGEND

- WELL SURFACE LOCATION
- 860–FOOT BUFFER/ HALO
- 500–FOOT BUFFER/ HALO
- PROPOSED WELL PAD SITE

HALFF®
3300 NORTH A STREET, BUILDING 2, SUITE 120
MIDLAND, TX 79705-5471
TEL (432) 253-3255
TBPELS SURVEYING FIRM #10193998

DATE: 7/26/2021
BY: J. ALVAREZ
AVO: 39678.647

PIONEER NATURAL RESOURCES USA, INC.

EXHIBIT "E"
AERIAL SITE PLAN

NAIL "E" #4

LOCATED IN
SECTION 1, BLOCK 39,
TOWNSHIP–1–SOUTH,
T&P RR CO SURVEY,
ABSTRACT NO. 314,
MARTIN COUNTY, TEXAS

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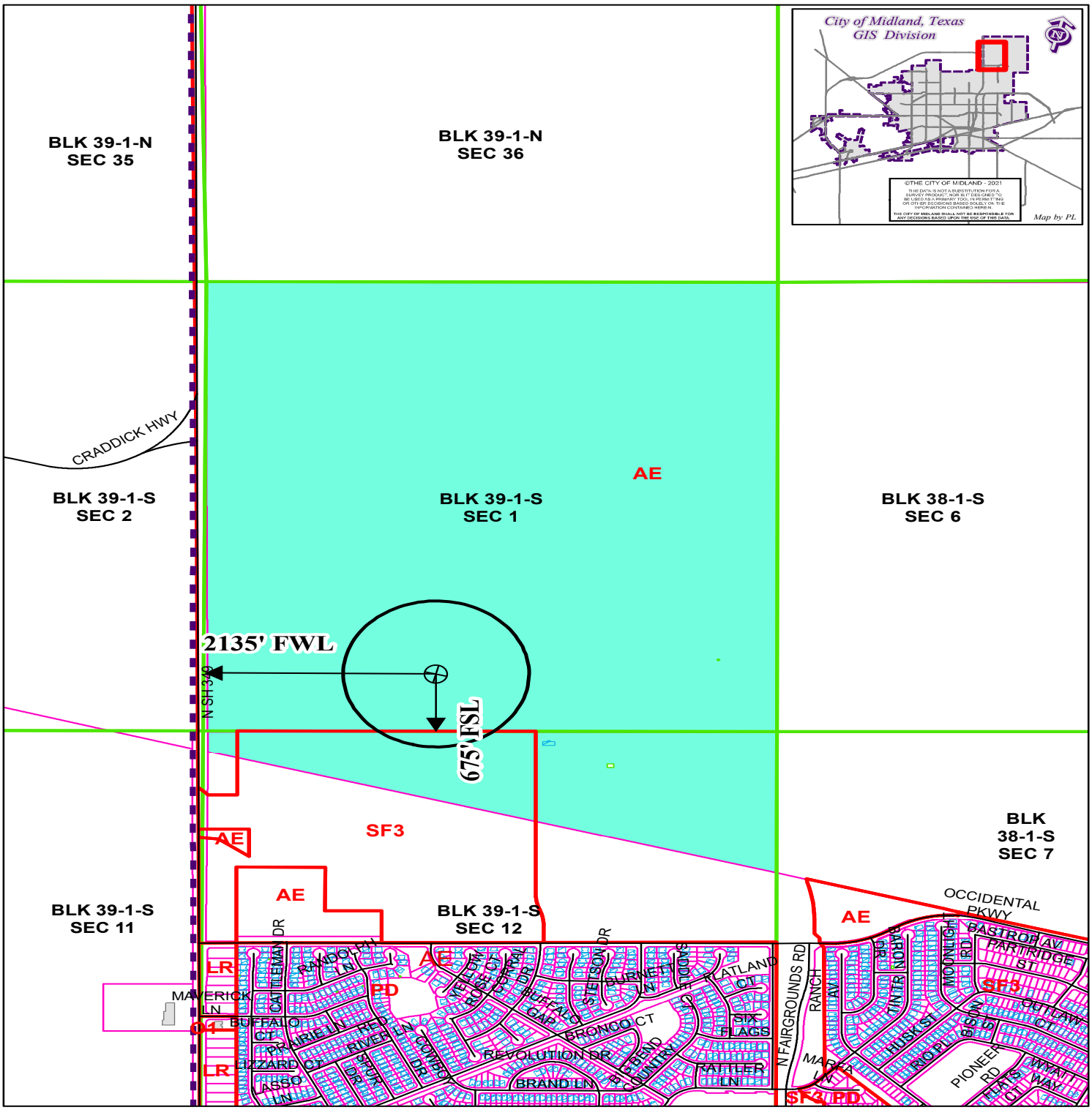


LOCATION AND ZONING MAP

Oil-039382-2021 **Scale: 1" = 1,300'**

Consider a request for a Permit to drill an Oil and Gas Well within the City Limits located 675' FSL and 2,135' FWL, Section 1, Block 39-1-S, T&P RR CO Survey, Martin County, Texas.

Generally located 3,172 feet north of Occidental Parkway and 2,135 feet east of N SH 349.

Nail E 4

LEGEND

CITY PARCELS	PUBLIC BLDGS	CITY LIMITS
COUNTY PARCELS	PRIVATE BLDGS	860 FT. BUFFER
ZONING	ACCESSORY BLDGS	SURVEY SEC.

ZONING DISTRICTS:

FD	FUTURE DEVELOPMENT	BP	BUSINESS PARK
PD	PLANNED DISTRICT	P	PARKING
AE	AGRICULTURE ESTATE	01, 02	OFFICE
CE	COUNTRY ESTATE	NS	NEIGHBORHOOD SERVICE
1F1, 1F2, 1F3	ONE-FAMILY DWELLING	LR, LR2, LR3	LOCAL RETAIL
MH	MOBILE HOME DWELLING	C1, C2, C3	COMMERCIAL
TH	TOWNHOUSE DWELLING	IP ,IP1, IP2, IP3	INDUSTRIAL PARK
2F	TWO-FAMILY DWELLING	LI	LIGHT INDUSTRY
MF1, MF2	MULTIPLE FAMILY DWELLING	HI	HEAVY INDUSTRY

City Council Meeting

Item Number: 18

Meeting Date: February 8, 2022

To: City Council / City Manager

From: Ron Jenkins, Oil and Gas Coordinator

Subject: **The proposed granting of an oil and gas well permit to Pioneer Natural Resources, USA, Inc. for the drilling of the oil and gas well Stimson Burley D 5; said well being generally located 2,220 feet north of Occidental Parkway extension and 5,945 feet West of North Elkins Road. (DISTRICT 1) (DEVELOPMENT SERVICES)**

Purpose:

The proposed granting of an oil and gas well permit to Pioneer Natural Resources, USA, Inc. for the drilling of the oil and gas well Stimson Burley D 5; said well being generally located 2,220 feet north of Occidental Parkway extension and 5,945 feet West of North Elkins Road. Council may consider this permit following a 30-day public comment period and at a regularly scheduled meeting. No notices of objection received

Recommended City Council Action:

Directional / Informational

Fiscal Impact:

There is no cost to the City to process this application.

Discussion:

The Oil and Gas Advisory Committee has reviewed the well site in detail and recommends approval with updated exhibits. No sound walls being used due to the distance of well location from residential development. This is a vertical well and not a horizontal well and operator is not requesting 24-hour fracing operations. The fracing operations will follow ordinance guidelines of 7:00 a.m. to 7:00 p.m. The operator has a surface agreement with the surface owner. Receiving support of the Oil & Gas Advisory Committee, Pioneer Natural Resources is requesting the following variances:

(1) Pioneer Natural Resources requests variance to remove drill cuttings from surface location to be taken off site.
(2) Pioneer Natural Resources requests a variance to the requirement of landscaping and irrigation due to no city water is available.
(3) Pioneer Natural Resources requests variance to the Road Repair Agreement due to no city streets will be used.

Attachments: Applications; Location maps; Exhibit - Drill site maps, Exhibit – Flow Line Location.

Robert Patrick

City Manager's Office

MIDLAND
Planning Division

APPLICATION FOR OIL AND GAS PERMIT

(Pursuant to Midland City Ordinance No. 8769)

I. General Information

Date	Operator Name (must match W-1)	Operator Address
11/10/2021	Pioneer Natural Resources, USA, Inc.	777 Hidden Ridge Lane Irving, Texas 75038

Representative Name	Representative Address (within Midland City Limits)	Rep. Tele.
Matt Mathis, Field Production Operations Manager	3617 N Big Spring St Midland, Texas 79705	432-571-3086 Office 469-203-5174 Mobile Rep. Fax
Fee: $4,000.00 Rec'd Yes___ No___	NOTE: All attachments need to bound and put in a binder before submitting.	Pages 1-4

Permit Compliance Contact (Choose 1):

Option A: Laura Wallace, Sr Staff Regulatory Specialist
972-969-1742 Office or 817-682-3483 Mobile

24/7 Answering Services - No. 1 (Tele.): 432-571-2666 **No. 2 (Tele.):**

Option B:

Company Compliance Representative (Name, Address, Local Telephone) ***(ATTACH STATEMENT AS EXHIBIT A):*** Attached as Exhibit A

Emergency Contact Representative (Name, Address, 24-Hour Tele. No.):
Pioneer Remote Operations Hub
3617 N Big Spring St. Midland, Texas 79705
432-571-2666 (Available 24/7)

Other Permitted Wells in City ***(ATTACH EXHIBIT B*** **[see § J(26)]).** Attached as Exhibit B

II. Mineral Ownership

Name(s) and Address(es) of Mineral Estate Lessors (under applicable lease):

1. See Attached Exhibit C
2.
3.

ATTACHED AS EXHIBIT C **is [a** ***Title Opinion by*** Lynch, Chappel & Alsup RashChapman ***, a licensed Texas Attorney/Title Commitment by Abstract Company/a Take-off from*** ***, a Certified Petroleum Landman/an opinion letter from*** ***, a licensed Texas Attorney)*** **indicating that [Operator] has a legal right to develop the mineral estate that is the subject of this Application. [See § J(5)].**

III. Surface Ownership & Use

General Description of Current Surface Use (within 860 feet of proposed surface location):

Located in Section 7, Block 38, T1S, T&P RR Co., Abstract 294, Martin County, Texas

Surface is owned by Fite D B Properties, Inc. There are two additional owners of property within 860'
See attached Exhibit C for details.

Currently undeveloped and using partially existing oil and gas facilities.

ATTACHED AS EXHIBIT D **is a Current Tax Roll from Martin & Midland Central Appraisal District.**

ATTACHED AS EXHIBIT E **is a** ***(map/p lat/satellite/aerial photo)*** **depicting all Residences, commercial structures, public buildings, all publicly dedicated Streets and alleys, Rights of Way, and permanent accessory structures surrounding the proposed Drill Site. The** ***(map/p lat/satellite/aerial photo)*** **includes two circles, as required by the Ordinance—one depicting a 500 foot radius and one depicting an 860 foot radius from the proposed well's surface location. [See § J(10)].**

ATTACHED AS EXHIBIT F **is a copy of the notification letter(s) sent to 100 percent of the surface owners, Certified Mail, Return Receipt Requested. [See § J(36)].**

IV. Well & Operations Information

Proposed Well Name: Stimson Burley D 5

Proposed Hole Size, Casing Program and Cementing Program (attach Exhibit as Necessary)[See § J(11) and § L(4)]:

A wellbore schematic with the applicable information is attached as Exhibit V

Legal Description of Proposed Well Site: 713' FNL, 600' FEL

Located in Section 7, Block 38, T1S, T&P RR Co., Abstract 294, Martin County, Texas

ATTACHED AS EXHIBIT G **is the Location Site Plan [See § J(9)].**

ATTACHED AS EXHIBIT H **is the Map with the proposed transportation route(s) and road(s) for equipment, chemicals, or refuse products used or produced in the proposed oil and gas operations. [See § J(12)].**

ATTACHED AS EXHIBIT I **is a copy of the approved Texas Railroad Commission permit to drill (Form W-1), together with all attachments** ***(also file copy of W-1 with City Secretary before commencement of drilling operations).*** **[See § J(16) and (20)].**

ATTACHED AS EXHIBIT J **is a copy of the required TCEQ report as to depth of usable quality ground water. [See § J(17)].**

ATTACHED AS EXHIBIT K (if applicable) **is the list of alternative locations developed in consultation with the Oil & Gas Advisory Committee. [See § J(27)].**

ATTACHED AS EXHIBIT L **is the Fencing and Irrigation Plan. [See § J(30)].**

ATTACHED AS EXHIBIT M **is the Road Repair Agreement and** ***Letter of Credit/Certificate of Deposit/Surety Bond*** **in the amount of at least $25,000.** ***Option (if applicable): Applicant would further state that no City-owned streets or alleys will be used by the Operator in connection with its oil and gas operations and as a result, requests a waiver from the Council of this requirement. Option B (if applicable):*** **Because Applicant has three Road Repair Agreements in effect that have been approved by the Council, Applicant requests that the Council consolidate all agreements into one and is filing the necessary $75,000** ***letter of credit/certificate of deposit/surety bond*** **in conjunction with this request. [See § J(31)].**

ATTACHED AS EXHIBIT N **is the Concept Plan depicting the proposed Operations Site (which includes tanks, roads, power lines, and pipeline routes). [See § J(32)].**

Description of Public Utilities required during (1) drilling and (2) operations:

(1) Drilling: N/A

(2) Operations: Electric is required to support production operations for this well.

Description of water source to be used during Drilling:

Water for drilling will be pulled from an existing fresh water pond located 2.4 miles SE of the proposed pad.

Description of all electric lines to production facilities (reference exhibits as necessary) [See § L(10)]:

The route for electric lines can be found on Exhibit N

Plan detailing construction, location, and closure of pits used for Drilling and Completion operations (attach exhibit if necessary) [See § J(35)]:

Pits will not be used for this well.

V. Additional Required Exhibits

ATTACHED AS EXHIBIT P **is the** ***Letter of Credit/Certificate of Deposit*** **in accordance with Subsection (K)(2). [See § J(18)].**

ATTACHED AS EXHIBIT Q **are Tax certificates from Midland Central Appraisal District to be submitted indicating that all taxes on personal and real property, including minerals, owned by Applicant are current. [See § J(29)].**

ATTACHED AS EXHIBIT R **is the required Insurance Certificate. [See § J(19) and § K(3)].**

ATTACHED AS EXHIBIT S (if applicable) **is the Drainage Plan approved by the City Engineer relating to Applicant's proposed operations. [See § J(21)].**

ATTACHED AS EXHIBIT T **is Applicant's Emergency Action Response Plan. [See § J(22)].**

ATTACHED AS EXHIBIT U **is Applicant's Hazardous Materials Management Plan, a copy of which has been submitted and is on file with the Midland Fire Department. [See § J(23)].**

Pioneer Natural Resources
[NAME OF COMPANY]

Laura E Wallace 1/4/21

By Laura Wallace
Its Regulatory Specialist

County of Dallas)

State of Texas)

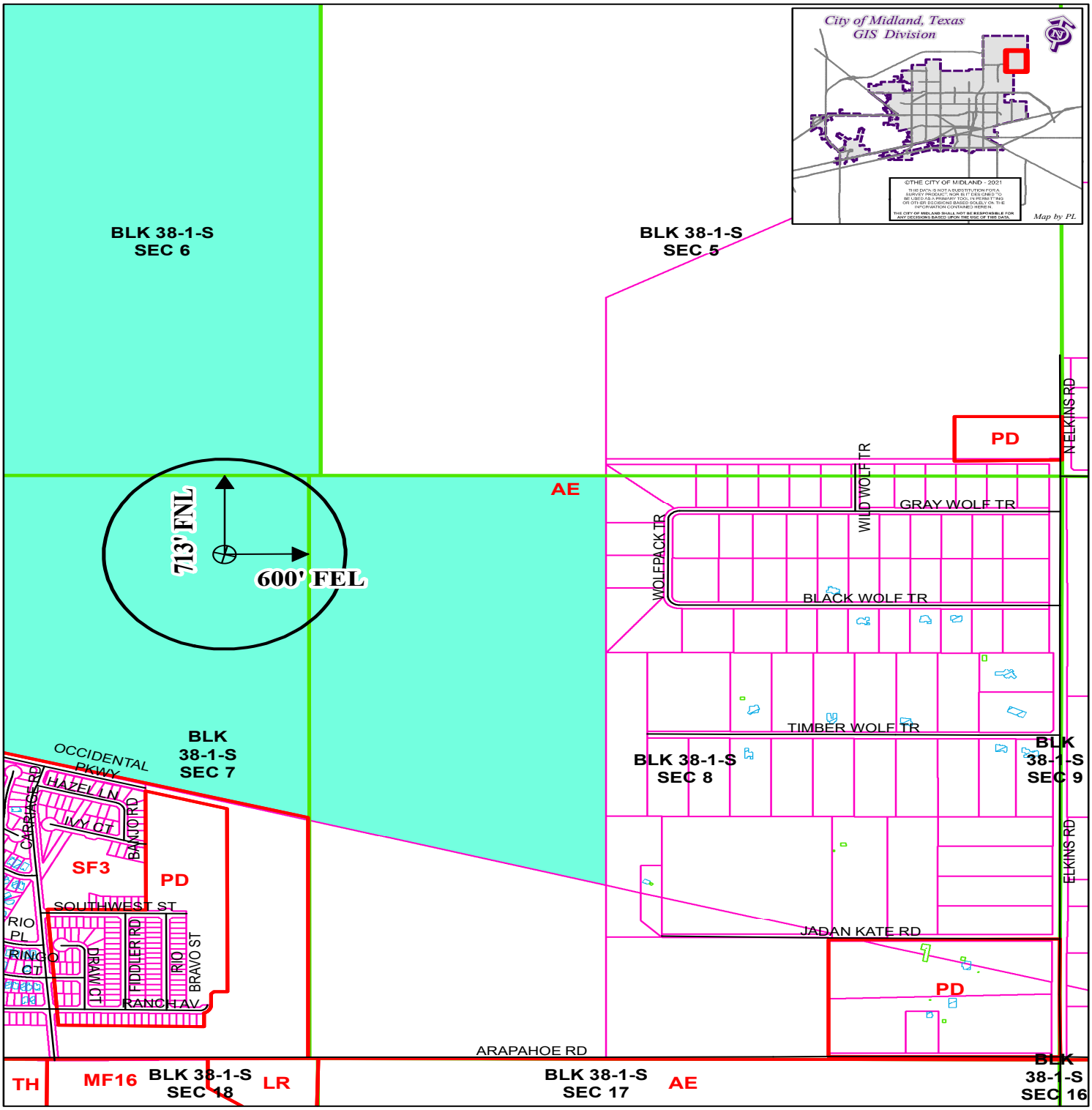
, personally appeared before me, and being first duly sworn declared he/she signed the application in the capacity designated, if any, and further states that he/she has read the above application and attached exhibits and the statements therein are true and correct to the best of their knowledge.

HEATHER M BARCIA
NOTARY PUBLIC
ID# 11239288
State of Texas
Comm. Exp. 06-01-2022

[S E A L]

Heather M Barcia

Notary Public, State of Texas



LOCATION AND ZONING MAP

Oil-039384-2021 **Scale: 1" = 1,000'**

Consider a request for a Permit to drill an Oil and Gas Well within the City Limits located 713' FNL and 600' FEL, Section 7, Block 38-1-S, T&P RR CO Survey, Martin County, Texas.

Generally located 2,220 feet north of Occidental Parkway extended and 5945 feet west of N Elkins Road.

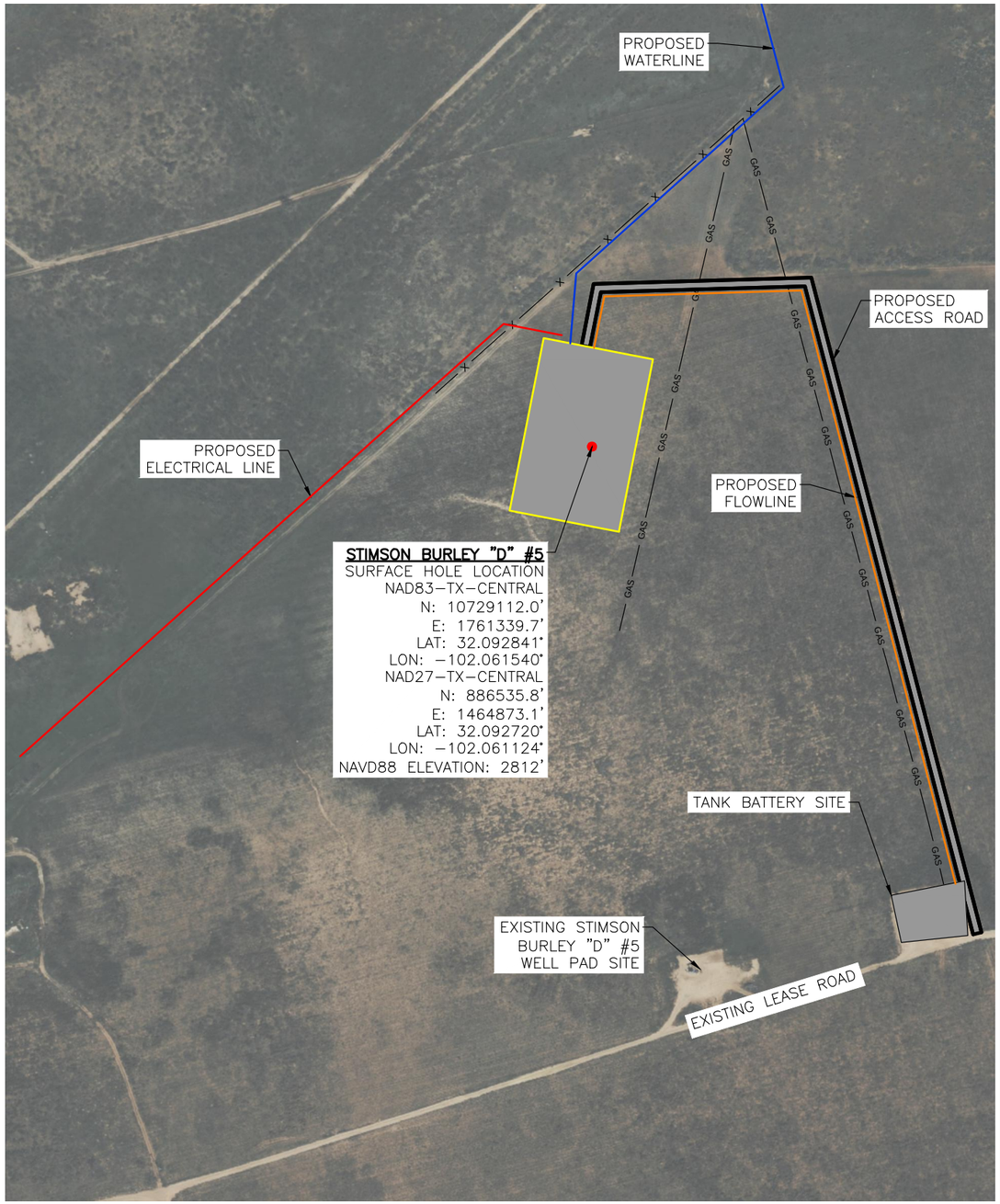
Stimson Burley D 5

LEGEND

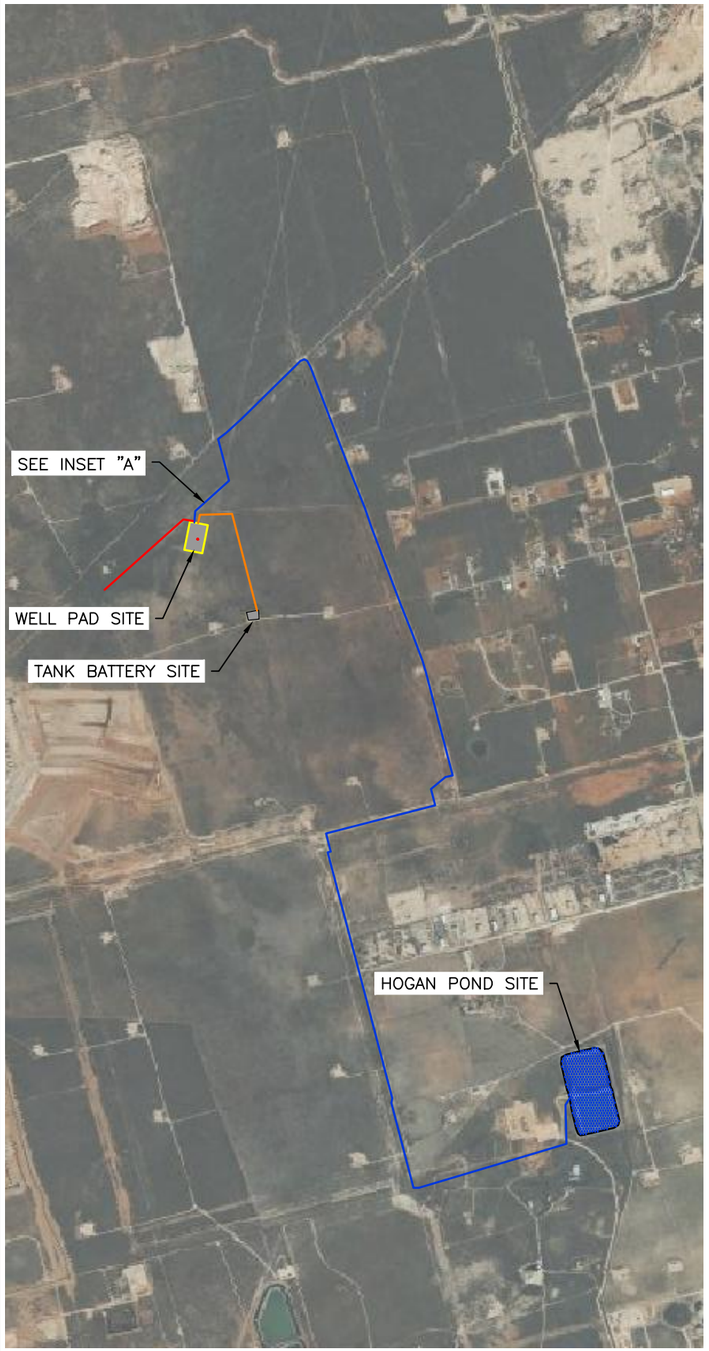
CITY PARCELS	PUBLIC BLDGS	CITY LIMITS
COUNTY PARCELS	PRIVATE BLDGS	860 FT. BUFFER
ZONING	ACCESSORY BLDGS	SURVEY SEC.

ZONING DISTRICTS:

FD	FUTURE DEVELOPMENT	BP	BUSINESS PARK
PD	PLANNED DISTRICT	P	PARKING
AE	AGRICULTURE ESTATE	O1, O2	OFFICE
CE	COUNTRY ESTATE	NS	NEIGHBORHOOD SERVICE
1F1, 1F2, 1F3	ONE-FAMILY DWELLING	GR	GENERAL RETAIL
MH	MOBILE HOME DWELLING	C1, C2, C3	COMMERCIAL
TH	TOWNHOUSE DWELLING	IP ,IP1, IP2, IP3	INDUSTRIAL PARK
2F	TWO-FAMILY DWELLING	LI	LIGHT INDUSTRY
MF1, MF2	MULTIPLE FAMILY DWELLING	HI	HEAVY INDUSTRY



INSET "A"
SCALE: 1" = 300'



N

0' 2000' 4000'

SCALE: 1" = 2000'

NOTES:

1. THIS DOES NOT CONSTITUTE A BOUNDARY SURVEY.
2. ANY ADJACENT WELLS ARE BASED SOLELY OFF RAILROAD COMMISSION (RRC) RECORDS AND ACCURACY CANNOT BE GUARANTEED.
3. ANY LEASE INFORMATION DEPICTED IS PROVIDED BY THE CLIENT.
4. WELL LOCATION IS APPROXIMATELY 3.0 MILES NORTH OF MIDLAND, TEXAS.

LEGEND

- WELL SURFACE LOCATION
- PROPOSED WELL PAD SITE
- TANK BATTERY SITE
- POND SITE
- PROPOSED FLOWLINE
- PROPOSED WATERLINE
- PROPOSED ELECTRICAL
- E — E — EXISTING OVERHEAD ELECTRICAL
- X — EXISTING FENCE
- GAS — EXISTING GAS PIPELINE
- PROPOSED ACCESS ROAD

HALFF
3300 NORTH A STREET, BUILDING 2, SUITE 120
MIDLAND, TX 79705-5471
TEL (432) 253-3255
TBPELS SURVEYING FIRM #10193998

DATE: 10/12/2021
BY: J. ALVAREZ
AVO: 39678.650

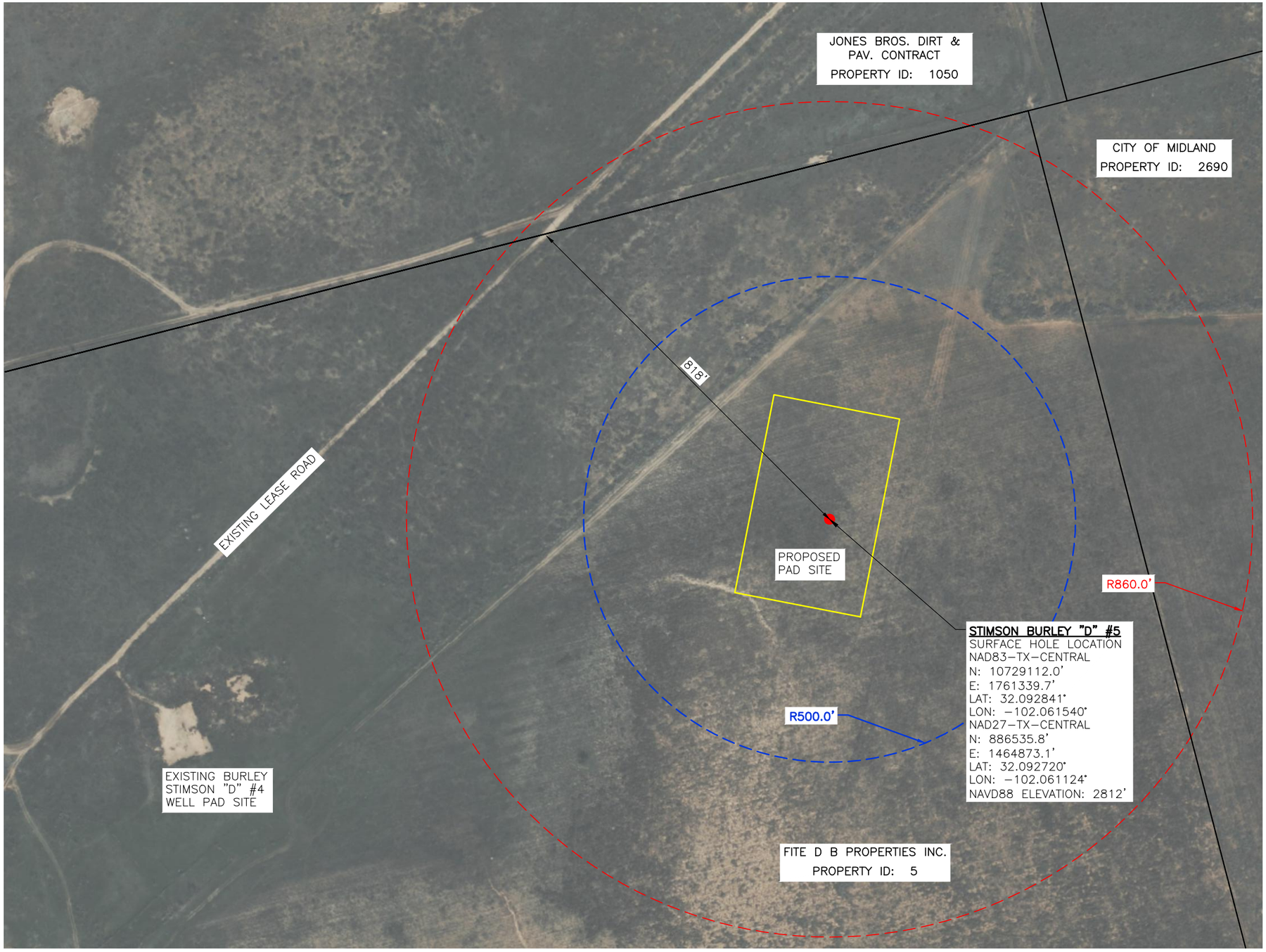
PIONEER NATURAL RESOURCES USA, INC.

EXHIBIT "N"
DRILL SITE, GATHERING LINES, ACCESS ROAD, FENCELINES

STIMSON BURLEY "D" #5

LOCATED IN
SECTION 7, BLOCK 38,
TOWNSHIP-1-SOUTH,
T&P RR CO SURVEY,
ABSTRACT NO. 294,
MARTIN COUNTY, TEXAS

I:\39000s\39678\650\CADD\SheetsMLD\EXHIBIT_PLATS\039697.650_EXHIBIT_N_DRILL_SITE.dwg



N

0' 200' 400'

SCALE: 1" = 200'

NOTES:

1. THIS DOES NOT CONSTITUTE A BOUNDARY SURVEY.
2. ANY ADJACENT WELLS ARE BASED SOLELY OFF RAILROAD COMMISSION (RRC) RECORDS AND ACCURACY CANNOT BE GUARANTEED.
3. ANY LEASE INFORMATION DEPICTED IS PROVIDED BY THE CLIENT.
4. WELL LOCATION IS APPROXIMATELY 3.0 MILES NORTH OF MIDLAND, TEXAS.

LEGEND

- WELL SURFACE LOCATION
- 860-FOOT BUFFER/ HALO
- 500-FOOT BUFFER/ HALO
- PROPOSED WELL PAD SITE
- PROPERTY OWNERSHIP BOUNDARY

HALFF®
3300 NORTH A STREET, BUILDING 2, SUITE 120
MIDLAND, TX 79705-5471
TEL (432) 253-3255
TBPELS SURVEYING FIRM #10193998

DATE: 7/26/2021
BY: J. ALVAREZ
AVO: 39678.650

PIONEER NATURAL RESOURCES USA, INC.

EXHIBIT "E"
AERIAL SITE PLAN

STIMSON BURLEY "D" #5

LOCATED IN
SECTION 7, BLOCK 38,
TOWNSHIP-1-SOUTH,
T&P RR CO SURVEY,
ABSTRACT NO. 294,
MARTIN COUNTY, TEXAS

I:\39000s\39678\650\CADD\SheetsMLD\EXHIBIT_PLATS\039697.650_EXHIBIT_E_AERIAL_SITE_PLAN.dwg

City Council Meeting

Item Number: **19**

Meeting Date: **February 8, 2022**

To: **City Council / City Manager**

From: **Kelly Martinez, Senior Planner**

Subject: **AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOT 6, BLOCK 50, EAST MIDLAND ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS, FROM HI, HEAVY INDUSTRIAL DISTRICT TO SF-3, SINGLE-FAMILY DWELLING DISTRICT (GENERALLY LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF NORTH MADISON STREET AND SOUTH STREET); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 2) (DEVELOPMENT SERVICES)**

Purpose:

The applicant, Well-Suited Property**,** is requesting a Zone Change from HI, Heavy Industrial District to SF-3 Single-Family Dwelling District at 601 North Madison Street, to construct a single-family residence.

Recommended City Council Action:

Approve

Fiscal Impact:

This request does not require any City funds.

Current Zoning:

HI, Heavy Industrial District.

Surrounding Zoning and Land Use:

The properties to the north, east, and west are also zoned HI, Heavy Industrial District and the location of vacant land and single-family residences, respectively. The property to the south is zoned SF-3 Single-Family Dwelling District and the location of single-family residence, respectively.

Analysis:

The property is located at 601 N. Madison Street and is currently vacant. The applicant is requesting this zone change for the purposes of constructing a single-family residence on the property. The current zoning is HI, Heavy Industrial District. Per the previous zoning ordinance, single-family detached dwellings were allowed within this zoning district. As of July 1, 2019, the new zoning ordinance does not allow the use of single-family detached dwellings within the HI, Heavy Industrial District. The property does not meet the minimum lot size requirements for the SF-3, Single Family Dwelling District, however; a special exception for the minimum lot dimensions was approved by the City Council on December 14, 2021.

This proposed zone change has been circulated to the respective City departments for internal review and their comments, conditions, and requirements are as follows:

Fire: (Approved)

No objections

Building: (Approved)

No issues. All future structures must adhere to the 2018 International Building Codes, the 2015 International Energy Code, the 2020 NEC requirements, the 2015 International Fire Codes, local city ordinances, zoning requirements, established setbacks, and floodplain requirements if necessary. Code versions are subject to change depending on time of new code edition adoption in the City of Midland and date of permit application.

Engineering: (Approved)

No objection to zone change. [For the Applicant's information only.]

Site drainage, utilities, driveway access, and traffic circulation may be adjusted during construction drawing review as necessary to receive building permit approval from Engineering and Traffic Operations. [For the Applicant's information only.]

Code: (Approved)

No Oil and Gas issues.

Transportation: (Approved)

No additions or changes to site access are approved with plat or zoning review. Driveways or other access points are approved only with construction drawing review. [For the Applicant's

information only.]

No objections to plat. [For the Applicant's information only.]

Planning:

This request is in compliance with the Tall City Tomorrow Comprehensive Plan, Chapter 3 An Integrated Land Use Vision, "Future Land Use Map" as it designates this area for Urban Medium, a classification which calls for a mix of residential and non-residential uses. As the surrounding lots consist of vacant lots and residences, this zone change will follow the existing characteristics of the surrounding neighborhood and provide additional housing for residents of the City of Midland.

This request is set to be heard at the February 1, 2022 Planning and Zoning Commission meeting.

Staff recommends approval of this zone change from HI, Heavy Industrial District to SF-3, Single Family Dwelling District, subject to condition A.

Conditions:

A. **That the use and development of this property shall conform to the regulations of the SF-3, Single-Family Dwelling District.**

Letters of Objection:

Staff has not received any letters of objection as of February 2, 2022.

Attachments:

Application
East Midland Plat
Maps

Robert Patrick

City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE LOT 6, BLOCK 50, EAST MIDLAND ADDITION, CITY AND COUNTY OF MIDLAND, TEXAS, FROM HI, HEAVY INDUSTRIAL DISTRICT TO SF-3, SINGLE-FAMILY DWELLING DISTRICT (GENERALLY LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF NORTH MADISON STREET AND SOUTH STREET); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, in compliance with the City Charter, the City Code, and State law, have given the requisite notices by United States mail, publication and otherwise; and after a full and fair hearing to all of the property owners generally and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body finds that the public health, safety and general welfare will be best served by rezoning Lot 6, Block 50, East Midland Addition, City and County of Midland, Texas (the "Property") to SF-3, Single-Family Dwelling District, as set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Zoning District Map of the City of Midland, Texas, is hereby amended to rezone the Property from HI, Heavy Industrial District to SF-3, Single-Family Dwelling District.

SECTION TWO. That the definitions given in the zoning regulations contained in the City Code of the City of Midland, Texas, shall be applicable to such of those terms as are used herein.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances

inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2022; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2022, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2022.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

MIDLAND Planning Division

Zone Change/Planned District Amendment/Site Plan Approval

Project Number: Z-21-0278

Case Number:

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name:		Phone ( ) Email	
Address	City	State	Zip

Property Owner Printed Name: Well Suited Property Solutions, LLC		Phone (432) 553-8756 Email ralph@wellsuitedps.com	
Address 601 N Madison Str.	City Midland	State TX	Zip 79701

Representative *(if different from Applicant or Property Owner)* Firm: Printed Name:		Phone ( ) Email	
Address	City	State	Zip

Street Address: 601 N Madison Street, Midland TX 79701

Legal Description R17105

Lot: Block: 6 Subdivision: 50 East Midland Addition Parcel

Current Zoning: HI

Proposed Zone: SF3
(List by tracts if more than one district is requested)

Reason for Zone Change Request: To re-zone from HI to SF3

Present Use of Property: Vacant.

Proposed Use of Property: To build a single family home.

How would this zone change affect the public health, safety and welfare? None

Describe how conditions affecting the property have changed since present zoning designation: None.

Submittal and Fees

Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Dimensioned Site Plan
- Digital Copies of Site Plan (PDF/JPEG)

Signature *(by property owner only – authorized agent must sign affidavit below)*	
Applicant (signature): Ralph	Date: 12/20/21
Applicant (printed): Ralph Okugbere	
Property Owner (signature): Ralph	Date: 12/20/21
Property Owner (printed) : Ralph Okugbere.	

The Zone Change/Planned District Amendment/Site Plan Approval shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appear_____who, being by me duly sworn, upon oath says: That (s)he is the owner of _____or authorized by_____, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

_____
Authorized Agent (*signature*)

Subscribed and sworn to before me, this_____day of_____, 20____, to certify which witness my hand and seal of office.

_____
NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

FOR OFFICE USE ONLY

☐ Property Owner Authorization	☐ Dimensioned Site Plan
☐ Application Fee	☐ Plans in Digital Format (PDF/JPEG)
Check # 1486	
Received By: JS	Date:

RECEIVED DEC 20 2021 BY:
RECEIVED DEC 15 2021 02 330
RECEIVED JUN 04 2020 BY:

****Application will not be considered for scheduling until reviewed by a planner.****

Do Not Remove From Drafting Room

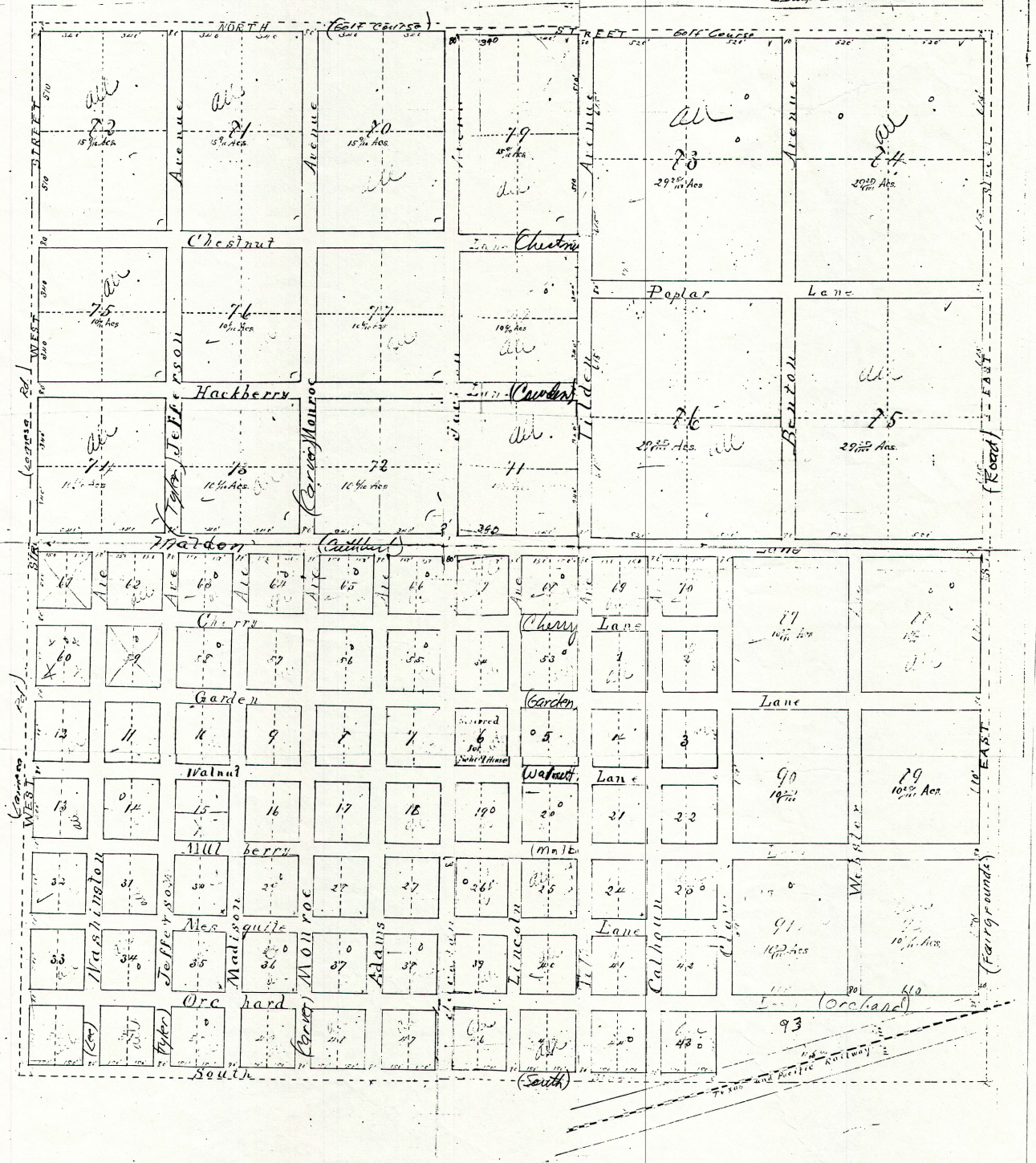
MAP of

EAST MIDLAND

MIDLAND COUNTY
TEXAS

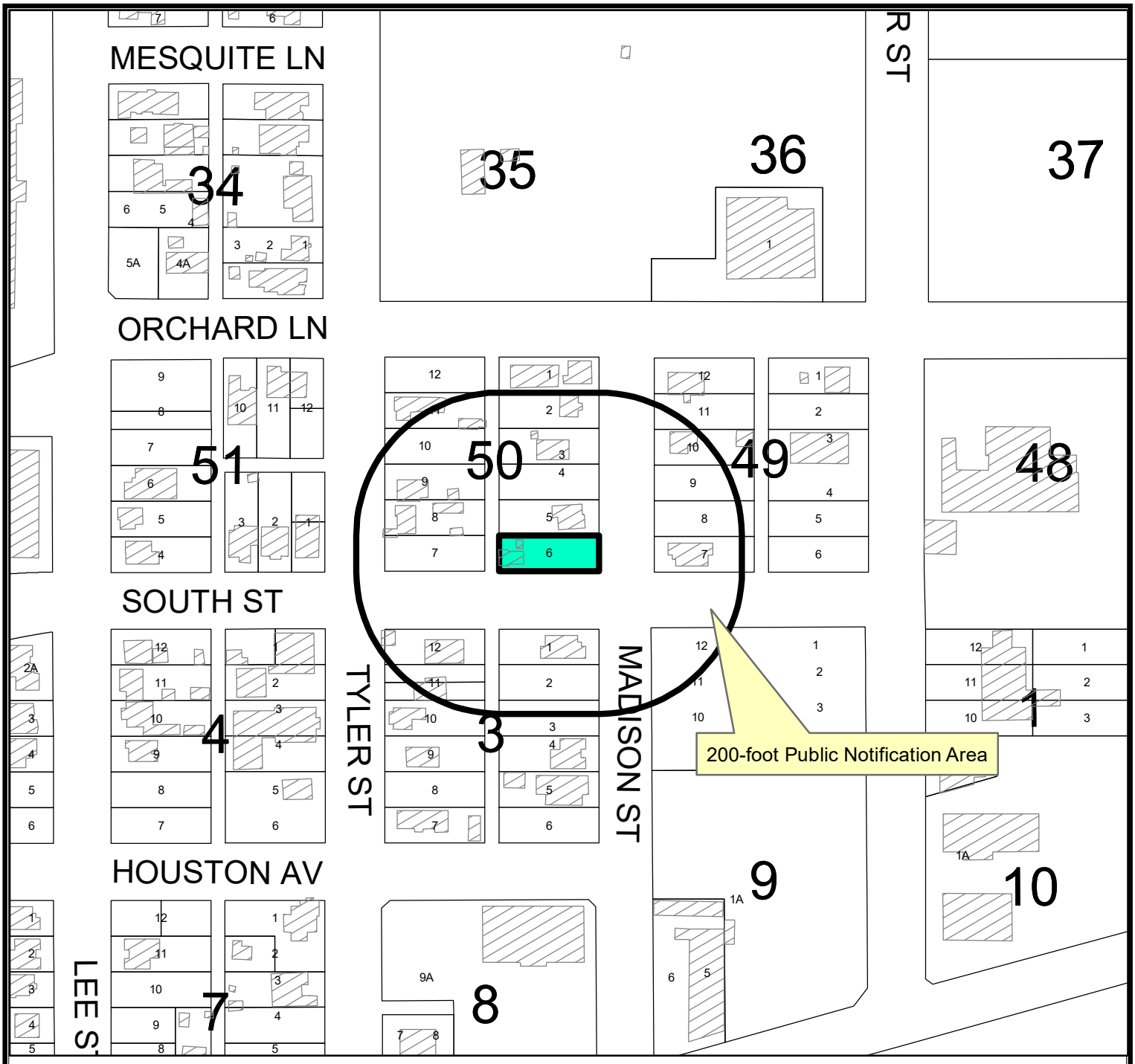
Being all of Section 25. Block 39
Township 1 South Texas and
Pacific Railway Company
Scale 40 ft = 1 inch

This Map is Recorded on pages of Book of the Records of Deeds of MIDLAND COUNTY Texas



State of Texas
Midland County } Know all men by this presents, that we John Howard of Tarrant County Texas and G. H. Griffith of Oneida County, New York acting herein by my attorney in fact File Griffith of said Tarrant County Texas under a Power of attorney dated September 21, 1885 and recorded in the records of deeds &c of Midland County Texas in Book I on Pages 86 & 87 and B. K. Braut of said Midland County Texas have bargained granted and donated and by those presents do bargain

Bostwick's



LOCATION MAP

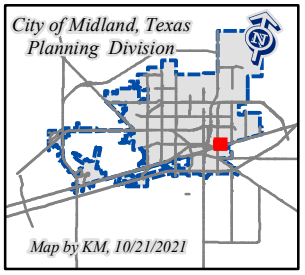
Z-21-0278 **Scale: 1" = 200'**

Consider a request by Well-Suited Property for a Zone Change from HI, Heavy Industrial District to SF-3, Single Family-Dwelling District on Lot 6, Block 50, East Midland, City and County of Midland, Texas.

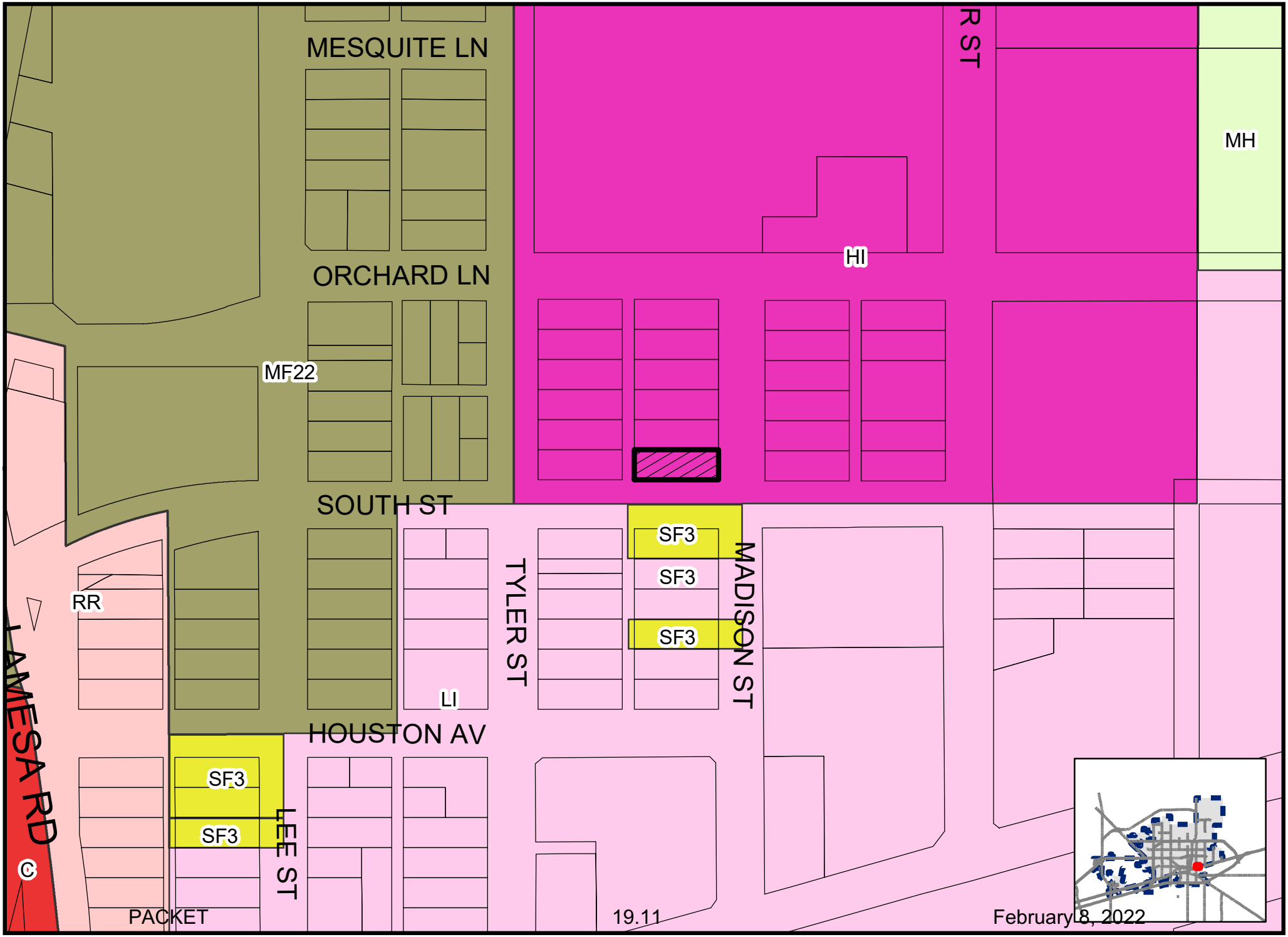
Generally located on the northwest corner of the intersection of N Madison Street and South Street. (Council District 2)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



©THE CITY OF MIDLAND - 2021
THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY PRODUCT NOR IS IT DESIGNED TO BE USED AS A PRIMARY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN.
THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.



Map By KM, 10/21/2021

Z-21-0278

Scale: 1" = 200'

ZONING MAP

© THE CITY OF MIDLAND - 2021: THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY PRODUCT, NOR IS IT DESIGNED TO BE USED AS A PRIMARY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN. THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.

GMC

City Council Meeting

Item Number: 20

Meeting Date: February 8, 2022

To: City Council / City Manager

From: Kelly Martinez, Senior Planner

Subject: AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE A 4.97-ACRE TRACT OF LAND OUT OF LOT 2, BLOCK 2, GREEN HILL TERRACE, CITY AND COUNTY OF MIDLAND, TEXAS, FROM AE, AGRICULTURAL ESTATE DISTRICT TO CE, COUNTRY ESTATE DISTRICT (GENERALLY LOCATED ON THE NORTH SIDE OF PIMLICO DRIVE, APPROXIMATELY 170 FEET EAST OF HOLIDAY HILL ROAD); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION (DISTRICT 1) (DEVELOPMENT SERVICES)

Purpose:

The applicant, Chukwuma Mbagwu, is requesting to rezone a 4.97-acre tract of land out of Lot 2, Block 2, Green Hill Terrace, City and County of Midland, Texas.

Recommended City Council Action:

Approve

Fiscal Impact:

This request does not require any City funds.

Current Zoning:

AE, Agricultural Estate District

Surrounding Zoning and Land Use:

The properties to the north and east are zoned AE, Agricultural Estate District and the locations of residential homes. The properties to the south are zoned RR, Regional Retail District and AE, Agricultural Estate District, and the locations of vacant land, Green Hill Terrace pool and residential homes. The property to the west is zoned PD, Planned Development District, and the location of vacant land.

Analysis:

The applicant is requesting this zone change for the purpose of developing single family homes. The property is currently vacant and zoned AE, Agricultural Estate District. The lot is in the process of being replatted into several lots each of them would be (1) one acre or more. However, the proposed lots do not meet the minimum lot dimensions for the AE, 2 0 1 5 Agricultural Estate District. Per our Zoning Ordinance, the minimum lot area in the AE, Agricultural Estate District is two (2) acres. Rezoning the tract would allow the applicant to meet the lot area requirement in the CE, Country Estate District. It should be noted that about 50% or more of the surrounding properties in this area are zoned AE, Agricultural Estate District and are an acre or less per lot. Based on the acreage of these properties, the appropriate zoning for them would be CE, Country Estate District. Furthermore, the character of the neighborhood would not be adversely affected by any use permitted in the proposed zoning district.

This proposed zone change has been circulated to the respective City departments for internal review and their comments, conditions, and requirements are as follows:

Fire: (Approved)

No objections.

Building: (Approved)

No issues. All future structures must adhere to the 2018 International Building Codes, the 2015 International Energy Code, the 2020 NEC requirements, the 2015 International Fire Codes, local city ordinances, zoning requirements, established setbacks, and floodplain requirements if necessary. Code versions are subject to change depending on time of new code edition adoption in the City of Midland and date of permit application.

Engineering: (Approved)

No objections to plat. [For the Applicant’s information only.]

No additions or changes to site access are approved with plat or zoning review. Driveways or other access points are approved only with construction drawing review. [For the Applicant’s information only.]

Code: (Approved)

No Oil and Gas issues.

Transportation: (Approved)

No additions or changes to site access are approved with plat or zoning review. Driveways or other access points are approved only with construction drawing review. [For the Applicant's information only.]

No objections to plat. [For the Applicant's information only.]

Planning:

The request does not fit with the Tall City Tomorrow Comprehensive Plan, Chapter 3- Land Use Vision. This designation calls for parks and open space. These areas are intended to remain undeveloped and natural or recreational in character. However, most of the surrounding land uses are residential homes; therefore, the development of single-family homes would not disrupt the character of the area. In addition to increasing the housing market with larger lots.

This request was recommended for approval at the January 18, 2022, Planning and Zoning Commission Meeting.

Therefore, staff recommends approval of this zone change from AE, Agricultural Estate District to CE, Country Estate District subject to condition A.

Conditions:

A. That the use and development of this property shall conform to the regulations of the CE, Country Estate District.

Letters of Objection:

Staff has not received any letters of objection as of February 2, 2022.

Attachments:

Application
Meets and Bounds (Exhibit A)
Survey Plat (Exhibit B)
Maps

Robert Patrick

City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE AMENDING THE ZONING DISTRICT MAP OF THE CITY OF MIDLAND TO REZONE A 4.97-ACRE TRACT OF LAND OUT OF LOT 2, BLOCK 2, GREEN HILL TERRACE, CITY AND COUNTY OF MIDLAND, TEXAS, FROM AE, AGRICULTURAL ESTATE DISTRICT TO CE, COUNTRY ESTATE DISTRICT (GENERALLY LOCATED ON THE NORTH SIDE OF PIMLICO DRIVE, APPROXIMATELY 170 FEET EAST OF HOLIDAY HILL ROAD); CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); AND ORDERING PUBLICATION

WHEREAS, the City Planning and Zoning Commission and the Governing Body of the City of Midland, in compliance with the City Charter, the City Code, and State law, have given the requisite notices by United States mail, publication and otherwise; and after a full and fair hearing to all of the property owners generally and particularly to those interested persons situated in the affected area and in the vicinity thereof, the Governing Body finds that the public health, safety and general welfare will be best served by rezoning a 4.97-acre tract of land out of Lot 2, Block 2, Green Hill Terrace, City and County of Midland, Texas, said tract being more specifically described by metes and bounds in Exhibit "A", which is attached hereto and incorporated herein (the "Property") to CE, Country Estate District, as set out hereinafter;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That the Zoning District Map of the City of Midland, Texas, is hereby amended to rezone the Property from AE, Agricultural Estate District to CE, Country Estate District.

SECTION TWO. That the definitions given in the zoning regulations contained in the City Code of the City of Midland, Texas, shall be applicable to such of those terms as are used herein.

SECTION THREE. The provisions of this ordinance are to be cumulative of all

other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2022; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2022, at a regular

meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2022.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

EXHIBIT "A"

FIELD NOTE DESCRIPTION OF A 4.97 ACRE TRACT OF LAND, OUT OF LOT 2, BLOCK 2, GREEN HILL TERRACE, AN ADDITION TO THE CITY OF MIDLAND, MIDLAND COUNTY, TEXAS, ACCORDING TO MAP OR PLAT THEREOF, RECORDED IN CABINET A, PAGE 26, PLAT OF RECORDS, MIDLAND COUNTY TEXAS; DESCRIBED MORE FULLY BY METES AND BOUNDS AS FOLLOWS:

BEGINNING AT A 1/2" REINF BAR FOUND FOR THE SOUTHWEST CORNER OF THIS TRACT, ALSO BEING THE SOUTHWEST CORNER OF LOT 2;

THENCE NORTH 14°17'26" WEST 468.10 FEET TO A 1/2" REINF BAR FOUND FOR THE NORTHWEST CORNER OF THIS TRACT;

THENCE NORTH 75°49'52" EAST 532.40 FEET TO A 1/2" REINF BAR SET FOR A CORNER OF THIS TRACT;

THENCE SOUTH 47°54'29" EAST 136.01 FEET TO A 1/2" REINF BAR SET FOR A CORNER OF THIS TRACT;

THENCE SOUTH 14°17'26" EAST 355.00 FEET TO A 1/2" REINF BAR SET FOR THE SOUTHEAST CORNER OF THIS TRACT;

THENCE SOUTH 75°49'52" WEST 40.00 FEET TO A 1/2" REINF BAR SET FOR A CORNER OF THIS TRACT;

THENCE NORTH 14°17'26" WEST 207.06 FEET TO A 1/2" REINF BAR SET FOR AN INTERNAL CORNER OF THIS TRACT;

THENCE SOUTH 75°43'02" WEST 307.93 FEET TO A 1/2" REINF BAR SET FOR AN INTERNAL CORNER OF THIS TRACT;

THENCE SOUTH 14°17'44" EAST 206.45 FEET TO A 1/2" REINF BAR SET FOR A CORNER OF THIS TRACT;

THENCE SOUTH 75°49'52" WEST 259.79 FEET TO THE PLACE OF BEGINNING.

STATE OF TEXAS
REGISTERED
RJ DAUM
4826
PROFESSIONAL
LAND SURVEYOR

12-21-2021

MIDLAND Planning Division

Zone Change/Planned District Amendment/Site Plan Approval

Project Number: 2-21-0279

Case Number:

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name:		Phone ( ) Email	
Address	City	State	Zip

Property Owner Printed Name: **Chukwuma Mbagwu**		Phone (**432**) **296-1826** Email **chux_mbagwu@yahoo.com**	
Address ***4502 Mockingbird***	City	State	Zip

Representative *(if different from Applicant or Property Owner)* Firm: Printed Name:		Phone ( ) Email	
Address	City	State	Zip

Street Address:

Legal Description
Lot: 2 Block: 2 Subdivision: Green Hill Terrace

Current Zoning: AE

Proposed Zone: CE
(List by tracts if more than one district is requested)

Reason for Zone Change Request: To build houses on each lot with the lot requirements. Lot is in the process of being re-platted into 1 acre lots.

Present Use of Property: Vacant

Proposed Use of Property: Residential

How would this zone change affect the public health, safety and welfare? It doesn't

Describe how conditions affecting the property have changed since present zoning designation:

Submittal and Fees
Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Dimensioned Site Plan
- Digital Copies of Site Plan (PDF/JPEG)

Signature *(by property owner only – authorized agent must sign affidavit below)*	
Applicant (signature):	Date:
Applicant (printed):	
Property Owner (signature): X	Date: 12/07/21
Property Owner (printed) :	

The Zone Change/Planned District Amendment/Site Plan Approval shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appear Eduardo L. Aleman who, being by me duly sworn, upon oath says: That (s)he is the owner of _____ or authorized by Chukwuma, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

Eduardo L. Aleman
Authorized Agent (*signature*)

Subscribed and sworn to before me, this 7th day of December, 20 21, to certify which witness my hand and seal of office.

HUNTER WAYNE HALL
Notary Public, State of Texas
Comm. Expires 06-05-2024
Notary ID 132509132

NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

FOR OFFICE USE ONLY

☑ Property Owner Authorization
☑ Application Fee
Check # 1722
☑ Dimensioned Site Plan
☑ Plans in Digital Format (PDF/JPEG)

Received By: KM
Date:

RECEIVED
DEC 21 2021

****Application will not be considered for scheduling until reviewed by a planner.****

FIELD NOTE DESCRIPTION OF A 4.97 ACRE TRACT OF LAND, OUT OF LOT 2, BLOCK 2, GREEN HILL TERRACE, AN ADDITION TO THE CITY OF MIDLAND, MIDLAND COUNTY, TEXAS, ACCORDING TO MAP OR PLAT THEREOF, RECORDED IN CABINET A, PAGE 26, PLAT OF RECORDS, MIDLAND COUNTY TEXAS; DESCRIBED MORE FULLY BY METES AND BOUNDS AS FOLLOWS:

BEGINNING AT A 1/2" REINF BAR FOUND FOR THE SOUTHWEST CORNER OF THIS TRACT, ALSO BEING THE SOUTHWEST CORNER OF LOT 2;

THENCE NORTH 14°17'26" WEST 468.10 FEET TO A 1/2" REINF BAR FOUND FOR THE NORTHWEST CORNER OF THIS TRACT;

THENCE NORTH 75°49'52" EAST 532.40 FEET TO A 1/2" REINF BAR SET FOR A CORNER OF THIS TRACT;

THENCE SOUTH 47°54'29" EAST 136.01 FEET TO A 1/2" REINF BAR SET FOR A CORNER OF THIS TRACT;

THENCE SOUTH 14°17'26" EAST 355.00 FEET TO A 1/2" REINF BAR SET FOR THE SOUTHEAST CORNER OF THIS TRACT;

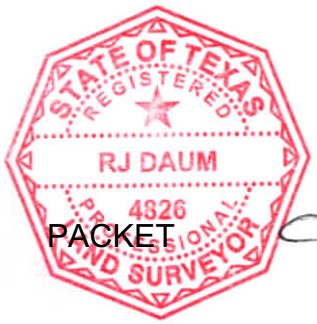
THENCE SOUTH 75°49'52" WEST 40.00 FEET TO A 1/2" REINF BAR SET FOR A CORNER OF THIS TRACT;

THENCE NORTH 14°17'26" WEST 207.06 FEET TO A 1/2" REINF BAR SET FOR AN INTERNAL CORNER OF THIS TRACT;

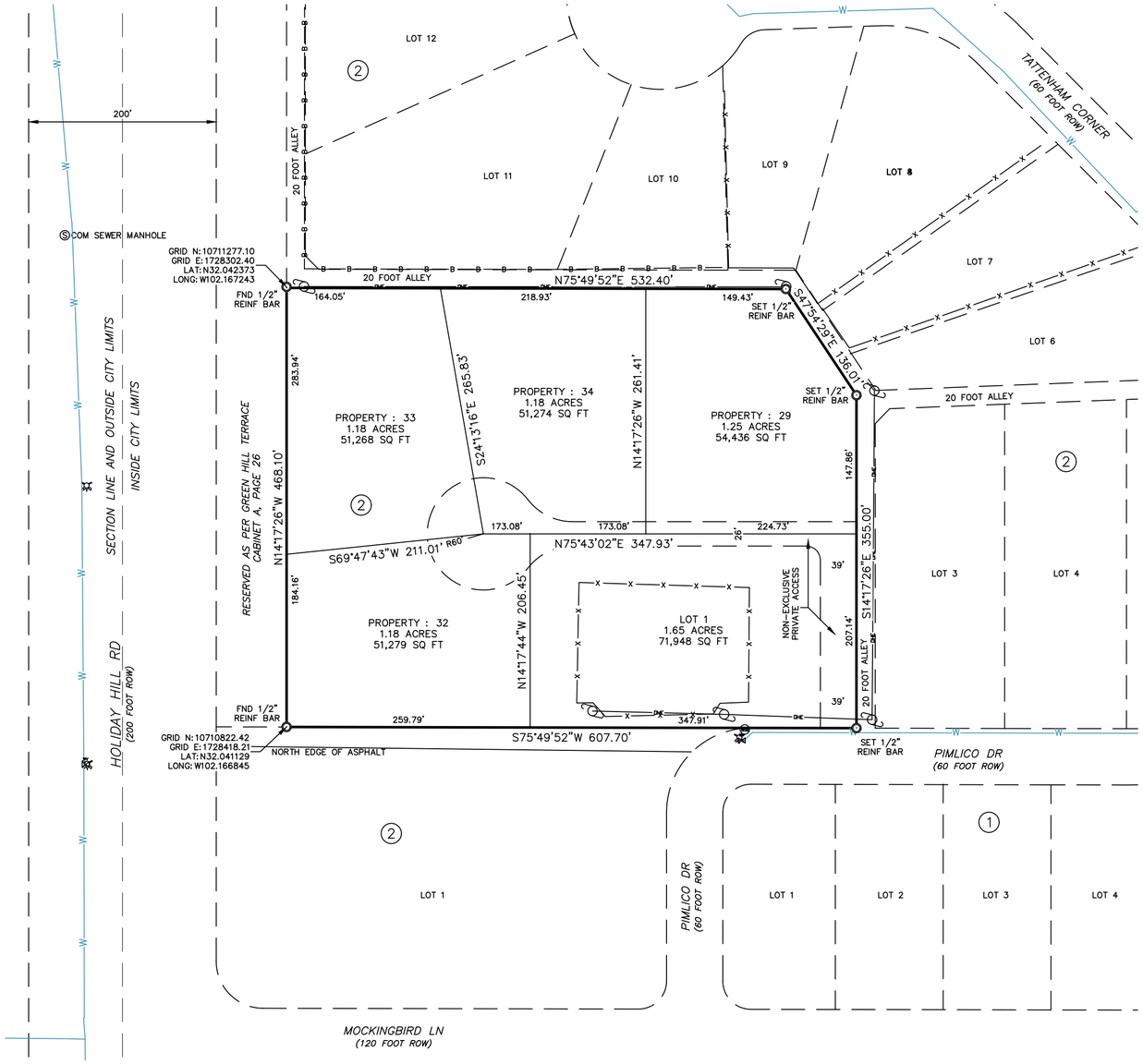
THENCE SOUTH 75°43'02" WEST 307.93 FEET TO A 1/2" REINF BAR SET FOR AN INTERNAL CORNER OF THIS TRACT;

THENCE SOUTH 14°17'44" EAST 206.45 FEET TO A 1/2" REINF BAR SET FOR A CORNER OF THIS TRACT;

THENCE SOUTH 75°49'52" WEST 259.79 FEET TO THE PLACE OF BEGINNING.



12-21-2021



SKETCH PLAN

GREEN HILL TERRACE, SECTION 19

BEING A RE-PLAT OF LOT 2, BLOCK 2, GREEN HILL TERRACE, CITY AND COUNTY OF MIDLAND, TEXAS

STATE OF TEXAS

COUNTY OF MIDLAND

WHEREAS, I AM THE RECORD OWNER OF LOT 2, BLOCK 2, GREEN HILL TERRACE, CITY AND COUNTY OF MIDLAND, TEXAS, AND MORE PARTICULARLY DESCRIBED HEREON.

NOW, THEREFORE, KNOW ALL MEN BY THESE PRESENTS:

THAT I DO HEREBY ADOPT THIS PLAT DESIGNATING THE HEREINABOVE DESCRIBED PROPERTY AS GREEN HILL TERRACE, SECTION 19, AN ADDITION TO THE CITY OF MIDLAND, AND DO HEREBY DEDICATE TO THE PUBLIC USE FOREVER THE STREETS, ALLEY, AND EASEMENTS, (AND PARKWAYS) SHOWN HEREON.

WITNESS MY HAND AT MIDLAND, TEXAS, THIS ____ DAY OF _____, 20____ .

_____
CHUKWUMA MBAGWU

STATE OF TEXAS:
COUNTY OF MIDLAND:

THIS INSTRUMENT WAS ACKNOWLEDGED BEFORE ME ON THIS____DAY OF _____, 20_____, CHUKWUMA MBAGWU.

_____
NOTARY PUBLIC
MIDLAND COUNTY, TEXAS

OWNER:

CHUKWUMA MBAGWU
4502 MOCKINGBIRD
MIDLAND, TX 79705
(432) 296-1826
CHUX_MBAGWU@YAHOO.COM

NOTES:

1. SELLING A PORTION OF THIS ADDITION BY METES AND BOUNDS MAY BE A VIOLATION OF CITY ORDINANCE AND STATE LAW AND SUBJECT TO FINES AND WITHHOLDING OF UTILITIES AND BUILDING PERMITS.

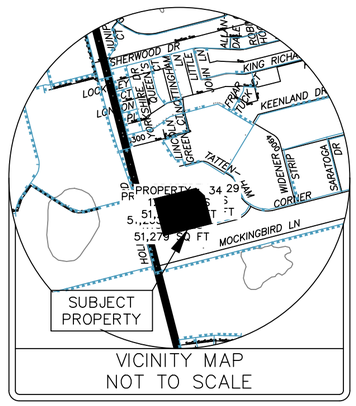
2. APPROVAL OF A SITE PLAN BY THE CITY OF MIDLAND MAY BE REQUIRED BEFORE THE DEVELOPMENT OF ANY LOT AND BEFORE A BUILDING PERMIT MAY BE OBTAINED.

3. BEARINGS, DISTANCES AND ACREAGE SHOWN ARE GRID BASED ON GPS OBSERVATIONS AND CONFORM TO THE "TEXAS COORDINATE SYSTEM" TEXAS CENTRAL ZONE, NORTH AMERICAN DATUM OF 1983.

4. THE INSTALLATION OF PUBLIC IMPROVEMENTS MAY BE REQUIRED BY THE CITY OF MIDLAND AS SUCH TIME AS: (1) THE 6.433 ACRE TRACT IS RE-PLATTED FOR SUBDIVISION INTO MORE THAN FIVE TRACT OR (2) THE PROPERTY IS REZONED FOR A MORE INTENSIVE USE.

5. INITIAL IMPACT FEES WILL BE ASSESSED DURING THE FINAL PLATTING PROCESS. IMPLEMENTATION AND COLLECTION OF IMPACT FEES WILL TAKE PLACE DURING THE BUILDING PERMIT PROCESS. ADDITIONAL IMPACT FEES OR INCREASES IN FEES MAY NOT BE ASSESSED AGAINST THE TRACT UNLESS THE NUMBER OF SERVICE UNITS TO BE DEVELOPED ON THE TRACT INCREASES.

6. THIS PROPERTY IS DESIGNATED ZONE "X" AS PER THE FEDERAL EMERGENCY MAMAGEMENT AGENCY (FEMA) FLOOD INSURANCE RATE MAP (FRIM) NUMBER 48329-C0066F. WITH THE EFFECTIVE DATE OF SEPTEMBER 16, 2005.



VICINITY MAP
NOT TO SCALE

THIS PLAT HAS BEEN CHECKED FOR ACCESSIBILITY OF UTILITIES.

SIGNED: _____
ONCOR ELECTRIC DELIVERY COMPANY

SIGNED: _____
AT&T TEXAS

SIGNED: _____
ATMOS ENERGY

SIGNED: _____
SUDDENLINK COMMUNICATIONS

SIGNED: _____
GRANDE COMMUNICATIONS

CERTIFICATE OF APPROVAL

FOR APPROVAL BY THE COMMISSION:

THIS IS TO CERTIFY THAT THE ABOVE AND FOREGOING PLAT OF GREEN HILL TERRACE, SECTION 19 WAS APPROVED BY PROPER ACTION OF THE CITY PLANNING AND ZONING COMMISSION OF THE CITY OF MIDLAND, ON THIS _____ DAY OF _____, 2022.

SIGNED: _____
CHAIRMAN LUCY SISNIEGA

ATTEST: _____
SECRETARY ELIZABETH SHAUGHNESSY

THAT I, RJ DAUM. A REGISTERED PROFESSIONAL LAND SURVEYOR, DO HEREBY CERTIFY THAT I PREPARED THIS PLAT FROM AN ACTUAL AND ACCURATE SURVEY OF THE LAND AND THAT THE CORNER MONUMENTS SHOWN THEREON WERE PROPERLY PLACED UNDER MY PERSONAL SUPERVISION, IN ACCORDANCE WITH THE SUBDIVISION REGULATIONS OF THE CITY OF MIDLAND, TEXAS.

_____
RJ DAUM
TEXAS RPLS 4826

PLAT FILED FOR RECORD
MIDLAND COUNTY, TEXAS
NO._____CABINET _____
DATE_____PAGE_____

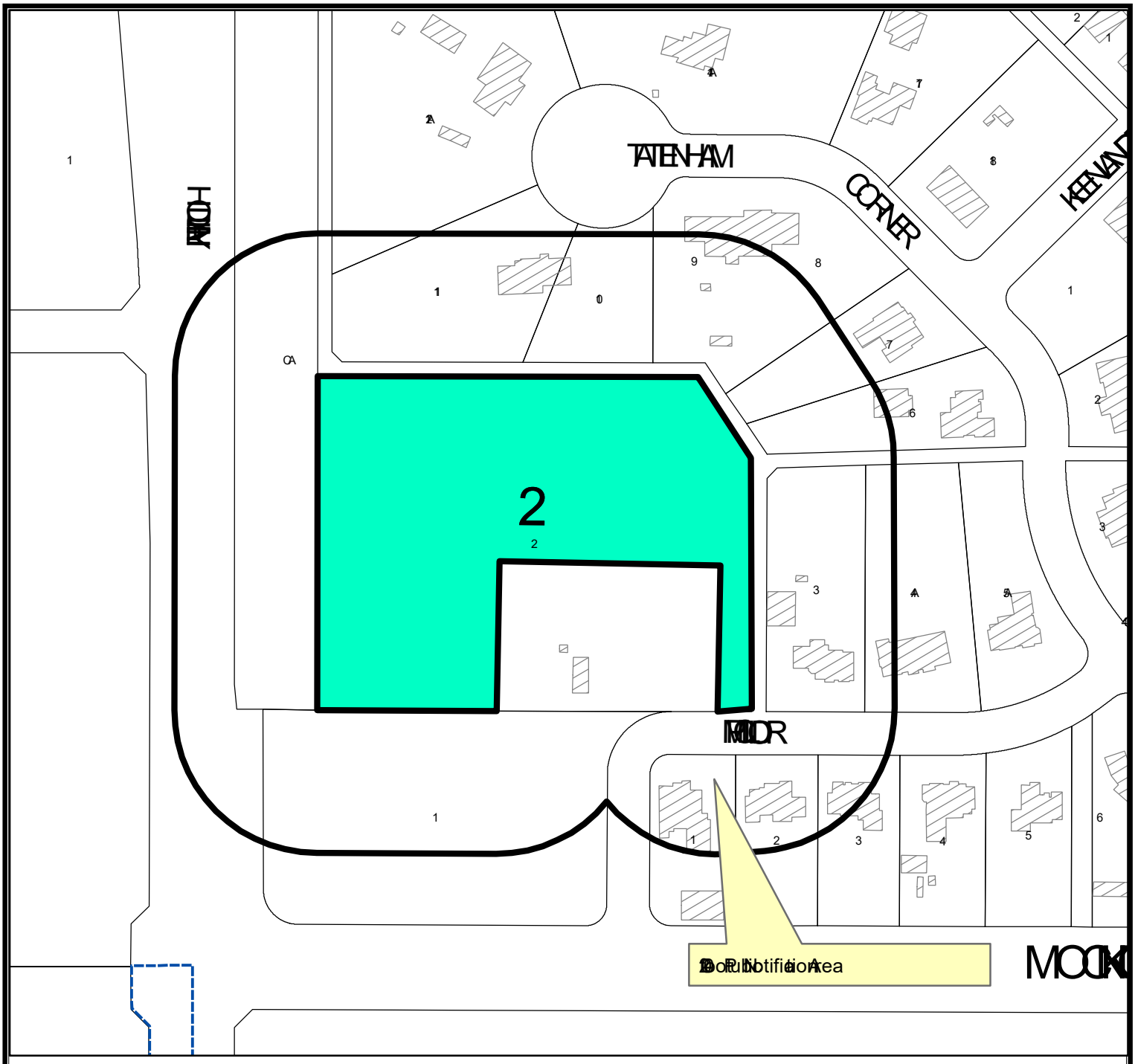
GRAPHIC SCALE
0 100' 200'
(IN FEET)
1 inch = 100 ft.

NO.	DATE	DESCRIPTION	BY
1	1/20/22	Preliminary Plan Prep.	ELA

DRAWN BY: KDS | DATE: 10/06/2021
CHECKED BY: RJD | DRAWING NO.: 78050
JOB NO.: 78,050 | SHEET 1 OF 1

SCHUMANN ENGINEERING CO.
A LATERAL LAND COMPANY
CIVIL ENGINEERING - LAND SURVEYING
800 N. MARIENFELD STREET SUITE 100 MIDLAND, TEXAS 79701
TEXAS FIRM No. P1880 - TEXAS FIRM No. 10149500
Office (432) 684-5548

GREEN HILL TERRACE, SECTION 19



LOCATION MAP

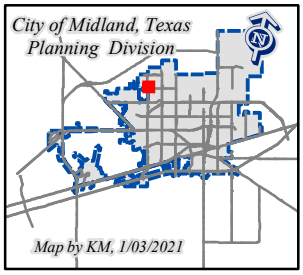
Z-21-0279 **Scale: 1" = 200'**

Consider a request by Chukwuma Mbagwu for a zone change from AE, Agricultural Estate District to CE, Country Estate District on a 4.97-acre tract of land out of Lot 2, Block 2, Greenhill Terrace, City and County of Midland, Texas.

Generally located on the north side of Pimlico Drive, approximately 170 feet east of Holiday Hill Road. (Council District 1)

LEGEND

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



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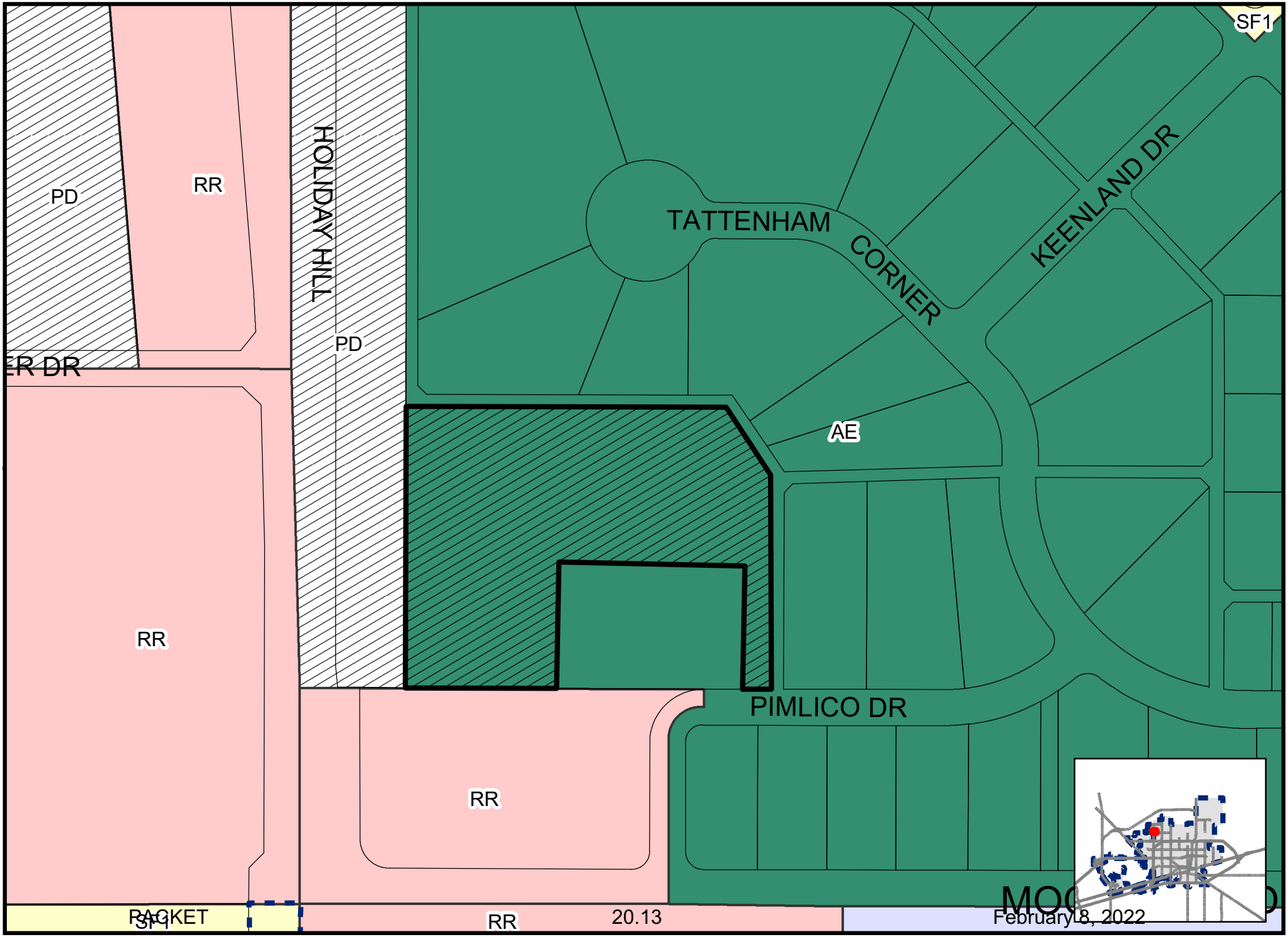
THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.



Map By KM, 01/03/2022

Z-21-0279

Scale: 1" = 200'

ZONING MAP

© THE CITY OF MIDLAND - 2021: THIS DATA IS NOT A SUBSTITUTION FOR A SURVEY PRODUCT, NOR IS IT DESIGNED TO BE USED AS A PRIMARY TOOL IN PERMITTING OR OTHER DECISIONS BASED SOLELY ON THE INFORMATION CONTAINED HEREIN. THE CITY OF MIDLAND SHALL NOT BE RESPONSIBLE FOR ANY DECISIONS BASED UPON THE USE OF THIS DATA.

City Council Meeting

Item Number: 21

Meeting Date: February 8, 2022

To: City Council / City Manager

From: Justin Smith, Planner

Subject: **AN ORDINANCE GRANTING A SPECIAL EXCEPTION FOR LOT 1, BLOCK 43, PERMIAN ESTATES, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF THOMASON DRIVE AND RUBY DRIVE), BY PERMITTING A REDUCED MINIMUM FRONT YARD SETBACK AND A REDUCED MINIMUM SIDE YARD SETBACK ON THE NORTH SIDE OF THE LOT; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); ORDERING RECORDATION BY THE CITY SECRETARY IN THE DEED RECORDS OF MIDLAND COUNTY, TEXAS; AND ORDERING PUBLICATION (DISTRICT 4) (DEVELOPMENT SERVICES)**

Purpose:

The applicants, Elias and Elisa Padilla, are requesting a Special Exception from the City of Midland Zoning Ordinance, *Section 5.04 – Residential Zoning District Dimensional Regulations Chart*, concerning the minimum side and rear yard setback for a corner lot to comply with City Ordinance for an existing carport on the property.

Recommended City Council Action:

Deny

Fiscal Impact:

No City funds are required to process this request.

Discussion:

The property is located at 616 Ruby Drive, which is zoned SF-3, Single Family Dwelling

District.

Per our City of Midland Zoning Ordinance, *Section 5.04 – Residential Zoning District Dimensional Regulations Chart:*

SF-3, Single Family Dwelling District
Lot dimensions
Minimum Front Yard Setback:
20 Feet
Minimum Side Yard Setback:
Interior Lot: 5 Feet

The applicant is requesting to reduce the required minimum side yard setback of the corner lot to be one and two tenths (1.2) of a foot and the minimum front yard setback to be five (5) feet from the property line in order to bring the existing carport into compliance. However, this property faces no hardships. The applicant already has an existing two car carport located in the rear lot, and an additional three accessory buildings, creating a total of four accessory buildings in where the maximum number of allowable accessory buildings is two. The property owner could park their vehicle in the existing carport when there is bad weather. Therefore, this request does not constitute a lack of reasonable use. There are extenuating circumstances on this particular structure. The applicant hired a contractor to erect the structure, but the contractor never applied for a building permit. Application for the building permit would have caught this ahead of time and the permit would have been refused.

This request has been circulated to all pertinent City departments for review. Below are the departments' comments.

Engineering: (Approved)

No comments

Transportation: (Approved)

No comments

Fire: (Approved)

No comments

Code Compliance: (Approved)

No oil or gas issues.

Building:

All future structures must adhere to the 2018 International Building Codes, the 2015 International Energy Code, the 2020 NEC requirements, the 2015 International Fire Codes, local city

ordinances, zoning requirements, established setbacks, and floodplain requirements if necessary. Code versions are subject to change depending on time of new code edition adoption in the City of Midland and date of permit application.

Planning Analysis:

As this request represents a deviation from the existing Zoning Ordinance, staff would recommend denial of this application for a Special Exception to the City of Midland Zoning Ordinance, *Section 5.04 – Residential Zoning District Dimensional Regulations Chart* concerning the minimum side and front yard setback for the interior side of a corner lot.

Should the City Council approve this request, the property shall be subject to conditions A through C:

Conditions:

A. That the property shall significantly conform to the site plan shown in Exhibit "A", which is attached hereto and incorporated herein for all purposes.

B. That the minimum side yard setback for the proposed addition on the western side of the property shall be 1 and two tenths of a foot.

C. That the minimum front yard setback of the proposed addition shall be five feet from the property line.

Letters of Objection:

As of January 27, 2022, City Staff have not received any letters of objection.

Attachments:

Application
Proposed Site Plan (Exhibit A)
Aerial View
Maps

Robert Patrick

City Manager's Office

ORDINANCE NO. _____

AN ORDINANCE GRANTING A SPECIAL EXCEPTION FOR LOT 1, BLOCK 43, PERMIAN ESTATES, CITY AND COUNTY OF MIDLAND, TEXAS (GENERALLY LOCATED AT THE NORTHWEST CORNER OF THE INTERSECTION OF THOMASON DRIVE AND RUBY DRIVE), BY PERMITTING A REDUCED MINIMUM FRONT YARD SETBACK AND A REDUCED MINIMUM SIDE YARD SETBACK ON THE NORTH SIDE OF THE LOT; CONTAINING A CUMULATIVE CLAUSE; CONTAINING A SAVINGS AND SEVERABILITY CLAUSE; PROVIDING FOR A MAXIMUM PENALTY OR FINE OF TWO THOUSAND DOLLARS ($2,000.00); ORDERING RECORDATION BY THE CITY SECRETARY IN THE DEED RECORDS OF MIDLAND COUNTY, TEXAS; AND ORDERING PUBLICATION

WHEREAS, the City Council modified the authority of the Board of Adjustment in Title XI, Chapter 1, Section 7 ("Section 11-1-7") of the Midland City Code; and

WHEREAS, Section 11-1-7 provides for the consideration of requests for special exceptions to the Midland Zoning Ordinance; and

WHEREAS, the Council finds that satisfactory evidence has been presented that the use to be authorized by the granting of the special exception will not be detrimental to the health, safety, comfort and welfare of the occupants of the land area near the tract on which the use to be allowed by special exception will be located; and

WHEREAS, the Council finds that it is clearly and specifically authorized by the terms of Section 11-1-7 to grant such a special exception, and said exception will be in harmony with the general purposes and intent of the zoning provisions of the Midland City Code; and

WHEREAS, after a full and fair public hearing at which all parties in interest were offered an opportunity to be heard, all pursuant to law, the Council finds it to be in the public interest to grant a special exception to the Zoning Code, pursuant to Section 11-1-7, for the purposes herein stated, subject to special conditions;

NOW, THEREFORE, BE IT ORDAINED BY THE CITY COUNCIL OF THE CITY OF MIDLAND, TEXAS:

SECTION ONE. That a special exception is hereby granted for the property described as Lot 1, Block 43, Permian Estates, City and County of Midland, Texas. Said special exception shall allow a reduced minimum front yard setback and a reduced minimum side yard setback on the north side of the lot.

SECTION TWO. Said special exception is subject to the following special conditions:

A. That the minimum front yard setback shall be five feet (5').

B. That the minimum side yard setback on the north side of the lot shall be one and two-tenths of a foot (1.2').

C. That the property shall significantly conform to Exhibit "A", which is attached hereto and incorporated herein for all purposes.

SECTION THREE. The provisions of this ordinance are to be cumulative of all other ordinances or parts of ordinances governing or regulating the same subject matter as that covered herein; provided, however, that all prior ordinances or parts of ordinances inconsistent with or in conflict with any of the provisions of this ordinance are hereby expressly repealed to the extent of any such inconsistency or conflict.

SECTION FOUR. If any section, subsection, sentence, clause or phrase of this ordinance is, for any reason, held to be unconstitutional or invalid, such holding shall not affect the validity of the remaining portions of this ordinance. The Council of the City of Midland hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase hereof irrespective of the fact that any one or more sections, subsections, sentences, clauses, or phrases be declared unconstitutional or invalid.

SECTION FIVE. The penalty for violation of this ordinance shall be in accordance with the general penalty provisions contained in Section 1-3-1 of the City Code of Midland, Texas, which provides for a fine not exceeding two thousand dollars ($2,000.00).

SECTION SIX. The City Secretary is hereby authorized and directed to file this ordinance with the Office of the County Clerk for purposes of recordation.

SECTION SEVEN. The City Secretary is hereby authorized and directed to publish the descriptive caption of this ordinance in the manner and for the length of time prescribed by the law as an alternative method of publication.

The above and foregoing ordinance was duly proposed, read in full and adopted on first reading, the _____ day of _____, A.D., 2022; and passed to second reading on motion of Council member _____, seconded by Council member _____, by the following vote:

Council members voting "AYE":

Council members voting "NAY":

The above and foregoing ordinance was read in full and finally adopted by the following vote upon motion of Council member _____, seconded by Council member _____, on the _____ day of _____, A.D., 2022, at a regular meeting of the City Council:

Council members voting "AYE":

Council members voting "NAY":

PASSED AND APPROVED THIS _____ day of _____, A.D., 2022.

_____
Patrick N. Payton, Mayor

ATTEST:

_____
Amy M. Turner, City Secretary

APPROVED AS TO CONTENT
AND COMPLETENESS:

_____
Charles Harrington, Director of Development Services

APPROVED ONLY AS TO FORM:

_____
John Ohnemiller, City Attorney

EXHIBIT "A"

Site Plan

MIDLAND
Planning Division

Special Exception Application

Project Number: E-22-00167

Case Number: _____

Applicant *(if acting as Agent, see affidavit on page 2)* Printed Name: Elias Padilla / Elisa Padilla		Phone (432) 556-5918 Email	
Address 616 Ruby Dr.	City Midland	State TX	Zip 79703

Property Owner Printed Name: Elias / Elisa Padilla		Phone (432) 556-5918 Email	
Address 616 Ruby Dr.	City Midland	State TX	Zip 79703

Representative *(if different from Applicant or Property Owner)* Firm: _____ Printed Name:		Phone ( ) Email	
Address	City	State	Zip

Street Address: 616 Ruby Dr

Legal Description
Lot: 616 Block: Ruby Dr. Subdivision:

Current Zoning:

This property qualifies as an exception to the City Code because:

- ☐ It is an expansion of a nonconforming use.
- ☑ There are existing nonconforming structures in the area.
- ☑ The addition of architectural or other projections of a minor extent.

Reason for Request: I would like to have my car under a carport when there is bad weather (The carport is existing)

Submittal and Fees
Items to be submitted with this application form:

- Application Fee – Payable to the 'City of Midland'
- Dimensioned Site Plan showing:
  - Parking
  - Building Footprint
- Digital Copies of Site Plan (PDF/JPEG)

RECEIVED
JAN 06 2022

Signatures	
Applicant (signature): Elias Padilla / Elisa Padilla	Date: 12.21.21
Applicant (printed): Elias Padilla / Elisa Padilla	
Property Owner (signature): Elias Padilla / Elisa Padilla	Date: 12.21.21
Property Owner (printed): Elias Padilla / Elisa Padilla	

The Special Exception shall be considered officially received in the Planning office only when it has been submitted in full compliance with the provisions of Section 212 of the Texas Local Government Code and the Zoning Code of Ordinances of the City of Midland and when such required items for the application are also received.

All materials, including exhibits, submitted in support of an application, or displayed during a public hearing, shall remain the property of the City of Midland.

If an agent is authorized by the property owner to file and execute the application on behalf of the property owner, the agent must complete the affidavit below.

STATE OF TEXAS
COUNTY OF MIDLAND

Before me, the undersigned authority, on this day personally appeared _____ who, being by me duly sworn, upon oath says: That (s)he is authorized by _____, the owner of the above described property, to fully represent him/her in this application and that (s)he had the legal right, power and authority to sign said owner's name hereto as his/her attorney in fact.

_____
Authorized Agent (*signature*)

Subscribed and sworn to before me, this _____ day of _____, 20 ___, to certify which witness my hand and seal of office.

_____
NOTARY PUBLIC, MIDLAND COUNTY, TEXAS

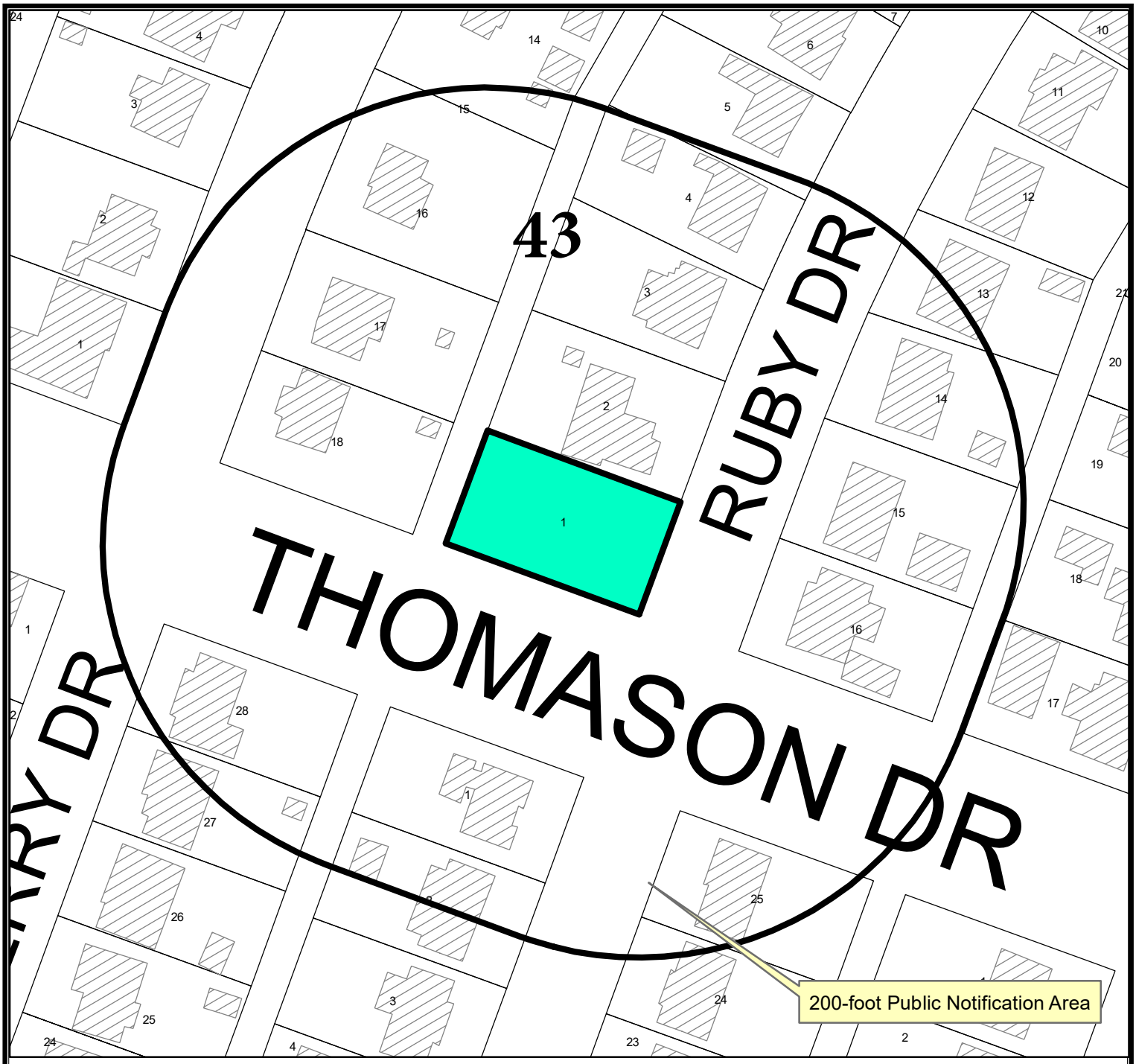
FOR OFFICE USE ONLY

☑ Property Owner Authorization	☑ Dimensioned Site Plan
☑ Application Fee	☐ Plans in Digital Format (PDF/JPEG) none
Check # 1605	JAN 06 2022
Received By: ES	Date:

****Application will not be considered for scheduling until reviewed by a planner.****

Site Plan

Aerial View



LOCATION MAP

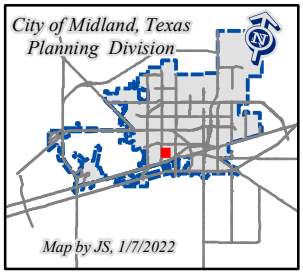
E-22-0067 **Scale: 1" = 1000'**

Request by Elias and Elisa Padilla for a Special Exception from the City of Midland Zoning Ordiance, Section 5.04 - Residential Zoning District Dimensional Regulations Chart, concering the minimum side and front yard setback for a corner lot on Lot 1, Block 43, Permian Estates, City and County of Midland, Texas.

Generally located on the northwest corner of the intersection of Thomason Drive and Ruby Drive. (Council District 4)

L E G E N D

- CITY LIMITS
- PARCEL
- PRIVATE BLDGS



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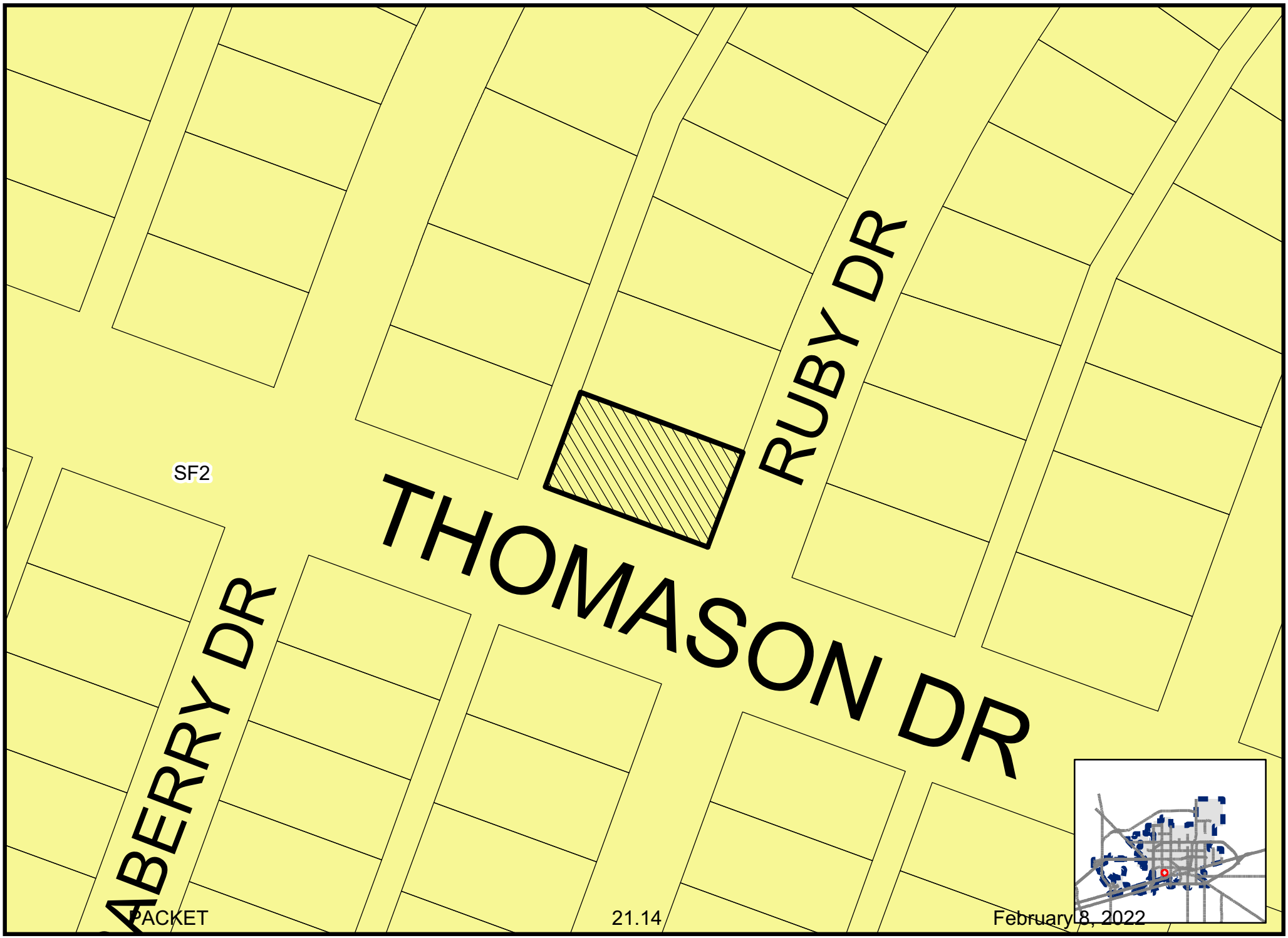

PACKET 21.14 February 8, 2022

Map By JS, 1/7/2022

E-22-0067

Scale: 1" = 1000'

ZONING MAP

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MIDLAND

Thomason
STOP

FRIENDS