Waller County, Texas
Invitation for Bid

Construction of Justice Center Vehicle Maintenance Garage
BID 25-002

SUBMIT BIDS TO:

Waller County
County Clerk's Office
Joe Kuciemba Annex
425 FM 1488, Suite 112
Hempstead, TX 77445

SUBMIT NO LATER THAN:

Thursday, August 7, 2025
1:00 PM (CST)

ENVELOPE TO BE LABELED:

Bid 25-002
Vehicle Maintenance Garage

ALL BIDS MUST BE RECEIVED AND TIME/DATE STAMPED BY THE COUNTY CLERK'S OFICE OF WALLER COUNTY ON OR BEFORE THE SPECIFIED TIME/DATE STATED ABOVE.
BIDS RECEIVED AS REQUIRED WILL BE OPENED AND PUBLICLY READ AFTER DUE DATE.
BIDS RECEIVED AFTER THE SPECIFIED TIME WILL BE RETURNED UNOPENED.

Results will not be given by phone. Results will be provided to bidder in writing after Commissioners Court award. Requests for information must be in writing and directed to Jaime Kovar, Procurement Director, j.kovar@wallercounty.us

Vendor Responsibilities:

- Download and complete any addendums posted on the Waller County website.
- Submit response in accordance with requirements stated in the document.
- DO NOT submit responses via email, as they will not be accepted.

Invitation for Bids

SECTION 1. GENERAL REQUIREMENTS

1.1 Entire Document: Read this entire document carefully. Follow all instructions. You are responsible for fulfilling all requirements and specifications. Be sure you understand them.

1.2 Applicability: General Requirements apply to all advertised Invitations for Bid; however, these may be superseded, in whole or in part, by the scope, special requirements, specifications, special specifications or other data contained herein.

1.3 Governing Law: Bidder is advised that these requirements shall be fully governed by the laws of the State of Texas and that Waller County may request and rely on advice, decisions and opinions of the Attorney General of Texas and the Waller County District Attorney concerning any portion of these requirements.

1.4 Bid Form Completion: Complete one (1) bid form, sign, and return with completed submittal to County Clerk's Office of Waller County. An authorized representative of the Bidder must sign the Contract Sheet. The contract will be binding only when approved by the Waller County Commissioners Court, signed by the County Judge of Waller County and a purchase order authorizing the item(s) desired has been issued. The use of corrective fluid is not acceptable and may result in the disqualification of bid. If an error is made, the bidder must draw a line through the error and initial each change.

1.5 Bid Returns: Bidders must return a completed Bid Package in a sealed envelope to the County Clerk's Office of Waller County, 425 FM 1488, Hempstead, TX 77445, no later than 1:00 P.M. (CST) on the date specified. The Bid Package is the set of documents outlining the requirements and details of the Project that is provided by the County to potential Bidders, and the complete, properly signed Bid. Late bids will not be accepted.

1.6 Addenda: No interpretation of the meaning of the drawings, specifications or other bid documents will be made to any bidder orally. All requests for such interpretations must be made in writing addressed to Jaime Kovar, Procurement Director by email at: J.Kovar@wallercounty.us. Any and all interpretations and any supplemental instructions will be in the form of written addenda to the contract documents which will be posted on Waller County's website. Addenda will ONLY be issued by the Waller County Procurement Director. It is the sole responsibility of each bidder to insure receipt of any and all addenda. All addenda issued will become part of the Contract Documents. Bidders must sign and include any and all issued addenda in the returned bid package. **The deadline for submission of questions and/or clarification is no later than July 31, 2025 at 10:00 AM (CST).** Requests received after the deadline will not be responded to due to the time constraints of this bid process.

1.7 References: All Bidders must submit, WITH BID, at least three (3) references from clients for whom a project similar to that specified herein has been successfully accomplished. References must include clients' name, contact person, and telephone number.

1.8 Bid Bond: All Bidders must submit, WITH BID, a cashier's check or certified check for at least five percent (5%) of the total bid price, payable to the order of Waller County, or a Bid Bond in the same amount issued by a surety, acceptable to Waller County, authorized to do business in the State of Texas, as a guarantee that the Bidder will do the work

described herein at the rates stated herein. The cashier's check or certified check submitted by an unsuccessful Bidder will be returned only after a written request to do so has been received by the Procurement Director.

1.9 Material Safety Data Sheets: Under the "Hazardous Communication Act", commonly known as the "Texas Right to Know Act", a Bidder must provide to Waller County and using departments, with each delivery, material safety data sheets, which are, applicable to hazardous substances defined in the Act. Bidders are obligated to maintain a current, updated file in Waller County. Failure of the Bidder to maintain such a file will be cause to reject any bid applying thereto.

1.10 Pricing: Prices for all goods and/or services shall be firm for the duration of the Contract and shall be stated on the bid sheet. The Bid submitted to the County shall be inclusive of all costs necessary to complete the Project. No price changes, additions, or subsequent qualifications will be honored during the course of the Contract, unless made in accordance with the Contract's General Terms and Conditions. All prices must be written in ink or typewritten.

1.11 Term Contracts: If the Contract is intended to cover a specific time period, said time will be given in the specifications under Scope.

1.12 Recycled Materials: Pursuant to Texas Health and Safety Code § 361.426, Waller County encourages the use of products made of recycled materials and shall give preference in purchasing to products made of recycled materials if the products meet applicable specifications as to quantity and quality. Waller County will be the sole judge in determining product preference application.

1.13 Evaluation: Evaluation shall be used as a determinant as to which bid items or services are the most efficient and/or most economical for Waller County. It shall be based on all factors which have a bearing on price and performance of the items in the user environment. All Bids are subject to tabulation by the Procurement Director and recommendation to Waller County Commissioners Court. Compliance with all bid requirements, delivery, and needs of the using department are considerations in evaluating bids. Pricing is NOT the only criteria in determining the lowest responsible bidder, or for making a recommendation. The Waller County Procurement Director reserves the right to contact any Bidder, at any time, to clarify, verify, or request information with regard to any Bid.

1.14 Disqualification of Bidder: Upon signing the Contract Sheet, a Bidder offering to provide supplies, materials, services, or equipment to Waller County certifies that the Bidder has not violated the antitrust laws of this state codified in section 15.01, et seq., Business & Commerce Code, or the federal antitrust laws, and has not communicated directly or indirectly the bid made to any competitor or any other person engaged in such line of business. Any and all Bids may be rejected if Waller County believes that collusion exists among the Bidders. Bids in which the prices appear to be unbalanced may be rejected. If multiple Bids are submitted by a Bidder and after the Bids are opened, one of the Bids is withdrawn, the result will be that all of the Bids submitted by that Bidder will be withdrawn; however, nothing herein prohibits a vendor from submitting multiple Bids for different products or services.

1.15 Awards: Waller County reserves the right to award the Contract to the lowest responsible

bidder in accordance with the laws of the State of Texas, to waive any formality or irregularity, to make awards to more than one Bidder, and to reject any or all Bids.

1.16 Contract Obligation: A Bid does not become binding upon the Bidder until it is accepted by official action of the Waller County Commissioners Court, and a Contract does not become binding on the County of the Bidders until it is approved by official action of the Waller County Commissioners Court and executed by the County Judge or another person authorized by the Waller County Commissioners Court. Department heads are not authorized to sign agreements for Waller County. Binding agreements shall remain in effect until all products and/or services covered by this purchase have been satisfactorily delivered and accepted.

SECTION 2. PRE-BID CONFERENCE

2.1 Pre-Bid Conference: A pre-bid conference will not be conducted for this Project.

SECTION 3. SCOPE

3.1 Scope: It is the intent of Waller County to contract with one (1) vendor for all materials, supplies, equipment, tools, services, labor, and supervision necessary to complete the Project, as specified herein.

Vendor is to construct an estimated 5,000 square foot, 50'x100' pre-engineered metal building, located at the existing Waller County Justice Complex, 100 Sheriff R. Glenn Smith Drive, Hempstead, TX 77445. The facility is to include four (4) bays that are two (2) cars deep with three (3) vehicle lifts, office space, restrooms, parts storage to include second floor decked storage, and tire storage area. Also included are seven (7) motorized garage doors, four (4) ceiling fans, and two (2) exhaust fans. All utility connections are part of the existing Justice Complex utility system for water, gas, septic, data, and electricity, with connections or conduit near the new building. Concrete paving for the associated entry driveways on south side and three (3) car parking on east side. In addition, new fencing and gate inside secure storage is required. Project is in permitting with the City of Hempstead. There is an existing detention pond for the entire Justice Center complex.

SECTION 4. ESTIMATED PROJECT COMPLETION DATE

4.1 Estimated Completion Date: Six (6) months beginning on the issuance date of the Notice to Proceed.

SECTION 5. ENCLOSURE

5.1 Enclosure #1: Specifications and Drawings

5.2 Enclosure #2: Pricing Form

SECTION 6. PRICING

6.1 Complete and provide Enclosure #2: Pricing Form

SECTION 7. PERFORMANCE AND PAYMENT BONDS

7.1 Bonds Required: The Bidder must provide to the County a payment bond and performance bond, each in the amount of 100% of the total Contract Price. Bonds must be submitted to the Procurement Director within ten (10) calendar days after receipt of notification of bid

award. Such bonds shall be executed by a solvent surety company duly authorized to do business and licensed in the State of Texas to issue surety bonds with a Best Rating of A/VII or better. Waller County reserves the right to accept or reject any surety company proposed by the Contractor. In the event Waller County rejects the proposed surety company, the Contractor will be afforded five (5) additional days to submit the required bonds issued by a surety company acceptable to Waller County.

An attorney-in-fact or agent who signs a bid bond, performance bond, or payment bond must file with each bond a certified and effectively dated copy of his or her power of attorney or authority to act.

SECTION 8. REQUIRED FORMS

8.1 Required Forms: All Bidders are required to complete and return with their Bids the following forms:

a. Pricing Form

b. Bidder's Business Information Sheet

c. Contract Special Terms & Conditions

d. Contract Sheet

e. W-9 Form

f. Texas Ethics Commission Form 1295:

i. Effective January 1, 2016 all contracts executed by Commissioners Court, regardless of the dollar amount, will require completion of Form 1295 "Certificate of Interested Parties", as required by Texas Government Code §2252.908. All vendors submitting a response to a formal Bid, RFP, SOQ or any contracts, contract amendments, renewals or change orders are required to complete the Form 1295 online through the State of Texas Ethics Commission website. Please visit: https://www.ethics.state.tx.us/filinginfo/1295/.

ii. On-line instructions:

a. Name of governmental entity is to read: Waller County, Texas.

b. Identification number used by the governmental entity is: B25-002.

c. Description is the title of the solicitation: Construction of Justice Center Vehicle Maintenance Garage

SECTION 9. AWARD

9.1 Award: The contract will be awarded to the overall lowest responsible bidder.

Bidder's Business Information Sheet

By submitting a Bid, Bidder is seeking to enter into a legal contract with the County. As such, a Bidder must be an individual or a legal business entity capable of entering into a binding contract. Bidders must completely and accurately provide the information requested below or your Bid may be deemed non-responsive.

Name of Company:

_____

Type of Business (please check one):

☐ Individual/Sole Proprietor

☐ Corporation

☐ Limited Liability Company

☐ Partnership

☐ Other

If other, please specify _____

State of Incorporation (if applicable): _____

Federal Employer Identification Number: _____

Principal Place of Business Address: _____

_____.

Name and Address for Notices to be Sent Under Contract General Terms and Conditions Section 18.19:

_____

_____.

List any other names the Company uses, or is known by (dba, aka, etc.):

_____

_____.

_____ _____

Company Name Date

_____ _____

Signature of Authorized Company Official Printed Name

Contract General Terms and Conditions

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SECTION 1. DEFINTIONS

1.1 Addendum: Written instruments issued by Waller County which clarify, correct, or change the bidding requirements or the Contract Documents prior to the Due Date.

1.2 Authorized Representative: The Waller County Engineer.

1.3 Bid: A complete, properly signed response to an Invitation for Bid that, if accepted, would bind the Bidder to perform the resultant contract.

1.4 Bidder: A person, firm, or entity that submits a Bid in response to an Invitation for Bid.

1.5 Bid Documents: The advertisement or Invitation for Bids, Bid form, the Price Sheet, the Contract Sheet, Specifications and Plans, Geotechnical Data, the Special Terms and Conditions Form, the Contract General Terms and Conditions, Bidder's Business Information Sheet, Form, and Addenda.

1.6 Calendar Day: Any day of the week, no days being excepted.

1.7 Construction Site: The area designated by the County where construction work on the Project is carried out.

1.8 Contract: The binding legal agreement between the County and the Contractor. The Contract represents the entire and integrated agreement between the County and the Contractor for performance of the Work, as evidenced by the Contract Documents.

1.9 Contract Price: the moneys payable by the County to the Contractor for completion of the Work in accordance with the Contract Documents.

1.10 Contract Sheet: the form provided in the Bid Documents.

1.11 Contract Time: The number of days allowed for completion of the Work as defined by the Contract Sheet. When any period is referred to in days, it will be computed to exclude the first and last day of such period. A day of twenty-four hours measured from midnight to the next midnight will constitute a day.

1.12 Contractor: The individual, firm, corporation, or other business entity with whom the County has entered into the Contract for the performance of the Work.

1.13 County: Waller County, Texas, a political subdivision of the State of Texas.

1.14 Design Engineer: Firm: Blueline
Address: 333 Cypress Run, Houston, TX 77094

1.15 Design Engineer Representative: The authorized representative of the Design Engineer who may be assigned to the site or any part thereof.

1.16 Drawings: Those portions of the Contract Documents which are graphic representations of the scope, extent and character of the Work to be furnished and performed by Contractor, and which have been approved by the County. Drawings may include plans, elevations, sections, details, schedules, and diagrams. Shop Drawings are not included in the definitions of Drawings.

1.17 Due Date: The date and time specified for receipt of Bids.

1.18 Final Completion: The point in time when the County determines that all Work has been completed and final payment to Contractor will be made in accordance with the Contract Documents.

1.19 Invitation for Bid ("IFB"): A solicitation requesting pricing for a specified good or service which has been advertised for Bid in a newspaper.

1.20 Minor Change: A written change in the Work that is ordered by the Authorized Representative, that does not change the Contract Price or Contract Time, and is consistent with the scope of the Contract.

1.21 Notice to Proceed: A written notice given by the Authorized Representative of the County to Contractor identifying the date on which the Work will commence, and on which Contractor shall start to perform Contractor's obligations under the Contract Documents.

1.22 Project: Specified in the Contract Documents.

1.23 Schedule of Values: an itemized list of each activity and all materials and labor required to complete the Project, and the corresponding values of each. When summed up, the Schedule of Values shall equal the total Contract Price.

1.24 Shop Drawings: All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor as required by the Contract Documents.

1.25 Specifications and Plans: Those portions of the Contract Documents consisting of written technical descriptions as applied to the Work, which set forth to Contractor, in detail, the

requirements which must be met by all materials, equipment, construction systems, standards, workmanship, equipment, and services in order to render a completed and useful project.

1.26 Subcontractor: An individual, firm, corporation, or other business entity having a direct contract with Contractor for the performance of a portion of the Work under the Contract.

1.27 Substantial Completion: The stage in the progress of the Work when the Work, or designated portion thereof, is sufficiently complete in accordance with the Contract Documents so that the County can occupy or utilize the Work for its intended use, as evidenced by a Certificate of Substantial Completion approved by the County.

1.28 Superintendent: The representative of Contractor authorized in writing to receive and fulfill instructions from the Authorized Representative, and who shall supervise and direct construction of the Work.

1.29 Supplier: An individual or entity that furnishes materials or equipment to be incorporated in the Work by the Contractor or any Subcontractor.

1.30 Transfer Date: the date on which the care, custody, and control of the Project passes to Waller County.

1.31 Work: The entire completed construction, or the various separately identifiable parts thereof, required to be furnished under the Contract Documents. It includes the procurement, delivery, and proper construction and/or installation of all materials, facilities, and associated appurtenances necessary to fulfill the winning Bidder's obligations under the Contract, including the coordination and administration of all services necessary for the Contractor, its agents, and/or subcontractors to fulfill Contractor's obligations under the Contract.

SECTION 2. CONTRACT DOCUMENTS

2.1 The Contract Documents: The Contract Documents are composed of the following:

a. Contract Sheet
b. Invitation for Bid
c. Price Sheet
d. Specifications and Plans
e. Contract Special Terms and Conditions, if any
f. Contract General Terms and Conditions
g. Bidder's Business Information Sheet
h. Forms

2.2 Intent: The purpose of the Contract Documents is to include all information necessary for the proper execution and timely completion of the Work by Contractor. The Contractor will execute the Work described in and reasonably inferable from the Contract Documents as necessary to produce the results indicated by the Contract Documents. The Contract Documents are complimentary, and what is required by one shall be as binding as if required by all.

2.3 Exclusion of Professional Services: Contractor shall neither perform nor provide professional services as defined by Texas Government Code Chapter 2254 under this Contract.

2.4 Order of Precedence: In the event of a conflict between any of the Contract Documents, they shall be given precedence in the order provided in Section 2.1.

2.5 Interpretation: In the event of any dispute concerning the terms of the Contract Documents, the County's interpretation shall govern.

SECTION 3. PROJECT DURATION

3.1 Project Timeline: Bidder agrees to complete all work required by the Contract Documents as indicated on the Contract Sheet after issuance of a purchase order by the County, and issuance of a Notice to Proceed by the Authorized Representative. The Contract Time will begin to run on the date the Notice to Proceed is issued.

3.2 Liquidated Damages: The Contractor or its surety shall be liable for liquidated damages for the failure of the Contractor to timely complete the Work or any portion thereof within the Contract Time. The Contractor shall pay the County one thousand five hundred dollars ($1,500) per day for each calendar day beyond the scheduled completion date specified herein, unless the contract time has been adjusted by a Change Order. If the Contractor pays liquidated damages to the County, the County will place the Contractor on one (1) year probation. The County will issue written notice to the Contractor of the probation, and the one (1) year probation period will begin to run on the date of issuance of the written notice. If the Contractor becomes responsible for liquidated damages on any other project during the probation period, the Contractor will be disqualified from any County work for a period of two (2) years, beginning on the issuance date of the written notice of the one (1) year probation period.

SECTION 4. CONTRACTOR'S RESPONSIBILITY FOR WORK

4.1 Preconstruction Work: Contractor shall perform the following preconstruction work upon written request from the County:

a. Cause Contractor's personnel to meet with the County and the Design Engineer to discuss the status of the Project;

b. Review drawings and specifications with the Design Engineer to determine the Project's compliance of the proposed facility with applicable codes; and

c. Submit to the Facilities Department a Schedule of Values for all of the Work, subdivided into component parts in sufficient detail to serve as the basis for progress payments during construction. At a minimum, the Schedule of Values must be broken out by trade and split between materials and labor. Prices will be deemed to include an appropriate amount of overhead and profit applicable to each item of Work. The Schedule of Values must be prepared in such form and supported by such data to substantiate its accuracy as the Facilities Department may require.

4.2 Construction Work: Contractor shall perform the following construction work:

a. All preparatory work at the Construction Site identified herein, including but not limited to: soil and concrete testing, demolition of improvements existing at the construction site, and any other actions necessary for construction to begin in compliance with all laws and regulations pertaining to the Project, including those related to archaeological and environmental requirements.

b. Construct and install the Project on the construction site in accordance with the Contract Documents.

c. Furnish all materials, supplies, equipment, tools, labor, supervision, utilities, transportation, and other materials and services necessary to complete the Project.

4.3 Reporting and Resolving Discrepancies: If, during the performance of the Work, the Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provisions of any such law or regulation applicable to the performance of the Work or of any such standard, specification, manual or code, or instructions of any Supplier, Contractor shall not proceed with the Work affected thereby until an amendment or supplement to the Contract Documents has been issued. The Contractor shall be liable to the County for failure to report any such conflict, error, ambiguity, or discrepancy of which Contractor knew or reasonable should have known.

4.4 Reporting Design Defects: The Contractor shall provide written disclosure to the County if the Contractor learns of a defect, inaccuracy, inadequacy, or insufficiency in the Contract Documents, plans, specifications, or other design documents that the Contractor discovers, or reasonably should have discovered by the use of ordinary diligence. The Contractor shall provide written disclosure within a reasonable time of learning of the defect, but not later than two (2) days after the discovery. Contractor shall not proceed with the Work affected thereby until instructed in writing by the Authorized Representative. If the Contractor fails to disclose a defect under this section of which the Contractor knew or reasonably should have known, the Contractor shall be liable to the County for the consequences of the defect(s) that result from the failure to disclose.

4.5 Minor Changes in the Work: Waller County acknowledges that in order to accomplish the efficient completion of the Project within the Contract Time, the Contractor may submit requests for Minor Changes in writing to the Authorized Representative in stages for approval or consent. Upon any request for a Minor Change submitted by the Contractor for review and approval, the Authorized Representative shall review the same, and shall diligently and promptly give the Contractor written notice of the Authorized Representative's approval or disapproval. The written approval or disapproval will be provided to the Contractor no later than fourteen (14) calendar days after receipt of the written request for Minor Change . If disapproved, the Authorized Representative's written decision shall set forth in detail all reasons for the disapproval. The Authorized Representative's right to disapprove any Minor Change shall be limited to the elements that: (a) do not conform substantially to matters previously approved, (b) have not been previously presented and approved, and that the Contractor fails to demonstrate is reasonably necessary for completion of the Project, or (c) are violations of this Contract or applicable laws and regulations.

4.6 Change Orders: A Change Order is required for all changes in the Project that require (a) an adjustment in the Contract Price, (b) an adjustment in the Contract Time, or (c) a material change in the overall scope or function of the Project. Change Orders may only be approved by the Waller County Commissioners Court. A Change Order must be approved before Contractor commences such change. Such procedure shall be the exclusive means to effect such changes in the Project.

a. If at any time Waller County desires to make any change in the Project requiring the issuance of a Change Order, Waller County will provide the Contractor with a written notice describing the change. Within a reasonable period of time after receiving such notice, the Contractor shall provide Waller County with a Change Order that describes the proposed change, and proposes changes, if any, to the Contract Price, the Schedule of Values, and the final completion date. Once the Contractor has provided a Change Order, the County will provide a written approval or disapproval of the Change Order not later than the 28th calendar day after receipt of the proposed Change Order. Upon approval of the Change Order, the Contractor shall perform the work in accordance with such Change Order. All work performed pursuant to a Change Order shall be performed in accordance with the terms of this Contract.

b. No action, acquiescence, or inaction by Waller County or any representative of Waller County shall be construed to be a waiver of requirements set forth in this Contract in regard to Change Orders, or as a ratification of a violation of such requirements. All acts in violation of this provision shall be considered void.

c. A Change Order is only effective if it is approved by the Waller County Commissioners Court, and signed by an authorized representative of both the County and the Contractor.

d. The Contract Price and the Schedule of Values shall be adjusted only as a result of a Change Order requiring such adjustment. Any extra work performed without a proper Change Order shall be considered voluntary and not subject to additional compensation.

4.7 Review and Approval of Changes: If the County disapproves of a Minor Change or Change Order, the Contractor shall have the right to alter such Minor Change or proposed Change Order to the satisfaction of the County, and resubmit the matter for evaluation. Any resubmission shall be subject to review and approval by the County.

a. The County and the Contractor shall attempt in good faith to resolve any disputes concerning a Minor Change or Change Order expeditiously, so as not to delay the completion of the Project in accordance with this Contract.

b. Waller County recognizes the importance of expeditious action upon all matters submitted to the County for review and approval, and of expeditious response to those aspects of the Project which require approval of governmental authorities having jurisdiction thereover. Waller County shall exercise its rights of review and approval hereunder with due diligence, reasonableness, and good faith. The County shall use its reasonable efforts to expedite any required review of the Project or other matters by any governmental authority.

4.8 Site Access: Prior to the Transfer Date, the County and the Contractor shall have uninterrupted access to the construction site. Subsequent to the Transfer Date, Waller County will permit the Contractor, the Design Engineer, and their representatives and subcontractors to enter upon the Project at times reasonably necessary to complete the punch list items.

4.9 Applicable Laws and Regulations: Contractor shall perform its obligations pursuant to this Contract in accordance with all applicable federal, state, and local statutes, ordinances laws, regulations, and executive, administrative and judicial orders. The Contractor may be entitled to an extension of time if changes in said applicable laws and regulations cause any delay in the performance of the Contractor's obligations under this Contract.

4.10 Environmental Regulations: Contractor shall plan and execute its operations in compliance with all applicable Federal, state, and local laws and regulations concerning control and abatement of water pollution and prevention and control of air pollution.

4.11 Material Safety Data Sheets: Contractor shall be responsible for providing and coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the site in accordance with laws and regulations.

4.12 Permits: Contractor shall obtain, possess, and pay for all permits, licenses, and fees required to complete the Project. The permits shall be in the name of Waller County.

4.13 Familiarity with Project: The Contractor represents and agrees that it is thoroughly familiar with all phases of the Project, all matters and conditions that may affect the construction and successful completion of the Project, and had the opportunity to conduct any and all additional inquiry, tests, and investigations that it deemed necessary and proper. Contractor further certifies that it has: (a) visited and examined the construction site, the obstacles thereon, if any, and observed all conditions that may affect the Project (b) determined the nature and location of the Project, (c) understands the general and local conditions which affect the Project, and (d) investigated the labor and materials market as they are relevant to the Project. Contractor represents and agrees that it is able to successfully complete the Project for the Contract Price.

4.14 Contractor: Contractor specifically represents that is has carefully examined the plans, the geotechnical report, if any, and the site of the proposed Work and is thoroughly familiar with all of the conditions surrounding construction of the Project, having had the opportunity to conduct any and all additional inquiry, tests, and investigation that he or she deems necessary and proper. The Contractor acknowledges the receipt of the geotechnical report, if any, and agrees that the report, while it is an accurate record of the geotechnical conditions at the boring locations, is not a guarantee of specific site conditions which may vary between boring locations.

4.15 Duty to Notify of Unforeseen Conditions: The Contractor must notify the County in writing as soon as reasonably possible, but no later than three (3) calendar days, if unforeseen conditions are encountered at the site which are i) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents, or ii) unknown physical conditions of an unusual nature, that differ materially from those normally encountered in the type of work being performed under this Contract. Contractor may not disturb the conditions until the County conducts an investigation. The Authorized Representative and the Design Engineer will promptly investigate such conditions. If it is determined that such conditions differ materially and cause an increase or decrease in the Contractor's cost of or time required for performance of any part of the Work, the Authorized Representative will recommend an equitable adjustment in the Contract Price, Contract Time, or both. If it determined that such conditions are not materially different from those indicated in the Contract Documents, the Authorized Representative will notify the Contractor in writing of such findings, and the Contract will not be adjusted.

4.16 Contractor's General Warranty: The Contractor warrants and guarantees to the County that all work performed on the Project will conform to the Contract Documents, be performed in a good and workmanlike manner in accordance with the Contract Documents, and will not be defective. The Contractor shall promptly correct defective work and damage that results from the Contractor's failure to exercise reasonable care in performing the Work, or from the Contractor's failure to perform the Work in a good and workmanlike manner. The Contractor shall use qualified, careful, and efficient contractors, subcontractors, employees, and workers in conformity with the provisions of this Contract. This Section 4.16 shall survive the termination or expiration of the Contract.

4.17 Contractor's Guarantee: The Contractor warrants and guarantees to the County that: (a) the Contractor possesses the skill and knowledge ordinarily possessed by well-informed members of its trade or profession, (b) the Contractor will use its best efforts to ensure that the services provided under this Contract are performed, delivered, and conducted in accordance with the best professional standards and in accordance with industry standards, and (c) the Contractor is fully experienced and properly qualified, equipped, organized and financed to successfully complete the Project. The services and materials provided by the Contractor to Waller County will conform to the representations contained in this Contract, including all attachments, schedules, and exhibits.

4.18 No Limitation on Implied Warranties: The Contractor shall not limit or exclude any implied warranties, and shall extend such warranties for the goods or services provided under this Contract.

4.19 Work Performed Contrary to Law or Regulations: If Contractor performs any Work knowing or having reason to know that it is contrary to laws or regulations, the Contractor shall bear all claims, costs, losses, and damages arising therefrom.

4.20 Warranties and Guarantees Cumulative: The Contractor's warranties and guarantees shall be cumulative, deemed consistent and not in conflict, are intended to be given full force and effect, and are to be interpreted expansively to give the County the broadest warranty protection. The Contractor's obligation to perform and complete the Work in a good and workmanlike manner in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:

a. Observations by County or the Design Engineer, or any of their officials, officers, representatives, employees, or agents;

b. Recommendation of any payment by County, or any of its officials, officers, representatives, employees, or agents;

c. The issuance of a certificate of Substantial Completion or any payment by the County to the Contractor under the Contract Documents;

d. Use or occupancy of the Project or any part thereof by the County or the public;

e. Any acceptance by the County, or failure to do so;

f. Any review of a Shop Drawing or sample submittal;

g. Any inspection, test, or approval by other; or

h. Any correction by the County of defective work.

4.21 Contractor's Personnel. Contractor shall maintain a work force adequate to accomplish the Work within the Contract Time. Contractor shall employ only competent, orderly, personnel for the Project that are skilled in the performance of the type of Work required under this Contract.

4.22 Contractor's Supervision: Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. The Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall be responsible to see that the completed Work complies accurately with the Contract Documents.

4.23 Contractor's Superintendent: Beginning on the execution of the Contract, and continuing until Final Completion, the Contractor shall identify and maintain a competent and qualified superintendent who shall be authorized to act on behalf of the Contractor and with whom Waller County may consult at all reasonable times. The superintendent must be an employee of the Contractor, unless such requirement is waived in writing by the Authorized Representative. The superintendent shall not be transferred from the Project without the County's consent, which shall not be unreasonably withheld or delayed. Notwithstanding the foregoing, the superintendent is not required to be assigned solely to the Project, and shall be entitled to spend reasonable time working on matters unrelated to the Project, so long as such work on other matters does not render the superintendent unavailable to the Project or to Waller County. If the superintendent is transferred from the Project, Waller County shall have the right to approve the replacement superintendent. The County's approval shall not be unreasonably withheld or delayed. The Contractor shall

replace the superintendent upon the County's request in the event that the superintendent is unable to perform to the County's satisfaction.

4.24 Effect of Obligation: The obligation to maintain the superintendent and work force shall not be construed to: (a) preclude the promotion of any of Contractor's employees assigned to the Project, or (b) give rise to any liability of the Contractor in the event an employee assigned to the Project leaves the Contractor's employment, or (c) imply that the County has an employer/employee relationship with Contractor, or any of its employees .

4.25 Wages: Contractor shall pay workers on the Project in accordance with Section 15, and not less than the wage rates, including fringe benefits, as published by the Department of Labor for Building Construction and Heavy and Highway Trades, as applicable.

4.26 Subcontractors: The Contractor shall not employ any Subcontractor, Supplier, or other person or organization, whether initially or as a substitute, against whom the County may have a reasonable objection. Contractor shall not substitute any Subcontractor, person, or organization that has been accepted by the County, unless the substitute has been accepted in writing by the County. No acceptance by the County of any Subcontractor, Supplier, or other person or organization shall constitute a waiver of any right of the County to reject defective work. Contractor shall provide County with a complete list of any Subcontractors it intends to use on the Project. In the event that Subcontractors are used on the Project, the Subcontractor must agree to be bound by the terms of this Contract.

4.27 Responsibility for Subcontractors: The Contractor shall be fully responsible to the County for all acts and omissions of the Subcontractors, Suppliers, and other persons and organizations performing or furnishing any of the Work under a direct or indirect contract with Contractor just as Contractor is responsible for the Contractor's own acts and omissions. Nothing in the Contract Documents shall create for the benefit of any such Subcontractor, Supplier, or other person or organization any contractual relationship between the County and any such Subcontractor, Supplier, or other person or organization, nor shall it create any obligation on the part of the County to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other person or organization except as may otherwise be required by laws and regulations.

4.28 Construction Site Order: The Contractor shall at all times maintain good discipline and order on the construction site. If Contractor becomes aware that any employee, subcontractor, or subcontractor's employee is incompetent, disorderly, abusive, disobedient, has knowingly violated safety regulations, has possessed any firearm in contravention of applicable Texas law, has possessed or was under the influence of alcohol or drugs on the job, or has violated any federal, state, or local law, rule, or ordinance. Contractor shall immediately remove such worker or representative, including an officer or owner of Contractor or any Subcontractor from performing work on the Project, and may not subsequently allow such worker or representative at the construction site without the County's written consent. Contractor, the Design Engineer, Subcontractors, and workers or employees shall comply with all applicable health, safety, and loss prevention rules of applicable governmental authorities. The Contractor shall at all times enforce strict discipline and good order among its employees and workers, and shall not employ on the Project any unfit person or anyone not skilled in the work assigned to him. Waller County may, upon thirty (30) days written notice to the Contractor and without cause, require the

removal of any individual from performing work on the Project.

4.29 Construction Site Conditions: Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the site and land and areas identified by the Designated Representative, and other land and areas permitted by laws and regulations, right-of-way, permits, and easements. Contractor shall not unreasonably encumber the premises with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas, resulting from the performance of the Work. During the progress of the Work, and on a daily basis, Contractor shall keep the premises free from accumulations of waste materials, rubbish, and other debris resulting from the Work. At the completion of the Work, Contractor shall remove all waste materials, rubbish, and debris from and about the premises, as well as all tools, appliances, construction equipment and machinery, and surplus materials. Contractor shall leave the site clean and ready for use by County at Substantial Completion of the Work. Contractor shall restore to original condition all property not designated for alteration by the Contract Documents. If the Contractor fails to clean up at the completion of the Work, the County may do so, and charge the cost thereof to the Contractor.

4.30 Inspection: The Project and all parts thereof shall be subject to inspection from time to time by inspectors designated by Waller County. No such inspections shall relieve the Contractor of any of its obligations hereunder. Neither failure to inspect, nor failure to discover defects or reject any of the work as not in accordance with the Contract Documents shall be construed to imply an acceptance of such work or to relieve the Contractor of any of its obligations hereunder. Waller County agrees that its right of inspection shall be used reasonably and in a timely manner so as not to delay orderly completion of the Project.

4.31 Safety: The Contractor shall be responsible for initiating, maintain, and supervising all safety precautions and programs in connection with performing work on the Project. The Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for the safety of persons or property, or to protect them from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall comply with all federal, state, and local occupational hazard and safety standards, codes and regulations applicable in the jurisdiction where the Project is located. The Contractor shall include the substance of this clause in its entirety in all subcontracts for any work to be performed at the construction site.

4.32 Responsibility for Property: Contractor shall notify owners of adjacent property and of underground facilities, and utility owners when performance of work on the Project may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property. All damage, injury, or loss to any materials or equipment used in furtherance of the Project, whether stored on or off site, and to any other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and underground facilities not designated for removal, relocation, or replacement in the course of construction that is caused, directly or indirectly, in whole or in part, by the Contractor, Subcontractor, or any personal or entity directly or indirectly employed by them shall be remedied by Contractor. Contractor is solely responsible for the location and protection of any and all public utility lines and utility customer service

lines in the Work area. "Public utility lines" means the utility distribution and supply system, and "utility customer service lines" means the utility lines connecting customers to the utility distribution and collection system. Generally, existing utility customer service line connections are not shown on the Drawings. The Contractor shall exercise due care to locate, mark, uncover, and otherwise protect all such lines in the construction zone and any of Contractor's work or storage areas, and to notify appropriate authorities of relevant activity in the construction zone. Contractor's responsibility for the location and protection of utilities is primary and nondelegable.

4.33 Protection Against Risks: The Contractor shall take all necessary and adequate precautions to protect against conditions created during the progress of the Project which involve a risk of bodily harm or death to persons, or a risk of damage or loss to any property. The Contractor shall regularly inspect all work, materials, and equipment to discover and determine any such conditions, and shall be responsible for discovery, determination, and correction of any such conditions.

4.34 Hazardous Materials: Contractor shall be responsible for any hazardous materials brought to the site by the Contractor, Subcontractor, Suppliers, or anyone else for whom Contract is responsible, and shall be responsible for the use, storage, and remediation of any such hazardous materials. The Contractor shall immediately notify the County of any hazardous material uncovered or revealed at the Construction Site which was not shown, indicated, or identified in the Contract Documents to be within the scope of the Work and which may present a substantial danger to persons or property exposed thereto in connection with the Work at the site. The Contractor shall immediately notify the Authorized Representative of any suspected hazardous materials encountered before or during the performance of the Work, and shall take all necessary precautions to avoid further disturbance of the materials.

4.35 Contractor's Duties Continue Until Final Acceptance: Contractor's duties and responsibilities for safety and protection of the Work and property shall continue until such time as the Project is completed, and the County has issued a written notice indicating final acceptance of the completed Project.

4.36 No Excessive Loading: Contractor shall no load, nor permit any part of any structure to be loaded in any manner that will endanger the structure. The Contractor shall not subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

4.37 Texas Department of Transportation: the Contractor shall perform the Work in accordance with any applicable rules, regulations, and standards adopted by the Texas Department of Transportation.

4.38 Meetings and Cooperation: Contractor shall meet with the County or its Authorized Representative on an as needed basis to ensure the Work is performed satisfactorily. The Contractor shall cooperate at all times with the County, and other contractors providing services to the County to maintain maximum security and efficiency.

4.39 Equipment and Materials: Except as expressly provided otherwise, the Contractor shall furnish and pay for all construction, transportation, installation, materials, labor, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and any other equipment, facilities, and incidentals required for the furnishing, performance, testing, start-up, and

completion of the Project within the time specified, except for professional services as defined by Texas Government Code Chapter 2254. Such equipment and facilities shall be of good quality and new (including new products made of recycled materials, pursuant to Texas Health and Safety Code § 361.426), and fit for the uses intended. Defective items shall be removed from the construction site promptly and at the Contractor's expense. If requested by the Authorized Representative, Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment used for the Project. All materials and equipment shall be applied, installed, connected, erected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, unless otherwise provided in the Contract Documents. Any Supplier or manufacturer furnishing these items shall be experienced in the design and construction of such materials, and shall be an established supplier of the items and materials. The Contractor shall schedule its other operations so as not to interfere with its duty to timely furnish the necessary equipment, materials facilities, and personnel to operate the same at the times necessary for the orderly and timely completion of the Project. Title to materials delivered to the Construction Site or a staging area will pass to the County upon delivery without the necessity for further documentation. Risk of loss will not pass to the County until Final Acceptance.

4.40 Defective Work: The County and the Design Engineer may disapprove or reject Work with either believes to be defective, or believes will not produce a completed Project that conforms to the Contract Documents, or will jeopardize the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. The Contract shall bear all losses, damages, costs, and claims related to remedying defective work.

4.41 Uncovering Work: The Contractor shall uncover the Work in the following circumstances:

a. If any Work, including the work of Subcontractors or others, that is to be inspected, tested, or approved is covered by the Contractor or Subcontractor without written concurrence of the Authorized Representative, or if any Work is covered contrary to the written request of the Authorized Representative, it must, if requested by the Authorized Representative, be uncovered and recovered at the Contractor’s expense.

b. If the Authorized Representative considers it necessary or advisable that covered Work be observed, inspected, or tested, the Contractor shall uncover, expose, or otherwise mark available for observation, inspection, or testing that portion of the Work in question, furnishing all necessary labor, material, and equipment. If it is found that such Work is defective, the Contractor shall pay all claims, costs, losses, and damages caused by, arising out of, or resulting from such uncovering, exposure, observation, inspection, and testing and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and the County shall be entitled to an appropriate decrease in the Contract Amount, and may make claim therefore. If such Work is not found to be defective, the Contractor may be allowed an increase in the Contract Price, or an extension of the Contract Time, or both, which is directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction.

4.42 Contractor's Remedy for Delay, Disruption, or Hindrance. Contractor and County contemplate that Contractor's performance may be delayed, disrupted, or interfered with by unanticipated causes including but not limited to the following:

a. Severe and unavoidable natural disasters such as fires, floods, epidemics and earthquakes;

b. Abnormal weather conditions;

c. Acts or failures to act of the County, third party utility owners, or other third party entities; and

d. Acts of war or terrorism.

Contractor and the County agree Contractor's sole remedy for delays in performance of the Work, whether or not such delays are foreseeable, is an extension of the Contract Time, except as provided in Section 4.43. Contractor shall receive no compensation or damages of any kind for delays, disruptions, or hindrances to the Work. The County's exercise of any of its rights or remedies under the Contract including, without limitation, ordering changes in the Work or directing suspension, rescheduling, or correction of the Work, regardless of the extent or frequency of the County's exercise of such rights or remedies, shall not be construed as intentional interference with Contractor's performance of the Work. The sole remedy of Contractor for any delay, disruption, or hindrance caused by the County's exercise of any of its rights or remedies under the Contract Documents shall be strictly limited to an extension of the Contract Time, except as expressly provided in Section 4.43.

In no event shall the Contractor be entitled to any compensation or recovery of any special damages in connection with any delays, disruptions, or hindrances, including without limitation: consequential damages, lost opportunity costs, impact damages, indirect damages, exemplary damages, compensation for unjust enrichment, attorney's fees or other similar damages or costs.

4.43 Direct and Unavoidable Costs: In the event the County is the sole cause of a delay, disruption, or hindrance by acts or omissions that constitute fraud, intentional misrepresentation, gross negligence, or intentional interference with Contractor's performance of the Work, Contractor may receive compensation for direct and unavoidable extra costs only to the extent such acts continue after Contractor notifies the County in writing of such conduct. The direct and unavoidable costs must be specifically proved, and caused solely by the proven wrong. When such extra compensation is claimed, a written statement thereof shall be presented by Contractor to the County, and if found by the County to be correct, shall be approved.

4.44 No Authority to Act of Behalf of County: The Contractor agrees and understands that neither it, nor any of its agents, employees, or Subcontractors may act in the name of the County unless specifically authorized in writing by the County.

SECTION 5. PREVAILING WAGES

5.1 Required Compliance with Texas Government Code Chapter 2258: This Project is subject to the prevailing wage rate requirements of Chapter 2258 of the Texas Government Code, and the Davis-Bacon Act Wage Determination # TX20250247 provided below. All persons

employed by Contractor shall be compensated at not less than the rates shown below. Contractor shall keep records of each worker employed by the Contractor or a subcontractor in the construction of the Project, including each worker's name, occupation, and the actual per diem wage paid to each worker. Said records shall be open at all reasonable hours to inspection by the County and its officers and agents. If Contractor pays any worker less than the below stated rates at any time, the Contractor shall pay Waller County sixty dollars ($60.00) per day for each worker employed by the Contractor for the provision of services described herein for each calendar day or part of the day that the worker is paid less than the below stated rates. Contractors may also visit www.wdol.gov/dba.aspx.

General Decision Number: TX20250247 07/04/2025

Superseded General Decision Number: TX20240247

State: Texas

Construction Type: Building

Counties: Austin, Brazoria, Chambers, Fort Bend, Galveston, Hardin, Harris, Jefferson, Liberty, Montgomery, Orange, San Jacinto and Waller Counties in Texas.

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

Note: Contracts subject to the Davis-Bacon Act are generally required to pay at least the applicable minimum wage rate required under Executive Order 14026 or Executive Order 13658.

Please note that these Executive Orders apply to covered contracts entered into by the federal government that are subject to the Davis-Bacon Act itself, but do not apply to contracts subject only to the Davis-Bacon Related Acts, including those set forth at 29 CFR 5.1(a)(1).

If the contract is entered into on or after January 30, 2022, or the contract is renewed or extend-ed (e.g., an option is exercised) on or after January 30, 2022, Executive Order 14026 generally applies to the contract. The contractor must pay all covered workers at least $17.75 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent per-forming on that contract in 2025.

If the contract was awarded on or between January 1, 2015 and January 29, 2022, and the con-tract is not renewed or extended on or after January 30, 2022, Executive Order 13658 generally applies to the contract. The contractor must pay all covered workers at least $13.30 per hour (or the applicable wage rate listed on this wage determination, if it is higher) for all hours spent performing on that contract in 2025.

The applicable Executive Order minimum wage rate will be adjusted annually. If this contract is covered by one of the Executive Orders and a classification considered necessary for performance of work on the contract does not appear on this wage determination, the contractor must still submit a conformance request.

Additional information on contractor requirements and worker protections under the Executive Orders is available at www.dol.gov/whd/govcontracts.

Modification Number	Publication Date
0	01/03/2025
1	03/07/2025
2	03/14/2025
3	05/16/2025
4	07/04/2025

	Rates	Fringes
ASBE0022-009 07/01/2024		
ASBESTOS WORKER/HEAT & FROST INSULATOR (Duct, Pipe and Mechanical System Insulation)	$ 30.20	12.38
BOIL0074-003 01/01/2025		
BOILERMAKER	$ 33.17	24.92
*CARP0551-008 04/01/2025		
CARPENTER (Excludes Acoustical Ceiling Installation, Drywall Hanging, Form Work and Metal Stud Installation)	$ 33.27	9.73
ELEC0716-005 08/26/2024		
ELECTRICIAN (Excludes Low Voltage Wiring and Installation of Alarms)	$ 36.50	10.51
ELEV0031-003 01/01/2025		
ELEVATOR MECHANIC	$ 53.59	38.435+a+b

FOOTNOTES:

A. 6% under 5 years based on regular hourly rate for all hours worked. 8% over 5 years based on regular hourly rate for all hours worked.

B. Holidays: New Year's Day; Memorial Day; Independence Day; Labor Day; Thanksgiving Day; Friday after Thanksgiving Day; Christmas Day; and Veterans Day.

	Rates	Fringes
ENGI0450-002 04/01/2024		
POWER EQUIPMENT OPERATOR		
Cranes	$ 39.47	10.39
IRON0084-002 06/01/2024		

IRONWORKER (ORNAMENTAL AND STRUCTURAL)	$ 28.26	8.13
PLAS0783-001 04/01/2023		
PLASTERER	$ 31.34	10.30
PLUM0068-002 10/01/2023		
PLUMBER	$ 39.98	11.61
PLUM0211-010 10/01/2024		
PIPEFITTER (Including HVAC Pipe Installation)	$ 41.14	11.86
SHEE0054-003 04/01/2020		
SHEET METAL WORKER (Excludes HVAC Duct and Unit Installation)	$ 29.70	13.85
*SUTX2014-023 07/21/2014		
ACOUSTICAL CEILING MECHANIC	$ 16.41 **	3.98
BRICKLAYER	$ 19.86	0.00
CAULKER	$ 15.36 **	0.00
CEMENT MASON/CONCRETE FINISHER	$ 13.82 **	0.00
DRYWALL FINISHER/TAPER	$ 16.30 **	3.71
DRYWALL HANGER AND METAL STUD INSTALLER	$ 17.45	3.96
ELECTRICIAN (Alarm Installation Only)	$ 17.97	3.37
ELECTRICIAN (Low Voltage Wiring Only)	$ 18.00	1.68
FLOOR LAYER: Carpet	$ 20.00	0.00
FORM WORKER	$ 11.87 **	0.00
GLAZIER	$ 19.12	4.41
INSULATOR – BATT	$ 14.87 **	0.73
IRONWORKER, REINFORCING	$ 12.10 **	0.00
LABORER: Common or General	$ 10.79 **	0.00
LABORER: Mason Tender – Brick	$ 13.37 **	0.00
LABORER: Mason Tender - Cement/Concrete	$ 10.50 **	0.00
LABORER: Pipelayer	$ 12.94 **	0.00
LABORER: Roof Tearoff	$ 11.28 **	0.00
LABORER: Landscape and Irrigation	$ 9.49 **	0.00
LATHER	$ 19.73	0.00
OPERATOR: Backhoe/Excavator/Trackhoe	$ 14.10 **	0.00
OPERATOR: Bobcat/Skid Steer/Skid Loader	$ 13.93 **	0.00
OPERATOR: Bulldozer	$ 20.77	0.00
OPERATOR: Drill	$ 16.22 **	0.34
OPERATOR: Forklift	$ 15.64 **	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	$ 16.00 **	0.00
PAINTER (Brush, Roller and Spray), Excludes Drywall Finishing/Taping	$ 16.77 **	4.51
ROOFER	$ 15.40 **	0.00
SHEET METAL WORKER (HVAC Duct Installation Only)	$ 17.81	2.64
SHEET METAL WORKER (HVAC Unit Installation Only)	$ 16.00 **	1.61
SPRINKLER FITTER (Fire Sprinklers)	$ 22.17	9.70
TILE FINISHER	$ 12.00 **	0.00
TILE SETTER	$ 16.17 **	0.00
TRUCK DRIVER: 1/Single Axle Truck	$ 14.95 **	5.23
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
WATERPROOFER	$ 14.39 **	0.00

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

** Workers in this classification may be entitled to a higher minimum wage under Executive Order 14026 ($17.75) or 13658 ($13.30). Please see the Note at the top of the wage determination for more information. Please also note that the minimum wage requirements of Executive Order 14026 are not currently being enforced as to any contract or subcontract to which the states of Texas, Louisiana, or Mississippi, including their agencies, are a party.

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) (iii)).

The body of each wage determination lists the classification and wage rates that have been found to be prevailing for the type(s) of construction and geographic area covered by the

wage determination. The classifications are listed in alphabetical order under rate identifiers indicating whether the particular rate is a union rate (current union negotiated rate), a survey rate, a weighted union average rate, a state adopted rate, or a supplemental classification 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 07/01/2024. 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. 07/01/2024, in the example, is the effective date of the most current negotiated rate.

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

Union Average Rate Identifiers

Thes UAVG identifier indicates that no single majority rate prevailed for those classifications; but that, 100% of the data reported for the classifications reflected union rates. EXAMPLE: UAVG-OH-0010 01/01/2024. UAVG indicates that the rate is a weighted union average rate. OH indicates the State of Ohio. The next number, 0010 in the example, is an internal number used in producing the wage determination. The date 01/01/2024 in the example, indicates the date the wage determination was updated to reflect the most current union average rate.

A UAVG rate will be updated once a year, usually in January, to reflect a weighted average of the current rates in the collective bargaining agreements on which the rate is based.

Survey Rate Identifiers

The "SU" identifier indicates that either a single non-union rate prevailed (as defined in 29 CFR 1.2) for this classification in the survey or that the rate was derived by computing a weighted average rate based on all the rates reported in the survey for that classification. As a weighted average rate includes all rates reported in the survey, it may include both union and non-union rates. Example: SUFLA2022-007 6/27/2024. SU indicates that the rate is a single non-union prevailing rate or a weighted average of survey data for that classification. FL indicates the State of Florida. 2022 is the year of the 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. The date, 6/27/2024 in the example, indicates the survey completion date for the classifications and rates under that identifier.

Survey wage rates typically remain in effect until a new survey is conducted. However, the Wage and Hour Division (WHD) has the discretion to update such rates under 29 CFR 1.6 (c) (1).

State Adopted Rate Identifiers

The "SA" identifier indicates that the classifications and prevailing wage rates set by a state (or local) government were adopted under 29 C.F.R 1.3(g)-(h). Example: SAME2023-007 01/03/2024. SA reflects that the rates are state adopted. ME refers to the State of Main. 2023 is the year during which the state completed the survey on which the listed classifications and rates are based. The next number, 007 in the example, is an internal number used in producing the wage determination. The date, 01/03/2024 in the example, reflects the date on which the classifications and rates under the SA identifier took effect under state law in the state from which the rates were adopted.

WAGE DETERMINATION APPEALS PROCESS

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

* a survey underlying a wage determination
* an existing published wage determination
* an initial WHD letter setting forth a position on a wage determination matter
* an initial conformance (additional classification and rate) determination

On survey related matters, initial contact, including requests for summaries of surveys, should be directed to the WHD Branch of Wage Surveys. Requests can be submitted via email to da-visbaconinfo@dol.gov or by mail to:

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

Regarding any other wage determination matter such as conformance decisions, requests for initial decisions should be directed to the WHD Branch of Construction Wage Determinations. Requests can be submitted via email to BCWD-Office@dol.gov or by mail 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 an initial decision has been issued, then any interested party (those affected by the action) that disagrees with the decision can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Requests for review and reconsideration can be submitted via email to dba.reconsideration@dol.gov or by mail 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 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

SECTION 6. PAYMENT

6.1 Payment: Waller County shall pay the Contractor according to the contract in current funds for the Contractor's performance, as stated herein, after issuance of a Notice to Proceed and a purchase order issued by the Waller County Procurement Director. In no event will Contractor be paid the entire contract price prior to beginning work, or prior to completion of the work.

6.2 Retainage: The County shall withhold a ten percent (10%) retainage from each Application for Payment, which shall be paid subject to Sections 6.6 and 6.7.

6.3 Applications for Payment: Waller County shall make progress payments to the Contractor as provided below.

a. The Contractor shall submit Applications for Payment to the Waller County Auditor, 425 FM 1488, Suite 119, Hempstead, Texas 77445 in a form acceptable to the County. Each Application for Payment must be filled out and signed by the Contractor, and cover the Work that is completed as of the date of the Application and be accompanied by sufficient supporting documentation.

b. With each Application for Payment, the Contractor must submit an affidavit certifying that Contractor has paid in full any bills submitted to the Contractor for labor, material and expendable equipment that Contractor used in the performance of Work or the provision of services under the Contract. The certifying affidavit must be provided to the County before the applicable Application for Payment will be approved for payment.

c. Applications for Payment shall not include requests for payment related to changes in the Work which have not been authorized through a Change Order.

d. Applications for Payment shall not include requests for payment of amounts that the Contractor does not intend to pay to a Subcontractor or Supplier because of a dispute or other reason.

e. The period covered by each Application for Payment shall be one calendar month beginning on the first day of the month, and ending on the last day of the month. A complete and accurate Application for Payment must be submitted to the County Auditor not later than the 15th day of the month following the month in which the work was performed.

f. The Application for Payment shall indicate the percentage of completion of each portion of the Project as of the end of the period covered by the application for payment.

g. Subject to the provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

   i. Take that portion of the contract sum properly allocable to the completed Project less retainage of ten percent (10%).

   ii. Add that portion of the contract sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved by Waller County, suitably stored off the site at a location agreed upon in writing), less retainage of ten percent (10%).

   iii. Subtract the aggregate of previous payments made by Waller County.

h. Payment will be made by the County in accordance with Texas Government Code, Chapter 2251.

6.4 Final Payment: If, upon Final Completion and on the basis of observation of the Work during construction, final inspection, and review of the final Application for Payment and accompanying documentation as required by the Contract Documents, the Authorized Representative is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, there are no outstanding claims, and punch list items have been completed, the Authorized Representative will recommend the final Application for Payment for approval to the Waller County Commissioners Court. Final payment shall constitute the entire unpaid, undisputed balance of the Contract Price. The Contractor may make application for final payment following the procedure for progress payments after the Contractor has complied with the requirements of Section 6.3 to the County's satisfaction, and delivered the following documents:

a. Affidavit by Contractor certifying the payment of all debts and claims;

b. The Record Documents identified in Section 13;

c. Consent to surety, if any, to final payment. If surety is not provided, complete and legally effective releases or waivers that are satisfactory to the County of all claims arising out of or filed in connection with the Work;

d. Certificate evidencing that any applicable requirement for insurance will remain in force after final payment and through the warranty period;

e. Proof of performance bond extension through warranty period, if a performance bond was required; and

f. Any other documentation called for in the Contract Documents.

Final payment is considered to have taken place when the Contractor, or any of its representatives negotiates the County's final payment check, whether labeled final or not, for cash or deposits check in any financial institution for its monetary return.

6.5 Review of Applications for Payment and Payment: The Authorized Representative will, within seven (7) calendar days after receipt of each Application for Payment, either indicate a recommendation for payment and forward the Application for processing by the County, or return the Application to the Contractor indicating the Authorized Representative's reasons for not recommending payment. If the Authorized Representative does not recommend payment, the Contractor shall make the necessary corrections and resubmit the Application.

a. By recommending payment, the Authorized Representative does not represent that:

i. Exhaustive or continuous on-site inspections have been made to check the quality or quantity of the Work;

ii. Examination has been made to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Price; or

iii. Contractor's construction means, methods, techniques, sequences, or procedures have been reviewed.

6.6 County's Right to Withhold Payment: The County may withhold or nullify the whole or part of any payment to such extent as the County deems necessary in the event that:

a. Defective work is not remedied as required by the County and in the time frame required by the County;

b. A third party files a claim or there is reasonable evidence indicating probable filing of such claims;

c. Contractor fails to make payments properly to Subcontractors for labor, materials, or equipment;

d. There is reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Amount;

e. There is damage to the County or another contractor;

f. There is reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;

g. The Contractor fails to submit a schedule of values in accordance with the Contract Documents;

h. The Contractor fails to maintain a record of changes on drawings and documents;

i. The Contractor fails to maintain weekly payroll reports and, as applicable, provide copies of reports in a timely manner upon request of the County;

j. The Contractor fails to submit monthly subcontractor reports;

k. Contractor neglects or unsatisfactorily prosecutes of the Work, including fails to clean up; or

l. The Contractor fails to comply with any provision of the Contract Documents.

6.7 Reason for Withholding Payment Removed: When the above reasons for withholding payment are removed, the Contractor shall resubmit an Application for Payment for the value of the Work performed. Payment will be made in accordance with Texas Government Code Chapter 2251.

6.8 Payment to Subcontractors when Payment Withheld: Subcontractors may request Partial Payment when the County withholds payment of an invoice to the Contractor for any reason listed in Section 6.6. If the payment is withheld by the County, the Contractor shall notify all affected Subcontractors within two (2) working days of notice that payment is being withheld. Upon notification, Subcontractors may submit a formal written request for Partial Payment to the Contractor and the County. If directed by the County, the Contractor shall within three (3) working days resubmit to the County an invoice for the same period that includes only work performed by the requesting Subcontractors during this period. The County will review this resubmitted invoice. Upon receipt of payment for the resubmitted invoice, the Contractor shall pay the Subcontractor within ten (10) calendar days.

SECTION 7. COMPLETION, TRANSER, AND ACCEPTANCE

7.1 Substantial Completion: When the Contractor considers that the Work, or a portion thereof which the County agrees to accept separately, is substantially complete, the Contractor shall notify the Authorized Representative, and request a determination as to whether the Work, or a designated portion thereof is substantially complete. If the Authorized Representative does not consider the Work to be substantially complete, the Authorized Representative will notify Contractor in writing, and give the reasons therefor. If Owner's Representative considers the Work to be substantially complete, the Authorized Representative will prepare and deliver a Certificate of Substantial Completion, which shall establish the date of Substantial Completion, shall include a punch list of items to be completed or corrected before final payment, and shall establish the time within which the Contractor shall finish the punch list. Failure to include an item on the punch list does not alter the Contractor's responsibility to complete all Work in accordance with the Contract Documents. If an inspection is required by public authorities having jurisdiction over the Work, such inspection must be made and passed before the Work, or any portion thereof will be considered substantially complete.

7.2 Final Inspection: Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, the County will make a final inspection with Contractor, and provide written notice of all the particulars in which inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

7.3 Punch List: Upon the occurrence of Substantial Completion, the punch list items shall be promptly commenced and thereafter completed within thirty (30) days after final completion.

SECTION 8. TERM, SUSPENTION OF WORK, AND TERMINATION

8.1 Agreement Term: The term of this Agreement shall begin on the date of execution, and shall continue until the complete performance of the terms and conditions of this Contract by the parties unless either party terminates this Contract in accordance with its terms.

8.2 Suspension by County for Convenience: The County may, in its sole discretion and without

cause, order the Contractor in writing to suspend or interrupt the Project in whole or in part for such period of time as the County may determine. In the event the County suspends or interrupts the Work, an adjustment may be made to account for any change in the actual cost of performance of the Work caused by the suspension, or interruption. No adjustment shall be made for an increase in the Contract Price if the performance of the work is, was, or would have been so suspended, delayed, or interrupted by another cause for which the Contractor is responsible, or when an equitable adjustment is made or denied under another provision of this Contract.

8.3 Automatic Termination: This Agreement shall automatically terminate upon complete performance of the terms and conditions of the Agreement by each Party, or otherwise in accordance with its terms.

8.4 Termination for Insolvency and Bankruptcy: The County, in its sole discretion, may immediately terminate this Agreement without notice or the opportunity to cure if Contractor becomes insolvent or files any petition for bankruptcy.

8.5 Termination for Cause: Upon seven (7) calendar days' notice to Contractor, the County may terminate the Contract for cause if the Contractor:

a. Persistently or repeatedly refuses or fails to supply enough properly skilled workers or proper materials;

b. Fails to make payment to Subcontractors for materials or labor in accordance with respective agreements between the Contractor and the Subcontractor;

c. Disregards laws, ordinances, rules, regulations, or orders of public authority having jurisdiction concerning the Project: or

d. Otherwise commits substantial breach of a provision of the Contract Documents.

8.6 Termination for Convenience: Upon seven (7) calendar days' written notice to Contractor, the County may, in its sole discretion and without penalty or prejudice to any right or remedy of County, terminate this Contract for convenience and without cause at any time. The written notice must be provided in accordance with Section 18.19. The notice must state the reasons for such termination, and provide an effective date of the termination. The notice may also contain instructions necessary to protect, store, or decommission any incomplete work or systems, and/or for safety. Upon receipt of such notice, Contractor shall immediately proceed with the following obligations regardless of whether a dispute regarding the Contract exists:

a. Stop all work;

b. Comply with any instructions contained in the termination notice;

c. Place no further subcontracts or order for materials or services;

d. Terminate all subcontracts for convenience;

e. Cancel all materials and equipment orders as applicable; and

f. Take appropriate action to protect and preserve all property related to the Contract which is in the possession of Contractor.

8.7 Notice of Termination: The terminating Party shall provide seven (7) days written notice

of termination to the other Party as provided in Section 18.19.

8.8 Discretionary Opportunity to Cure: A Party receiving notice of termination for failure to perform in accordance with the terms of this Agreement shall have the opportunity to cure its failure to perform beginning on the day of its receipt of the written notice, and continuing for thirty (30) calendar days thereafter. The cure, if made, shall be to the terminating Party's satisfaction. If no cure is made, the Agreement will terminate on the date specified in the written termination notice, or if no date is specified, on the thirtieth (30^{th}) calendar day after the date of receipt of the notice, unless otherwise agreed by the Parties.

8.9 County's Rights After Termination: In the event of termination, the County may immediately take possession of the site, and of all materials, equipment, tools, and construction equipment and machinery thereon. The County may finish the Project by whatever reasonable method it deems expedient.

8.10 Duty to Mitigate: In the event of termination or suspension under this Contract, the Contractor shall take all reasonable actions to mitigate its damages and any and all claims which may be asserted against the County.

8.11 Responsibility During Demobilization: While demobilizing, the Contractor shall take all necessary and reasonable actions to preserve and protect the Work, the site, and other property of the County or others at the site.

8.12 Payment After Termination: In the event the County terminates the Contract, the County shall pay the Contractor only for work performed prior to the date of termination, and that is satisfactory to County. Contractor shall not be entitled to lost or anticipated profits should the County choose to exercise its option to terminate. Not later than 30 days after the date of termination, the Contractor shall submit to County a final termination settlement proposal to the County for Work already performed. It any of the Work contained in the settlement proposal is not satisfactory to the County, the County shall provide written notice to the Contractor. The County shall only pay for the portion of the Work that it determines in good faith to be satisfactory. If Contractor fails to submit the settlement proposal within the time specified, the County may unilaterally determine the amount owed to Contractor. Payment of the amount determined by the County shall be full satisfaction of any claim or debt due by County to Contractor under the Contract.

SECTION 9. RIGHT TO ASSURANCE

9.1 Right to Assurance: In the event that the county has a reason to question the Contractor's intent or ability to perform its obligations under the Contract, the County may demand that the Contractor give written assurance of its intent to perform, its plan to properly continue performance, and a detailed timeline for completion of the Project. The Contractor shall provide a written response to County that addresses the County's demand for written assurance within five (5) business days. If Contractor fails to provide the written response, the County may treat the failure as an anticipatory repudiation of the Contract.

SECTION 10. INSURANCE

10.1 Insurance Coverages: Contractor shall carry insurance in the types and amounts indicated below, which shall include items owned by the County in the care, custody, and control of the Contractor prior to and during construction and warranty period. It is intended that

policies required by this Contract covering both the County and the Contractor shall be considered primary coverages as applicable. Contractor shall provide the County with certificates of insurance evidencing compliance with the requirements of this Section. The certificates shall indicate the name of the Contractor, the name of the insurance company, the policy number, and the term and limits of coverage. The insurance coverage must be with a company having Best's rating of A/VII or better, authorized to do business in the State of Texas at the time the policies are issued and in force, and shall be of the following types and limits:

a. Workers Compensation insurance in accordance with applicable law. Substitutes to genuine Workers' Compensation Insurance will not be allowed.

b. Employers' Liability insurance with limits of not less than $1,000,000 per injury by accident, $1,000,000 per injury by disease, and $1,000,000 per bodily injury by disease.

c. Comprehensive general liability insurance with a limit of not less than $1,000,000 each occurrence and $2,000,000 in the annual aggregate. Policy shall cover liability for bodily injury, personal injury, and property damage and products/completed operations arising out of the business operations of the policy holder.

d. Business Automobile Liability coverage for owned, non-owned, and hired vehicles, with a combined Bodily Injury/Property Damage with minimum limits of not less than $1,000,000 each accident. The policy shall cover liability arising from the operation of licensed vehicles by policyholder.

e. Builder's Risk Insurance or Installation Insurance on an all risk physical loss form in the Contract Amount. Coverage shall continue until the Work is accepted by the County. The County shall be a loss payee on the policy. If off-site storage is permitted, coverage shall include transit and storage in an amount sufficient to protect property being transported or stored.

10.2 Additional Insured: Contractor's insurance policies that cover performance under this Contract shall name the County an additional insured, except for Workers' Compensation and Professional Liability, if required. All endorsements naming the County as additional insured, waivers, and notices of cancellation of endorsements, as well as the Certificates of Insurance shall indicate: Waller County, Texas, 425 FM 1488, Suite 106, Hempstead, Texas 77445.

10.3 Certificates of Insurance: Contractor shall provide the County with properly executed certificates of such insurance before the Contract is executed as verification of the coverage required in Section 10.1. The certificates shall indicate that all required insurance coverages are effective as of the Effective Date, and that such insurance shall not be canceled, except on thirty (30) days prior written notice to the County. The Contract shall not commence Work until the required insurance is obtained and until such insurance has been reviewed by the County. The Contractor must also provide Certificates of Insurance when a previously identified policy period has expired as verification of continuing coverage.

10.4 Certified Copies of Insurance Policies: The Contractor shall provide the County with

certified copies of the required insurance policies and endorsements thereto upon request and without expense to the County.

10.5 Responsibility for Insurance: The Contractor shall be responsible for premiums, deductibles, and self-insured retentions, if any, state in the policies. All deductibles or self-insurance retentions shall be disclosed on the Certificates of Insurance.

10.6 No Decrease in Liability: The County's acceptance or approval of the certificates of insurance or certified copies of insurance policies shall not relieve, decrease, or limit Contractor's liability. The insurance coverages required under this Contract are required minimum and are not intended to limit the responsibility of liability of the Contractor.

10.7 No Cancellation or Modification: The Contractor shall continuously maintain the required insurance coverages during the Contract Term. Contractor shall not cancel or modify the insurance coverages required by this Agreement without providing thirty (30) days written notice to the County. Contractor shall not allow a lapse in the insurance coverage specified in this Contract for the duration of the Contract.

10.8 Workers Compensation Certification: By signing this Contract or providing or causing to be provided a certificate of coverage, the Contractor is representing to the County that all employees of the Contractor who will provided services on the Project will be covered by workers' compensation coverage for the duration of the Project, that the coverage will be based on proper reporting of classification codes and payroll amounts, and that all coverage agreements will be filed with the appropriate insurance carrier or, in the case of self-insured, with the Texas Worker's Compensation Commission's Division of Self-Insurance Regulation. Providing false or misleading information may subject Contractor to administrative penalties, criminal penalties, civil penalties, or other civil actions.

10.9 County Occupancy: All insurance shall provide for the County to take occupancy of the Work or any part thereof during the term of said insurance.

10.10 Failure to Comply: Contractor's failure to comply with any of these provisions is a breach of Contract by Contractor which entitles the County to declare the Contract void if Contractor does not remedy the breach within ten (10) days after receipt of notice of breach from the County.

SECTION 11. BONDS

11.1 Bonds Required: The Contractor must furnish the County with both a Performance Bond and a Payment Bond. Bonds shall be executed on forms acceptable to the County. Performance Bonds and Payment Bonds must be issued in an amount of one hundred percent (100%) of the Contract Amount as security for the faithful performance and/or payment of all of Contractor's obligations under the Contract Documents. Performance Bonds and Payment Bonds shall be issued by a solvent surety company duly authorized to do business in the State of Texas, and licensed in the State of Texas to issue surety bonds with a Best Rating of A/VII or better, and shall meet any other requirements established by law or by the County pursuant to applicable law.

11.2 Surety Acceptable to County: The surety company must be acceptable to the County. If the County rejects the Contractor's proposed surety company, the Contractor must obtain the required bonds from a surety acceptable to the County within five (5) days of the County's rejection.

11.3 Extension Through Warranty Period: The required Performance Bond must extend through any applicable warranty period.

11.4 Bond Signed by Agent: All bonds signed by an agent must be accompanied by a certified copy of such agent's authority to act.

11.5 Surety Declares Bankruptcy: If the surety on any bond furnished by the Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in the State of Texas, or it ceases to meet the requirements of the preceding paragraph, Contractor shall within ten (10) days thereafter substitute another bond and surety, both of which must be acceptable to the County.

SECTION 12. INDEMNIFICATION

12.1 **INDEMNITY FOR BODILY INJURY OR DEATH CLAIMS: TO THE FULLEST EXTENT PERMITTING BY LAW, CONTRACTOR SHALL INDEMNIFY, DEFEND, AND HOLD HARMLESS THE COUNTY AND ITS OFFICERS, DIRECTORS, CONTRACTORS, EMPLOYEES, REPRESENTATIVES, AND AGENTS FROM AND AGAINST ALL CLAIMS, LOSSES, EXPENSES, COSTS, DEMANDS, SUITS, CAUSES OF ACTION, AND DAMAGES, INCLUDING WITHOUT LIMITATION, ATTORNEYS' FEES AND EXPENSES, FOR BODILY INJURY OR DEATH OF ANY EMPLOYEE OF CONTRACTOR, ITS AGENTS, OR ITS SUBCONTRACTORS OF EVERY TIER, EVEN IF THE BODILY INJURY OR DEATH IS CAUSED BY OR ALLEDGED TO HAVE BEEN CAUSED BY THE SOLE OR PARTIAL NEGLIGENCE, FAULT, OR STRICT LIABILITY OF ANY INDEMNITEE**

12.2 **GENERAL INDEMNITY: CONTRACTOR, ITS OFFICERS, DIRECTORS, PARTNERS, CONTRACTORS, EMPLOYEES, REPRESENTATIVES, AGENTS, SUCCESSORS, ASSIGNS, VENDORS, GRANTEES, AND/OR TRUSTEES (COLLECTIVELY REFERRED TO AS "CONTRACTOR" FOR PURPOSES OF THIS SECTION), AGREE TO RELEASE, DEFEND, INDEMNIFY, AND HOLD HARMLESS THE COUNTY AND ITS OFFICERS, OFFICIALS, DEPARTMENT HEADS, REPRESENTATIVES, AGENTS, AND EMPLOYEES (COLLECTIVELY REFERRED TO AS "COUNTY" FOR PUPOSES OF THIS SECTION) FROM ANY AND ALL CLAIMS, DEMANDS, DAMAGES, INJURIES – INCLUDING DEATH AND BODILY INJURY – LIABILITIES, AND EXPENSES (INCLUDING ATTORNEY'S FEES AND COSTS OF DEFENSE) ARISING DIRECTLY OUT OF OR RESULTING FROM THE OPERATION OR PERFORMANCE OF CONTRACTOR UNDER THIS AGREEMENT. THE COUNTY WILL NOT ACCEPT LIABILITY FOR INJURIES THAT ARE THE RESULT OF THE NEGLIGENCE, MALFEASANCE, ACTION, OR OMMISION OF CONTRACTOR. CONTRACTOR AGREES TO ACCEPT LIABILITY FOR INJURIES TO ITSELF OR OTHERS CAUSED BY ITS OWN NEGLIGENCE, MALFEASANCE, ACTION, OR OMMISSION. THIS INDEMNIFICATION PROVISION IS ALSO SPECIFICALLY INTENDED TO APPLY TO, BUT NOT BE LIMITED TO, ANY AND ALL CLAIMS, WHETHER CIVIL OR CRIMINAL, BROUGHT AGAINST COUNTY BY ANY GOVERNMENT AUTHORITY OR AGENCY RELATED TO ANY PERSON PROVIDING SERVICES UNDER THIS**

AGREEMENT THAT ARE BASED ON ANY FEDERAL IMMIGRATION LAW AND ANY AND ALL CLAIMS, DEMANDS, DAMAGES, ACTIONS, AND CAUSES OF ACTION OF EVERY KIND AND NATURE, KNOWN AND UNKNOWN, EXISTING OR CLAIMED TO EXIST, RELATING TO OR ARISING OUT OF ANY EMPLOYMENT RELATIONSHIP BETWEEN CONTRACTOR AND ITS EMPLOYEES OR SUBCONTRACTORS AS A RESULT OF THAT SUBCONTRACTOR'S OR EMPLOYEE'S EMPLOYMENT AND/OR SEPARATION FROM EMPLOYMENT WITH THE CONTRACTOR, INCLUDING BUT NOT LIMITED TO ANY DISCRIMINATION CLAIM BASED ON SEX, SEXUAL ORIENTATION OR PREFERENCE, RACE, RELIGION, COLOR, NATIONAL ORIGIN, AGE OR DISABILITY UNDER FEDERAL, STATE OR LOCAL LAW, RULE OR REGULATION, AND/OR ANY CLAIM FOR WRONGFUL TERMINATION, BACK PAY, FUTURE WAGE LOSS, OVERTIME PAY, EMPLOYEE BENEFITS, INJURY SUBJECT TO RELIEF UNDER THE WORKERS' COMPENSATION ACT OR WOULD BE SUBJECT TO RELIEF UNDER ANY POLICY FOR WORKERS COMPENSATION INSURANCE, AND ANY OTHER CLAIM, WHETHER IN TORT, AGREEMENT, OR OTHERWISE.

COUNTY SHALL HAVE THE RIGHT TO APPROVE DEFENSE COUNSEL TO BE RETAINED BY CONTRACTOR IN FULFILLING ITS OBLIGATION TO DEFEND AND INDEMNIFY COUNTY HEREUNDER, UNLESS SUCH RIGHT IS EXPRESSLY WAIVED BY COUNTY IN WRITING. COUNTY RESERVES THE RIGHT TO PROVIDE A PORTION OR ALL OF ITS OWN DEFENSE; HOWEVER, COUNTY IS UNDER NO OBLIGATION TO DO SO. ANY SUCH ACTION BY COUNTY IS NOT TO BE CONSTRUED AS A WAIVER OF CONTRACTOR'S OBLIGATION TO DEFEND COUNTY OR AS A WAIVER OF CONTRACTOR'S OBLIGATION TO INDEMNIFY COUNTY PURSUANT TO THIS AGREEMENT. IF CONTRACTOR FAILS TO RETAIN COUNTY APPROVED DEFENSE COUNSEL WITHIN TEN (10) BUSINESS DAYS OF COUNTY'S WRITTEN NOTICE THAT COUNTY IS INVOKING ITS RIGHT TO INDEMNIFICATION UNDER THIS AGREEMENT, COUNTY SHALL HAVE THE RIGHT TO RETAIN DEFENSE COUNSEL ON ITS OWN BEHALF, AND CONTRACTOR SHALL BE LIABLE FOR ALL REASONABLE ATTORNEY FEES AND COSTS INCURRED BY COUNTY. CONTRACTOR AND COUNTY AGREE TO FURNISH TIMELY WRITTEN NOTICE TO EACH OTHER OF ANY SUCH CLAIM.

THIS SECTION SHALL SURVIVE THE TERMINATION OF THIS AGREEMENT.

SECTION 13. RECORDS AND AUDITS

13.1 Record Copy: Contractor shall maintain a record copy of all Drawings, Specifications, Addenda, Change Orders, and written interpretations and clarifications in good order and annotated to show all changes made during construction. These documents, together with all final samples and all final Shop Drawings shall be available to the County and the Design Engineer during performance of the Work. Upon Substantial Completion of the Work, these records and documents, samples, and Shop Drawings shall be promptly delivered to the Authorized Representative.

13.2 Document Ownership: The County shall be the absolute and unqualified owner of all drawings, preliminary layouts, record drawings, sketches, as-built drawings and other documents, including those identified in Section 13.1, prepared by the Contractor pursuant to this Contract. The Contractor shall deliver all such documents to the County prior to submitting the final Application for Payment. Neither the Contractor nor any Subcontractor shall reuse any such documents or copies on any other project without the written consent of both the County and the Design Engineer.

13.3 Record Preservation and Maintenance: The Contractor shall maintain and preserve accurate and complete records relating to the Project for a period of five (5) years measured from the expiration of the defects period, termination of this Contract, until all audit and litigation matters that the County has brought to the attention of the Contractor are resolved, or as otherwise required by law, whichever is longer. Upon request, the Contractor shall provide the County with such records. This Section 13.3 shall survive termination of the Contract.

13.4 Right to Inspect, Examine, Reproduce, and Audit: Waller County, and any of its duly authorized employees or agents, shall have the right to inspect, examine, reproduce, and audit the books and records of the Contractor generated by or on behalf of Contractor, whether paper, electronic, or other media, which are in any way related to performance of or compliance with this Contract, including, but not limited to:

a. Accounting records;

b. Written policies and procedures;

c. Subcontract files (including proposals of successful and unsuccessful bidders, and other related documents);

d. Original estimates and estimating work sheets;

e. Correspondence;

f. Change Order files;

g. Back charge logs and supporting documentation;

h. General ledger entries detailing cash and trade discounts earned, insurance rates, and dividends;

i. Lump sum agreements between Contractor and any Subcontractor or Supplier;

j. Records necessary to evaluate Contract compliance, Change Order pricing, and any Claim submitted by Contractor or any of its payees; and

k. Any other Contractor record that may substantiate any charge related to this Contract.

13.5 Survival of Terms: Waller County's right to inspect, examine, reproduce, and audit under this section for the same period of years that Contractor is required to maintain and preserve records under Section 13.3.

SECTION 14. SILENCE OF SPECIFICATIONS

14.1 Silence of Specifications: The apparent silence of specifications as to any detail, or the apparent omission of a detailed description concerning any point, shall be regarded as

meaning that only the best commercial practice is to prevail, and that only material and workmanship of the finest quality are to be used. All interpretations of specifications shall be made on the basis of this statement. The items furnished under this contract shall be new, unused of the latest product in production for commercial trade. The materials used and workmanship provided shall be of the highest quality.

SECTION 15. INDEPENDENT CONTRACTOR

15.1 Independent Contractor: The Contractor and its employees are independent contractors. Contractor shall exercise independent judgment in performing its duties under this Contract, and is solely responsible for setting working hours, scheduling or prioritizing its work flow, and determining how the work is to be performed. No term or provision of this Contract shall be construed as creating an employer/employee relationship, partnership, or a joint venture. Contractor agrees and understands that the Contract does not grant any rights or privileges established for employees of the County.

SECTION 16. LIMIT OF APPROPRIATIONS

16.1 Limit of Appropriations: Funds for payment of this Contract have been provided through the County budget approved by Commissioners Court for this fiscal year only. The State of Texas law prohibits the obligation and expenditure of public funds beyond the current fiscal year. The fiscal year for the County extends from January 1 of each calendar year until December 31 of the same calendar year. It is the expectation of the County that funding will be available to pay for the expenditures related to this Contract. Notwithstanding anything to the contrary in this Contract, if at any time during the term of this Contract the Commissioners Court of the County fails to provide funding for this Contract during the County's following fiscal year, does not adopt a budget for expenditures, or is only able to partially fund the expenditures required by this Contract, the County may, upon giving Contractor written notice of such failure, terminate this Contract, or a part hereof without any further liability to Contractor. Neither County, its elected officials, employees, agents, insurers, attorneys, nor any other individual acting on behalf of County may make any representation or warranty as to whether any appropriation will, from time to time, be made by the Waller County Commissioners Court. The failure of County to appropriate sufficient funds will not cause the County to be in default under this Agreement, and Contractor's sole and exclusive remedy shall be to terminate this Agreement. The County shall pay Contractor for any services already rendered under this Contract prior to the effective date of the termination.

SECTION 17. TEXAS REQUIRED CERTIFICATIONS

17.1 No Boycotting Israel: By signature affixed hereto, Contractor certifies that it does not currently boycott Israel, and will not boycott Israel during the term of this Contract.

17.2 Texas Comptroller's List of Prohibited Companies: By signature affixed hereto, Contractor certifies that it is not listed on the website of the Texas Comptroller concerning the listing of companies that are identified under Texas Government Code §§ 806.051, 807.051, or 2253.153.

17.3 No Energy Company Boycott: By signature affixed hereto, Contractor certifies that it does not currently boycott energy companies, and will not boycott energy companies during the term of this Contract.

17.4 No Discrimination Against Firearm and Ammunition Industries: By signature affixed hereto, Contractor certifies that it does not currently discriminate against firearm and ammunition industries, and that it will not during the term of this Contract.

SECTION 18. MISCELLANEOUS PROVISIONS

18.1 Jurisdiction and Venue: This Contract is made in and shall be construed according to the laws of the State of Texas, without regard to its conflict of laws provisions. Venue of any court action(s) brought directly or indirectly by reason of this Contract shall be in a court of competent jurisdiction in Waller County, Texas. This Contract is made and is to be performed in Waller County, Texas.

18.2 Right of Review: The County may review any and all of the goods and services performed by Contractor under this Agreement. The County is granted the right to audit, at the County's election, all of Contractor's records and billings related to the performance of this Contract as may be reasonably necessary. Any payment, settlement, satisfaction, or release made or provided during the course of performance of this Contract shall be subject to County's rights as may be disclosed by a review under this Section.

18.3 No Waiver: No claim or right arising out of a breach of this Contract can be discharged in whole or in part by a waiver or renunciation of the claim or right unless the waiver or renunciation is supported by consideration and is in writing signed by the aggrieved Party. The County's failure to require strict performance of any provision of this Contract does not waive or diminish the County's right thereafter to demand strict compliance with that or any other provision. The County's waiver or failure to exercise in any respect any right provided for in this Contract shall not be deemed a waiver of any further right under this Contract. The County does not waive, modify, or alter to any extent any of its defenses, immunities, or remedies.

18.4 No Personal Liability: Nothing herein shall be construed as creating any personal liability for any officer, agent, or employee of the County.

18.5 Severability: If any provision of this agreement is invalid, illegal, or unenforceable under any applicable statute, court decision, or rule of law, it is to that extent deemed to be omitted. In such event, there shall be substituted for such deleted provision a provision as similar as possible in terms and in effect to such deleted provision that is valid, legal, or enforceable. The remainder of the agreement shall be valid and enforceable to the maximum extent possible.

18.6 Entire Agreement: This Contract, together with all of its appendices, embodies the complete agreement of the Parties hereto, superseding all oral or written previous and contemporary agreements between the Parties and relating to matters in this Contract. By entering into this Contract, the Parties do not intend to create any obligations, express or implied, other than those specifically set out in this Contract.

18.7 Modification: The Contract may not be modified, altered, or amended except by written instrument duly authorized by the Waller County Commissioners Court and executed by both Parties.

18.8 Titles Not Restrictive: The titles assigned to the various sections and paragraphs of this Contract are for convenience only. Titles shall not be considered restrictive of the subject matter of any part of this Contract.

18.9 Tax Exempt: The County is a tax-exempt entity under Texas Tax Code § 151.039, and will not pay a tax from which it is exempt. Tax exempt paperwork will be provided upon written request for the purchase of any items qualifying for exemption under this Contract. In accordance with applicable laws and regulations, Contractor shall issue its Texas Resale Certificate to vendors and subcontractors for items that qualify for exemption. The Contractor shall be responsible for paying any and all taxes assessed, in whole or in part, on the Project or the Work. The County will not pay for, or reimburse Contractor for any tax from which it is exempt.

18.10 No Arbitration: A dispute arising under this Contract shall not be subject to arbitration.

18.11 Waiver of Subrogation: Contractor, Subcontractor's, and their insurance carriers waive any and all rights whatsoever with regard to subrogation against County as indirect parties to any suit arising out of personal or property damages resulting from Contractor's or Subcontractor's, or their employees' performance under this Contract.

18.12 Successors and Assigns: Waller County and the Contractor bind themselves, and their permitted successors executors, administrators, and assigns to this Contract. Neither Party shall assign, sublet, or transfer its interest, in whole or in part, in this Contract without the prior written consent of the other Party. The following conditions must be met before any permitted assignment becomes effective: a) Contractor must give written notice of a proposed assignment to the County at least thirty (30) days prior to the effective date of the assignment; b) the assignee must explicitly accept all of Contractor's obligations under this Contract; c) Contractor must retain its obligations to the County under this Contract until the assignment is effective; d) the assignment must be executed by both Contractor and the assignee; e) Contractor must provide the County a fully executed assignment agreement not later than five (5) business days after the assignment is signed, and f) the County provides a signed, written consent to the assignment.

18.13 Illegal Price Fixing: Contractor agrees to assign to the County any rights it may have to bring antitrust suits against its Suppliers for overcharges on materials incorporated in the Project growing out of illegal price fixing agreements. Contractor further agrees to cooperate with the County should the County which to prosecute suits against Suppliers for illegal price fixing.

18.14 Right to Offset: No money shall be paid by the County upon any claim, debt, demand, or account to any person, firm, corporation, or entity who owes taxes or any other debt to the County. The County shall be entitled to offset any such debt, claims, demand, or account by deducting the amount of taxes due to the County from any payment due to the Contractor. No assignment, or transfer of any such debt, claim, demand, or account after said taxes are due or other debt accrues shall affect the right of the County to so offset said taxes or other debt against the Contractor.

18.15 No Third-Party Beneficiaries: This Contract does not inure to the benefit of any third party, except permitted successor or assigns.

18.16 Authority to Sign: Signatories to this Contract represent and warrant that they have the authority to bind the respective parties.

18.17 Public Communications: Contractor shall not, under any circumstance, release any material or information developed in the performance of its services hereunder without the express

written permission of the County, except where required by law to do so. If required by law to release any material or information, Contractor shall notify the County before the release. County shall be solely responsible for communicating with and providing information to the news media, citizens of Waller County, and other governmental agencies.

18.18 Confidentiality: The County is bound by Texas Government Code Chapter 552, the Public Information Act, and other laws concerning government records. Contractor shall clearly and noticeably mark all confidential information and documents it provides to the County pursuant to this Contract. The County will make good faith efforts to promptly notify Contractor if any such information is requested in a public information request, subpoena, or other method so Contractor may argue against the release of such information. Contractor recognizes and understands that the final decision as to what information must be disclosed pursuant to the PIA lies with the Texas Attorney General. Contractor further agrees that the County may furnish information acquired through or pursuant to this Contract and that is requested through the PIA to the Texas Attorney General for a determination of whether the information must be disclosed. Neither the County, nor any of its officers, or employees shall have any liability or obligation to any party for the disclosure to the public, or to any person or persons, of any items or data furnished to the County by Contractor in reliance on any statute, court opinion, court order, or the advice, decision, or opinion of the Texas Attorney General.

18.19 Notices: Notices delivered hereunder shall be in writing and shall be delivered by personal delivery or certified mail, return receipt requested. Mailed notices shall be deemed received three (3) business days after the notice is placed in the mail with proper postage paid. Any notice or certification to be provided pursuant to this Agreement shall be delivered to the following persons, unless a substitute representative is designated in writing:

To the County	To Contractor:
Attn: County Judge 425 FM 1488, Suite 106 Hempstead, Texas 77445	As indicated on Bidder's Business Information Sheet

With a copy to:

Waller County Facilities Department
Attn: Danny Rothe
425 FM 1488
Hempstead, Texas 77445

END

Contract Special Terms and Conditions

Bidder must clearly identify on this form whether it requests any Special Terms and Conditions that deviate from the Bid Documents, including the Contract Documents, or any other requirements contained in the IFB. Complete and detailed information regarding deviations must be clearly identified on this form. The County will consider any Special Terms and Conditions in its Contract award decision, and reserves the right to accept or reject a Bid based upon any submitted deviation.

In the absence of the identification on this form of requested deviations, Bidder must fully comply with the Bid Documents and Contract Documents and all other requirements associated with this IFB if awarded a Contract under this IFB. A deviation will not be effective unless it is accepted by the County. The County may, in its sole discretion, seek clarification from and/or communicate with Bidder(s) regarding any submitted deviation, consistent with general procurement principles of fair competition. The County reserves the right to accept or reject a Bid based upon any submitted deviation.

Please mark one of the following:

☐ Bidder requests NO deviations.

☐ Bidder requests deviations.

Specifically identify the language and location or section of the Bid Documents and/or Contract Documents that Bidder is requesting a deviation from, and provide the specific language to be substituted as Special Terms and Conditions. **Attach the sheet(s) containing the requested deviations to his form.**

Company Name	Date
Signature of Authorized Company Official	Printed Name

Contract Sheet

Contract Sheet
Bid 25-002

THE STATE OF TEXAS
COUNTY OF WALLER

This Contract is made and entered into on the _____ day of _____, 2025, by and between Waller County, Texas, a political subdivision of the State of Texas ("County"), acting through County Judge Carbett "Trey" Duhon, III by virtue of an order of Waller County Commissioners Court, and _____, of the City of _____, County of _____, and State of _____ ("Contractor") (referred to individually as "Party," and collectively as "Parties").

In consideration of the promises, performances, payments, and agreements set forth herein, Contractor hereby agrees to commence and complete the following Project: **Construction of Justice Center Vehicle Maintenance Garages for Waller County**, and all Work in accordance with the Contract Documents, which are incorporated herein by reference and made a part hereof for all purposes as if each were set out at length, word for word, and the County agrees to pay the Contractor the total amount of:

$	
(Figures)	(Words)

The Contractor hereby agrees to commence work on the date specified in the written Notice to Proceed to be issued by the County, and to finally complete construction of the improvements, as required by the Contract Documents within _____ calendar days. Waiver of any breach of this Contract shall not constitute waiver of any subsequent breach.

In consideration of the award and execution of this Contract, and in consideration of the waiver of its right to attorney's fees by the County, the Contractor knowingly and intentionally waives its right to attorney's fees under Texas Local Government Code Section 271.153 in any administrative proceeding, alternative dispute resolution proceeding, or litigation arising out of or connected to this Contract.

The County agrees to pay the Contractor from available funds for performance of the Contract in accordance with the Bind and provisions of the Contract Documents, subject to additions and deductions, as provided therein.

The County's payment obligations are payable only and solely from funds available for the purposes of this Contract.

It is further agreed that this contract shall not become binding or effective until signed by the parties hereto and a purchase order authorizing the items desired has been issued.

Although drafted by the County, the Contract, in the event of any disputes over its meaning or application, shall be interpreted fairly and reasonably, and neither more strongly for nor against either Party.

This Contract is executed to be effective upon the date of the last signature affixed hereto.

The undersigned, by their signature, represents that they are authorized to bind the Contractor to fully comply with the Contract. The Contractor, by signing below, acknowledges that they have read the entire Contract, and agree to be bound by the terms contained therein.

Approved this _____day of _____20_____.

Waller County, Texas

_____
County Judge, Carbett "Trey" Duhon, III

_____
Date

_____
By: Signature of Contractor

_____
Date

_____
Printed Name and Title of Signatory

ATTEST

_____
Debbie Hollan, County Clerk

VEHICLE MAINTENANCE GARAGE

FOR

WALLER COUNTY

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

PROJECT MANUAL

APRIL 2025

LDDBlueline™

Discover | Design | Deliver

VEHICLE MAINTENANCE GARAGE
for
WALLER COUNTY

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TEXAS 77445

PROJECT MANUAL
APRIL 2025

OWNER	**Waller County** 836 Austin St., Suite 124 Hempstead, TX 77445 Phone: 979.826.7737
ARCHITECT	**LDDBlueline** 333 Cypress Run, Suite 350 Houston, TX 77094 Phone: 281.497.1040
CIVIL ENGINEER	**ALJ Lindsey** 18635 N. Eldridge Pkwy, Suite 200 Tomball, TX 77377 Phone: 281.301.5955
STRUCTURAL ENGINEER	**SCA Consultant Engineers** 12511 Emily Court Sugar Land, TX 77478 Phone: 713.779.7252
MEP ENGINEER	**KO Design** 455 School St., Suite 46 Tomball, TX 77375 Phone: 832.643.0368

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SECTION 00100 – INSTRUCTIONS TO BIDDERS

PART 1 - GENERAL

The Instructions to Bidders shall be the American Institute of Architects (AIA) Standard Document No. A701, "Instructions to Bidders," 1997 Edition. Printed copies may be obtained at architects' supplies stores, or by contacting the American Institute of Architects local chapter:

AIA/Houston
315 Capital St
Houston, Texas 77002
Phone (713) 520-0155

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 00100

SECTION 00620 – PAYMENT BOND

PART 1 - GENERAL

1.1 The Contractor shall furnish a Labor and Material Payment Bond by a Surety Company of the Contractor's choice, on forms satisfactory to Owner, in an amount equal to 100% of the Contract Sum. Bond form shall be compatible with provisions of governing authorities. Contractor shall record bond with the County Clerk in the location of the Project.

1.2 Bond shall remain in force for the time of the Contractor's obligations under The Agreement (the contract executed between the Owner and Contractor).

1.3 Surety Company executing bond shall be acceptable to the Owner, authorized to do business in the State of Texas and acceptable according to the latest list of companies holding Certificates of Authority from the U.S. Secretary of the Treasury.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 00620

SECTION 00700 – GENERAL CONDITIONS

PART 1 - GENERAL

The General Conditions of this Agreement is the American Institute of Architects (AIA) Standard Document No. A201, "General Conditions of the Contract for Construction," 2007 Edition. Printed copies may be obtained at architects' supplies stores, or by contacting the American Institute of Architects local chapter:

AIA/Houston
315 Capital St
Houston, Texas 77002
Phone (713) 520-0155

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 00700

SECTION 00800 – SUPPLEMENTARY CONDITIONS

PART 1 - GENERAL

1.1 The General Conditions are amended by these Supplementary Conditions. Where a portion of the General Conditions is modified or deleted by these Supplementary Conditions, the unaltered portions of the General Conditions shall remain in effect.

1.2 Wherever the term "Bid" may be used it shall mean "Proposal," and wherever the term "Bidder" is used it shall mean "Offeror" or "Proposer."

1.3 Modifications to the General Conditions follow, referenced by article and paragraph number used or implied in the General Conditions.

Article 2, Owner

Change paragraph 2.2.5 to read as follows:

2.2.5 The Contractor will be furnished free of charge **1** copy of Drawings and Project Manuals. Additional sets will be furnished at the cost of reproduction, postage and handling.

Article 3, Contractor

Add paragraph 3.3.4 as follows:

3.3.4 The Contractor shall promptly after commencement of the Work (1) review installation procedures recommended by manufacturers, (2) advise the Architect if following any of the procedures will affect any warranties including the Contractor's general warranty, and if so, (3) propose an alternative procedure which the Contractor will warrant and which will not increase the cost to the Owner.

Add paragraph 3.3.5 as follows:

3.3.5 Contractor shall bear sole responsibilities for design and execution of acceptable trenching and shoring procedures, in accordance with Texas Government Code, Section 2166.303 and Texas Health and Safety Code, Subchapter C, Sections 756.021, et seq. On trench excavations in excess of 5 feet in depth, Contractor shall pay a qualified engineer, experienced in the engineering design and preparation of drawings and specifications for compliance with state requirements for trenching and shoring, to prepare and professionally seal detailed drawings and specifications directing Contractor in the safe execution of trenching and shoring."

Change paragraph 3.4.2 to read as follows:

3.4.2 After the Contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions and within the time frames set forth in Division 1 of the Specifications. By making any request for substitutions, the Contractor:

.1 represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified by a comparison of all characteristics and properties;

.2 represents that the Contractor will provide the same warranty for the substitution that the Contractor would provide for that specified;

.3 certifies that the cost data presented is complete and includes all related costs under this Contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and

.4 will coordinate the installation of the accepted substitute, including any affect on related Work, making such changes as may be required for the Work to be complete in all respects.

Add the following paragraph:

3.4.4 PREVAILING WAGE RATES: In compliance with the laws of Texas relating to labor, the Contractor and subcontractors shall ascertain the General Prevailing wage rates in the location of the Project. Contractor and subcontractors shall pay all laborers, workmen and mechanics employed by them in the execution of the Work not less than such rate for each craft or type of laborer, workman or mechanic needed to execute the Work.

Add the following subparagraph:

3.6.1.1 Owner qualifies for tax exempt status under Federal and State law, and shall receive the full benefits for such status as the law allows with regard to taxes normally paid. Owner will provide Contractor with applicable forms for Contractor’s use in this regard.

Add the following paragraph:

3.18.3 The obligations of the Contractor under this Paragraph 3.18 shall not extend to the liability of the Architect, the Architect's consultants, and agents and employees of any of them arising out of (1) the preparation or approval of maps, drawings, opinions, reports, surveys, Change Orders, designs or specifications, or (2) the giving of directions or instructions by the Architect, the Architect's consultants, and agents and employees of any of them provided such giving is the primary cause of the injury or damage.

Article 4, Administration of the Contract

Add the following subparagraph:

4.2.4.1 Any direct communications between Owner and Contractor that affect the performance or administration of the Contract shall be made or confirmed in writing, with copies to the Architect, and any such communications that represent a modification of the Contract requirements shall be documented appropriately. Communications among the Architect and Subcontractors shall be confirmed in writing to the Contractor.

Change paragraph 4.2.10 to read as follows:

4.2.10 A full-time project representative will not be provided on this Project.

Add the following subparagraph:

4.3.2.1 Instead of filing a claim, either party may file a Notice of Possible Claim within 21 days after the occurrence of the event or first recognition of a condition. By filing such notice, all further actions and timetables concerning the possible claim will be held until, if and when such Claim is actually filed. All Claims must be filed prior to Final Payment to be handled under the procedures of the General Conditions.

Article 7, Changes in the Work

Add the following paragraph:

7.3.10 Only amounts confirmed in signed Change Orders may be included in Applications for Payment.

Article 8, Time

Change paragraph 8.3.2 to read:

8.3.2 Contractor shall request any extension of Contract Time due to changes in the Work at the time of submitting request for change in Contract Cost. Changes in Construction Time shall generally be allowed only for the trade affected by the change. Changes in Contract Time due to weather will be allowed only for those trades not able to work due to the weather. An allowance for any Change in Contract Time is not an agreement to additional cost to the Owner.

Add the following new paragraph:

8.3.4 The Contractor shall anticipate and include in the construction schedule lost time due to adverse weather conditions in accordance with the average number of rain days per month in the Houston area per the National Weather Bureau as follows:

January ..... 6 days
February ..... 7 days
March ..... 4 days
April ..... 4 days
May ..... 2 days
June ..... 2 days
July ..... 3 days
August ..... 3 days
September ..... 2 days
October ..... 3 days
November ..... 4 days
December ..... 5 days

Article 9, Payments and Completion

Add to the end of paragraph 9.2.1:

9.2.1 …. Schedule of Values and Application for Payment back-up pages shall separate all trades into two categories and quote dollar amounts for each; i.e.: "Material" and "Labor".

Change paragraph 9.3.1.1 to read:

9.3.1.1 Only amounts confirmed in signed Change Orders may be included in Applications for Payment. A 10% retainage from amount due will be withheld monthly until Final Payment.

Change paragraph 9.4.1 to read:

9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either sign the Certificate on the Application for such amount as the Architect determines is properly due and send the certified Application to the Owner, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Subparagraph 9.5.1.

Add the following to the end of paragraph 9.6.7:

9.6.7 …. Nothing contained herein shall be in conflict with the Texas Property Code for projects in Texas.

Add the following to the end of paragraph 9.8.5:

9.8.5 …. Nothing contained herein shall be in conflict with Texas lien laws for projects in Texas. Release of retainage is considered final payment and is governed by provisions of paragraph 9.10.

Add the following to the end of paragraph 9.10.2:

9.10.2 …. When there has been filed with the County Clerk a Statutory Payment Bond and a copy of the Contract in accordance with Subparagraph 11.5.1, rights and liabilities of the Owner and Contractor in regard to claims for unpaid bills arising by virtue of the Contract shall be prescribed by the applicable provisions of Section 53.001 of the Texas Property Code added by the acts of the Regular Session of the 68th Legislature for private work, and Chapter 2253 of the Texas Government Code for public work.

Add the following paragraph

9.10.6 In any event, Final Payment shall not be due until 30 days after last Work has been completed under this Contract.

Article 10, Protection of Persons and Property

Add the following paragraph:

10.2.8 Damage to the Owner's property or adjacent property shall be restored to original usable condition before completion of this Contract.

Article 11, Insurance and Bonds

Add the following subparagraph:

11.1.2.1 Contractor shall purchase and maintain in force the following insurance coverages. Insurance must be in companies authorized to do business in Texas and are approved and acceptable to the Owner. Contractor shall be responsible to determine and enforce extent of coverage required of subcontractors. Provide Waiver of Subrogation in favor of Owner and Architect for coverages in A, B, and E below. Provide 30 days notice of any changes to coverage. Amounts of coverage listed below are minimums and may be increased by Owner's directive to Contractor.

A. Commercial General Liability, occurrence basis, including:

Premises - Operations
Explosion and Collapse Hazard
Underground Hazard
Independent Contractors
Broad Form Property Damage
Contractual Liability
Products and Completed Operations
Personal Injury with Employment Exclusion Deleted

Minimum limits of liability for the above coverages shall be:

General aggregate	$ 2,000,000
Products – Completed Operations	$ 2,000,000
Property Damage	$ 500,000
Bodily Injury	$ 1,000,000

Bodily Injury & Property Damage Combined	$ 1,000,000
Personal Injury	$ 1,000,000

B. Automobile Liability, any auto including Owned, Hired and Non-Owned. Minimum limits of liability for the above coverages shall be:

Combined single limits	$ 1,000,000

C. Excess Liability, Umbrella Form. Minimum limit of liability for the above coverage shall be:

Each Occurrence	$ 2,000,000
Aggregate	$ 2,000,000

D. Workers' Compensation: Statutory Amount

E. Employer's Liability. Minimum limit of liability for the above coverage shall be:

Each Accident	$ 1,000,000
Disease - Policy Limit	$ 1,000,000
Disease - Each Employee	$ 1,000,000

Add the following subparagraph:

11.1.1.10 Completed Operations Insurance shall be kept in force for at least two years after Date of Final Completion. Contractor shall be responsible to determine and enforce extent of coverage required of subcontractors.

Replace paragraph 11.2.1 with the following:

11.2.1 Contractor shall secure and pay for Owner's Protective Liability Insurance in the same amounts as stated above for General Liability Insurance. Name Architect, Engineers and Consultants (if any) as additional insureds.

Revise paragraph 11.4.1 as follows:

11.4.1 Change first sentence to require Contractor, not Owner, to purchase and maintain All-Risk Builder's Risk property insurance, including structures and materials, to cover Owner, Contractor and all Subcontractors, as their interests may appear, on a 100% Completed Value basis, with a maximum deductible of $1,000 (Contractor shall be responsible for payment of all deductibles). Change intent of Paragraphs 11.4.1 thru 11.4.6 to comply.

Add the following paragraph 11.5.3:

11.5.3 Bonds shall be as follows:

1. Performance Bond: Performance Bond covering faithful performance of the Contract shall be equal to 100% of the Contract Sum and shall be issued by a Corporate Surety satisfactory to the Owner and authorized to do business in the State of Texas.
2. Payment Bond: Payment Bond covering payment of obligations arising under the Contract shall be equal to 100% of the Contract Sum and shall be issued by a Corporate Surety satisfactory to the Owner and authorized to do business in the State of Texas. This bond shall be approved by the Owner and filed, together with a copy of the Agreement between the Contractor and Owner, in the office of the County Clerk. Bond to comply with Texas Property Code, Section 53.001, or Texas Government Code, Chapter 2253, as applicable.

Article 14, Termination or Suspension of the Contract

Revise paragraph 14.2.2 to read as follows:

14.2.2 If no Performance Bond has been furnished and when any of the above reasons exist, the Owner, upon certification by the Architect that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor seven days' written notice, terminate employment of the Contractor and may:

Add a new paragraph and subparagraphs between 14.2.2 and 14.2.3 as follows:

If a Performance Bond has been furnished and whenever the Contractor shall be declared by the Owner to be in default under the Contract for any of the causes stated above, and the Owner's obligations have been performed thereunder, the Surety shall promptly remedy the default, or shall promptly:

1. Complete the Contract in accordance with its terms and conditions, or
2. Obtain a proposal or proposals for submission to the Owner for completing the Contract in accordance with its terms and conditions, and upon determination by the Owner and the Surety of an acceptable proposal and offeror, arrange for a contract between such offeror and Owner, and make available as work progresses, even though there should be a default or a succession of defaults under the contract or contracts of completion arranged under this paragraph, sufficient funds to pay the cost of completion less the balance of the contract price, but not exceeding, including other costs and damages for which the Surety may be liable under the Bond, the penal amount of the Bond. The term "balance of the contract price", as used herein shall mean the total amount payable by the Owner to the Contractor under the Contract and amendments thereto, less the amount properly paid by the Owner to the Contractor.

Change paragraph 14.4.3 to read as follows:

14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment only for Work executed and costs incurred by reason of such termination.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 00800

SECTION 01100 – SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Work covered by the Contract Documents.
2. Type of the Contract.
3. Work included in Contract.
4. Work excluded from Contract.
5. Use of premises.
6. Work restrictions.
7. Owner-furnished products.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. Project Identification: Waller County Vehicle Maintenance Garage (06-25-003)

1. Project Location: 200 Sheriff R Glenn Smith Dr. Hempstead, TX 77445

B. Owner: **Waller County**
836 Austin St. Suite 124
Hempstead, TX 77445
979.826.7737

C. Architect: **LDDBlueline**
333 Cypress Run, Suite 350
Houston, TX 77094
281.497.1040

D. The Work consists of the following:

1. The Work includes new construction of a 1-story vehicle maintenance garage and associated site work.

1.4 TYPE OF CONTRACT

A. Project will be constructed under a single contract between Owner and Contractor.

B. Contract will be:

1. Lump sum contract (AIA A101).

C. WORK INCLUDED IN CONTRACT

1. Performance with Payment Bonds
2. Lightning Protection.
3. Natural Gas Service.
4. Coordination with Owner's Security System Provider including Card Access Readers at doors.
5. Fifty (50) gallon oil tank installation (see "Owner-Furnished Products" for Contractor responsibilities).
6. Irrigations sleeves underneath all new concrete (drives, etc.) for future Owner irrigation.
7. Landscaping, site irrigation (sprinkler lines), irrigation sleeves, irrigation meter, tap, and backflow preventer.

D. WORK EXCLUDED FROM CONTRACT

1. Fire Sprinkler system.
2. Generator.
3. Security system.
4. Sound system and audio/visual system.
5. Telephone with intercom systems.
6. Computer cabling.
7. Window coverings.
8. Food service equipment and appliances (see "Owner-Furnished Products" for Contractor responsibilities).
9. Kitchen appliances.
10. Commercial icemaker.
11. Refrigerators.
12. Coffee Maker.
13. Water Dispenser.
14. Microwaves.
15. Copiers and mail equipment / furniture.
16. Furnishings.
17. Trash and recycle bins.

18. Landscaping, site irrigation (sprinkler lines), irrigation sleeves, irrigation meter, tap, and backflow preventer.
19. Lawn maintenance.
20. Hazardous materials detection and abatement, including asbestos and mold.
21. Impact fees and assessments.
22. Tap fees and connection fees and meter fees.

1.5 USE OF PREMISES

A. General: Contractor shall have limited use of premises for construction operations as indicated on Drawings by the Contract limits.

1. Owner’s toilet facilities are not to be used by Contractor.

B. Use of Site: Limit use of premises to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.

1.6 WORK RESTRICTIONS

A. On-Site Work Hours: Work shall be generally performed during normal business working hours of 7:00 a.m. to 3:30 p.m., Monday through Friday, except as otherwise agreed upon with Owner.

1.7 OWNER-FURNISHED PRODUCTS

A. Owner will furnish products indicated. The Work includes providing support systems to receive Owner's equipment and making plumbing, mechanical, and electrical connections where required to make equipment operational.

1. Owner will arrange for and deliver pertinent information to Contractor.
2. Owner will arrange and pay for delivery of Owner-furnished items according to Contractor's Construction Schedule.
3. After delivery, Owner will inspect delivered items for damage. Contractor shall be present for and assist in Owner's inspection.
4. If Owner-furnished items are damaged, defective, or missing, Owner will arrange for replacement.
5. Owner will arrange for manufacturer's field services and for delivery of manufacturer's warranties to Contractor.
6. Owner will furnish Contractor the earliest possible delivery date for Owner-furnished products. Using Owner-furnished earliest possible delivery dates, Contractor shall designate delivery dates of Owner-furnished items in Contractor's Construction Schedule.
7. Contractor shall review Shop Drawings, Product Data, and Samples and return them to Architect noting discrepancies or anticipated problems in use of product.
8. Contractor is responsible for receiving, unloading, and handling Owner-furnished items at Project site.

9. Contractor is responsible for protecting Owner-furnished items from damage during storage and handling, including damage from exposure to the elements.
10. If Owner-furnished items are damaged as a result of Contractor's operations, Contractor shall repair or replace them.
11. Contractor shall install and otherwise incorporate Owner-furnished items into the Work.

B. Owner-Furnished Products:

1. Fifty (50) gallon oil tank.

1.8 MISCELLANEOUS PROVISIONS

A. Fees paid by Owner

1. Assessment charges for storm sewer, sanitary sewer, and water service based on land development, if any, exclusive of permit fees.
2. Easement charges, if any
3. Texas Accessibility Standards approval fees.
4. Tap and connection fees and meter fees.

B. Fees paid by Contractor

1. All building-permit costs, and new driveway approach inspection fees.
2. All other permits, governmental fees, licenses and inspections necessary for the proper execution of the Contract and which are legally required at the time the Contract is signed, and which are not paid by the Owner.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01100

SECTION 01210 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Allowances.

1.3 SELECTION AND PURCHASE

A. At the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. Obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. After Architect's selection, promptly notify Architect of any reasonable objections against supplier.

D. Purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

1.5 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials ordered by Owner under allowance and shall include taxes, freight, and delivery to Project site.

B. Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner under allowance shall be included as part of the Contract Sum and not part of the allowance.

C. Show all allowance amounts on Contractor’s Schedule of Values.

1.7 CONTINGENCY ALLOWANCES

A. Use the contingency allowance only as directed by Architect for Owner's purposes and only by Change Orders or Contingency Allowance Authorizations that indicate amounts to be charged to the allowance.

B. Contractor's overhead, profit, and related costs for products and equipment ordered by Owner under the contingency allowance are included in the allowance and are not part of the Contract Sum. These costs include delivery, installation, taxes, insurance, equipment rental, and similar costs.

C. Change Orders authorizing use of funds from the contingency allowance will include Contractor's related costs and reasonable overhead and profit margins.

D. At Project closeout, credit unused amounts remaining in the contingency allowance to Owner by Change Order.

1.8 UNUSED MATERIALS

A. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Owner or Architect, prepare unused material for storage by Owner when it is not economically practical to return the material for credit. If directed to do so, deliver unused material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. **Allowance No. 1**: For modifications to finished construction resulting from field inspection for compliance with the Texas Accessibility Standards (TAS), an allowance of five thousand dollars (**$5,000.00**).

B. **Allowance No. 2**: For interior and exterior signage per Division 10 Section “Signage”, an allowance of five thousand dollars (**$5,000.00**).

C. **Allowance No. 3**: For porcelain floor & wall tile, per Division 9 Section “Porcelain Tile”, an allowance of six dollars and fifty cents per square foot (**$6.50/sf**), materials only.

D. **Allowance No. 4**: For contingency per Division 0 Section “Allowances”, an allowance of fifty thousand dollars (**$50,000**).

END OF SECTION 01210

SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Contract Modification Procedures.

1.3 MINOR CHANGES IN THE WORK

A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710, "Architect's Supplemental Instructions" or similar form.

1.4 PROPOSAL REQUESTS

A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Proposal Requests issued by Architect are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
2. Within 5 business days after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect. Contractor shall provide detailed back-up information as requested by Owner or Architect.

C. Proposal Request Form: Use AIA Document G709 or similar form for Proposal Requests.

1.5 ALLOWANCES

A. Allowance Adjustment: To adjust allowance amounts, base each Change Order proposal on the difference between purchase amount and the allowance, multiplied by final measurement of

work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within 15 business days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner may reject claims submitted later than 15 business days after such authorization.

1.6 CHANGE ORDER PROCEDURES

A. After Owner's approval of a Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701. Multiple Proposal Requests may be bundled into a single Change Order, in which case Contractor will be directed to proceed with work prior to execution of the Change Order.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714 or similar form. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

B. Documentation: Maintain detailed records where Construction Change Directive is done on a time and material basis. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01250

SECTION 01290 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Payment Procedures.

1.3 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Submit the Schedule of Values to Architect at earliest possible date but no later than **seven** days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values.

1. Change Orders: Provide a separate line item in the Schedule of Values for each Change Order.
2. Allowances: Provide a separate line item in the Schedule of Values for each allowance.

1.4 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

B. Payment Application Times: Progress payments shall be submitted to Architect by the last of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

C. Payment Application Forms: Use **AIA Document G702** and **AIA Document G703 Continuation Sheets** as form for Applications for Payment.

1. **Only** the **AIA G702** form is acceptable. Architect’s certification of Applications for Payment expressly assumes that all language, meanings, and intents on any application

for payment form submitted by Contractor are identical to those in the AIA G702. Should Contractor submit applications for payment on any form besides the AIA G702, Architect shall be entitled to consider the form submitted as being completely in conformance with AIA G702, notwithstanding any language, meanings, or intents that are at variance with AIA G702. Any variances from AIA G702 are not acknowledged.

D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect may return incomplete applications without action.

E. Transmittal: Submit **4** signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

F. Waivers of Mechanic's Lien: If required by Owner, with each Application for Payment, submit waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment. Submit waivers of lien on forms, executed in a manner acceptable to Owner.

G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule (preliminary if not final).
4. Schedule of unit prices, if any.
5. Certificates of insurance and insurance policies.
6. Performance and payment bonds, if required by Owner.

H. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

I. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. Final Project accounting (Cost Plus projects only).
5. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
6. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
7. AIA Document G707, "Consent of Surety to Final Payment."
8. Evidence that claims have been settled.
9. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01290

SECTION 01310 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative provisions for coordinating construction operations on Project:

B. Coordinate the requirements of this Section with those of other sections that require coordination with Project Management and Coordination.

1.3 COORDINATION

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections, that depend on each other for proper installation, connection, and operation.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare Coordination Drawings if limited space availability necessitates maximum utilization of space for efficient installation of different components or if coordination is required for installation of products and materials fabricated by separate entities.

B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other key personnel in attendance at Project site. List telephone numbers.

1.5 ADMINISTRATIVE AND SUPERVISORY PERSONNEL

A. General: In addition to Project superintendent, provide other administrative and supervisory personnel as required for proper performance of the Work.

1.6 PROJECT MEETINGS

A. General: Schedule and conduct meetings and conferences at Project site, unless otherwise indicated.

B. Preconstruction Conference: Schedule a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement. Hold the conference at Project site or another convenient location. Conduct the meeting to review responsibilities and personnel assignments.

1. Agenda: Discuss items of significance that could affect progress, including the following:

a. Tentative construction schedule.
b. Phasing.
c. Critical work sequencing and long-lead items.
d. Designation of key personnel and their duties.
e. Procedures for processing field decisions and Change Orders.
f. Procedures for requests for interpretations (RFIs).
g. Procedures for testing and inspecting.
h. Procedures for processing Applications for Payment.
i. Distribution of the Contract Documents.
j. Submittal procedures.
k. Preparation of Record Documents.
l. Use of the premises.
m. Work restrictions.
n. Owner's occupancy requirements.
o. Responsibility for temporary facilities and controls.
p. Construction waste management and recycling.
q. Parking availability.
r. Office, work, and storage areas.
s. Equipment deliveries and priorities.
t. Security.
u. Progress cleaning.
v. Working hours.
w. Construction progress meetings' time.

2. Minutes: Record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity that requires coordination with other construction. Pertinent installers and manufacturers/fabricators shall attend. Advise Architect of scheduled meeting dates (Architect may attend some conferences). Distribute minutes of the meeting to each party present and to parties who should have been present.

D. Progress and Coordination Meetings: Conduct progress meetings at regular intervals every other week, as required by Owner and Architect.

1. Agenda:

a. Contractor's Construction Schedule:

b. Review present and future activities and needs. This is to include the next scheduled meeting.

c. Review status of procedures:

1) Status of submittals.
2) Field observations.
3) Requests for interpretations (RFIs).
4) Status of proposal requests.
5) Pending changes.
6) Status of Change Orders.
7) Pending claims and disputes.
8) Documentation of information for payment requests.

2. Minutes: Record and distribute the meeting minutes.

3. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 01310

SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:

1. Construction Schedule.
2. Submittals Schedule.
3. Daily construction reports.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Construction Progress Documentation.

1.3 SUBMITTALS

A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:

1. Scheduled date for first submittal.
2. Specification Section number and title.
3. Name of subcontractor.
4. Description of the Work covered.

B. Construction Schedule: Submit three opaque copies.

1.4 COORDINATION

A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.

B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

A. Preparation: Submit a schedule of submittals, arranged in chronological order by approximate dates of submittal to Architect. Plan for sufficient time for Architect's review to prevent any delays to construction.

2.2 CONSTRUCTION SCHEDULE

A. Procedures: Comply generally with procedures contained in AGC's "Construction Planning & Scheduling."

B. Time Frame: Extend schedule from date established for commencement of the Work to date of Final Completion.

2.3 REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording information concerning events at Project site.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Contractor's Construction Schedule Updating: At monthly intervals, so every other construction progress meeting, update schedule to reflect actual construction progress and activities.

B. Distribution: Distribute copies of approved schedule to Architect**,** Owner, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

END OF SECTION 01320

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Submittal Procedures.

1.3 SUBMITTAL PROCEDURES

A. General: Electronic copies of CAD Drawings of the Contract Drawings may be provided by Architect for Contractor's use in preparing submittals, if requested.

B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

C. Submittals Schedule: Comply with requirements in Division 1 Section "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

E. Identification: Place a permanent label or title block on each submittal for identification.

F. Deviations: Highlight or otherwise specifically identify deviations from the Contract Documents on submittals.

G. Contractor’s Certification: All submittals shall bear a stamp, dated and initialed or signed by Contractor, that submittal has been reviewed by Contractor prior to submittal to Architect, and that submittal applies directly to Project.

H. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

I. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Transmit only to Architect (not to Architect's consultants) unless specifically authorized otherwise in advance. Architect will return submittals, without review, received from sources other than Contractor.

J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.

L. Use for Construction: Use only final submittals with mark indicating "Approved" or "Approved as Noted" taken by Architect.

1.4 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

A. General: It is the responsibility of the General Contractor and each sub-contractor requesting CAD files, to pay a fee of $500 (payable to the architect (Blueline) for administrative services associated with preparing the CAD files. The fee must be paid prior to receipt of the CAD files. At Contractor's written request, copies of Architect's CAD files may be provided to Contractor for Contractor's use in connection with Project, subject to the following conditions:

1. CAD files may be provided, but only as a convenience to the Contractor. Contractor and Contractor's subcontractors, suppliers, or any other party ("Contractor") who accept receipt of the CAD files, assumes all responsibility for confirming the suitability and accuracy of any information that is incorporated into submittals from the CAD files. It shall be the duty *solely* of the Contractor to verify dimensions, materials, etc, in the field that are graphically indicated on the CAD files. Due to the possibility of damage or alteration of CAD files in transmission, copying, or adaptation to other programs, Architect makes no representation or warranties regarding the information contained in CAD files. It is left *solely* to the discretion of Contractor whether CAD files are suitable for use. **HOLD HARMLESS**: Contractor shall hold Architect and Architect's consultants harmless for any matters relating to usage of CAD files.

2. Only CAD files of plans will be provided.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.

C. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Dimensions.
    b. Identification of products.
    c. Fabrication and installation drawings.
    d. Roughing-in and setting diagrams.
    e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    f. Shopwork manufacturing instructions.
    g. Templates and patterns.
    h. Schedules.
    i. Design calculations.
    j. Compliance with specified standards.
    k. Notation of coordination requirements.
    l. Notation of dimensions established by field measurement.
    m. Relationship to adjoining construction clearly indicated.
    n. Seal and signature of professional engineer if specified.
    o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

2. Number of Copies: Submit the number of copies needed by Contractor, plus one copy for Architect, plus one copy for Engineer if review by Engineer is likely. Submit two additional copies where copies are required for operation and maintenance manuals. Architect will retain one copy and Engineer one copy; remainder will be returned.

D. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of appropriate Specification Section.

2. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

3. Samples for Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

4. Number of Samples: Submit three samples.

2.2 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.

B. Manufacturer's Instructions: Submit written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

C. Material Safety Data Sheets (MSDSs): Submit only if specifically requested by Owner, and submit information directly to Owner. **Do not submit to Architect**.

2.3 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents, and that design is in accordance with applicable codes. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Submittals not required by the Contract Documents may not be reviewed and may be discarded without notification to Contractor.

END OF SECTION 01330

SECTION 01400 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality assurance and quality control.

B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.

1. Specific quality-assurance and -control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.

C. Coordinate the requirements of this Section with those of other sections requiring coordination with Quality Requirements.

1.3 SUBMITTALS

A. Reports: Prepare and submit certified written reports that include the following:

1. Identification of testing agency or inspector.
2. Date of issue.
3. Project title and number.
4. Name, address, and telephone number of testing agency.
5. Dates and locations of samples and tests or inspections.
6. Names of individuals making tests and inspections.
7. Description of the Work and test and inspection method.
8. Identification of product and Specification Section.
9. Complete test or inspection data.
10. Test and inspection results and an interpretation of test results.
11. Record of temperature and weather conditions at time of sample taking and testing and inspecting.
12. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
13. Name and signature of laboratory inspector.

14. Recommendations on retesting and re-inspecting.

1.4 QUALITY ASSURANCE

A. Testing: Where testing agency is indicated to perform preconstruction testing for compliance with specified requirements for performance and test methods, comply with the following:

1. Contractor responsibilities include the following:

   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.
   c. Provide sizes and configurations of test assemblies, mockups, and laboratory mockups to adequately demonstrate capability of products to comply with performance requirements.
   d. When testing is complete, remove test specimens, assemblies, mockups, and laboratory mockups; do not reuse products on Project.

2. Testing Agency Responsibilities: Submit a certified written report of each test, inspection, and similar quality-assurance service to Architect, Engineer, Owner, and Contractor. Interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from the Contract Documents.

1.5 QUALITY MONITORING

A. Owner Responsibilities: Owner will engage a qualified testing agency to perform quality testing for the Owner.

1. As a courtesy to the Contractor, copies of the testing agency reports will be provided to the Contractor.
2. Owner will pay for services of testing agency.
3. Costs for retesting and re-inspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor.

B. Testing Agency Responsibilities: Cooperate with Architect and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

1. Notify Architect and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality monitoring services.
5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
6. Do not perform any duties of Contractor.

C. Contractor Responsibilities:

1. Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not. Provide in accordance with other paragraphs of this specification.

2. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that replaced Work that failed to comply with the Contract Documents.

3. Associated Services by Contractor: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:

   a. Access to the Work.
   b. Incidental labor and facilities necessary to facilitate tests and inspections.
   c. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
   d. Facilities for storage and field curing of test samples.
   e. Preliminary design mix proposed for use for material mixes that require control by testing agency.
   f. Security and protection for samples and for testing and inspecting equipment at Project site.

4. Coordination by Contractor: Coordinate sequence of activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TESTS

A. SOIL TESTS

1. Soil Analysis: Perform one analysis for each type of soil used under structure and pavements. Perform separate analysis for limestone base under asphalt paving areas. Each analysis shall include:

   a. Liquid Limit.
   b. Plastic Limit.
   c. Plasticity Index.
   d. Maximum Laboratory Density (Proctor) Tests, ASTM Method D698 (latest revision), with optimum moisture controlled within -1 to +4 percent of optimum.

2. Field Density Tests: Perform no less than one test for each 5,000 sq.ft.; perform at least 3 tests per trip.

B. INSPECTIONS OF FOUNDATIONS

1. Field inspections of drilled footings and other excavations.

2. Inspections will check for stability of the excavation and presence of water.

3. Bottom elevations, bearing capacities, and lengths of drilled piers indicated have been estimated from available soil data. Actual elevations and drilled-pier lengths and bearing capacities will be determined by Owner's testing and inspecting agency.

C. TESTS FOR CONCRETE

1. Mix Design: In accord with ACI 613 and 318 and with PCA T-12, for proportions, water-cement ratio and slump, for proposed mixes.

2. Slump Tests: In accord with ASTM C143.

   a. For structural concrete, take at the beginning of each day’s pour, and whenever water adjustments or noticeable change of slump occur.

3. Sampling: In accord with ASTM C172.

   a. For structural concrete, make four (4) standard test cylinders for each 100 yards or fraction thereof. Take additional samples at any noticeable change in the makeup of the concrete.

4. Curing: In accord with ASTM C31.

5. Testing: Compression tests in accord with ASTM C39. Test one cylinder of each set at 7 days and two cylinders at 28 days. One cylinder will be held for additional testing, if required.

D. INSPECTION AND TESTING OF STRUCTURAL STEEL

1. Inspect 25 percent of the field welds and 10 percent of the bolted connections, per building code and AISC requirements.

2. Test 25 percent of welds per Division 5 “Structural Steel” requirements.

3. Radiographic Testing shall be provided for all welds shown on the drawings as Full Penetration Welds. If welds are inaccessible to Radiograph, welds shall be testing using Ultrasonic Testing.

END OF SECTION 01400

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Temporary Facilities and Controls.

1.3 DEFINITIONS

A. Enclosure: Temporary roofing is to be weathertight; temporary exterior walls are to be weathertight; and all temporary openings are to be closed with permanent construction or substantial temporary closures that are weathertight.

1.4 USE CHARGES

A. General: Cost or use charges for temporary facilities, including those for sewer, water, and electric power, shall be included in the Contract Sum.

1.5 QUALITY ASSURANCE

A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.

B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.6 PROJECT CONDITIONS

A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Chain-Link Fencing: Minimum 2-inch, 0.148-inch- thick, galvanized steel, chain-link fabric fencing; minimum 6 feet high with galvanized steel pipe posts; minimum 2-3/8-inch- OD line posts and 2-7/8-inch- OD corner and pull posts.

2.2 TEMPORARY FACILITIES

A. Field Offices, General: Prefabricated weather tight or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.

B. Storage and Fabrication Sheds: Provide watertight sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.

1. Store combustible materials apart from building.

2.3 EQUIPMENT

A. As required by Contractor’s safety program.

B. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.

B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Install temporary service or connect to existing service.

1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.

B. Water Service: Connect to Owner’s existing water system or to public water supply if there is no existing water system. Extend distribution to locations required, install proper valve and terminal fittings.

C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.

D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.

E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.

F. Electric Power Service: Provide electric power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations. Pay electric bills.

G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, safety, security, and traffic conditions.

H. Telephone Service: Provide temporary telephone or other appropriate electronic communications service in common-use facilities for use by all construction personnel. Pay costs.

3.3 SUPPORT FACILITIES INSTALLATION

A. Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations. Locate temporary roads and paved areas within construction limits indicated on Drawings. Roads and paved areas may be in same locations as permanent roads and paved areas.

1. Provide dust-control treatment that is nonpolluting and nontracking. Reapply treatment as required to minimize dust.

B. Traffic Controls: Comply with requirements of authorities having jurisdiction.

C. Parking: Provide temporary parking areas for construction personnel where designated by Owner.

D. Dewatering: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water as necessary for construction operations. If necessary, provide adequate pumping equipment, with qualified personnel to operate.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.

E. Project Identification and Temporary Signs: Provide Project identification sign and install on wood posts in location directed by Architect. Sign shall be 3 colors on 4’ x 8’ plywood,

professionally painted, design to be provided by Architect. Unauthorized signs are not permitted.

1. Provide temporary, directional signs for construction personnel and visitors.
2. Maintain and touchup signs so they are legible at all times.
3. Contractor may display his firm sign in appropriate location approved by Owner.

F. Architect's Sign: In addition to Project identification sign, pick up Architect's sign at Architect's office. Install on wood posts in location approved by Owner and as directed by Architect. After Substantial Completion, carefully remove sign and return to Architect's office.

G. Waste Disposal Facilities: Comply with requirements specified in Division 1 Section "Construction Waste Management."

H. Temporary Stairs: Until permanent stairs are available, provide temporary stairs where ladders are not adequate.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

B. Temporary Erosion and Sedimentation Control: Provide measures to prevent soil erosion and discharge of soil-bearing water runoff and airborne dust to adjacent properties and walkways, according to requirements of authorities having jurisdiction.

C. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.

D. Tree and Plant Protection: Install temporary fencing outside the drip line of trees to protect vegetation from damage from construction operations. Protect tree root systems from damage, flooding, and erosion.

E. Site Enclosure Fence: Furnish and install site enclosure fence in a manner that will prevent people and animals from easily entering site except by entrance gates.

1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
2. Maintain security by limiting number of keys and restricting distribution to authorized personnel. Provide Owner with one set of keys.

F. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.

G. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

H. Temporary Partitions: Provide floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner from fumes and noise.

I. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.

B. Maintenance: Maintain facilities in good operating condition until removal.

C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.

D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.

END OF SECTION 01500

SECTION 01524 - CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for the following:

1. Disposing of nonhazardous demolition and construction waste.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Construction Waste Management.

1.3 DEFINITIONS

A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging.

B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.

C. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.

1.4 QUALITY ASSURANCE

A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PLAN IMPLEMENTATION

A. General: Implement waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.

B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work occurring at Project site.

C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
2. Comply with Division 1 Section "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 DISPOSAL OF WASTE

A. General: Remove waste materials from Project site and legally dispose of them in a location and manner acceptable to authorities having jurisdiction.

B. Burning: Do not burn waste materials.

C. Disposal: Transport waste materials off Owner's property and legally dispose of them.

END OF SECTION 01524

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and comparable products.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Product Requirements.

1.3 DEFINITIONS

A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
2. Comparable Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of other named manufacturers.

1.4 SUBMITTALS

A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Documentation: Show compliance with requirements for substitutions and the following, as applicable and as may be requested by Architect:

    a. Statement why specified material or product cannot be provided.
    b. List of changes or modifications needed to other parts of the Work.
    c. Comparison of qualities of proposed substitution with those of the Work specified.
    d. Product Data.
    e. Samples, where applicable or requested.
    f. List of similar installations with addresses, and architect and owner references.
    g. Available test reports indicating compliance with requirements indicated.
    h. Reports evidencing compliance with building code in effect.
    i. Effect on Contractor's Construction Schedule.
    j. Cost information, including a proposal of change, if any, in the Contract Sum.
    k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
    l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

B. Comparable Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

C. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section "Submittal Procedures." Show compliance with requirements.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.

1.6 PRODUCT WARRANTIES

A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.

C. Submittal Time: Comply with requirements in Division 1 Section "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Comparable Products" Article to obtain approval for use of an unnamed product.

B. Product Selection Procedures:

1. Product: Where Specifications name a single product and manufacturer, provide the named product that complies with requirements.
2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements.
3. Products: Where Specifications include a list of names of both products and manufacturers, provide one of the products listed that complies with requirements.
4. Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements.
5. Product Options: Where Specifications indicate that sizes, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide the specified product or system. Comply with provisions in Part 2 "Product Substitutions" Article for consideration of an unnamed product or system.
6. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or a comparable product by one of the other named manufacturers, or if no other manufacturers are named, by a recognized manufacturer of comparable products. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with provisions in Part 2 "Comparable Products" Article for consideration of an unnamed product by the other named manufacturers.

2.2 PRODUCT SUBSTITUTIONS

A. Timing: Architect will consider requests for substitution or comparable product if received within 30 days after commencement of the Work by the Contractor. Requests received after that time may be considered or rejected at discretion of Architect.

2.3 COMPARABLE PRODUCTS

A. Conditions: Architect will consider Contractor's request for comparable product when the following conditions are satisfied:

1. Evidence that the proposed product does not require extensive revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those named in the Specifications.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

PART 3 - EXECUTION (Not Used)

END OF SECTION 01600

SECTION 01700 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. Construction layout.
2. Field engineering and surveying.
3. General installation of products.
4. Coordination of Owner-installed products.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.
8. Correction of the Work.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Execution Requirements.

1.3 SUBMITTALS

A. Landfill Receipts: If applicable to requirements of Project, submit to Owner copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for any hazardous waste disposal.

B. Final Property Survey: Submit 3 copies showing the Work performed and record survey data. Comply with requirements of jurisdiction that grants building permit or other approvals.

1.4 QUALITY ASSURANCE

A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems, underground and other utilities, and other construction affecting the Work.

B. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 CONSTRUCTION LAYOUT

A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.

B. General: Engage a land surveyor to lay out the Work using accepted surveying practices.

C. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

3.4 FIELD ENGINEERING

A. Final Property Survey: Prepare a final property survey showing significant features (real property) for Project. Include on the survey a certification, signed by land surveyor, that principal metes, bounds, lines, and levels of Project are accurately positioned as shown on the survey. Comply with requirements of jurisdiction that grants building permit or other approvals.

3.5 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.

G. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.6 OWNER-INSTALLED PRODUCTS

A. Site Access: Provide access to Project site for Owner's construction forces, if any.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces or FFE contractors/suppliers/vendors.

3.7 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.8 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Division 1 Section "Cutting and Patching."

B. Restore permanent facilities used during construction to their specified condition.

C. Existing Conditions Restoration: Existing facilities, including landscaping and grass areas, that are affected by the construction Work shall be returned to their prior condition.

1. Photographically document existing conditions at the start of the Work, and provide copies of photographs to Owner.
2. In the absence of photographic documentation, the judgment of the Owner and/or Architect will prevail regarding the requirements for remedial work.

D. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.

F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 01700

SECTION 01731 - CUTTING AND PATCHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes procedural requirements for cutting and patching.

B. Coordinate the requirements of this Section with those of others sections that require coordination with Cutting and Patching.

1.3 DEFINITIONS

A. Cutting: Removal of or damage to in-place construction necessary to permit installation or performance of the Work.

B. Patching: Fitting and repair work required to restore surfaces to original conditions after installation of the Work.

1.4 QUALITY ASSURANCE

A. Structural Elements: Do not cut and patch structural elements in a manner that could change their load-carrying capacity or load-deflection ratio.

B. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.

C. Visual Requirements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching.

1.5 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties. Request existing warranty information from Owner prior to starting.

PART 2 - PRODUCTS

2.1 MATERIALS

A. In-Place Materials: Use materials identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will match the visual and functional performance of in-place materials.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.

1. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.

C. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to prevent interruption to occupied areas.

3.3 PERFORMANCE

A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.

B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.

C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as

possible. Provide materials and comply with installation requirements specified in other Sections.

1. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.

D. Cleaning: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

E. Paving

1. Sawcut existing paving with mechanical means to produce smooth, straight, tie-ins to new work.
2. Where asphalt paving is involved, use equipment necessary to remove existing asphalt wearing course and existing limestone base which will not damage existing paving areas to remain.
3. Patch and replace any portion of existing pavement surface which is found to be damaged, discolored, or shows other imperfections, with matching material.

F. Grass

1. Maintain existing grass areas to remain. Contractor to limit vehicular traffic to minimum required and to designated parking or storage areas.
2. Re-sod areas where grass has been damaged.

G. Existing Conditions Restoration: Existing facilities, including but not limited to structures, utilities, landscaping, and grass areas, that are affected by the construction Work shall be returned to their prior condition.

1. Photographically document existing conditions at the start of the Work, and provide copies of photographs to Owner.
2. In the absence of adequate photographic documentation, the judgment of the Owner and/or Architect will prevail regarding the requirements for remedial work.

END OF SECTION 01731

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Warranties.
3. Final cleaning.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Closeout Procedures.

1.3 SUBSTANTIAL COMPLETION

A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.

1. Prepare a list of items to be completed and corrected (punch list).
2. Advise Owner of pending insurance changeover requirements.
3. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
4. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
5. Complete startup testing of systems.
6. Advise Owner of changeover in utilities.
7. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

B. Inspection: Submit a written request for inspection for Substantial Completion (e-mail or fax are acceptable). On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1.4 FINAL COMPLETION

A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:

1. Submit a final Application for Payment according to Division 1 Section "Payment Procedures." Include final project cost accounting detail.

2. Submit copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list). The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.

3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

4. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems.

5. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.

6. Prepare and submit Project Record Documents, operation and maintenance manuals, **property surveys**, and similar final record information.

7. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer’s name and model number where applicable.

8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.

9. Complete final cleaning requirements, include touchup painting.

10. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.

B. Inspection: Submit a written request for final inspection for acceptance (e-mail or fax is acceptable). On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1.5 WARRANTIES

A. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.

B. Provide additional copies of each warranty to include in operation and maintenance manuals.

1.6 SUBMITTAL REQUIREMENTS

A. Assemble warranties and bonds executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of original signed copies required: Two each.

C. Table of Contents: neatly typed, in orderly sequence. Provide complete information for each item.

1. Product of work item.
2. Firm, with name of principal, address, and telephone.
3. Scope.
4. Date of beginning of warranty, bond, guaranty and maintenance contract.
5. Duration of warranty, bond, guaranty and maintenance contract.
6. Provide information for Owner's personnel:
   a. Proper procedure in case of failure.
   b. Instances which might affect the validity of warranty, bond or guaranty.
7. Contractor, name of responsible principal, address and telephone number.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: Provide final cleaning using cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.

1. Remove labels that are not permanent.
2. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
   a. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid Project of rodents, insects, and other pests.

D. Comply with safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from Project site and dispose of lawfully.

END OF SECTION 01770

SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for Project Record Documents, including the following:

1. Record Drawings.
2. Record Specifications.
3. Record Product Data.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Project Record Documents.

1.3 SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set of marked-up Record Prints and one set of like transparencies to the owner, along with an electronic copy (scanned PDFs on a disk are acceptable). Also, submit an electronic copy to the Architect.

B. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications to the owner, along with an electronic copy (PDFs on a disk are acceptable). Also, submit an electronic copy to the Architect.

C. Record Product Data: Submit one copy of each Product Data submittal to the owner, along with an electronic copy (PDFs on a disk are acceptable). Also, submit an electronic copy to the Architect.

1. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

A. Record Prints: Maintain one set of blue- or black-line white prints of the Contract Drawings and Shop Drawings.

1. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally.

2. Content: Types of items requiring marking include, but are not limited to, the following:

a. Significant dimensional changes to Drawings.
b. Significant revisions to details shown on Drawings.
c. Locations and depths of underground utilities.
d. Locations of concealed internal utilities, piping and conduits.
e. Changes made by Change Order or Construction Change Directive.
f. Changes made following Architect's written orders.
g. Details not on the original Contract Drawings.

B. Record Transparencies: Immediately before inspection for Final Completion, review marked-up Record Prints and prepare a full set of corrected transparencies of the Contract Drawings and Shop Drawings (scanned PDFs on a disk are acceptable).

C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.

2.2 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation where installation varies significantly from that indicated in Specifications, addenda, and contract modifications, and variance is not reflected in approved shop drawings or product data submittals.

2.3 RECORD PRODUCT DATA

A. Preparation: Mark Product Data to indicate the actual product installation where installation varies significantly from that indicated in Product Data submittal.

PART 3 - EXECUTION

3.1 RECORDING AND MAINTENANCE

A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.

B. Maintenance of Record Documents and Samples: Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

END OF SECTION 01781

SECTION 01782 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Operation manuals for systems, subsystems, and equipment.
3. Maintenance manuals for the care and maintenance of products, materials, and finishes and systems and equipment.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Operation and Maintenance Data.

1.3 SUBMITTALS

A. Final Submittal: Submit one copy of each manual in final form at least 10 days before final inspection. Correct or modify each manual to comply with Architect's or Owner’s comments.

PART 2 - PRODUCTS

2.1 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system.

B. Manual Contents: Organize into sets of manageable size. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
2. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts. However, include these in same binder.

2.2 OPERATION AND MAINTENANCE MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards, procedures and logs.
4. Wiring, control and piped system diagrams.
5. Precautions against improper use.
6. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name, manufacturer and model number.
2. Equipment identification with serial number of each component.
3. Equipment function and operating characteristics.
4. Limiting conditions and performance curves.
5. Engineering data and tests.
6. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping and normal shutdown instructions.
6. Seasonal and weekend operating instructions.
7. Required sequences for electric or electronic systems.
8. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.3 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

B. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.

C. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

D. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

E. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

F. Warranties and Bonds: Include copies of warranties and bonds. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

B. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

C. Drawings: Provide drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

D. Comply with Division 1 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 01782

SECTION 01820 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.

B. Coordinate the requirements of this Section with those of other sections that require coordination with Demonstration and Training.

1.3 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate content of training with content of approved emergency, operation, and maintenance manuals

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction. Use Operations and Maintenance Manuals.

3.2 INSTRUCTION

A. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

B. Scheduling: Provide instruction at mutually agreed on times.

END OF SECTION 01820

SECTION 02210 – GEOTECHNICAL REPORT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. The Owner commissioned **Alpha Testing** to prepare a geotechnical study of the site for the proposed building(s) and site work. This report is being provided by the Owner for the Contractor's information and guidance.
2. Report No. **H180173** dated **August 21, 2018** ("Report") is **bound herein**.

B. The purposes of the geotechnical study were to:

1. Explore and evaluate subsurface stratigraphy at the proposed building site(s).
2. Explore and evaluate groundwater conditions at the Project area.
3. Provide specific geotechnical recommendations to guide design and construction of the building foundations and paving for the proposed Project.

C. The logs of the borings are shown in the Report.

D. Coordinate the requirements of this Section with those of other sections that interface matters dealt with in the Geotechnical Report.

1.3 QUALITY ASSURANCE

A. Use of the Report

1. The information in the Report was used in preparing the designs for the foundations of the building and the paving.
2. Bidders (or proposers) are expected to examine the site and the Report to determine the character of materials to be encountered.
3. Information in the report represents conditions at the points of boring only and is for general information only. Inapplicability of this data to other areas of the site shall not incur liability on the part of the Owner or Architect and Architect's consultants.
4. **When there is a conflict between the requirements of the geotechnical report and those of the drawings and specifications, the requirements of the geotechnical report shall govern.**

B. The logs of the borings represent conditions encountered at the exact boring locations only. Contractor shall make reasonable inferences regarding soils conditions on the site, based on the information provided in the geotechnical report.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

The Report (including drawing showing boring locations) follows.

END OF SECTION 02210

GEOTECHNICAL EXPLORATION

WALLER COUNTY CRIMINAL JUSTICE FACILITY

Old Houston Highway and Grace Road
Waller County, Texas
ALPHA Report No. H180173
August 21, 2018

Prepared for:

BSW ARCHITECTS, INC.
5000 Quorum Drive, Suite 600
Dallas, Texas 75254
Attention: Charles Goodman, AIA

Prepared By:

ALPHA TESTING
WHERE IT ALL BEGINS

ALPHA TESTING
WHERE IT ALL BEGINS

Geotechnical
Construction Materials
Environmental
TBPE Firm No. 813

6513 W. Little York Road
Houston, Texas 77040

Tel: 713-360-0460
Fax: 713-360-0481
www.alphatesting.com

August 21, 2018

BSW Architects, Inc.
5000 Quorum Drive, Suite 600
Dallas, Texas 75254
Attention: Charles Goodman, AIA

Re: Geotechnical Exploration
Waller County Criminal Justice Facility
Old Houston Highway and Grace Road
Waller County, Texas
ALPHA Report No. H180173

Attached is the report of the geotechnical exploration performed for the project referenced above. This study was authorized by James Wiginton, AIA on December 20, 2017 using AIA Document C401-2007 and performed in general accordance with ALPHA Proposal No. 62634, dated December 19, 2017.

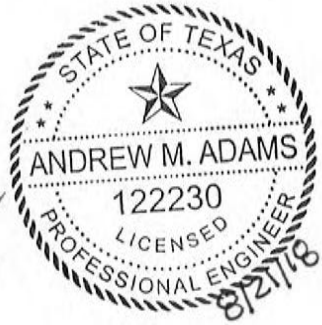
This report contains results of field explorations and laboratory testing and an engineering interpretation of these with respect to available project characteristics. The results and analyses were used to develop recommendations to aid design and construction of foundations and pavements.

ALPHA TESTING, INC. appreciates the opportunity to be of service on this project. If we can be of further assistance, such as providing the final geotechnical exploration, please contact our office.

Sincerely,

ALPHA TESTING, INC.

Andrew M. Adams, P.E.
Senior Geotechnical Engineer



Theodore (Tony) A. Janish, P.E.
Principal

AMA/MLM
Copies: (1-PDF) Client

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1.0 PURPOSE AND SCOPE

The purpose of this geotechnical exploration is for ALPHA TESTING, INC. ("ALPHA") to evaluate for BSW Architects, Inc. ("Client") some of the physical and engineering properties of subsurface materials at selected locations on the subject site with respect to formulation of geotechnical design parameters for the proposed construction. The field exploration was accomplished by securing subsurface samples from widely spaced borings performed across the project site. Engineering analyses were performed from results of the field exploration and results of laboratory tests performed on representative samples.

Also included are general comments pertaining to reasonably anticipated construction problems and recommendations concerning earthwork and quality control testing during construction. This information can be used to evaluate subsurface conditions and to aid in ascertaining whether the construction meets project specifications.

Recommendations provided in this report were developed from information obtained in borings depicting subsurface conditions only at the specific boring locations and at the particular time designated on the Log of Boring sheets. Subsurface conditions at other locations may differ from those observed at the boring locations, and subsurface conditions at the boring locations may vary at different times of the year. The scope of work may not fully define the variability of subsurface materials and conditions that are present on the site.

The nature and extent of variations between borings may not become evident until construction. If significant variations then appear evident, our office should be contacted to re-evaluate our recommendations after performing on-site observations and possibly other tests.

2.0 PROJECT CHARACTERISTICS

It is proposed to construct a new criminal justice facility at a site located generally at the northeast corner of Old Houston Highway and Grace Road in Waller County, Texas. The facility is expected to consist of a two-story jail building, two-story sheriff's office building, single-story courthouse building and single-story secure parking garage. A vicinity map showing the project's general location is provided as Figure A-1, in Appendix A of this report. At the time of field explorations, the site was generally open with scattered trees and heavily vegetated areas along the future north access road. Several stockpiles were observed across the site.

The new structures are anticipated to create light to moderate loads to be carried by the foundations. It is anticipated the new structures will be supported by either a shallow or deep foundation system. We also understand it is generally desired to support the floor slabs on-grade. Pavement areas consisting of general parking and access drives are also planned. Both asphalt and concrete pavement systems will be considered. We anticipate that site retaining walls may be constructed at this site. Based on the Grading Plan prepared by BSW Architects, Inc. (Project No. 21715.00 dated May 24, 2018, Sheet No. C100), the floor slabs are expected to be constructed at the finished floor elevations (FFE) as detailed in Table A.

3.0 FIELD EXPLORATION

Subsurface conditions on the site were explored by drilling a total of twenty (20) borings in general accordance with ASTM D 420. The corresponding location of each boring is provided in Table A below.

TABLE A
APPROXIMATE BORING LOCATIONS

Locations	Boring No.	Boring Depths, ft	Finished Floor Elevation (FFE)
Jail Building	B-5 through B-9	40	229.00
Sheriff's Office Building	B-2 and B-3	40	229.00
Courthouse Building	B-10	40	226.00
Secure Parking Garage	B-1	40	229.50
Parking and Drives	B-11 through B-17	15	--
Stockpile	B-18	15	--
Utilities	B-19 and B-20	15	--

The approximate location of each test boring is shown on the Boring Location Plan, Figure A-2, in Appendix A of this report. Details of drilling and sampling operations are briefly summarized in Methods of Field Exploration, Figure A-3 in Appendix A of this report.

Subsurface conditions observed during the field exploration are presented on the boring logs, Figures A-4 through A-23, in Appendix A of this report. The boring logs contain our field and laboratory test results, as well as our Field Technician's and Engineer's interpretation of conditions believed to exist between actual samples retrieved. Therefore, these boring logs contain both factual and interpretive information. Lines delineating subsurface strata on the boring logs are intended to group soils having similar engineering properties and characteristics. They should be considered approximate as the actual transition between soil types (strata) may be gradual. A Key to Soil Symbols and Classifications used on the boring logs is presented on Figure A-24, in Appendix A of this report.

4.0 LABORATORY TESTS

Selected samples of the subsurface materials were tested in the laboratory to evaluate their engineering properties as a basis in providing recommendations for foundation design and earthwork construction. To aid in classifying the subsurface materials and to determine the general engineering characteristics, visual classifications, natural moisture content tests (ASTM D 2216), Atterberg-limit tests (ASTM D 4318), percent passing No. 200 Sieve (ASTM D 1140) and dry unit weight determinations (ASTM D 2166) were performed on selected samples.

Unconfined compression tests (ASTM D 2166) and pocket-penetrometer tests were conducted on selected soil samples to evaluate the soil shear strength. Swell tests (ASTM D 4546) were performed on selected undisturbed clayey soil samples and the results are provided on the Swell Test Data sheet, Figure B-3 included in the Appendix. Each swell test was performed until no further swell was measured. Resistivity tests were performed on representative samples from the building borings and the results are shown in Table F in Section 6.9.

A brief description of testing procedures used in the laboratory can be found in Methods of Laboratory Testing, Section B-1 of the Appendix. Individual test results are presented on the boring logs enclosed in the Appendix.

5.0 GENERAL SUBSURFACE CONDITIONS

5.1 Local Geology

Based on a review of literature and public maps in our library, as well as our experience, the project site lies within the Coastal Prairies Province of the Gulf Coastal Plains Physiographic Region of Texas and is underlain by soils common to the Willis Formation.

The Willis Formation is approximately Pliocene in age. At outcrop, the Willis Formation erosionally downcuts and locally truncates the underlying Goliad Formation, and is in turn eroded and locally onlapped by the overlying Lissie Formation. The Willis outcrop consists of cuesta-forming erosional remnants in the Houston Embayment and on the San Marcos Arch. The Willis Formation is composed of gravelly coarse sand in several upward-fining successions that are interpreted as incised valley fills overlain by transgressive deposits.

The Willis Formation ranges in thickness from about 100 feet at outcrop to 500 feet near the coast and also thickens northeastward. The Willis dips coastward about 15 to 20 feet per mile, and is 1,000 to 2,000 feet deep at the modern shoreline. Willis fluvial systems include dip-oriented, sand-rich channel-fill facies and sand-poor interchannel areas, which grade toward the coast into shore-parallel deltaic and shore-zone sands and interdeltaic muddy bay deposits. Individual Willis sands vary widely in thickness from about 20 to 200 feet, and are separated by muds of similar thickness. Fluvial channel sands thin and become more isolated in interchannel muds southward along the central coast.

5.2 Subsurface Stratigraphy

Based on the borings the upper 2 to 6 feet of materials generally consist of silty sand (SM) at 14 of the boring locations. Sandy clays were encountered at the surface at the remaining borings to depths of about 2 to 15 feet. The surficial sand and clay soils were underlain by varying layers of lean sandy clay (CL), fat clay (CH), sand (SP) and/or clayey sand (SC), extending to the boring termination depth (40 feet) in borings B-1 through B-10. The upper 2 feet of material in borings B-3, B-10, B-17 was visually classified as fill material. Boring 18 was drilled on top of an existing stockpile with the expectation for use as borrow material. As anticipated, the upper 15 feet of material in boring B-18 was classified as fill material.

The letters in parenthesis represent the soils' classification according to the Unified Soil Classification System (ASTM D 2488). More detailed stratigraphic information is presented on the Logs of Boring sheets attached to this report.

5.3 Depth-to-Water

Free groundwater was encountered in borings B-2, B-4, and B-11 at depths of about 2 to 3 feet below the existing ground surface. Upon completion of drilling, borehole B-4 was observed to be dry. In boreholes B-2 and B-11, the groundwater level at completion of drilling was observed at a depth of about 3 feet. Significant cave-in was observed in borings B-2 and B-11 at depths of

about 5 to 6 feet below the existing ground surface. Free groundwater was not observed in the remaining borings upon completion of drilling. All boring excavations were backfilled upon completion of work; for safety considerations, no borings were allowed to remain open overnight for additional water level readings.

The granular soils (silty sand, sand, and clayey sand) encountered in the borings are considered relatively permeable and are anticipated to have a rapid response to water movement. However, the clay and sandy clay soils encountered in the borings are considered relatively impermeable and are expected to have a relatively slow response to water movement. Therefore, several days of observation would be required to evaluate actual groundwater levels within the depths explored. Also, the groundwater level at the site is anticipated to fluctuate seasonally depending on the amount of rainfall, prevailing weather conditions and subsurface drainage characteristics.

6.0 DESIGN RECOMMENDATIONS

The following design recommendations were developed on the basis of the previously described Project Characteristics (Section 2.0) and General Subsurface Conditions (Section 5.0). If project criteria should change, including structures locations on the site, our office should conduct a review to determine if modifications to the recommendations are required. Further, it is recommended our office be provided with a copy of the final plans and specifications for review prior to construction.

6.1 General Considerations

The foundation system being considered to provide support for the proposed structures must satisfy two independent engineering criteria. One criterion is the foundation system must be designed with an appropriate factor of safety, or a performance limit state, to reduce the possibility of soil failure when subjected to axial and lateral load conditions. The other criterion is foundation and floor slab movements, whether vertical, horizontal or rotational, must be within allowable operational limits of the structures. These criteria can be achieved for the planned structure foundations if they are designed and constructed in accordance with the recommendations contained in this report.

The following design criteria given in this report were developed assuming the finish building pad elevation is constructed at the finished floor elevations (FFE) as described in Table A. Substantial cutting and filling on the site can alter the recommended foundation design parameters. Therefore, it is recommended our office be contacted before performing other cutting and filling on site to verify the appropriate design parameters are utilized for final foundation design.

6.1.1 Vertical Movements

Expansive soils are present at this site. This report provides recommendations to reduce the effects of soil shrinkage and expansion. However, even if these recommendations are followed, some movement and cracking in the structures should be anticipated. The severity of cracking and other damage such as uneven floor slabs will probably increase if any modification of the site results in excessive wetting or drying of the expansive soils.

Structures that are supported at the proposed finished floor elevations (FFE) in Table A could experience soil-related potential seasonal rise (i.e, PVR) up to about 2 inches at this site if the subgrade is not improved as recommended in Section 6.5 of this report. This

potential seasonal movement was estimated in general accordance with methods outlined by the Texas Department of Transportation (TxDOT) Test Method Tex-124-E, swell test results, engineering judgment and experience. The estimated movement was calculated assuming the moisture content of the in-situ soil within the normal zone of seasonal moisture content change varies between a "dry" condition and a "wet" condition as defined by Tex-124-E. Also, it was assumed a 1 psi surcharge load from the floor slab acts on the subgrade soils.

Movements exceeding those predicted above could occur if positive drainage of surface water is not maintained or if soils are subject to an outside water source, such as leakage from a utility line or subsurface moisture migration from off-site locations. However, soil movements may be reduced by implementing the subgrade improvement recommendations presented in Section 6.2 of this report.

6.1.2 Foundation Considerations

Based on the presence of moderate shrink-swell clays at the boring locations and the amount of fill required for grading the site, we recommend a shallow foundation system to support the structural loads of miscellaneous structures at this site. Grade supported floor slabs can be used. Subgrade improvement will be required for support the building foundations and floor slabs at this site. Recommendations for shallow foundations and subgrade improvement are provided in the following sections.

6.2 Subgrade Improvement for Support of Floor Slabs and Spread Footing Foundations

Structures supported the proposed finished floor elevations (FFE) in Table A could experience soil-related potential seasonal movements up to 2 inches if the subgrade is not improved as recommended in the paragraphs below. Based on the subsurface conditions and the Client's performance expectations, we recommend the potential seasonal movements be reduced to about ½ inch by preparing the subgrade (building pads) as detailed below:

Over-excavate the soils to a depth of at least 4 feet below finished pad grade in the building area. The building area is defined as the area directly beneath and at least 5 ft (horizontal) beyond the perimeter of the proposed building and appurtenances. Appurtenances are those items attached to the building, typically including, but not limited to, the building sidewalks, adjoining flatwork, porches, ramps, stoops, etc. ***Note:*** *The over-excavated soils may qualify for re-use as select, non-expansive fill material. Materials proposed for re-use as select fill should be free or organics, debris, or other unsuitable materials. In addition, the material should be routinely tested to ensure it meets the requirements of Section 7.3.*

After over-excavating the soils to the recommend depth, the building pad can be completed by backfilling and compacting non-expansive material to the bottom of the floor slab in the building area. The new exposed slope should be benched during fill placement forming horizontal cuts into the slope at vertical intervals of 1 to 3 ft. To provide a more uniform slab support and create a more all-weather working surface, the final 6 inches of the building pad could be constructed with flexible base (optional) to provide a working surface. Criteria for non-expansive material (which includes select fill and flexible base) are provided in Section 7.3 of this report.

In subgrade improvement areas outside the perimeter beam of the building that are not covered with concrete flatwork or pavements, the upper 1 ft of the improvement overbuild should consist of a cohesive clay with a Plasticity Index (PI) of at least 25. The purpose of the clay cap is to reduce the potential for water to infiltrate the building pad causing the subgrade soils to swell. The clay cap material should have at least 60 percent by weight passing the No. 200 Sieve and no more that 15 percent by weight retained on the No. 4 Sieve. The material should be compacted as recommended in Section 7.3 of this report, to reduce the risk of surface water infiltration into the select fill material and below the floor slab.

6.3 Shallow Footing Foundation System

Following subgrade improvement as described in Section 6.2 above, the structural frame and walls for the planned structures may be supported using a shallow footing foundation system. Footings may be designed using a net allowable soil bearing pressure of 2,500 pounds per square foot (psf). The above bearing pressure is applicable for footings bearing on native soils or select, non-expansive soils as recommended in Sections 6.2 and 7.3 of this report. This bearing pressure includes a factor of safety of at least 3. In using net pressure, the weight of the footing and backfill over the footing, including the weight of the floor slab need not be considered. Hence, only loads applied at/or above the finished floor need to be used for dimensioning footings.

All exterior footings should be located at a depth of at least 2 feet below final exterior grade as measured adjacent to the buildings. Interior footings may be supported at a nominal depth below the bottom of the floor slabs. Wall footings should have a least dimension of 12 inches in width and column footings should have a least dimension of 18 inches for bearing capacity considerations.

The resulting total foundation movements are estimated to be limited and not exceed about 1 inch. Differential movements between foundation elements should not exceed about 75 percent of the predicted total movement. Careful field inspection of footing excavations will contribute substantially to reducing foundation movements.

Careful monitoring during construction is necessary to locate any pockets or seams of unsuitable materials, which might be encountered in excavations for footings. Unsuitable materials encountered at the foundation bearing level should be removed and replaced with lean concrete (about 2,000 psi strength at 28 days), structural concrete, or select fill compacted to at least 98 percent of standard Proctor maximum dry density (ASTM D 698) and at a moisture content within 2 percentage points of the material's optimum moisture content.

Resistance to sliding will be developed by friction along the base of the footings and passive earth pressure acting on the vertical face of the footing and a key installed in the base of the footings, if required. We recommend a coefficient of base friction of 0.3 be used along the bottom of the footing. The available passive earth resistance on the vertical face of the footing and a key constructed in the base of the footing may be calculated using an allowable passive earth pressure of 150 psf per foot of depth below a depth of 1 foot from adjacent grade.

6.4 Slab-on-Grade Foundations for Secure Parking Garage

We understand a slab and grade beam foundation (slab foundation) may be used for the Secure Parking Garage (Boring B-1). Subgrade improvement as discussed in Section 6.2 above will be required to reduce slab foundation movements to the desired level of ½ inch or less.

Slab foundations should be designed with exterior and interior grade beams adequate to provide sufficient rigidity to the foundation system. A net allowable bearing pressure of 2,500 psf should be used for design of all grade beams bearing on native soils or select, non-expansive soils as recommended in Sections 6.2 and 7.3 of this report. Grade beams should bear at a minimum depth of 12 inches below final grade and should have a minimum width of 10 inches considering the above referenced net allowable soil bearing pressure.

To reduce cracking as normal movements occur in foundation soils, all grade beams and floor slabs should be adequately reinforced with steel (conventional reinforcing steel and/or post-tension reinforcement). It is common to experience some minor cosmetic distress to structures with slab-on-grade foundation systems due to normal ground movements. A properly designed and constructed moisture barrier should be placed between the slabs and subgrade soils to retard moisture migration through the slabs.

It should be noted that forming-fill for grade beams is typically placed without engineering control and with only incidental compaction and is considered to be uncontrolled fill. As a result, care should be given to avoiding placement of grade beams within the forming-fill to reduce the chances of excessive settlements. The grade beams should completely penetrate the forming-fill and extend into the natural, undisturbed subgrade soils or suitably compacted fill.

6.5 Retaining Walls and Lateral Earth Pressures

We understand site retaining walls are planned at the jail facility and will be up to about 5 feet tall. The retaining walls can be supported using shallow spread footings. A net allowable bearing pressure of 2,000 psf can be used for foundations bearing on sandy soils or stiff sandy clays, considering a minimum foundation depth below grade of 25 percent of the retained height of the wall (minimum 1 ft below final grade). This includes a factor of safety of about 3. The retaining wall foundation safety against lateral load should be checked by structural engineer. Foundations subject to lateral forces should be proportioned such that the resulting soil reaction force on the base of the foundation should lie within the middle one-third of the foundation. For bearing capacity considerations, strip footings should be at least 18 inches wide and individual spread footings should be at least 24 inches wide.

Resistance to sliding will be developed by friction along the base of the footings and passive earth pressure acting on the vertical face of the footing and a key installed in the base of the footings, if required. We recommend a coefficient of base friction of 0.3 be used along the bottom of the footing. If granular soils (sand, silty sand, and clayey sand) are used in front of the retaining wall, the available passive earth resistance on the vertical face of the footing and a key constructed in the base of the footing may be calculated using an allowable passive earth pressure of 150 psf, per foot of depth below a depth of 1 ft from adjacent grade. Granular soils should be compacted per Section 7.3 of this report. Where cohesive (clay and sandy clay) are used in front of the retaining wall, the available passive earth resistance on the vertical face of the footing and a key constructed in the base of the footing may be calculated using an allowable uniform passive earth pressure of 500 psf below a depth of 1 ft from adjacent grade. Cohesive soils should be compacted per Section 7.3 of this report.

Global stability analyses of the retaining walls is beyond the scope of ALPHA's services for this project. We recommend global stability analyses for retaining walls in excess of about 5 feet in height and for walls that are constructed with slopes steeper than about 1 vertical to 4 horizontal

above or below the wall. ALPHA Testing would be pleased to provide global stability analyses for retaining walls for this project if desired.

Retaining walls should be designed to resist the expected lateral earth pressures. The magnitude of lateral earth pressure against the walls is dependent on the method of backfill placement, type of backfill soil, drainage provisions, and type of wall (rigid or yielding) after placement of the backfill. Experience demonstrates when a wall is held rigidly against horizontal movement (restrained at the top), the lateral pressure (at-rest lateral earth pressure) against the wall is greater than the normally assumed active pressure. Yielding walls (rotation at the top of the wall on the order of 0.1 to 0.4 percent of the wall height) can be designed for active earth pressures (k_a) but rigid walls should be designed for higher at-rest lateral earth pressures (k_o).

Walls should be designed using the equivalent fluid pressures provided in Table B, considering a triangular stress distribution and assuming a horizontal ground surface extending back from the top of the wall. The equivalent fluid pressures provided do not include a factor of safety. The equivalent fluid pressures provided also do not include the effects of hydrostatic pressure.

TABLE B
LATERAL EARTH PRESSURES

Backfill Type	Estimated Total Unit Weight (pcf)	Active Condition		At-Rest Condition	
		Earth Pressure Coefficient, k_a	Equivalent Fluid Density (pcf)	Earth Pressure Coefficient, k_o	Equivalent Fluid Density (pcf)
Clays	125	0.75	94	0.80	100
Sandy Clays	120	0.53	63	0.69	83
Clayey Sands	115	0.35	40	0.52	60
Silty Sands and Sands	115	0.31	36	0.47	54
Free-Draining Granular	120	0.28	34	0.44	53

Notes: *Free Draining Granular Backfill*
Free Draining Granular backfill material should be a clean, non-plastic, relatively well-graded granular backfill consisting of a sand, gravel, or sand and gravel mixture, with less than 5 percent finer than the No. 200 sieve size. Material meeting the requirements of ASTM C 33 Size No. 57 or 67 could be used for this purpose. To reduce surface water seepage into the free draining granular backfill, the top 1 ft of the backfill should consist of on-site clay soil with a plasticity index of 25 to 35 percent. The free draining granular backfill should extend outward at least 2 ft from the base of the wall and then extend upward on a 1 (horizontal) to 2 (vertical) slope to utilize the active earth pressure in the table above. The free draining granular backfill should be separated from the adjacent native soils using a non-woven filter fabric (Mirafi 140N, or equivalent) to prevent intrusion of native soils into the free draining granular backfill. Complete drainage of the free draining granular material should be provided to prevent the development of hydrostatic pressures behind the wall. A typical drainage system should consist of perforated plastic drain pipes placed in filter trenches excavated parallel to the base of the walls for their entire length. The drain pipes should be positioned at a depth lower than the bottom elevation of the wall and should also be wrapped with filter fabric (Mirafi 140N, or equivalent). A perimeter drain system is beneficial regardless of the type of backfill used behind the wall. As a minimum, a system of

weep-holes should be provided for free standing site retaining walls that are not structurally associated with the building, although weep holes by themselves will likely not be sufficient to prevent occasional build-up of hydrostatic pressure behind the wall. Subsurface drains are recommended behind retaining walls in below-grade areas. Subsurface drains would not be required for typical at-grade slabs.

The effects of surcharge loading must also be considered. The surcharge load should be multiplied by the applicable coefficient of earth pressure from Table B above, and the resulting pressure applied as a uniform lateral pressure over the full height of the wall.

6.6 Seismic Considerations

TABLE C
SEISMIC PARAMETERS

Description	Values
2015 International Building Code Site Classification (IBC) [1]	D [2]
Site Latitude (Degrees)	30.090425
Site Longitude (Degrees)	-96.063631
Mapped Spectral Acceleration for Short Periods (0.2-Second): (S_S) [3]	0.072 g
Mapped Spectral Acceleration for a 1-Second Period: (S_1) [3]	0.039 g

1 The site class definition was determined using SPT N-values in conjunction with section 1613.3.2 in the 2015 IBC and Table 20.3-1 in the 2010 ASCE-7.

2 Section 20.1 in the 2010 ASCE-7 requires a site soil profile determination extending to a depth of 100 feet for seismic site classification. The current scope does not include the required 100-foot soil profile determination. Borings extended to a maximum depth of 40 ft, and this seismic site class definition considers that hard soil continues below the maximum depth of the subsurface exploration. Additional exploration to deeper depths would be needed to confirm the conditions below the current depth of exploration.

3 The Spectral Acceleration values were determined using publicly available information provided on the United States Geological Survey (USGS) website. The spectral acceleration values can be used to determine the site coefficients using Tables 1613.3.3 (1) and 1613.3.3 (2) in the 2015 IBC.

6.7 Flatwork

Exterior flatwork supported on-grade could be subjected to potential seasonal movements up to 2 inches as described in Section 6.1.1 of this report. Subgrade improvement, as discussed in Section 6.2 to reduce flatwork movements to about ½ inch can be considered. This subgrade improvement should be utilized in any flatwork areas where the risk of flatwork movements or differential movements between the flatwork and adjoining structural elements is not acceptable. Subgrade improvement below flatwork is intended to reduce the potential for large differential movements between the flatwork and the structure. However, some differential movement should be expected. Therefore, allowances should be made for differential movements between the structure and the flatwork, including flexible connections and control joints. The use of sand as a leveling course below flatwork supported on expansive clays should be avoided. *Note: ALPHA should be contacted if supplemental recommendations are desired to reduce the potential seasonal movements in the flatwork area at this site.*

The flatwork should be installed to ensure drainage away from the structure. A positive slope away from the structure should be maintained. The flatwork should never be allowed to reach

either a level plane or negative slope back toward the structure. In addition, a moisture seal should be provided at the joint between the flatwork and the foundation.

6.8 Area Pavement

The soils encountered near the ground surface should be improved and prepared prior to construction of pavements at this site. To permit correlation between information from the borings and actual subgrade conditions exposed during construction, a qualified Geotechnical Engineer should be retained to provide subgrade monitoring and testing during construction. If there is any change in project criteria, the recommendations contained in this report should be reviewed by our office.

Calculations used to determine the required pavement thickness are based only on the physical and engineering properties of the materials and conventional thickness determination procedures. Pavement joining the buildings should be constructed with a curb and the joint between the building and curb should be sealed. Related civil design factors such as subgrade drainage, shoulder support, cross-sectional configurations, surface elevations, reinforcing steel, joint design and environmental factors will significantly affect the service life and must be included in preparation of the construction drawings and specifications, but were not included in the scope of this study. Normal periodic maintenance will be required for all pavements to achieve the design life of the pavement system.

Recommendations for both Portland Cement Concrete (PCC) and asphalt concrete pavements are provided below. These types of pavement are not considered equal in performance. Over the life of the pavement structure, asphalt concrete pavement should be expected to have a shorter life and higher maintenance costs. Also, pavement in dumpster areas and areas receiving heavy truck traffic should consist of PCC. The dumpster pads should be extended to include all wheels of any garbage trucks.

Based on our knowledge of the project, we anticipate that traffic loads will be produced primarily by automobile traffic and occasional delivery trucks, trash removal trucks, and buses. For this project Light-Duty and Moderate-Duty pavement section alternatives are provided. Light-Duty is for areas expected to receive only car traffic. Moderate-Duty assumes areas with some delivery truck traffic, trash trucks, buses, and main access drive areas. If heavier traffic loading is expected, ALPHA should be provided with the information and allowed to review these pavement sections.

Note: The recommended pavement sections provided below are considered the minimum necessary to provide satisfactory performance based on the expected traffic loading. In some cases, County minimum standards for pavement section construction may exceed those provided below.

6.8.1 Pavement Subgrade Preparation

After final subgrade elevation has been achieved, the exposed subgrade soils should be scarified to a depth of at least 6 inches and then compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of 0 to 3 percentage points above the material's optimum moisture content. The pavement subgrade should be proofrolled as described in Section 7.1. Recommendations for subgrade preparation (recompacted subgrade, cement stabilization or lime/fly ash stabilization) are presented in Section 6.8.4.

It is recommended that subgrade preparation (recompacted subgrade, cement stabilization, or lime/fly ash stabilization) extend at least 1 ft beyond the edge of the pavement to reduce effects of seasonal shrinking and swelling upon the extreme edges of pavement. Also, the curb should be constructed such that the base of the curb extends at least 3 inches into the pavement subgrade.

Pavement will have the same potential for movement as discussed in Section 6.1.1 (up to 2 inches). Good perimeter surface drainage with a minimum slope of 2 percent away from the pavement is recommended. The use of sand as a leveling course below pavement supported on expansive clays should be avoided. Normal maintenance of pavement should be expected over the life of the pavement structures.

Based on the results of laboratory testing for soluble sulfate concentrations and our experience with residual soils associated with the Willis geologic formation, the risk of sulfate induced heave of lime-treated subgrade is considered to be low at this site. No special treatment of the subgrade in this regard is recommended.

6.8.2 Portland Cement Concrete (PCC) Pavement

Subgrade preparation as described in Section 6.8.1 is required for PCC pavement. The minimum recommended PCC pavement sections to be constructed are provided in Table D below:

TABLE D
PORTLAND CEMENT CONCRETE PAVEMENT SECTIONS

Material Type	General Parking 30,000 ESAL (inches)		Access Drives 100,000 ESAL (inches)	
Reinforced PCC	5.0	6.0	6.0	7.0
Lime/Fly-Ash Stabilized Subgrade or Cement Stabilized Subgrade	6.0	----	6.0	----
Recompacted Subgrade	----	6.0	----	6.0

Dumpster pad areas and areas to receive forklift traffic should consist of PCC. A minimum of 7.0 inches of PCC over 6 inches lime/fly-ash stabilized subgrade or cement stabilized subgrade is recommended for dumpster pads and areas to receive moderate to heavy forklift traffic. PCC should have a minimum compressive strength of 3,500 lbs per sq inch (psi) at 28 days. Concrete should be designed with 5 $\pm$ 1 percent entrained air. Joints in concrete paving should not exceed 15 ft. Reinforcing steel should consist of No. 3 bars placed at 18 inches on-center in two directions. *Note: Refer to ACI 330 for additional information on pavement joints and reinforcement.*

6.8.3 Asphalt Concrete Pavement

Subgrade preparation as described in Section 6.8.1 is required for asphalt concrete pavement. The minimum recommended asphalt concrete pavement sections to be constructed are tabulated below. Pavement materials are described in Section 6.8.4

TABLE E
ASPHALT CONCRETE PAVEMENT SECTIONS

Material Type	General Parking 18,000 ESAL (inches)		Access Drives 75,000 ESAL (inches)	
HMAC Surface Course	2.0	2.0	2.0	2.0
Flexible Base	6.0	8.0	10.0	14.0
Lime/Fly-Ash Stabilized Subgrade or Cement Stabilized Subgrade, or Geogrid [1]	6.0	----	6.0	----
Recompacted Subgrade	----	6.0	----	6.0

[1] *Geogrid may be used in lieu of the 6-inch lime/fly ash or cement stabilized subgrade. Criteria for geogrid can be found in Section 6.8.4.*

6.8.4 Pavement Materials

Presented below are various materials that may be used to construct the pavement sections at this site. Submittals should be made for each pavement material. The submittals should be reviewed by the Geotechnical Engineer and appropriate members of the design team and should provide test information necessary to verify full compliance with the recommended or specified material properties.

Hot Mix Asphaltic Concrete (HMAC) Courses - The HMAC surface course should be plant mixed, hot laid Type C or D (TxDOT Standard Specifications Item 341). The HMAC base course should also be plant mixed, hot laid Type A or B. Each mix should meet the master specifications requirements of 2014 TxDOT Standard Specifications Item 341, Item SS 3224 (2011) and specific criteria for the job mix formula.

Flexible Base – Flexible base should meet TxDOT Standard Specification Item 247 Grade 1-2, Type D. Flexible base should be compacted to a minimum of 95 percent of the materials maximum standard Proctor dry density (ASTM D 698) at a moisture content of -2 to +2 percentage points of optimum moisture.

Lime/Fly-Ash Stabilized Subgrade – If lime-fly ash modification is used, the exposed surface of the pavement subgrade soils should be scarified to a depth of 6 inches and mixed with at least 3 percent hydrated lime and 7 percent fly ash (by dry unit weight) in conformance with TxDOT Item 265. The curing period of the soil-lime mixture before the fly ash stabilization begins should be as directed by the Geotechnical Engineer-of-Record. Prior to construction, we recommend that the optimum lime content of the subgrade soils be determined by laboratory testing. The selected Fly-Ash should be in accordance with ASTM C 618, Class C; and have a minimum CaO content of 20 percent. Lime-Fly Ash treated subgrade soils should be compacted to a minimum of 95 percent of the maximum density at a moisture content within the range of optimum moisture content to 3 percentage points above the optimum moisture content as determined by ASTM D 698. The soil mixture should be compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of -2 to +2 percentage points of the mixture's optimum moisture content.

Cement Modified Subgrade – Due to the presence of sandy and low plasticity soils at this site, the pavement can be modified with Portland cement. The exposed surface of the

pavement subgrade soils should be scarified to a depth of 6 inches and mixed with 4 percent Portland cement (by dry unit weight) in conformance with TxDOT Item 275. Assuming an in-place unit weight of 110 pcf for the clayey sand soils, this percentage of cement equates to about 20 lbs of cement per sq yard of subgrade treated. The soil-cement mixture should be compacted to at least 95 percent of the standard Proctor maximum dry density (ASTM D 698) and within the range of -1 to +3 percentage points of the mixture's optimum moisture content. *Note: The cement modified subgrade material in asphalt pavement areas should be micro-cracked prior to placement of asphalt concrete pavement materials. The micro-cracking should be performed with a minimum of one pass of a vibratory roller. The purpose of the micro-cracking is to reduce the risk of cracks forming in the subgrade materials that could reflect to the surface through the asphalt pavement. Cement modification of the pavement subgrade could also be utilized where sandy clay soils are encountered at the pavement subgrade level. Micro-cracking of the cement modified subgrade is not required for PCC pavements.*

Our recommendations on subgrade stabilization are preliminary. The actual depth and type of stabilization should be determined in the field at the time of construction just after site stripping and proofrolling. Furthermore, the type and amount of the stabilizer may vary depending on the final grade elevation and the soil type encountered.

Geogrid – Geogrid can be used in lieu of the 6 inches of lime stabilized subgrade or cement stabilized subgrade for asphalt pavements. The geogrid should consist of Tensar TX130S, Tensar Biaxial Type 1, TXDOT Type 2, or equivalent. The geogrid should be placed at the bottom of the flexible base material layer. However, the pavement subgrade should still be moisture conditioned and compacted to a depth of about 6 inches.

Recompacted Subgrade - The subgrade should be scarified to a depth of 6 inches and compacted to a dry density of at least 95 percent of the material's maximum standard Proctor dry density (ASTM D 698) and within a range of 0 to +3 percentage points of optimum moisture.

6.9 Corrosion

Results of resistivity tests performed on selected samples are presented below in Table F.

TABLE F
CORROSION TEST RESULTS

Sample		Type of Material	Resistivity ohm-cm
Boring No.	Depth, ft		
B-10	8-10	Reddish Brown & Gray Sandy Clay	2,800 (Dry) / 2,000 (Wet)
B-3	4-6	Reddish Brown Sandy Clay	4,000 (Dry) / 2,600 (Wet)
B-8	6-8	Reddish Brown & Gray Sandy Clay	4,500 (Dry) / 1,300 (Wet)

Based on results of these tests, the corrosion potential of metal utility lines is anticipated to be moderate to high and metal utility lines would require corrosion protection.

6.10 Detention Pond and Berm

We understand that the detention pond bottom, slopes, and associated berm may be required to hold water. The slopes are expected to be no steeper than about 4H (Horizontal) to 1V (Vertical). Based on the borings, the silty sands and lean sandy clays encountered in the excavation side slopes and bottom have relatively moderate to high permeability. These materials should be removed to provide a clay liner in areas where it is required to retain water. We recommend a minimum clay liner thickness of 2 ft.

The on-site clay soils can be used as clay liner material for the portions of the basins where a sufficient thickness of native clays are not present (generally 2 ft thick). The clay liner should extend from the bottom of the ponds to at least the top of the planned water level. In general, clay liner material should have the following properties:

Hydraulic Conductivity:	Less than 1 x 10^{-7} $^{cm}/_{sec}$
Liquid Limit:	≤ 70
Plasticity Index:	25 or greater
Percent Passing No. 200 Sieve:	60 or greater
Pinhole Dispersion Test Method A:	ND1 – ND2

The clay liner material should be compacted to a dry density of at least 95 percent of standard Proctor maximum dry density (ASTM D 698) at a moisture content of within the range of 1 percentage point below to 4 percentage points above the material's optimum moisture content.

Clayey soil materials used should be processed and the largest particle or clod should be less than 6 inches prior to compaction.

Compaction should be accomplished by placing about 8-inch thick loose lifts and compacting each lift to at least the specified minimum dry density. Field density and moisture content tests should be performed on each lift.

6.11 Drainage and Other Considerations

Adequate drainage should be provided to reduce seasonal variations in the moisture content of foundation soils. All pavement and sidewalks within 5 ft of the structures should be sloped away from the buildings to prevent ponding of water around the foundations. Final grades within 5 ft of the structures should be adjusted to slope away from the structures at a minimum slope of 2 percent. Maintaining positive surface drainage throughout the life of the structures is essential.

In areas with pavement or sidewalks adjacent to the new structures, a positive seal must be maintained between the structure and the pavement or sidewalk to minimize seepage of water into the underlying supporting soils. Post-construction movement of pavement and flat-work is common. Normal maintenance should include examination of all joints in paving and sidewalks, etc. as well as re-sealing where necessary.

Several factors relate to civil and architectural design and/or maintenance, which can significantly affect future movements of the foundation and floor slab system:

- Preferably, a complete system of gutters and downspouts should carry runoff water a minimum of 5 feet from the completed structures.

- Large trees and shrubs should not be allowed closer to the foundations than a horizontal distance equal to roughly one-half of their mature height due to their significant moisture demand upon maturing.

- Moisture conditions should be maintained "constant" around the edge of the slabs. Ponding of water in planters, in unpaved areas, and around joints in paving and sidewalks can cause slab movements beyond those predicted in this report.

- Planter box structures placed adjacent to the buildings should be provided with a means to assure concentrations of water are not available to the subsoil stratigraphy.

Trench backfill for utilities should be properly placed and compacted as outlined in Section 7.3 of this report and in accordance with requirements of local City standards. Since granular bedding backfill is used for most utility lines, the backfilled trench should not become a conduit and allow access for surface or subsurface water to travel toward the new structures. Concrete cut-off collars or clay plugs should be provided where utility lines cross building lines to prevent water from traveling in the trench backfill and entering beneath the structures.

7.0 GENERAL CONSTRUCTION PROCEDURES AND GUIDELINES

Variations in subsurface conditions could be encountered during construction. To permit correlation between test boring data and actual subsurface conditions encountered during construction, it is recommended a registered Professional Engineering firm be retained to observe construction procedures and materials.

Some construction problems, particularly degree or magnitude, cannot be anticipated until the course of construction. The recommendations offered in the following paragraphs are intended not to limit or preclude other conceivable solutions, but rather to provide our observations based on our experience and understanding of the project characteristics and subsurface conditions encountered in the borings.

7.1 Site Preparation and Grading

All areas supporting floor slabs, foundations, pavement, flatwork, or areas to receive new fill should be properly prepared.

- After completion of the necessary stripping, clearing, and excavating and prior to placing any required fill, the exposed soil subgrade should be carefully evaluated by probing and testing in accordance with the construction materials testing laboratory's discretion based on conditions encountered. Any undesirable material (organic material, wet, soft, or loose soil) still in place should be removed.

- The exposed soil subgrade should be further evaluated by proof-rolling with a heavy pneumatic tired roller, loaded dump truck or similar equipment weighing approximately 20 tons to check for pockets of soft or loose material hidden beneath a thin crust of possibly better soil. Proof-rolling should be performed in accordance with TxDOT Standard Specifications Item 216 (except for the weight of the proof-roll vehicle, as specified above).

- Proof-rolling procedures should be observed routinely by a Professional Engineer, or his designated representative. Any undesirable material (organic material, wet, soft, or loose soil) exposed during the proofroll should be removed and replaced with well-compacted material as outlined in Section 7.3.

- Prior to placement of any fill, the exposed soil subgrade should then be scarified to a minimum depth of 6 inches and recompacted as outlined in Section 7.3.

If fill is to be placed on existing slopes (natural or constructed) steeper than six horizontal to one vertical (6:1), the fill materials should be benched into the existing slopes in such a manner as to provide a minimum bench-key width of five (5) ft. This should provide a good contact between the existing soils and new fill materials, reduce potential sliding planes, and allow relatively horizontal lift placements.
Slope stability analysis of embankments (natural or constructed) was not within the scope of this study.

The contractor is responsible for designing any excavation slopes, temporary sheeting or shoring. Design of these structures should include any imposed surface surcharges. Construction site safety is the sole responsibility of the contractor, who shall also be solely responsible for the means, methods and sequencing of construction operations. The contractor should also be aware that slope height, slope inclination or excavation depths (including utility trench excavations) should in no case exceed those specified in local, state and/or federal safety regulations, such as OSHA Health and Safety Standard for Excavations, 29 CFR Part 1926, or successor regulations. Stockpiles should be placed well away from the edge of the excavation and their heights should be controlled so they do not surcharge the sides of the excavation. Surface drainage should be carefully controlled to prevent flow of water over the slopes and/or into the excavations. Construction slopes should be closely observed for signs of mass movement, including tension cracks near the crest or bulging at the toe. If potential stability problems are observed, a geotechnical engineer should be contacted immediately. Shoring, bracing or underpinning required for the project (if any) should be designed by a professional engineer registered in the State of Texas.

Due to the nature of the sandy soils found near the surface at the borings, traffic of heavy equipment (including heavy compaction equipment) may create pumping and general deterioration of shallow soils. Therefore, some construction difficulties should be anticipated during periods when these soils are saturated.

7.2 Foundation Excavations

All foundation excavations should be properly monitored to verify loose, soft or otherwise undesirable materials are removed and foundations will bear on satisfactory material. Soil exposed in the base of all foundation excavations should be protected against detrimental change in condition, such as surface sloughing or side disturbance, rain or excessive drying.

Silty sand is expected to be encountered during excavation for foundations. This material is prone to caving. It may be necessary to form the foundations.

Surface runoff should be drained away from excavations and not allowed to pond in the bottom of the excavation. Concrete for foundations should be placed as soon as practical after the excavation

is made. That is, the exposed foundation soils should not be allowed to become excessively dry or wet before placement of concrete.

7.3 Fill Compaction

Select Fill (Non-Expansive Fill): Select fill used as non-expansive fill should have a liquid limit less than or equal to 40 and a plasticity index (PI) between 4 and 20. Select fill should not contain deleterious material and debris. Select fill should be compacted to a dry density of at least 95 percent of standard Proctor maximum dry density (ASTM D 698). The compacted moisture content of the clays during placement should be determined at the time of construction based upon results of Proctor testing and the moisture range needed to achieve 95 percent of the maximum dry density. Excavated materials at the site may qualify as select fill. Atterberg-limits tests shall be performed to verify the plasticity index of all materials proposed for use as select fill (on-site or imported).

Granular soils should be compacted to a dry density of at least 95 percent of standard Proctor maximum dry density (ASTM D 698). The compacted moisture content of the granular soils during placement should be within the range of -2 to +2 percentage points of optimum moisture.

Clay soils to be used as fill at the sites should be compacted to a dry density of 95 to 100 percent of standard Proctor maximum dry density (ASTM D 698) and within the range of 1 percentage point below to 3 percentage points above the material's optimum moisture content. Clayey soil materials used as fill should be processed and the largest particle or clod should be less than 6 inches prior to compaction.

Compaction should be accomplished by placing fill in about 8-inch thick loose lifts and compacting each lift to at least the specified minimum dry density. Field density and moisture content tests should be performed on each lift.

Although not anticipated for this project, where either mass fills or utility lines are more than 10 feet deep, the fill/backfill below 10 feet should be compacted to at least 100 percent of standard Proctor maximum dry density (ASTM D-698) and within 2 percentage points of the material's optimum moisture content. The portion of the fill/backfill shallower than 10 feet should be compacted as outlined above.

Even if fill is properly compacted, fills in excess of about 10 ft are still subject to settlements over time of up to about 1 to 2 percent of the total fill thickness. This should be considered when designing utility lines under pavements and/or wall backfill.

7.4 Constructability

About 2 to 6 feet of silty sand soils were observed at the ground surface at the boring locations. As such, construction difficulties should be anticipated, especially during the wet season or immediately after rain events.

Although having a thin layer of sandy soils overlying cohesive soils is typical of this geologic region, our experience suggests that the local contractors find these materials troublesome and can often be the source of change orders, construction delays, and budget over runs. The following

recommendations are intended to address the site access and workability problems that will occur due to the presence of surficial sandy soils and are provided in descending order of preference:

1. The most appropriate method of dealing with the surficial sandy soils is to remove them and replace them with suitable cohesive fill soils. After successfully passing a proofroll as discussed above in Section 7.1, suitable cohesive fill soils should be placed and compacted as discussed above in Section **Error! Reference source not found.**.

2. Cement modification of the sandy soils could be utilized to aid in compaction and to provide a working surface. Recommendations for application rates and placement procedures for cement modification are provided above in Section 6.8.4.

3. Based on our experience, the most difficult method of dealing with the surficial sandy soils would be to rework the sandy soils using conventional moisture control and compaction methods. However, even properly placed and compacted sandy soils will not have enough shear strength (bearing capacity) to hold up to construction traffic or weathering when exposed at the ground surface. As such, the surficial sandy soils would require continual repair and maintenance until the planned footings and/or pavements could be constructed.

7.5 Wet Weather Conditions

Due to the nature of the surficial soils, construction operations may encounter difficulties due to wet or soft surface soils becoming a general hindrance to equipment, especially following periods of wet weather. If the subgrade cannot be adequately compacted to the minimum densities as described previously, one of the following measures will be required: 1) removal and replacement with select fill, 2) chemical treatment of the soil to dry and improve the condition of the subgrade, or 3) drying by natural means if the schedule allows. Based on our experience with similar soils in this area, chemical treatment is generally the most efficient and effective method to increase the supporting value of wet and weak subgrade. ALPHA TESTING should be contacted for additional recommendations if chemical treatment is needed due to soft and wet subgrade.

7.6 Groundwater

Free groundwater was encountered in borings B-2, B-4, and B-11 at depths of about 2 to 3 feet below the existing ground surface. Based on our experience with similar soils, groundwater seepage could be encountered at shallower depths in excavations for foundations, utility conduits, and other general excavations. The risk of seepage increases with depth of excavation and during or after periods of precipitation. Standard sump pits and pumping may be adequate to control seepage on a local basis for relatively shallow excavations. Supplemental dewatering procedures (such as, but not limited to, submersible pumps in slotted casings or well points) may be required for excavations into granular soils that encounter groundwater.

8.0 LIMITATIONS

Professional services provided in this geotechnical exploration were performed, findings obtained, and recommendations prepared in accordance with generally accepted geotechnical engineering principles and practices. The scope of services provided herein does not include an environmental assessment of the site or investigation for the presence or absence of hazardous materials in the

soil, surface water or groundwater. ALPHA, upon written request, can be retained to provide these services.

ALPHA is not responsible for conclusions, opinions or recommendations made by others based on this data. Information contained in this report is intended for the exclusive use of the Client (and their designated design representatives), and is related solely to design of the specific structures outlined in Section 2.0. No party other than the Client (and their designated design representatives) shall use or rely upon this report in any manner whatsoever unless such party shall have obtained ALPHA's written acceptance of such intended use. Any such third party using this report after obtaining ALPHA's written acceptance shall be bound by the limitations and limitations of liability contained herein, including ALPHA's liability being limited to the fee paid to it for this report. Recommendations presented in this report should not be used for design of any other structures except those specifically described in this report. In all areas of this report in which ALPHA may provide additional services if requested to do so in writing, it is presumed that such requests have not been made if not evidenced by a written document accepted by ALPHA. Further, subsurface conditions can change with passage of time. Recommendations contained herein are not considered applicable for an extended period of time after the completion date of this report. It is recommended our office be contacted for a review of the contents of this report for construction commencing more than one (1) year after completion of this report. Non-compliance with any of these requirements by the Client or anyone else shall release ALPHA from any liability resulting from the use of, or reliance upon, this report.

Recommendations provided in this report are based on our understanding of information provided by the Client about characteristics of the project. If the Client notes any deviation from the facts about project characteristics, our office should be contacted immediately since this may materially alter the recommendations. Further, ALPHA is not responsible for damages resulting from workmanship of designers or contractors. It is recommended the Owner retain qualified personnel, such as a Geotechnical Engineering firm, to verify construction is performed in accordance with plans and specifications.

APPENDIX

ALPHA TESTING

WHERE IT ALL BEGINS

VICINITY MAP

CLIENT BSW Architects
PROJECT NAME Waller County Criminal Justice Facitlity
PROJECT NUMBER H180173
PROJECT LOCATION Waller County, Texas

Key Map used with permission.

FIGURE A-1

ALPHA TESTING

WHERE IT ALL BEGINS

BORING LOCATION PLAN

CLIENT BSW Architects

PROJECT NUMBER H180173

PROJECT NAME Waller County Criminal Justice Facility

PROJECT LOCATION Waller County, Texas

Site plan provided by Client.

FIGURE A-2

A-3 METHODS OF FIELD EXPLORATION

Using standard rotary drilling equipment, a total of twenty (20) test borings were performed for this geotechnical exploration at the approximate locations shown on the Boring Location Plan, Figure A-2. The boring locations were staked by using a handheld GPS device as shown on the site plan provided during this study. The locations of the test borings shown on the Boring Location Plan are considered accurate only to the degree implied by the method used to define them.

Relatively undisturbed samples of the cohesive subsurface materials were obtained by hydraulically pressing 3-inch O.D. thin-wall sampling tubes into the underlying soils at selected 15depths (ASTM D 1587). These samples were removed from the sampling tubes in the field and examined visually. One representative portion of each sample was sealed in a plastic bag for use in future visual examinations and possible testing in the laboratory.

Representative samples of the subsurface materials were obtained employing split-spoon sampling procedures in general accordance with ASTM Standard D 1586. Disturbed samples were obtained at selected depths in the borings by driving a standard 2-inch outside diameter split-spoon sampler 18 inches into the subsurface material using a 140-pound hammer falling 30 inches. The number of blows required to drive the split-spoon sampler the final 12 inches of penetration (N-value) is recorded in the appropriate column on the boring logs presented in Appendix A of this report.

Logs of all borings are included in the Appendix of this report. The logs show visual descriptions of subsurface strata encountered using the Unified Soil Classification System. Sampling information, pertinent field data, and field observations are also included. Samples not consumed by testing will be retained in our laboratory for at least 14 days and then discarded unless the Client requests otherwise.

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Fax: (713) 360-0481
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LOG OF BORING NO.: B-1

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger+ Mud Augering

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown **SILTY SAND**										16			
		4.0			12					31		17			
5		Reddish Brown **SANDY CLAY**				2.3						17			
		8.0				2.3						12	38	12	26
		Reddish Brown **CLAYEY SAND**													
10		10.0			WH							12			
		Reddish Brown and Gray **SANDY CLAY**				2.3						8			
		12.0													
		Reddish Tan **SILTY SAND**													
15					27					23		14			
20		20.0			20							20			
		Reddish Tan and Gray **CLAY**													
25						2.0				99		27			
30						1.5		0.4			93	28			
		33.0													
		Tan **SILTY SAND**													
35					36							10			
40		40.0			27							11			
		BORING TERMINATED AT 40 feet													
		Notes:													
45		1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
50															

FIGURE A-4

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-2
Sheet 1 of 1
PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger+ Mud Augering

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): 3
▼ After Drilling (ft): 3
▼ After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND**										11			
		▼			4							16			
		4.0													
5		Reddish Brown **CLAY with sand**				2.3				68		19	55	16	39
		6.0													
		Reddish Tan **SILTY SAND**			30							9			
10					25					25		10			
		13.0													
		Reddish Tan and Gray **CLAY**				2.0		1.3			96	30	66	27	39
15															
						2.0						32			
20															
		23.0													
		Reddish Tan **SILTY SAND**			29							23			
25															
					24					24		16			
30															
		33.0													
		Reddish Tan and Gray **SANDY CLAY**				0.3						21			
35															
		38.0													
		Tan **SAND**			29							4			
40		40.0													
		BORING TERMINATED AT 40 feet													
		Notes:													
45		1-Free water was observed at a depth of 3 ft. during drilling operation and upon completion. 2-Backfilled with soil cuttings. 3-Borehole caved-in at 5-6 ft. after completion.													
50															

FIGURE A-5

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-3

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 1/30/2018 **End Date:** 1/30/2018
Drilling Method: Straight Flight Auger+ Mud Augering

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown and Tan **SANDY CLAY - FILL**				0.5						29			
		2.0													
		Brown **SILTY SAND**			12							12			
		4.0													
5		Reddish Brown **SANDY CLAY**				0.8						14			
						1.1				49		15	33	16	17
		8.0													
		Reddish Tan **SILTY SAND**			21							13			
10					30					26		13			
15					30							23			
		18.0													
		Reddish Tan and Gray **SANDY CLAY**				0.8		0.4			110	25	33	17	16
20															
25						0.5				87		17			
		28.0													
		Tan **SILTY SAND**			38							15			
30		33.0													
		Reddish Tan and Gray **CLAY with sand**				1.5		0.5			98	25	50	20	30
35															
40		40.0				1.0						29			
		BORING TERMINATED AT 40 feet													
		Notes:													
45		1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
50															

FIGURE A-6

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-4

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger+ Mud Augering

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): 2
▼ After Drilling (ft): 3
▼ After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND**										12			
		4.0			6							17			
5		Reddish Brown and Gray **CLAY with sand**				1.0						13	30	14	16
		8.0				1.0						15			
		Reddish Brown and Gray **CLAY**				2.3				93		28	62	24	38
10		10.0													
		Reddish Tan **SANDY CLAY**				2.3						11			
		12.0													
		Reddish Tan **SILTY SAND**													
15					32							16			
		18.0													
		Reddish Tan and Gray **CLAY**				1.8		0.5			93	29	68	23	45
20		22.0													
		Reddish Tan **SANDY SILT**													
25					33					79		15			
30		30.0			27							15			
		Reddish Tan and Gray **SANDY CLAY with sand seams and layers**													
						0.5		0.3			114	15			
35															
40		40.0				0.1				70		14			
		BORING TERMINATED AT 40 feet													
		Notes:													
45		1-Free water was observed at a depth of 2 ft during drilling operation and rose to a depth of 3 ft upon completion. 2- Backfilled with soil cuttings.													
50															

FIGURE A-7

ALPHA TESTING
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LOG OF BORING NO.: B-5

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger+ Mud Augering

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SANDY CLAY** 2.0				0.6						20			
		Reddish Brown and Gray **SANDY CLAY**				1.4		1.4			124	11	43	13	30
5		6.0				2.0						17			
		Reddish Brown and Gray **SANDY CLAY with sand seams and layers**				2.3				30		8	24	10	14
		9.0				2.3						11			
10		Reddish Tan **SAND with silt**			21							4			
15					32					12		4			
20		20.0			30							4			
		Reddish Tan and Gray **CLAY**				1.5		1.5			94	30	76	28	48
25		25.0													
		Tan **SILTY SAND**													
30					30							4			
35					22					23		4			
40		40.0			27							3			
		BORING TERMINATED AT 40 feet													
		Notes:													
45		1-Free water was not observed during drilling operation.													
		2- Backfilled with soil cuttings.													
50															

FIGURE A-8

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-6
Sheet 1 of 1
PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger+ Mud Augering

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND**										18			
		2.0													
		Reddish Brown and Gray **CLAY with sand**				1.5						20	60	19	41
5		Reddish Brown and Gray **SANDY CLAY**				2.0						12	39	17	22
						2.3						12			
		8.0													
		Reddish Tan **CLAY**				2.3				97		31	68	26	42
10		10.0													
		Reddish Tan **SAND with silt**			29							4			
15					28					8		4			
		18.0													
		Reddish Tan and Gray **CLAY with sand**				1.1		0.7			105	20			
20															
25						1.3		0.3			96	28	62	24	38
		28.0													
		Tan **SAND with silt**			29							5			
30															
35					32							5			
40		40.0			41							4			
		BORING TERMINATED AT 40 feet													
		Notes:													
45		1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
50															

FIGURE A-9

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-7

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 1/30/2018 **End Date:** 1/30/2018
Drilling Method: Straight Flight Auger+ Mud Augering

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND**										10			
		4.0			16							11			
5		Reddish Brown and Gray **CLAY with sand**				2.3						14	30	14	16
		8.0				2.3		1.6			110	14			
		Reddish Tan **SILTY SAND**			36							14			
10		13.0			35							14			
		Reddish Tan and Gray **CLAY with sand**				1.0						26			
15															
20		23.0				1.8		1.2			96	28	62	25	37
		Reddish Tan **SILTY SAND**			30							8			
25															
30		33.0			34							15			
		Reddish Tan and Gray **CLAY with sand**				1.8						26	62	25	37
35															
40		40.0				2.0		0.9			89	29			
		BORING TERMINATED AT 40 feet													
		Notes:													
45		1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
50															

FIGURE A-10

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-8
Sheet 1 of 1
PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 1/28/2018 **End Date:** 1/30/2018
Drilling Method: Straight Flight Auger+ Mud Augering

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND**										20			
		2.0													
		Reddish Brown and Gray **SANDY CLAY**				1.5									
5						2.3						10	37	13	24
						1.9						14			
		8.0													
		Reddish Tan **SAND**			30							3			
10					36							2			
15					30							2			
		17.0													
		Reddish Tan and Gray **CLAY**				2.1		1.6			102	24			
20															
25						2.3						22	61	20	41
30						2.1						20			
35						2.3		0.5			113	19	42	17	25
40		40.0				2.3						27			
		BORING TERMINATED AT 40 feet													
		Notes:													
45		1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
50															

FIGURE A-11

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-9

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 1/28/2018 **End Date:** 1/30/2018
Drilling Method: Straight Flight Auger+ Mud Augering

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND**										13			
		2.0													
		Reddish Brown and Gray **SANDY CLAY**				1.6		0.6			118	16	29	14	15
5						2.1						15			
						2.3						14	33	13	20
		8.0													
		Reddish Brown and Gray **CLAY with sand**				1.5						26	63	20	43
10						0.8						27			
15						1.4						32	59	23	36
20						2.1		0.3			99	27			
		23.0													
		Reddish Tan **SILTY SAND**			28							14			
25															
30					36							11			
35		35.0			24							15			
		Reddish Tan and Gray **CLAY with sand**													
40		40.0				2.3		2.4			106	22	48	23	25
		BORING TERMINATED AT 40 feet													
		Notes:													
45		1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
50															

FIGURE A-12

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-10

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 1/30/2018 **End Date:** 1/30/2018
Drilling Method: Straight Flight Auger+ Mud Augering

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown and Tan **SANDY CLAY - FILL**				1.0						19			
		2.0													
		Brown **SILTY SAND**			6							14			
		4.0													
5		Reddish Brown and Gray **SANDY CLAY**				1.9					122	14	25	10	15
						2.0						13	33	12	21
10						0.9									
						0.5						10			
		13.0													
15		Reddish Tan and Gray **CLAY with sand**				1.5					102	20			
20						2.0						31	68	28	40
		23.0													
25		Reddish Tan **SILTY SAND**			35							15			
30					31							17			
		33.0													
35		Reddish Tan and Gray **CLAY with sand**				2.3					107	21			
40		40.0				2.3						23			
		BORING TERMINATED AT 40 feet													
		Notes:													
45		1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
50															

FIGURE A-13

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-11

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): 2
After Drilling (ft): 3
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND**										8			
		2.0													
		Reddish Brown **SILTY SAND**			9							6			NP
5					17							12			
		6.0													
		Reddish Brown and Gray **SANDY CLAY**				2.3						7	27	12	15
10						2.3						7			
		10.0													
		BORING TERMINATED AT 10 feet													

Notes:

1-Free water was observed at a depth of 2 ft. during drilling operation and rose to a depth of 3 ft. upon completion.
2-Backfilled with soil cuttings.
3-Borehole caved-in at 5-6 feet after completion.

15 20 25 30 35 40 45 50

FIGURE A-14

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-12

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown **SILTY SAND**				2.3						17			NP
		Reddish Brown and Gray **CLAY** 4.0				2.3						21			
5		Reddish Brown and Gray **CLAY with sand**				2.3						13			
		8.0				2.3						14	36	12	24
		Reddish Tan **SILTY SAND**													
10		10.0										9			
		BORING TERMINATED AT 10 feet													
15		Notes: 1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
20															
25															
30															
35															
40															
45															
50															

FIGURE A-15

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-13

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND**										13			
		4.0			9							14			NP
5		Reddish Brown and Gray **CLAY with sand**				2.3						12			
						2.3						12	36	12	24
10		10.0				2.3						8			
		BORING TERMINATED AT 10 feet													
15		Notes: 1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
20															
25															
30															
35															
40															
45															
50															

FIGURE A-16

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-14

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND**										11			NP
		4.0			23							14			
5		Reddish Brown and Gray **CLAY with sand**				2.3						15			
						2.3						15	25	14	11
10		10.0				2.3						15			
		BORING TERMINATED AT 10 feet													
15		Notes: 1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
20															
25															
30															
35															
40															
45															
50															

FIGURE A-17

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-15
Sheet 1 of 1
PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND** 2.0										13			
		Reddish Brown and Gray **CLAY with sand** 4.0				1.5						21	69	21	48
5		Reddish Brown and Gray **SANDY CLAY**				2.3						13			
						2.3						13			
10		10.0				2.3						13	30	14	16
		BORING TERMINATED AT 10 feet													
		Notes:													
15		1-Free water was not observed during drilling operation.													
		2- Backfilled with soil cuttings.													
20															
25															
30															
35															
40															
45															
50															

FIGURE A-18

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-16

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): None
▼ After Drilling (ft): Dry
▼ After ____ Hours (ft): ____

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown **SANDY CLAY**				1.4						14			
						1.3						15	16	12	4
		4.0													
5		Reddish Brown and Gray **CLAY with sand**				2.1						12			
						2.3						15	22	11	11
10		10.0				2.3						17			
		BORING TERMINATED AT 10 feet													
		Notes:													
15		1-Free water was not observed during drilling operation.													
		2- Backfilled with soil cuttings.													
20															
25															
30															
35															
40															
45															
50															

FIGURE A-19

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-17

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
▽ On Rods (ft): None
▼ After Drilling (ft): Dry
▼ After ____ Hours (ft): ____

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown and Tan **SANDY CLAY - FILL**				0.9						19			
		2.0													
		Reddish Brown **SILTY SAND**			9							6			NP
5					26							16			
		6.0													
		Reddish Brown and Gray **CLAY**				2.3						15			
10						2.3						18	44	14	30
		10.0													
15		BORING TERMINATED AT 15 feet													
		Notes:													
20		1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
25															
30															
35															
40															
45															
50															

FIGURE A-20

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-18

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Dark Brown, Tan, and Gray **SANDY CLAY - FILL**										9			
					16							12	21	15	6
5						0.5						15			
						0.5						18	33	24	9
						0.4						12			
10						0.4									
15		15.0				0.5						18			
		BORING TERMINATED AT 15 feet													
		Notes:													
		1-Free water was not observed during drilling operation.													
20		2-Backfilled with soil cuttings.													
		3-This boring was drilled on top of a soil stockpile.													
25															
30															
35															
40															
45															
50															

FIGURE A-21

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-19

Sheet 1 of 1

PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND**										28			
		2.0													
		Reddish Brown and Gray **CLAY with sand**				2.3						15	47	17	30
5						2.3		0.9			116	16			
		6.0													
		Reddish Tan **SILTY SAND**			37							9			
10					32							7			
15		15.0			36							9			
		BORING TERMINATED AT 15 feet													
20		Notes: 1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
25															
30															
35															
40															
45															
50															

FIGURE A-22

ALPHA TESTING
WHERE IT ALL BEGINS

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LOG OF BORING NO.: B-20
Sheet 1 of 1
PROJECT NO.: H180173

Client: BSW Architects
Project: Waller County Criminal Justice Facility
Start Date: 2/1/2018 **End Date:** 2/1/2018
Drilling Method: Straight Flight Auger

Location: Waller County, Texas
Surface Elevation:
Latitude: Not Determined
Longitude: Not Determined
Hammer Drop (lbs / in):

GROUND WATER OBSERVATIONS
On Rods (ft): None
After Drilling (ft): Dry
After ____ Hours (ft):

Depth, feet	Graphic Log	MATERIAL DESCRIPTION	Sample Type	Recovery %	TX Cone or Standard Pen. (blows/ft,in)	Shear Strength (tsf) Pocket Pen	Torvane	Unconfined Compression	Unconsolidated Undrained Compr	% Passing No. 200 Sieve	Dry Unit Weight (pcf)	Water Content, %	Liquid Limit	Plastic Limit	Plasticity Index
		Brown **SILTY SAND** 2.0										10			
5		Reddish Brown **SILTY SAND** 6.0			6 7							15 17			
10		Reddish Brown and Gray **CLAY with sand** 10.0				2.3 2.3						16 20	34	14	20
15		Reddish Tan **SILTY SAND** 15.0			37							6			
		BORING TERMINATED AT 15 feet													
20		Notes: 1-Free water was not observed during drilling operation. 2- Backfilled with soil cuttings.													
25															
30															
35															
40															
45															
50															

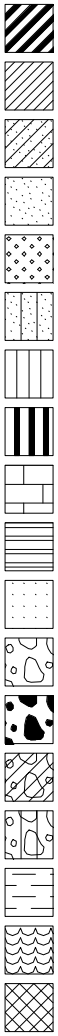
FIGURE A-23

ALPHA TESTING
WHERE IT ALL BEGINS

KEY TO SOIL SYMBOLS AND CLASSIFICATIONS

CLIENT BSW Architects
PROJECT NAME Waller County Criminal Justice Facility
PROJECT NUMBER H180173
PROJECT LOCATION Waller County, Texas

SOIL & ROCK SYMBOLS



(CH), High Plasticity CLAY
(CL), Low Plasticity CLAY
(SC), CLAYEY SAND
(SP), Poorly Graded SAND
(SW), Well Graded SAND
(SM), SILTY SAND
(ML), SILT
(MH), Elastic SILT
LIMESTONE
SHALE / MARL
SANDSTONE
(GP), Poorly Graded GRAVEL
(GW), Well Graded GRAVEL
(GC), CLAYEY GRAVEL
(GM), SILTY GRAVEL
(OL), ORGANIC SILT
(OH), ORGANIC CLAY
FILL

SAMPLING SYMBOLS

SHELBY TUBE (3" OD except where noted otherwise)
SPLIT SPOON (2" OD except where noted otherwise)
AUGER SAMPLE
TEXAS CONE PENETRATION
ROCK CORE (2" ID except where noted otherwise)

RELATIVE DENSITY OF COHESIONLESS SOILS (blows/ft)

VERY LOOSE	0 TO 4
LOOSE	5 TO 10
MEDIUM	11 TO 30
DENSE	31 TO 50
VERY DENSE	OVER 50

SHEAR STRENGTH OF COHESIVE SOILS (tsf)

VERY SOFT	LESS THAN 0.25
SOFT	0.25 TO 0.50
FIRM	0.50 TO 1.00
STIFF	1.00 TO 2.00
VERY STIFF	2.00 TO 4.00
HARD	OVER 4.00

RELATIVE DEGREE OF PLASTICITY (PI)

LOW	4 TO 15
MEDIUM	16 TO 25
HIGH	26 TO 35
VERY HIGH	OVER 35

RELATIVE PROPORTIONS (%)

TRACE	1 TO 10
LITTLE	11 TO 20
SOME	21 TO 35
AND	36 TO 50

PARTICLE SIZE IDENTIFICATION (DIAMETER)

BOULDERS	8.0" OR LARGER
COBBLES	3.0" TO 8.0"
COARSE GRAVEL	0.75" TO 3.0"
FINE GRAVEL	5.0 mm TO 3.0"
COURSE SAND	2.0 mm TO 5.0 mm
MEDIUM SAND	0.4 mm TO 5.0 mm
FINE SAND	0.07 mm TO 0.4 mm
SILT	0.002 mm TO 0.07 mm
CLAY	LESS THAN 0.002 mm

FIGURE A-24

B-1 METHODS OF LABORATORY TESTING

Selected samples were examined and classified by a qualified member of the Geotechnical Division and the boring logs were edited as necessary. To aid in classifying the subsurface materials and to determine the general engineering characteristics, natural moisture content tests (ASTM D 2216), Atterberg-limit tests (ASTM D 4318), and gradation tests (percent of material passing a No. 200 sieve, ASTM D 1140 were performed on select samples. A calibrated pocket penetrometer was used to approximate the unconfined compressive strength as an indicator of soil consistency for all in-tact cohesive samples. Unconfined compression strength tests (ASTM D 2166) was also performed on a representative samples. Results of all laboratory tests described above are provided on either the accompanying Log of Boring sheets or on summary data sheets as noted.

In addition to the Atterberg-limit tests, the expansive properties of the clay soils were further analyzed by absorption swell tests (ASTM D 4546). The swell test is performed by placing a selected sample in a consolidation machine and applying either the approximate current or expected overburden pressure and then allowing the sample to absorb water. When the sample exhibits very little tendency for further expansion, the height increase is recorded and the percent free swell and total moisture gain calculated. Results of the absorption swell tests are provided on the Swell Test Data sheet, Figure B-3 included in this appendix.

ALPHA TESTING

WHERE IT ALL BEGINS

SUMMARY OF TEST RESULTS

CLIENT BSW Architects **PROJECT NAME** Waller County Criminal Justice Facility

PROJECT NUMBER H180173 **PROJECT LOCATION** Waller County, Texas

Boring No.	Sample No.	Sample Top Depth, ft	Sample Bottom Depth, ft	Sample Type	SPT N-Value bpf	Moisture Content %	Dry Density pcf	Liquid Limit	Plastic Limit	Plasticity Index	Passing -200 %	Shear Strength, tsf				USCS
												UC	UU	TV	PP	
B-1	1	0	2	GB		16.4										
B-1	2	2.5	4	SS	12	17.2					31.1					
B-1	3	4	6	ST		17.3									2.3	
B-1	4	6	8	ST		11.6		38	12	26					2.3	
B-1	5	8.5	10	SS	WH	11.8										
B-1	6	10	12	ST		8.0									2.3	
B-1	7	13.5	15	SS	27	14.2					23.4					
B-1	8	18	20	SS	20	19.6										
B-1	9	23	25	ST		26.6					98.9				2.0	
B-1	10	28	30	ST		28.1	93.0					0.4			1.5	
B-1	11	33.5	35	SS	36	9.5										
B-1	12	38.5	40	SS	27	10.8										
B-2	1	0	2	GB		11.3										
B-2	2	2	3.5	SS	4	15.5										
B-2	3	4	6	ST		19.0		55	16	39	67.9				2.3	CH
B-2	4	6.5	8	SS	30	8.9										
B-2	5	8.5	10	SS	25	10.5					25.3					
B-2	6	13	15	ST		30.2	96.1	66	27	39		1.3			2.0	
B-2	7	18	20	ST		32.3									2.0	

SS = Split Spoon Sampler
ST = Shelby Tube (Undisturbed Sample Extruded on-Site)
SPT = Standard Penetration Test
UC = Unconfined Compression
UU = Triaxial Compr. (Conf Pressure, psi)
TV = Hand-held Torvane
PP = Pocket Penetrometer

CH = Fat Clay
CL = Lean Clay
CL-ML = Silty Clay
GC = Clayey Gravel
GM = Silty Gravel
GP = Poorly Graded Gravel
GP-GC = Poorly Graded Gravel w/ Clay
GP-GM = Poorly Graded Gravel w/ Silt

GW = Well Graded Gravel
GW-GC = Well Graded Gravel w/ Clay
GW-GM = Well Graded Gravel w/ Silt
MH = Elastic Silt
ML = Silt
SC = Clayey Sand
SC-SM = Clayey, Silty Sand
SM = Silty Sand

SP = Poorly Graded Sand
SP-SC = Poorly Graded Sand w/ Clay
SP-SM = Poorly Graded Sand w/ Silt
SW = Well Graded Sand
SW-SC = Well Graded Sand w/ Clay
SW-SM = Well Graded Sand w/ Silt

NP = Non Plastic

FIGURE B-2a

ALPHA TESTING

WHERE IT ALL BEGINS

SUMMARY OF TEST RESULTS

CLIENT BSW Architects **PROJECT NAME** Waller County Criminal Justice Facility

PROJECT NUMBER H180173 **PROJECT LOCATION** Waller County, Texas

Boring No.	Sample No.	Sample Top Depth, ft	Sample Bottom Depth, ft	Sample Type	SPT N-Value bpf	Moisture Content %	Dry Density pcf	Liquid Limit	Plastic Limit	Plasticity Index	Passing -200 %	Shear Strength, tsf				USCS
												UC	UU	TV	PP	
B-2	8	23.5	25.5	SS	29	23.2										
B-2	9	28.5	30	SS	24	16.0					23.9					
B-2	10	33	35	ST		20.5									0.3	
B-2	11	38.5	40	SS	29	3.5										
B-3	1	0	2	ST		28.9									0.5	
B-3	2	2.5	4	SS	12	12.5										
B-3	3	4	6	ST		13.8									0.8	
B-3	4	6	8	ST		14.9		33	16	17	48.8				1.1	SC
B-3	5	8.5	10	SS	21	12.8										
B-3	6	10.5	12	SS	30	12.7					25.5					
B-3	7	14.5	16	SS	30	22.7										
B-3	8	18	20	ST		24.6	110.0	33	17	16		0.4			0.8	
B-3	9	23	25	ST		16.9					87.1				0.5	
B-3	10	28.5	30	SS	38	15.2										
B-3	11	33	35	ST		24.7	98.4	50	20	30		0.5			1.5	
B-3	12	38	40	ST		29.4									1.0	
B-4	1	0	2	ST		12.2										
B-4	2	2.5	4	SS	6	16.5										
B-4	3	4	6	ST		13.4		30	14	16					1.0	

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CL = Lean Clay
CL-ML = Silty Clay
GC = Clayey Gravel
GM = Silty Gravel
GP = Poorly Graded Gravel
GP-GC = Poorly Graded Gravel w/ Clay
GP-GM = Poorly Graded Gravel w/ Silt

GW = Well Graded Gravel
GW-GC = Well Graded Gravel w/ Clay
GW-GM = Well Graded Gravel w/ Silt
MH = Elastic Silt
ML = Silt
SC = Clayey Sand
SC-SM = Clayey, Silty Sand
SM = Silty Sand

SP = Poorly Graded Sand
SP-SC = Poorly Graded Sand w/ Clay
SP-SM = Poorly Graded Sand w/ Silt
SW = Well Graded Sand
SW-SC = Well Graded Sand w/ Clay
SW-SM = Well Graded Sand w/ Silt

NP = Non Plastic

FIGURE B-2b

ALPHA TESTING

WHERE IT ALL BEGINS

SUMMARY OF TEST RESULTS

CLIENT BSW Architects **PROJECT NAME** Waller County Criminal Justice Facility

PROJECT NUMBER H180173 **PROJECT LOCATION** Waller County, Texas

Boring No.	Sample No.	Sample Top Depth, ft	Sample Bottom Depth, ft	Sample Type	SPT N-Value bpf	Moisture Content %	Dry Density pcf	Liquid Limit	Plastic Limit	Plasticity Index	Passing -200 %	Shear Strength, tsf				USCS
												UC	UU	TV	PP	
B-4	4	6	8	ST		14.9									1.0	
B-4	5	8	10	ST		27.5		62	24	38	93.3				2.3	CH
B-4	6	10	12	ST		11.4									2.3	
B-4	7	13.5	15	SS	32	15.9										
B-4	8	18	20	ST		28.9	92.7	68	23	45		0.5			1.8	
B-4	9	23.5	25	SS	33	15.1					79.3					
B-4	10	28.5	30	SS	27	15.2										
B-4	11	33	35	ST		15.1	113.6					0.3			0.5	
B-4	12	38	40	ST		14.4					70.1				0.1	
B-5	1	0	2	ST		19.8									0.6	
B-5	2	2	4	ST		11.5	123.5	43	13	30		1.4			1.4	
B-5	3	4	6	ST		17.2									2.0	
B-5	4	6	7	ST		8.2		24	10	14	30.1				2.3	SC
B-5	5	7	9	ST		11.2									2.3	
B-5	6	10.5	12	SS	21	4.5										
B-5	7	13.5	15	SS	32	3.7					12.2					
B-5	8	18.5	20	SS	30	3.7										
B-5	9	23	25	ST		30.3	93.9	76	28	48		1.5			1.5	
B-5	10	28.5	30	SS	30	3.9										

SS = Split Spoon Sampler
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GM = Silty Gravel
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GP-GC = Poorly Graded Gravel w/ Clay
GP-GM = Poorly Graded Gravel w/ Silt

GW = Well Graded Gravel
GW-GC = Well Graded Gravel w/ Clay
GW-GM = Well Graded Gravel w/ Silt
MH = Elastic Silt
ML = Silt
SC = Clayey Sand
SC-SM = Clayey, Silty Sand
SM = Silty Sand

SP = Poorly Graded Sand
SP-SC = Poorly Graded Sand w/ Clay
SP-SM = Poorly Graded Sand w/ Silt
SW = Well Graded Sand
SW-SC = Well Graded Sand w/ Clay
SW-SM = Well Graded Sand w/ Silt

NP = Non Plastic

FIGURE B-2c

ALPHA TESTING

WHERE IT ALL BEGINS

SUMMARY OF TEST RESULTS

CLIENT BSW Architects **PROJECT NAME** Waller County Criminal Justice Facility

PROJECT NUMBER H180173 **PROJECT LOCATION** Waller County, Texas

Boring No.	Sample No.	Sample Top Depth, ft	Sample Bottom Depth, ft	Sample Type	SPT N-Value bpf	Moisture Content %	Dry Density pcf	Liquid Limit	Plastic Limit	Plasticity Index	Passing -200 %	Shear Strength, tsf				USCS
												UC	UU	TV	PP	
B-5	11	33.5	35	SS	22	4.3					23.3					
B-5	12	38.5	40	SS	27	2.8										
B-6	1	0	2	GB		18.1										
B-6	2	2	4	ST		20.2		60	19	41					1.5	
B-6	3	4	6	ST		12.4		39	17	22					2.0	
B-6	4	6	8	ST		12.2									2.3	
B-6	5	8	10	ST		30.6		68	26	42	97.3				2.3	CH
B-6	6	10.5	12	SS	29	4.3										
B-6	7	13.5	15	SS	28	4.1					8.2					
B-6	8	18	20	ST		19.7	105.0					0.7			1.1	
B-6	9	23	25	ST		28.1	95.8	62	24	38		0.3			1.3	
B-6	10	28.5	30	SS	29	5.0										
B-6	11	33.5	35	SS	32	5.3										
B-6	12	38.5	40	SS	41	3.9										
B-7	1	0	2	GB		9.7										
B-7	2	2.5	4	SS	16	11.4										
B-7	3	4	6	ST		13.9		30	14	16					2.3	
B-7	4	6	8	ST		13.7	110.2					1.6			2.3	
B-7	5	8.5	10	SS	36	14.2										

SS = Split Spoon Sampler
ST = Shelby Tube (Undisturbed Sample Extruded on-Site)
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GM = Silty Gravel
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GP-GC = Poorly Graded Gravel w/ Clay
GP-GM = Poorly Graded Gravel w/ Silt

GW = Well Graded Gravel
GW-GC = Well Graded Gravel w/ Clay
GW-GM = Well Graded Gravel w/ Silt
MH = Elastic Silt
ML = Silt
SC = Clayey Sand
SC-SM = Clayey, Silty Sand
SM = Silty Sand

SP = Poorly Graded Sand
SP-SC = Poorly Graded Sand w/ Clay
SP-SM = Poorly Graded Sand w/ Silt
SW = Well Graded Sand
SW-SC = Well Graded Sand w/ Clay
SW-SM = Well Graded Sand w/ Silt

NP = Non Plastic

FIGURE B-2d

ALPHA TESTING

WHERE IT ALL BEGINS

SUMMARY OF TEST RESULTS

CLIENT BSW Architects **PROJECT NAME** Waller County Criminal Justice Facility

PROJECT NUMBER H180173 **PROJECT LOCATION** Waller County, Texas

Boring No.	Sample No.	Sample Top Depth, ft	Sample Bottom Depth, ft	Sample Type	SPT N-Value bpf	Moisture Content %	Dry Density pcf	Liquid Limit	Plastic Limit	Plasticity Index	Passing -200 %	Shear Strength, tsf				USCS
												UC	UU	TV	PP	
B-7	6	10.5	12	SS	35	13.6										
B-7	7	13	15	ST		26.4									1.0	
B-7	8	18	20	ST		27.7	96.0	62	25	37		1.2			1.8	
B-7	9	23.5	25	SS	30	7.6										
B-7	10	28.5	30	SS	34	14.6										
B-7	11	33	35	ST		26.4		62	25	37					1.8	
B-7	12	38	40	ST		28.6	89.0					0.9			2.0	
B-8	1	0	2	GB		20.4										
B-8	2	2	4	ST											1.5	
B-8	3	4	6	ST		10.3		37	13	24					2.3	
B-8	4	6	8	ST		13.7									1.9	
B-8	5	8	9.5	SS	30	2.6										
B-8	6	10.5	12	SS	36	2.3										
B-8	7	13.5	15	SS	30	2.2										
B-8	8	18	20	ST		24.1	102.1					1.6			2.1	
B-8	9	23	25	ST		21.6		61	20	41					2.3	
B-8	10	28	30	ST		19.8									2.1	
B-8	11	33	35	ST		18.8	113.3	42	17	25		0.5			2.3	
B-8	12	38	40	ST		26.5									2.3	

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GM = Silty Gravel
GP = Poorly Graded Gravel
GP-GC = Poorly Graded Gravel w/ Clay
GP-GM = Poorly Graded Gravel w/ Silt

GW = Well Graded Gravel
GW-GC = Well Graded Gravel w/ Clay
GW-GM = Well Graded Gravel w/ Silt
MH = Elastic Silt
ML = Silt
SC = Clayey Sand
SC-SM = Clayey, Silty Sand
SM = Silty Sand

SP = Poorly Graded Sand
SP-SC = Poorly Graded Sand w/ Clay
SP-SM = Poorly Graded Sand w/ Silt
SW = Well Graded Sand
SW-SC = Well Graded Sand w/ Clay
SW-SM = Well Graded Sand w/ Silt

NP = Non Plastic

FIGURE B-2e

ALPHA TESTING

WHERE IT ALL BEGINS

SUMMARY OF TEST RESULTS

CLIENT BSW Architects **PROJECT NAME** Waller County Criminal Justice Facility

PROJECT NUMBER H180173 **PROJECT LOCATION** Waller County, Texas

Boring No.	Sample No.	Sample Top Depth, ft	Sample Bottom Depth, ft	Sample Type	SPT N-Value bpf	Moisture Content %	Dry Density pcf	Liquid Limit	Plastic Limit	Plasticity Index	Passing -200 %	Shear Strength, tsf				USCS
												UC	UU	TV	PP	
B-9	1	0	2	GB		13.4										
B-9	2	2	4	ST		15.7	118.2	29	14	15		0.6			1.6	
B-9	3	4	6	ST		14.6									2.1	
B-9	4	6	8	ST		14.3		33	13	20					2.3	
B-9	5	8	10	ST		25.8		63	20	43					1.5	
B-9	6	10	12	ST		26.8									0.8	
B-9	7	13	15	ST		31.5		59	23	36					1.4	
B-9	9	18	20	ST		26.6	98.5					0.3			2.1	
B-9	9	23.5	25	SS	28	14.0										
B-9	10	28.5	30	SS	36	11.0										
B-9	11	33.5	35	SS	24	15.2										
B-9	12	38	40	ST		22.0	106.0	48	23	25		2.4			2.3	
B-10	1	0	2	ST		18.5									1.0	
B-10	2	2.5	4	SS	6	14.3										
B-10	3	4	6	ST		13.6	122.0	25	10	15					1.9	
B-10	4	6	8	ST		13.0		33	12	21					2.0	
B-10	5	8	10	ST											0.9	
B-10	6	10	12	ST		9.5									0.5	
B-10	7	13	15	ST		20.3	101.9								1.5	

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GC = Clayey Gravel
GM = Silty Gravel
GP = Poorly Graded Gravel
GP-GC = Poorly Graded Gravel w/ Clay
GP-GM = Poorly Graded Gravel w/ Silt

GW = Well Graded Gravel
GW-GC = Well Graded Gravel w/ Clay
GW-GM = Well Graded Gravel w/ Silt
MH = Elastic Silt
ML = Silt
SC = Clayey Sand
SC-SM = Clayey, Silty Sand
SM = Silty Sand

SP = Poorly Graded Sand
SP-SC = Poorly Graded Sand w/ Clay
SP-SM = Poorly Graded Sand w/ Silt
SW = Well Graded Sand
SW-SC = Well Graded Sand w/ Clay
SW-SM = Well Graded Sand w/ Silt

NP = Non Plastic

FIGURE B-2f

ALPHA TESTING

WHERE IT ALL BEGINS

SUMMARY OF TEST RESULTS

CLIENT BSW Architects **PROJECT NAME** Waller County Criminal Justice Facility

PROJECT NUMBER H180173 **PROJECT LOCATION** Waller County, Texas

Boring No.	Sample No.	Sample Top Depth, ft	Sample Bottom Depth, ft	Sample Type	SPT N-Value bpf	Moisture Content %	Dry Density pcf	Liquid Limit	Plastic Limit	Plasticity Index	Passing -200 %	Shear Strength, tsf				USCS
												UC	UU	TV	PP	
B-10	8	18	20	ST		30.9		68	28	40					2.0	
B-10	9	23.5	25	SS	35	14.7										
B-10	10	28.5	30	SS	31	16.7										
B-10	11	33	35	ST		20.7	106.6								2.3	
B-10	12	38	40	ST		23.3									2.3	
B-11	1	0	2	GB		8.0										
B-11	2	2.5	4	SS	9	6.0				NP						
B-11	3	4.5	6	SS	17	11.8										
B-11	4	6	8	ST		7.2		27	12	15					2.3	
B-11	5	8	10	ST		6.6									2.3	
B-12	1	0	2	ST		17.4				NP					2.3	
B-12	2	2	4	ST		21.4									2.3	
B-12	3	4	6	ST		12.8									2.3	
B-12	4	6	8	ST		13.8		36	12	24					2.3	
B-12	5	8.5	10	SS		9.3										
B-13	1	0	2	GB		13.0										
B-13	2	2.5	4	SS	9	14.2				NP						
B-13	3	4	6	ST		11.8									2.3	
B-13	4	6	8	ST		12.2		36	12	24					2.3	

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GP-GC = Poorly Graded Gravel w/ Clay
GP-GM = Poorly Graded Gravel w/ Silt

GW = Well Graded Gravel
GW-GC = Well Graded Gravel w/ Clay
GW-GM = Well Graded Gravel w/ Silt
MH = Elastic Silt
ML = Silt
SC = Clayey Sand
SC-SM = Clayey, Silty Sand
SM = Silty Sand

SP = Poorly Graded Sand
SP-SC = Poorly Graded Sand w/ Clay
SP-SM = Poorly Graded Sand w/ Silt
SW = Well Graded Sand
SW-SC = Well Graded Sand w/ Clay
SW-SM = Well Graded Sand w/ Silt

NP = Non Plastic

FIGURE B-2g

ALPHA TESTING

WHERE IT ALL BEGINS

SUMMARY OF TEST RESULTS

CLIENT BSW Architects **PROJECT NAME** Waller County Criminal Justice Facility

PROJECT NUMBER H180173 **PROJECT LOCATION** Waller County, Texas

Boring No.	Sample No.	Sample Top Depth, ft	Sample Bottom Depth, ft	Sample Type	SPT N-Value bpf	Moisture Content %	Dry Density pcf	Liquid Limit	Plastic Limit	Plasticity Index	Passing -200 %	Shear Strength, tsf				USCS
												UC	UU	TV	PP	
B-13	5	8	10	ST		7.9									2.3	
B-14	1	0	2	GB		10.9				NP						
B-14	2	2.5	4	SS	23	14.1										
B-14	3	4	6	ST		15.5									2.3	
B-14	4	6	8	ST		15.1		25	14	11					2.3	
B-14	5	8	10	ST		14.6									2.3	
B-15	1	0	2	GB		13.1										
B-15	2	2	4	ST		20.9		69	21	48					1.5	
B-15	3	4	6	ST		13.0									2.3	
B-15	4	6	8	ST		12.7									2.3	
B-15	5	8	10	ST		12.9		30	14	16					2.3	
B-16	1	0	2	ST		13.6									1.4	
B-16	2	2	4	ST		14.9		16	12	4					1.3	
B-16	3	4	6	ST		12.0									2.1	
B-16	4	6	8	ST		15.5		22	11	11					2.3	
B-16	5	8	10	ST		17.0									2.3	
B-17	1	0	2	ST		18.7									0.9	
B-17	2	2.5	4	SS	9	6.2				NP						
B-17	3	4.5	6	SS	26	15.8										

SS = Split Spoon Sampler
ST = Shelby Tube (Undisturbed Sample Extruded on-Site)
SPT = Standard Penetration Test
UC = Unconfined Compression
UU = Triaxial Compr. (Conf Pressure, psi)
TV = Hand-held Torvane
PP = Pocket Penetrometer

CH = Fat Clay
CL = Lean Clay
CL-ML = Silty Clay
GC = Clayey Gravel
GM = Silty Gravel
GP = Poorly Graded Gravel
GP-GC = Poorly Graded Gravel w/ Clay
GP-GM = Poorly Graded Gravel w/ Silt

GW = Well Graded Gravel
GW-GC = Well Graded Gravel w/ Clay
GW-GM = Well Graded Gravel w/ Silt
MH = Elastic Silt
ML = Silt
SC = Clayey Sand
SC-SM = Clayey, Silty Sand
SM = Silty Sand

SP = Poorly Graded Sand
SP-SC = Poorly Graded Sand w/ Clay
SP-SM = Poorly Graded Sand w/ Silt
SW = Well Graded Sand
SW-SC = Well Graded Sand w/ Clay
SW-SM = Well Graded Sand w/ Silt

NP = Non Plastic

FIGURE B-2h

ALPHA TESTING

WHERE IT ALL BEGINS

SUMMARY OF TEST RESULTS

CLIENT BSW Architects **PROJECT NAME** Waller County Criminal Justice Facility

PROJECT NUMBER H180173 **PROJECT LOCATION** Waller County, Texas

Boring No.	Sample No.	Sample Top Depth, ft	Sample Bottom Depth, ft	Sample Type	SPT N-Value bpf	Moisture Content %	Dry Density pcf	Liquid Limit	Plastic Limit	Plasticity Index	Passing -200 %	Shear Strength, tsf				USCS
												UC	UU	TV	PP	
B-17	4	6	8	ST		15.0									2.3	
B-17	5	8	10	ST		17.6		44	14	30					2.3	
B-18	1	0	2	GB		9.1										
B-18	2	2.5	4	SS	16	11.5		21	15	6						
B-18	3	4	6	ST		15.0									0.5	
B-18	4	6	8	ST		17.7		33	24	9					0.5	
B-18	5	8	10	ST		12.0									0.4	
B-18	6	10	12	ST											0.4	
B-18	7	13	15	ST		17.6									0.5	
B-19	1	0	2	GB		27.8										
B-19	2	2	4	ST		15.2		47	17	30					2.3	
B-19	3	4	6	ST		15.8	115.7					0.9			2.3	
B-19	4	6.5	8	SS	37	9.0										
B-19	5	8.5	10	SS	32	6.6										
B-19	6	13.5	15	SS	36	8.7										
B-20	1	0	2	GB		10.2										
B-20	2	2.5	4	SS	6	14.8										
B-20	3	4.5	6	SS	7	17.0										
B-20	4	6	8	ST		16.4		34	14	20					2.3	

SS = Split Spoon Sampler
ST = Shelby Tube (Undisturbed Sample Extruded on-Site)
SPT = Standard Penetration Test
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GP-GM = Poorly Graded Gravel w/ Silt

GW = Well Graded Gravel
GW-GC = Well Graded Gravel w/ Clay
GW-GM = Well Graded Gravel w/ Silt
MH = Elastic Silt
ML = Silt
SC = Clayey Sand
SC-SM = Clayey, Silty Sand
SM = Silty Sand

SP = Poorly Graded Sand
SP-SC = Poorly Graded Sand w/ Clay
SP-SM = Poorly Graded Sand w/ Silt
SW = Well Graded Sand
SW-SC = Well Graded Sand w/ Clay
SW-SM = Well Graded Sand w/ Silt

NP = Non Plastic

FIGURE B-2i

ALPHA TESTING

WHERE IT ALL BEGINS

SUMMARY OF TEST RESULTS

CLIENT BSW Architects **PROJECT NAME** Waller County Criminal Justice Facility

PROJECT NUMBER H180173 **PROJECT LOCATION** Waller County, Texas

Boring No.	Sample No.	Sample Top Depth, ft	Sample Bottom Depth, ft	Sample Type	SPT N-Value bpf	Moisture Content %	Dry Density pcf	Liquid Limit	Plastic Limit	Plasticity Index	Passing -200 %	Shear Strength, tsf				USCS
												UC	UU	TV	PP	
B-20	5	8	10	ST		19.6									2.3	
B-20	6	13.5	15	SS	37	5.8										

SS = Split Spoon Sampler
ST = Shelby Tube (Undisturbed Sample Extruded on-Site)
SPT = Standard Penetration Test
UC = Unconfined Compression
UU = Triaxial Compr. (Conf Pressure, psi)
TV = Hand-held Torvane
PP = Pocket Penetrometer

CH = Fat Clay
CL = Lean Clay
CL-ML = Silty Clay
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GM = Silty Gravel
GP = Poorly Graded Gravel
GP-GC = Poorly Graded Gravel w/ Clay
GP-GM = Poorly Graded Gravel w/ Silt

GW = Well Graded Gravel
GW-GC = Well Graded Gravel w/ Clay
GW-GM = Well Graded Gravel w/ Silt
MH = Elastic Silt
ML = Silt
SC = Clayey Sand
SC-SM = Clayey, Silty Sand
SM = Silty Sand

SP = Poorly Graded Sand
SP-SC = Poorly Graded Sand w/ Clay
SP-SM = Poorly Graded Sand w/ Silt
SW = Well Graded Sand
SW-SC = Well Graded Sand w/ Clay
SW-SM = Well Graded Sand w/ Silt

NP = Non Plastic

FIGURE B-2j

ALPHA TESTING

WHERE IT ALL BEGINS

SWELL TEST RESULTS

CLIENT BSW Architects

PROJECT NAME Waller County Criminal Justice Facility

PROJECT NUMBER H180173

PROJECT LOCATION Waller County, Texas

BORING	AVERAGE DEPTH	INITIAL DRY UNIT WEIGHT, pcf	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	INITIAL MOISTURE CONTENT, %	FINAL MOISTURE CONTENT, %	MEASURED PERCENT SWELL	FINAL MOISTURE CONTENT / LL	PL - INITIAL MOISTURE CONTENT
B-2	5		55	16	39	19.6	21.2	0.4	0.4	-3.6
B-3	7		33	16	17	14.9	15.3	0	0.5	1.1
B-4	9		62	24	38	26.6	30.0	0.4	0.5	-2.6
B-5	6.5		24	10	14	11.7	14.2	0	0.6	-1.7
B-6	9		68	26	42	30.3	33.0	0.2	0.5	-4.3
B-7	5		30	14	16	14.2	14.3	0	0.5	-0.2
B-8	5		37	13	24	6.7	17.9	0	0.5	6.3
B-9	7		33	13	20	12.3	14.6	0	0.4	0.7
B-10	7		33	12	21	13.2	13.9	0	0.4	-1.2

FIGURE B-3

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Preparing subgrades for slabs-on-grade, walks, pavements, and lawns and grasses.
2. Excavating and backfilling.

B. Coordinate the requirements of this Section with those of other sections that interface with Earthwork.

1.3 DEFINITIONS

A. Backfill: 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: placed over initial backfill to fill a trench.

B. Base Course: Course placed between the subbase course and hot-mix asphalt paving.

C. Bedding Course: Course placed over the excavated subgrade in a trench before laying pipe.

D. Borrow Soil: Satisfactory soil imported from off-site for use as fill, backfill, or select fill.

E. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.

F. Fill: Soil materials used to raise existing grades.

G. Select Fill: Course supporting a slab-on-grade or similar construction.

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: Course placed between the subgrade and base course for hot-mix asphalt pavement, or course placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.

J. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

K. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

1.4 SUBMITTALS

A. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated:

1. Classification according to ASTM D 2487 of each soil material proposed for fill, backfill, and select fill.

B. Preexcavation Photographs or Videotape: Contractor may, at his option, submit documentation that shows existing conditions of adjoining construction and site improvements, including finish surfaces, that might be misconstrued as damage caused by earthwork operations. Submit before earthwork begins.

1.5 PROJECT CONDITIONS

A. Sub-surface Investigation Data: See Section 02210 for Geotechnical Report.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted by Owner and then only after arranging to provide temporary utility services according to requirements indicated.

C. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

D. Protection:

1. Protect bench marks, existing fences, roads, walks, paving, curbs, and other constructed features from damage.
2. Protect aerial, surface, and underground utility lines and appurtenances that are to remain.
3. Reestablish bench marks, monuments, and reference points disturbed by damage; repair all other damage caused by construction Work.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations on the site.

B. Subgrade Under Building Pad: <**per geotechnical report**>.

C. Select Fill Under Building Slab: <**per geotechnical report**>.

D. Subbase Material for Paving: **per geotechnical report**.

E. Base Course for Paving: **per geotechnical report**.

F. Bedding Course for Trenches: **Bedding course to be placed in accordance with the Civil Plans**.

G. Trench Backfill:

1. Initial Backfill: **Initial/Final backfill to be placed in accordance with the Civil Plans**.
2. Final Backfill: **Initial/Final backfill to be placed in accordance with the Civil Plans**.

H. Sand: ASTM C 33; fine aggregate, natural, or manufactured sand. Use only where specifically indicated.

1. Cement-stabilized sand.
2. Cement sand meeting 100 psi within 48 hours, tested by ASTM C558.

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. All work shall be laid out by a competent surveyor, in accordance with Division 1. The Contractor shall be responsible for all elevations and dimensions and shall verify actual site conditions. Refer discrepancies to Architect for interpretation or modification before proceeding.

B. Establish benchmark and maintain it until completion. Set floor level by instrument.

C. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

D. Preparation of subgrade for earthwork operations including removal of vegetation, topsoil, debris, obstructions, and deleterious materials from ground surface is specified in Division 2 Section "Site Clearing."

E. Protect and maintain erosion and sedimentation controls, which are specified in Division 2 Section "Site Clearing," during earthwork operations.

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.

3.3 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.

B. Explosives: Do not use explosives.

3.4 EXCAVATION FOR STRUCTURES

A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch, or more if approved by the Architect. 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.

    a. Should cave-ins occur or excavations be made over 2 inches beyond dimensions shown, increase excavation size to allow forming, and install wood forms.

2. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended as bearing surfaces.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated lines, cross sections, elevations, and subgrades.

3.6 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

B. Excavate trenches to uniform widths to provide sufficient 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.

C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe elevation to allow for bedding course. Hand excavate for bell of pipe.

3.7 SUBGRADE INSPECTION

A. Proof-roll subgrade below the building slabs and pavements with heavy pneumatic-tired equipment to identify any wet, soft, or pumping pockets.

B. Authorized additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

3.8 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill, with 28-day compressive strength as indicated for footings may be used.

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 or temporary shoring, bracing or sheeting.
5. Removing trash and debris.

3.10 UTILITY TRENCH BACKFILL

A. Place backfill on subgrades free of mud or other deleterious conditions.

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. Backfill trenches excavated under footings and within 18 inches of bottom of footings with Select Fill.

D. Initial Backfill: Place and compact initial backfill to a height of 12 inches over the utility pipe or conduit.

1. 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.

E. Final Backfill: Place and compact final backfill to final subgrade elevation.

F. Backfill voids with matching soil while installing and removing shoring and bracing.

G. 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. Building Elements: Place and compact fill material in layers to required elevations as follows:

1. Under building slabs, use Select Fill in accordance with geotechnical report, to elevations required such that top of slab is at elevation indicated on Drawings.
2. Under footings and foundations, use Select Fill in accordance with geotechnical report, to elevations required such that tops of footings and foundations are at elevations indicated on Drawings.
3. Under walks and pavements, use soil material in accordance with geotechnical report, to underside of surfacing (allow for sand layer at walks, where indicated on Drawings).
4. Under steps and ramps, use Select Fill in accordance with geotechnical report, to elevations required such that top of steps and ramps is at grades indicated on Drawings.

C. Landscape Areas:

1. Under grass areas, use satisfactory soil material to one inch below finish grades indicated on Drawings.
2. Under planting areas, use satisfactory soil material to finish grades indicated on Drawings, allowing 3 inches for topsoil.

3.12 SOIL MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction. Compact in accordance with geotechnical report.

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 6 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 according to ASTM D 698:

1. Under structures, building slabs, steps, and pavements: 95 percent.
2. Under walkways: 95 percent.
3. Under lawn or unpaved areas: 95 percent.
4. For utility trenches under building & paving: 95 percent.
5. For utility trenches under lawn or unpaved areas: 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. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:

1. Lawn or Unpaved Areas: Plus or minus 1 inch.
2. Walks: Plus or minus 1 inch.
3. Pavements: Plus or minus ½ inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

3.15 SUBBASE AND BASE COURSES

A. Place subbase and base course on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place subbase and base course under pavements and walks as follows:

1. Place base course material over subbase course under hot-mix asphalt pavement.
2. Shape subbase and base course to required crown elevations and cross-slope grades.
3. Place subbase and base course 6 inches or less in compacted thickness in a single layer.
4. Place subbase and base course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
5. Compact subbase and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 95 percent of maximum dry density for subgrade, and 95 percent for base course, according to ASTM D 698.

C. Pavement Shoulders: Place shoulders along edges of subbase and base course to prevent lateral movement. Construct shoulders, at least 12 inches wide, of satisfactory soil materials and

compact simultaneously with each subbase and base layer to not less than 95 percent of maximum dry density for subgrade, and 95 percent for base course, according to ASTM D 698.

3.16 SELECT FILL

A. Place fill on subgrades free of mud, frost, snow, or ice.

B. On prepared subgrade, place and compact fill under cast-in-place concrete slabs-on-grade as follows:

1. Place select fill course 6 inches or less in compacted thickness in a single layer.
2. Place select fill course that exceeds 6 inches in compacted thickness in layers of equal thickness, with no compacted layer more than 6 inches thick or less than 3 inches thick.
3. Compact each layer of select fill to required cross sections and thicknesses to not less than 95 percent of maximum dry density according to ASTM D 698.

3.17 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. 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 to depth required; recompact and retest until specified compaction is obtained.

3.18 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.

3.19 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.

B. Disposal: Transport surplus satisfactory soil to designated storage areas on Owner's property. Stockpile or spread soil as directed by Architect.

1. Remove waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property.

END OF SECTION 02300

SECTION 02361 - TERMITE CONTROL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Soil treatment with termiticide.

B. Coordinate the requirements of this Section with those of other sections that interface with Termite Control.

1.3 PERFORMANCE REQUIREMENTS

A. Service Life of Soil Treatment: Soil treatment by use of a termiticide that is effective for not less than five years against infestation of subterranean termites.

1.4 SUBMITTALS

A. Product Data: For termiticide or borate.

1. Include the EPA-Registered Label for termiticide and borate products.

B. Product Certificates: For termite control products, signed by product manufacturer.

C. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's record information, including the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Brand name and manufacturer of termiticide.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes, and rates of application used.
6. Areas of application.
7. Water source for application.

D. Submit a diagram of the structure to be treated (Architect’s plan may be used). Clearly mark areas to be treated, as well as measurements and calculations of materials to be used.

E. Warranty: Special warranty specified in this Section.

1.5 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, and who employs workers trained and approved to install manufacturer's products.

B. Regulatory Requirements: Formulate and apply termiticides according to the EPA-Registered Label.

1.6 PROJECT CONDITIONS

A. 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.

1.7 COORDINATION

A. Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

B. Apply borate treatment after framing, sheathing, and exterior weather protection is completed but before electrical and mechanical systems are installed.

1.8 WARRANTY

A. 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: Five years from date of Substantial Completion.

2. Applicator shall make annual inspections during life of warranty period. If evidence of termite activity is apparent during warranty period, promptly:

a. Re-treat soil to prevent subterranean termites from attacking the building or its contents, using means acceptable to Owner, at no cost to Owner, and:
b. Make good on all damage caused by subterranean termite activity, at no cost to Owner.

1.9 MAINTENANCE SERVICE

A. Continuing Service: Beginning at Substantial Completion, provide 60 months' continuing service including monitoring, inspection, and re-treatment for occurrences of termite activity. Provide a standard continuing service agreement. State services, obligations, conditions, and terms for agreement period; and terms for future renewal options.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Termiticides:

a. Aventis Environmental Science USA LP; Termidor.
b. Bayer Corporation; Premise 75.
c. Dow AgroSciences LLC; Dursban TC.
d. Syngenta; ProBuild TC.

2. Borates:

a. Nisus Corp.; Bora-Care, Jecta.
b. NovaGuard Technologies, Inc.; Armor-Guard, Shell-Guard.
c. U.S. Borax Inc.; Tim-Bor.

2.2 SOIL TREATMENT

A. Termiticide: Provide an EPA-registered termiticide complying with requirements of authorities having jurisdiction, in an aqueous solution (fuel oil or other petroleum products are not allowed to be used as dilutent) formulated to prevent termite infestation. Provide quantity required for application at the label volume and rate for the maximum termiticide concentration allowed for each specific use, according to product's EPA-Registered Label.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil, interfaces with earthwork, slab and foundation work, landscaping, and other conditions affecting performance of termite control.

1. Proceed with application only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparation before beginning application of termite control treatment. Remove all 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.

3.3 APPLICATION, GENERAL

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's EPA-Registered Label for products. Comply with manufacturer's instructions.

3.4 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Provide quantity required for application at the label volume and rate for the maximum specified concentration of termiticide, according to manufacturer's EPA-Registered Label, to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction. Distribute treatment evenly.

1. Slabs-on-Grade: Under ground-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: Adjacent soil including soil along the entire inside perimeter of foundation walls, around plumbing pipes and electric conduit penetrating the slab, and around interior column footers, piers, and similar elements; also along the entire outside perimeter, from grade to bottom of footing or grade beam. Avoid soil washout around footings.
3. Penetrations: At expansion joints, control joints, and areas where slabs will be penetrated.

B. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

C. Protect termiticide solution, dispersed in treated soils and fills, from being diluted until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

D. Post warning signs in areas of application.

E. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

END OF SECTION 02361

SECTION 02510 - WATER DISTRIBUTION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes water-distribution piping and related components outside the building for [**water service**] [**fire-service mains**].

B. Utility-furnished products include water meters that will be furnished to the site, ready for installation.

1.3 DEFINITIONS

A. EPDM: Ethylene propylene diene terpolymer rubber.

B. LLDPE: Linear, low-density polyethylene plastic.

C. PA: Polyamide (nylon) plastic.

D. PE: Polyethylene plastic.

E. PP: Polypropylene plastic.

F. PVC: Polyvinyl chloride plastic.

G. RTRF: Reinforced thermosetting resin (fiberglass) fittings.

H. RTRP: Reinforced thermosetting resin (fiberglass) pipe.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Detail precast concrete vault assemblies and indicate dimensions, method of field assembly, and components.

1. Wiring Diagrams: Power, signal, and control wiring for alarms.

C. Coordination Drawings: For piping and specialties including relation to other services in same area, drawn to scale. Show piping and specialty sizes and valves, meter and specialty locations, and elevations.

D. Field quality-control test reports.

E. Operation and Maintenance Data: For water valves and specialties to include in emergency, operation, and maintenance manuals.

1.5 QUALITY ASSURANCE

A. Regulatory Requirements:

1. Comply with requirements of utility company supplying water. Include tapping of water mains and backflow prevention.
2. Comply with standards of authorities having jurisdiction for potable-water-service piping, including materials, installation, testing, and disinfection.
3. Comply with standards of authorities having jurisdiction for fire-suppression water-service piping, including materials, hose threads, installation, and testing.

B. Piping materials shall bear label, stamp, or other markings of specified testing agency.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

D. Comply with ASTM F 645 for selection, design, and installation of thermoplastic water piping.

E. Comply with FMG's "Approval Guide" or UL's "Fire Protection Equipment Directory" for fire-service-main products.

F. NFPA Compliance: Comply with NFPA 24 for materials, installations, tests, flushing, and valve and hydrant supervision for fire-service-main piping for fire suppression.

G. NSF Compliance:

1. Comply with NSF 14 for plastic potable-water-service piping. Include marking "NSF-pw" on piping.
2. Comply with NSF 61 for materials for water-service piping and specialties for domestic water.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Preparation for Transport: Prepare valves, including fire hydrants, according to the following:

1. Ensure that valves are dry and internally protected against rust and corrosion.
2. Protect valves against damage to threaded ends and flange faces.
3. Set valves in best position for handling. Set valves closed to prevent rattling.

B. During Storage: Use precautions for valves, including fire hydrants, according to the following:

1. Do not remove end protectors unless necessary for inspection; then reinstall for storage.
2. Protect from weather. Store indoors and maintain temperature higher than ambient dew-point temperature. Support off the ground or pavement in watertight enclosures when outdoor storage is necessary.

C. Handling: Use sling to handle valves and fire hydrants if size requires handling by crane or lift. Rig valves to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

D. 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.

E. Protect stored piping from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor when storing inside.

F. Protect flanges, fittings, and specialties from moisture and dirt.

G. Store plastic piping protected from direct sunlight. Support to prevent sagging and bending.

1.7 PROJECT CONDITIONS

A. Interruption of Existing Water-Distribution Service: Do not interrupt service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water-distribution service according to requirements indicated:

1. Notify Architect and Owner no fewer than seven (7) days in advance of proposed interruption of service.
2. Do not proceed with interruption of water-distribution service without Architect's and Owner's written permission.

1.8 COORDINATION

A. Coordinate connection to water main with utility company.

PART 2 - PRODUCTS

2.1 PVC PIPE AND FITTINGS

A. PVC, Schedule 40 Pipe: ASTM D 1785.

1. PVC, Schedule 40 Socket Fittings: ASTM D 2466.

B. PVC, Schedule 80 Pipe: ASTM D 1785.

1. PVC, Schedule 80 Socket Fittings: ASTM D 2467.

2. PVC, Schedule 80 Threaded Fittings: ASTM D 2464.

C. PVC, AWWA Pipe: AWWA C900, [**Class 150**] [**and**] [**Class 200**], with bell end with gasket, and with spigot end.

1. Comply with UL 1285 for fire-service mains if indicated.
2. PVC Fabricated Fittings: AWWA C900, [**Class 150**] [**and**] [**Class 200**], with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
3. PVC Molded Fittings: AWWA C907, Class 150, with bell-and-spigot or double-bell ends. Include elastomeric gasket in each bell.
4. Push-on-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

    a. Gaskets: AWWA C111, rubber.

5. Mechanical-Joint, Ductile-Iron Fittings: AWWA C110, ductile- or gray-iron standard pattern or AWWA C153, ductile-iron compact pattern.

    a. Glands, Gaskets, and Bolts: AWWA C111, ductile- or gray-iron glands, rubber gaskets, and steel bolts.

2.2 GATE VALVES

A. AWWA, Cast-Iron Gate Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. American AVK Co.; Valves & Fittings Div.
    b. American Cast Iron Pipe Co.; American Flow Control Div.
    c. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
    d. Crane Co.; Crane Valve Group; Stockham Div.
    e. East Jordan Iron Works, Inc.
    f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
    g. McWane, Inc.; Kennedy Valve Div.
    h. McWane, Inc.; M & H Valve Company Div.
    i. McWane, Inc.; Tyler Pipe Div.; Utilities Div.
    j. Mueller Co.; Water Products Div.
    k. NIBCO INC.
    l. U.S. Pipe and Foundry Company.
    m. Park Equipment.

2. Nonrising-Stem, Metal-Seated Gate Valves:

    a. Description: Gray- or ductile-iron body and bonnet; with cast-iron or bronze double-disc gate, bronze gate rings, bronze stem, and stem nut.

        1) Standard: AWWA C500.
        2) Minimum Pressure Rating: 200 psig.

3) End Connections: Mechanical joint.
4) Interior Coating: Complying with AWWA C550.

3. Nonrising-Stem, Resilient-Seated Gate Valves:

a. Description: Gray- or ductile-iron body and bonnet; with bronze or gray- or ductile-iron gate, resilient seats, bronze stem, and stem nut.

1) Standard: AWWA C509.
2) Minimum Pressure Rating: 200 psig.
3) End Connections: Mechanical joint.
4) Interior Coating: Complying with AWWA C550.

4. Nonrising-Stem, High-Pressure, Resilient-Seated Gate Valves:

a. Description: Ductile-iron body and bonnet; with bronze or ductile-iron gate, resilient seats, bronze stem, and stem nut.

1) Standard: AWWA C509.
2) Minimum Pressure Rating: 250 psig.
3) End Connections: Push on or mechanical joint.
4) Interior Coating: Complying with AWWA C550.

5. OS&Y, Rising-Stem, Metal-Seated Gate Valves:

a. Description: Cast- or ductile-iron body and bonnet, with cast-iron double disc, bronze disc and seat rings, and bronze stem.

1) Standard: AWWA C500.
2) Minimum Pressure Rating: 200 psig.
3) End Connections: Flanged.

6. OS&Y, Rising-Stem, Resilient-Seated Gate Valves:

a. Description: Cast- or ductile-iron body and bonnet, with bronze or gray- or ductile-iron gate, resilient seats, and bronze stem.

1) Standard: AWWA C509.
2) Minimum Pressure Rating: 200 psig.
3) End Connections: Flanged.

B. UL/FMG, Cast-Iron Gate Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American Cast Iron Pipe Co.; American Flow Control Div.
b. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
c. Crane Co.; Crane Valve Group; Stockham Div.
d. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).

e. McWane, Inc.; Kennedy Valve Div.
f. McWane, Inc.; M & H Valve Company Div.
g. Mueller Co.; Water Products Div.
h. NIBCO INC.
i. U.S. Pipe and Foundry Company.
j. Park Equipment.

2. UL/FMG, Nonrising-Stem Gate Valves:

a. Description: Iron body and bonnet with flange for indicator post, bronze seating material, and inside screw.

1) Standards: UL 262 and FMG approved.
2) Minimum Pressure Rating: 175 psig.
3) End Connections: Flanged.

3. OS&Y, Rising-Stem Gate Valves:

a. Description: Iron body and bonnet and bronze seating material.

1) Standards: UL 262 and FMG approved.
2) Minimum Pressure Rating: 175 psig.
3) End Connections: Flanged.

2.3 GATE VALVE ACCESSORIES AND SPECIALTIES

A. Tapping-Sleeve Assemblies:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
b. East Jordan Iron Works, Inc.
c. Flowserve.
d. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
e. McWane, Inc.; Kennedy Valve Div.
f. McWane, Inc.; M & H Valve Company Div.
g. Mueller Co.; Water Products Div.
h. U.S. Pipe and Foundry Company.
i. Park Equipment.

2. Description: Sleeve and valve compatible with drilling machine.

a. Standard: MSS SP-60.
b. Tapping Sleeve: Cast- or ductile-iron or stainless-steel, two-piece bolted sleeve with flanged outlet for new branch connection. Include sleeve matching size and type of pipe material being tapped and with recessed flange for branch valve.
c. Valve: AWWA, cast-iron, nonrising-stem, [**metal**] [**resilient**]-seated gate valve with one raised face flange mating tapping-sleeve flange.

B. Valve Boxes: Comply with AWWA M44 for cast-iron valve boxes. Include top section, adjustable extension of length required for depth of burial of valve, plug with lettering "WATER," and bottom section with base that fits over valve and with a barrel approximately 5 inches in diameter.

1. Operating Wrenches: Steel, tee-handle with one pointed end, stem of length to operate deepest buried valve, and socket matching valve operating nut.

C. Indicator Posts: UL 789, FMG-approved, vertical-type, cast-iron body with operating wrench, extension rod, and adjustable cast-iron barrel of length required for depth of burial of valve.

2.4 CHECK VALVES

A. AWWA Check Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
3. Basis-of-Design Product: Subject to compliance with requirements, provide [**the product indicated on Drawings**] <**Insert manufacturer's name; product name or designation**> or a comparable product by one of the following:

a. American AVK Co.; Valves & Fittings Div.
b. American Cast Iron Pipe Co.; American Flow Control Div.
c. APCO Williamette; Valve and Primer Corporation.
d. Crane Co.; Crane Valve Group; Crane Valves.
e. Crane Co.; Crane Valve Group; Stockham Div.
f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
g. McWane, Inc.; Kennedy Valve Div.
h. McWane, Inc.; M & H Valve Company Div.
i. Mueller Co.; Water Products Div.
j. NIBCO INC.
k. Watts Water Technologies, Inc.

4. Description: Swing-check type with resilient seat. Include interior coating according to AWWA C550 and ends to match piping.

a. Standard: AWWA C508.
b. Pressure Rating: 175 psig.

B. UL/FMG, Check Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

3. Basis-of-Design Product: Subject to compliance with requirements, provide [**the product indicated on Drawings**] <**Insert manufacturer's name; product name or designation**> or a comparable product by one of the following:

    a. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
    b. Crane Co.; Crane Valve Group; Stockham Div.
    c. Globe Fire Sprinkler Corporation.
    d. Kidde Fire Fighting.
    e. MATCO-NORCA, Inc.
    f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
    g. McWane, Inc.; Kennedy Valve Div.
    h. Mueller Co.; Water Products Div.
    i. NIBCO INC.
    j. Reliable Automatic Sprinkler Co., Inc.
    k. Tyco Fire & Building Products.
    l. United Brass Works, Inc.
    m. Victaulic Company of America.
    n. Viking Corporation.
    o. Watts Water Technologies, Inc.

4. Description: Swing-check type with pressure rating; rubber-face checks, unless otherwise indicated; and ends matching piping.

    a. Standards: UL 312 and FMG approved.
    b. Pressure Rating: [175 psig] [250 psig].

2.5 DETECTOR CHECK VALVES

A. Detector Check Valves:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Ames Fire & Waterworks; a division of Watts Regulator Co.
    b. Badger Meter, Inc.
    c. FEBCO; SPX Valves & Controls.
    d. Globe Fire Sprinkler Corporation.
    e. McWane, Inc.; Kennedy Valve Div.
    f. Mueller Co.; Hersey Meters.
    g. Victaulic Company of America.
    h. Viking Corporation.
    i. Watts Water Technologies, Inc.
    j. Park Equipment.

2. Description: Galvanized cast-iron body, bolted cover with air-bleed device for access to internal parts, and flanged ends. Include one-piece bronze disc with bronze bushings, pivot, and replaceable seat. Include threaded bypass taps in inlet and outlet for bypass meter connection. Set valve to allow minimal water flow through bypass meter when major water flow is required.

a. Standards: UL 312 and FMG approved.
b. Pressure Rating: 175 psig.
c. Water Meter: AWWA C700, disc type, at least one-fourth size of detector check valve. Include meter, bypass piping, gate valves, check valve, and connections to detector check valve.

3. Description: Iron body, corrosion-resistant clapper ring and seat ring material, flanged ends, with connections for bypass and installation of water meter.

a. Standards: UL 312 and FMG approved.
b. Pressure Rating: 175 psig.

2.6 WATER METERS

A. Water meters will be furnished by utility company.

2.7 VACUUM BREAKERS

A. Pressure Vacuum Breaker Assembly:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Ames Fire & Waterworks; a division of Watts Regulator Co.
b. Conbraco Industries, Inc.
c. FEBCO; SPX Valves & Controls.
d. Flomatic Corporation.
e. Toro Co. (The); Irrigation Division.
f. Watts Water Technologies, Inc.
g. Wilkins; a Zurn company.
h. Park Equipment.

2. Standard: ASSE 1020.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: [5 psig] maximum, through middle 1/3 of flow range.
5. Size: <**Insert** NPS**.**>

2.8 BACKFLOW PREVENTERS

A. Reduced-Pressure-Principle Backflow Preventers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Ames Fire & Waterworks; a division of Watts Regulator Co.
b. Conbraco Industries, Inc.

c. FEBCO; SPX Valves & Controls.
d. Flomatic Corporation.
e. Watts Water Technologies, Inc.
f. Wilkins; a Zurn company.
g. Park Equipment.

2. Standard: [**ASSE 1013**] [**or**] [**AWWA C511**].
3. Accessories:

a. Valves: Ball type with threaded ends on inlet and outlet of NPS 2 and smaller; OS&Y gate type with flanged ends on inlet and outlet of NPS 2-1/2 and larger.
b. Air-Gap Fitting: ASME A112.1.2, matching backflow preventer connection.

B. Double-Check, Backflow-Prevention Assemblies:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Ames Fire & Waterworks; a division of Watts Regulator Co.
b. Conbraco Industries, Inc.
c. FEBCO; SPX Valves & Controls.
d. Flomatic Corporation.
e. Watts Water Technologies, Inc.
f. Wilkins; a Zurn company.
g. Park Equipment.

2. Standard: [**ASSE 1015**] [**or**] [**AWWA C510**].
3. Operation: Continuous-pressure applications, unless otherwise indicated.
4. Pressure Loss: [5 psig] maximum, through middle 1/3 of flow range.
5. Size: <**Insert** NPS**.**>

C. Double-Check, Detector-Assembly Backflow Preventers:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Ames Fire & Waterworks; a division of Watts Regulator Co.
b. Conbraco Industries, Inc.
c. FEBCO; SPX Valves & Controls.
d. Watts Water Technologies, Inc.
e. Wilkins; a Zurn company.
f. Park Equipment.

2. Standards: ASSE 1048 and UL listed or FMG approved.
3. Operation: Continuous-pressure applications.
4. Pressure Loss: [5 psig] maximum, through middle 1/3 of flow range.
5. Accessories:

a. Valves: UL 262, FMG-approved, OS&Y gate type with flanged ends on inlet and outlet.
b. Bypass: With displacement-type water meter, shutoff valves, and reduced-pressure backflow preventer.

D. Backflow Preventer Test Kits:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Conbraco Industries, Inc.
b. FEBCO; SPX Valves & Controls.
c. Flomatic Corporation.
d. Watts Water Technologies, Inc.
e. Wilkins; a Zurn company.

2. Description: Factory calibrated, with gages, fittings, hoses, and carrying case with test-procedure instructions.

2.9 WATER METER BOXES

A. Water meter boxes to meet Utility company requirements.

2.10 CONCRETE VAULTS

A. Description: Precast, reinforced-concrete vault, designed for A-16 load designation according to ASTM C 857 and made according to ASTM C 858.

1. Ladder: ASTM A 36/A 36M, steel or polyethylene-encased steel steps.
2. Manhole: ASTM A 48/A 48M Class No. 35A minimum tensile strength, gray-iron traffic frame and cover.

a. Dimension: 24-inch minimum diameter, unless otherwise indicated.

3. Manhole: ASTM A 536, Grade 60-40-18, ductile-iron traffic frame and cover.

a. Dimension: 24-inch- minimum diameter, unless otherwise indicated.

4. Drain: ASME A112.6.3, cast-iron floor drain with outlet of size indicated. Include body anchor flange, light-duty cast-iron grate, bottom outlet, and integral or field-installed bronze ball or clapper-type backwater valve.

2.11 PROTECTIVE ENCLOSURES

A. Freeze-Protection Enclosures:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Aqua Shield.
    b. BF Products, Inc.
    c. DekoRRa Products.
    d. Dunco Manufacturing, Inc.
    e. G&C Enclosures.
    f. Hot Box, Inc.
    g. HydroCowl, Inc.
    h. Watts Water Technologies, Inc.

2. Description: Insulated enclosure designed to protect aboveground water piping, equipment, or specialties from freezing and damage, with heat source to maintain minimum internal temperature of 40 deg F when external temperatures reach as low as minus 34 deg F.

    a. Standard: ASSE 1060.
    b. Class I: For equipment or devices other than pressure or atmospheric vacuum breakers.
    c. Class I-V: For pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.

        1) Housing: Reinforced [**-aluminum**] [**or**] [**-fiberglass**] construction.

            a) Size: Of dimensions indicated, but not less than those required for access and service of protected unit.
            b) Drain opening for units with drain connection.
            c) Access doors with locking devices.
            d) Insulation inside housing.
            e) Anchoring devices for attaching housing to concrete base.

        2) Electric heating cable or heater with self-limiting temperature control.

B. Weather-Resistant Enclosures:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Aqua Shield.
    b. BF Products, Inc.
    c. DekoRRa Products.
    d. Dunco Manufacturing, Inc.
    e. G&C Enclosures.
    f. Hot Box, Inc.
    g. HydroCowl, Inc.
    h. Watts Water Technologies, Inc.

2. Description: Uninsulated enclosure designed to protect aboveground water piping, equipment, or specialties from weather and damage.

    a. Standard: ASSE 1060.
    b. Class III: For equipment or devices other than pressure or atmospheric vacuum breakers.
    c. Class III-V: For pressure or atmospheric vacuum breaker equipment or devices. Include drain opening in housing.

        1) Housing: Reinforced [**-aluminum**] [**or**] [**-fiberglass**] construction.

            a) Size: Of dimensions indicated, but not less than those required for access and service of protected unit.
            b) Drain opening for units with drain connection.
            c) Access doors with locking devices.
            d) Anchoring devices for attaching housing to concrete base.

C. Expanded-Metal Enclosures:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Backflow Prevention Device InnClosures, Inc.
    b. BF Products, Inc.
    c. Cross Brothers, Inc.
    d. Le Meur Welding & Manufacturing Co.

2. Description: Enclosure designed to protect aboveground water piping, equipment, or specialties from damage.

    a. Material: ASTM F 1267, expanded metal side and top panels, of weight and with reinforcement of same metal at edges as required for rigidity.
    b. Type: Type [**I, expanded**] [**II, expanded and flattened**].
    c. Class: Class [**1, uncoated carbon steel**] [**2, hot-dip, zinc-coated carbon steel**] [**3, corrosion-resisting steel**].
    d. Finish: Manufacturer's enamel paint.
    e. Size: Of dimensions indicated, but not less than those required for access and service of protected unit.
    f. Locking device.
    g. Lugs or devices for securing enclosure to base.

D. Enclosure Bases:

1. Description: [4-inch-] [6-inch-] minimum thickness precast concrete, of dimensions required to extend at least 6 inches beyond edges of enclosure housings. Include openings for piping.

2.12 FIRE HYDRANTS

A. Dry-Barrel Fire Hydrants:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. American AVK Co.; Valves & Fittings Div.
b. American Cast Iron Pipe Co.; American Flow Control Div.
c. American Cast Iron Pipe Co.; Waterous Co. Subsidiary.
d. American Foundry Group, Inc.
e. East Jordan Iron Works, Inc.
f. McWane, Inc.; Clow Valve Co. Div. (Oskaloosa).
g. McWane, Inc.; Kennedy Valve Div.
h. McWane, Inc.; M & H Valve Company Div.
i. Mueller Co.; Water Products Div.
j. Troy Valve; a division of Penn-Troy Manufacturing, Inc.
k. U.S. Pipe and Foundry Company.

2.13 FIRE DEPARTMENT CONNECTIONS

A. Fire Department Connections:

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Elkhart Brass Mfg. Co., Inc.
b. Fire End & Croker Corporation.
c. Guardian Fire Equipment, Inc.
d. Kidde Fire Fighting.
e. Potter Roemer.
f. Reliable Automatic Sprinkler Co., Inc.
g. Park Equipment.

2.14 ALARM DEVICES

A. Alarm Devices, General: UL 753 and FMG approved, of types and sizes to mate and match piping and equipment.

B. Water-Flow Indicators: Vane-type water-flow detector, rated for 250-psig working pressure; designed for horizontal or vertical installation; with 2 single-pole, double-throw circuit switches to provide isolated alarm and auxiliary contacts, 7 A, 125-V ac and 0.25 A, 24-V dc; complete with factory-set, field-adjustable retard element to prevent false signals and tamperproof cover that sends signal when cover is removed.

C. Supervisory Switches: Single pole, double throw; designed to signal valve in other than fully open position.

D. Pressure Switches: Single pole, double throw; designed to signal increase in pressure.

PART 3 - EXECUTION

3.1 EARTHWORK

A. Refer to Division 2 Section "Earthwork" for excavating, trenching, and backfilling.

3.2 PIPING APPLICATIONS

A. General: Use pipe, fittings, and joining methods for piping systems according to the following applications.

B. Transition couplings and special fittings with pressure ratings at least equal to piping pressure rating may be used, unless otherwise indicated.

C. Do not use flanges or unions for underground piping.

D. Flanges, unions, grooved-end-pipe couplings, and special fittings may be used, instead of joints indicated, on aboveground piping and piping in vaults.

E. Underground water-service piping [NPS 3/4 to NPS 3] shall be[**any of**] the following:

1. Soft copper tube, [ASTM B 88, Type K] [ASTM B 88, Type L]; [**wrought-copper, solder-joint fittings; and brazed**] [**copper, pressure-seal fittings; and pressure-sealed**] joints.
2. PVC, Schedule [**40 pipe; PVC, Schedule 40**] [**80 pipe; PVC, Schedule 80**] socket fittings; and solvent-cemented joints.

F. Underground water-service piping [NPS 4 to NPS 8] shall be[**any of**] the following:
1. NPS 4 and NPS 6: NPS 6 PVC, AWWA Class 150 pipe; PVC, AWWA Class 150 [**fabricated**] fittings; and gasketed joints.
2. NPS 8: PVC, AWWA Class 200 pipe; [**PVC, AWWA Class 200 fabricated**] [**mechanical-joint, ductile-iron**] fittings; and gasketed joints.

G. Water Meter Box Water-Service Piping [NPS 3/4 to NPS 2] shall be same as underground water-service piping.

H. Underground Fire-Service-Main Piping [NPS 4 to NPS 12] shall be[**any of**] the following:

1. PVC, AWWA Class 150 pipe listed for fire-protection service; PVC Class 150 fabricated or molded fittings; and gasketed joints.

I. Aboveground[**and Vault**] Fire-Service-Main Piping [NPS 4 to NPS 12] shall be ductile-iron, grooved-end pipe; ductile-iron-pipe appurtenances; and grooved joints.

3.3 VALVE APPLICATIONS

A. General Application: Use mechanical-joint-end valves for NPS 3 and larger underground installation. Use threaded- or flanged-end valves for installation in vaults. Use UL/FMG, nonrising-stem gate valves for installation with indicator posts. Use corporation valves and curb valves with ends compatible with piping, for NPS 2 and smaller installation.

B. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:

1. Underground Valves, NPS 3 and Larger: AWWA, cast-iron, nonrising-stem, [**metal**] [**resilient**] -seated gate valves with valve box.
2. Underground Valves, NPS 4 and Larger, for Indicator Posts: UL/FMG, cast-iron, nonrising-stem gate valves with indicator post.

3.4 PIPING SYSTEMS - COMMON REQUIREMENTS

A. See Division 2 Section "Piped Utilities - Basic Materials and Methods" for piping-system common requirements.

3.5 PIPING INSTALLATION

A. Water-Main Connection: Arrange with utility company for tap of size and in location indicated in water main.

B. Water-Main Connection: Tap water main according to requirements of water utility company and of size and in location indicated.

C. Make connections larger than NPS 2 with tapping machine according to the following:

1. Install tapping sleeve and tapping valve according to MSS SP-60.
2. Install tapping sleeve on pipe to be tapped. Position flanged outlet for gate valve.
3. Use tapping machine compatible with valve and tapping sleeve; cut hole in main. Remove tapping machine and connect water-service piping.
4. Install gate valve onto tapping sleeve. Comply with MSS SP-60. Install valve with stem pointing up and with valve box.

D. Make connections NPS 2 and smaller with drilling machine according to the following:

1. Install service-saddle assemblies and corporation valves in size, quantity, and arrangement required by utility company standards.
2. Install service-saddle assemblies on water-service pipe to be tapped. Position outlets for corporation valves.
3. Use drilling machine compatible with service-saddle assemblies and corporation valves. Drill hole in main. Remove drilling machine and connect water-service piping.
4. Install corporation valves into service-saddle assemblies.
5. Install manifold for multiple taps in water main.
6. Install curb valve in water-service piping with head pointing up and with service box.

E. Comply with NFPA 24 for fire-service-main piping materials and installation.

1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.
2. Install copper tube and fittings according to CDA's "Copper Tube Handbook."

F. Install ductile-iron, water-service piping according to AWWA C600 and AWWA M41.

1. Install PE corrosion-protection encasement according to ASTM A 674 or AWWA C105.

G. Install PE pipe according to ASTM D 2774 and ASTM F 645.

H. Install PVC, AWWA pipe according to ASTM F 645 and AWWA M23.

I. Install fiberglass AWWA pipe according to AWWA M45.

J. Bury piping with depth of cover over top at least [48 inches], with top at least [12 inches] below level of maximum frost penetration, and according to the following:

1. Under Driveways: With at least [48 inches] cover over top.
2. Under Railroad Tracks: With at least [48 inches] cover over top.
3. In Loose Gravelly Soil and Rock: With at least [12 inches] additional cover.

K. Install piping by tunneling or jacking, or combination of both, under streets and other obstructions that cannot be disturbed.

L. Extend water-service piping and connect to water-supply source and building-water-piping systems at outside face of building wall in locations and pipe sizes indicated.

1. Terminate water-service piping at building wall until building-water-piping systems are installed. Terminate piping with caps, plugs, or flanges as required for piping material. Make connections to building-water-piping systems when those systems are installed.

M. Sleeves are specified in Division 15 Section "Sleeves and Sleeve Seals for Plumbing Piping."

N. Mechanical sleeve seals are specified in Division 15 Section "Sleeves and Sleeve Seals for Plumbing Piping."

O. Install underground piping with restrained joints at horizontal and vertical changes in direction. Use restrained-joint piping, thrust blocks, anchors, tie-rods and clamps, and other supports.

P. See Division 13 Section "Fire-Suppression Piping" for fire-suppression-water piping inside the building.

Q. See Division 15 Section "Domestic Water Piping" for potable-water piping inside the building.

3.6 JOINT CONSTRUCTION

A. See Division 2 Section "Piped Utilities - Basic Materials and Methods" for basic piping joint construction.

B. Make pipe joints according to the following:

1. Copper-Tubing, Pressure-Sealed Joints: Use proprietary crimping tool and procedure recommended by copper, pressure-seal-fitting manufacturer.
2. Ductile-Iron Piping, Gasketed Joints for Water-Service Piping: AWWA C600 and AWWA M41.
3. Ductile-Iron Piping, Gasketed Joints for Fire-Service-Main Piping: UL 194.
4. Ductile-Iron Piping, Grooved Joints: Cut-groove pipe. Assemble joints with grooved-end, ductile-iron-piping couplings, gaskets, lubricant, and bolts according to coupling manufacturer's written instructions.
5. PE Piping Insert-Fitting Joints: Use plastic insert fittings and fasteners according to fitting manufacturer's written instructions.
6. PVC Piping Gasketed Joints: Use joining materials according to AWWA C900. Construct joints with elastomeric seals and lubricant according to ASTM D 2774 or ASTM D 3139 and pipe manufacturer's written instructions.
7. Fiberglass Piping Bonded Joints: Use adhesive and procedure recommended by piping manufacturer.
8. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.

    a. Dielectric Fittings for [NPS 2] and Smaller: Use dielectric [**nipples**] [**unions**].
    b. Dielectric Fittings for [NPS 2-1/2 to NPS 4]: Use dielectric [**flanges**] [**flange kits**] [**nipples**].
    c. Dielectric Fittings for [NPS 5] and Larger: Use dielectric flange kits.

3.7 ANCHORAGE INSTALLATION

A. Anchorage, General: Install water-distribution piping with restrained joints. Anchorages and restrained-joint types that may be used include the following:

1. Concrete thrust blocks.
2. Locking mechanical joints.
3. Set-screw mechanical retainer glands.
4. Bolted flanged joints.
5. Heat-fused joints.
6. Pipe clamps and tie rods.

B. Install anchorages for tees, plugs and caps, bends, crosses, valves, and hydrant branches. Include anchorages for the following piping systems:

1. Gasketed-Joint, Ductile-Iron, Water-Service Piping: According to AWWA C600.
2. Gasketed-Joint, PVC Water-Service Piping: According to AWWA M23.
3. Bonded-Joint Fiberglass, Water-Service Piping: According to AWWA M45.
4. Fire-Service-Main Piping: According to NFPA 24.

C. Apply full coat of asphalt or other acceptable corrosion-resistant material to surfaces of installed ferrous anchorage devices.

3.8 VALVE INSTALLATION

A. AWWA Gate Valves: Comply with AWWA C600 and AWWA M44. Install each underground valve with stem pointing up and with valve box.

B. AWWA Valves Other Than Gate Valves: Comply with AWWA C600 and AWWA M44.

C. UL/FMG, Gate Valves: Comply with NFPA 24. Install each underground valve and valves in vaults with stem pointing up and with vertical cast-iron indicator post.

D. UL/FMG, Valves Other Than Gate Valves: Comply with NFPA 24.

E. MSS Valves: Install as component of connected piping system.

F. Corporation Valves and Curb Valves: Install each underground curb valve with head pointed up and with service box.

G. Pressure-Reducing Valves: Install in vault or aboveground between shutoff valves. [**Install full-size valved bypass.**]

H. Relief Valves: Comply with AWWA C512. Install aboveground with shutoff valve on inlet.

3.9 DETECTOR-CHECK VALVE INSTALLATION

A. Install in vault or aboveground.

B. Install for proper direction of flow. Install bypass with water meter, gate valves on each side of meter, and check valve downstream from meter.

C. Support detector check valves, meters, shutoff valves, and piping on brick or concrete piers.

3.10 WATER METER INSTALLATION

A. Install water meters, piping, and specialties according to utility company's written instructions.

B. Water Meters: Install [**displacement**] [**turbine**]-type water meters, NPS 2 and smaller, in meter boxes with shutoff valves on water meter inlets. Include valves on water meter outlets and valved bypass around meters unless prohibited by authorities having jurisdiction.

C. Water Meters: Install [**compound**] [**turbine**]-type water meters, NPS 3 and larger, in meter vaults. Include shutoff valves on water meter inlets and outlets and valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.

D. Water Meters: Install detector-type water meters in meter vault according to AWWA M6. Include shutoff valves on water meter inlets and outlets and full-size valved bypass around meters. Support meters, valves, and piping on brick or concrete piers.

3.11 ROUGHING-IN FOR WATER METERS

A. Rough-in piping and specialties for water meter installation according to utility company's written instructions.

3.12 VACUUM BREAKER ASSEMBLY INSTALLATION

A. Install pressure vacuum breaker assemblies of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

B. Do not install pressure vacuum breaker assemblies in vault or other space subject to flooding.

3.13 BACKFLOW PREVENTER INSTALLATION

A. Install backflow preventers of type, size, and capacity indicated. Include valves and test cocks. Install according to requirements of plumbing and health department and authorities having jurisdiction.

B. Do not install backflow preventers that have relief drain in vault or in other spaces subject to flooding.

C. Do not install bypass piping around backflow preventers.

D. Support NPS 2-1/2 and larger backflow preventers, valves, and piping near floor and on brick or concrete piers.

3.14 WATER METER BOX INSTALLATION

A. Install water meter boxes in paved areas flush with surface.

B. Install water meter boxes in grass or earth areas with top [2 inches] above surface.

3.15 CONCRETE VAULT INSTALLATION

A. Install precast concrete vaults according to ASTM C 891.

3.16 PROTECTIVE ENCLOSURE INSTALLATION

A. Install concrete base level and with top approximately [2 inches] above grade.

B. Install protective enclosure over valves and equipment.

C. Anchor protective enclosure to concrete base.

3.17 FIRE HYDRANT INSTALLATION

A. General: Install each fire hydrant with separate gate valve in supply pipe, anchor with restrained joints or thrust blocks, and support in upright position.

B. Wet-Barrel Fire Hydrants: Install with valve below frost line. Provide for drainage.

C. AWWA Fire Hydrants: Comply with AWWA M17.

D. UL/FMG Fire Hydrants: Comply with NFPA 24.

3.18 FLUSHING HYDRANT INSTALLATION

A. Install post-type flushing hydrants with valve below frost line and provide for drainage. Support in upright position. Include separate gate valve or curb valve and restrained joints in supply piping.

B. Install ground-type flushing hydrants with valve below frost line and provide for drainage. Install hydrant box flush with grade. Include separate gate valve or curb valve and restrained joints in supply piping.

C. Install sampling stations with valve below frost line and provide for drainage. Attach weather-resistant housing and support in upright position. Include separate curb valve in supply piping.

3.19 FIRE DEPARTMENT CONNECTION INSTALLATION

A. Install ball drip valves at each check valve for fire department connection to mains.

B. Install protective pipe bollards [**on two sides of**] [**on three sides of**] each fire department connection. Pipe bollards are specified in Division 5 Section "Metal Fabrications."

3.20 ALARM DEVICE INSTALLATION

A. General: Comply with NFPA 24 for devices and methods of valve supervision. Underground valves with valve box do not require supervision.

B. Supervisory Switches: Supervise valves in open position.

1. Valves: Grind away portion of exposed valve stem. Bolt switch, with plunger in stem depression, to OS&Y gate-valve yoke.
2. Indicator Posts: Drill and thread hole in upper-barrel section at target plate. Install switch, with toggle against target plate, on barrel of indicator post.

C. Locking and Sealing: Secure unsupervised valves as follows:

1. Valves: Install chain and padlock on open OS&Y gate valve.
2. Post Indicators: Install padlock on wrench on indicator post.

D. Pressure Switches: Drill and thread hole in exposed barrel of fire hydrant. Install switch.

E. Water-Flow Indicators: Install in water-service piping in vault. Select indicator with saddle and vane matching pipe size. Drill hole in pipe, insert vane, and bolt saddle to pipe.

F. Connect alarm devices to building fire alarm system. Wiring and fire-alarm devices are specified in Division 13 Section "Fire Alarm."

3.21 CONNECTIONS

A. Piping installation requirements are specified in other Division 2 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.

B. See Division 2 Section "Piped Utilities - Basic Materials and Methods" for piping connections to valves and equipment.

C. Connect water-distribution piping to [**existing water main**]. Use [**tapping sleeve and tapping valve**] or [**service clamp and corporation valve**].

D. Connect water-distribution piping to interior [**domestic water**] [**and**] [**fire-suppression**] piping.

E. Ground equipment according to Division 16 Section "Grounding and Bonding."

F. Connect wiring according to Division 16 Section "Conductors and Cables."

3.22 FIELD QUALITY CONTROL

A. Piping Tests: Conduct piping tests before joints are covered and after concrete thrust blocks have hardened sufficiently. Fill pipeline 24 hours before testing and apply test pressure to stabilize system. Use only potable water.

B. Hydrostatic Tests: Test at not less than one-and-one-half times working pressure for two hours.

1. Increase pressure in 50-psig increments and inspect each joint between increments. Hold at test pressure for 1 hour; decrease to 0 psig. Slowly increase again to test pressure and hold for 1 more hour. Maximum allowable leakage is 2 quarts per hour per 100 joints. Remake leaking joints with new materials and repeat test until leakage is within allowed limits.

C. Prepare reports of testing activities.

3.23 IDENTIFICATION

A. Install continuous under-ground [**detectable**] warning tape during backfilling of trench for underground water-distribution piping. Locate below finished grade, directly over piping. Underground warning tapes are specified in Division 2 Section "Earthwork."

B. Permanently attach equipment nameplate or marker indicating plastic water-service piping, on main electrical meter panel. See Division 2 Section "Piped Utilities - Basic Materials and Methods" for identifying devices.

3.24 CLEANING

A. Clean and disinfect water-distribution piping as follows:

1. Purge new water-distribution piping systems and parts of existing systems that have been altered, extended, or repaired before use.

2. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in NFPA 24 for flushing of piping. Flush piping system with clean, potable water until dirty water does not appear at points of outlet.
3. Use purging and disinfecting procedure prescribed by authorities having jurisdiction or, if method is not prescribed by authorities having jurisdiction, use procedure described in AWWA C651 or do as follows:

    a. Fill system or part of system with water/chlorine solution containing at least 50 ppm of chlorine; isolate and allow to stand for 24 hours.
    b. Drain system or part of system of previous solution and refill with water/chlorine solution containing at least 200 ppm of chlorine; isolate and allow to stand for 3 hours.
    c. After standing time, flush system with clean, potable water until no chlorine remains in water coming from system.
    d. Submit water samples in sterile bottles to authorities having jurisdiction. Repeat procedure if biological examination shows evidence of contamination.

B. Prepare reports of purging and disinfecting activities.

END OF SECTION 02510

SECTION 02751 – EXTERIOR CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:

1. Driveways, roadways and parking lots.
2. Curbs and gutters.
3. Sidewalks.
4. Pavement markings.

B. Coordinate the requirements of this Section with those of other sections that interface with Exterior Concrete, in particular:

1. Division 2 Section "Earthwork" for subgrade preparation, grading, and subbase course.
2. Division 2 Section "Pavement Joint Sealants" for joint sealants of joints in concrete pavement and at isolation joints of concrete pavement with adjacent construction.
3. Division 2 Section "Stained Concrete" for surface-imprinted, stamped finished concrete pavement.

1.3 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, fly ash and other pozzolans, and ground granulated blast-furnace slag.

1.4 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixtures: For each concrete pavement mixture. Include alternate mixture designs when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:

1. Cementitious materials.
2. Steel reinforcement and reinforcement accessories.
3. Fiber reinforcement.

4. Admixtures.
5. Curing compounds.
6. Applied finish materials.
7. Bonding agent or epoxy adhesive.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products who complies with ASTM C 94/C 94M requirements for production facilities and equipment.

B. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by requirements in the Contract Documents.

C. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.

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, smooth exposed surfaces.

1. Use flexible or curved forms for curves with a radius 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

2.2 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Reinforcement: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.

D. Steel Bar Mats: ASTM A 184/A 184M; with ASTM A 615/A 615M, Grade 60, deformed bars; assembled with clips.

E. Plain Steel Wire: ASTM A 82, as drawn.

F. Joint Dowel Bars: Plain steel bars, ASTM A 615/A 615M, Grade 60. Cut bars true to length with ends square and free of burrs.

G. 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, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

H. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.

2.3 CONCRETE MATERIALS

A. Cementitious Material: Use the same brand and type of cementitious materials, from the same manufacturer, throughout the Project:

1. Portland Cement: ASTM C 150, Type I or II. Supplement with the following:

a. Fly Ash: ASTM C 618, Class F or C.
b. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

B. Water: ASTM C 94/C 94M.

C. Aggregates: ASTM C 33, Class 4M coarse aggregate, uniformly graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: not to exceed one-third the depth or thickness of the concrete member or casting, but in no case more than 1-1/2 inches. Use materials that are free of substances that cause spalling.
2. Fine Aggregate: Use materials that are free of substances that cause spalling, and that are free of materials with deleterious reactivity to alkali in cement.

2.4 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures.

B. Air-Entraining Admixture: ASTM C 260.

C. Chemical Admixtures: Provide 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.

1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
2. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
3. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
4. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.

2.5 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming; manufactured for application to fresh concrete.

B. Clear Waterborne Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

2.6 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

2.7 PAVEMENT MARKINGS

A. Pavement-Marking Paint: Alkyd-resin type, lead and chromate free, ready mixed, complying with FS TT-P-115, Type I or AASHTO M 248, Type N.

1. Color: White except where indicated otherwise.

2.8 PREFABRICATED UNITS

A. Splash Blocks: Precast concrete 12 inches wide x 4 inches high x 18 inches long formed splash blocks. Provide one for every downspout that is not connected into underground drainage piping.

B. Wheel Stops: Precast, air-entrained concrete, 2500-psi minimum compressive strength, 6 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, 3/4-inch diameter, 18-inch minimum length.

2.9 CONCRETE MIXTURES

A. Prepare design mixtures, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

1. Use a qualified independent testing agency for preparing and reporting proposed concrete mixture designs for the trial batch method.
2. Do not use Owner's field quality-control testing agency as the independent testing agency.

B. Proportion mixtures to provide normal-weight concrete with the following properties:

1. Compressive Strength (28 Days): **3500** psi unless indicated otherwise on the Drawings.
2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.45.
3. Slump Limit: 4 inches.
4. Slump Limit for Concrete Containing High-Range Water-Reducing Admixture: Not more than 8 inches after adding admixture to plant- or site-verified 2- to 3-inch slump.

C. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content of **3 to 5** percent.

D. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use accelerating admixtures in cold weather only with prior approval of the Architect. Do not use calcium chloride.
2. Use set-retarding admixtures during hot weather only with prior approval of the Architect.

E. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements as follows:

1. Fly Ash: 25 percent.
2. Combined Fly Ash and Pozzolan: 25 percent.
3. Ground Granulated Blast-Furnace Slag: 50 percent.
4. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slag: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

F. Limit water-soluble, chloride-ion content in hardened concrete to **0.30** percent by weight of cement.

2.10 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.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.

B. Proof-roll prepared subbase surface to identify soft pockets and areas of excess yielding, and to check for unstable conditions. Verify need for additional compaction.

C. Proceed with concrete pavement operations only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

D. Remove loose material from compacted subbase surface immediately before placing concrete.

E. Sidewalks and Ramps: Place and level sand cushion over prepared sub-grade to a compacted depth of 2 inches. During concrete placement, keep sand cushion sufficiently moist to prevent excessive absorption of water from freshly placed concrete.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement 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.

3.3 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 1-1/2 inch cover to reinforcement.

D. 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.

3.4 JOINTS AND EDGES

A. General: Form construction, isolation, and contraction joints and tool edgings 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 pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Parking Lots, Driveways and Roadways:

1. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour unless pavement terminates at isolation joints.

a. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
b. Continue steel reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
c. Provide tie bars at sides of pavement strips where indicated.
d. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

e. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat dowels, or use pre-coated dowels, over one-half of dowel length to prevent concrete bonding to one side of joint.

2. Expansion and Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.

a. Locate expansion joints at intervals of no more than 50 feet, unless joint pattern with more dense spacing is indicated on the Drawings. Confirm joint spacing with Architect prior to installing joint forming materials.
b. Extend joint fillers full width and depth of joint.
c. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
d. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
e. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
f. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
g. Doweled Joints: Install dowel bars and support assemblies at joints. Lubricate or asphalt coat dowels, or use pre-coated dowels, over one-half of dowel length to prevent concrete bonding to one side of joint.

3. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:

a. 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.

4. Edges: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to a 1/2-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.

C. Sidewalks: Same as for Parking Lots, Driveways and Roadways, except:

1. Expansion and Isolation Joints: Place top of joint filler ½ inch below top of pavement, tooling edges on both sides to ½ inch radius. Locate expansion joints as indicated on Drawings; if not indicated on Drawings locate as follows:

a. Where no joint pattern is indicated on the Drawings, locate expansion joints a maximum of 20 feet in each direction.
b. Where a joint pattern is shown on the Drawings but expansion joints are not specifically indicated, locate expansion joints coincident on any of the joints shown so that spacing does not exceed 20 feet in each direction.

2. Contraction Joints: Tooled grooved joints, 1/8 inch wide and ¼ inch deep, with tooled radius of ½ inch both sides.

3. Edges: Tool edges of sidewalks, including along expansion and contraction joints, to provide 4 inch wide smooth trowel finish each side of joint or along edge, unless indicated otherwise on the Drawings.

3.5 CONCRETE PLACEMENT

A. Inspection: Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subbase surface and 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 R requirements for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery, at Project site, or during placement.

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 309 R by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.

H. Screed pavement surfaces 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. Curbs and Gutters: When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not approved, remove and replace with formed concrete.

K. Cold-Weather Placement: Comply with ACI 306.1.

L. Hot-Weather Placement: Comply with ACI 301.

3.6 FINISHING

A. General: Do not add water to concrete surfaces during finishing operations.

B. Float Finish: Begin the second floating operation 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. Parking Lots, Driveways and Roadways: Use a Medium-to-Coarse-Textured Broom Finish. Provide finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.
2. Curbs: Use a Steel Trowel finish. Sufficient cement and water may be added to the surface to obtain the smooth finish.
3. Sidewalks: Use a Medium-to-Fine-Textured Broom Finish, except for Smooth-Trowel Finish along edges and joints per “Joints and Edges” Article above. Draw a soft bristle broom across float-finished concrete surface in pattern shown to provide a uniform, fine-line texture. If no pattern is shown, draw broom perpendicular to line of traffic.
4. Other Surfaces: For other surfaces where finish may not be specifically indicated, use a Medium-to-Fine-Textured Broom Finish.

3.7 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. Comply with ACI 305R.

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. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

3.8 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:

1. Elevation: 1/4 inch.
2. Thickness: Plus or minus 3/8 inch.
3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed 1/4 inch.

3.9 PAVEMENT MARKING

A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.

B. Allow concrete pavement to cure for 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 pavement markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.

3.10 PREFABRICATED UNITS

A. Splash Blocks: Place one splash block at the base of each downspout that does not connect into underground piping. Place splash block firmly on earth, directing the flow of water perpendicularly away from the face of the building.

B. Wheel Stops: Securely attach wheel stops into pavement with not less than two galvanized steel dowels embedded in holes drilled or cast into wheel stops at one-quarter to one-third points. Firmly bond each dowel to wheel stop and to pavement. Securely install dowels into pavement and bond to wheel stop. Recess head of dowel beneath top of wheel stop. Extend upper portion of dowel a minimum of 4 inches into wheel stop and lower portion a minimum of 5 inches into pavement, grouted firmly and securely in place.

3.11 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Test results shall be reported in writing to Architect, concrete manufacturer, 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.

C. 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.

D. 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.

E. Remove and replace concrete pavement where test results indicate that it does not comply with specified requirements.

F. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.12 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective or that does not comply with requirements in this Section.

B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

END OF SECTION 02751

SECTION 02764 - PAVEMENT JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Expansion and contraction joints within cement concrete pavement.
2. Joints between cement concrete and asphalt pavement.

1.3 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for any multicomponent materials.

PART 2 - PRODUCTS

2.1 JOINT SEALANT

A. Pour grade elastomeric polymer.

1. Sonneborn, Masterseal SL 2 BASF
2. Shep-Calk 45
3. Or approved equal.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint-sealant manufacturer based on field experience and laboratory testing.

B. Backer Strips for Sealants: ASTM D 5249; Type 2; of thickness and width required to control sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

2.3 PRIMERS

A. Primers: Product 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.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint-sealant manufacturer, Apply primer to comply with joint-sealant manufacturer's written instructions

3.2 INSTALLATION OF JOINT SEALANTS

A. General: Install sealant in paving and sidewalk expansion joints. 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 backer materials of type 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.

D. When abutting buildings, provide continuous joint backer strips and sealant.

E. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

3.3 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 and remove damaged or deteriorated joint sealants immediately and replace with joint sealant so installations with repaired areas are indistinguishable from the original work.

END OF SECTION 02764

SECTION 02823 - CHAIN-LINK FENCES AND GATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Chain-Link Fences.

B. Coordinate the requirements of this Section with those of other sections that interface with Chain Link Fences and Gates, in particular:

1. Division 2 Section "Earthwork" for site excavation, fill, and backfill where chain-link fences and gates are located.
2. Division 3 Section "Cast-in-Place Concrete."

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for chain-link fences and gates.

1. Fence and gate posts, rails, and fittings.
2. Chain-link fabric, reinforcements, and attachments.
3. Accessories.

B. Manufacturer's Instructions: Provide manufacturer's installation instructions and procedures, including standard details for fences and gates.

C. Samples: Manufacturer's color charts or 6-inch lengths of actual units showing the full range of colors available for components with factory-applied color finishes.

1.4 PROJECT 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.

PART 2 - PRODUCTS

2.1 CHAIN-LINK FENCE FABRIC

A. General: Provide fabric in one-piece heights measured between top and bottom of outer edge of selvage knuckle or twist. Comply with ASTM A 392, CLFMI CLF 2445, and requirements indicated below:

1. Fence Type 1 (standard galvanized fence):

a. Steel Wire Fabric: Coated wire with a diameter of 0.148 inch.
b. Mesh Size: 2 inches.
c. Metallic (Zinc) Coating: ASTM A 392, Type II, Class 2, 2.0 oz./sq. ft. with zinc coating.

2. Selvage: Knuckled at both selvages for fences 6 feet in height or less; twisted top and knuckled bottom for fences greater than 6 feet in height.

3. Coat selvage ends of fabric that is metallic coated before the weaving process with manufacturer's standard clear protective coating.

B. Height as indicated on Drawings.

2.2 FENCE FRAMING

A. Posts and Rails: Comply with ASTM F 1043 for framing, ASTM F 1083 for Group IC round pipe, and the following:

1. Group: IA, round steel pipe, Schedule 40.
2. Strength Requirement: Heavy industrial according to ASTM F 1043.
3. Post Diameter and Thickness: According to ASTM F 1083.

a. Top Rail: 1.66 inches.
b. Line Post: 2.375 inches.
c. End, Corner and Pull Post: 2.875 inches.

4. Coating for Steel Framing:

a. Metallic Coating: Type A, consisting of not less than minimum 2.0-oz./sq. ft. average zinc coating per ASTM A 123/A 123M.

B. Height as indicated on Drawings.

2.3 TENSION WIRE

A. General: Provide horizontal tension wire at the following locations:

1. Location: Extended along top of fence fabric where fence is indicated to be without top rail.

2. Location: Extended along bottom of fence fabric.

B. Metallic-Coated Steel Wire: 0.177-inch- diameter, marcelled tension wire complying with ASTM A 817, ASTM A 824, and the following:

1. Metallic Coating: Type II, zinc coated (galvanized) with the following minimum coating weight:

a. Class 1: Not less than 0.8 oz./sq. ft. of uncoated wire surface.

2.4 FITTINGS

A. General: Comply with ASTM F 626.

B. Post and Line Caps: Provide for each post.

1. Line post caps with loop to receive tension wire or top rail.

C. Rail and Brace Ends: Attach rails securely to 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 intermediate and bottom rails in the fence line-to-line posts.

E. Tension and Brace Bands: Pressed steel.

F. Tension Bars: Steel, length not less than 2 inches shorter than full height of chain-link fabric. Provide one bar for each gate and end post, and two for each corner and pull post, unless fabric is integrally woven into post.

G. Truss Rod Assemblies: Steel, hot-dip galvanized after threading rod and turnbuckle or other means of adjustment.

H. 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; Hot-Dip Galvanized Steel.

I. Finish: Metallic Coating for Pressed Steel or Cast Iron: Not less than 1.2 oz. /sq. ft. zinc.

2.5 CONCRETE, GROUT AND ANCHORING CEMENT

A. Concrete for Footings: In accordance with Division 3 section “Cast-in-Place Concrete. 28 day compressive strength shall be 2500 psi.

B. Nonshrink, Nonmetallic Grout: Premixed, factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout, recommended in writing by manufacturer, for exterior applications.

C. Erosion-Resistant Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with potable water at Project site to create pourable anchoring, patching, and grouting compound. Provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended in writing by manufacturer, for exterior applications.

PART 3 - EXECUTION

3.1 EXAMINATION AND PREPARATION

A. Examine areas and conditions, with Installer present, for compliance with requirements for site clearing, earthwork, pavement work, and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

B. 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.

3.2 INSTALLATION, GENERAL

A. Install chain-link fencing to comply with ASTM F 567 and more stringent requirements specified.

3.3 CHAIN-LINK FENCE INSTALLATION

A. Post Excavation: Drill or hand-excavate holes for posts to diameters and spacings indicated, in firm, undisturbed soil.

B. 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: Place concrete around posts to dimensions indicated below and vibrate or tamp for consolidation. Protect aboveground portion of posts from concrete splatter. Expose concrete 2 inches above final grade; shape and smooth to shed water.

3. Footing sizes:

Type Of Post	**Fence Height**	**Hole Diameter**	**Hole Depth**	**Post Embedment**
Line	Less than 6 feet	8 inches	30 inches	27 inches
Line	6 feet to 16 feet	10 inches	38 inches	36 inches
End & corner	Less than 6 feet	10 inches	36 inches	34 inches
End & corner	6 feet to 16 feet	12 inches	38 inches	36 inches
Gate		6 x max. post dim.	42 inches	40 inches

C. Terminal Posts: Locate terminal end, corner, and gate posts per ASTM F 567 and terminal pull posts at changes in horizontal or vertical alignment of 15 degrees or more.

D. Line Posts: Space line posts uniformly as shown on the Drawings. If not indicated on the Drawings, space equally at no more than 10 feet o.c.

E. Post Bracing and Intermediate Rails: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Install braces at end and gate posts and at both sides of corner and pull posts.

1. Locate horizontal braces at midheight of fabric more than 6 feet tall, and at top rail of fence, and at 2/3 fabric height on fences where indicated to be without top rail. Install so posts are plumb when diagonal rod is under proper tension.

F. Tension Wire: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. Pull wire taut, without sags. Fasten fabric to tension wire with 0.120-inch- diameter hog rings of same material and finish as fabric wire, spaced a maximum of 24 inches o.c. Install tension wire in locations indicated before stretching fabric.

1. Bottom Tension Wire: Install tension wire within 6 inches of bottom of fabric and tie to each post with not less than same diameter and type of wire.

G. Top Rail: Install according to ASTM F 567, maintaining plumb position and alignment of fencing. 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.

1. Provide top rail unless indicated otherwise on Drawings.

H. Bottom Rails: Install where indicated on Drawings, spanning between posts.

I. Chain-Link Fabric: Apply fabric to inside (side of usage) of framework. Leave 2 inches 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.

1. Fabric to be continuous full height of fence unless otherwise indicated on Drawings.
2. Stretch fabric continuous between terminal posts or at intervals of 100 foot maximum, whichever is the least dimension.

J. Tension or Stretcher Bars: Thread through fabric and secure to end, corner, pull, and gate posts with tension bands spaced not more than 15 inches o.c.

K. Tie Wires: Use wire of proper length to firmly secure fabric to line posts and rails. Attach wire at 1 end to chain-link fabric, wrap wire around post a minimum of 180 degrees, and attach other end to chain-link fabric per ASTM F 626. Bend ends of wire to minimize hazard to individuals and clothing.

1. Maximum Spacing: Tie fabric to line posts at 15 inches o.c. and to braces at 24 inches o.c.

L. Fasteners: Install nuts for tension bands and carriage bolts on the side of the fence opposite the fabric side. Peen ends of bolts or score threads to prevent removal of nuts.

3.4 GROUNDING AND BONDING

A. Protection at Crossings of Overhead Electrical Power Lines: Ground fence in accordance with IEEE standards at location of crossing and at a maximum distance of 150 feet on each side of crossing.

B. Fences Enclosing Electrical Power Distribution Equipment: Ground as required by IEEE C2, unless otherwise indicated.

END OF SECTION 02823

SECTION 02920 – FINISH GRADING, LAWNS AND GRASSES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Finish grading.
2. Seeding including “hydroseed.”
3. Sodding.

B. Coordinate the requirements of this Section with those of other sections that interface with Finish Grading, Lawns, and Grasses, particularly:

1. Division 2 Section "Site Clearing."
2. Division 2 Section "Earthwork."

1.3 DEFINITIONS

A. Finish Grade: Elevation of finished surface of planting soil.

B. Manufactured Soil: Soil produced off-site by homogeneously blending mineral soils or sand with stabilized organic soil amendments to produce topsoil or planting soil.

C. Planting Soil: Native or imported topsoil, manufactured topsoil, or surface soil modified to become topsoil; mixed with soil amendments.

D. Subgrade: Surface or elevation of subsoil remaining after completing excavation, or top surface of a fill or backfill immediately beneath planting soil.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Sod: Harvest, deliver, store, and handle sod according to requirements in TPI's "Specifications for Turfgrass Sod Materials" and "Specifications for Turfgrass Sod Transplanting and Installation" in its "Guideline Specifications to Turfgrass Sodding."

1.5 LAWN MAINTENANCE

A. Begin maintenance immediately after each area is planted and continue until acceptable lawn is established, until the latest of the following occurrences:

1. Evidence that lawn is fully established, in a healthy, growing condition.
2. 60 days from date of installation.
3. Final acceptance by the Owner.

B. Maintain and establish lawn by watering, fertilizing, weeding, mowing, trimming, and replanting; by applying insecticides and fungicides; and by other operations, all as required to achieve a healthy growth. Roll, regrade, and replant bare or eroded areas and remulch to produce a uniformly smooth lawn.

C. Watering: Provide and maintain temporary piping, hoses, and lawn-watering equipment to convey water from sources and to keep lawn uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water lawn daily for the first ten days at a minimum, or until seed in the mulch or sod root structure has germinated and rooted in the soil.

D. Mow lawn as soon as top growth is tall enough to cut. Repeat mowing at regular intervals to maintain 2 to 3 inch height without cutting more than 40 percent of grass height.

E. Lawn Postfertilization: Apply fertilizer in accordance with manufacturer’s recommendations after initial mowing and when grass is dry.

PART 2 - PRODUCTS

2.1 SEED

A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Journal of Seed Technology; Rules for Testing Seeds" for purity and germination tolerances.

B. Seed Species:

1. Bermudagrass (Cynodon dactylon).
2. Annual Ryegrass (Lolium multiflorum).

2.2 TURFGRASS SOD

A. Turfgrass Sod: Number 1 Quality/Premium, including limitations on thatch, weeds, diseases, nematodes, and insects, complying with TPI's "Specifications for Turfgrass Sod Materials" in its "Guideline Specifications to Turfgrass Sodding." Furnish viable sod of uniform density, color, and texture, strongly rooted, and capable of vigorous growth and development when planted.

B. Turfgrass Species: St. Augustine grass (Stenotaphrum secundatum).

2.3 TOPSOIL

A. Topsoil: ASTM D 5268, pH range of 5.5 to 7.5, a minimum of 4 percent and a maximum of 25 percent organic material content; free of subsoil, roots, grass, and excessive amounts of weeds; free of stones 1 inch or larger in any dimension and other extraneous materials harmful to plant growth.

1. Topsoil Source: Reuse surface soil stockpiled on-site if conforming to requirements. Verify suitability of stockpiled surface soil to produce topsoil. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
2. Supplement with imported or manufactured topsoil from off-site sources when quantities are insufficient.

2.4 FERTILIZER

A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character conforming to FS O-F-241, 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: Indicated by triple-numeric designation such as “10-20-10” with first number specifying percentage of total nitrogen, second number specifying available phosphoric acid, and third number specifying water soluble potash.
2. If no indication of composition is indicated, provide percentages as recommended in soil reports from a qualified soil-testing agency.

2.5 MULCHES

A. Fiber Mulch: Biodegradable, dyed-wood, cellulose-fiber mulch; nontoxic; free of plant-growth or germination inhibitors; with maximum moisture content of 15 percent and a pH range of 4.5 to 6.5.

2.6 ACCESSORIES

A. Selective Herbicides: EPA registered and approved, of type recommended by manufacturer for application.

B. Water: Clean, fresh and free of substances or matter that would inhibit vigorous growth of grass.

C. Soil Additive: “Fertilaid Soil Activator” or equal product.

2.7 SEED MIX

A. Hydroseed Mix: For application between April 1 and August 31:

1. 50 lbs. Fiber Mulch.
2. 2-1/2 lbs. Bermudagrass seed (tagged and tested).
3. 20 lbs. Fertilizer (10-20-10).
4. 10 lbs. Soil Additive.
5. 150 gallons water.

B. Hydroseed Mix: For application between September 1 and March 31:

1. 50 lbs. Fiber Mulch.
2. 3 lbs. Bermudagrass seed (tagged and tested).
3. 1 lb. Annual ryegrass seed.
4. 20 lbs. Fertilizer (10-20-10).
5. 10 lbs. Soil Additive.
6. 150 gallons water.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas to receive lawns and grass for compliance with requirements and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities, trees, shrubs, and plantings from damage caused by planting operations.

1. Protect adjacent and adjoining areas from hydroseeding overspray.

B. Provide 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.

3.3 FINISH GRADING

A. Limit finish grading to areas to be planted.

B. Subgrade Preparation: Loosen subgrade to a minimum depth of 4 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. Spread topsoil to a depth of 3 inches but not less than required to meet finish grades after light rolling and natural settlement. Do not spread if topsoil or subgrade is frozen, muddy, or excessively wet.

1. Topsoil is to be used only in areas that will receive sod, as indicated on the Drawings.
2. Spread approximately one-half the thickness of planting soil mix over loosened subgrade. Mix thoroughly into top 2 inches of subgrade. Spread remainder of topsoil.
3. Reduce elevation of planting soil to allow for soil thickness of sod.

D. Finish Grading: Grade to a smooth, uniform surface plane with loose, uniformly fine texture. Finish grades shall be within 3/4 inch of indicated elevations or reasonably interpolated or extrapolated elevations. Adjust grades to allow for thickness of sod, where it occurs. Make changes between indicated grades smooth and gradual, and blend slopes into level areas. Roll and rake, remove ridges, and fill depressions to meet finish grades. Areas to be finish graded include:

1. All areas that receive topsoil or sod.
2. All areas within 20 feet of sidewalks and buildings.
3. All areas within 5 feet of parking lots and vehicular drives.

E. Slope grade away from buildings at a rate of 6 inches down for every 10 feet horizontal, unless indicated otherwise on the Drawings.

F. Moisten prepared lawn areas before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

G. Restore areas if eroded or otherwise disturbed after finish grading and before planting.

3.4 HYDROSEEDING

A. Hydroseeding: Mix specified seed, fertilizer, fiber mulch, and additives in water, using equipment specifically designed for hydroseed application. Continue mixing until uniformly blended into homogeneous slurry suitable for hydraulic application.

1. Apply slurry uniformly to all areas to be seeded in a one-step process. Apply mulch at a minimum rate of 1500-lb/acre dry weight but not less than the rate required to obtain specified seed-sowing rate.

3.5 SODDING

A. Lay sod as soon as possible after delivery to prevent deterioration, but not more than 24 hours after harvesting. Do not lay sod if dormant or if ground is frozen or muddy.

B. Lay sod to form a solid mass with tightly fitted joints. Butt ends and sides of sod; do not stretch or overlap. Stagger sod strips or pads to offset joints in adjacent courses. Tamp and roll lightly to ensure contact with subgrade, eliminate air pockets, and form a smooth surface.

C. Saturate sod with fine water spray within two hours of planting. During first week, water daily or more frequently as necessary to maintain moist soil to a minimum depth of 1-1/2 inches below sod.

3.6 SATISFACTORY LAWNS

A. Satisfactory Seeded Lawn: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities.

B. Satisfactory Sodded Lawn: At end of maintenance period, a healthy, well-rooted, even-colored, viable lawn has been established, free of weeds, open joints, bare areas, and surface irregularities.

C. Reestablish lawns that do not comply with requirements and continue maintenance until lawns are satisfactory.

3.7 CLEANUP AND PROTECTION

A. Promptly remove soil and debris created by lawn work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.

B. Erect barricades and warning signs as required to protect newly planted areas from traffic. Maintain barricades throughout maintenance period and remove after lawn is established.

C. Remove erosion-control measures after grass establishment period.

D. Remove surplus sub-soil and topsoil from site and dispose of legally off-site.

END OF SECTION 02920

SECTION 03300 - CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section specifies cast-in place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:

1. Footings and foundations.
2. Slabs-on-grade.

B. Coordinate the requirements of this Section with those of other sections that interface with Cast-in-Place Concrete.

1. Grouting at base plates is included in Division 5 section “Structural Steel.”

2. Grouting at base plates is included in Division 13 section “Metal Buildings.”

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Design Mixtures: For each concrete mixture. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

1. Indicate amounts of mixing water to be withheld for later addition at Project site.

C. Steel Reinforcement Shop Drawings: Placing drawings that detail fabrication, bending, and placement. Include bar sizes, lengths, material, grade, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, splices and laps, mechanical connections, tie spacing, hoop spacing, and supports for concrete reinforcement.

D. Waterstops and underslab Vapor Retarders:

1. Samples for each product indicated.
2. Submit manufacturer’s installation instructions including installation of boots around pipe and conduit penetrations.

E. Material Test Reports: For the following, from a qualified testing agency, indicating compliance with requirements:

1. Aggregates. Include service record data indicating absence of deleterious expansion of concrete due to alkali aggregate reactivity.

1.4 QUALITY ASSURANCE

A. 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. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from one source, and obtain admixtures through one source from a single manufacturer.

C. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:

1. ACI 301, "Specification for Structural Concrete."
2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
3. ACI 315.
4. ACI 318.
5. ACI 305.
6. ACI 306.
7. Other publications as may be referenced.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

B. Avoid damaging coatings on steel reinforcement.

C. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products specified.

2.2 FORM MATERIALS

A. Smooth-Formed Finished Concrete: For concrete exposed to view, use form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.

1. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:

a. High-density overlay, Class 1 or better.

B. Rough-Formed Finished Concrete: For concrete concealed in finish work, use plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation.

E. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

F. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch, minimum.

G. Rustication Strips and Reveals: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

H. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form materials.

I. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent staining or spalling of concrete on removal.

J. Nails, Spikes, Lag Bolts, Through-Bolts, and Anchorages: Of sufficient size, strength, and character to maintain formwork in place while pouring concrete.

2.3 STEEL REINFORCEMENT

A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60, deformed, except no. 3 or no. 4 bars which are bent (stirrups, ties, and dowels) may be Grade 40.

B. Epoxy-Coated Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed bars, ASTM A 775/A 775M or ASTM A 934/A 934M, epoxy coated, with less than 2 percent damaged coating in each 12-inch bar length.

C. Epoxy-Coated-Steel Wire: ASTM A 884/A 884M, Class A coated.

D. Galvanized Reinforcing Bars: ASTM A 615/A 615M, Grade 60 deformed bars, ASTM A 767/A 767M, Class I zinc coated after fabrication and bending.

E. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M, deformed.

F. Plain-Steel Welded Wire Reinforcement: ASTM A 185, plain, fabricated from as-drawn steel wire into flat sheets.

G. Plain-Steel Wire: ASTM A 82, as drawn, or galvanized where indicated.

H. Deformed-Steel Welded Wire Reinforcement: ASTM A 497, flat sheet.

I. Deformed-Steel Wire: ASTM A 496.

2.4 REINFORCEMENT ACCESSORIES

A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded wire reinforcement in place. Manufacture bar supports from steel wire, plastic, or precast concrete according to CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

1. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire.
2. For epoxy-coated reinforcement, use epoxy-coated or other dielectric-polymer-coated wire bar supports.
3. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

B. Tie Wire: Minimum 16 gauge annealed type, or patented system accepted by the Architect.

C. 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. At expansion joint locations, provide with plastic dowel cover on one side of expansion joint.

D. Epoxy-Coated Joint Dowel Bars: ASTM A 615/A 615M, Grade 60, plain-steel bars, ASTM A 775/A 775M epoxy coated.

E. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A 775/A 775M.

F. Zinc Repair Material: ASTM A 780, zinc-based solder, paint containing zinc dust, or sprayed zinc.

2.5 CONCRETE MATERIALS

A. Cementitious Material: Use the following cementitious materials, of the same type, brand, and source, throughout Project:

1. Portland Cement: ASTM C 150, Type I. Supplement with the following:

a. Fly Ash: ASTM C 618, Class C or Class F.

B. Normal-Weight Aggregates: ASTM C 33, Class 4M coarse aggregate or better, graded. Provide aggregates from a single source.

1. Maximum Coarse-Aggregate Size: not to exceed one-third the depth or thickness of the concrete member or casting, but in no case more than 1-1/2 inches.
2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

C. Lightweight Aggregate: ASTM C 330, not to exceed one-third the depth or thickness of the concrete member or casting, but in no case more than 1 inch nominal maximum aggregate size.

D. Water: ASTM C 94/C 94M and potable.

2.6 ADMIXTURES

A. Air-Entraining Admixture: ASTM C 260. Use in concrete with exposure to the exterior, 5% plus-or-minus 1%.

B. Chemical Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures and that will 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 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. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
5. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
6. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
7. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

C. Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete and complying with ASTM C 494/C 494M, Type C.

1. Available Products:

a. Grace Construction Products, W. R. Grace & Co.; DCI.
b. Sika Corporation; Sika CNI.
c. Equal product by another manufacturer.

D. Non-Set-Accelerating Corrosion-Inhibiting Admixture: Commercially formulated, non-set-accelerating, anodic inhibitor or mixed cathodic and anodic inhibitor; capable of forming a protective barrier and minimizing chloride reactions with steel reinforcement in concrete.

1. Available Products:

a. Grace Construction Products, W. R. Grace & Co.; DCI-S.
b. Sika Corporation; FerroGard-901.
c. Equal product by another manufacturer.

2.7 WATERSTOPS

A. Flexible Rubber Waterstops: CE CRD-C 513, with factory-installed metal eyelets**,** for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.

1. Acceptable Manufacturers:

a. Sika Greenstreak.
b. Progress Unlimited, Inc.
c. Williams Products, Inc.

2. Profile: Ribbed with center bulb.
3. Splices: Provide integral factory-made splice fittings.
4. Dimensions: 6 inches by 3/8 inch thick; nontapered.
5. Performance: Capable of withstanding 125 feet of head pressure.
6. Use: As indicated on Drawings, and at all locations where floors meet walls or where floor plane changes, and finish floor is below finish grade.

2.8 VAPOR RETARDERS

A. Plastic Vapor Retarder: ASTM E 1745, Class C, not less than 10 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive joint tape.

1. Acceptable Products:

a. Fortifiber Corporation; Moistop Ultra 10.
b. Soco-Shield VB-15.
c. Reef Industries, Inc.; Griffolyn Type-85.
d. Stego Industries, LLC; Stego Wrap, 10 mils.

B. Plastic Vapor Retarder: ASTM E 1745, Class A, not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.

1. Acceptable Products:

a. Stego Industries, LLC; Stego Wrap, 15 mils.
b. Fortifiber Corporation; Moistop Ultra 15.

c. Raven Industries Inc.; Vapor Block 15.
d. Reef Industries, Inc.; Griffolyn Type-65G.

2.9 FLOOR AND SLAB TREATMENTS

A. Unpigmented Mineral Dry-Shake Floor Hardener: Factory-packaged dry combination of portland cement, graded quartz aggregate, and plasticizing admixture.

1. Acceptable Products:

a. Burke by Edoco; NonMetallic Floor Hardener.
b. Euclid Chemical Company (The); Surflex.
c. Scofield, L. M. Company; Lithochrome Color Hardener.
d. Symons Corporation, a Dayton Superior Company; Hard Top.

B. Pigmented Mineral Dry-Shake Floor Hardener: Factory-packaged, dry combination of portland cement, graded quartz aggregate, color pigments, and plasticizing admixture. Use color pigments that are finely ground, nonfading mineral oxides interground with cement.

1. Acceptable Products:

a. Burke by Edoco; NonMetallic Floor Hardener-Color.
b. Euclid Chemical Company (The); Surflex.
c. Scofield, L. M. Company; Lithochrome Color Hardener.
d. Symons Corporation, a Dayton Superior Company; Color Hardener.

2. Color: As selected by Architect from manufacturer's full range.

C. Metallic Dry-Shake Floor Hardener: Unpigmented, except where indicated as pigmented on the Drawings, factory-packaged, dry combination of portland cement, graded metallic aggregate, rust inhibitors, and plasticizing admixture; with metallic aggregate consisting of no less than 65 percent of total aggregate content.

1. Color: As selected by Architect from manufacturer's full range.

D. Slip-Resistive Aluminum Granule Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive aggregate of not less than 95 percent fused aluminum-oxide granules.

1. Acceptable Products:

a. Anti-Hydro International, Inc.; A-H Alox.
b. L&M Construction Chemicals, Inc.; Grip It AO.
c. Sonneborn, Div. of ChemRex; Frictex NS.

E. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or siliconate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.

1. Acceptable Products:

a. Burke by Edoco; Titan Hard.
b. Curecrete Distribution Inc.; Ashford Formula.
c. Euclid Chemical Company (The); Euco Diamond Hard.
d. Symons Corporation, a Dayton Superior Company; Buff Hard.

2.10 CURING MATERIALS

A. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, nondissipating, certified by curing compound manufacturer to not interfere with bonding of floor covering.

2.11 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, per ASTM D 2240; as manufactured by Euclid or Metzger-McGuire or equal.

C. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade to suit requirements, and as follows:

1. Types I and II, non-load bearing, or Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.12 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 C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
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 according to ASTM C 109/C 109M.

B. Repair Overlayment: 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 C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
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 according to ASTM C 109/C 109M.

2.13 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, according to ACI 301.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Combined Fly Ash and Pozzolan: 20 percent.

C. Limit water-soluble, chloride-ion content in hardened concrete to 0.05 percent by weight of cement.

D. Admixtures: Use admixtures according to manufacturer's written instructions.

1. Use water-reducing, high-range water-reducing, or plasticizing admixture 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, concrete for heavy-use industrial slabs and parking structure slabs, concrete required to be watertight, and concrete with a water-cementitious materials ratio below 0.50.
4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

2.14 CONCRETE MIXTURES FOR BUILDING ELEMENTS

A. Concrete strengths shall be as indicated on Drawings.

B. Proportion concrete mixes in accordance with ACI 301, 3.8 and to meet strength requirements.

C. Provide smaller aggregate mix for stair tread pans and landings, and equipment platforms.

2.15 FABRICATING REINFORCEMENT

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

B. Locate reinforcing splices, where not indicated on Drawings, at points of minimum stress.

C. Where indicated, weld reinforcing bars in accordance with AWS D12.1.

2.16 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94/C 94M, and furnish batch ticket information.

1. When air temperature is between 85 and 90 deg F, reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F, reduce mixing and delivery time to 60 minutes.
2. Delete references in ASTM C94 that allow additional water to be added to batch for material with insufficient slump. Do not add water to concrete mix after mixing.

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.

1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than 5 minutes after ingredients are in mixer, before any part of batch is released.
2. For mixer capacity 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, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, Class A for smooth-formed surfaces and Class B for rough-formed surfaces.

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to

prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete, except where may be indicated otherwise on the Drawings.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

1. Do not apply form release agent where concrete surfaces will receive special finishes, applied coverings that are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces wet prior to placing concrete.

M. Obtain Architect’s approval for use of earth forms. When using earth forms, hand-trim sides and bottoms, and remove loose dirt prior to placing concrete.

N. Obtain Architect’s approval before framing openings that are not indicated on Drawings in structural members.

3.2 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. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded. Do not perform work unless specifically indicated on the Drawings or reviewed by Architect prior to installation.

1. Provide formed openings where required for pipes, conduits, sleeves, and other work to be embedded in or passing through concrete members.
2. Locate and set in place items that will be cast directly into concrete.
3. Install concrete accessories in accordance with manufacturer’s recommendations, straight, level and plumb.

B. Place formed construction joints in slab. Set top screed to required elevations. Secure to resist movement of wet concrete.

C. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings to allow flushing water to drain. Close temporary openings with tight-fitting panels, flush with inside of forms, neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.3 REMOVING AND REUSING FORMS

A. General: Formwork removal shall be in accordance with ACI 318 and ACI 347.

B. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after concrete has gained sufficient strength to carry its own weight as well as construction and design loads that are liable to be imposed on it.

1. Remove formwork that does not directly support the weight of the concrete as soon as concrete is hard enough to not be damaged by form-removal operations and curing and protection operations are maintained.

C. Formwork for Structural Elements:

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved at least 75 percent of its 28-day design compressive strength, provided construction is reshored.
2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
3. Remove formwork progressively and in accordance with code requirements, and so that no shock loads or unbalanced loads are imposed on structure.

D. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against concrete surfaces.

E. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

3.4 VAPOR RETARDERS

A. Plastic Vapor Retarders: Place, protect, and repair vapor retarders according to ASTM E 1643 and manufacturer's written instructions.

1. Lap joints 6 inches and seal with manufacturer's recommended tape.
2. Install boots around pipe and conduit penetrations per manufacturer’s written instructions.

3.5 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.

1. Do not cut or puncture vapor retarder. 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 would reduce bond to concrete.

C. Accurately position, support, and secure reinforcement against displacement. Locate and support reinforcement with bar supports to maintain minimum concrete cover. Do not tack weld crossing reinforcing bars.

1. Maintain concrete cover around reinforcing as indicated on the Drawings.
2. Weld reinforcing bars according to AWS D1.4, where indicated.

D. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

E. Install welded wire reinforcement in longest practicable lengths on bar supports spaced to minimize sagging. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

F. Epoxy-Coated Reinforcement: Repair cut and damaged epoxy coatings with epoxy repair coating according to ASTM D 3963/D 3963M. Use epoxy-coated steel wire ties to fasten epoxy-coated steel reinforcement.

G. Zinc-Coated Reinforcement: Repair cut and damaged zinc coatings with zinc repair material according to ASTM A 780. Use galvanized steel wire ties to fasten zinc-coated steel reinforcement.

3.6 JOINTS

A. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

B. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated.

1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of floors and slabs.
2. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Space vertical joints in walls as indicated. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
6. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness as follows:

1. Sawed Joints: Form contraction joints with power saws equipped with shatterproof “soffcut” 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 concrete develops random contraction cracks.

D. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
2. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length to prevent concrete bonding to one side of joint.

3.7 WATERSTOPS

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of the Work. Field fabricate joints in waterstops according to manufacturer's written instructions.

3.8 CONCRETE PLACEMENT

A. Maintain records of poured concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

B. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect.

D. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as indicated. Deposit concrete to avoid segregation.

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. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
2. Maintain reinforcement in position on chairs during concrete placement.

F. Cold-Weather Placement: Comply with ACI 306.1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

G. Hot-Weather Placement: Comply with ACI 301.

3.9 FINISHING FLOORS AND SLABS

A. General: Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.

1. Apply float finish to surfaces to receive trowel finish and to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.

C. Trowel Finish: After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

1. Apply a trowel finish to surfaces exposed to view or to be covered with resilient flooring, carpet, paint, or similar finishes.
2. Finish surfaces to the tolerances specified in ACI 302.1R.

D. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated and where ceramic or quarry tile is to be installed. While concrete is still plastic, slightly scarify surface with a fine broom.

E. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, and ramps; to stair treads and landings; and elsewhere as indicated. Apply in accordance with patterns and in combination with other finishes as may be indicated on Drawings.

3.10 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates from manufacturer furnishing machines and equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items. Cast-in inserts and accessories as shown on Drawings. Screed, tamp, and trowel-finish concrete surfaces.

3.11 CONCRETE PROTECTING AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and ACI 301 for hot-weather protection during curing.

B. Evaporation Retarder: Apply evaporation retarder to unformed 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.

C. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing for the remainder of the curing period.

D. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.

E. Cure concrete according to ACI 308.1, by one or a combination of the following methods:

1. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

2. Curing and Sealing Compound: Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Repeat process 24 hours later and apply a second coat. Maintain continuity of coating and repair damage during curing period.

3.12 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller according to manufacturer's written instructions.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month. Do not fill joints until construction traffic has permanently ceased.
2. Eleven months after Substantial Completion, conduct an inspection and repair or replace all joint fillers that have lost bond with concrete on both sides of joint.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints. Overfill joint and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half 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. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Compact mortar in place and strike off slightly higher than surrounding surface.
2. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance; maintain required concrete coverages over reinforcing.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.

1. Correct low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.

2. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 1/16 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. Finish repaired areas to blend into adjacent concrete.
5. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least a 3/4-inch clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mixture as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.

6. Repair random cracks and single holes 1 inch or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. 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 and Inspecting: Owner will engage a qualified testing and inspecting agency to perform field tests and inspections and prepare test reports. Tests that are to be conducted include, but may not be limited to, those described in Division 1 section “Quality Requirements.”

END OF SECTION 03300

SECTION 05120 - STRUCTURAL STEEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Structural steel.
2. Grout.
3. Architecturally exposed structural steel.

B. Coordinate the requirements of this Section with those of other sections that interface with Structural Steel.

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

B. Architecturally Exposed Structural Steel: Structural steel designated as architecturally exposed structural steel in the Contract Documents.

1.4 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand loads indicated and comply with other information and restrictions indicated.

1. Select and complete connections using schematic details indicated and AISC's "Manual of Steel Construction.
2. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.

1. **Provide one (1) complete package to submit for review. Partial submittal packages will not be accepted and will be returned "REJECTED".**
2. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
3. Include embedment drawings.
4. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
5. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
6. **For structural-steel connections indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.**

C. Welding certificates.

1.6 QUALITY ASSURANCE

A. Shop-Painting Applicators: Qualified according to SSPC-QP 3, "Standard Procedure for Evaluating Qualifications of Shop Painting Applicators."

B. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

C. Comply with applicable provisions of the following specifications and documents:

1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC's "Specifications for the Design, Fabrication, and Erection of Structural Steel for Buildings", latest edition.
3. AISC's "Specification for the Design of Steel Hollow Structural Sections."
4. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

1.7 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 erosion and deterioration.

1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
2. 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.

1.8 COORDINATION

A. Furnish 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.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M.

B. Channels, Angles -Shapes: ASTM A 36/A 36M.

C. Plate and Bar: ASTM A 36/A 36M.

D. Cold-Formed Hollow Structural Sections: ASTM A 500 structural tubing, Grade B.

E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.

1. Finish: Black, except where indicated to be galvanized.

F. Medium-Strength Steel Castings: ASTM A 27/A 27M, Grade 65-35, carbon steel.

G. High-Strength Steel Castings: ASTM A 148/A 148M, Grade 80-50, carbon or alloy steel.

H. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325, Type 1 or ASTM A 490, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

B. Shear Connectors: ASTM A 108, Grades 1015 through 1020, headed-stud type, cold-finished carbon steel; AWS D1.1, Type B.

C. Unheaded Anchor Rods, Headed Anchor Rods, and Threaded Rods: Refer to Structural Drawings.

2.3 PRIMER

A. Primer: SSPC-Paint 25, Type I, iron oxide, zinc oxide, raw linseed oil, and alkyd. Use on any steel that is not located in air-conditioned space.

B. Primer: SSPC-Paint 25 BCS, Type I, iron oxide, zinc oxide, raw linseed oil, and alkyd.

C. Primer: SSPC-Paint 23, latex primer.

D. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20.

2.4 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges.

1. Camber structural-steel members where indicated.
2. Mark and match-mark materials for field assembly.
3. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Architecturally Exposed Structural Steel: Comply with fabrication requirements, including tolerance limits, of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for structural steel identified as architecturally exposed structural steel.

1. Fabricate with exposed surfaces smooth, square, and free of surface blemishes including pitting, rust, scale, seam marks, roller marks, rolled trade names, and roughness.
2. Remove blemishes by filling or grinding or by welding and grinding, before cleaning, treating, and shop priming.

C. 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.

D. Bolt Holes: Cut, drill, or punch standard bolt holes perpendicular to metal surfaces.

E. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

F. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 1, "Solvent Cleaning."

G. Shear Connectors: Prepare steel surfaces as recommended by manufacturer of shear connectors. Use automatic end welding of headed-stud shear connectors according to AWS D1.1 and manufacturer's written instructions.

H. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.

1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Refer to Structural Drawings.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.

2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
3. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

a. Grind butt welds flush.
b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

2.7 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.
3. Surfaces to be high-strength bolted with slip-critical connections.
4. Surfaces to receive sprayed fire-resistive materials.
5. Galvanized surfaces.

B. Surface Preparation: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces according to the following specifications and standards:

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

C. Priming: Immediately after surface preparation, apply primer according to manufacturer's written instructions and at rate recommended by SSPC to provide a dry film thickness of not less than 1.0 mil. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

1. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/ A 123M.

1. Fill vent holes and grind smooth after galvanizing.
2. Galvanize lintels and shelf angles attached to structural-steel frame and located in exterior walls, either in masonry veneers, or where part will be exposed to view or the elements.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, 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.

1. Do not remove temporary shoring supporting composite deck construction until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges."

B. Base Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base plates. Clean bottom surface of base plates.

1. Set base plates for structural members on wedges, shims, or setting nuts as required.
2. Weld plate washers to top of base plate.
3. Tighten anchor rods per the Structural Drawings after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base plate before packing with grout.
4. Promptly pack grout solidly between bearing surfaces and base 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.

C. Maintain erection tolerances of structural steel <**and Architecturally Exposed Structural Steel**> within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. 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 is completed and in service.

E. Splice members only where indicated.

F. Do not use thermal cutting during erection unless approved by Architect. If allowed, finish thermally cut sections within smoothness limits in AWS D1.1.

G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

H. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.

3.4 FIELD CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.

1. Joint Type: Refer to Structural Drawings.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
2. Assemble and weld built-up sections by methods that will maintain true alignment of axes without exceeding tolerances of AISC's "Code of Standard Practice for Steel Buildings and Bridges" for mill material.
3. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
4. Verify that weld sizes, fabrication sequence, and equipment used for architecturally exposed structural steel will limit distortions to allowable tolerances. Prevent weld show-through on exposed steel surfaces.

a. Grind butt welds flush.
b. Grind or fill exposed fillet welds to smooth profile. Dress exposed welds.

3.5 QUALITY CONTROL

A. Owner will engage an independent testing and inspecting agency to perform tests and inspections and prepare test reports. Contractor shall correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

B. Bolted Connections: Bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: In addition to visual inspection, 25 percent of welded connections will be tested and inspected according to AWS D1.1 and the following or similar inspection procedures:

1. Radiographic Inspection: ASTM E 94.

3.6 REPAIRS AND PROTECTION

A. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories and abutting structural steel.

1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

B. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

END OF SECTION 05120

SECTION 05400 - COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Exterior non-load-bearing wall framing.
2. Exterior and interior load-bearing wall framing.

B. Coordinate the requirements of this Section with those of other sections that interface with Cold-Formed Metal Framing.

C. For cold-formed roof purlins, see Division 13 section “Metal Building Systems.”

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: in accordance with the International Building Code, latest edition, and building codes in effect at the Project location.

B. Design Responsibilities:

1. Structural Engineer of Record is responsible for the designing member sizes, and locating bridging and bracing.
2. Contractor’s engineer is responsible for designing connections between members, and anchorages of members to substrates.

1.4 SUBMITTALS

A. Product Data: For each type of cold-formed metal framing product and accessory indicated.

B. Installation Instructions: Manufacturer’s printed instructions for installation of components.

C. Shop Drawings: For special components and installations not fully dimensioned or detailed in manufacturer’s Product Data or Installation Instructions. Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing,

supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining Work.

1. Include structural analysis data signed and sealed by the qualified professional engineer registered in the State of Texas who is responsible for their preparation.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

B. Fire-Test-Response Characteristics: Where metal framing is part of a fire-resistance-rated assembly, provide framing identical to that of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

C. AISI Specifications: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members" including:

1. CCFSS Technical Bulletin: "AISI Specification Provisions for Screw Connections."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:

1. Delta Metal Products
2. Dietrich Industries, Inc.
3. Nucor Building Products
4. Unimast, Inc.
5. Wheeling Corrugating Co.

2.2 MATERIALS

A. Steel Sheet: ASTM A 1101/A 1101M, hot rolled or ASTM A 108/ ASTM A 108M, cold rolled; cleaned, pretreated, and primed with manufacturer's baked-on, lead- and chromate-free, rust-inhibitive primer complying with performance requirements in FS TT-P-664, of grade as follows:

1. Grade 33 or C, Type 1 or 2, for minimum uncoated steel thickness of 0.0428 inch and less
2. Grade 40 or D, Type 1 or 2, for minimum uncoated steel thickness of 0.0538 inch and greater.

B. Identify steel thickness on members by means of gauge designations painted on members, by or other identifying marks.

2.3 WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, complying with ASTM C 955. Provide in size and thickness as indicated. Flange width shall be manufacturer’s standard to correspond with stud depths, but with a minimum of 1-5/8 inches.

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, complying with ASTM C 955. Thickness and depth to match studs, minimum flange width of 1-1/4 inches.

C. Single Deflection Track: At Non-Load Bearing Walls, provide manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal and lateral loads. Thickness and depth to match studs, minimum flange width of 2 inches.

2.4 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories of the same material and finish used for framing members, with a minimum yield strength of 33,000 psi for members 0.0428 inch or less thickness, and 40,000 psi for members 0.0538 inch or greater thickness.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. End clips.
5. Foundation clips.
6. Gusset plates.
7. Stud kickers, knee braces, and girts.
8. Joist hangers and end closures.
9. Hole reinforcing plates.
10. Backer plates.

2.5 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

D. Power-Actuated Anchors: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 10 times design load, as determined by testing per ASTM E 1190 conducted by a qualified independent testing agency.

E. Mechanical Fasteners: Corrosion-resistant-coated, self-drilling, self-threading steel drill screws.

1. Head Type: Low-profile head beneath sheathing, manufacturer's standard elsewhere.

F. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035.

B. Gypsum Sheathing: Comply with requirements in Division 9 Section "Gypsum Sheathing."

2.7 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.

3. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing according to ASTM C 1007, unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to manufacturer's written recommendations and requirements in this Section.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed metal framing members by welding or screw fastening, as standard with fabricator. Wire tying of framing members is not permitted.

a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

E. Install framing members in one-piece lengths, unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

H. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

I. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:

3.3 WALL FRAMING INSTALLATION

A. Install continuous top and bottom tracks sized to match studs. Align tracks accurately and securely anchor at corners and ends, and at spacings as follows:

1. Anchor Spacing: As shown on Shop Drawings, but not greater than 24 inches o.c.

B. Squarely seat studs against webs of top and bottom tracks. Fasten both flanges of studs to top and bottom tracks. Space studs as indicated on Drawings.

C. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install single deep-leg deflection tracks and anchor to building structure.

2. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of flat, taut, steel sheet straps of width and thickness indicated and stud or stud-track solid blocking of width and thickness matching studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.

a. Install solid blocking at every other stud.

D. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar configurations.

E. Align studs vertically where wall-framing continuity is interrupted by floor framing. Where studs cannot be aligned, continuously reinforce track to transfer loads.

F. Align floor and roof framing over studs. Where framing cannot be aligned, continuously reinforce track to transfer loads.

G. Anchor studs abutting structural columns or walls, including masonry walls, to supporting structure as indicated.

H. Install headers over wall openings wider than stud spacing. Locate headers above openings as indicated. Fabricate headers of compound shapes indicated or required to transfer load to supporting studs, complete with clip-angle connectors, web stiffeners, or gusset plates.

1. Frame wall openings with not less than a double stud at each jamb of frame as indicated on Shop Drawings.
2. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with clip angles or by welding, and space jack studs same as full-height wall studs.

I. Install supplementary framing, blocking, and bracing in stud framing indicated to support fixtures, equipment, services, casework, heavy trim, furnishings, and similar work requiring attachment to framing.

1. If type of supplementary support is not indicated, comply with stud manufacturer's written recommendations and industry standards in each case, considering weight or load resulting from item supported.

J. Install horizontal bridging in stud system, spaced as indicated on Shop Drawings, but no greater than 54 inches o.c. apart. Fasten at each stud intersection.

1. Bridging: Cold-rolled steel channel, welded to webs of studs.

K. Install steel sheet diagonal bracing straps to both stud flanges, terminate at and fasten to reinforced top and bottom tracks. Fasten clip-angle connectors to multiple studs at ends of bracing and anchor to structure.

L. Install miscellaneous framing and connections, including supplementary framing, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 05400

SECTION 05500 - METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Miscellaneous steel framing and supports.
2. Steel framing and supports for applications where framing and supports are not specified in other Sections, such as countertop and bench supports.
3. Miscellaneous loose steel items and trim.
4. Miscellaneous metal fabrications such as ladders and safety cages, bollards, and bicycle racks.

B. Products furnished, but not installed, under this Section include the following:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, and wedge-type inserts indicated to be cast into concrete or built into unit masonry.

C. Coordinate the requirements of this Section with those of other sections that interface with Metal Fabrications.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance of Ladders: Provide ladders capable of withstanding the effects of loads and stresses within limits and under conditions specified in ANSI A14.3.

B. Thermal Movements: Exterior metal fabrications shall allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 100 deg F, ambient; 180 deg F, material surfaces.

1.4 SUBMITTALS

A. Product Data: For the following:

1. Nonslip aggregates and nonslip-aggregate surface finishes.
2. Paint products.
3. Grout.

B. Shop Drawings: Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.
2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in the State of Texas responsible for their preparation.

1.5 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.1, "Structural Welding Code--Steel."
2. AWS D1.2, "Structural Welding Code--Aluminum."
3. AWS D1.3, "Structural Welding Code--Sheet Steel."
4. AWS D1.6, "Structural Welding Code--Stainless Steel."

1.6 PROJECT CONDITIONS AND COORDINATION

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication and indicate measurements on Shop Drawings.

B. Coordinate installation of anchorages for metal fabrications.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

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.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500, cold-formed steel tubing.

C. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40), unless another weight is indicated or required by structural loads.

D. Cast Iron: ASTM A 48/A 48M, Class 30, unless another class is indicated or required by structural loads.

2.3 NONFERROUS METALS

A. Aluminum Plate and Sheet: ASTM B 209, Alloy 6061-T6.

B. Aluminum Extrusions: ASTM B 221, Alloy 6063-T6.

C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.4 FASTENERS

A. General: Unless otherwise indicated, provide Type **304** stainless-steel fasteners and anchors for exterior use and zinc-plated fasteners and anchors with coating complying with ASTM B 633, Class Fe/Zn 5 elsewhere.

B. Steel Bolts, Nuts and Washers: ASTM A 307, as recommended for structural steel joints. Select fasteners for type, grade, and class required.

C. Provide stainless-steel fasteners, Type 304, for fastening aluminum. Select fasteners for type, grade, and class required.

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.

C. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

E. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.6 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Use connections that maintain structural value of joined pieces.

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 true to line and level with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously. At exposed connections, finish exposed welds and surfaces smooth.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts, unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage, coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction, unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction retained by framing and supports. Cut, drill, and tap units to receive hardware, hangers, and similar items.

C. Galvanize miscellaneous framing and supports where indicated or if not indicated, at all conditions where moisture may be encountered or metal is in contact with concrete, grout, or masonry.

D. Fabricate supports for operable partitions from continuous steel beams of sizes indicated with attached bearing plates, anchors, and braces as indicated. Drill bottom flanges of beams to receive partition track hanger rods; locate holes where indicated on operable partition Shop Drawings.

E. Fabricate steel pipe columns for supporting wood frame construction from Schedule 40 steel pipe with steel baseplates and top plates as required. Drill baseplates and top plates for anchor and connection bolts and weld to pipe with fillet welds all around.

2.8 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates.

2.9 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

C. Galvanize exterior miscellaneous steel trim.

D. Prime interior miscellaneous steel trim, where indicated on drawings, with zinc-rich primer.

1. Prime interior ladders, where indicated, including brackets and fasteners, with zinc-rich primer.

2.10 METAL BOLLARDS

A. Fabricate metal bollards from galvanized Schedule 40 steel pipe.

B. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch- thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches deep and 3/4 inch larger than OD of bollard.

C. Fabricate bollards with 3/8-inch- thick steel baseplates for bolting to concrete slab, where bollards are to be anchored to existing construction. Drill baseplates at all 4 corners for 3/4-inch anchor bolts.

1. Where bollards are to be anchored to sloping concrete slabs, angle baseplates for plumb alignment of bollards.

2.11 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

2.12 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123/A 123M, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Shop Priming: Prepare uncoated ferrous metal surfaces and apply shop primer to uncoated surfaces of metal fabrications, except those with galvanized finishes and those to be embedded in concrete, sprayed-on fireproofing, or masonry, unless otherwise indicated. Comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

2.13 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. Class I, Clear Anodic Finish: AA-M12C22A41 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class I, clear coating 0.018 mm or thicker) complying with AAMA 611.

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. Fastening to In-Place Construction: Provide appropriate and secure anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

D. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with a heavy coat of bituminous paint.

3.2 INSTALLING 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. Install pipe columns on concrete footings with grouted baseplates. Grout baseplates of columns supporting steel girders after girders are installed and leveled.

3.3 INSTALLING PIPE BOLLARDS

A. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete. Fill annular space around bollard solidly with nonshrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch toward bollard.

B. Fill bollards solidly with concrete, mounding top surface to shed water.

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the 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 A 780.

END OF SECTION 05500

SECTION 05511 - METAL STAIRS AND RAILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Preassembled steel stairs with concrete-filled treads.
2. Steel tube railings attached to metal stairs.
3. Steel tube handrails attached to walls or structural steel.

B. Coordinate the requirements of this Section with those of other sections that interface with Metal Stairs and Railings.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance of Stairs: Provide metal stairs capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Uniform Load: 100 lbf/sq. ft.
2. Concentrated Load: 300 lbf applied on an area of 4 sq. in.
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
5. Limit deflection of treads, platforms, and framing members to L/360 or 1/4 inch, whichever is less.

B. Structural Performance of Handrails and Railings: Provide railings capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Railings:

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.

1.4 SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

1. Provide templates for anchors and bolts specified for installation under other Sections.
2. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer licensed in the State of Texas responsible for their preparation.

B. Welding certificates.

1.5 QUALITY ASSURANCE

A. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.

1. Preassembled Stairs: Commercial class.

B. Welding: 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 COORDINATION

A. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

B. Coordinate locations of hanger rods and struts with other work so that they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces, unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513, Type 5 (mandrel drawn).

C. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D. Minimum yield point of 30 ksi.

D. Uncoated, Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, structural steel, Grade 25, unless another grade is required by design loads; exposed.

2.3 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners and anchors for exterior use and zinc-plated fasteners and anchors with coating complying with ASTM B 633, Class Fe/Zn 5 elsewhere. Select fasteners for type, grade, and class required.

B. Steel Bolts, Nuts and Washers: ASTM A 307, as recommended for structural steel joints. Select fasteners for type, grade, and class required.

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79.

C. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.

D. Nonslip-Aggregate Concrete Finish: Factory-packaged abrasive aggregate made from fused, aluminum-oxide grits or crushed emery; rustproof and nonglazing; unaffected by freezing, moisture, or cleaning materials.

E. Welded Wire Fabric: ASTM A 185, 6 by 6 inches--W1.4 by W1.4, unless otherwise indicated.

F. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

G. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

H. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.5 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts, railings, clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.

1. Join components by welding, unless otherwise indicated.
2. Use connections that maintain structural value of joined pieces.

B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible.

C. 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.

D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Form exposed work true to line and level with accurate angles and surfaces and straight edges.

F. Weld connections to minimize distortion and develop strength and corrosion resistance of base metals. 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.

G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

H. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

2.6 STEEL-FRAMED STAIRS

A. Stair Framing:

1. Fabricate stringers of steel channels, or of steel tubes where indicated on Drawings.
    a. Provide closures for exposed ends of channel or tube stringers.
    b. Run stringers continuous at platforms and landings, matching height to top of stringer to similar dimension above tread nosings.
2. Construct platforms of steel headers and miscellaneous framing members as needed to comply with performance requirements. Use channels or tubes to match stringers.
3. Weld stringers to headers; weld framing members to stringers and headers.
4. Where stairs are enclosed by gypsum board assemblies, provide hanger rods or struts to support landings from floor construction above or below. Locate hanger rods and struts where they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

B. Metal-Pan Stairs: Form risers, subtread pans, and subplatforms to configurations shown from steel sheet of thickness needed to comply with performance requirements but not less than 0.0677 inch.

1. Steel Sheet: Uncoated cold-rolled steel sheet; use in typical interior locations.
2. Steel Sheet: Galvanized steel sheet; use on exterior stairs and where indicated on Drawings.
3. Attach risers and subtreads to stringers with brackets made of steel angles or bars. Weld brackets to stringers and attach metal pans to brackets by welding, riveting, or bolting.
4. Shape metal pans to include nosing integral with riser.

2.7 STEEL TUBE HANDRAILS AND RAILINGS

A. General: Fabricate railings to comply with drawings and with requirements indicated for design, dimensions, details, finish, and member sizes, including wall thickness of tube, post spacings, and anchorage, but not less than that needed to withstand indicated loads.

1. Accessibility Requirements: Fabricate railings to comply with requirements of the Americans With Disabilities Act (ADA) and the Texas Accessibility Standards (TAS), including but not limited to the following:

a. Size: **Minimum** dimension of **1-1/4 inches actual** (not nominal); and **maximum** dimension of **1-1/2 inches actual** (not nominal).
b. Clearance from walls: 1-1/2 inch clear, continuous.

2. Openings in railings shall be sized not to exceed four inches.

B. Welded Connections: Fabricate railings with welded connections. Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

C. Form simple and compound curves by bending members in jigs to produce uniform curvature for each repetitive configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

D. Close exposed ends of railing members with prefabricated end fittings.

E. Provide wall returns at ends of wall-mounted handrails, unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch or less.

F. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings, and anchors for interconnecting components and for attaching to other work. Furnish inserts and other anchorage devices for connecting to concrete or masonry work.

1. Connect posts to stair framing by direct welding, unless otherwise indicated.
2. **Fabricate posts to connect posts at floor directly to structural steel member, under floor slab, by direct welding; do NOT use base plates and bolts to anchor to concrete floor.**
3. For galvanized railings, provide galvanized fittings, brackets, fasteners, sleeves, and other ferrous-metal components.

G. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.8 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Galvanizing: Hot-dip galvanize items as indicated to comply with applicable standard listed below:

1. ASTM A 123/A 123M, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.
3. Fill vent and drain holes that will be exposed in finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

C. Prepare surfaces and apply shop primer to uncoated surfaces of metal stair components, except those with galvanized finishes and those to be embedded in concrete or masonry unless otherwise indicated. 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. Fastening to In-Place Construction: Provide appropriate and secure anchorage devices and fasteners where necessary for securing metal stairs to in-place construction.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.

C. Install metal stairs by welding stair framing to steel structure or to weld plates cast into concrete, unless otherwise indicated.

D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

E. 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.

F. Field Welding: Comply with requirements for fabrication.

G. Place and finish concrete fill for treads and platforms to comply with Division 3 Section "Cast-in-Place Concrete."

3.2 INSTALLING METAL STAIRS WITH GROUTED BASEPLATES

A. Clean concrete and masonry bearing surfaces of bond-reducing materials, and roughen to improve bond to surfaces. Clean bottom surface of baseplates.

B. Set steel stair baseplates on wedges, shims, or leveling nuts. After stairs have been positioned and aligned, tighten anchor bolts. Do not remove wedges or shims but, if protruding, cut off flush with edge of bearing plate before packing with grout.

1. Use nonmetallic, nonshrink grout, unless otherwise indicated.
2. Pack grout solidly between bearing surfaces and plates to ensure that no voids remain.

3.3 INSTALLING STEEL TUBE RAILINGS

A. Adjust railing systems before anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated or, if not indicated, as required by design loads. Plumb posts in each direction. Secure posts and rail ends to building construction as follows:

1. **Anchor posts to steel by welding directly to steel supporting members. Do <u>not</u> bolt to concrete slabs.**
2. Anchor handrail ends to concrete and masonry with steel round flanges welded to rail ends and anchored with postinstalled anchors and bolts.
3. Attach handrails securely to wall with wall brackets. Provide bracket with 1-1/2-inch clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

3.4 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the 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 A 780.

END OF SECTION 05511

SECTION 06100 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Wood non-structural framing.
2. Equipment bases and support curbs.
3. Wood blocking, cants, and nailers.
4. Utility shelving.
5. Plywood backing panels.

B. Coordinate the requirements of this Section with those of other sections that interface with Rough Carpentry.

1.3 DEFINITIONS

A. Rough Carpentry: Carpentry work not specified in other Sections and not exposed, unless otherwise indicated.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

1. NELMA - Northeastern Lumber Manufacturers Association.
2. NLGA - National Lumber Grades Authority.
3. RIS - Redwood Inspection Service.
4. SPIB - Southern Pine Inspection Bureau.
5. WCLIB - West Coast Lumber Inspection Bureau.
6. WWPA - Western Wood Products Association.

1.4 SUBMITTALS

A. Product Data:

1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements.
2. Include data for fire retardant treatment, if required.
3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of lumber grading agencies certified by the American Lumber Standards Committee Board of Review. Provide grade stamps on all lumber if required by authorities.

1. Provide dry lumber with 15 percent maximum moisture content at time of dressing for 2-inch nominal thickness or less, unless otherwise indicated.

B. Wood Structural Panels:

1. Plywood: DOC PS 1.
2. Comply with "Code Plus" provisions in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial."
3. Factory mark panels according to indicated standard.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA C2 (lumber) and AWPA C9 (plywood), except that lumber that is not in contact with the ground and is continuously protected from liquid water may be treated according to AWPA C31 with inorganic boron (SBX).

B. Kiln-dry material after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark each treated item with the treatment quality mark of an inspection agency approved by the American Lumber Standards Committee Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. Wood floor plates that are installed over concrete slabs directly in contact with earth.

2.3 DIMENSION LUMBER

A. General: Provide dimension lumber of grades indicated according to the American Lumber Standards Committee National Grading Rule provisions of the grading agency indicated. Use Southern Yellow Pine No. 2 or Fir standard grade for concealed construction.

2.4 MISCELLANEOUS LUMBER

A. General: Provide lumber for support or attachment of other construction, including curbs, blocking, cants, nailers, furring, and grounds. Use Southern Yellow Pine #2 or Fir standard grade.

B. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine, No. 2 grade; SPIB.
2. Spruce-pine-fir (south) or Spruce-pine-fir, Standard grade; NELMA, NLGA, WCLIB, or WWPA.

C. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

A. Telephone and Electrical Equipment Backing Panels: DOC PS 1, Exposure 1, C-D Plugged, fire-retardant treated, in thickness indicated or, if not indicated, not less than 1/2 inch thick.

2.6 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where rough carpentry is exposed to weather, in ground contact, or at wall sheathing and roof decking, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: CABO NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1.

G. Bolts: Steel bolts complying with ASTM A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers.

H. Expansion Anchors: Zinc-plated carbon steel anchor bolt and sleeve assembly with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete per ASTM E 488

2.7 METAL FRAMING ANCHORS

A. General: Provide framing anchors made from metal indicated, of structural capacity, type, and size indicated on Drawings.

B. Galvanized Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 coating designation.

2.8 MISCELLANEOUS MATERIALS

A. See Section 07131 – Self-Adhering Sheet Waterproofing and Flashing.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.

B. Do not use materials with defects that impair quality of rough carpentry or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

C. Apply field treatment complying with AWPA M4 to cut surfaces of preservative-treated lumber and plywood.

D. Securely attach rough carpentry work to substrate by anchoring and fastening. Make tight connections between members. Install fasteners without splitting wood; predrill as required.

3.2 WOOD FRAMING INSTALLATION, GENERAL

A. Framing Standard: Comply with AFPA's "Manual for Wood Frame Construction," unless otherwise indicated.

3.3 BUILDING WRAP APPLICATION

A. See Section 07131 – Self-Adhering Sheet Waterproofing and Flashing.

END OF SECTION 06100

SECTION 06615 - SIMULATED STONE COUNTERTOPS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Quartz agglomerate countertops.

B. Related Sections:

1. Division 5, Section “Metal Fabrications” for countertop supports.
2. Division 6, Section “Interior Architectural Woodwork” for Cabinetwork and Plastic Laminate Work.

1.3 SUBMITTALS

A. Product Data: For countertop materials.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

C. Samples: For each type of material exposed to view.

PART 2 - PRODUCTS

2.1 QUARTZ AGGLOMERATE COUNTERTOPS

A. Countertops: **3/4-inch-**thick, quartz agglomerate **with front edge built up with same material**.

B. Backsplashes and other vertical surfaces: **1/2-inch-** thick, quartz agglomerate.

2.2 COUNTERTOP MATERIALS

A. Quartz Agglomerate: Solid sheets consisting of quartz aggregates bound together with a matrix of filled plastic resin and complying with the "Physical Characteristics of Materials" Article of ANSI SS1.

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. Caesar Stone.
    b. Cambria.
    c. Cosentino USA.
    d. E. I. du Pont de Nemours and Company.
    e. LG Chemical, Ltd.
    f. Meganite Inc.
    g. Samsung Chemical USA, Inc.
    h. Technistone USA, Inc.
    i. Transolid, Inc.
    j. Wilsonart

2. Colors and Patterns: **As selected by Architect from manufacturer's full range**.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Fasten countertops by screwing through corner blocks of base units into underside of countertop. 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.

END OF SECTION 06615

SECTION 07131 - SELF-ADHERING SHEET WATERPROOFING AND FLASHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Flexible Flashing.
2. Sheet waterproofing.

B. Coordinate the requirements of this Section with those of other sections that interface with Self-Adhering Sheet Waterproofing and Flashing.

1.3 PERFORMANCE REQUIREMENTS

A. Provide waterproofing that prevents the passage of water.

1.4 SUBMITTALS

A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.

B. Samples: For the following products:

1. 12-by-12-inch square of waterproofing and flashing sheet.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store according to manufacturer's written instructions.

B. Protect stored materials from direct sunlight.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.

B. Maintain adequate ventilation during preparation and application of waterproofing materials.

PART 2 - PRODUCTS

2.1 FLEXIBLE FLASHING

A. Use for flashing not exposed to the exterior.

B. Rubberized-Asphalt Flashing: Composite flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film to produce an overall thickness of not less than 0.030 inch. Acceptable products:

1. Carlisle Coatings & Waterproofing; CCW-705-TWF Self-Adhering Thru-Wall Flashing.
2. Grace Construction Products, a unit of W. R. Grace & Co. - Conn.; Perm-A-Barrier Wall Flashing.
3. Henry Company; Blueskin TWF.
4. Protecto Wrap Company; PW 100/40 Non-Permeable Self-Adhered Air /Vapor Barrier & Thru Wall Flashing
5. Equal, with approval of Architect.

C. Locations:

1. All base flashings.
2. All lintel flashings.
3. All shelf angle flashings.
4. All ledge flashings.
5. At all other obstructions to the downward flow of water in walls, and as otherwise indicated on the Drawings.

2.2 SHEET WATERPROOFING

A. Use at all back-up walls to exterior building face materials:

B. Self-Adhering, Polyethylene-Faced Sheet: ASTM D 1970, 40 mils thick minimum, consisting of slip-resisting polyethylene-film reinforcing and top surface laminated to SBS-modified asphalt adhesive, with release-paper backing; cold applied, where indicated.

1. Products:

a. Carlisle Coatings & Waterproofing, CCW-705 Air & Vapor Barrier.
b. Grace Construction Products; Perm-A-Barrier Wall Membrane.
c. Henry Company; Blueskin SA Self-Adhered Water Resistive Air Barrier
d. Protecto Wrap Company; PW 100/40 Non-Permeable Self-Adhered Air /Vapor Barrier & Thru Wall Flashing
e. Equal, with approval of Architect.

C. Locations:

1. All back-up walls to exterior veneers.
2. To wrap from sheathing or back-up walls to cover soffits and eave fascias, connecting to roof membrane.

2.3 AUXILIARY MATERIALS

A. General: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with sheet waterproofing.

B. Primer: Liquid primer recommended for substrate by manufacturer of sheet waterproofing material.

C. Surface Conditioner: Liquid, waterborne surface conditioner recommended for substrate by manufacturer of sheet waterproofing material.

D. Sheet Strips: Self-adhering, rubberized-asphalt composite sheet strips of same material and thickness as sheet waterproofing.

E. Substrate Patching Membrane: Low-viscosity, two-component, asphalt-modified coating.

F. Mastic, Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates, including liquid mastic and adhesives, and adhesive tapes.

PART 3 - EXECUTION

3.1 PREPARATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with curing, finish, and moisture requirements and other conditions affecting performance. Correct unsatisfactory conditions prior to installation.

B. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.

3.2 APPLICATION

A. Install flexible flashing to provide continuous flashing membrane in locations indicated. Install product and auxiliary materials to tie into adjacent waterproofing.

B. Install sheet waterproofing membrane to provide continuous membrane over entire back-up wall surface. Install product and auxiliary materials to tie into adjacent waterproofing and flashing.

C. Install self-adhering product, including primer application, according to waterproofing manufacturer's written instructions and recommendations in ASTM D 6135.

D. Install flashing at masonry walls as follows, unless otherwise indicated:

1. Seal all penetrations in flashing with adhesive, sealant or tape per flashing manufacturer's recommendations.
2. At lintels and shelf angles, if not indicated otherwise on drawings, extend flashing a minimum of 6 inches into masonry at each end of heads. At sills, extend flashing 6 inches at ends and turn up not less than 2 inches to form end dams.
3. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

E. Repair tears, voids, and lapped seams in product not complying with requirements. Slit and flatten fishmouths and blisters. Patch with sheets extending 6 inches beyond repaired areas in all directions.

F. Correct deficiencies in or remove product that does not comply with requirements, repair substrates, reapply waterproofing, and repair sheet flashings.

3.3 PROTECTION AND CLEANING

A. Do not permit foot or vehicular traffic on unprotected membrane.

B. Protect waterproofing from damage and wear during remainder of construction period.

C. Protect from damage due to excess ultraviolet light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction soon after installation.

D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

E. Trim exposed membranes neatly at edges of adjacent construction.

END OF SECTION 07131

SECTION 07210 - BUILDING INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Concealed building insulation.
2. Cavity wall insulation.

B. Coordinate the requirements of this Section with those of other sections that interface with Building Insulation.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: Full-size units for each type of exposed insulation indicated.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide insulation and related materials with the fire-test-response characteristics indicated, as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify materials with appropriate markings of applicable testing and inspecting agency.

1. Surface-Burning Characteristics: ASTM E 84.
2. Fire-Resistance Ratings: ASTM E 119.
3. Combustion Characteristics (unfaced mineral-fiber insulation): ASTM E 136.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration by moisture, soiling, sunlight, heat, ignition sources, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Glass-Fiber Insulaiton

a. CertainTeed Corporation.
b. Johns Manville Corporation.
c. Knauf Fiber Glass.
d. Owens Corning.

2. Polyisocyanurate Board Insulation:

a. Atlas Roofing Corporation.
b. Dow Chemical Company.
c. Rmax, Inc.

3. Extruded-Polystyrene Board Insulation:

a. DiversiFoam Products.
b. Dow Chemical Company.
c. Owens Corning.
d. Tenneco Building Products.

2.2 INSULATING MATERIALS

A. General: Provide insulating materials that comply with requirements and with referenced standards.

1. Preformed Units: Sizes to fit applications indicated; selected from manufacturer's standard thicknesses, widths, and lengths.

2. Typical minimum insulating values to be achieved:

a. R-19 cavity Batt Insulation inside the building’s perimeter envelope walls.
b. R-5cicontinuous Polyisocyanurate Board Insulation outside the building’s perimeter envelope walls.
c. R-25 + R-11 LS Insulation system by the Pre-Engineered Metal Building manufacturer at roofs where Batts are draped over and in between purlins and thermal blocks are utilized.

3. All insulation units are to have insulating “R” values displayed in visible locations to meet requirements of authorities.

B. Unfaced Mineral-Fiber Blanket (Batt) Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from glass; with maximum flame-spread

and smoke-developed indices of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

1. Usage: typical wall insulation, unless noted otherwise.

C. Metal Building Insulation: ASTM C991, Type I, or NAIMA 202, glass-fiber-blanket (batt) insulation; 0.5-lb/cu. ft. (8-kg/cu. m) density minimum; 2-inch- (50-mm-) wide minimum. See required insulation values above.

1. Usage: typical roof insulation where pre-engineered metal building systems are used, unless noted otherwise.
2. Provide continuous, vapor-tight edge tabs; and with a flame-spread index of 25 or less, vinyl faced.

D. Polyisocyanurate Board Insulation: ASTM C 1289, Type I, Class 1 or 2, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, based on tests performed on unfaced core on thicknesses up to 4 inches.

2.3 AUXILIARY INSULATING MATERIALS

A. Adhesive for Bonding Insulation: Product with demonstrated capability to bond insulation securely to substrates indicated without damaging insulation and substrates.

2.4 INSULATION FASTENERS

A. Adhesively Attached, Spindle-Type Anchors: Plate welded to projecting spindle; capable of holding insulation of thickness indicated securely in position indicated with self-locking washer in place; and complying with the following requirements:

1. Plate: Perforated galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
2. Spindle: Copper-coated, low carbon steel, fully annealed, 0.105 inch in diameter, length to suit depth of insulation indicated.
3. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick galvanized steel sheet, with beveled edge for increased stiffness, sized as required to hold insulation securely in place, but not less than 1-1/2 inches square or in diameter.
4. Anchor Adhesive: Product with demonstrated capability to bond insulation anchors securely to substrates indicated without damaging insulation, fasteners, and substrates.

B. Poultry Mesh: Galvanized 20 gauge. Use 18 gauge annealed, galvanized steel wire to anchor poultry mesh to substrate.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and application indicated.

B. Install insulation that is undamaged, dry, and unsoiled.

C. Extend insulation in thickness indicated to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Water-Piping Coordination: If water piping is located on inside of insulated exterior walls, stuff insulation around pipe to fully cover and encapsulate piping.

E. Apply single layer of insulation to produce thickness indicated, unless multiple layers are otherwise shown or required to make up total thickness.

3.2 INSTALLATION OF GENERAL BUILDING INSULATION

A. Apply insulation units to substrates, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Install mineral-fiber blankets in cavities formed by framing members according to the following requirements:

1. Use blanket widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill cavity, provide lengths that will produce a snug fit between ends.
2. Place blankets in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. For metal-framed wall cavities, support un-faced blankets mechanically with spindle-and-washer type anchors; additionally, use poultry mesh or wire strands if, in Architect’s judgment, this is required to hold insulation firmly in place.
4. At roofs, hold insulation in place with poultry mesh securely anchored to building structure with wire strands, providing complete coverage of the insulation.

C. Stuff glass-fiber blanket insulation into miscellaneous voids and cavity spaces where shown. Compact to approximately 40 percent of normal maximum volume equaling a density of approximately 2.5 lb/cu. ft.

3.3 INSTALLATION OF CAVITY WALL AND MASONRY CELL INSULATION

A. On units of Polyisocyanurate Board Insulation and Polystyrene Board Insulation, install small pads of adhesive spaced approximately 24 inches o.c. both ways on inside face, as recommended by manufacturer. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

3.4 PROTECTION

A. Protect installed insulation and vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes. Provide temporary coverings or enclosures where insulation

is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 07210

SECTION 07412 - METAL WALL PANELS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Factory-formed and field-assembled, lap-seam metal wall panels for interior installation.

B. Coordinate the requirements of this Section with those of other sections that interface with Metal Wall Panels.

1.3 DEFINITION

A. Metal Wall Panel Assembly: Metal wall panels, attachment system components, miscellaneous metal framing, thermal insulation, and accessories necessary for a complete weathertight system.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide metal wall panel assemblies that comply with performance requirements specified

B. Water Penetration: No water penetration.

C. Structural Performance: Provide metal wall panel assemblies capable of withstanding the effects of gravity loads and the following loads and stresses.

1. Wind Loads: Determine loads based on applicable building code or the International Building Code latest edition, whichever is more stringent.

D. Thermal Movements: Provide metal wall panel assemblies that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.5 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of metal wall panel and accessory.

B. Shop Drawings: Show fabrication and installation layouts of metal wall panels; details of edge conditions, joints, panel profiles, corners, anchorages, attachment system, trim, flashings, closures, and accessories; and special details. Distinguish between factory- and field-assembled work.

C. Samples: For each type of metal wall panel indicated with factory-applied color finishes.

D. Maintenance Data: For metal wall panels to include in maintenance manuals.

E. Warranties: Special warranties specified in this Section.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, unload and store components, sheets, metal wall panels, and other manufactured items so as not to be damaged or deformed. Package metal wall panels for protection during transportation and handling.

1.7 COORDINATION

A. Coordinate metal wall panel assemblies with rain drainage work, flashing, trim, and construction of studs, soffits, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.8 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of metal wall panel assemblies that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures, including rupturing, cracking, or puncturing.
b. Deterioration of metals, metal finishes, and other materials beyond normal weathering.

2. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Basis-of-Design Products: The design for each metal wall panel specified is based on the product named. Subject to compliance with requirements, provide either the named product or a comparable product by one of the other manufacturers specified, with architect's approval.

B. Acceptable Manufacturers:

1. Berridge Manufacturing Co.
2. MBCI.
3. AEP-Span.

2.2 PANEL MATERIALS

A. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 coating designation; structural quality, 24 gauge.
2. Surface: Smooth, flat finish.
3. Exposed Finishes: Apply the following coil coating.

a. Fluoropolymer Three-Coat System: Manufacturer's standard three-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight, with a minimum total dry film thickness of 1.5 mil; complying with physical properties and coating performance requirements of AAMA 2605.

4. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil.

B. Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch wide and 1/8 inch thick.
2. Joint Sealant: ASTM C 920; elastomeric polyurethane, polysulfide, or silicone sealant; of type, grade, class, and use classifications required to seal joints in metal wall panels and remain weathertight; and as recommended in writing by metal wall panel manufacturer.

3. Butyl-Rubber-Based, Solvent-Release Sealant: ASTM C 1311.

2.3 MISCELLANEOUS METAL FRAMING

A. Steel Sheet Components, General: Complying with ASTM C 645 requirements for metal and with manufacturer's standard corrosion-resistant zinc coating.

B. Base or Sill Angles or Channels: 0.079-inch bare steel thickness, cold-formed, galvanized steel sheet.

C. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base Metal Thickness: 0.0179 inch.
2. Depth: 1-1/2 inches.

D. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.4 MISCELLANEOUS MATERIALS

A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads and as recommended by manufacturer. Where specified, provide exposed fasteners with heads matching color of metal wall panels by means of plastic caps or factory-applied coating.

1. Fasteners for Wall Panels: Self-drilling or self-tapping, zinc-plated, hex-head carbon-steel screws, with a stainless-steel cap or zinc-aluminum-alloy head and EPDM or neoprene sealing washer.
2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws with hex washer head.
3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.

B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.5 EXPOSED-FASTENER, LAP-SEAM METAL WALL PANELS

A. General: Provide factory-formed metal wall panels designed to be field assembled by lapping side edges of adjacent panels and mechanically attaching panels to supports using exposed fasteners in side laps. Include accessories required for weathertight installation.

B. Exposed-Fastener Metal Wall Panels formed with raised, major ribs and intermediate stiffening ribs symmetrically spaced between major ribs.

1. Basis-of-Design Product: MBCI PBU panel or a comparable product by one of the Acceptable Manufacturers.

2. Major-Rib Spacing: 6 inches o.c.
3. Panel Coverage: 36 inches.
4. Panel Height: 0.75 inch.

2.6 METAL SOFFIT PANELS – refer to Division 7 “Metal Roof Panels”

2.7 ACCESSORIES

A. Wall Panel Accessories: Provide components recommended by manufacturer and required for a complete metal wall panel assembly including trim, copings, fasciae, mullions, sills, corner units, clips, flashings, sealants, gaskets, fillers, closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.

B. Flashing and Trim: Formed from 0.0179-inch- thick, zinc-coated (galvanized) steel sheet or aluminum-zinc alloy-coated steel sheet prepainted with coil coating. Provide flashing and trim as required to seal against weather and to provide finished appearance. Locations include, but are not limited to, bases, drips, sills, jambs, corners, endwalls, framed openings, rakes, fasciae, parapet caps, soffits, reveals, and fillers. Finish flashing and trim with same finish system as adjacent metal wall panels.

2.8 FABRICATION

A. General: Fabricate and finish metal wall panels and accessories at the factory to greatest extent possible, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements demonstrated by laboratory testing. Comply with indicated profiles and with dimensional and structural requirements.

B. Fabricate metal wall panels in a manner that eliminates condensation on interior side of panel and with joints between panels designed to form weathertight seals.

C. Fabricate metal wall panel joints with factory-installed captive gaskets or separator strips that provide a tight seal and prevent metal-to-metal contact, in a manner that will minimize noise from movements within panel assembly.

D. Sheet Metal Accessories: Fabricate flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to the design, dimensions, metal, and other characteristics of item indicated.

2.9 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, rough-ins, and conditions, with Installer present, for compliance with requirements for installation tolerances, metal wall panel supports, and other conditions affecting performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Install flashings, fasciae and copings and other sheet metal to comply with requirements specified in Division 7 Section "Sheet Metal Flashing and Trim."

B. Miscellaneous Framing: Install miscellaneous wall panel support members and anchorage according to ASTM C 754 and metal wall panel manufacturer's written recommendations.

3.3 METAL WALL PANEL INSTALLATION, GENERAL

A. General: Install metal wall panels in orientation, sizes, and locations indicated on Drawings. Install panels perpendicular to furring members or other miscellaneous framing, unless otherwise indicated. Anchor metal wall panels and other components of the Work securely in place, with provisions for thermal and structural movement.

1. Provide wall panels in single piece for the full length of wall surface, except where not possible and approved by Architect.

2. Provide weatherproof escutcheons for pipe, conduit and other items penetrating exterior walls.

B. Fasteners:

1. Steel Wall Panels: Use stainless-steel fasteners for surfaces exposed to the exterior and galvanized steel fasteners for surfaces exposed to the interior.

C. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by metal wall panel manufacturer.

D. Joint Sealers: Install gaskets, joint fillers, and sealants where indicated and where required for weatherproof performance of metal wall panel assemblies. Provide types of gaskets, fillers, and sealants recommended by metal wall panel manufacturer.

1. Seal metal wall panel end laps with double beads of tape or sealant, full width of panel. Seal side joints where recommended by metal wall panel manufacturer.

2. Prepare joints and apply sealants to comply with requirements in Division 7 Section "Joint Sealants."

3.4 FIELD-ASSEMBLED METAL WALL PANEL INSTALLATION

A. Furring Channels: Attach to wall framing with fasteners.

B. Lap-Seams: Fasten metal wall panels to supports with fasteners at each lapped joint at location and spacing recommended by manufacture. Apply panels and associated items for neat and weathertight enclosure.

1. Provide metal-backed washers under heads of exposed fasteners bearing on weather side of metal wall panels.
2. Locate and space exposed fasteners in uniform vertical and horizontal alignment.
3. Provide sealant tape at lapped joints of metal wall panels and between panels and protruding equipment, vents, and accessories.
4. Apply a continuous ribbon of sealant tape to weather-side surface of fastenings on end laps, and on side laps of nesting-type panels; on side laps of corrugated nesting-type, ribbed, or fluted panels; and elsewhere as needed to make panels weatherproof to driving rains.
5. At panel splices, nest panels with minimum 6-inch end lap, sealed with butyl-rubber sealant and fastened together by interlocking clamping plates.

C. Fascia Panels: Align bottom of panels and fasten with blind rivets, bolts, or self-tapping screws. Flash and seal panels with weather closures where fasciae meet soffits, along lower panel edges, and at perimeter of all openings.

3.5 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 wall panel assembly including trim, copings, corners, seam covers, flashings, sealants, gaskets, fillers, closure strips, and similar items.

B. Flashing and Trim: Comply with performance requirements, manufacturer's written installation instructions, and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners.

3.6 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align metal wall panel units within installed tolerance of 1/4 inch in 20 feet, nonaccumulative, on level, plumb, and location lines as indicated and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING AND PROTECTION

A. Remove temporary protective coverings and strippable films, as metal wall panels are installed, unless otherwise indicated in manufacturer's written installation instructions. On completion of metal wall panel installation, clean finished surfaces as recommended by metal wall panel manufacturer.

B. After metal wall panel installation, clear weep holes and drainage channels of obstructions, dirt, and sealant.

C. Replace metal wall panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07412

SECTION 07920 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes joint sealants for the following applications:

1. Exterior joints in vertical surfaces and horizontal nontraffic surfaces as indicated.
2. Interior joints in vertical surfaces and horizontal nontraffic surfaces as indicated.

B. Coordinate the requirements of this Section with those of other sections that interface with Joint Sealants.

1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

B. Provide joint sealants for certain interior applications that establish and maintain water-resistant continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.

C. Warranties: Special warranties specified in this Section.

D. Manufacturer’s descriptive literature including surface preparation and installation instructions.

1.5 PROJECT 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.
2. When joint substrates are wet.

3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. When contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.6 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products: Subject to compliance with requirements, provide one of the products listed in other Part 2 articles.

2.2 MATERIALS, 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 sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range (more than one color may be required for each type of sealant).

C. Elastomeric Joint Sealants: Comply with ASTM C 920. Where elastomeric sealants applied to porous substrates such as stone or masonry are specified to be nonstaining, provide products that have undergone testing according to ASTM C 1248 and have not stained substrates indicated for Project.

2.3 JOINT SEALANTS

A. Single-Component, Ultra-Low Modulus Silicone Sealant:

1. Products:

a. Dowsil; 790.

b. GE Silpruf SCS2000.
c. Equal if approved in advance by Architect.

2. Usage: Brick and masonry expansion joints; concrete wall panel joints; plaster expansion joints.

B. Single-Component, Medium Modulus Silicone Sealant:

1. Products:

a. Dowsil; 795.
b. Equal if approved in advance by Architect.

2. Usage: Joints between perimeter of metal window/door systems and adjacent materials. Joints between framing sections in storefront and curtainwall systems.

C. Single-Component Mildew-Resistant Neutral-Curing Silicone Sealant:

1. Products:

a. Pecora Corporation; 898.
b. Tremco; Tremsil 600 White.
c. Equal if approved in advance by Architect.

2. Usage: Interior side of joints around perimeter of windows; “wet” interior areas such as toilet and bath rooms.

D. Non-Curing Butyl Sealant:

1. Products:

a. Tremco Curtainwall Sealant.
b. Pecora BA-98.
c. Equal if approved in advance by Architect.

2. Usage: Concealed uses at window systems and doors, in particular at sills.

E. Latex Sealant: Comply with ASTM C 834, Type OP, Grade NF.

1. Usage: Interior “dry” uses other than those for which single-component mildew-resistant neutral-curing silicone is used. Provide at joints between countertops and backsplashes and backsplashes and wallboard, at joints between dissimilar finish materials such as gypsum board and concrete or concrete masonry, and at all other locations as required to provide a complete, finished look on the building interiors.

F. Acoustical Sealant for Exposed and Concealed Joints: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Flame-spread and smoke-developed indexes of less than 25 per ASTM E 84 where required by codes.

1. Usage: Where indicated.

2.4 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings (“Backer Rod”): ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Oversize 30% to 50%.

C. Bond-Breaker Tape: Polyethylene self-adhesive 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 where such adhesion would result in sealant failure.

2.5 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.

2.6 PENETRATING SEALER

A. Clear, aqueous mixture of modified Silicates that does not alter bondability of concrete for application of all flooring materials and surface coatings.

B. Products

1. “Deep-Seal” as manufactured by VanHearron Inc., 410 South Coker Street, Greenwood, AR 72936. Phone: (479) 255-6101.
2. Equal if approved in advance by Architect.

C. Usage:

1. Where storefront or curtainwall sill rests on floor slab, coat face of grade beam down 24 inches from sill, and coat slab in 12 inches from face of building. Extend coating full width of window and 12 inches beyond each jamb.
2. On other concrete and masonry surfaces where indicated.

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 joint-sealant performance.

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. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant.

B. Joint Priming: Prime joint substrates. 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.

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. Acoustical Sealant Application Standard: Comply with recommendations in ASTM C 919 for use of joint sealants in acoustical applications as applicable to materials, applications, and conditions indicated.

D. Install sealant backings of type 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.

E. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

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.

END OF SECTION 07920

SECTION 08111 - STEEL DOORS AND FRAMES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Hollow-metal steel frames.
2. Hollow-metal steel doors

B. Coordinate the requirements of this Section with those of other sections that interface with Steel Doors & Frames.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, core descriptions, label compliance, fire-resistance rating**,** and finishes for each type of steel door and frame specified.

B. Shop Drawings (manufacturer's published details will suffice in lieu of shop drawings, provided that the same information is shown): In addition to requirements below, provide a schedule of steel doors and frames using same reference numbers for details and openings as those on Drawings:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details.
3. Frame details for each frame type, including dimensioned profiles.
4. Details and locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, accessories, joints, and connections.
7. Details of glazing frames and stops showing glazing.
8. Details of conduit and preparations for electrified door hardware and controls, if applicable.

C. Product Test Reports: Based on evaluation of comprehensive fire tests performed by a qualified testing agency, for each type of steel door and frame.

1.4 QUALITY ASSURANCE

A. Fire-Rated Door Sidelight and/or Transom 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.

B. 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 or UL 9. Label each individual glazed lite.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver doors and frames palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify openings by field measurements before fabrication and indicate measurements on Shop Drawings.

1.7 COORDINATION

A. Coordinate installation of anchorages for steel frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Amweld Building Products, LLC.
2. Ceco Door Products; an ASSA ABLOY Group Company.
3. Republic Builders Products Company.
4. Steelcraft; an Ingersoll-Rand Company.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum A40 zinc-iron-alloy (galvannealed) coating designation.

D. Electrolytic Zinc-Coated Steel Sheet (for supports and anchors of frames): ASTM A 591/A 591M, Commercial Steel (CS), Class B coating; mill phosphatized.

E. Supports and Anchors: After fabricating, galvanize units to be built into exterior walls according to ASTM A 153/A 153M, Class B.

F. Inserts, Bolts, and Fasteners: Provide items to be built into exterior walls, hot-dip galvanized according to ASTM A 153/A 153M.

G. Grout: Comply with ASTM C 476, with a slump of 4 inches for steel door frames built into concrete or masonry, as measured according to ASTM C 143/C 143M.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. density; with maximum flame-spread and smoke-developed indexes of 25 and 50 respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in Division 8 Section "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 STEEL (HOLLOW METAL) DOORS

A. General: Provide 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 A250.8.

1. Design: Flush panel.

2. Core Construction: As required to meet the below R-values, manufacturer's polystyrene, polyurethane, kraft-paper honeycomb, mineral-board, or vertical steel-stiffener core that produces doors complying with ANSI A250.8.

a. Fire Door Core: As required to provide fire-protection ratings indicated.

b. Thermal-Rated (Insulated) Doors: On exterior doors, provide doors fabricated with thermal-resistance value (R-value) of not less than **2.2** when tested according to ASTM C 1363 (not less than **6** when tested according to ASTM C 518).

3. Vertical Edges: Square edge unless beveled edge is indicated.

4. Top and Bottom Edges: Closed with flush or inverted 18 Gauge (0.042-inch minimum) thick end closures or channels of same material as face sheets.

5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Steel Doors and Frames."

B. Interior Doors: Face sheets fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior door requirements. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:

1. Level 2 and Physical Performance Level B (Heavy Duty), 18 Gauge, Model 1 (Full Flush).

C. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI A250.8 for level and model and ANSI A250.4 for physical-endurance level:

1. Level 3 and Physical Performance Level A (Extra Heavy Duty), 16 Gauge, Model 1 (Full Flush).

D. Hardware Reinforcement: Fabricate reinforcement plates from same material as door face sheets. Coordinate with hardware supplier.

E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STEEL (HOLLOW METAL) FRAMES

A. General: Comply with ANSI A250.8 and with details indicated for type and profile.

B. Interior Frames: Fabricated from cold-rolled steel sheet, unless otherwise indicated to comply with exterior frame requirements.

1. Fabricate frames with mitered and welded face corners with exposed welds ground flush and smooth.
2. Fabricate knocked-down frames with mitered or coped corners, for field assembly.
3. Fabricate knocked-down, drywall slip-on frames for in-place gypsum board partitions.
4. Frames for Level 2 Steel Doors: 16 Gauge (0.053-inch minimum) thick steel sheet.
5. Frames for Wood Doors: 16 Gauge (0.053-inch minimum) thick steel sheet.
6. Frames for Borrowed Lights: 18 Gauge (0.042-inch minimum) thick steel sheet**,** unless otherwise indicated or required for fire rating.

C. Exterior Frames: Fabricated from metallic-coated steel sheet.

1. Fabricate frames with mitered and welded face corners with exposed welds ground flush and smooth.
2. Frames for Level 3 Steel Doors: 14 Gauge (0.067-inch minimum) thick steel sheet.

D. Hardware Reinforcement: Fabricate reinforcement plates from same material as frames. Coordinate with hardware provider.

E. Supports and Anchors: Fabricated from electrolytic zinc-coated or metallic-coated steel sheet.

F. Jamb Anchors:

1. Stud-Wall Type: Designed to engage stud, welded to back of frames; 18 Gauge (0.042-inch minimum) thick.
2. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, 18 Gauge (0.042-inch minimum) thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors; 7 Gauge (0.177-inch minimum) thick.
3. Compression Type for Slip-on Frames: Adjustable compression anchors.
4. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch-diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

G. Floor Anchors: Formed from same material as frames, 18 Gauge (0.042-inch minimum) thick, and as follows:

1. Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.

H. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.5 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: 20 Gauge (0.032-inch minimum) thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with steel frames, minimum 5/8 inch high, unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: 20 Gauge (0.032-inch minimum) thick, fabricated from same material as frames in which they are installed.

2.6 FABRICATION

A. General: Fabricate steel doors and frames 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. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Steel Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
2. Glazed Lites: Factory cut openings in doors.

C. Steel Frames:

1. 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.

3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners, unless otherwise indicated.

4. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.

5. Jamb Anchors: Provide number and spacing of anchors as follows:

   a. 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) Three anchors per jamb up to 60 inches in height.
      2) Four anchors per jamb from 60 to 90 inches in height.
      3) Five anchors per jamb from 90 to 96 inches in height.
      4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 96 inches in height.
      5) Two anchors per head for frames more than 42 inches wide and mounted in metal-stud partitions.

   b. 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) Two anchors per jamb up to 60 inches in height.
      2) Three anchors per jamb from 60 to 90 inches in height.
      3) Four anchors per jamb from 90 to 120 inches in height.
      4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof more than 120 inches in height.

   c. Compression Type: Not less than two anchors in each jamb.

   d. Postinstalled Expansion Type: Locate anchors not more than 6 inches from top and bottom of frame. Space anchors not more than 26 inches o.c.

6. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Provide plastic plugs to keep holes clear during construction.

   a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
   b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

D. Hardware Preparation: Factory prepare steel doors and frames to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping, according to the Door Hardware Schedule and templates furnished as specified in Division 8 Section "Door Hardware."

1. Reinforce doors and frames to receive nontemplated mortised and surface-mounted door hardware.
2. Comply with applicable requirements in ANSI A250.6 and ANSI/DHI A115 Series specifications for door and frame preparation for hardware. Locate hardware as indicated on Shop Drawings or, if not indicated, according to ANSI A250.8.

E. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of door or frame.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings such that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of doors and frames.
5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.7 STEEL FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Finish steel door and frames after assembly.

B. Metallic-Coated Steel Surface Preparation: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

1. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

C. Steel Surface Preparation: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning"; remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel; comply with SSPC-SP 3, "Power Tool Cleaning," or SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."

D. Factory Priming for Field-Painted Finish: Apply shop primer specified below immediately after surface preparation and pretreatment. Apply a smooth coat of even consistency to provide a uniform dry film thickness of not less than 0.7 mils.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied finish paint system indicated; and providing a sound foundation for field-applied topcoats despite prolonged exposure.

PART 3 - EXECUTION

3.1 PREPARATION

A. Prior to installation and with installation spreaders in place, adjust and securely brace steel door frames for squareness, alignment, twist, and plumb to the following tolerances:

B. Drill and tap doors and frames to receive non-templated mortised and surface-mounted door hardware.

3.2 INSTALLATION

A. General: Provide doors and frames of sizes, thicknesses, and designs indicated. Install steel doors and frames plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Steel Frames: Install steel frames for doors, sidelights, transoms, borrowed lights and other openings, of size and profile indicated. Comply with SDI 105.

1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

a. Remove temporary braces necessary for installation only after frames have been properly set and secured.
b. At fire-protection-rated openings, install frames according to NFPA 80.
c. Install frames with removable glazing stops located on secure side of opening.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor and secure with postinstalled expansion anchors.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.

C. Steel Doors: Fit hollow-metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated 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. Glazing: Comply with installation requirements in Division 8 Section "Glazing" and with steel door and frame manufacturer's written instructions.

1. Secure stops with countersunk flat- or oval-head machine screws spaced uniformly not more than 9 inches o.c., and not more than 2 inches o.c. from each corner.

3.3 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 steel doors or frames that are warped, bowed, or otherwise unacceptable.

B. Clean grout and other bonding material off steel doors and frames immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.

D. Galvannealed Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 08111

SECTION 08331 - OVERHEAD COILING DOORS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Electric-motor operated Overhead Coiling Insulated Doors.

B. Coordinate the requirements of this Section with those of other sections that interface with electric operated Overhead Coiling Doors.

C. See Division 05 Section “Metal Fabrications” for miscellaneous steel supports.

D. See Division 26 Sections for electrical service and connections for powered operators and accessories.

1.3 WORK INCLUDED

A. Specify all labor and material required to furnish and install manually operated and electric motor operated overhead coiling doors, related guides and hardware.

1.4 DEFINITIONS

A. Operation Cycle: One cycle of a door is complete when it is moved from the closed position to the fully open position and returned to the closed position.

1.5 PERFORMANCE REQUIREMENTS

A. Operation-Cycle Requirements: Provide overhead coiling door components and operators capable of operating for not less than 50,000 cycles.

1.6 SUBMITTALS

A. Product Data: For each type and size of overhead coiling door and accessory. Include the following:

1. Summary of forces and loads on walls and jambs.

2. Provide pertinent dimensioning, component connections and details, anchorage methods and installation details.

B. Shop Drawings: For special components and installations not dimensioned or detailed in manufacturer's product data.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for both installation and maintenance of units required for this Project.

B. Single-Source Responsibility: Provide doors, tracks, motors, and accessories from one manufacturer for each type of door. Provide secondary components from source acceptable to manufacturer of primary components.

C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer: Subject to compliance with requirements, provide products by one of the following:

1. Atlas Door.
2. The Cookson Company.
3. Cornell Iron Works, Inc.
4. Overhead Door Corporation.
5. Wayne Dalton Corp.

B. Basis of Design: Cornell Thermiser Max Mode ESD30.

2.2 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Finish: Galvanized steel, prime painted, field applied paint, baked-on polyster top coat, stainless steel, or aluminum with anodized finish as appropriate.

B. Door Curtains: Fabricate overhead coiling door curtain of polyurethane insulated interlocking slats, designed to withstand 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. Steel Door Curtain Slats: Zinc-coated (galvanized), cold-rolled structural steel (SS) sheet, complying with ASTM A 653/A653M, G90 (Z275) coating designation.

a. Minimum Base-Metal (Uncoated) Thickness: 22 gauge.

b. Flat profile slats.

C. Bottom Bar: Consisting of 2 angles, each not less than Manufacturer's standard; galvanized, stainless-steel, or aluminum extrusions to suit type of curtain slats.

D. Curtain Jamb Guides: Fabricate curtain jamb guides of steel angles or channels and angles, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Build up units with not less than 3/16-inc- thick galvanized steel sections complying with ASTM A 36/A36M and STM A123/A123M. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel or curtain. Attach to jambs with 3/8" bolts, max 24" spacing, face mount at jambs.

E. Hood: Galvanized steel or aluminum as appropriate.

F. Weatherseals: Vinyl bottom seal and guide weatherseal.

G. Locking: Slide bolts on bottom bar at jambs, cylinder locks for electric operation with interlock switches, or mortise key cylinders as appropriate.

1. Provide safety interlock switch to disengage power supply when door is locked.

H. Counterbalancing Mechanism: Counter balance by means of a Helical torsion spring type housed in a steel tube or pipe barrel sized for curtain area. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

I. Brackets: Minimum 3/16" thick steel plates bolted to guides for mounting curtain and barrel assembly. Fit drive side bracket with sealed ball bearing.

2.3 ELECTRIC DOOR OPERATORS

A. General: Provide electric door operator assembly of size and capacity recommended and provided by door manufacturer.

B. Size the motor for the weight load of the doors, minimum 1/3 HP.

C. Include push button switch for door operators.

D. Include auxiliary chain for manual operation in case of motor/power failure.

2.4 FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Galvanized Steel Finish: Manufacturer's standard baked-on polyester top coat.

1. Color: Color to be selected from manufacturer's full range.

C. Factory Primer for Field Finish: Manufacturer's standard primer.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Install coiling doors and operating equipment complete with necessary hardware, jamb and head molding strips, anchors, inserts, hangers, and equipment supports in accordance with Manufacturer's standard.

B. Fit, align, and adjust door assembly level and plumb, adjust for smooth operation.

C. Lubricate bearings and sliding parts; adjust doors to operate easily, free of warp, twist, or distortion and with tight fit around entire perimeter.

3.2 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 08331

SECTION 08411 - ALUMINUM-FRAMED ENTRANCES, STOREFRONTS AND WINDOWS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Exterior and interior aluminum-framed storefronts and windows.

a. Glazing is retained mechanically with gaskets on four sides.

2. Exterior and interior manual-swing aluminum doors.

B. Coordinate the requirements of this Section with those of other sections that interface with Aluminum Framed Entrances, Storefronts, and Windows.

1.3 PERFORMANCE REQUIREMENTS

A. General: Provide aluminum-framed systems, including anchorage, capable of withstanding, without failure, the effects of the following:

1. Structural loads.
2. Thermal movements.
3. Movements of supporting structure indicated on Drawings including, but not limited to, story drift and deflection from uniformly distributed and concentrated live loads.
4. Dimensional tolerances of building frame and other adjacent construction.
5. Wind loads per International Building Code, latest edition, including amendments adopted by local governing authorities, but no less than 20 lbs. per sq. ft.

B. Deflection of Framing Members:

1. Deflection Normal to Wall Plane: Limited to 1/175 of clear span for spans up to 13 feet 6 inches and to 1/240 of clear span plus 1/4 inch for spans greater than 13 feet 6 inches.
2. Deflection Parallel to Glazing Plane: Limited to 1/360 of clear span or 1/8 inch, whichever is smaller.

C. Structural-Test Performance: Provide aluminum-framed systems that conform to ASTM E 330 as follows:

1. When tested at positive and negative wind-load design pressures, systems do not evidence deflection exceeding specified limits.

2. When tested at 150 percent of positive and negative wind-load design pressures, systems, including anchorage, do not evidence material failures, structural distress, and permanent deformation of main framing members exceeding 0.2 percent of span.
3. Test Durations: As required by design wind velocity but not less than 10 seconds.

D. Thermal Movements: Provide aluminum-framed systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

E. Air Infiltration: Provide aluminum-framed systems with maximum air leakage through fixed glazing and framing areas of 0.06 cfm/sq. ft. of fixed wall area when tested according to ASTM E 283 at a minimum static-air-pressure difference of 8.0 lbs/sq. ft.

F. Water Penetration: Provide aluminum-framed systems that do not evidence water penetration through fixed glazing and framing areas when tested according to ASTM E 331 at a minimum static or dynamic air-pressure difference of 8.0 lbs. per square foot.

G. Condensation Resistance: Provide aluminum-framed systems with fixed glazing and framing areas having condensation-resistance factor (CRF) of not less than 45 tested according to AAMA 1503.

1.4 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of product indicated.

B. Certified Test Results: Provide certified test results from a nationally recognized testing agency that the system meets the Performance Requirements specified in Part 1 Article “Performance Requirements” above.

C. Shop Drawings: For aluminum-framed systems. Include plans, elevations, sections, details, and attachments to other work.

1. Include details of provisions for system expansion and contraction and for draining moisture occurring within the system to the exterior.
2. For entrances, include hardware schedule and indicate operating hardware types, functions, quantities, and locations.

D. Structural Analysis Data: Include structural analysis data and shop drawings related to system anchorage that are signed and sealed by the Professional Engineer registered in the state of Texas who is responsible for their preparation. Engineer shall also provide structural analysis data, signed and sealed, for system Performance Requirements that are not certified by manufacturer.

E. Maintenance Data: For aluminum-framed systems to include in maintenance manuals.

F. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Capable of meeting requirements of this Section and who is acceptable to manufacturer.

B. Accessible Entrances: Comply with Texas Accessibility Standards (“TAS”).

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of structural supports for aluminum-framed systems by field measurements before fabrication and indicate measurements on Shop Drawings. Ensure adequacy of proper joint widths between system and adjoining building components.

1.7 WARRANTY

A. Special Assembly Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of aluminum-framed systems that do not comply with requirements or that deteriorate as defined in this Section within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures including, but not limited to, excessive deflection.
b. Deterioration of metals and other materials beyond normal weathering.
c. Water leakage through fixed glazing and framing areas.
d. Failure of operating components.

2. Warranty Period: Five years from date of Substantial Completion.

B. Special Finish Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components on which finishes fail within specified warranty period. Warranty does not include normal weathering.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: The design for aluminum-framed systems is based on the following system:

1. Storefront:

a. Kawneer Tri-Fab 451 with High Performance sill flashing.

2. Windows:

a. Kawneer Tri-Fab 451 with High Performance sill flashing.

3. Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

a. Atlas Industries.
b. Arch Aluminum & Glass, manufacturers of Amarlite
c. Oldcastle
d. Pittco Architectural Metals, Inc.
e. Tubelite, Inc.

NOTE: Products by U.S. Aluminum are **not permitted** on the Project.

NOTE: Products by YKK AP America Inc. are **not permitted** for the Project.

2.2 MATERIALS

A. Aluminum: Alloy and temper recommended by manufacturer for type of use and finish indicated.

1. Sheet and Plate: ASTM B 209.
2. Extruded Bars, Rods, Profiles, and Tubes: ASTM B 221.
3. Extruded Structural Pipe and Tubes: ASTM B 429.
4. Structural Profiles: ASTM B 308/B 308M.

B. Steel Reinforcement: With manufacturer's standard corrosion-resistant primer complying with SSPC-PS Guide No. 12.00 applied immediately after surface preparation and pretreatment. Select surface preparation methods according to recommendations in SSPC-SP COM and prepare surfaces according to applicable SSPC standard. Provide wherever required to meet Performance Standards cited above.

1. Structural Shapes, Plates, and Bars: ASTM A 36.
2. Cold-Rolled Sheet and Strip: ASTM A 1008.
3. Hot-Rolled Sheet and Strip: ASTM A 1011.

2.3 FRAMING SYSTEMS

A. Framing Members: Manufacturer's standard extruded-aluminum framing members of thickness required and reinforced as required to support imposed loads.

B. Brackets and Reinforcements: Manufacturer's standard high-strength aluminum with nonstaining, nonferrous shims for aligning system components.

C. Fasteners and Accessories: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding fasteners and accessories compatible with adjacent materials.

D. Flashing: Manufacturer's standard corrosion-resistant, nonstaining, nonbleeding flashing compatible with adjacent materials. Form exposed flashing from sheet aluminum finished to match framing. Use for end dams at sills.

E. Framing System Gaskets and Sealants: Manufacturer's standard recommended by manufacturer for joint type.

2.4 GLAZING SYSTEMS

A. Glazing: As specified in Division 8 Section "Glazing."

B. Glazing Gaskets: Manufacturer's standard compression types, replaceable, molded or extruded, that maintain uniform pressure and watertight seal, as specified in Division 8 Section "Glazing."

C. Spacers and Setting Blocks: Manufacturer's standard elastomeric types.

2.5 ACCESSORY MATERIALS

A. Bituminous Paint: Cold-applied asphalt-mastic paint complying with SSPC-Paint 12 requirements except containing no asbestos, formulated for 30-mil thickness per coat.

2.6 FABRICATION

A. Framing Members, General: Fabricate components that, when assembled, have the following characteristics:

1. Profiles which are sharp, straight, and free of defects or deformations.
2. Accurately fitted hairline joints with ends coped or mitered.
3. Means to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.
4. Physical and thermal isolation of glazing from framing members.
5. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.
6. Provisions for field replacement of glazing from exterior.
7. Fasteners, anchors, and connection devices that are concealed from view to greatest extent possible.

B. Door Frames: Reinforce as required to support loads imposed by door operation and for installing hardware.

C. Doors: Reinforce doors as required for installing hardware.

D. Hardware Installation: Factory installed hardware to the greatest extent possible.

2.7 ALUMINUM FINISHES

A. General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Class II, Clear Anodic Finish: AA-M12C22A31 (Mechanical Finish: nonspecular as fabricated; Chemical Finish: etched, medium matte; Anodic Coating: Architectural Class II, clear coating 0.010 mm or thicker) complying with AAMA 611.

C. Baked-Enamel Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Apply baked enamel complying with paint manufacturer's written instructions for cleaning, conversion coating, and painting.

1. Organic Coating: Thermosetting, modified-acrylic enamel primer/topcoat system complying with AAMA 2603 except with a minimum dry film thickness of 1.5 mils, medium gloss.

a. Color: To match exterior finish.

b. Use in interior locations only.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General:

1. Examine areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.
2. Comply with manufacturer's written instructions.
3. Do not install damaged components.
4. Fit joints to produce hairline joints free of burrs and distortion.
5. Rigidly secure nonmovement joints.
6. Install anchors with separators and isolators to prevent metal corrosion and electrolytic deterioration.
7. Seal joints watertight, unless otherwise indicated.

B. Erection Tolerances: Install aluminum-framed systems to comply with the following maximum tolerances:

1. Limit variation from true location and plane to 1/8 inch in 12 feet; 1/4 inch over total length.
2. Alignment:

a. Where surfaces abut in line, limit offset from true alignment to 1/16 inch.
b. Where surfaces meet at corners, limit offset from true alignment to 1/32 inch.

C. Metal Protection:

1. Where aluminum will contact dissimilar metals, protect against galvanic action by painting contact surfaces with primer or by applying sealant or tape or installing nonconductive spacers as recommended by manufacturer for this purpose.
2. Where aluminum will contact concrete or masonry, protect against corrosion by painting contact surfaces with bituminous paint.

D. Install components to drain water passing joints, condensation occurring within framing members, and moisture migrating within the system to exterior.

E. Install components plumb and true in alignment with established lines and grades, without warp or rack.

F. Install glazing as specified in Division 8 Section "Glazing."

G. Install perimeter joint sealants as specified in Division 7 Section "Joint Sealants" and to produce weathertight installation.

END OF SECTION 08411

SECTION 08561 – ALUMINUM INTERIOR SLIDING SERVICE WINDOW

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:

A. Aluminum interior sliding service window with 1/4" clear tempered safety glazing located between Maintenance Bays and Office.

B. Related Sections:

A. Division 01: Administrative, procedural, and temporary work requirements.

1.2 REFERENCES

A. American Welding Society (AWS) D1.6/D1.6M - Structural Welding Code - Stainless Steel.

B. ASTM International (ASTM) A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar.

1.3 SUBMITTALS

A. Product Data: Submit Manufacturer’s technical product data substantiating that products comply.

B. Shop Drawings: Submit for fabrication and installation of windows. Include details, elevations and installation requirement of finish hardware and cleaning.

C. Certification: Provide printed data in sufficient detail to indicate compliance with the contract documents.

D. Closeout Submittals:

A. Maintenance Data: Include instructions for cleaning of glazed panels.

1.4 QUALITY ASSURANCE

A. Transaction Window Assemblies.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver windows created to provide protection during transit and job storage.

B. Inspect windows upon delivery for damage. Unless minor defects can be made to meet the Architect’ specifications and satisfaction, damaged parts should be removed and replaced.

C. Store window assemblies upright in protected, dry area, off ground or floor, with at least 1/4 inch space between individual units.

D. Do not cover with non vented coverings that create excessive humidity.

E. Remove wet coverings immediately.

1.6 PROJECT CONDITIONS

A. Field measurements: Check opening by accurate field measurement before fabrication. Show recorded measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid dela of work.

1.7 WARRANTY

A. All material and workmanship shall be warranted against defects for a period of one (1) year from the original date of purchase.

PART 2 PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide CR Laurence Co. Inc, Protection Manual Service Window or comparable product.

2.2 MATERIALS

A. Frames: Aluminum frame modules shall be constructed of .125” thick 6063-T5 extruded aluminum. Window rolls on top-hung ball bearing rollers. Catch locks included with all interior windows. Overall frame sizes are to be in accordance with the contract drawings.

B. Finish: All aluminum to be clear satin anodized.

C. Glazing: the glazing shall be 1 ¼” Level 3 Lexgard.

D. Configuration: O-X

E. Provide also the following:

A. Stainless steel shelf.
B. Keyed lock.
C. Full bottom track.
D. Surround frame.

2.3 FINISHES

A. Aluminum: clear anodized.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install window in accordance with manufacturer’s printed instructions and recommendations. Repair damaged units as directed or replace with new units.

3.2 CLEANING

A. Clean frame and glazing surfaces after installation, complying with requirements contained in the manufacturer's instructions. Remove excess glazing sealant compounds, dirt or other substances.

3.3 PROTECTION

A. Institute protective measures required throughout the remainder of the construction period to ensure that all the windows do not incur any damage or deterioration, other than normal weathering, at the time of acceptance.

END OF SECTION 08561

SECTION 087100 - DOOR HARDWARE

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Hardware for fire-rated doors.

B. Lock cylinders for doors with balance of hardware specified in other sections.

C. Thresholds.

D. Weatherstripping and gasketing.

1.02 RELATED REQUIREMENTS

A. Section 081113 - Hollow Metal Doors and Frames.

B. Section 081416 - Flush Wood Doors.

C. Section 083323 - Overhead Coiling Doors: Door hardware, except cylinders.

1.03 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. BHMA A156.1 - Standard for Butts and Hinges; 2021.

C. BHMA A156.2 - Bored and Preassembled Locks and Latches; 2022.

D. BHMA A156.3 - Exit Devices; 2020.

E. BHMA A156.4 - Door Controls - Closers; 2019.

F. BHMA A156.5 - Cylinders and Input Devices for Locks; 2020.

G. BHMA A156.6 - Standard for Architectural Door Trim; 2021.

H. BHMA A156.7 - Template Hinge Dimensions; 2016.

I. BHMA A156.16 - Auxiliary Hardware; 2018.

J. BHMA A156.21 - Thresholds; 2019.

K. BHMA A156.22 - Standard for Gasketing; 2021.

L. BHMA A156.28 - Standard for Recommended Practices for Mechanical Keying Systems; 2018.

M. BHMA A156.115 - Hardware Preparation in Steel Doors and Steel Frames; 2016.

N. BHMA A156.115W - Hardware Preparation in Wood Doors with Wood or Steel Frames; 2006.

O. DHI (H&S) - Sequence and Format for the Hardware Schedule; 2019.

P. DHI (KSN) - Keying Systems and Nomenclature; 2019.

Q. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

R. ITS (DIR) - Directory of Listed Products; Current Edition.

S. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2022.

T. NFPA 105 - Standard for Smoke Door Assemblies and Other Opening Protectives; 2022.

U. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

V. UL (DIR) - Online Certifications Directory; Current Edition.

W. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

X. UL 1784 - Standard for Air Leakage Tests of Door Assemblies; Current Edition, Including All Revisions.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the manufacture, fabrication, and installation of products that door hardware is installed on.

B. Sequence installation to ensure facility services connections are achieved in an orderly and expeditious manner.

C. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by affected installers and the following:
   1. Architect.
   2. Installer's Architectural Hardware Consultant (AHC).
   3. Hardware Installer.
   4. Owner's Security Consultant.

D. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.

E. Keying Requirements Meeting:
   1. Attendance Required:
      a. Owner.
      b. Architect.
   2. Agenda:
      a. Establish keying requirements.
      b. Verify locksets and locking hardware are functionally correct for project requirements.
      c. Verify that keying and programming complies with project requirements.
      d. Establish keying submittal schedule and update requirements.
   3. Incorporate "Keying Requirements Meeting" decisions into keying submittal upon review of door hardware keying system.
   4. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Owner, participants, and those affected by decisions made.
   5. Deliver established keying requirements to manufacturers.

1.05 SUBMITTALS

A. See Section 013000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project, and includes construction details, material descriptions, finishes, and dimensions and profiles of individual components.

C. Shop Drawings - Door Hardware Schedule: A detailed listing that includes each item of hardware to be installed on each door.
   1. Prepared by or under supervision of Architectural Hardware Consultant (AHC).
   2. Comply with DHI (H&S) using door numbering scheme and hardware set numbers as indicated in Contract Documents.
      a. Submit in vertical format.
   3. Include complete description for each door listed.

D. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

E. Manufacturer's qualification statement.

F. Installer's qualification statement.

G. Supplier's qualification statement.

H. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.

I. Keying Schedule:
   1. Submit three (3) copies of Keying Schedule in compliance with requirements established during Keying Requirements Meeting unless otherwise indicated.

J. Warranty: Submit manufacturer's warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

K. Project Record Documents: Record actual locations of concealed equipment, services, and conduit.

L. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
   1. See Section 016000 - Product Requirements, for additional provisions.

1.06 QUALITY ASSURANCE

A. Standards for Fire-Rated Doors: Maintain one copy of each referenced standard on site, for use by Architect and Contractor.

B. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified for commercial door hardware with at least three years of documented experience.

D. Supplier Qualifications: Company with certified Architectural Hardware Consultant (AHC) and Electrified Hardware Consultant (EHC) to assist in work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Package hardware items individually; label and identify each package with door opening code to match door hardware schedule.

1.08 WARRANTY

A. See Section 017800 - Closeout Submittals for additional warranty requirements.

B. Manufacturer Warranty: Provide manufacturer warranty against defects in material and workmanship for period indicated, from Date of Substantial Completion. Complete forms in Owner's name and register with manufacturer.
   1. Closers: Five years, minimum.
   2. Exit Devices: Three years, minimum.
   3. Locksets and Cylinders: Three years, minimum.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS

A. Provide specified door hardware as required to make doors fully functional, compliant with applicable codes, and secure to extent indicated.

B. Provide individual items of single type, of same model, and by same manufacturer.

C. Closers:
   1. Provide door closer on each exterior door, unless otherwise indicated.
   2. Provide door closer on each fire-rated and smoke-rated door.
   3. Spring hinges are not an acceptable self-closing device, unless otherwise indicated.

D. Drip Guards: Provide at head of outswinging exterior doors unless protected by roof or canopy directly overhead.

E. Weatherstripping and Gasketing:
   1. Provide weatherstripping on each exterior door at head, jambs, and meeting stiles of door pairs, unless otherwise indicated.
   2. Provide door bottom sweep on each exterior door, unless otherwise indicated.

F. Fasteners:
   1. Provide fasteners of proper type, size, quantity, and finish that comply with commercially recognized standards for proposed applications.
      a. Aluminum fasteners are not permitted.
      b. Provide phillips flat-head screws with heads finished to match door surface hardware unless otherwise indicated.
   2. Provide machine screws for attachment to reinforced hollow metal and aluminum frames.
      a. Self-drilling (Tek) type screws are not permitted.
   3. Provide stainless steel machine screws and lead expansion shields for concrete and masonry substrates.
   4. Provide wall grip inserts for hollow wall construction.
   5. Fire-Resistance-Rated Applications: Comply with NFPA 80.
      a. Provide wood or machine screws for hinges mortised to doors or frames, strike plates to frames, and closers to doors and frames.
      b. Provide steel through bolts for attachment of surface mounted closers, hinges, or exit devices to door panels unless proper door blocking is provided.

2.02 PERFORMANCE REQUIREMENTS

A. Provide door hardware products that comply with the following requirements:
   1. Applicable provisions of federal, state, and local codes.
   2. Accessibility: ADA Standards and ICC A117.1.
   3. Fire-Resistance-Rated Doors: NFPA 80, listed and labeled by qualified testing agency for fire protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
   4. Hardware on Fire-Resistance-Rated Doors: Listed and classified by UL (DIR), ITS (DIR), or testing firm acceptable to authorities having jurisdiction as suitable for application indicated.
   5. Hardware for Smoke and Draft Control Doors: Provide door hardware that complies with local codes, and requirements of assemblies tested in accordance with UL 1784.
   6. Hardware Preparation for Steel Doors and Steel Frames: BHMA A156.115.
   7. Hardware Preparation for Wood Doors with Wood or Steel Frames: BHMA A156.115W.

2.03 HINGES

A. Manufacturers: Conventional butt hinges.
   1. BEST; dormakaba Group: www.bestaccess.com/#sle.

B. Properties:
   1. Butt Hinges: As applicable to each item specified.
      a. Standard Weight Hinges: Minimum of two (2) permanently lubricated non-detachable bearings.
      b. Heavy Weight Hinges: Minimum of four (4) permanently lubricated bearings on heavy weight hinges.
      c. Template screw hole locations.
      d. Bearing assembly installed after plating.

e. Bearings: Exposed fully hardened bearings.
f. Bearing Shells: Shapes consistent with barrels.
g. Pins: Easily seated, non-rising pins.
1) Fully plate hinge pins.
2) Non-Removable Pins: Slotted stainless steel screws.
h. UL 10C listed for fire-resistance-rated doors.

C. Sizes: See Door Hardware Schedule.
1. Hinge Widths: As required to clear surrounding trim.
2. Sufficient size to allow 180 degree swing of door.

D. Finishes: See Door Hardware Schedule.
1. Fully polish hinges; front, back, and barrel.

E. Grades:
1. Butt Hinges: Comply with BHMA A156.1 and BHMA A156.7 for templated hinges.

F. Material: Base metal as indicated for each item by BHMA material and finish designation.

G. Types:
1. Butt Hinges: Include full mortise hinges.

H. Options: As applicable to each item specified.

I. Quantities:
1. Butt Hinges: Three (3) hinges per leaves up to 90 inches (2286 mm) in height. Add one (1) for each additional 30 inches (762 mm) in height or fraction thereof.
a. Hinge weight and size unless otherwise indicated in hardware sets:
1) For doors up to 36 inches (914 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.134 inch (3.4 mm) and a minimum of 4-1/2 inches (114 mm) in height.
2) For doors from 36 inches (914 mm) wide up to 42 inches (1067 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.145 inch (3.7 mm) and a minimum of 4-1/2 inches (114 mm) in height.
3) For doors from 42 inches (1067 mm) wide up to 48 inches (1219 mm) wide and up to 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.
4) For doors greater than 1-3/4 inches (44.5 mm) thick provide hinges with a minimum thickness of 0.180 inch (4.6 mm) and a minimum of 5 inches (127 mm) in height.

J. Applications: At swinging doors.
1. Provide non-removable pins at out-swinging doors with locking hardware and all exterior doors.

K. Products:
1. Butt Hinges:
a. Ball Bearing, Five (5) Knuckle.

2.04 EXIT DEVICES

A. Manufacturers:
1. BEST, dormakaba Group: www.bestaccess.com/#sle.
2. Von Duprin, Allegion Group.

B. Properties:
1. Actuation: Full-length touchpad.

2. Touchpads: 'T" style metal touchpads and rail assemblies with matching chassis covers end caps.
3. Latch Bolts: Stainless steel deadlocking with 3/4 inch (19 mm) projection using latch bolt.
4. Lever Design: Match project standard lockset trims.
5. Cylinder: Include where cylinder dogging or locking trim is indicated.
6. Strike as recommended by manufacturer for application indicated.
7. Sound dampening on touch bar.
8. Dogging:
   a. Non-Fire-Resistance-Rated Devices: 1/4 inch (6 mm) hex key dogging.
   b. Fire-Resistance-Rated Devices: Manual dogging not permitted.
9. Touch bar assembly on wide style exit devices to have a 1/4 inch (6.3 mm) clearance to allow for vision frames.
10. All exposed exit device components to be of architectural metals and "true" architectural finishes.
11. Handing: Field-reversible.
12. Fasteners on Back Side of Device Channel: Concealed - exposed fasteners not allowed.
13. Vertical Latch Assemblies' Operation: Gravity, without use of springs.

C. Grades: Complying with BHMA A156.3, Grade 1.
   1. Provide exit devices tested and certified by UL or by a recognized independent laboratory for mechanical operational testing to 10 million cycles minimum with inspection confirming Grade 1 Loaded Forces have been maintained.

D. Products:
   1. 2000.

2.05 LOCK CYLINDERS

A. Manufacturers:
   1. BEST, dormakaba Group: www.bestaccess.com/#sle.

B. Properties:
   1. Lock Cylinders: Provide key access on outside of each lock, unless otherwise indicated.
      a. Provide cylinders from same manufacturer as locking device.
      b. Provide cams and/or tailpieces as required for locking devices.
      c. Provide cylinders with appropriate format interchangeable cores where indicated.

C. Grades:
   1. Standard Security Cylinders: Comply with BHMA A156.5.

D. Material:
   1. Manufacturer's standard corrosion-resistant brass alloy.

E. Types: As applicable to each item specified.

F. Applications: At locations indicated in hardware sets, and as follows
   1. As required for items with locking devices provided by other sections, including at elevator controls and cabinets.
      a. When provisions for lock cylinders are referenced elsewhere in the Project Manual to this Section, provide compatible type of lock cylinder, keyed to building keying system, unless otherwise indicated.

G. Products:
   1. Rim/mortise.

2.06 CYLINDRICAL LOCKS

A. Manufacturers:
   1. BEST, dormakaba Group: www.bestaccess.com/#sle.

B. Properties:
   1. Mechanical Locks:
      a. Fitting modified ANSI A115.2 door preparation.
      b. Door Thickness Fit: 1-3/8 inches (35 mm) to 2-1/4 inches (57 mm) thick doors.
      c. Construction: Hub, side plate, shrouded rose, locking pin to be a one-piece casting with a shrouded locking lug.
         1) Through-bolted anti-rotational studs.
      d. Cast stainless steel latch retractor with roller bearings for exceptionally smooth operation and superior strength and durability.
      e. Bored Hole: 2-1/8 inch (54 mm) diameter.
      f. Backset: 2-3/4 inches (70 mm) unless otherwise indicated.
      g. Latch: Single piece tail-piece construction.
         1) Latchbolt Throw: 9/16 inch (14.3 mm), minimum.
      h. Cylinders:
         1) Cylinder Core Types: Locks capable of supporting manufacturers' cores, as applicable.
            (a) Small format interchangeable.
      i. Lever Trim:
         1) Style: See Door Hardware Schedule.
         2) Functionality: Allow the lever handle to move up to 45 degrees from horizontal position prior to engaging the latchbolt assembly.
         3) Strength: Locksets outside locked lever designed to withstand minimum1,400 inch-lbs. (158.2 Nm) of torque. In excess of that, a replaceable part will shear. Key from outside and/or inside lever will still operate lockset.
         4) Independent spring mechanism for each lever.
            (a) Contain lever springs in the main lock hub.
         5) Outside Lever Sleeve: Seamless one-piece construction.
         6) Keyed Levers: Removable only after core is removed by authorized control key.

C. Finishes: See Door Hardware Schedule.
   1. Core Faces: Match finish of lockset.

D. Grades: Comply with BHMA A156.2, Grade 1, Series 4000, Operational Grade 1, Extra Heavy Duty.
   1. Durability: Passing 50 Million cycle tests verified by third party testing agency.

E. Material: Manufacturer's standard for specified lock.
   1. Critical Latch and Chassis Components: Brass or corrosion-resistance treated steel.
   2. Outside Lever Sleeve: Hardened steel alloy.

F. Products: Cylindrical locks, including mechanical types.
   1. 9K (Grade 1).

2.07 CLOSERS

A. Manufacturers:
   1. BEST, dormakaba Group www.bestaccess.com/#sle.
   2. LCN, Allegion Group.

B. Properties:

1. Surface Mounted Closers: Manufacturer's standard.
   a. Construction: Single piece casted cast iron housing.
   b. Maximum Projection from Face of Door: 2-7/16 inches (62 mm).
   c. Mechanism: Separate, tamper-resistant, retention ring, self-regulating adjusting valves for closing and latching speeds, backcheck, advanced variable backcheck and optional delayed action feature.
      1) All valve adjustment socket screw drives must be slotted hex not requiring special tools for maintenance or adjustments.
      2) Spring adjustment screw must be hex key.
      3) All valves must have mechanism to prevent oil leaks from over adjustment.
      4) All closer adjustments must be front facing and adjustable without removing closer from installed surface.
      5) Advanced Variable Backcheck: Backcheck positioning adjustment (POS)
         (a) Selectable adjustment to facilitate degree of backcheck engagement point:
            (1) Parallel arm mount: 50 degrees.
            (2) Regular arm and top jamb mount: Between 50 and 80 degrees.
         (b) Intensity of backcheck shall be fully adjustable with tamper resistant non-critical valve screw.
      6) Spring Size:
         (a) Adjustable spring sizes 1-6 with +50% power increase capability.
         (b) Spring size indicator shall be easy to read, located front facing on the housing and adjustable without removal of housing from the installed surface.
   d. Hydraulic: All-weather fluid.
   e. Arm Assembly:
      1) Construction: Stamped arms and forged hub.
      2) Material: Steel.
      3) Degree of Swing:
         (a) Parallel arm NHO mounting shall not limit opening angle and permit 180-degree door swing.
         (b) Regular arm NHO mounting shall not limit opening angle and permit 120-degree door swing.
         (c) Consult factory for non-standard templating.
      4) Include hold-open, integral stop, or spring-loaded stop feature, as specified in Door Hardware Schedule.
      5) Where obstructions limit opening angle and wall or floor stops are prohibited, provide “IS” or “S-IS” arms.
   f. Covers:
      1) Type:
         (a) Full. (standard)
      2) Material:
         (a) Plastic. (standard)
      3) Finish:
         (a) Painted. (standard)
      4) Attachment: Two-point flange mounting, dual-clamp friction fit closer cover.

C. Grades:
   1. Closers: Comply with BHMA A156.4, Grade 1.
      a. Underwriters Laboratories Compliance:

1) Product Listing: UL (DIR) and ULC for use on fire-resistance-rated doors.
(a) CAN/ULC S-133 - Standard Method Of Tests For Door Closers Intended For Use With Swinging Doors.

b. Testing Standards Compliance: Meeting requirements of UL 10C for positive pressure.

D. Code Compliance: As required by authorities having jurisdiction in the State in which the Project is located.

E. Options:
1. Delayed action, adjustable with an independent valve.

F. Installation:
1. Mounting: Includes surface mounted installations.
2. Mount closers on non-public side of door and stair side of stair doors unless otherwise noted in hardware sets.
3. At out swinging exterior doors, mount closer on interior side of door.
4. Provide adapter plates, shim spacers, and blade stop spacers as required by frame and door conditions.
5. Where an overlapping astragal is included on pairs of swinging doors, provide coordinator to ensure door leaves close in proper order.

G. Products:
1. Surface Mounted:
a. EHD9000

2.08 PROTECTION PLATES

A. Manufacturers:
1. Burns.

B. Properties:
1. Plates:
a. Kick Plates: Provide along bottom edge of push side of every wood door with closer, except aluminum storefront and glass entry doors, unless otherwise indicated.
b. Mop Plates: Provide along bottom edge of push side of doors to provide protection from cleaning liquids and equipment damage to door surface.
c. Edges: Beveled, on four (4) unless otherwise indicated.

C. Grades: Comply with BHMA A156.6.

D. Material: As indicated for each item by BHMA material and finish designation.
1. Metal Properties: Stainless steel.

E. Installation:
1. Fasteners: Countersunk screw fasteners

2.09 STOPS AND HOLDERS

A. Manufacturers:
1. ABH.

B. General: Provide overhead stop/holder when wall or floor stop is not feasible.

C. Grades:
1. Door Holders, Wall Bumpers, and Floor Stops: Comply with BHMA A156.16 and Resilient Material Retention Test as described in this standard.

D. Material: Base metal as indicated for each item by BHMA material and finish designation.

E. Types:
1. Wall Bumpers: Bumper, concave, wall stop.

F. Installation:
1. Non-Masonry Walls: Confirm adequate wall reinforcement has been installed to allow lasting installation of wall bumpers.

G. Products:
1. Wall Bumpers.

2.10 THRESHOLDS

A. Manufacturers:
1. National Guard Products, Inc: www.ngpinc.com/#sle.

B. Properties:
1. Threshold Surface: Fluted horizontal grooves across full width.

C. Grades: Thresholds: Comply with BHMA A156.21.

D. Types: As applicable to project conditions. Provide barrier-free type at every location where specified.
1. Bumper Seal Thresholds with Gasket: Use silicone gaskets.

2.11 WEATHERSTRIPPING AND GASKETING

A. Manufacturers:
1. National Guard Products, Inc: www.ngpinc.com/#sle.

B. Properties:
1. Adhesive-Backed Perimeter Gasketing: Silicone gasket material applied to frame with self- adhesive.
2. Rigid, Housed, Perimeter Gasketing: Sponge silicone gasket material held in place by aluminum housing; fastened to frame stop with screws.
3. Door Sweeps: Silicone gasket material held in place by flat aluminum housing or flange; surface mounted to face of door with screws.

C. Grades: Comply with BHMA A156.22.

2.12 KEYS AND CORES

A. Manufacturers:
1. BEST, dormakaba Group: www.bestaccess.com/#sle.

B. Properties: Complying with guidelines of BHMA A156.28.
1. Provide small format interchangeable core.
2. Provide Patented CORMAX keys and cores.
3. Provide keying information in compliance with DHI (KSN) standards.
4. Keying Schedule: Arrange for a keying meeting, with Architect, Owner and hardware supplier, and other involved parties to ensure locksets and locking hardware, are functionally correct and keying complies with project requirements.
5. Keying: Master keyed.
6. Include construction keying and control keying with removable core cylinders.
7. Supply keys in following quantities:
   a. Master Keys: 4 each.
   b. Construction Master Keys: 6 each.
   c. Construction Keys: 15 each.
   d. Construction Control Keys: 2 each.
   e. Control Keys if New System: 2 each.

8. Provide key collection envelopes, receipt cards, and index cards in quantity suitable to manage number of keys.
9. Deliver keys with identifying tags to Owner by security shipment direct from manufacturer.
10. Permanent Keys and Cores: Stamped with applicable key marking for identification. Do not include actual key cuts within visual key control marks or codes. Stamp permanent keys "Do Not Duplicate."
11. Include installation of permanent cores and return construction cores to hardware supplier. Construction cores and keys to remain property of hardware supplier.

C. Products:
1. Patented:
a. CORMAX.

2.13 FINISHES

A. Finishes: Identified in Hardware Sets.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that doors and frames are ready to receive this work; labeled, fire-rated doors and frames are properly installed, and dimensions are as indicated on shop drawings.

B. Correct all defects prior to proceeding with installation.

3.02 INSTALLATION

A. Install hardware in accordance with manufacturer's instructions and applicable codes.

B. Install hardware using the manufacturer’s fasteners provided. Drill and tap all screw holes located in metallic materials. Do not use “Riv-Nuts” or similar products.

C. Install hardware on fire-rated doors and frames in accordance with applicable codes and NFPA 80.

D. Install hardware for smoke and draft control doors in accordance with NFPA 105.

E. Use templates provided by hardware item manufacturer.

F. Do not install surface mounted items until application of finishes to substrate are fully completed.

G. Wash down masonry walls and complete painting or staining of doors and frames.

H. Complete finish flooring prior to installation of thresholds.

I. Set exterior door thresholds with full-width bead of elastomeric sealant at each point of contact with floor providing a continuous weather seal; anchor thresholds with stainless steel countersunk screws.

J. Include in installation for existing doors and frames any necessary field modification and field preparation of doors and frames for new hardware. Provide necessary fillers, reinforcements, and fasteners for mounting new hardware and to cover existing door and frame preparations.

3.03 FIELD QUALITY CONTROL

A. Perform field inspection and testing under provisions of Section 014000 - Quality Requirements.

3.04 ADJUSTING

A. Adjust work under provisions of Section 017000 - Execution and Closeout Requirements.

B. Adjust hardware for smooth operation.

C. Adjust gasketing for complete, continuous seal; replace if unable to make complete seal.

3.05 CLEANING

A. Clean finished hardware in accordance with manufacturer's written instructions after final adjustments have been made.

B. Clean adjacent surfaces soiled by hardware installation activities.

C. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.06 PROTECTION

A. Protect finished Work under provisions of Section 017000 - Execution and Closeout Requirements.

B. Do not permit adjacent work to damage hardware or finish.

3.07 HARDWARE SCHEDULE

Manufacturer list

ABH	Architectural Builders Hardware
BES	BEST
BUR	Burns
PRE	BEST (Precision)
NGP	National Guard Products
TRI	Trimco

Option list

Code:	Name:
(1/4-20 MS/EA)	1/4-20 Mach. Screw/Exp Anchor
B4E Heavy	Heavy Bevel Edges
CSK	Counter Sunk Holes
LAR	Length As Required
S3	ANSI 4 7/8" Strike

Finish list

Code:	Name:
26D	Satin Chrome
32D	Satin Stainless Steel
626	Satin Chrome
630	Satin Stainless Steel
689	Aluminum
A	Anodized Aluminum
C	Charcoal
Gray	Gray Rubber

Specification Report
Set #1
Doors: 101A, 105E

3	Hinge	FBB191 45X45	32D	BES
1	Cylindrical Lock	9K 3 7 AB 15 D S3 CORMAX	626	BES
1	Door Closer	EHD90 16 DS90	689	BES
1	Kick Plate	KP50 10" X 2" LDW CSK B4E Heavy	630	BUR
1	Threshold	896 S LAR (1/4-20 MS/EA)	A	NGP
1	Gasketing	110S Head & Jambs (2)	A	NGP
1	Sweep	200S LAR	A	NGP

Set #2
Doors: 105A, 105B, 105C, 105D, 105F, 105G, 105H

1	Mortise Cylinder	1E 7 4 CORMAX	626	BES

NOTE: Remainder of hardware by door supplier. Coordinate with door supplier to verify quantity / type of cylinders required.

Set #3
Doors: 104A

3	Hinge	FBB191 45X45	32D	BES
1	Exit Device	2103 A 4903	630	PRE
1	Rim Cylinder	12E 7 2 CORMAX	626	BES
1	Door Closer	EHD90 16 DS90	689	BES
1	Kick Plate	KP50 10" X 2" LDW CSK B4E Heavy	630	BUR
1	Threshold	896 S LAR (1/4-20 MS/EA)	A	NGP
1	Gasketing	110S Head & Jambs (2)	A	NGP
1	Sweep	200S LAR	A	NGP

Set #4
Doors: 101B, 104B

3	Hinge	FBB179 45X45	26D	BES
1	Cylindrical Lock	9K 3 7 AB 15 D S3 CORMAX	626	BES
1	Door Closer	EHD90 16 AF90P	689	BES
1	Kick Plate	KP50 10" X 2" LDW CSK B4E Heavy	630	BUR
3	Silencer			
1	Wall Stop	1841	US32D	ABH

Set #5
Doors: 102, 103

3	Hinge	FBB179 45X45	26D	BES
1	Cylindrical Lock	9K 3 0 L 15 D S3	626	BES
1	Door Closer	EHD90 16 AF90P	689	BES
1	Kick Plate	KP50 10" X 2" LDW CSK B4E Heavy	630	BUR
1	Gasketing	5050 Head & Jambs (2)	C	NGP
1	Wall Stop	1841	US32D	ABH
1	Mop Plate	MP50 6" X 1" LDW CSK B4E Heavy	630	BUR

Set #6: Same as Set #5 minus the Gasketing and Wall Stop
Doors: 106

END OF SECTION

SECTION 08800 - GLAZING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Windows.
2. Interior lites.

B. Coordinate the requirements of this Section with those of other sections that interface with Glazing.

1.3 DEFINITIONS

A. Manufacturers of Glass Products: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

C. Interspace: Space between lites of an insulating-glass unit that contains dehydrated air or a specified gas.

D. Deterioration of Insulating Glass: Failure of hermetic seal under normal use that is attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

E. Deterioration of Coated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for maintaining and cleaning coated glass contrary to manufacturer's written instructions. Defects include peeling, cracking, and other indications of deterioration in metallic coating.

F. Deterioration of Laminated Glass: Defects developed from normal use that are attributed to the manufacturing process and not to causes other than glass breakage and practices for 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.

1.4 PERFORMANCE REQUIREMENTS

A. General: Provide glazing systems capable of withstanding normal thermal movement and wind and impact loads (where applicable) without failure, including loss or glass breakage attributable to the following: defective manufacture, fabrication, and installation; failure of sealants or gaskets to remain watertight and airtight; deterioration of glazing materials; or other defects in construction.

B. Glass Design: **Glass thickness designations indicated are minimums and are for detailing only**. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed ASTM E 1300 and applicable building codes (if no building code is in force in the project jurisdiction, meet IBC, latest edition).

   a. Maximum Lateral Deflection: For the following types of glass supported on all 4 edges, provide thickness required that limits center deflection at design wind pressure to 1/50 times the short side length or 1 inch, whichever is less.

   b. Minimum Glass Thickness for Exterior Lites: Not less than ¼ inch.

   c. Maximum deflection of glass supported on two sides: Thickness of glass.

C. Thermal Movements: Provide glazing that allows for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures acting on glass framing members and glazing components. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

   1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data.

1.5 SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glazing Schedule: Use same designations indicated on Drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

C. Product Certificates: Signed by manufacturers of glass and glazing products certifying that products furnished comply with requirements.

D. Installation Instructions: For each type of glazing product including gaskets, provide manufacturer’s printed instructions.

E. Warranties: Special warranties specified in this Section.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who is approved or licensed by the manufacturer.

B. Source Limitations for Glazing Accessories: Obtain glazing accessories through one source from a single manufacturer for each product and installation method indicated.

C. Glazing for Fire-Rated Door Assemblies: Glazing for assemblies that comply with NFPA 80 and 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 252.

D. Glazing for Fire-Rated Window Assemblies: Glazing for assemblies that comply with NFPA 80 and 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 NFPA 257.

E. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.

F. Insulating-Glass Certification Program: Permanently marked either on spacers or on at least one component lite of units with appropriate certification label of the following testing and inspecting agency:

1. Insulating Glass Certification Council.
2. Associated Laboratories, Inc.

G. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA Laminated Division's "Laminated Glass Design Guide" and GANA's "Glazing Manual."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions and as needed to prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

B. For insulating-glass units that will be exposed to substantial altitude changes, comply with insulating-glass manufacturer's written recommendations for venting and sealing to avoid hermetic seal ruptures.

1.8 PROJECT 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.

1.9 WARRANTY

A. Manufacturer's Special Warranty for Coated-Glass Products: Manufacturer's standard form, made out to Owner and signed by coated-glass manufacturer agreeing to replace coated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

B. Manufacturer's Special Warranty on Laminated Glass: Manufacturer's standard form, made out to Owner and signed by laminated-glass manufacturer agreeing to replace laminated-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: Five years from date of Substantial Completion.

C. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form, made out to Owner and signed by insulating-glass manufacturer agreeing to replace insulating-glass units that deteriorate as defined in "Definitions" Article, f.o.b. the nearest shipping point to Project site, within specified warranty period indicated below.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Glass:

1. AFG Industries
2. Pilkington
3. Guardian Industries
4. PPG

2.2 GLASS PRODUCTS

A. Float Glass: ASTM C 1036.

B. Heat-Treated Float Glass: ASTM C 1048.

1. Provide Kind FT (fully tempered) float glass where safety glass is indicated or required by code; or, should the Project be located in a jurisdiction with no applicable building

code, provide Kind FT (fully tempered) float glass where safety glass would be required by the International Building Code, latest edition.

C. Insulating-Glass Units, General: Factory-assembled units consisting of sealed lites of glass separated by a dehydrated interspace, and complying with ASTM E 774 for Class CBA units and with requirements specified in this Article and in Part 2 "Insulating-Glass Units" Article.

1. Provide Kind FT (fully tempered) glass lites where safety glass is indicated.

2. Overall Unit Thickness and Thickness of Each Lite: Dimensions indicated for insulating-glass units are nominal and the overall thicknesses of units are measured perpendicularly from outer surfaces of glass lites at unit's edge.

3. Sealing System: Dual seal, with primary and secondary sealants as follows:

a. Manufacturer's standard sealants.

4. Spacer Specifications: Manufacturer's standard spacer material and construction complying with the following requirements:

a. Spacer Material: Aluminum with clear anodic finish.
b. Desiccant: Molecular sieve or silica gel, or blend of both.
c. Corner Construction: Manufacturer's standard corner construction.

2.3 GLASS TYPES

A. Solarban 60 (2) Solargrey + Clear: 1 inch insulating glass with the following characteristics:

a. 1/4” gray tinted Low-E fully tempered float safety glass
b. 1/4” clear fully tempered float safety glass
c. SHGC = 0.25 or less
d. U-Factor = 0.29 or less

B. 1/4” clear fully tempered float safety glass

2.4 GLAZING GASKETS

A. Compression Gaskets: Extruded or molded, closed-cell, integral-skinned neoprene gaskets; complying with ASTM C 509, Type II, black; and of profile and hardness required to maintain watertight seal.

1. Use single piece gaskets all around window perimeters, with molded corners.

2.5 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions with a Shore, Type A durometer hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

2.6 FABRICATION OF GLAZING UNITS

A. Fabricate glazing units in sizes required to glaze 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.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing glazing, 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 system.
3. Minimum required face or 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.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, 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 is glass with edge damage or other imperfections that, when installed, could weaken glass and impair performance and appearance.

C. 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.

D. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

E. Provide spacers for glass lites where length plus width is larger than 50 inches as follows:

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.

F. 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 according to requirements in referenced glazing publications.

G. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

3.4 GASKET GLAZING (DRY)

A. Fabricate compression gaskets in 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. 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 by gasket manufacturer.

D. Install gaskets so they protrude past face of glazing stops.

3.5 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from any cause during construction period.

END OF SECTION 08800

SECTION 09253 - GYPSUM SHEATHING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Paper-surfaced gypsum sheathing board.
2. Building wrap.

B. Coordinate the requirements of this Section with those of other sections that interface with Gypsum Sheathing.

1.3 DEFINITIONS

A. Gypsum Board Construction Terminology Standard: Refer to ASTM C 11 for definitions of terms for gypsum sheathing board construction not defined in this Section or in other referenced standards.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

1. Building Wrap: For air/moisture-infiltration protection, include data substantiating compliance with building code in effect for Project.

1.5 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For assembles designated to have fire-resistance ratings, provide materials and construction identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, or other causes. Stack sheathing flat on leveled supports off the ground, under cover, and fully protected from weather.

PART 2 - PRODUCTS

2.1 GYPSUM SHEATHING

A. Paper-Surfaced Gypsum Wall Sheathing: ASTM C 79/C 79M, with water-resistant material incorporated into the core and with water-repellent paper bonded to core's face, back, and long edges.

1. Type and Thickness: Regular, 1/2 inch thick.
2. Edge and End Configuration: tongue and groove.
3. Size: 24 by 96 inches for horizontal, or 48 by 96 inches for vertical installation.

2.2 WEATHER-RESISTANT BARRIER

A. Building Wrap: Air-retarder sheeting made from polyolefins; cross-laminated films, woven strands, or spun-bonded fibers; coated or uncoated; with or without perforations; and complying with ASTM E 1677, Type I. Use where indicated.

1. Thickness: Not less than 3 mils.
2. Permeance: Not less than 10 perms.
3. Flame-Spread Index: 25 or less per ASTM E 84.
4. “Tyvek” or approved equal.
5. Building Wrap Tape: Pressure-sensitive plastic tape recommended by building wrap manufacturer for sealing joints and penetrations in building wrap.

B. Sheathing Tape: Pressure-sensitive plastic tape for sealing joints and penetrations in sheathing and recommended by sheathing manufacturer for use with type of sheathing required.

2.3 ACCESSORY MATERIALS

A. Fasteners: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing board to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

1. For steel framing less than 0.0329 inch thick, attach sheathing with steel drill screws complying with ASTM C 1002.
2. For steel framing from 0.033 to 0.112 inch thick, attach sheathing with drill screws complying with ASTM C 954.

PART 3 - EXECUTION

3.1 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and manufacturer's written instructions.

B. Cut boards at penetrations, edges, and other obstructions of work; fit tightly against abutting construction, unless otherwise indicated.

1. Install boards with a 3/8-inch setback where non-load-bearing construction abuts structural elements.
2. Install boards with a 1/4-inch setback where they abut masonry or similar materials that might retain moisture, to prevent wicking.

C. Coordinate sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed exterior wall assembly.

D. Apply fasteners so screw heads bear tightly against face of sheathing boards but do not cut into facing.

E. Do not bridge building expansion joints with sheathing; cut and space edges to match spacing of structural support elements.

F. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of stud flanges, and stagger end joints of adjacent boards not less than one stud spacing. Screw-attach boards at perimeter and within field of board to each steel stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.

G. Vertical Installation: Install board vertical edges centered over flanges of steel studs. Abut ends and edges of each board with those of adjacent boards. Screw-attach boards at perimeter and within field of board to each steel stud.

1. Space fasteners approximately 8 inches o.c. and set back a minimum of 3/8 inch from edges and ends of boards.

3.2 WEATHER-RESISTANT BARRIER INSTALLATION

A. Cover sheathing with weather-resistant barrier as follows:

1. Cut back barrier 1/2 inch on each side of the break in supporting members at expansion- or control-joint locations.
2. Apply barrier to cover vertical flashing with a minimum 4-inch overlap, unless otherwise indicated.

B. Building Paper: Apply horizontally with a 2-inch overlap and a 6-inch end lap; fasten to sheathing with corrosion-resistant staples.

C. Building Wrap: Comply with manufacturer's written installation instructions.

D. Seal sheathing joints according to sheathing manufacturer's written recommendations.

1. Apply glass-fiber sheathing tape to gypsum sheathing board joints, and apply and trowel silicone emulsion sealant to embed sealant in entire face of tape. Apply sealant to

exposed fasteners with a trowel so fasteners are completely covered. Seal other penetrations and openings.

3.3 PROTECTION

A. Protect sheathing that will be exposed to weather for more than 30 days (or 180 days if glass-mat sheathing) by covering exposed exterior surface of sheathing with a securely fastened weather-resistant barrier. Apply covering immediately after sheathing is installed.

END OF SECTION 09253

SECTION 09260 - GYPSUM BOARD ASSEMBLIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Interior gypsum wallboard.
2. Tile backing panels.
3. Non-load-bearing steel framing.

B. Coordinate the requirements of this Section with those of other sections that interface with Gypsum Board Assemblies, in particular:

1. Division 5 Section "Cold-Formed Metal Framing" for load-bearing steel framing.
2. Division 6 Section "Rough Carpentry" for wood framing and furring.
3. Division 9 Section "Gypsum Sheathing" for installations over steel framing.

1.3 DEFINITIONS

A. Gypsum Board Terminology: Refer to ASTM C 11 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.4 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: For gypsum board assemblies with fire-resistance ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

1. Fire-Resistance-Rated Assemblies: Indicated by design designations from UL's "Fire Resistance Directory."

B. Sound Transmission Characteristics: For gypsum board assemblies with STC ratings, provide materials and construction identical to those tested in assembly indicated according to ASTM E 90 and classified according to ASTM E 413 by a qualified independent testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.

B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Stack gypsum panels flat to prevent sagging.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

PART 2 - PRODUCTS

2.1 STEEL SUSPENDED CEILING AND SOFFIT FRAMING

A. Components, General: Comply with GA-216 and ASTM C 754 for conditions indicated.

B. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch- diameter wire, or double strand of 0.0475-inch- diameter wire.

C. Hangers: As follows:

1. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.162-inch diameter.

D. Carrying Channels: Cold-rolled, commercial-steel sheet with a base metal thickness of 0.0538 inch, a minimum 1/2-inch- wide flange, with manufacturer's standard corrosion-resistant zinc coating.

1. Depth: 1-1/2 inches.

E. Furring Channels (Furring Members): Commercial-steel sheet with manufacturer's standard corrosion-resistant zinc coating.

1. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch deep.

a. Minimum Base Metal Thickness: 0.0179 inch.

F. Grid Suspension System for Interior Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

2.2 STEEL PARTITION FRAMING

A. Components, General: As follows:

1. Comply with GA-216 and ASTM C 754 for conditions indicated.
2. Steel Sheet Components: Complying with ASTM C 645 requirements for metal and with manufacturer's standard corrosion-resistant zinc coating.

B. Steel Studs and Runners: ASTM C 645.

1. Minimum Base Metal Thickness: 0.0179 inch, and 0.0312 inch at fire-rated door frames.
2. Depth: As indicated.

C. Deep-Leg Deflection Track: ASTM C 645 top runner with 2-inch- deep flanges, use in the following locations:

1. Wherever partition head is anchored directly to steel, concrete or wood structural members.
2. Wherever “slip joint” is called for on Drawings.

D. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width as required to securely anchor the fixtures indicated.

1. Minimum Base Metal Thickness: 0.0179 inch.

E. Cold-Rolled Channel Bridging: 0.0538-inch bare steel thickness, with minimum 1/2-inch- wide flange.

1. Depth: 1-1/2 inches.
2. Clip Angle: 1-1/2 by 1-1/2 inch, 0.068-inch- thick, galvanized steel.

F. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base Metal Thickness: 0.0179 inch.
2. Depth: 7/8 inch or as otherwise indicated.

G. Cold-Rolled Furring Channels: 0.0538-inch bare steel thickness, with minimum 1/2-inch- wide flange.

1. Depth: 3/4 inch.
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum bare steel thickness of 0.0312 inch.
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.0625-inch-diameter wire, or double strand of 0.0475-inch- diameter wire.

H. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches, wall attachment flange of 7/8 inch, minimum bare metal thickness of 0.0179 inch, and depth required to fit insulation thickness indicated.

I. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

2.3 GYPSUM WALLBOARD PRODUCTS

A. Panel Size: Provide in maximum lengths and widths available that will minimize joints in each area and correspond with support system indicated.

B. Gypsum Wallboard: GA-216 and ASTM C 1396.

1. Regular Type:

a. Thickness: 5/8 inch, unless otherwise indicated.
b. Long Edges: Tapered.

2. Type X:

a. Thickness: 5/8 inch.
b. Long Edges: Tapered.
c. Location: As indicated, and where required for fire-resistance-rated assembly.

C. Water-Resistant Gypsum Backing Board: ASTM C 1396/C 1396 M.

1. Core: 5/8 inch, Type X.

2. Locations

a. All walls on which plumbing fixtures are located.
b. All walls with tile finish.
c. All walls in spaces with high moisture content in the air, including shower rooms, laundry rooms, and spaces with exterior exposure.
d. Water-Resistant Gypsum Backing Board shall extend full height of wall.

2.4 TRIM ACCESSORIES

A. Interior Trim: GA-216 and ASTM C 1047.

1. Material: Paper-faced composite sheet.
2. Shapes:

a. Cornerbead: Use at outside corners.
b. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges.
c. U-Bead: J-shaped; exposed short flange does not receive joint compound; use where indicated.
d. Bullnose Bead: Use where indicated.
e. L-Bead: L-shaped; exposed long leg receives joint compound; use where indicated.
f. Expansion (Control) Reveal Joint: Use Fry Reglet, or approved equal, U-shaped model number DRM-25-25, as required by **ASTM C 840** and in specific locations indicated on the Drawings.

B. Exterior Trim: ASTM C 1047.

1. Material: Hot-dip galvanized steel sheet or rolled zinc.
2. Shapes:

    a. Cornerbead: Use at outside corners.
    b. LC-Bead: J-shaped; exposed long flange receives joint compound; use at exposed panel edges.
    c. Expansion (Control) Joint: One-piece, rolled zinc with V-shaped slot and removable strip covering slot opening. Use where required and in specific locations indicated on the Drawings.

C. Aluminum Trim: Extruded accessories of profiles and dimensions indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Fry Reglet Corp.
    b. Gordon, Inc.
    c. MM Systems Corporation.
    d. Pittcon Industries.

2. Aluminum: Alloy and temper with not less than the strength and durability properties of ASTM B 221, alloy 6063-T5.
3. Finish: Baked enamel, color as selected by Architect from manufacturer's full range.

2.5 JOINT TREATMENT MATERIALS

A. General: Comply with GA-216 and ASTM C 475.

B. Joint Tape:

1. Interior Gypsum Wallboard: Paper.
2. Exterior Gypsum Soffit Board: Paper.
3. Glass-Mat Gypsum Sheathing Board: 10-by-10 glass mesh.
4. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Wallboard: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use setting-type taping compound.
3. Fill Coat: For second coat, use setting-type, sandable topping compound.
4. Finish Coat: For third coat, use setting-type, sandable topping compound.
5. Skim Coat: For final coat of Level 5 finish, use setting-type, sandable topping compound.

D. Joint Compound for Exterior Applications: As recommended by manufacturer at Cementitious Backer Units.

E. Joint Compound for Tile Backing Panels:

1. Water-Resistant Gypsum Backing Board: Use setting-type taping and setting-type, sandable topping compounds.
2. Cementitious Backer Units: As recommended by manufacturer.

2.6 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

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. Isolation Strip at Exterior Walls:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch thick, in width to suit steel stud size.

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. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLING STEEL FRAMING, GENERAL

A. Install control joints above door frames on both sides and left and right (example: 4 locations at each interior door).

B. Installation Standards: GA-216, ASTM C 754, and **ASTM C 840** requirements that apply to framing installation. The following are some of the excerpted requirements for installing control joints in gypsum board assemblies:

1. Section 20.3.1 (GA 4.7.3.1) – A control joint shall be installed where a partition, wall, or ceiling traverses a construction joint (expansion, seismic or building control element) in the base building structure.

2. Section 20.3.2 (GA 4.7.3.2) – Control joints shall be installed where a wall or partition runs in an uninterrupted straight plane exceeding 30 linear feet (9100 mm)
3. Section 20.3.3 (GA 4.7.3.3) – Control joints in interior ceilings with perimeter relief shall be installed so that linear dimensions between control joints do not exceed 50 ft (15000 mm) and total area between control joints does not exceed 2500 sq ft (230 m²)
4. Section 20.3.4 (GA 4.7.3.4) – Control joints in interior ceilings without perimeter relief shall be installed so that linear dimensions between control joints do not exceed 30 ft (9100 mm) and total area between control joints does not exceed 900 sq ft (84 m²)
5. Section 20.3.5 (GA 4.7.3.5) – Control joints in exterior ceilings and soffits shall be installed so that linear dimensions between control joints do not exceed 30 ft (9100 mm) and total area between control joints does not exceed 900 sq ft (84 m²)
6. Section 20.3.6 (GA 4.7.3.6) – A control joint or intermediate blocking shall be installed where ceiling framing members change direction Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with gypsum board manufacturer's written recommendations or, if none available, with United States Gypsum's "Gypsum Construction Handbook."

C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement.

1. Isolate ceiling assemblies where they abut or are penetrated by building structure.
2. Isolate partition framing and wall furring where it abuts structure, except at floor. Install slip-type joints at head of assemblies that avoid axial loading of assembly and laterally support assembly.

D. **Do not bridge building control and expansion joints with steel framing or furring members. Frame both sides of joints independently**.

3.3 INSTALLING STEEL SUSPENDED CEILING AND SOFFIT FRAMING

A. Suspend ceiling 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 ceiling suspension system. 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 the location of hangers required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards.
3. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eyescrews, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause them to deteriorate or otherwise fail.
4. Secure rod, flat, or angle hangers to structure, including intermediate framing members, by attaching to inserts, eyescrews, or other devices and fasteners that are secure and

appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.

5. Attach hangers to structural members only.

B. Installation Tolerances: Install steel framing components for suspended ceilings so members for panel attachment are level to within 1/8 inch in 12 feet measured lengthwise on each member and transversely between parallel members.

C. For exterior soffits, install cross bracing and framing to resist wind uplift.

D. Wire-tie or clip furring channels to supports, as required to comply with requirements for assemblies indicated.

E. Install suspended steel framing components in sizes and spacings indicated, but not less than that required by the referenced steel framing and installation standards.

1. Hangers: 48 inches o.c.
2. Carrying Channels (Main Runners): 48 inches o.c.
3. Furring Channels (Furring Members): 16 inches o.c.

F. Grid Suspension System: Attach perimeter wall track or angle where grid suspension system meets vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

3.4 INSTALLING STEEL PARTITION AND SOFFIT FRAMING

A. Install tracks (runners) at floors, ceilings, and structural walls and columns where gypsum board assemblies abut other construction.

B. Installation Tolerance: Install each steel framing and furring member so fastening surfaces vary not more than 1/8 inch from the plane formed by the faces of adjacent framing.

C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.

1. Cut studs 1/2 inch short of full height to provide perimeter relief. Do not fasten studs to top track to allow independent movement of studs and track.
2. For fire-resistance-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid-structure surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed to support gypsum board closures and to make partitions continuous from floor to underside of solid structure.

D. Install steel studs so flanges point in the same direction and leading edge or end of each panel can be attached to open (unsupported) edges of stud flanges first.

E. Frame door openings to comply with GA-600 and with gypsum board manufacturer's applicable written recommendations, unless otherwise indicated. 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.

1. Install two studs at each jamb, unless otherwise indicated.

F. 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.

3.5 APPLYING AND FINISHING PANELS, GENERAL

A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA-216.

B. Install sound attenuation blankets before installing gypsum panels, unless blankets are readily installed after panels have been installed on one side.

C. Install gypsum 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. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

F. Attach gypsum panels to framing provided at openings and cutouts.

G. Form control and expansion joints with space between edges of adjoining gypsum panels.

H. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

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 open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch-wide joints to install sealant.

I. Isolate perimeter of non-load-bearing gypsum board partitions at structural abutments, except floors. Provide 1/4- 1/2-inch wide spaces at these locations, and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

J. STC-Rated Assemblies: Seal construction at perimeters, behind control and expansion 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 manufacturer's written recommendations for locating edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.

K. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's written recommendations.

L. Space fasteners in panels that are tile substrates a maximum of 8 inches o.c.

M. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

3.6 PANEL APPLICATION METHODS

A. Single-Layer Application:

1. On partitions/walls, apply gypsum panels vertically (parallel to framing), unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of board.
    b. At stairwells and other high walls, install panels horizontally, unless otherwise indicated or required by fire-resistance-rated assembly.

2. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.

3. On ceilings, apply gypsum panels before wall/partition board application to the greatest extent possible and at right angles to framing, unless otherwise indicated.

B. Multilayer Application 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 one 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.

1. Z-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 one furring member. Locate edge joints of base layer over furring members.

C. Single-Layer Fastening Methods: Apply gypsum panels to supports with steel drill screws.

D. Multilayer Fastening Methods: Fasten base layers and face layers separately to supports with screws where required for fire-rating; otherwise fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.

E. 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 recommendations and temporarily brace or fasten gypsum panels until fastening adhesive has set.

F. Tile Backing Panels:

1. Water-Resistant Gypsum Backing Board: Install at showers, tubs, and where indicated. Install with 1/4-inch gap where panels abut other construction or penetrations.
2. Areas Not Subject to Wetting: Install standard gypsum wallboard panels to produce a flat surface except at showers, tubs, and other locations indicated to receive water-resistant panels.
3. Where tile backing panels abut other types of panels in the same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.7 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 according to **ASTM C 840** and in specific locations indicated on the Drawings.

3.8 FINISHING GYPSUM BOARD ASSEMBLIES

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 and damaged surface areas.

C. Apply joint tape over gypsum board joints, except those with trim having flanges not intended for tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below, according to ASTM C 840, for locations indicated:

1. Embed tape at joints in ceiling plenum areas and in other similarly and completely concealed-from-view areas.
2. Embed tape and apply separate first coat of joint compound to tape, fasteners, and trim flanges where panels are substrate for tile.
3. Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges at panel surfaces that will be exposed to view and covered with wallcovering or flat or semi-gloss paint finish.
4. Embed tape and apply separate first, fill, and finish coats of joint compound to tape, fasteners, and trim flanges, and apply skim coat of joint compound over entire surface at panel surfaces to receive gloss paint finish.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

END OF SECTION 09260

SECTION 09310 - PORCELAIN TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Porcelain floor and wall tile.
2. Crack-suppression membrane.
3. Epoxy grout.
4. Metal edge strips installed as part of floor and wall tile installations.

B. Coordinate the requirements of this Section with those of other sections that interface with Porcelain Tile.

1.3 PERFORMANCE REQUIREMENTS

A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with values in conformance with the Americans with Disabilities Act and the Texas Accessibility Standards, as determined by testing identical products per ASTM C 1028.

B. Dynamic Coefficient of Friction: For tile installed on walkway surfaces, provide products with values per ANSI A137.1 of 0.42 or greater.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

C. Samples for Verification:

1. Assembled samples with grouted joints for each type and composition of tile and for each color and finish required, at least 12 inches square and mounted on rigid panel. Use grout of type and in color or colors approved for completed work.

D. Master Grade Certificates: For each shipment, type, and composition of tile, signed by tile manufacturer and Installer.

E. Product Certificates: For each type of product, signed by product manufacturer.

F. Material Test Reports: For each tile-setting and -grouting product.

1.5 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain all tile of same type from one source or producer.

1. Obtain tile 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 a single manufacturer and each aggregate from one source or producer.

1.6 PROJECT 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.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match 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 2 percent of amount installed, for each type, composition, color, pattern, and size indicated.

PART 2 - PRODUCTS

2.1 GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI and Tile Council of America (TCNA) standards referenced below.

C. Colors, Textures, and Patterns: Where manufacturer's standard products are indicated for tile, grout, and other products requiring selection of colors, surface textures, patterns, and other appearance characteristics, provide specific products or materials as selected by Architect from manufacturer's full range.

D. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

E. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.

2.2 TILE PRODUCTS

A. Acceptable Manufacturers:

1. Daltile; Div. of Dal-Tile International Inc.
2. Lone Star Ceramics Company.
3. Summitville Tiles, Inc.
4. Texaramic, Inc.
5. Other, with prior approval of Architect.

B. Products:

1. As selected by allowance per Division 1 Section “Allowances”.

2.3 CRACK-SUPPRESSION MEMBRANES FOR THIN-SET TILE INSTALLATIONS

A. General: Manufacturer's standard product that complies with ANSI A118.10.

B. Acceptable Products:

1. Hydro-Rite, by Tex-Rite.
2. DalSeal (or NobleSeal), by Noble Co.

2.4 SETTING AND EPOXY GROUTING MATERIALS

A. Acceptable Manufacturers:

1. C-Cure.
2. Custom Building Products.
3. LATICRETE International Inc.
4. Mapei
5. For wall applications, provide nonsagging mortar.

B. Chemical-Resistant, Water-Cleanable, Tile-Setting and -Grouting Epoxy: ANSI A118.3.

C. Water-Cleanable, Tile-Setting Epoxy Adhesive: ANSI A118.3.

2.5 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

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.

C. Grout Sealer: Manufacturer's standard silicone product for sealing grout joints that does not change color or appearance of grout.

1. Acceptable Products:

a. C-Cure; Penetrating Sealer 978.
b. Jamo Inc.; Penetrating Sealer.
c. Southern Grouts & Mortars, Inc.; Silicone Grout Sealer.
d. Summitville Tiles, Inc.; SL-15, Invisible Seal Penetrating Grout and Tile Sealer.
e. TEC Specialty Products Inc.; TA-256 Penetrating Silicone Grout Sealer.
f. Equal, with prior approval of Architect.

D. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for floor and wall applications, exposed-edge material.

1. Basis-of-Design Product at floor: Schluter Systems, **Schiene**, or approved equal.

2. Basis-of-Design Product at wall: Schluter Systems, **Quadec**, or approved equal.

3. Material: **Satin anodized aluminum**.

2.6 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 AND PREPARATION

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 installed tile. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Ensure that surfaces are flat and level, within tolerances required by ANSI A108, with maximum variation of 1/8 inch in 10 feet.

a. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
b. Remove protrusions, bumps, and ridges by sanding or grinding.

2. Ensure that substrates for setting tile are firm; dry; clean; free of oil, waxy films, curing compounds, and other materials that are incompatible with tile-setting materials.

3.2 INSTALLATION, GENERAL

A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.

B. TCNA Installation Guidelines: TCNA's "Handbook for Ceramic Tile Installation." Comply with TCNA installation methods indicated in ceramic tile installation schedules.

C. 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.

D. 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.

E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.

F. Expansion Joints: Locate sealant-filled expansion joints where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.

1. Locate Expansion Joints in tile surfaces directly above any expansion, control, contraction or isolation joints in concrete substrates, even if joints in substrate are not indicated on the Drawings.

G. Grout tile to comply with requirements of ANSI A108.10 and, where applicable, ANSI A108.6.

3.3 CRACK-SUPPRESSION MEMBRANE INSTALLATION

A. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.

B. At all tile Expansion Joints, install membrane a width of 3 times the tile size, or a minimum of 24 inches.

1. At expansion joints in substrate, cut membrane along center of joint before installing tile. Leave joint in tile free of grout to allow sealant application.

3.4 FLOOR TILE INSTALLATION

A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCNA installation methods and ANSI A108 Series of tile installation standards.

A. Joint Widths: Install tile on floors with joint widths per the manufacturer’s recommendation.

B. Expansion Joints: In lieu of grout, install joint sealant in accordance with Division 7 section “Joint Sealers” at joints that align over expansion joints.

C. Grout Sealer: Apply grout sealer to grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer that has gotten on tile faces by wiping with soft cloth.

3.5 WALL TILE INSTALLATION

A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCNA installation methods and ANSI setting-bed standards.

A. Joint Widths: Install tile on walls with joint widths per the manufacturer’s recommendation.

3.6 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all exposed tile surfaces so they are free of foreign matter.

1. Remove all 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.

B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION 09310

SECTION 09511 - ACOUSTICAL PANEL CEILINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes acoustical panels and exposed suspension systems for ceilings.

B. Coordinate the requirements of this Section with those of other sections that interface with Acoustical Panel Ceilings.

1.3 DEFINITIONS

A. LR: Light Reflectance coefficient.

B. NRC: Noise Reduction Coefficient.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Panel: Set of 12-inch- square Samples of each type, color, pattern, and texture.
2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- long Samples of each type, finish, and color.

C. Maintenance Data: For finishes to include in maintenance manuals.

1.5 QUALITY ASSURANCE

A. Source Limitations:

1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
2. Suspension System: Obtain each type through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Surface-Burning Characteristics: Provide acoustical panels with surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84.

2. Fire-Resistance Characteristics: Where indicated, provide acoustical panel ceilings identical to those of assemblies tested for fire resistance per ASTM E 119 by UL or another testing and inspecting agency acceptable to authorities having jurisdiction.

a. Fire-Resistance Ratings: Indicated by design designations from UL's "Fire Resistance Directory" or from the listings of another testing and inspecting agency.
b. Identify materials with appropriate markings of applicable testing and inspecting agency.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Pressurized Plenums: Operate ventilation system for not less than 48 hours before beginning acoustical panel ceiling installation.

2. Maintain uniform minimum temperature of 61 degrees F and maintain humidity of 55% to 60% prior to, during and after installation.

1.8 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.9 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Panels: Full-size panels equal to 3 percent of quantity installed.
2. Suspension System Components: Quantity of each exposed component equal to 3 percent of quantity installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

A. Acceptable Manufacturers:

1. Armstrong World Industries
2. CertainTeed
3. Conwed Corporation
4. Johns-Manville
5. United States Gypsum

B. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

C. Acoustical Panel Colors and Patterns: Match appearance characteristics indicated for each product type.

D. Fire Resistance Rating: Provide panels to achieve required ratings.

E. Coating-Based Antimicrobial Treatment: Provide acoustical panels with face and back surfaces coated with antimicrobial treatment consisting of manufacturer's standard formulation with fungicide added to inhibit growth of mold and mildew and showing no mold or mildew growth when tested according to ASTM D 3273.

2.2 ACOUSTICAL PANEL TYPES

A. At Ceiling Type 1:

1. Products:
   a. Armstrong Cirrus 574HumiGuard Plus, or equal product in performance and appearance by one of the Acceptable Manufacturers.
   b. Locations: Typical, unless indicated otherwise on the Drawings.
   c. Size per Drawings.
   d. Square Edge.
   e. Provide Humidity-Resistant panels.
   f. NRC of 0.70 or greater
   g. Antimicrobial Treatment: Coating or Panel based.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

A. Acceptable Manufacturers:

1. Armstrong World Industries.
2. CertainTeed.
3. Chicago Metallic Corporation.
4. USG Donn Brand

B. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

1. Provide “Intermediate Duty” structural class system.

C. Fire Resistance Rating: Provide system to achieve ratings indicated.

D. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

E. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated.

F. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at three times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.106-inch- diameter wire for interior applications and 0.135-inch- diameter wire for exterior applications.

G. Hold-Down Clips: Provide manufacturer's standard hold-down clips spaced 24 inches o.c. on all cross tees in the following locations:

1. Where required to achieve fire ratings.
2. All exterior locations.

2.4 METAL SUSPENSION SYSTEM TYPES

A. At Ceiling Type 1:

1. Products:
   a. Armstrong Prelude XL 15/16 exposed tee, or equal product in performance and appearance by one of the Acceptable Manufacturers.
   b. Locations: Typical, unless indicated otherwise on the Drawings.
   c. End Condition of Cross Runners: Override (stepped) type.
   d. Face Design: Flat, flush.
   e. Cap Material: Steel or aluminum cold-rolled sheet.

f. Cap Finish: Painted in color as selected from manufacturer's full range.

2.5 METAL EDGE MOLDINGS AND TRIM

A. Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that fit acoustical panel edge details and suspension systems indicated; formed from metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

1. For lay-in panels with **reveal edge** details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
2. For **circular penetrations** of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
3. For **narrow-face suspension systems**, provide suspension system and manufacturer's standard edge moldings that match width and configuration of exposed runners.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION, GENERAL

A. General: Install acoustical panel ceilings to comply with ASTM C 636, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Install ceiling systems in a manner capable of supporting superimposed loads, with maximum permissible deflection of 1/360 of span and maximum surface deviation of 1/8 inch in 10 ft.

C. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.

2. Splay hangers only where required and, if permitted with fire-resistance-rated ceilings, to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Do not attach hangers to steel deck tabs.
6. Do not attach hangers to steel roof deck. Attach hangers to structural members.
7. Space hangers not more than 48 inches o.c. along each member supported directly from hangers, unless otherwise indicated, and at splices in main runners; provide hangers not more than 8 inches from ends of each member, and 2 feet o.c. around air duct outlets.
8. All lighting fixtures shall be supported by fixture support system rods or wires, **independent of the ceiling suspension devices**, for each fixture, and **at all four corners.** Locate support not more than 6 inches from the lighting fixture corners.

D. Center ceiling systems on room axes leaving equal border pieces, not less than one-half tile width, unless otherwise indicated on Drawings.

E. Install lay-in panels level, in uniform plane and free from twist, warp and dents.

F. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels. Do not use exposed fasteners, including pop rivets, on moldings and trim.

1. Install edge moldings at intersection of ceiling and vertical surfaces, using maximum lengths, straight, true to line and level. Miter corners. Provide edge moldings at junctions with other ceiling finishes.

G. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

H. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. Install hold-down clips in areas indicated, in areas required by authorities having jurisdiction, for fire-resistance ratings, and to achieve UL listings; space as recommended by panel manufacturer's written instructions, unless otherwise indicated.
2. Protect lighting fixtures and air ducts to comply with requirements indicated for fire-resistance-rated assembly.

3.4 ADJUSTMENT AND CLEANING

A. Adjust any sags or twists which develop in the ceiling system(s) and replace any part which is damaged or faulty.

B. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 09511

SECTION 09651 - RESILIENT FLOOR TILE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Vinyl composition tile (VCT).
2. Resilient wall base and accessories.
3. Resilient stair accessories.

B. Coordinate the requirements of this Section with those of other sections that interface with Resilient Flooring.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: Manufacturer’s standard-size Samples.

C. Samples for Verification: After initial selection, submit full-size units of each color and pattern of resilient floor tile required.

1. Resilient Wall Base and Accessories: Manufacturer's standard-size Samples, but not less than 12 inches long, of each resilient product color and pattern required.

D. Manufacturer’s printed installation instructions.

E. Maintenance Data: For resilient products to include in maintenance manuals.

1.4 PROJECT CONDITIONS

A. Maintain temperatures within range recommended by manufacturer, but not less than 65 deg F or more than 95 deg F, in spaces to receive floor tile for 48 hours before, during, and 48 hours after installation.

B. After postinstallation period, maintain temperatures within range recommended by manufacturer.

C. Close spaces to traffic during floor covering installation and for 48 hours after.

D. Install resilient products after other finishing operations, including painting, have been completed.

1.5 EXTRA MATERIALS

A. Furnish extra materials described below 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 of each type, color, and pattern of floor tile installed.
2. Resilient Wall Base and Accessories: 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.

PART 2 - PRODUCTS

2.1 COLORS AND PATTERNS

A. Colors and Patterns: As selected by Architect from manufacturer's full range.

B. Price shall include tile colors that vary from room-to-room, and the possibility that patterns in each room could include up to three colors of tile.

2.2 VINYL COMPOSITION TILE

A. Acceptable Manufacturers:

1. American Biltrite (Canada) Ltd.
2. Armstrong World Industries, Inc.
3. Azrock Commercial Flooring, DOMCO.
4. Congoleum Corporation.
5. Johnsonite.
6. Mannington Mills, Inc.
7. Tarkett Inc.

B. Comply with ASTM F 1066.

C. Vinyl Composition Tile (VCT):

1. Class: 2 (through-pattern tile).
2. Wearing Surface: Smooth.
3. Thickness: 0.125 inch.
4. Size: 12 by 12 inches.
5. Usage: where indicated on the Drawings.

a. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2.3 RESILIENT WALL BASE

A. Acceptable Manufacturers:

1. Flexco (USA), Inc.
2. Johnsonite.
3. Roppe Corporation.

B. Comply with ASTM F 1861.

C. Base Type 1:

1. Type (Material Requirement): TS (rubber, vulcanized thermoset).
2. Group I (solid).
3. Style: Cove (with top-set toe).
4. Minimum Thickness: 0.125 inch.
5. Height: 4 inches.
6. Lengths: Coils in manufacturer's standard length.
7. Outside Corners: Premolded.
8. Inside Corners: Premolded.
9. Surface: Smooth.
10. Usage: where indicated on the Drawings and as indicated herein.

2.4 RESILIENT STAIR ACCESSORIES

A. Acceptable Manufacturers:

1. Allstate, by Stoler Industries.
2. Johnsonite.
3. Flexco (USA), Inc.
4. Musson, R. C. Rubber Co.
5. Pirelli Rubber Flooring.
6. Roppe Corporation.

B. Comply with FS RR-T-650.

C. Stair Treads:

1. Material: Rubber, Composition A.
2. Surface Design: Type 2 Design: Raised-diamond pattern.
3. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.
4. Nosing Height: 2 inches.
5. Thickness: 3/16 inch.
6. Size: Lengths and depths to fit each stair tread n one piece or, for treads exceeding maximum lengths manufactured, in equal-length units.
7. Usage: typical on stair treads unless a different flooring material is specifically called for on the Drawings.

8. Fire-Test-Response Characteristics:

a. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

D. Stair Nosings:

1. Material: Rubber, Composition A.
2. Nosing Style: Square, adjustable to cover angles between 60 and 90 degrees.
3. At VCT: Roppe #1 Commercial Stair Nosing, or equal by acceptable manufacturers.
4. At Carpet: Roppe #11 Single Flange Carpet Stair Nosing (when carpet is on tread only), or Roppe #15 Double Flange Carpet Stair Nosing (when carpet is on both tread and riser); or equal product by acceptable manufacturers.
5. Size: Lengths and depths to fit each stair tread n one piece or, for treads exceeding maximum lengths manufactured, in equal-length units.
6. Usage: typical on stairs where flooring other than rubber stair treads is called for on Drawings.

7. Fire-Test-Response Characteristics:

a. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm per ASTM E 648.

2.5 RESILIENT MOLDING ACCESSORIES

A. Acceptable Manufacturers:

1. Allstate, by Stoler Industries.
2. Johnsonite.
3. Marley Flexco (USA), Inc.
4. Musson, R. C. Rubber Co.
5. Roppe Corporation.

B. Material: Rubber.

C. Products:

1. Tile/Carpet Joiner (Roppe #50 or equal): use wherever resilient flooring meets carpet.
2. Carpet Edge (Roppe #38 or equal): use wherever glue-down carpet meets concrete flooring (whether concrete is finished or not). Use similar product if carpet is not glue-down.
3. Reducer Strip (Roppe #45 or equal): use wherever resilient flooring meets concrete flooring (whether concrete is finished or not).

2.6 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 manufacturer to suit resilient products and substrate conditions indicated.

C. Stair-Tread-Nose Filler: Two-part epoxy compound recommended by resilient tread manufacturer to fill nosing substrates that do not conform to tread contours.

D. Substrate Sealers: as recommended by flooring manufacturer.

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.

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.
2. 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 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. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

3. Moisture Testing:

a. Perform anhydrous calcium chloride test, ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 5 lb of water/1000 sq. ft. in 24 hours, or 3 lb of water/1000 sq. ft. in 24 hours if required by flooring manufacturer.
b. Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

4. Flooring Subcontractor shall be responsible for assuring that moisture vapor emission rate prior to floor installation is acceptable according to manufacturer’s requirements. If required by the General Contractor in order to meet the project schedule, the Flooring Subcontractor shall provide a sealer or other membrane acceptable to the flooring manufacturer to meet the required moisture vapor emission level, with no change to the General Contractor’s schedule and at no additional cost.

C. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.

D. Access Flooring Panels: Remove protective film of oil or other coating using method recommended by access flooring manufacturer.

E. Use trowelable leveling and patching compound to fill cracks, holes, and depressions in substrates.

F. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

1. Do not install resilient products until they are same temperature as space where they are to be installed.

G. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 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 one-half tile at perimeter.

1. Lay tiles square with room axis, unless otherwise indicated.

B. Match tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain direction alternating in adjacent tiles (basket-weave pattern), unless indicated otherwise.

2. Patterns with up to three colors may be required in a room, at no additional cost.

3. Colors may vary from room-to-room, at no additional cost.

C. Scribe, cut, and fit tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, edgings, door frames, thresholds, and nosings.

D. Extend tiles into toe spaces, door reveals, closets, and similar 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, nonstaining marking device.

F. Adhere tiles to flooring 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 RESILIENT WALL BASE INSTALLATION

A. Apply wall base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

B. Install wall base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

C. Tightly adhere wall base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

D. Do not stretch wall base during installation.

E. Premolded Corners: Install premolded corners before installing straight pieces.

F. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends. Shave back of base at points where bends occur and remove strips perpendicular to length of base that are only deep enough to produce a snug fit without removing more than half the wall base thickness.
2. Inside Corners: Use straight pieces of maximum lengths possible. Form by cutting an inverted V-shaped notch in toe of wall base at the point where corner is formed. Shave back of base where necessary to produce a snug fit to substrate.

3.5 RESILIENT ACCESSORY INSTALLATION

A. Resilient Stair Accessories:

1. Use stair-tread-nose filler to fill nosing substrates that do not conform to tread contours.
2. Tightly adhere to substrates throughout length of each piece.
3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

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 coverings that would otherwise be exposed.

3.6 CLEANING AND PROTECTION

A. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.

3. Damp-mop surfaces to remove marks and soil.

    a. Do not wash surfaces until after time period recommended by manufacturer.

B. Protect resilient products 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. Apply protective floor polish to VCT and to other surfaces if recommended by manufacturer, that are free from soil, visible adhesive, and surface blemishes.

    a. Use commercially available product acceptable to manufacturer.
    b. Coordinate selection of floor polish with Owner's maintenance service.

2. Do not move heavy and sharp objects directly over surfaces. Place hardboard or plywood panels over flooring and under objects while they are being moved. Slide or roll objects over panels without moving panels.

END OF SECTION 09651

SECTION 09681 – CARPET TILE

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes modular, tufted carpet tile.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance. Include installation recommendations for each type of substrate required.

B. Shop Drawings: Show the following:

1. Carpet tile type, color, and dye lot.
2. Type of subfloor and type of adhesive.
3. Pattern type, repeat size, location, direction, and starting point.
4. Type, color, and location of edge, transition, and other accessory strips.
5. Transition details to other flooring materials.

C. Samples: 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.
2. Exposed Edge Stripping and Accessory: 12-inch- long Samples.
3. Carpet Seam: 6-inch Sample.

D. Maintenance Data: For carpet to include in maintenance manuals specified in Division 1. Include the following:

1. Methods for maintaining carpet, 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.

1.3 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: Provide products with the critical radiant flux classification indicated in Part 2, as determined by testing identical products per ASTM E 648 by an independent testing and inspecting agency acceptable to authorities having jurisdiction.

B. Installer Qualifications: An experienced installer who is certified by the Floor Covering Installation Board or who can demonstrate compliance with its certification program requirements.

C. Mockups: Before installing carpet tile, build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Approved mockups may become part of the completed Work if undamaged at time of Substantial Completion.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104, Section 5, "Storage and Handling."

1.5 PROJECT CONDITIONS

A. Comply with CRI 104, Section 7.2, "Site Conditions; Temperature and Humidity" and Section 7.12, "Ventilation."

B. Environmental Limitations: Do not install carpet tiles until wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1. Do not commence carpet work until painting and finishing work is complete, and ceilings and overhead work are tested, approved, and completed.
2. Maintain room temperature at minimum 60 degrees F, and relative humidity at approximately final occupied conditions, for at least 24 hours prior to installation.
3. Provide sufficient lighting.

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.

1.6 WARRANTY

A. General Warranty: Special warranty 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. Special Warranty for Carpet Tiles: Manufacturer's standard form in which manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, and runs, loss of tuft bind strength, dimensional stability, excess static discharge, and delamination.

1. Warranty Period: 10 years from date of Substantial Completion.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below, before installation begins, 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 2 percent of amount installed for each type indicated, but not less than 10 sq. yd.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Products: Carpet Tile shall be included by Allowance per division 01210.

1. Allowance shall include cost to Contractor of products and materials ordered under allowance, and shall include taxes, freight, and delivery to Project site.
2. Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials ordered by Owner under allowance shall be included as part of the Contract Sum and not part of the allowance.

B. Carpet Tile Color: Up to three, and as selected by Architect from manufacturer's full range.

C. Performance Characteristics: As follows:

1. Antimicrobial Activity: Not less than 2-mm halo of inhibition for gram-positive bacteria; not less than 1-mm halo of inhibition for gram-negative bacteria; no fungal growth; per AATCC-174.
2. AntiRaveling Backing: manufacturer’s standard.
3. Dry Breaking Strength: Not less than 100 lbf per ASTM D 2646.
4. Colorfastness to Crocking: Not less than 4, wet and dry, per AATCC-165.
5. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) per AATCC-16.
6. ADA compliant for minimum static coefficient of friction of 0.6 for accessible routes.

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 complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

1. Adhesive: Lee’s “Unibond” wet set adhesive or equal.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Verify that substrates and conditions are satisfactory for carpet tile installation and comply with requirements specified.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, and depressions in substrates.

C. Broom and vacuum clean substrates to be covered immediately before installing carpet tile. After cleaning, examine substrates for moisture, alkaline salts, carbonation, or dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION

A. General: Comply with CRI 104, Section 14, "Carpet Modules," and with carpet tile manufacturer's written installation instructions.

B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.

C. Comply with carpet tile manufacturer's written recommendations for seam locations and direction of carpet tile; maintain uniformity of carpet tile direction and lay of pile. At doorways, center seams under the door in closed position. Level adjoining border edges.

D. Do not bridge building expansion joints with carpet tile.

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 finish flooring 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 CRI 104, Section 15, "Protection of Indoor Installations."

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 manufacturer.

END OF SECTION 09681

SECTION 09772 – 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.

1.2 RELATED SECTIONS

A. Division 9 Section “Gypsum Board Assemblies” for Gypsum substrate board.

B. Division 5 Section “Cold-Formed Metal Framing” for Metal Stud Framing

C. Division 9 Section “Painting”.

D. Division 9 Section “Resilient Floor Tile” for Resilient Base.

1.3 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.

1.4 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. Do not submit Manufacturers Material Safety Data Sheets (MSDS) to Architect. Submit MSDS sheets to General Contractor for all products used in the construction.

1.5 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 A.

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.

1.6 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°F) for 48 hours prior to installation.

1.7 PROJECT CONDITIONS

A. Environmental Limitations: Building are to be fully enclosed prior to installation with sufficient heat (70°) 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.

1.8 WARRANTY

A. Furnish one year guarantee against defects in material and workmanship.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURER

A. Marlite, or approved equal. 1 Marlite Drive, Dover, OH 44622. 800-377-1221 FAX (330) 343-4668 Email: info@marlite.com www.marlite.com.

B. Product:

1. Standard FRP

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” nominal
   b. Width - 4'-0” nominal
   c. Length – 8’-0” nominal
3. Tolerance:
   a. Length and Width: +/-1/8”
   b. Square - Not to exceed 1/8”

B. Properties: Resistant to rot, corrosion, staining, denting, peeling, and splintering.

1. Flexural Strength - 1.0 x 10^4 psi per ASTM D 790.
2. Flexural Modulus - 3.1 x 10^5 psi per ASTM D 790.
3. Tensile Strength - 7.0 x 10^3 psi per ASTM D 638.
4. Tensile Modulus - 1.6 x 10^5 psi per ASTM D 638.
5. Water Absorption - 0.72% 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: Provide the following characteristics:

   a. Color: White

   b. Surface: Smooth

c. Fire Rating: Class A (I)

d. Size: 48” x 96” x 0.090” nominal

2.3 MOLDINGS

A. PVC Trim: Thin-wall semi-rigid extruded PVC.

1. Inside Corner
2. Outside Corner
3. Division
4. Edge
5. Color: White

2.4 ACCESSORIES

A. Adhesive: Either of the following construction adhesives complying with ASTM C 557.

1. Marlite C-551 FRP Adhesive - Water- resistant, non-flammable adhesive.
2. Marlite C-915 Construction Adhesive - Flexible, water-resistant, solvent based adhesive, formulated for fast, easy application.
3. Titebond Advanced Polymer Panel Adhesive – VOC compliant, non-flammable, environmentally safe adhesive.
4. Approved Equal.

B. Sealant:

1. Marlite Brand MS-250 Clear Silicone Sealant.
2. Marlite Brand MS-251 White Silicone Sealant.
3. Marlite Brand - Color Match Sealant.
4. Approved Equal.

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” 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” clearance for every 8 foot 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” oversize with high speed drill bit.
   a. Space at 8” maximum on center at perimeter, approximately 1” from panel edge.
   b. Space at in field in rows 16’ on center, with fasteners spaced at 12” 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” 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 09772

SECTION 09912 - PAINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes surface preparation and field painting of exposed exterior and interior items and surfaces.

1. Surface preparation, priming, and finish coats specified in this Section are in addition to shop priming and surface treatment specified in other Sections.

B. Paint exposed surfaces, except where these Specifications indicate that the surface or material is not to be painted or is to remain natural. If an item or a surface is not specifically mentioned, paint the item or surface the same as similar adjacent materials or surfaces. If a color of finish is not indicated, Architect will select from standard colors and finishes available.

1. Painting includes field painting of exposed bare and covered pipes and ducts (including color coding), hangers, exposed steel and iron supports, and surfaces of mechanical and electrical equipment that do not have a factory-applied final finish.

2. Painting includes field painting of exposed sheet metal, louvers, trim, and similar items, unless prefinished with a color.

a. If such items have clear anodized aluminum finish, confirm color with Architect prior to beginning painting.

C. Do not paint prefinished items, concealed surfaces, low voltage wiring, finished metal surfaces, cables, operating parts, and labels.

1. Inside of ductwork behind air supply or return grilles is *not* considered a concealed space; these shall be painted flat black far enough back so that interior of ductwork is not visible.
2. Labels: Do not paint over UL, FMG, or other code-required labels or equipment name, identification, performance rating, or nomenclature plates.
3. Cabling: Do not paint low voltage wiring such as that used for data, alarms and security, sensors for restroom accessories, and audio / video.

D. Coordinate the requirements of this Section with those of other sections that interface with Painting.

1.3 DEFINITIONS

A. General: Standard coating terms defined in ASTM D 16 apply to this Section.

1. Flat refers to a lusterless or matte finish with a gloss range below 15 when measured at an 85-degree meter.
2. Eggshell refers to low-sheen finish with a gloss range between 20 and 35 when measured at a 60-degree meter.
3. Semigloss refers to medium-sheen finish with a gloss range between 35 and 70 when measured at a 60-degree meter.
4. Full gloss refers to high-sheen finish with a gloss range more than 70 when measured at a 60-degree meter.

1.4 SUBMITTALS

A. Product Data: For each paint system indicated. Include block fillers and primers.

1. Material List: An inclusive list of required coating materials. Indicate each material and cross-reference specific coating, finish system, and application. Identify each material by manufacturer's catalog number and general classification.
2. Manufacturer's Information: Manufacturer's technical information, including label analysis and instructions for handling, storing, and applying each coating material.

B. Samples for Initial Selection: For each type of finish-coat material indicated, submit color chips.

1. After color selection, Architect will furnish color chips for surfaces to be coated.

C. On-Site Samples: For each color and material to be applied, provide large-sized (at least 4 feet square) installed samples on actual on-the-job substrate. Samples may be left in place as part of the finished Work, if approved by Architect.

1. Final approval of colors will be from On-Site Samples.
2. Provide correct lighting conditions with light fixtures installed as specified per the contract documents.

D. Qualification Data: For Applicator.

1.5 QUALITY ASSURANCE

A. Applicator Qualifications: A firm or individual experienced in applying paints and coatings similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance for a period not less than five years.

B. Source Limitations: Obtain block fillers and primers for each coating system from the same manufacturer as the finish coats.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original, unopened packages and containers bearing manufacturer's name and label and the following information:

1. Product name and description.
2. Contents by volume, for pigment and vehicle constituents.
3. Thinning instructions.
4. Application instructions.
5. Color name and number.
6. VOC content.

B. Store materials not in use in tightly covered containers in a well-ventilated area at a minimum ambient temperature of 45 deg F. Maintain storage containers in a clean condition, free of foreign materials and residue.

C. Take precautionary measures to prevent fire hazards and spontaneous combustions.

1.7 PROJECT CONDITIONS

A. Apply waterborne paints only when temperatures of surfaces to be painted and surrounding air are between 50 and 90 deg F.

B. Apply solvent-thinned paints only when temperatures of surfaces to be painted and surrounding air are between 45 and 95 deg F.

C. Do not apply paint in rain, fog, or mist; or when relative humidity exceeds 85 percent; or at temperatures less than 5 deg F above the dew point; or to damp or wet surfaces.

1. Painting may continue during inclement weather if surfaces and areas to be painted are enclosed and maintained within temperature and humidity limits specified by manufacturer during application and drying periods.

D. Do not work when dust or insects are present. Ensure that spaces are swept clean, and that no other work is in progress at time of painting.

E. Provide a minimum of 15 fc of lighting on surfaces to be finished.

1.8 EXTRA MATERIALS

A. Furnish extra paint materials from the same production run as the materials applied and in the quantities described below. Package with protective covering for storage and identify with labels describing contents. Deliver extra materials to Owner.

1. Quantity: Furnish Owner with one gallon of each color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers:

1. Benjamin Moore & Co. (Benjamin Moore).
2. Pratt & Lambert.
3. PPG.
4. Sherwin-Williams Co. (Sherwin-Williams). (Basis of Design)

B. Where a specific product is indicated below, provide that product or an equal product made by one of the Acceptable Manufacturers.

2.2 PAINT MATERIALS, GENERAL

A. Material Compatibility: Provide block fillers, primers, and finish-coat materials that are compatible with one another and with the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.

B. Material Quality: Provide manufacturer's best-quality paint material of the various coating types specified that are factory formulated and recommended by manufacturer for application indicated. Paint-material containers not displaying manufacturer's product identification will not be acceptable.

C. Use only one brand of materials insofar as possible.

D. Colors: As selected by Architect from manufacturer's full range.

1. Each exterior material may have a different color.
2. There will be a total of 4 different interior colors, and each room may have 2 different paint colors.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for paint application. Proceed with paint application only after unsatisfactory conditions have been corrected and surfaces receiving paint are thoroughly dry. Start of painting will be construed as Applicator's acceptance of surfaces and conditions within a particular area.

B. Coordination of Work: Review other Sections in which primers are provided to ensure compatibility of the total system for various substrates.

3.2 PREPARATION

A. General: Remove hardware and hardware accessories, plates, machined surfaces, lighting fixtures, and similar items already installed that are not to be painted. If removal is impractical or impossible because of size or weight of the item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations in each space or area, reinstall items removed using workers skilled in the trades involved.

B. Cleaning: Before applying paint or other surface treatments, clean substrates of substances that could impair bond of the various coatings. Remove oil and grease before cleaning.

1. Schedule cleaning and painting so dust and other contaminants from the cleaning process will not fall on wet, newly painted surfaces.

C. Surface Preparation: Clean and prepare surfaces to be painted according to manufacturer's written instructions for each particular substrate condition and as specified.

1. Provide barrier coats over incompatible primers or remove and reprime.

2. Interior Concrete to be Sealed: Remove efflorescence, chalk, dust, dirt, grease, oils, and release agents. Prepare in accordance with manufacturer’s printed instructions.

3. Steel and Iron (Ferrous Metals): Clean ungalvanized ferrous-metal surfaces that have not been shop coated; remove oil, grease, dirt, loose mill scale, and other foreign substances. Use solvent or mechanical cleaning methods that comply with SSPC's recommendations.

a. Treat bare and sandblasted or pickled clean metal with a metal treatment wash coat before priming.
b. Touch up bare areas and shop-applied prime coats that have been damaged. Wire-brush, clean with solvents recommended by paint manufacturer, and touch up with same primer as the shop coat.

4. Galvanized Surfaces: Clean galvanized surfaces with nonpetroleum-based solvents so surface is free of oil and surface contaminants. Remove pretreatment from galvanized sheet metal fabricated from coil stock by mechanical methods.

D. Material Preparation: Mix and prepare paint materials according to manufacturer's written instructions.

1. Maintain containers used in mixing and applying paint in a clean condition, free of foreign materials and residue.
2. Stir material before application to produce a mixture of uniform density. Stir as required during application. Do not stir surface film into material. If necessary, remove surface film and strain material before using.
3. Use only thinners approved by paint manufacturer and only within recommended limits.

E. Tinting: Tint each undercoat a lighter shade to simplify identification of each coat when multiple coats of same material are applied. Tint undercoats to match the color of the finish coat, but provide sufficient differences in shade of undercoats to distinguish each separate coat.

3.3 APPLICATION

A. General: Apply paint according to manufacturer's written instructions. Use applicators and techniques best suited for substrate and type of material being applied.

1. Paint colors, surface treatments, and finishes are indicated in the paint schedules.
2. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions detrimental to formation of a durable paint film.
3. Provide finish coats that are compatible with primers used.
4. The term "exposed surfaces" includes areas visible when permanent or built-in fixtures, grilles, convector covers, covers for finned-tube radiation, and similar components are in place. Extend coatings in these areas, as required, to maintain system integrity and provide desired protection.
5. Paint surfaces behind movable equipment and furniture the same as similar exposed surfaces. Before final installation of equipment, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
6. Paint interior surfaces of ducts with a flat, nonspecular black paint where visible through registers or grilles.
7. Paint back sides of access panels and removable or hinged covers to match exposed surfaces.
8. Finish exterior doors on tops, bottoms, and side edges the same as exterior faces.
9. Finish interior of wall and base cabinets and similar field-finished casework to match exterior.
10. Sand lightly between each succeeding enamel or varnish coat.

B. Scheduling Painting: Apply first coat to surfaces that have been cleaned, pretreated, or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.

1. The number of coats and film thickness required are the same regardless of application method. Do not apply succeeding coats until previous coat has cured as recommended by manufacturer. If sanding is required to produce a smooth, even surface according to manufacturer's written instructions, sand between applications.
2. Omit primer over metal surfaces that have been shop primed and touchup painted.
3. If undercoats, stains, or other conditions show through final coat of paint, apply additional coats until paint film is of uniform finish, color, and appearance. Give special attention to ensure that edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.
4. Allow sufficient time between successive coats to permit proper drying. Do not recoat surfaces until paint has dried to where it feels firm, and does not deform or feel sticky under moderate thumb pressure, and until application of another coat of paint does not cause undercoat to lift or lose adhesion.

C. Application Procedures: Apply paints and coatings by brush, roller, spray, or other applicators according to manufacturer's written instructions.

1. Brushes: Use brushes best suited for type of material applied. Use brush of appropriate size for surface or item being painted.
2. Rollers: Use rollers of carpet, velvet-back, or high-pile sheep's wool as recommended by manufacturer for material and texture required.

3. Spray Equipment: Use airless spray equipment with orifice size as recommended by manufacturer for material and texture required. Use spray equipment only with prior approval of Owner.

D. Minimum Coating Thickness: Apply paint materials no thinner than manufacturer's recommended spreading rate to achieve dry film thickness indicated. Provide total dry film thickness of the entire system as recommended by manufacturer.

E. Interior Concrete to be Sealed. Apply sealer in accordance with manufacturer's printed instructions.

F. Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to items exposed in equipment rooms and occupied spaces.

G. Mechanical items to be painted include, but are not limited to, the following:

1. Uninsulated metal and plastic piping.
2. Pipe hangers and supports.
3. Tanks that do not have factory-applied final finishes.
4. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
5. Duct, equipment, and pipe insulation having "all-service jacket" or other paintable jacket material.
6. Mechanical equipment that is indicated to have a factory-primed finish for field painting.

H. Electrical items to be painted include, but are not limited to, the following:

1. Switchgear.
2. Panelboards.
3. Electrical equipment that is indicated to have a factory-primed finish for field painting.
4. Other, as required to provide fully finished project.

I. Block Fillers: Apply block fillers to concrete masonry block at a rate to ensure complete coverage with pores filled.

J. Prime Coats: Before applying finish coats, apply a prime coat, as recommended by manufacturer, to material that is required to be painted or finished and that has not been prime coated by others. Recoat primed and sealed surfaces where evidence of suction spots or unsealed areas in first coat appears, to ensure a finish coat with no burn-through or other defects due to insufficient sealing.

K. Pigmented (Opaque) Finishes: Completely cover surfaces as necessary to provide a smooth, opaque surface of uniform finish, color, appearance, and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness, or other surface imperfections will not be acceptable.

L. Stipple Enamel Finish: Roll and redistribute paint to an even and fine texture. Leave no evidence of rolling, such as laps, irregularity in texture, skid marks, or other surface imperfections.

M. Completed Work: Match approved samples for color, texture, and coverage. Remove, refinish, or repaint work not complying with requirements.

3.4 CLEANING

A. Cleanup: At the end of each workday, remove empty cans, rags, rubbish, and other discarded paint materials from Project site.

1. After completing painting, clean glass and paint-spattered surfaces. Remove spattered paint by washing and scraping without scratching or damaging adjacent finished surfaces.

3.5 PROTECTION

A. Protect work of other trades, whether being painted or not, against damage from painting. Correct damage by cleaning, repairing or replacing, and repainting, as approved by Architect.

1. Furnish sufficient drop cloths, shields, and protective equipment to prevent spray or droppings from fouling surfaces not being painted, particularly within storage and preparation area.

B. Provide "Wet Paint" signs to protect newly painted finishes. After completing painting operations, remove temporary protective wrappings provided by others to protect their work.

1. After work of other trades is complete, touch up and restore damaged or defaced painted surfaces. Comply with procedures specified in PDCA P1.

C. Place cotton waste, cloths and materials that may constitute a fire hazard in closed metal containers, and remove from site daily.

3.6 EXTERIOR PAINT SCHEDULE

A. Steel and Iron (Ferrous Metal): Provide the following finish systems over exterior ferrous metal. Primer is not required on shop-primed items.

1. Full-Gloss Urethane Alkyd-Enamel Finish: Two finish coats over a rust-inhibitive primer.

a. Primer: SW Pro Industrial Pro-Cryl Universal Metal Primer, B66W310, at 2.0 – 4.0 mils dft.
b. Finish Coats: SW Pro Industrial Urethane Alkyd Enamel, B54W150, at 2.0 – 4.0 mils dft.

B. Zinc-Coated Metal: Provide the following finish systems over exterior zinc-coated metal surfaces:

1. Full-Gloss Urethane Alkyd-Enamel Finish: Two finish coats over a galvanized metal primer.

a. Primer: SW Pro Industrial Pro-Cryl Universal Metal Primer, B66W310, at 2.0 – 4.0 mils dft.
b. Finish Coats: SW Pro Industrial Urethane Alkyd Enamel, B54W150, at 2.0 – 4.0 mils dft.

C. Aluminum: Provide the following finish systems over exterior aluminum surfaces:

1. Full-Gloss Urethane Alkyd-Enamel Finish: Two finish coats over a primer.

a. Primer: SW Pro Industrial Pro-Cryl Universal Metal Primer, B66W310, at 2.0 – 4.0 mils dft.
b. Finish Coats: SW Pro Industrial Urethane Alkyd Enamel, B54W150, at 2.0 – 4.0 mils dft.

D. Mineral-Fiber-Reinforced Cement Panels: Provide the following finish systems over exterior, mineral-fiber-reinforced cement panels:

1. Flat Acrylic Finish: Two finish coats over a primer.

a. Primer: SW Loxon Exterior Concrete and Masonry Primer, A24W8300, at 3.0 mils dft.
b. Finish Coats: SW Duracraft Exterior Latex Flat, at 1.3 mils dft.

E. Smooth Wood: Provide the following finish systems over smooth wood siding, wood trim, and other smooth exterior wood surfaces:

1. Flat Acrylic Finish: Two finish coats over a primer.

a. Primer: SW Exterior Oil Based Wood Primer.
b. Finish Coats: SW Duracraft Exterior Latex Flat, at 1.3 mils dft.

F. Wood Trim: Provide the following finish systems over exterior wood trim:

1. Semigloss Acrylic-Enamel Finish: Two finish coats over a primer.

a. Primer: SW Exterior Oil Based Wood Primer.
b. Finish Coats: SW Duracraft Exterior Latex Flat, at 1.3 mils dft.

G. Parking Stripes:

1. Provide two full coats SW (White TM5626) Set Fast Solvent Based Acrylic on concrete.

3.7 INTERIOR PAINT SCHEDULE

A. Gypsum Board: Provide the following finish systems over interior gypsum board surfaces:

1. Low-Luster Acrylic-Enamel (Eggshell) Finish: Two finish coats over a primer.

a. Primer: SW Pro Mar 200 Zero VOC Latex Primer, B28W2600.
b. Finish Coats: SW Pro Mar 200 Zero VOC Latex Eg-Shel, B20W2600.

B. Steel and Iron (Ferrous Metal): Provide the following finish systems over ferrous metal:

1. Semigloss Alkyd-Enamel Finish: Two finish coats over a primer.

a. Primer: SW Pro Industrial Pro-Cryl Universal Metal Primer, B66W310.
b. Finish Coats: SW Pro Industrial Zero VOC Acrylic Enamel Semi-Gloss.

C. Zinc-Coated Metal: Provide the following finish systems over interior zinc-coated metal surfaces:

1. Semigloss Alkyd-Enamel Finish: Two finish coats over a primer.

a. Primer: SW Pro Industrial Pro-Cryl Universal Metal Primer, B66W310.
b. Finish Coats: SW Pro Industrial Zero VOC Acrylic Enamel Semi-Gloss.

D. Plaster: Provide the following finish systems over new interior plaster surfaces:

1. Flat Acrylic Finish: Two finish coats over a primer.

a. Primer: SW Loxon Concrete and Masonry Primer.
b. Finish Coats: SW Pro Mar 200 Zero VOC Flat Latex.

E. Mineral-Fiber-Reinforced Cement Panels: Provide the following finish systems over interior mineral-fiber-reinforced cement panels:

1. Flat Acrylic Finish: Two finish coats.

a. Finish Coats: SW Pro Mar 200 Zero VOC Flat Latex.

F. Wood and Hardboard: Provide the following paint finish systems over new interior wood surfaces:

1. Semigloss Acrylic-Enamel Finish: Two finish coats over a wood undercoater.

a. Primer: SW Premium Wall & Wood Primer, B28W8111.
b. Finish Coats: SW Pro Industrial Zero VOC Acrylic Semi-Gloss.

G. All-Service Jacket over Insulation: Provide the following finish system on cotton or canvas insulation covering:

1. Flat Acrylic Finish: Two finish coats. Add fungicidal agent to render fabric mildew-proof.

a. Finish Coats: SW Pro Mar 200 Zero VOC Flat Latex.

END OF SECTION 09912

SECTION 10200 - LOUVERS AND VENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Fixed, extruded-aluminum louvers.

B. Coordinate the requirements of this Section with those of other sections that interface with Louvers and Vents, in particular:

1. Division 15 Sections for louvers that are a part of mechanical equipment.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide louvers capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act on vertical projection of louvers.

B. Wind loads per International Building Code, latest edition, including amendments adopted by local governing authorities, but no less than 20 lbs. per sq. ft.

C. Thermal Movements: Provide louvers that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

D. Air-Performance, Water-Penetration, Air-Leakage, and Wind-Driven Rain Ratings: Provide louvers complying with performance requirements indicated, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other Work. Show blade profiles, angles, and spacing.

C. Samples: For units with factory-applied color finishes.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents through one source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. Welding: Qualify procedures and personnel according to the following:

1. AWS D1.2, "Structural Welding Code--Aluminum."

C. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

1.6 PROJECT CONDITIONS

A. Field Measurements: Verify louver openings by field measurements before fabrication and indicate measurements on Shop Drawings.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Louvers:

a. Airolite Company (The).
b. Construction Specialties, Inc.
c. Industrial Louvers, Inc.
d. Louvers & Dampers, Inc.
e. Ruskin Company; Tomkins PLC.
f. Vent Products Company, Inc.

2.2 MATERIALS

A. Aluminum Extrusions: ASTM B 221, alloy 6063-T5 or T-52.

B. Fasteners: Of same basic metal and alloy as fastened metal or 300 Series stainless steel, unless otherwise indicated. Do not use metals that are incompatible with joined materials. Use types and sizes to suit unit installation conditions.

C. Postinstalled Fasteners for Concrete and Masonry: Torque-controlled expansion anchors, made from stainless-steel components, with capability to sustain, without failure, a load equal to 4 times the loads imposed, for concrete, or 6 times the load imposed, for masonry, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.3 FABRICATION, GENERAL

A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Vertical Assemblies: Where height of louver units exceeds fabrication and handling limitations, fabricate units to permit field-bolted assembly with close-fitting joints in jambs and mullions, reinforced with splice plates.

1. Continuous Vertical Assemblies: Fabricate units without interrupting blade-spacing pattern.

C. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

D. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints of 3/8 inch.

1. Frame Type: Channel, unless otherwise indicated.

E. Include supports, anchorages, and accessories required for complete assembly.

F. Provide vertical mullions of type and at spacings indicated, but not more than recommended by manufacturer, or 72 inches o.c., whichever is less.

1. Semirecessed Mullions: Where indicated, provide mullions partly recessed behind louver blades so louver blades appear continuous. Where length of louver exceeds fabrication and handling limitations, fabricate with interlocking split mullions and close-fitting blade splices designed to permit expansion and contraction.
2. Exposed Mullions: Where indicated, provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.

3. Exterior Corners: Prefabricated corner units with mitered and welded blades and with semirecessed mullions at corners.

G. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer, concealed from view, unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

H. Where indicated, provide subsills made of same material as louvers for recessed louvers.

2.4 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal, Drainable-Blade Louver: Drainable-blade louver with mullions capable of collecting and draining water from blades.

1. Basis-of-Design Product: Airolite Model CB 6774 or equal product by an acceptable manufacturer. Use where Drawings indicate continuous horizontal louver blades with concealed mullions.

2. Louver Depth: 4 inches.
3. Frame and Blade Nominal Thickness: As required to comply with structural performance requirements, but not less than 0.080 inch for blades and 0.080 inch for frames.
4. Performance Requirements:

   a. Free Area: Not less than 48%.
   b. Point of Beginning Water Penetration: Not less than 1000 fpm.
   c. Air Performance: Not more than 0.10-inch wg static pressure drop at 750-fpm free-area velocity.

5. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.5 LOUVER SCREENS

A. General: Provide screen at each exterior louver, covering entire louver.

1. Screen Location for Fixed Louvers: Interior face.

2. Screening Type: Insect screening:

   a. For aluminum louvers, 18-by-16 aluminum mesh, 0.012-inch wire.

B. Secure screens to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches from each corner and at 12 inches o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
2. Finish: Same finish as louver frames to which louver screens are attached.

3. Type: Rewirable frames with a driven spline or insert for securing screen mesh.

2.6 BLANK-OFF PANELS

A. General: Provide to seal louvers wherever opening is not required on back side for ductwork penetrations.

B. Uninsulated, Blank-off Panels:

1. Aluminum sheet for aluminum louvers, not less than 0.050-inch nominal thickness, unless otherwise indicated.
2. Galvanized steel sheet for steel louvers, not less than 0.040-inch nominal thickness, unless otherwise indicated.
3. Panel Finish: Same type of finish applied to louvers, but black color.
4. Attach blank-off panels to back of louver frames with stainless-steel, sheet metal screws.

2.7 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish louvers after assembly.

2.8 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with system established by the Aluminum Association for designating aluminum finishes.

B. High-Performance Organic-Coating Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

1. Fluoropolymer Three-Coat Coating System: Manufacturer's standard three-coat, thermocured system consisting of specially formulated inhibitive primer, fluoropolymer color coat, and clear fluoropolymer topcoat, with both color coat and clear topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

a. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Secure louvers into openings with anchor bolts into sub-frame at head and jambs. Securing louvers at the sill is only acceptable where shown in drawings.

D. Form closely fitted joints with exposed connections accurately located and secured.

E. Provide perimeter reveals and openings of uniform 3/8 inch width for sealants and joint fillers, unless different joint width is indicated on Drawings.

F. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

G. Protect galvanized and nonferrous-metal surfaces from corrosion or galvanic action by applying a heavy coating of bituminous paint on surfaces that will be in contact with concrete, masonry, or dissimilar metals.

H. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants.

I. Seal all concealed penetrations through subsills with non-curing sealant in compliance with Division 7 section “Joint Sealants.”

3.3 ADJUSTING AND CLEANING

A. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate until final cleaning.

B. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

C. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in factory-applied finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating. Comply with manufacturer’s instructions regarding coating materials.

END OF SECTION 10200

SECTION 10432 - SIGNAGE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Room signs.
2. Accessible parking signs.
3. Signage accessories.

B. Coordinate the requirements of this Section with those of other sections that interface with Signage.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of sign.

B. Shop Drawings: Include plans, elevations, and large-scale sections of typical members and other components. Show mounting methods, grounds, mounting heights, layout, spacing, reinforcement, accessories, and installation details.

1. Provide message list for each sign, including large-scale details of wording, lettering, artwork**,** and braille layout.

a. For typical interior signage showing room name and numbers, it is acceptable to provide shop drawings illustrating typical signage details, accompanied by a list of all signs with accompanying text.

C. Samples: For each type of sign material provide a full-size sample indicating:

1. Type, style and color selection.
2. Method of attachment.
3. If approved by Architect and at Architect’s discretion, sample may be incorporated in the final Work.

D. Maintenance Data: For signage cleaning and maintenance requirements to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain each sign type through one source from a single manufacturer.

B. Regulatory Requirements: Comply with the Americans with Disabilities Act (ADA), the Texas Accessibility Standards, and with other code provisions as adopted by authorities having jurisdiction.

1. Interior Code Signage: If required by authorities having jurisdiction, provide signage as required by accessibility and other regulations and requirements, including but not limited to the following:

a. Fire Doors.
b. Room Capacity.
c. Stairway Identification.
d. Signs for Accessible Spaces.

1.5 COORDINATION

A. For signs supported by or anchored to permanent construction, advise installers of anchorage devices about specific requirements for placement of anchorage devices and similar items to be used for attaching signs. Furnish templates for installation of anchorage devices, if required.

1.6 ALLOWANCE

A. Materials specified under this Section shall be purchased under an Allowance in accordance with Division 1 Section “Allowances.”

PART 2 - PRODUCTS

2.1 ROOM SIGNS

A. General: Provide panel signs that comply with requirements indicated for materials, thicknesses, finishes, colors, designs, shapes, sizes, and details of construction.

B. Materials:

1. Cast-Acrylic Sheet: Manufacturer's standard. Color shall be clear, translucent or solid, as selected by Architect from manufacturer's full range.
2. Plastic Laminate: Provide high-pressure laminate engraving stock with face and core plies in finishes and color combinations indicated, as selected by Architect from manufacturer's full range.
3. PVC: Extruded, high-impact PVC plastic in color as selected by Architect.

C. Fabrication:

1. Unframed Signs: Fabricate signs with edges mechanically and smoothly finished to comply with the following requirements:

a. Edge Condition: Square cut.
b. Corner Condition: Rounded to radius of approximately ½ inch.

2. Laminated Panels: Permanently laminate face panels to backing sheets of material; use manufacturer's standard process.

D. Graphic Content and Style:

1. Provide sign copy that complies with requirements of governing authorities and as may be indicated on the Drawings for size, style, spacing, content, mounting height and location, material, finishes, and colors of signage.

2. Tactile and Braille Copy: Manufacturer's standard process for producing copy complying with ADA Accessibility Guidelines and ICC/ANSI A117.1. Text shall be accompanied by Grade 2 braille. Produce precisely formed characters with square cut edges free from burrs and cut marks.

a. Material: Opaque acrylic sheet.
b. Raised-Copy Thickness: Not less than 1/32 inch above adjacent surfaces.

E. Room Signage Schedule:

1. Provide a sign for each space including room number and name.
2. Do not provide signs for lobbies, corridors and hallways.

2.2 ACCESSIBLE PARKING SIGNS

A. Accessible Parking Signs:

1. Material: 0.080-inch stainless steel, galvanized steel, or aluminum.
2. Background Color: Blue.
3. Copy Material: Reflective vinyl.

B. Symbols of Accessibility: Provide 6-inch- high symbol fabricated from opaque nonreflective vinyl film, 0.0035-inch nominal thickness, with pressure-sensitive adhesive backing suitable for both exterior and interior applications.

C. Mounting: Mounted to Tube Steel Post with fasteners as indicated on Drawings.

2.3 ACCESSORIES

A. Mounting Methods: Use concealed fasteners fabricated from materials that are not corrosive to sign material and mounting surface.

B. Anchors and Inserts: Provide nonferrous-metal or hot-dip galvanized anchors and inserts for exterior installations and elsewhere as required for corrosion resistance. Use toothed steel or lead expansion-bolt devices for drilled-in-place anchors. Furnish inserts, as required, to be set into concrete or masonry work.

2.4 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of range of approved Samples. Noticeable variations in same piece are not acceptable. Variations in appearance of other components are acceptable if they are within range of approved Samples and are assembled or installed to minimize contrast.

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 work.

B. Examine supporting members to ensure that surfaces are at elevations indicated or required to comply with authorities having jurisdiction and are free from dirt and other deleterious matter.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Locate signs and accessories where indicated, using mounting methods of types described and in compliance with manufacturer's written instructions.

1. Install signs level, plumb, and at heights indicated, with sign surfaces free from distortion and other defects in appearance.
2. Provide shims or other fixed and firmly placed means as necessary to ensure that signs are plumb and surfaces in plane. If required, at Architect's discretion, provide matching trim or other measures acceptable to Architect around signs to hide irregularities in distance between substrate and sign edges.
3. Interior Wall Signs: Install signs on walls adjacent to latch side of door. Where not possible, such as double doors, install signs on nearest adjacent walls. Locate to allow approach within 3 inches of sign without encountering protruding objects or standing within swing of door.

B. Wall-Mounted Room Signs: Attach panel signs to wall surfaces using methods recommended by manufacturer.

1. Where panel signs are scheduled or indicated to be mounted on glass, provide matching plate on opposite side of glass to conceal mounting materials.

C. Accessible Parking Signs: Mount in accordance with manufacturer's instructions.

3.3 CLEANING AND PROTECTION

A. After installation, clean soiled sign surfaces according to manufacturer's written instructions. Protect signs from damage until acceptance by Owner.

END OF SECTION 10432

SECTION 10521 – FIRE EXTINGUISHERS AND CABINETS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Portable fire extinguishers.
2. Fire-protection cabinets for portable fire extinguishers.

B. Coordinate the requirements of this Section with those of other sections that interface with Fire Extinguishers and Cabinets.

1.3 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for fire-protection cabinets.

1. Fire Extinguishers: Include rating and classification.
2. Fire-Protection Cabinets: Include roughing-in dimensions, details showing mounting methods, relationships of box and trim to surrounding construction, door hardware, cabinet type, trim style, and panel style.

B. Maintenance Data: To include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain fire extinguishers and fire-protection cabinets through one source from a single manufacturer. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.

B. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

C. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

D. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements of ASTM E 814 for fire-resistance rating of walls where they are installed.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Fire End & Croker Corporation.
B. General Fire Extinguisher Corporation.
C. JL Industries, Inc.
D. Kidde Fyrnetics.
E. Larsen's Manufacturing Company.
F. Modern Metal Products; Div. of Technico.
G. Moon American.
H. Potter Roemer; Div. of Smith Industries, Inc.
I. Watrous; Div. of American Specialties, Inc.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B.

B. Tempered Break Glass: ASTM C 1048, Kind FT, Condition A, Type I, Quality q3, 1.5 mm thick.

2.3 PORTABLE FIRE EXTINGUISHERS

A. General: Provide fire extinguishers of type, size, and capacity for each fire-protection cabinet indicated.

1. Valves: Manufacturer's standard.
2. Handles and Levers: Manufacturer's standard.
3. Instruction Labels: Include pictorial marking system complying with NFPA 10, Appendix B.

B. Basis of Design Product: Provide JL Industries Model Cosmic 5E, or equal product made by one of the Acceptable Manufacturers.

C. Multipurpose Dry-Chemical Type in Steel Container: UL-rated 3-A:40-B:C, 5-lb nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.4 FIRE-PROTECTION CABINET

A. Basis-of-Design Product: JL Industries Ambassador No. **1017-G17**>, or a comparable product made by one of the Acceptable Manufacturers.

B. Cabinet Construction: Fire rating shall match that of the wall or partition in which it is placed.

C. Cabinet Material: Enameled-steel sheet.

D. Semi-Recessed Cabinet: Cabinet box recessed in walls of sufficient depth to suit style of trim indicated.

1. 3” Rolled Trim: One-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (rolled) of 3 inches.

E. Cabinet Trim Material: Same material and finish as door.

F. Door Material: Steel sheet.

G. Door Style: Glazed panel with frame.

H. Door Glazing: Tempered float glass (clear).

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 pivot hinge 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. Lettered Door Handle: One-piece, mill aluminum door handle with the word "FIRE" embossed into face.
3. Door Lock: Cylinder lock, keyed alike to other cabinets.
4. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated by Architect.

a. Identify fire extinguisher in fire-protection cabinet with the words "FIRE EXTINGUISHER."

1) Location: Applied to cabinet glazing.
2) Application Process: Silk-screened.
3) Lettering Color: Red.
4) Orientation: Vertical.

K. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:

a. Exterior of cabinet, door, and trim, except for those surfaces indicated to receive another finish.
b. Interior of cabinet and door.

2. Steel: Baked enamel.

a. Color and Texture: As selected by Architect from manufacturer's full range.

2.5 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. Construct fire-rated cabinets with double walls fabricated from 0.0428-inch- thick, cold-rolled steel sheet lined with minimum 5/8-inch- thick, fire-barrier material.

    a. Provide factory-drilled mounting holes.

B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles selected.

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.

C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces 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 the same piece are not acceptable.

2.7 STEEL FINISHES

A. Surface Preparation: Clean surfaces of dirt, oil, grease, mill scale, rust, and other contaminants that could impair paint bond using manufacturer's standard methods.

B. Baked-Enamel Finish: Immediately after cleaning and pretreating, apply manufacturer's standard two-coat, baked-enamel finish consisting of prime coat and thermosetting topcoat. Comply with paint manufacturer's written instructions for applying and baking to achieve a minimum dry film thickness of 2 mils.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine walls and partitions for suitable framing depth and blocking where **recessed** cabinets will be installed.

B. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged units.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare recesses for recessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION

A. General: Install fire-protection specialties in locations and at mounting heights indicated or, if not indicated, at heights indicated below:

1. Fire-Protection Cabinets: 54 inches above finished floor to top of cabinet.
2. Mounting Brackets: 54 inches above finished floor to top of fire extinguisher.

B. Fire-Protection Cabinets: Fasten fire-protection cabinets to structure, square and plumb.

1. Unless otherwise indicated, provide recessed fire-protection cabinets. If wall thickness is not adequate for recessed cabinets, provide semirecessed 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. Mounting Brackets: Fasten mounting brackets to surfaces, square and plumb, at locations indicated.

3.4 ADJUSTING AND CLEANING

A. Remove temporary protective coverings and strippable films, if any, as fire-protection specialties 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 manufacturer.

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 10521

SECTION 10532 – WALKWAY COVERS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Pre-engineered aluminum walkway cover system as shown on the drawings.
2. Drainage system for walkway cover.
3. Concrete foundations engineered by the canopy supplier.

B. Coordinate the requirements of this Section with those of other sections that interface with Walkway Covers.

1.3 SUBMITTALS

A. Product Data:

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings:

1. Furnish complete shop drawings for cover and foundations, showing installation details, layout, plans, sections, accessories, and anchorages.
2. Shop drawings shall bear the seal of a Texas Registered Professional Engineer, certifying design compliance of cover and foundations with live and wind loads required by applicable building codes.

C. Samples:

1. For each type of exposed material and factory-applied finish.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Avadek Walkway Cover Systems and Canopies.

B. Equal system by equal manufacturer may be acceptable, but only with prior approval of the Architect.

2.2 PRODUCTS

A. All structural components shall be 6063-T6 alloy extruded aluminum.

B. Columns, beams, support cables, and roof deck shall be sized as required to meet the engineering requirements of the Project.

C. Provide all components and accessories necessary for concealed drainage system.

D. Exposed surfaces shall be Kynar 500 in color selected by Architect from manufacturer's standard color selection.

E. Provide neoprene shims to separate dissimilar metals (aluminum from steel).

F. Provide bituminous coating for concealed metal surfaces in contact with concrete.

2.3 FASTENERS

A. General: Provide fasteners of size and type recommended by manufacturer that comply with requirements specified in this Article for material, manufacture, and code requirements.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install the canopy in strict accordance with the manufacturer's written instructions.

B. Install columns and beams straight and true.

3.2 INSTALLATION

A. Install raincaps over draining sections of the deck.

B. Fill downspout columns with grout to the discharge level to prevent standing water. Deflectors shall be installed after grouting.

C. Install flashing as required.

D. Ensure that dissimilar metals are separated by neoprene shims or spacers. Ensure that metals are coated with bituminous coating in concealed locations to prevent contact with concrete.

3.3 CLEANING

A. Thoroughly clean after installation, using cleanser and methods as recommended by manufacturer.

END OF SECTION 10532

SECTION 10801 - TOILET AND BATH ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:

1. Washroom accessories and anchorage hardware.
2. Grab bars.
3. Mirrors.

B. Coordinate the requirements of this Section with those of other sections that interface with Toilet and Bath Accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: Provide products of same manufacturer unless otherwise approved by Architect.

1.5 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. Provide to general contractor requirements for blocking or reinforcement in walls and partitions for secure anchorage.

1.6 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch minimum nominal thickness, unless otherwise indicated.

B. Brass: ASTM B 19 flat products; ASTM B 16, rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch minimum nominal thickness.

D. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 hot-dip zinc coating.

E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 MANUFACTURERS

A. Basis-of-Design Product: The design for accessories is based on products indicated, as manufactured by **Bobrick Washroom Equipment, Inc.** Subject to compliance with requirements, provide the named product or a comparable product by one of the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bradley Corporation.
4. General Accessory Manufacturing Co. (GAMCO).

B. Where a manufacturer different from Bobrick or one of the other manufacturers listed above is called for, provide the product of that manufacturer as specified.

2.3 WASHROOM ACCESSORIES

A. **Toilet Tissue Dispenser**: B-4288.

1. Description: Double-roll dispenser.
2. Mounting: Surface mounted.
3. Operation: Noncontrol delivery with heavy duty spindle.
4. Capacity: Designed for 5-inch- diameter tissue rolls.
5. Material and Finish: Stainless steel, No. 4 finish (satin).
6. Lockset: Flush tumbler type.

B. **Towel Dispenser/Waste Receptacle**: B-43944.

1. Mounting: Recessed, designed for nominal 4-inch wall depth.
2. Minimum Towel-Dispenser Capacity: 600 C-fold or 800 multifold paper towels.
3. Minimum Waste-Receptacle Capacity: 16 gal.
4. Material and Finish: Stainless steel, No. 4 finish (satin).
5. Liner: Reusable, vinyl waste-receptacle liner.
6. Lockset: Tumbler type for towel-dispenser compartment.

C. **Soap Dispenser**: B-4112.

1. Description: Designed for dispensing soap in liquid or lotion form.
2. Mounting: Surface mounted.
3. Capacity: 40 oz..
4. Materials: Stainless steel No. 4 (satin).
5. Lockset: Tumbler type.
6. Refill Indicator: Window type.

D. **Napkin Disposal**: B-270.

1. Mounting: Surface mounted.
2. Door or Cover: Self-closing disposal-opening cover.
3. Receptacle: Removable.
4. Material and Finish: Stainless steel, No. 4 finish (satin).

E. **Mirror**: B-165.

1. Size: As indicated on Drawings..
2. Frame: Stainless-steel channel with bright-polished finish.
3. Corners: Mitered and mechanically interlocked.
4. Hangers: Produce rigid, tamper- and theft-resistant installation. Use one-piece, galvanized steel, wall-hanger device with spring-action locking mechanism to hold mirror unit in position with no exposed screws or bolts.

F. **36” Grab Bar**: B-6806x36

1. Configuration: As indicated on Drawings.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch thick.

4. Finish: Smooth, No. 4, satin finish.
5. Outside Diameter: 1-1/2 inches maximum outside actual (not nominal) dimension.

G. **42" Grab Bar**: B-6806x42

1. Configuration: As indicated on Drawings.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch thick.
4. Finish: Smooth, No. 4, satin finish.
5. Outside Diameter: 1-1/2 inches maximum outside actual (not nominal) dimension.

2.4 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 six 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.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf, when tested according to method in ASTM F 446.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 10801

SECTION 13125 - METAL BUILDING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

A. The metal building provider shall design, engineer, and provide all above-ground systems made of steel, except as may be specifically excluded below.

B. This Section includes:

1. **NOTE:** The metal building provider shall design, engineer and provide all above-ground systems including those indicated below, unless specifically excluded:

    a. Metal building systems that consist of integrated sets of mutually dependent components including structural framing**,** roof panels, and accessories.
    b. Anchor bolts for embedment into concrete foundation for attachment of steel frame.
    c. Grout.
    d. Intermediate floor or mezzanine framing, excluding cold-formed members and non-metallic decking.
    e. Stairs and railings.
    f. Intermediate horizontal framing in gable end walls for exterior wall studs' anchorage.

2. Exclusions from the metal building provider's responsibilities:

    a. Cold-formed metal studs in exterior walls and interior partitions, unless required for structural performance of the metal building system.
    b. Items specifically indicated on the Drawings as being of another trade.

C. Coordinate the requirements of this Section with those of other sections that interface with Metal Building Systems.

1. Metal building system will also include floor joists. Refer to Division 5 Section "Steel Joists" for requirements.

2. Metal building system will also include floor deck. Refer to Division 5 Section "Steel Deck" for requirements.

3. Metal building system will also include steel stairs. Refer to Division 5 Section "Metal Stairs and Railings" for requirements.

1.3 DEFINITIONS

A. Refer to MBMA's "Metal Building Systems Manual" for definitions of terms for metal building system construction.

1.4 SYSTEM DESCRIPTION

A. General: Provide a complete, integrated set of metal building system manufacturer's standard mutually dependent components and assemblies that form a metal building system capable of withstanding structural and other loads, thermally induced movement, and exposure to weather without failure or infiltration of water into building interior. Include primary and secondary framing, metal roof panels, metal wall panels, soffit panels, and accessories complying with requirements indicated.

B. Primary Frame Type:

1. Rigid Modular: Solid-member, structural-framing system with interior columns.

C. Secondary Frame Type: Manufacturer's standard purlins and joists and girts.

D. End-Wall Framing: Engineer end walls to be expandable. Provide primary frame, capable of supporting full-bay design loads, and end-wall columns.

E. Roof System: standing-seam metal roof panels with concealed anchorage assembly, and accessory components.

F. Exterior Wall System: Manufacturer's standard metal wall panels with concealed anchorage assembly, and accessory components.

1.5 SYSTEM PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide metal building systems capable of withstanding the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Engineer metal building systems according to procedures in MBMA's "Metal Building Systems Manual."

2. Engineer metal building systems to comply with the requirements of the applicable building codes, including but not limited to:

a. Live loads. Include vertical loads induced by the building occupancy indicated on Drawings. Include loads induced by maintenance workers, materials, and equipment for roof live loads.

b. Wind loads: Include horizontal loads induced by a basic wind speed corresponding to a 10-year, mean-recurrence interval at Project site of **122** mph.

c. Collateral Loads: Include additional dead loads other than the weight of metal building system for permanent items such as sprinklers, mechanical systems, electrical systems, and ceilings.

d. Load Combinations: Design metal building systems to withstand the most critical effects of load factors and load combinations as required by applicable building codes.

e. If no building codes govern, at a minimum comply with International Building Code, latest edition.

3. Deflection Limits: Engineer assemblies to withstand design loads with deflections no greater than the following:

a. Lateral Deflection: 1/360.
b. All other elements, including roof and wall panels: 1/240 of the span.

4. Design secondary framing system to accommodate deflection of primary building structure and construction tolerances, and to maintain clearances at openings.

5. Auxiliary Loads: Include dynamic live loads, such as those generated by cranes and materials-handling equipment indicated on Drawings.

B. Thermal Movements: Provide metal panel systems that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 100 deg F, ambient; 180 deg F, material surfaces.

C. Water Penetration for Metal Roof and Wall Panels: No water penetration.

D. Wind-Uplift Resistance: Provide metal roof panel assemblies that comply with UL 580 for Class 90.

E. Fire Resistance Rating: As indicated on Drawings.

1.6 SUBMITTALS

A. Product Data: Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each type of the following metal building system components:

1. Structural-framing system.
2. Metal roof panels.
3. Metal wall panels.
4. Flashing and trim.
5. Accessories, including roof mounted items such as curbs, pipe penetrations, etc.

B. Calculations for design criteria required by the engineer designing the foundations, including reactions and moments. This shall be provided as soon as possible after acceptance by Contractor of metal building supplier’s contract.

C. Design calculations, signed and sealed by a qualified Professional Engineer in the state of Texas.

D. Shop Drawings: For the following metal building system components. Include plans, elevations, sections, details, and attachments to other work. Include drawings for fabrication and erection.

1. For all building systems include structural analysis data and shop drawings signed and sealed by a qualified Professional Engineer in the state of Texas.

2. Anchor-Bolt Plans: Submit anchor-bolt plans before foundation work begins. Include location, diameter, and projection of anchor bolts required to attach metal building to foundation.

3. Structural-Framing Drawings: Show complete fabrication of primary and secondary framing; include provisions for openings. Indicate welds and bolted connections, distinguishing between shop and field applications. Include transverse cross-sections.

4. Metal Roof and Wall (if applicable) Panel Layout Drawings: Show layouts of metal (and translucent) panels including methods of support. Include details of edge conditions, joints, panel profiles, corners, anchorages, trim, flashings, closures, and special details. Distinguish between factory- and field-assembled work; show locations of exposed fasteners.

E. Samples for Selection: For each type of building component with factory-applied color finish.

F. Indicate welded connections using standard AWS symbols. Indicate net weld lengths.

G. Submit manufacturer’s printed installation instructions.

H. Maintenance Data: For metal panel finishes to include in maintenance manuals.

I. Warranties: Special warranties specified in this Section.

1.7 QUALITY ASSURANCE

A. Welding: Comply with AWS D1.1, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

B. Structural Steel: Comply with AISC's "Specification for Structural Steel Buildings--Allowable Stress Design, Plastic Design," or AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings," for design requirements and allowable stresses.

C. Cold-Formed Steel: Comply with AISI's "Specification for the Design of Cold-Formed Steel Structural Members," or AISI's "Load and Resistance Factor Design Specification for Steel Structural Members," for design requirements and allowable stresses.

D. Fire-Resistance Ratings: Where indicated, provide metal panel assemblies identical to those of assemblies tested for fire resistance per ASTM E 119 by a testing and inspecting agency acceptable to authorities having jurisdiction.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver, unload, store and erect components, sheets, panels, and other manufactured items so as not to be damaged or deformed. Package metal panels for protection during transportation and handling.

1.9 COORDINATION

A. Coordinate size and location of concrete foundations and casting of anchor-bolt inserts into foundations.

B. Coordinate installation of roof curbs, equipment supports, and roof penetrations that may be required in other sections.

C. Coordinate metal panel assemblies with rain drainage work, flashing, trim, and construction of supports and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

D. Coordinate with other systems that interface with the metal building, including doors and windows, louvers, mechanical equipment, and the like.

1.10 WARRANTY

A. Special Weathertightness Warranty for Standing-Seam Metal Roof Panels: Manufacturer's single source, no dollar limit warranty standard form in which manufacturer agrees to repair or replace at manufacturer’s cost, standing-seam, metal roof panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.

1. Warranty Period: Twenty years from date of Substantial Completion

2. Erector will co-sign warranty, and make any required repairs for two years from date of Substantial Completion.

B. Special Weathertightness Warranty for Wall Panels: Manufacturer's single source, no dollar limit warranty standard form in which manufacturer agrees to repair or replace at manufacturer’s cost, metal wall panel assemblies that fail to remain weathertight, including leaks, within specified warranty period.

1. Warranty Period: Twenty years from date of Substantial Completion

2. Erector will co-sign warranty, and make any required repairs for two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with requirements, provide system by one of the following:

1. American International Building Systems.
2. Butler Mfg. Co.
3. Rigid Building Systems
4. Whirlwind Building Systems
5. Robert S. Henry Company
6. Others, with approval by Architect.

2.2 STRUCTURAL-FRAMING MATERIALS

A. W-Shapes: ASTM A 992; ASTM A 572, Grade 50 or 55; or ASTM A 529, Grade 50 or 55.

B. Channels, Angles, M-Shapes, S-Shapes, Plate and Bar: ASTM A 36; ASTM A 572, Grade 50 or 55; or ASTM A 529, Grade 50 or 55.

C. Steel Pipe: ASTM A 53, Type E or S, Grade B.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B or C, structural tubing.

E. Joist Girders: "Standard Specifications for Joist Girders," in SJI's "Standard Specifications, Load Tables, and Weight Tables for Steel Joists and Joist Girders."

F. Steel Joists: "Standard Specifications for Open Web Steel Joists, K-Series," in SJI's "Standard Specifications, Load Tables, and Weight Tables for Steel Joists and Joist Girders."

G. Anchor Bolts: ASTM A 325 or Section 1C or ASTM A 307, plain finish.

H. Bolts, Nuts, and Washers: ASTM A 325, Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers. Plain finish.

I. Anchor Rods: ASTM F 1554, Grade 36.

J. Threaded Rods: ASTM A 193.

K. Primer: SSPC-Paint 15, Type I, red oxide.

2.3 GROUT

A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107, factory-packaged, nonmetallic aggregate grout, noncorrosive, nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.4 MATERIALS FOR METAL PANELS

A. Metallic-Coated Steel Sheet Prepainted with Coil Coating: Steel sheet metallic coated by the hot-dip process and prepainted by the coil-coating process to comply with ASTM A 755/A 755M.

1. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS), Grades 33 through 80, with G90 coating designation, 24 gauge.
2. Surface: Smooth, flat finish.
3. Exposed Finishes: Apply the following coil coating, as specified or indicated on Drawings:

    a. High-Performance Organic Finish (3-Coat Fluoropolymer): AA-C12C40R1x, with a minimum total dry film thickness of 1.5 mil. Comply with AAMA 2605 and with coating and resin manufacturers' written instructions.

    b. Color as selected by architect from manufacturer’s full range.

    c. Concealed Finish: Apply pretreatment and manufacturer's standard white or light-colored backer finish, consisting of prime coat and wash coat with a total minimum dry film thickness of 0.5 mil.

2.5 THERMAL INSULATION FOR FIELD-ASSEMBLED METAL PANELS

A. Refer to Division 7 section “Building Insulation”.

2.6 MISCELLANEOUS MATERIALS

A. Fasteners: Self-tapping screws, bolts, nuts, self-locking rivets and bolts, end-welded studs, and other suitable fasteners designed to withstand design loads and as recommended by manufacturer. Provide fasteners with heads matching color of materials being fastened.

B. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

C. Metal Panel Sealants:

1. Sealant Tape: Pressure-sensitive, 100 percent solids, gray polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape of manufacturer's standard size.
2. Joint Sealant: ASTM C 920; one-part silicone-rubber sealant; of type, grade, class, and use classifications required to seal joints in metal panels and remain weathertight; and as recommended by metal building system manufacturer.

2.7 FABRICATION, GENERAL

A. Tolerances: Comply with MBMA's "Metal Building Systems Manual": Chapter IV, Section 9, "Fabrication and Erection Tolerances."

B. Metal Panels: Fabricate and finish metal panels at the factory, by manufacturer's standard procedures and processes, as necessary to fulfill indicated performance requirements. Comply with indicated profiles and with dimensional and structural requirements.

2.8 STRUCTURAL FRAMING FABRICATION

A. All framing members shall carry an identifying mark, either stamped, stenciled, or painted.

B. Primary Framing including but not limited to transverse and lean-to frames; rafter, rake, and canopy beams; sidewall, intermediate, end-wall, and corner columns; intermediate floor framing (if any); and wind bracing: 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.

C. Secondary Framing including but not limited to purlins, girts, eave struts, flange bracing, base members, gable angles, clips, headers, jambs, and other miscellaneous structural members: Shop fabricate framing components from cold-formed, structural-steel sheet 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.

D. End-Wall Framing: Manufacturer's standard primary end-wall framing fabricated for field-bolted assembly.

E. Canopy Framing: Manufacturer's standard structural-framing system, designed to withstand required loads, fabricated from shop-welded, built-up steel plates or structural-steel shapes. Provide frames with attachment plates and splice members, factory drilled for field-bolted assembly.

F. Bracing: Provide wind bracing as follows and as indicated on drawings:

1. Rigid Portal Frames: Fabricate from shop-welded, built-up steel plates or structural-steel shapes to match primary framing; of size required to withstand design loads. Locate in approximate locations indicated on drawings.

2. Rods (ASTM A 36; ASTM A 572, Grade 50; or ASTM A 529, Grade 50) or Cable (ASTM A 475). Locate in roof plane only, no “X” bracing allowed in walls.

G. Bolts: Provide plain finish bolts for structural-framing components that are primed or finish painted. Provide zinc-plated bolts for structural-framing components that are galvanized.

2.9 METAL ROOF AND WALL PANELS

A. Standing-Seam Metal Roof Panels: MBCI **Batten-lok**, or equal approved by architect.

B. Concealed-Fastener Metal Wall Panels: Berridge **HR-16**, or equal approved by architect.

C. Panel Lengths:

1. Roof Panels: Fabricate roof panels in single piece for full length of roof slope from eave to slope, unless approved otherwise by Architect.

2. Wall Panels: Fabricate wall panels in single piece for full height of wall, unless approved otherwise by Architect.

2.10 METAL SOFFIT PANELS

A. General: Provide factory-formed metal soffit 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. Metal Soffit Panels: Match material of metal roof panels.

1. Finish: Match finish of metal roof panels.
2. Color: As selected by Architect from manufacturer's full range.
3. Sealant: Factory applied within interlocking joint.

C. Reveal-Joint-Profile Metal Soffit Panels: Solid panels formed with vertical panel edges and flat pan between panel edges; with recessed reveal joint between panels. Provide perforated panels where indicated on the drawings.

1. Basis-of-Design Product: Berridge FW-12 or a comparable product, with architect's approval.
2. Panel Coverage: 12.0 inches.
3. Panel Height: 1.0 inch.

2.11 .ACCESSORIES

A. General: Provide accessories as standard with metal building system manufacturer and as specified. Comply with indicated profiles and with dimensional and structural requirements.

B. Roof Panel Accessories: Provide components required for a complete metal roof panel assembly including copings, fasciae, corner units, eave and ridge closures, clips and cleats, backing plates, sealants, gaskets, fillers, closure strips, thermal spacer blocks, 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, eave and rake closure strips, and similar items. Match material and finish of metal wall panels, unless otherwise indicated.

D. Flashing and Trim: Formed from minimum 26 gauge metallic-coated steel sheet finished to match adjacent metal panels, as required to seal against weather and to provide finished appearance.

E. Gutters and downspouts: Formed from minimum 26 gauge metallic-coated steel sheet; finished to match roof fascia and rake trim. Profile as shown, complete with end pieces, outlet tubes, and other special pieces as required. Fabricate in minimum 96-inch- long sections, according to SMACNA's "Architectural Sheet Metal Manual."

1. Supports: Fabricated from same material and finish as gutters; spaced 36 inches o.c.
2. Strainers: Bronze, copper, or aluminum wire ball type at outlets.

F. Roof Ventilators: Gravity type, complete with hardware, flashing, closures, and fittings, as indicated on drawings.

G. Roof Curbs: Fabricated from minimum 0.0428-inch- thick, metallic-coated steel sheet or aluminum-zinc alloy-coated steel sheet 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 indicated loads and of size and height indicated. Include subframing.

H. Pipe Flashing: Premolded, EPDM pipe collar with flexible aluminum ring bonded to base.

2.12 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

PART 3 - EXECUTION

3.1 ERECTION OF STRUCTURAL FRAMING

A. Erect metal building system according to AISC Specification and manufacturer's written erection instructions and erection drawings.

B. Provide temporary shores, guys, braces, and other supports during erection to keep structural framing secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural framing, connections, and bracing are in place.

C. Do not field cut, drill, or alter structural members without written approval from metal building system manufacturer's professional engineer.

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. Promptly pack non-shrink grout solidly between bearing surfaces and plates so no voids remain and to obtain uniform bearing. 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. Erect framing true to line, level, plumb, rigid, and secure.

F. Steel Joists and Joist Girders: Install joists**,** girders**,** and accessories plumb, square, and true to line; securely fasten to supporting construction according to SJI's "Standard Specifications, Load Tables, and Weight Tables for Steel Joists and Joist Girders," joist manufacturer's written recommendations, and requirements in these Specifications.

G. Steel Deck: Install deck panels and accessories according to applicable specifications and commentary in SDI Publication No. 29, manufacturer’s written instructions, and requirements of these Specifications.

H. 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.

I. Erection Tolerances: Maintain erection tolerances of structural framing within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

3.2 PANEL INSTALLATION

A. General: Anchor metal panels and other components of the Work securely in place according to manufacturer's recommendations, with provisions for thermal and structural movement. Use fasteners as recommended by manufacturer.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by 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, types recommended by manufacturer.

D. Panels to be free of oilcanning, dimples, wrinkles, etc.

E. Roof Panels: Provide metal roof panels of full length from eave to ridge, unless otherwise approved by Architect.

1. Where conditions prevent one continuous run and panel lap joints are approved by Architect, lap panels 8 inches minimum, and seal with sealant tape between panels. Also seal with silicone sealant at panel edges.

2. Where lap joints have been approved by Architect, align or stagger lap joints in accordance with manufacturer's instructions.

F. Wall Panels: 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.

1. Apply non-curing butyl sealant continuously between metal base channel (sill angle) and concrete.
2. Provide weatherproof escutcheons for pipe and conduit penetrating exterior walls.

G. Soffit Panels: Provide metal soffit panels full width of soffits. Install panels perpendicular to support framing. Flash and seal panels with weather closures where panels meet walls and at perimeter of all openings.

3.3 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. Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating, by applying rubberized-asphalt underlayment to each contact surface, or by other permanent separation as recommended by manufacturer.

2. Provide for thermal movement.

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.

C. Hanging Gutters: Join sections with riveted and soldered joints or with lapped joints sealed with sealant. Provide for thermal expansion. Attach gutters at eave or fascia to firmly anchored gutter brackets spaced not more than 36 inches apart. Provide end closures and seal watertight with sealant. Slope to downspouts.

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. Sleeve downspouts into underground drainage system indicated using loosely fitted connection.

E. Circular Roof Ventilators: Set ventilators complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports. Mount ventilators on flat level base. Install preformed filler strips at base to seal ventilator to metal roof panels.

F. Continuous Roof Ventilators: Set ventilators complete with necessary hardware, anchors, dampers, weather guards, rain caps, and equipment supports. Join sections with splice plates and end-cap skirt assemblies where required to achieve indicated length. Install preformed filler strips at base to seal ventilator to metal roof panels.

G. Roof Curbs: Install curbs at locations as may be indicated on Drawings. Install flashing around bases where they meet metal roof panels.

H. Pipe Flashing: Form flashing around pipe penetration and metal roof panels. Fasten and seal to panel as recommended by manufacturer.

3.4 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. High-Strength, Field-Bolted Connections and Welded Connections.

B. Correct deficiencies in Work that test reports and inspections indicate do not comply with the Contract Documents.

3.5 CLEANING AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After erection, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted structural framing**,** bearing plates**,** and accessories.

C. Metal Panels: On completion of metal panel installation, clean finished surfaces as recommended by metal panel manufacturer. Maintain in a clean condition during construction.

1. Replace metal panels that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 13125

SECTION 16670 - LIGHTNING PROTECTION SYSTEM FOR LOW RISE BUILDING

1.1 GENERAL

A. The General Conditions, Supplementary General Conditions, Division 1 and the Section entitled "Electrical Work - General Requirements" apply to all work herein.

B. Objective: To provide safety for the building and occupants by preventing damage to building structure caused by lightning.

1.2 STANDARDS

A. The following specifications and standards of the latest issue form a part of this specification:

1. Lightning Protection Institute
   Installation Standard, LPI 175
2. Underwriters Laboratories, Inc.
   Installation Requirements, UL96A
3. National Electrical Code (NEC)
4. National Fire Protection Association
   Lightning Protection Code, NFPA 780
5. U.S. Bureau of Standards

1.3 SCOPE

A. The work covered in this section of the specifications consists of furnishing all labor, materials, and items of service required for the completion of a functional and unobtrusive lightning protection system as approved by the engineer, and in strict accordance with this section of the specifications and the applicable Contract Drawings. Provide Class I materials.

B. If any departure from the Contract Drawings or submittal drawings covered below are deemed necessary by the Contractor, details of such departures and reasons therefore shall be submitted as soon as practical to the engineer for approval.

1.4 QUALITY ASSURANCE

A. The lightning protection system shall conform to the requirements and standards for lightning protection systems of the LPI, UL, NFPA and NEC. Upon completion, application shall be made to the Underwriters Laboratories, Inc. for inspection and certification. In addition, the Lightning Protection Institute certified system certificate shall be issued and delivered to the owner ensuring that the concealed components have also been monitored during job progress.

B. The system to be furnished under this specification shall be the standard product of manufacturers regularly engaged in the production of lightning protection equipment and shall be the manufacturer's latest approved design. The equipment shall be UL listed and properly UL labeled.

1.5 QUALIFIED MANUFACTURERS:

A. Bonded Lightning Protection Systems, Inc. - Dallas

B. Advanced Lightning Technology - Dallas

C. Thompson Lightning Protection - Minnesota

D. Harger Lightning Protection - Illinois

E. East Coast Lightning Equipment - Connecticut

1.6 SUBMITTALS

A. Complete shop drawings showing the type, size and locations of all grounding, down conductors, through-wall assemblies, roof conductors and air terminals shall be submitted to the engineer for approval.

PART 2 - PRODUCTS

2.1 LIGHTNING PROTECTION EQUIPMENT: All materials shall be copper and bronze and of the size, weight and construction to suit the application and used in accordance with LPI, UL, NEC and NFPA. Class I sized components are required for roof levels not exceeding 75 feet in height. Bolt-type connectors and splicers shall be utilized on Class I structures. Pressure squeeze clamps are not acceptable. All mounting hardware on the roof shall be stainless steel and on the facade shall be brass and/or copper.

2.2 MATERIALS:

A. All materials on the roof shall be copper as manufactured by Thompson Lightning Protection, Inc., Minneapolis, Minn., or approved equal, and shall be approved by the Underwriters' Laboratories, Inc. All down conductors shall be copper. All anchors on down conductors shall be Thompson #169 Loop Masonry Anchors which includes 1/4"-20 Pak-tite masonry anchors and 1/4" x 3/4" brass machine screws (no exceptions).

B. STANDARD: All equipment used in this installation shall be UL listed and properly UL labeled. All equipment shall be new, and of a design and construction to suit the application where it is used in accordance with accepted industry standards and LPI, UL, NFPA and NEC code requirements.

C. All roof-mounted and downlead conductors shall be Thompson No. 29X "Century rope lay copper with a minimum of 29 strand, 17 gauge heavy duty copper (99.97% pure), and shall be stranded cable weighing not less than 190 lbs. per 1000 feet, with 3/8” diameter.

D. Air terminals shall be nickel-tipped copper, having a copper base. Air terminals shall be spaced not more than twenty feet apart. Provide flathead air terminals on the roof in areas where accidental implement may occur.

PART 3 - INSTALLATION

A. The installation shall be accomplished by an experienced installation company that is UL listed, a member of the Lightning Protection Institute, United Lightning Protection Association qualified, and an employer of Certified Master Installers of lightning protection systems. A Certified Master Installer shall directly supervise the work.

B. All equipment shall be installed in a neat, workmanlike manner. The system shall consist of a complete conductor network at the roof and include air terminals, connectors, splicers, bonds, copper down leads and proper ground terminals.

C. Copper downlead cables shall be utilized. No penetration shall be made in the roof membrane.

D. Provide 20% spare air terminals to owner for replacement stock.

E. Where conductors are run in conduit for protection, the conductor shall be bonded to the entrance and exit point of the conduit by bonding wedges or approved methods to maintain electrical continuity.

E. Down conductors shall be attached to ground devices in accordance with the specific provisions of the Underwriters' Laboratories, Inc., Code. All-down conductors shall be concealed. Any exposed conductors shall be approved by Architect.

F. All metals of conductance within six feet of the lightning protection system shall be securely bonded and made a part thereof. Where stack or chimney is present, lead covered non-corrosive air terminals and conductors shall be used. Metal water pipes extending into the ground may be rated as best in ground virtue and should be made an integral part of the grounding system.

3.1 COORDINATION

A. The lightning protection installer will work with any other trades present to insure a correct, neat and unobtrusive installation.

B. It shall be the responsibility of the lightning protection installer to assure a solid bond to the main water service and to assure interconnection with other ground systems.

3.2 COMPLETION

A. Upon completion of the installation, the lightning protection installer shall secure and deliver to the owner the Underwriters Laboratories, Inc. Master Label certification and the Lightning Protection Institute Certified System certification. The system will not be accepted without the UL Master Label plate and the LPI certification certificate.

END OF SECTION 16670

(SCHEMATIC RENDERING FOR VISUALIZATION PURPOSES ONLY - NOT FOR CONSTRUCTION)

WALLER COUNTY

VEHICLE MAINTENANCE GARAGE

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

ABBREVIATIONS

ACM	ALUMINUM COMPOSITE PANEL
ACT	ACOUSTICAL CEILING TILE
ADJ	ADJUSTABLE
ADDL	ADDITIONAL
AFF	ABOVE FINISHED FLOOR
ALUM	ALUMINUM
ALT	ALTERNATE
ANOD	ANODIZED
APPROX	APPROXIMATE
ARCH	ARCHITECT(URAL)
AUTO	AUTOMATIC
AV	AUDIO VISUAL
BD	BOARD
BL	BUILDING LINE
BO	BOTTOM OF
BOS	BOTTOM OF STEEL
BTWN	BETWEEN
CAB	CABINET
CI	CONTINUOUS INSULATION
CJ	CONTROL JOINT
CL	CENTERLINE
CLG	CEILING
CLR	CLEAR(ANCE)
CMU	CONCRETE MASONRY UNIT(S)
C.O.	CASED OPENING
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUE / CONTINUOUS
CORR	CORRIDOR
CPT	CARPET
CT	CERAMIC TILE
CTR	CENTER
CW	CURTAIN WALL
DEPT	DEPARTMENT
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DN	DOWN
DS	DOWNSPOUT
EA	EACH
EDF	ELECTRIC DRINKING FOUNTAIN
EIFS	EXTERIOR INSULATION & FINISH SYSTEM
EJ	EXPANSION JOINT
ELEC	ELECTRICAL
ELEV	ELEVATOR / ELEVATION
EOS	EDGE OF SLAB
EQ	EQUAL
EQUIP	EQUIPMENT
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EXT	EXTERIOR
FD	FLOOR DRAIN
FE	FIRE EXTINGUISHER
FEC	FIRE EXTINGUISHER CABINET
FIN FLR	FINISHED FLOOR
FOB	FACE OF BRICK
FR	FIRE RESISTANCE
FRT	FIRE RETARDANT TREATED
FRP	FIBER REINFORCED PLASTIC
FT	FOOT / FEET
FTG	FOOTING
FURN	FURNITURE / FURNISH
GA	GAUGE
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GFRC	GLASS FIBER REINFORCED CONCRETE
GFRG	GLASS FIBER REINFORCED GYPSUM
GWB	GYPSUM WALL BOARD
HC	HANDICAP
HDWD	HARDWOOD
HM	HOLLOW METAL
HORIZ	HORIZONTAL
HT	HEIGHT
HVAC	HEATING, VENTILATION, & AIR CONDITIONING
IBC	INTERNATIONAL BUILDING CODE
ID	INSIDE DIAMETER
INFO	INFORMATION
INSUL	INSULATION
INT	INTERIOR
JAN	JANITOR / CUSTODIAL
LAM	LAMINATE
LAV	LAVATORY
LED	LIGHT EMITTING DIODE
LF	LINEAR FEET
LVT	LUXURY VINYL TILE
MAX	MAXIMUM
MBM	METAL BUILDING MANUFACTURER
MECH	MECHANICAL
MEZZ	MEZZANINE
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MTD	MOUNTED
MTG	MOUNTING
MTL	METAL
N/A	NOT APPLICABLE
NIC	NOT IN CONTRACT
NO	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER / OVERFLOW DRAIN
OH	OPPOSITE HAND
OPP	OPPOSITE
PLAM	PLASTIC LAMINATE
POLYISO	POLYISOCYANURATE
PR	PAIR
PREFAB	PREFABRICATED
PREFIN	PREFINISHED
PSI	POUNDS PER SQUARE INCH
PT	PRESSURE TREATED / POINT
PTD	PAINTED
PVC	POLYVINYL CHLORIDE (PLASTIC)
QTY	QUANTITY
R	RADIUS / RISER / RESISTANCE VALUE
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
RE	REFER(ANCE)
REF	REFRIGERATOR
REINF	REINFORCED
REQD	REQUIRED
RESIL	RESILIENT
RO	ROUGH OPENING
ROW	RIGHT OF WAY
SC	SOLID CORE
SCHED	SCHEDULED
SF	SQUARE FEET / STOREFRONT
SHT	SHEET
SIM	SIMILAR
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL / SOLID SURFACE
STD	STANDARD
STL	STEEL
STOR	STORAGE
STRUCT	STRUCTURAL
SUSP	SUSPENDED
TEMP	TEMPORARY
TFF	TOP OF FINISHED FLOOR
T&G	TONGUE & GROOVE
THK	THICK(NESS)
TO	TOP OF
TOB	TOP OF BEAM
TOC	TOP OF CONCRETE / TOP OF CURB
TPO	THERMOPLASTIC POLYOLEFIN
TV	TELEVISION
TYP	TYPICAL
UC	UNDER COUNTER
UL	UNDERWRITER'S LABORATORY
UNO	UNLESS NOTED OTHERWISE
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VEST	VESTIBULE
VIF	VERIFY IN FIELD
W/	WITH
W/O	WITHOUT
WC	WATER CLOSET
WD	WOOD
WP	WORKING POINT
WRB	WATER RESISTIVE BARRIER
WT	WEIGHT
YD	YARD

THE ABOVE LISTING OF ABBREVIATIONS ARE INCLUDED FOR THE CONVENIENCE OF THE CONTRACTOR AND IS NOT INTENDED AS A COMPLETE LISTING OF ALL ABBREVIATIONS USED IN THE CONTRACT DOCUMENTS. OTHER ABBREVIATIONS MAY BE USED AND SHALL HAVE THE SAME MEANING AS IN COMMON OR NORMAL TECHNICAL LANGUAGE.

GENERAL NOTES

PURPOSE OF DOCUMENTS:

- THESE DRAWINGS ARE THE WRITTEN AND GRAPHIC DOCUMENTS PREPARED FOR COMMUNICATING THE PROJECT DESIGN AND ADMINISTERING THE CONSTRUCTION CONTRACT. THEY CONSIST OF THE DRAWINGS, SPECIFICATIONS, CONTRACTING REQUIREMENTS, PROCUREMENT REQUIREMENTS, MODIFICATIONS, AND ADDENDA.
- THESE DRAWINGS ARE DIAGRAMMATIC, INTENDING TO OUTLINE GENERAL DESIGN REQUIREMENTS ONLY, AND ARE NOT INTENDED TO BE COMPLETE IN ALL DETAILS. SPECIFIC IMPLEMENTATION OF THE DRAWINGS SHALL BE THE RESPONSIBILITY OF EACH SUBCONTRACTOR ENGAGED UPON THE WORK. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR OVERALL COORDINATION.
- THESE DRAWINGS AND SPECIFICATIONS ARE AN OUTLINE OF THE MINIMUM MATERIAL REQUIREMENTS AND THEIR APPLICATION. MANUFACTURER SPECIFICATIONS AND REQUIREMENTS, WHEN IN EXCESS OF MINIMUM SPECIFICATIONS, SHALL CONTROL.
- THESE DRAWINGS ARE THE PROPERTY OF LDDBLUELINE AND SHALL NOT BE REPRODUCED OR COPIED IN WHOLE OR IN PART WITHOUT WRITTEN CONSENT. THEY ARE A COMPOSITE SET AND MAY NOT BE SEPARATED FOR DISTRIBUTION.
- THESE DRAWINGS ARE TO BE USED FOR THE PROJECT AND SITE SPECIFICALLY IDENTIFIED HEREIN AND SHALL NOT BE USED ON ANY OTHER PROJECT.

PROJECT REQUIREMENTS:

- ALL CONSTRUCTION SHALL BE PERFORMED IN STRICT COMPLIANCE WITH GOVERNING FEDERAL, STATE, AND LOCAL BUILDING CODE REQUIREMENTS, INCLUDING THE 2018 INTERNATIONAL BUILDING CODE.
- ALL CONSTRUCTION SHALL BE EXECUTED IN ACCORDANCE WITH ACCEPTED INDUSTRY STANDARDS, AND SHALL CONFORM TO SPECIFIC REGULATIONS AS MANDATED BY THE OWNER, THE ARCHITECT, AND THE AUTHORITIES HAVING JURISDICTION.

VERIFICATION:

- BEFORE COMMENCING WORK, CONTRACTOR SHALL PERFORM A SURVEY OF EXISTING CONDITIONS TO VERIFY THEIR ACCURACY AND COMPATIBILITY WITH DIMENSIONS AND CONDITIONS SHOWN ON THE CONSTRUCTION DRAWINGS. CONTRACTOR SHALL NOTIFY ARCHITECT IMMEDIATELY, IN WRITING, OF ALL DISCREPANCIES FOUND WHICH MAY AFFECT THE WORK, AND SHALL NOT PROCEED UNTIL ALL DISCREPANCIES ARE RESOLVED TO THE SATISFACTION OF ALL PARTIES. PROCEEDING WITH THE WORK SHALL CONSTITUTE ACCEPTANCE BY THE CONTRACTOR THAT THE CONDITIONS ARE CORRECT, AT WHICH POINT THEY SHALL ASSUME FULL RESPONSIBILITY, INCLUDING THE COSTS OF CORRECTIVE WORK, FOR ANY ERRORS RESULTING FROM THEIR FAILURE TO EXERCISE SUCH VERIFICATION.
- IF WRITTEN (SPECIFICATIONS) AND GRAPHIC DOCUMENTS (DRAWINGS) PROVIDE CONFLICTING INFORMATION, CONTRACTOR SHALL ISSUE A 'REQUEST FOR INFORMATION' (RFI) TO THE ARCHITECT TO CLARIFY THE CONFLICT.
- CONTRACTOR SHALL VERIFY ALL SPECIFICATIONS WITH THE ARCHITECT PRIOR TO COMMENCING THE WORK. ANY REQUESTS FOR SUBSTITUTIONS OF ANY SPECIFIED ITEM ARE TO BE SUBMITTED TO THE ARCHITECT IN WRITING AND WILL BE CONSIDERED ONLY IF THE ALTERNATE PROPOSED IS PROVEN TO BE ADVANTAGEOUS TO THE OWNER WITH RESPECT TO DELIVERY DATE, QUALITY, OR COST.

DELEGATED DESIGN:

- FIRE ALARM DETECTION SYSTEM DRAWINGS ARE TO BE DEFERRED SUBMITTALS, SUBMITTED SEPARATELY BY THE CONTRACTOR TO THE FIRE MARSHAL FOR REVIEW & APPROVAL.

MISC:

- THE ARCHITECT HAS NOT CONDUCTED ANY INVESTIGATION AS TO THE PRESENCE OF ASBESTOS OR OTHER HAZARDOUS SUBSTANCES ON THE PROJECT SITE AND ASSUMES NO RESPONSIBILITY WITH RESPECT TO SAME.
- MECHANICAL REPRODUCTION ERRORS MAY CAUSE DRAWING SCALES TO BECOME INACCURATE.
- DO NOT SCALE DRAWINGS.

CONTRACTOR RESPONSIBILITIES:

- BY ENTERING INTO CONTRACT, EACH CONTRACTOR AFFIRMS THAT THEY HAVE THE SKILL AND EXPERTISE NECESSARY TO EXECUTE THE WORK REQUIRED, AND THAT THEY ARE LICENSED BY THE STATE DEPARTMENT OF COMMERCE IN ACCORDANCE WITH THE LATEST REQUIREMENTS IN THE STATE CODE, AS AMENDED.
- GENERAL CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR THE MEANS AND METHODS OF CONSTRUCTION, INCLUDING TEMPORARY STRUCTURES AND FACILITIES.
- GENERAL CONTRACTOR SHALL REVIEW ALL DRAWINGS AND DISTRIBUTE THE ENTIRE SET TO EACH SUBCONTRACTOR.
- GENERAL CONTRACTOR SHALL SUBMIT A SCHEDULE FOR CONSTRUCTION TO THE OWNER AND ARCHITECT PRIOR TO PROCEEDING WITH ANY WORK. REQUIRED DATES FOR SUBMITTALS SHALL BE INCLUDED WITH THE CONSTRUCTION SCHEDULE. ARCHITECT MAY REQUIRE UP TO 10 BUSINESS DAYS TO PROCESS SUBMITTALS.
- GENERAL CONTRACTOR SHALL ENSURE THE PROCUREMENT OF REQUIRED AND NECESSARY PERMITS AND APPROVALS PRIOR TO THE COMMENCEMENT OF ANY WORK, AS WELL AS A CERTIFICATE OF OCCUPANCY UPON COMPLETION OF PROJECT. GENERAL CONTRACTOR IS RESPONSIBLE FOR ANY FEES ASSOCIATED WITH PROCURING SUCH DOCUMENTS AND SHALL FURNISH COPIES OF PERMITS, INSPECTIONS, AND CERTIFICATES TO THE OWNER.
- GENERAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL COMPONENTS OF THE CONSTRUCTION DOCUMENTS, UNLESS NOTED OTHERWISE. GENERAL CONTRACTOR SHALL INSTALL ANY OWNER-FURNISHED ITEMS, INCLUDING THE NECESSARY BLOCKING, UNLESS NOTED OTHERWISE.
- GENERAL CONTRACTOR SHALL INCLUDE ANY ITEM IN THESE DOCUMENTS IN THE PROJECT WITHOUT ADDITIONAL COST UNLESS A SPECIFIC CLARIFICATION HAS BEEN MADE IN THE OWNER-CONTRACTOR AGREEMENT. IF AN ITEM IS ONLY NOTED IN THE WRITTEN DOCUMENTS AND NOT THE GRAPHIC DOCUMENTS, OR VICE VERSA, THE CONSTRUCTION DOCUMENTS AS A WHOLE STILL INCLUDE THE PROVISION FOR THE ITEM AND THE GENERAL CONTRACTOR SHALL INCLUDE THE ITEM WITHOUT ADDITIONAL COST.
- GENERAL CONTRACTOR SHALL CONSTRUCT A MOCK-UP PANEL, SEPARATE FROM THE BUILDING, TO SHOW THE FULL SCOPE OF THE EXTERIOR FINISH MATERIALS AND THE WATER PROOFING SYSTEMS BEHIND THE FINISHES AND AT OPENINGS. THE MOCK-UP PANEL SHALL BE COMPLETED FOR REVIEW & APPROVAL PRIOR TO COMMENCING WORK.
- GENERAL CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR JOBSITE SAFETY AND SECURITY, MEETING OSHA REGULATIONS, AND CONSULTING WITH LOCAL FIRE AUTHORITIES TO ASCERTAIN REQUIREMENTS FOR FIRE SUPPRESSION AND SAFETY DURING CONSTRUCTION.
- GENERAL CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR PROTECTING BUILDING MATERIALS AND INSTALLED CONSTRUCTION FROM INCLEMENT WEATHER, THEFT, AND OTHER HAZARDS. GENERAL CONTRACTOR SHALL FOLLOW ALL MANUFACTURER RECOMMENDATIONS FOR STORAGE OF MATERIALS. PARTIALLY COMPLETED WALLS SHALL BE COVERED TO PROTECT FROM WATER INTRUSION. DAMAGE RESULTING FROM WATER INTRUSTION DURING CONSTRUCTION, INCLUDING BUT NOT LIMITED TO MOLD, SHALL BE REPAIRED AT THE CONTRACTOR'S EXPENSE.
- GENERAL CONTRACTOR SHALL COORDINATE DEMOLITION OF EXISTING STRUCTURES, EMPLOYING ENGINEERING EXPERTISE AND SHORING AS NEEDED.
- GENERAL CONTRACTOR SHALL COORDINATE ALL WORK TO MINIMIZE DISRUPTION OF ANY EXISTING TENANTS OR BUILDING OPERATIONS. GENERAL CONTRACTOR SHALL TAKE ADEQUATE PRECAUTIONS TO PROTECT BUILDING OCCUPANTS, MATERIALS, AND EXISTING CONSTRUCTION FROM DAMAGE DUE TO THEIR OPERATIONS THROUGHOUT ALL PHASES OF CONSTRUCTION. CONTRACTOR SHALL REPLACE OR REPAIR, AT THEIR EXPENSE, ANY DAMAGED WORK TO THE SATISFACTION OF THE OWNER.
- CONTRACTOR SHALL REMOVE ALL TRASH & DEBRIS FROM THE JOBSITE ON A DAILY BASIS AND LEAVE THE WORK IN AN ORDERLY AND BROOM-CLEAN CONDITION.

PROJECT TEAM

OWNER
WALLER COUNTY
836 AUSTIN ST., SUITE 124
HEMPSTEAD, TX 77445
979.826.7737
CONTACT: DANNY ROTHE
drothe@wallercounty.us

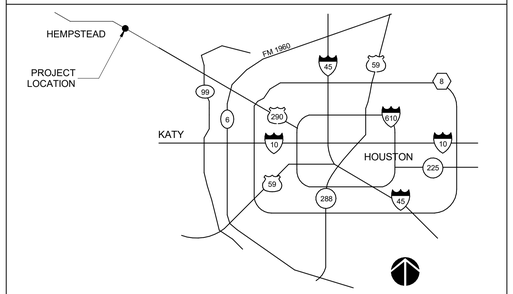
ARCHITECT
LDDBLUELINE
333 CYPRESS RUN, SUITE 350
HOUSTON, TX 77094
281.497.1040
CONTACT: JACK DURAN
jack.duran@lddblueline.com

STRUCTURAL ENGINEER
SCA CONSULTANT ENGINEERS
12511 EMILY COURT
SUGAR LAND, TX 77478
713.779.7252
CONTACT: WES HINTON
hintonw@scaengineers.com

CIVIL ENGINEER
ALJ LINDSEY
18635 N. ELDRIDGE PKWY, SUITE 200
TOMBALL, TX 77377
281.301.5955
CONTACT: BRETT HANRAHAN
bhanrahan@aljlindsey.com

MEP ENGINEER
KO DESIGN
455 SCHOOL ST., SUITE 46
TOMBALL, TX 77375
832.643.0368
CONTACT: KRIS ODOM
ko@kodesign-mep.com

VICINITY MAP



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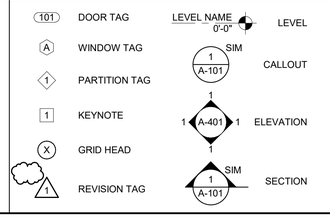
TABS2025016542

APPLICABLE CODES

2021 INTERNATIONAL BUILDING CODE (IBC)
2021 INTERNATIONAL FIRE CODE (IFC)
2021 INTERNATIONAL MECHANICAL CODE (IMC)
2021 INTERNATIONAL PLUMBING CODE (IPC)
2021 INTERNATIONAL ENERGY CONSERVATION CODE (IECC)
2020 NATIONAL ELECTRIC CODE (NEC)
2012 TEXAS ACCESSIBILITY STANDARDS (TAS)

AND CITY OF HEMPSTEAD AMENDMENTS

SYMBOL LEGEND



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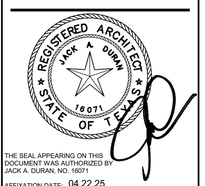
200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445



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PROJECT NO.: 06-25-003
DRAWN BY: BH QC: JD

COVER

G-001

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BUILDING CODE REVIEW

THE INFORMATION CONTAINED BELOW WAS COMPILED BY AND FOR THE EXCLUSIVE USE OF THE ARCHITECT IN THE DESIGN OF THEIR PORTION OF THE WORK. IT IS ALSO INTENDED TO IDENTIFY TO THE CODE OFFICIAL THE ARCHITECT'S INTERPRETATION OF THE CODE. THE INFORMATION IS EXCERPTED FROM THE CODE IDENTIFIED BELOW UNLESS INDICATED OTHERWISE. IT IS INTENDED TO IDENTIFY REQUIREMENTS FOR THIS STRUCTURE PRIMARILY IN TERMS OF OCCUPANCY, CONSTRUCTION TYPE AND EGRESS. MISCELLANEOUS OTHER ISSUES MAY ALSO BE IDENTIFIED. THE INFORMATION IS NOT INTENDED TO INCLUDE ALL APPLICABLE PORTIONS OF THE CODE OR OTHER APPLICABLE CODES AND GOVERNING REGULATIONS. IT IS ALSO NOT INTENDED TO DIMINISH THE IMPORTANCE OR RELEVANCE OF OTHER PORTIONS OF CODES AND REGULATIONS THAT ARE APPLICABLE TO THE WORK CONTAINED IN THE DRAWINGS AND SPECIFICATIONS. CONSULTANTS, CONTRACTORS, MANUFACTURERS AND OTHER PARTIES THAT HAVE OR WILL PERFORM DESIGN OR CONSTRUCTION SERVICES ON THIS STRUCTURE SHALL NOT RELY ON THIS INFORMATION IN THE PERFORMANCE OF THEIR WORK. EACH SUCH PARTY SHALL BE RESPONSIBLE FOR THEIR OWN REVIEW AND COMPLIANCE OF CODES AND REGULATIONS.

PROJECT INFORMATION

PROJECT NUMBER: 06-25-003
PROJECT NAME: WALLER COUNTY - VEHICLE MAINTENANCE GARAGE
ADDRESS: 200 SHERIFF R GLENN SMITH DR. HEMPSTEAD, TEXAS 77445

CODES / STANDARDS

2021 INTERNATIONAL BUILDING CODE (IBC)
2021 INTERNATIONAL FIRE CODE (IFC)
2021 INTERNATIONAL MECHANICAL CODE (IMC)
2021 INTERNATIONAL PLUMBING CODE (IPC)
2021 INTERNATIONAL ENERGY CONSERVATION CODE (IECC) 1
2020 NATIONAL ELECTRIC CODE (NEC)
2012 TEXAS ACCESSIBILITY STANDARDS (TAS)

BUILDING DESCRIPTION

NEW CONSTRUCTION, 1-STORY, COUNTY VEHICLE MAINTENANCE GARAGE.

CHAPTER 3 - USE & OCCUPANCY CLASSIFICATIONS

S-1: MODERATE-HAZARD STORAGE.

CHAPTER 4 - TYPE OF CONSTRUCTION

TYPE II-B, NON-SPRINKLERED

CHAPTER 5 - ALLOWABLE HEIGHT AND STORIES

BUILDING USE & CONSTRUCTION TYPE	ALLOWABLE BUILDING HEIGHT *	ALLOWABLE NUMBER OF STORIES**
S-1 ; TYPE IIB	**55 FEET**	**2 STORIES**

* FROM TABLE 504.3
** FROM TABLE 504.4

ACTUAL HEIGHT AND STORIES

ACTUAL HEIGHT: **26' - 1"**
ACTUAL STORIES: **1 STORIES**

505.3 EQUIPMENT PLATFORMS:
EQUIPMENT PLATFORMS IN BUILDINGS SHALL NOT BE CONSIDERED AS A PORTION OF THE FLOOR BELOW. SUCH *EQUIPMENT PLATFORMS* SHALL NOT CONTRIBUTE TO EITHER THE *BUILDING AREA* OR THE NUMBER OF *STORIES* AS REGULATED BY SECTION 503.1. THE AREA OF THE *EQUIPMENT PLATFORM* SHALL NOT BE INCLUDED IN DETERMINING THE *FIRE AREA* IN ACCORDANCE WITH SECTION 903. *EQUIPMENT PLATFORMS* SHALL NOT BE A PART OF ANY *MEZZANINE* AND SUCH PLATFORMS AND THE WALKWAYS, STAIRWAYS, ALTERNATING TREAD AND LADDERS PROVIDING TO AN *EQUIPMENT PLATFORM* SHALL NOT SERVE A A PART OF THE *MEANS OF EGRESS* FROM THE BUILDING.

CHAPTER 5 - ALLOWABLE BUILDING AREA PER STORY

BUILDING USE & CONSTRUCTION TYPE	ALLOWABLE BUILDING AREA *
S-1 ; TYPE IIB	**17,500 SF**

* FROM TABLE 506.2

ACTUAL BUILDING AREA PER STORY

TOTAL: 5,052 SF

CHAPTER 6 - FIRE-RESISTANCE RATING REQUIREMENTS FOR BUILDING ELEMENTS

BUILDING ELEMENT	TYPE IIB	PROVIDED
PRIMARY STRUCTURAL FRAME	0	**0**
BEARING WALLS EXTERIOR INTERIOR	 0 0	 **0** **0**
NONBEARING WALLS & PARTITIONS (RE: TABLE 602) EXTERIOR (FIRE SEPARATION DISTANCE > 30 FT)	0	**0**
NONBEARING WALLS & PARTITIONS INTERIOR	0	**0**
FLOOR CONSTRUCTION & ASSOCIATED SECONDARY MEMBERS	0	**0**
ROOF CONSTRUCTION & ASSOCIATED SECONDARY MEMBERS	0	**0**

FROM TABLE 601, ALL VALUES IN HOURS

CHAPTER 7 - FIRE WALLS, BARRIERS, PARTITIONS, & HORIZONTAL ASSEMBLIES
REQUIRED FIRE-RESISTANCE RATINGS

BUILDING ELEMENT	REQUIRED	PROVIDED	REFERENCE
FIRE WALLS	N/A	**N/A**	N/A
HORIZONTAL ASSEMBLIES	N/A	**N/A**	N/A
SHAFT ENCLOSURES	N/A	**N/A**	N/A
INTERIOR EXIT STAIRWAY	N/A	**N/A**	N/A
ENCLOSURES FOR EXIT ACCESS	N/A	**N/A**	N/A
EXIT PASSAGEWAY	N/A	**N/A**	N/A
CORRIDOR WALLS	N/A	**N/A**	N/A
ELEVATOR SEPARATION	N/A	**N/A**	N/A

ALL VALUES IN HOURS

CHAPTER 7 - OPENING PROTECTIVES
REQUIRED FIRE-RESISTANCE RATINGS

BUILDING ELEMENT	TYPE OF ASSEMBLY	ASSEMBLY RATING	PROTECTION REQUIRED	GLAZING MARK
DOOR	FIRE WALL	N/A		
DOOR	FIRE BARRIER	X	X	X
DOOR VISION PANEL *	FIRE BARRIER	X	X	X
SIDELIGHT / TRANSOM	FIRE BARRIER	X	X	X
DOOR	FIRE PARTITION	X	X	X
DOOR VISION PANEL **	FIRE PARTITION	X	X	X

ALL VALUES IN HOURS
* VISION PANEL SIZE = 100 SQ IN MAX
** VISION PANEL SIZE = MAXIMUM TESTED

CHAPTER 8 - INTERIOR WALL & CEILING FINISHES

BUILDING ELEMENT	**S** USE GROUP
INTERIOR EXIT STAIRWAYS, RAMPS, & EXIT PASSAGEWAYS	**CLASS B**
CORRIDORS & ENCLOSURES FOR EXIT ACCESS STAIRWAYS & EXIT ACCESS RAMPS	**CLASS B**
ROOMS & ENCLOSED SPACES	**CLASS C**

FROM TABLE 803.13

CHAPTER 9 - FIRE PROTECTION SYSTEMS

AUTOMATIC SPRINKLER SYSTEM: **NOT REQUIRED** (SECTION 903)
STANDPIPE SYSTEM: **NOT REQUIRED** (SECTION 905)
PORTABLE FIRE EXTINGUISHERS: **REQUIRED** (SECTION 906)*

(CLASS LIGHT: MODERATE HAZARD OCCUPANCY)
MINIMUM RATED SINGLE EXTINGUISHER: 2-A, 40-B:C MINIMUM
MAXIMUM FLOOR AREA PER UNIT OF A: 1,500 SF
MAXIMUM FLOOR AREA FOR EXTINGUISHER: 11,250 SF
MAXIMUM TRAVEL DISTANCE TO EXTINGUISHER: 75 FT

FIRE ALARM SYSTEM: **REQUIRED** (SECTION 907)
SMOKE CONTROL SYSTEMS: **NOT REQUIRED** (SECTION 909)

* (ADDITIONAL REQUIREMENTS OF PORTABLE FIRE EXTINGUISHERS FOR REPAIR GARAGES IN THE INTERNATIONAL FIRE CODE - IFC SECTION 2311.6: PLACEMENTS NOT TO EXCEED 75 FT FROM PUMPS, DISPENSERS, OR STORAGE TANK FILL-TYPE OPENINGS)

CHAPTER 10 - OCCUPANT LOAD

REFER TO LIFE SAFETY PLANS: SHEET G-101
FOR OCCUPANT LOAD TABULATION

CHAPTER 10 - REQUIRED EXITS & EGRESS WIDTH

STORY	OCCUPANT LOAD	REQUIRED EXITS *	PROVIDED EXITS	REQUIRED WIDTH **	PROVIDED WIDTH
LEVEL 1	**18**	2	**3**	3.6"	**99"**

SEE LIFE SAFETY PLANS FOR REQUIRED AND PROVIDED STAIR WIDTHS
*PER TABLE 1006.3.3
** PER SECTION 1005

CHAPTER 10 - COMMON PATH OF EGRESS TRAVEL

USE GROUP S, NON-SPRINKLERED: **100 FT MAXIMUM** (TABLE 1006.2.1)

CHAPTER 10 - EXIT ACCESS TRAVEL DISTANCE

USE GROUP S-1, NON-SPRINKLERED: **200 FT MAXIMUM** (SECTION 1017)

CHAPTER 15 - ROOF ASSEMBLIES

CONSTRUCTION TYPE = **CLASS C** (SECTION 1505.1)

CHAPTER 29 - PLUMBING
MINIMUM REQUIRED FIXTURES

BUILDING ELEMENT	GROUP S-1 REQUIRED (18 OCC)	PROVIDED
WATER CLOSETS MALE FEMALE	1 PER 100 1	**2**
LAVATORIES MALE FEMALE	1 PER 100 1	**4**
DRINKING FOUNTAINS	1 PER 1,000	**2**
SERVICE SINKS	1 SERVICE SINK	**1**

ENERGY CODE REVIEW

CHAPTER 3 - GENERAL REQUIREMENTS

CLIMATE ZONE: **2A**

CHAPTER 4 - OPAQUE THERMAL ENVELOPE INSULATION

MINIMUM REQUIREMENTS (R-VALUE)

BUILDING ELEMENT	REQUIRED	PROVIDED
ROOF INSULATION ENTIRELY ABOVE DECK METAL BUILDING ATTIC & OTHER	 -- R-19 + R-11 LS --	 1 **R-25 + R-11 LS**
ABOVE GRADE WALLS: MASS METAL FRAMED WOOD FRAMED & OTHER	 XX R-13 + R-6.5 CI XX	 **XX** **R-13 + R-6.5 CI** **XX**
BELOW GRADE WALL	XX	**XX**
FLOORS MASS JOIST / FRAMING	 XX --	 **XX** **--**
SLAB ON GRADE FLOORS (UNHEATED)	XX	**XX**
OPAQUE DOORS (NONSWINGING)	U-0.31	**U-0.31**

PER TABLE C402.1.3
RE: SEPARATE COMCHECK REPORT

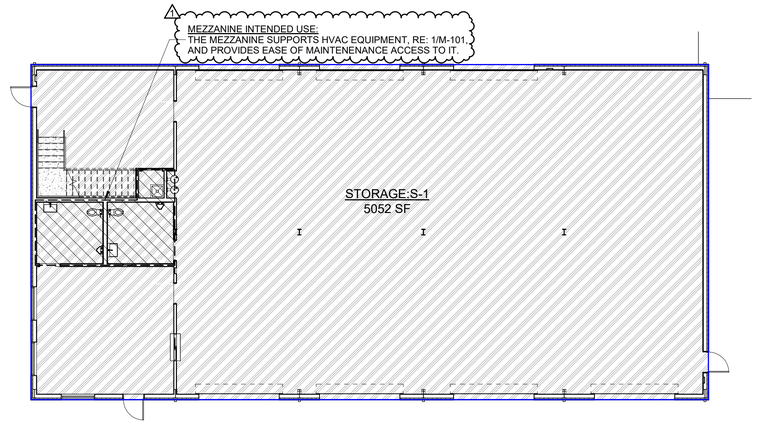
CHAPTER 4 - FENESTRATION

MINIMUM REQUIREMENTS

BUILDING ELEMENT	REQUIRED		PROVIDED	
VERTICAL FENESTRATION	U-FACTOR		U-FACTOR	
FIXED FENESTRATION OPERABLE FENESTRATION ENTRANCE DOORS	XX XX XX		**N/A** **N/A** **XX**	
SHGC: ORIENTATION	SEW	N	SEW	N
SHGC: PF < 0.25 SHGC: 0.25 ≤ PF < 0.5 SHGC: PF ≥ 0.5	XX XX XX	XX XX XX	**N/A** **N/A** **N/A**	**N/A** **N/A** **N/A**
SKYLIGHTS U-FACTOR SHGC	 XX XX		 **N/A** **N/A**	

PER TABLE C402.4

BUILDING CODE REVIEW: AREA KEY PLANS



1 LEVEL 1 AREA PLAN
3/32" = 1'-0"

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VEHICLE MAINTENANCE GARAGE
200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

REGISTERED ARCHITECT
JACK A. DURAN
18071
STATE OF TEXAS

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AFFIXATION DATE: 04.22.25

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CODE ANALYSIS

G-002

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CHAPTER 3: BUILDING BLOCKS

302 Floor or Ground Surfaces

302.2 Carpet. Carpet or carpet tile shall be securely attached and shall have a firm cushion, pad, or backing or no cushion or pad. Carpet or carpet tile shall have a level loop, textured loop, level cut pile, or level cut/uncut pile texture.

Pile height shall be 1/2 inch (13 mm) maximum. Exposed edges of carpet shall be fastened to floor surfaces and shall have trim on the entire length of the exposed exposed edge. Carpet edge trim shall comply with 303.

Figure 302.2 Carpet Pile Height

302.3 Openings. Openings in floor or ground surfaces shall not allow passage of a sphere more than 1/2 inch (13 mm) diameter except as allowed in 407.4.3, 409.4.3, 410.4, 810.5.3 and 810.10. Elongated openings shall be placed so that the long dimension is perpendicular to the dominant direction of travel.

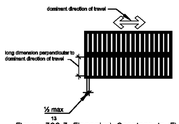


Figure 302.3 Elongated Openings in Floor or Ground Surfaces

303.2 Vertical. Changes in level of 1/4 inch (6.4 mm) high maximum shall be permitted to be vertical.

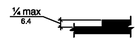


Figure 303.2 Vertical Change in Level

303.3 Beveled. Changes in level between 1/4 inch (6.4 mm) high minimum and 1/2 inch (13 mm) high maximum shall be beveled with a slope not steeper than 1:2.

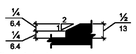


Figure 303.3 Beveled Change in Level

304 Turning Space

304.3.1 Circular Space. The turning space shall be a space of 60 inches (1525 mm) diameter minimum. The space shall be permitted to include knee and toe clearance complying with 306.

304.3.2 T-Shaped Space. The turning space shall be a T-shaped space within a 60 inch (1525 mm) square minimum with arms and base 36 inches (915 mm) wide minimum. Each arm of the T shall be clear of obstructions 12 inches (305 mm) minimum in each direction and the base shall be clear of obstructions 24 inches (610 mm) minimum. The space shall be permitted to include knee and toe clearance complying with 306 only at the end of either the base or one arm.

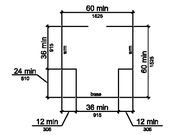


Figure 304.3.2 T-Shaped Turning Space

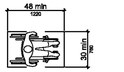


Figure 305.3 Clear Floor or Ground Space

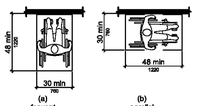


Figure 305.5 Position of Clear Floor or Ground Space

305.7.1 Forward Approach. Alcoves shall be 36 inches (915 mm)wide minimum where the depth exceeds 24 inches (610 mm).

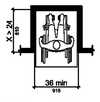


Figure 305.7.1 Maneuvering Clearance in an Alcove, Forward Approach

305.7.2 Parallel Approach. Alcoves shall be 60 inches (1525 mm) wide minimum where the depth exceeds 15 inches (380 mm).

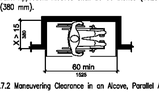


Figure 305.7.2 Maneuvering Clearance in an Alcove, Parallel Approach

306 Knee and Toe Clearance

306.2 Toe Clearance.

306.2.1 General. Space under an element between the finish floor or ground and 9 inches (230 mm) above the finish floor or ground shall be considered toe clearance and shall comply with 306.2.

306.2.2 Maximum Depth. Toe clearance shall extend 25 inches (635 mm) maximum under an element.

306.2.3 Minimum Required Depth. Where toe clearance is required at an element as part of a clear floor space, the toe clearance shall extend 17 inches (430 mm) minimum under the element.

306.2.4 Additional Clearance. Space extending greater than 6 inches (150 mm) beyond the available knee clearance at 9 inches (230 mm) above the finish floor or ground shall not be considered toe clearance.

306.2.5 Width. Toe clearance shall be 30 inches (760 mm) wide minimum.

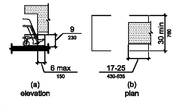


Figure 306.2 Toe Clearance

306.3 Knee Clearance.

306.3.1 General. Space under an element between 9 inches (230 mm) and 27 inches (685 mm) above the finish floor or ground shall be considered knee clearance and shall comply with 306.3.

306.3.2 Maximum Depth. Knee clearance shall extend 25 inches (635 mm) maximum under an element at 9 inches (230 mm) above the finish floor or ground.

306.3.3 Minimum Required Depth. Where knee clearance is required under an element as part of a clear floor space, the knee clearance shall be 11 inches (280 mm) deep minimum at 9 inches (230 mm) above the finish floor or ground, and 8 inches (205 mm) deep minimum at 27 inches (685 mm) above the finish floor or ground.

306.3.4 Clearance Reduction. Between 9 inches (230 mm) and 27 inches (685 mm) above the finish floor or ground, the knee clearance shall be permitted to reduce at a rate of 1 inch (25 mm) in depth for each 6 inches (150 mm) in height.

306.3.5 Width. Knee clearance shall be 30 inches (760 mm) wide minimum.

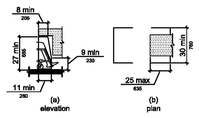


Figure 306.3 Knee Clearance

307 Protruding Objects

307.2 Protrusion Limits. Objects with leading edges more than 27 inches (685 mm) and not more than 80 inches (2030 mm) above the finish floor or ground shall protrude 4 inches (100 mm) maximum horizontally into the circulation path.

EXCEPTION: Handrails shall be permitted to protrude 4 1/2 inches (115 mm) maximum.

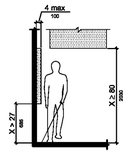


Figure 307.2 Limits of Protruding Objects

307.3 Post-Mounted Objects. Free-standing objects mounted on posts or pylons shall overhang circulation paths 12 inches (305 mm) maximum when located 27 inches (685 mm) minimum and 80 inches (2030 mm) maximum above the finish floor or ground. Where a sign or other obstruction is mounted between posts or pylons and the clear distance between the posts or pylons is greater than 12 inches (305 mm), the lowest edge of such sign or obstruction shall be 27 inches (685 mm) maximum or 80 inches (2030 mm) minimum above the finish floor or ground.

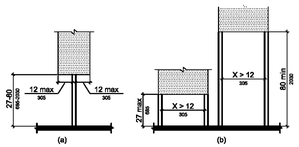


Figure 307.3 Post-Mounted Protruding Objects

307.4 Vertical Clearance. Vertical clearance shall be 80 inches (2030 mm) high minimum. Guardrails or other barriers shall be provided where the vertical clearance is less than 80 inches (2030 mm) high. The leading edge of such guardrail or barrier shall be located 27 inches (685 mm) maximum above the finish floor or ground.

EXCEPTION: Door closers and door stops shall be permitted to be 78 inches (1980 mm) minimum above the finish floor or ground.

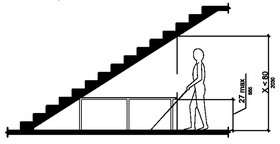


Figure 307.4 Vertical Clearance

308 Reach Ranges

Children's Reach Ranges

Forward or Side Reach	High (maximum)	Low (minimum)
Ages 3 and 4	36 in (915 mm)	20 in (510 mm)
Ages 5 through 8	40 in (1015 mm)	18 in (455 mm)
Ages 9 through 12	44 in (1120 mm)	16 in (405 mm)

308.2 Forward Reach.

308.2.1 Unobstructed. Where a forward reach is unobstructed, the high forward reach shall be 48 inches (1220 mm) maximum and the low forward reach shall be 15 inches (380 mm) minimum above the finish floor or ground.

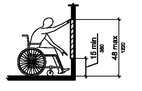


Figure 308.2.2 Obstructed High Forward Reach

308.2.2 Obstructed High Reach. Where a high forward reach is over an obstruction, the clear floor space shall extend beneath the element for a distance not less than the required reach depth over the obstruction. The high forward reach shall be 48 inches (1220 mm) maximum where the reach depth is 20 inches (510 mm) maximum. Where the reach depth exceeds 20 inches (510 mm), the high forward reach shall be 44 inches (1120 mm) maximum and the reach depth shall be 25 inches (635 mm) maximum.

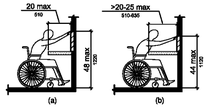
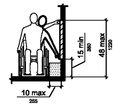


Figure 308.3.1 Unobstructed Side Reach

308.3 Side Reach.

308.3.1 Unobstructed. Where a clear floor or ground space allows a parallel approach to an element and the side reach is unobstructed, the high side reach shall be 48 inches (1220 mm) maximum and the low side reach shall be 15 inches (380 mm) minimum above the finish floor or ground.



308.3.2 Obstructed High Reach. Where a clear floor or ground space allows a parallel approach to an element and the high side reach is over an obstruction, the height of the obstruction shall be 34 inches (865 mm) maximum and the depth of the obstruction shall be 24 inches (610 mm) maximum. The high side reach shall be 48 inches (1220 mm) maximum for a reach depth of 10 inches (255 mm) maximum. Where the reach depth exceeds 10 inches (255 mm), the high side reach shall be 46 inches (1170 mm) maximum for a reach depth of 24 inches (610 mm) maximum.

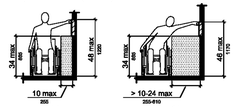


Figure 308.3.2 Obstructed High Side Reach

309 Operable Parts

309.2 Clear Floor Space. A clear floor or ground space complying with 305 shall be provided.

309.3 Height. Operable parts shall be placed within one or more of the reach ranges specified in 308.

309.4 Operation. Operable parts shall be operable with one hand and shall not require tight grasping, pinching, or twisting of the wrist. The force required to activate operable parts shall be 5 pounds (22.2 N) maximum.

CHAPTER 4: ACCESSIBLE ROUTES

402.2 Components. Accessible routes shall consist of one or more of the following components: walking surfaces with a running slope not steeper than 1:20, doorways, ramps, curb ramps excluding the flared sides, elevators, and platform lifts. All components of an accessible route shall comply with the applicable requirements of Chapter 4.

Advisory 402.2 Components. Walking surfaces must have running slopes not steeper than 1:20, see 403.3. Other components of accessible routes, such as ramps (405) and curb ramps (406), are permitted to be more steeply sloped.

403 Walking Surfaces

403.1 General. Walking surfaces that are a part of an accessible route shall comply with 403.

403.2 Floor or Ground Surface. Floor or ground surfaces shall comply with 302.

403.3 Slope. The running slope of walking surfaces shall not be steeper than 1:20. The cross slope of walking surfaces shall not be steeper than 1:48.

403.4 Changes in Level. Changes in level shall comply with 303.

403.5 Clearances. Walking surfaces shall provide clearances complying with 403.5.

EXCEPTION: Within employee work areas, clearances on common use circulation paths shall be permitted to be decreased by work area equipment provided that the decrease is essential to the function of the work being performed.

403.5.1 Clear Width. Except as provided in 403.5.2 and 403.5.3, the clear width of walking surfaces shall be 36 inches (915 mm) minimum.

EXCEPTION: The clear width shall be permitted to be reduced to 32 inches (815 mm) minimum for a length of 24 inches (610 mm) maximum provided that reduced width segments are separated by segments that are 48 inches (1220 mm) long minimum and 36 inches (915 mm) wide minimum.

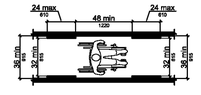


Figure 403.5.1 Clear Width of an Accessible Route

403.5.2 Clear Width at Turn. Where the accessible route makes a 180 degree turn around an element which is less than 48 inches (1220 mm) wide, clear width shall be 42 inches (1065 mm) minimum approaching the turn, 48 inches (1220 mm) minimum at the turn and 42 inches (1065 mm) minimum leaving the turn.

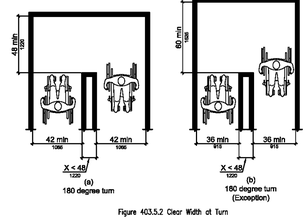


Figure 403.5.2 Clear Width at Turn

403.5.3 Passing Spaces. An accessible route with a clear width less than 60 inches (1525 mm) shall provide passing spaces at intervals of 200 feet (61 m) maximum.

404 Doors, Doorways, and Gates

404.2.3 Clear Width. Door openings shall provide a clear width of 32 inches (815 mm) minimum. Clear openings of doorways with swinging doors shall be measured between the face of the door and the stop, with the door open 90 degrees. Openings more than 24 inches (610 mm) deep shall provide a clear opening of 36 inches (915 mm) minimum. There shall be no projections into the required clear opening width lower than 34 inches (865 mm) above the finish floor or ground. Projections into the clear opening width between 34 inches (865 mm) and 80 inches (2030 mm) above the finish floor or ground shall not exceed 4 inches (100 mm).

Figure 404.2.3 Clear Width of Doorways

404.2.4 Maneuvering Clearances. Minimum maneuvering clearances at doors and gates shall comply with 404.2.4. Maneuvering clearances shall extend the full width of the doorway and the required latch side or hinge side clearance.

404.2.4.3 Recessed Doors and Gates. Maneuvering clearances for forward approach shall be provided when any obstruction within 18 inches (455 mm) of the latch side of a doorway projects more than 8 inches (205 mm) beyond the face of the door, measured perpendicular to the face of the door or gate.

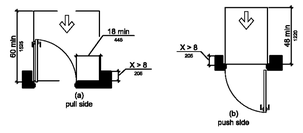


Figure 404.2.4.3 Maneuvering Clearances at Recessed Doors and Gates

404.2.6 Doors in Series and Gates in Series. The distance between two hinged or pivoted doors in series and gates in series shall be 48 inches (1220 mm) minimum plus the width of doors or gates swinging into the space.

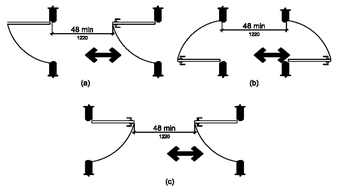


Figure 404.2.6 Doors in Series and Gates in Series

404.2.7 Door and Gate Hardware. Handles, pulls, latches, locks, and other operable parts on doors and gates shall comply with 309.4. Operable parts of such hardware shall be 34 inches (865 mm) minimum and 48 inches (1220 mm) maximum above the finish floor or ground. Where sliding doors are in the fully open position, operating hardware shall be exposed and usable from both sides.

404.2.8.1 Door Closers and Gate Closers. Door closers and gate closers shall be adjusted so that from an open position of 90 degrees, the time required to move the door to a position of 12 degrees from the latch is 5 seconds minimum.

404.2.8.2 Spring Hinges. Door and gate spring hinges shall be adjusted so that from the open position of 70 degrees, the door or gate shall move to the closed position in 1.5 seconds minimum.

404.2.9 Door and Gate Opening Force. Fire doors shall have a minimum opening force allowable by the appropriate administrative authority. The force for pushing or pulling open a door or gate other than fire doors shall be as follows:

1. Interior hinged doors and gates: 5 pounds (22.2 N) maximum.

2. Sliding or folding doors: 5 pounds (22.2 N) maximum.

These forces do not apply to the force required to retract latch bolts or disengage other devices that hold the door or gate in a closed position.

404.2.10 Door and Gate Surfaces. Swinging door and gate surfaces within 10 inches (255 mm) of the finish floor or ground measured vertically shall have a smooth surface on the push side extending the full width of the door or gate. Parts creating horizontal or vertical joints in these surfaces shall be within 1/16 inch (1.6 mm) of the same plane as the other. Cavities created by added kick plates shall be capped.

404.2.11 Vision Lights. Doors, gates, and side lights adjacent to doors or gates, containing one or more glazing panels that permit viewing through the panels shall have the bottom of at least one glazed panel located 43 inches (1090 mm) maximum above the finish floor.

404.3 Automatic and Power-Assisted Doors and Gates. Automatic doors and automatic gates shall comply with 404.3. Full-powered automatic doors shall comply with ANSI/BHMA A156.10 (incorporated by reference, see "Referenced Standards" in Chapter 1). Low-energy and power-assisted doors shall comply with ANSI/BHMA A156.19 (1997 or 2002 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1).

404.3.2 Maneuvering Clearance. Clearances at power-assisted doors and gates shall comply with 404.2.4. Clearances at automatic doors and gates without standby power and serving an accessible means of egress shall comply with 404.2.4.

404.3.7 Revolving Doors, Revolving Gates, and Turnstiles. Revolving doors, revolving gates, and turnstiles shall not be part of an accessible route.

405 Ramps

405.2 Slope. Ramp runs shall have a running slope not steeper than 1:12.

405.3 Cross Slope. Cross slope of ramp runs shall not be steeper than 1:48.

405.5 Clear Width. The clear width of a ramp run and, where handrails are provided, the clear width between handrails shall be 36 inches (915 mm) minimum.

405.6 Rise. The rise for any ramp run shall be 30 inches (760 mm) maximum.

405.7 Landings. Ramps shall have landings at the top and the bottom of each ramp run. Landings shall comply with 405.7.

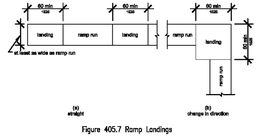


Figure 405.7 Ramp Landings

405.7.1 Slope. Landings shall have slope no steeper than 1:48. Changes in level are not permitted.

405.7.2 Width. The landing clear width shall be at least as wide as the widest ramp run leading to the landing.

405.7.3 Length. The landing clear length shall be 60 inches (1525 mm) long minimum.

405.7.4 Change in Direction. Ramps that change direction between runs at landings shall have a clear landing 60 inches (1525 mm) minimum by 60 inches (1525 mm) minimum.

405.7.5 Doorways. Where doorways are located adjacent to a ramp landing, maneuvering clearances required by 404.2.4 and 404.3.2 shall be permitted to overlap the required landing

405.8 Handrails. Ramp runs with a rise greater than 6 inches (150 mm) shall have handrails complying with 505.

405.9 Edge Protection. Edge protection complying with 405.9.1 or 405.9.2 shall be provided on each side of ramp runs and at each side of ramp landings.

405.9.1 Extended Floor or Ground Surface. The floor or ground surface of the ramp run or landing shall extend 12 inches (305 mm) minimum beyond the inside face of a handrail complying with 505.

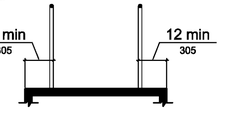


Figure 405.9.1 Extended Floor or Ground Surface Edge Protection

405.9.2 Curb or Barrier. A curb or barrier shall be provided that prevents the passage of a 4 inch (100 mm) diameter sphere, where any portion of the sphere is within 4 inches (100 mm) of the finish floor or ground surface.

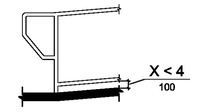


Figure 405.9.2 Curb or Barrier Edge Protection

406 Curb Ramps

406.1 General. Curb ramps on accessible routes shall comply with 406, 405.2 through 405.5, and 405.10.

406.2 Counter Slope. Counter slopes of adjoining gutters and road surfaces immediately adjacent to the curb ramp shall not be steeper than 1:20. The adjacent surfaces at transitions at curb ramps to walks, gutters, and streets shall be at the same level.

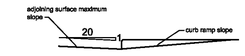


Figure 406.2 Counter Slope of Surfaces Adjacent to Curb Ramps

406.3 Sides of Curb Ramps. Where provided, curb ramp flares shall not be steeper than 1:10.

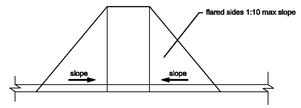


Figure 406.3 Sides of Curb Ramps

406.4 Landings. Landings shall be provided at the tops of curb ramps. The landing clear length shall be 36 inches (915 mm) minimum. The landing clear width shall be at least as wide as the curb ramp, excluding flared sides, leading to the landing.

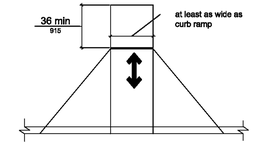


Figure 406.4 Landings at the Top of Curb Ramps

406.5 Location. Curb ramps and the flared sides of curb ramps shall be located so that they do not project into vehicular traffic lanes, parking spaces, or parking access aisles. Curb ramps at marked crossings shall be wholly contained within the markings, excluding any flared sides.

406.6 Diagonal Curb Ramps. Diagonal or corner type curb ramps with returned curbs or other well-defined edges shall have the edges parallel to the direction of pedestrian flow. The bottom of diagonal curb ramps shall have a clear space 48 inches (1220 mm) minimum outside active traffic lanes of the roadway. Diagonal curb ramps provided at marked crossings shall provide the 48 inches (1220 mm) minimum clear space within the markings. Diagonal curb ramps with flared sides shall have a segment of curb 24 inches (610 mm) long minimum located on each side of the curb ramp and within the marked crossing.

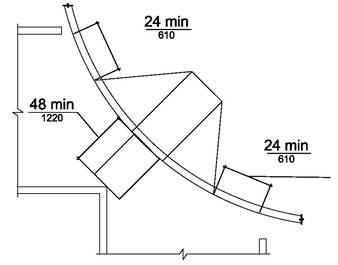


Figure 406.6 Diagonal or Corner Type Curb Ramps

406.7 Islands. Raised islands in crossings shall be cut through level with the street or have curb ramps at both sides. Each curb ramp shall have a level area 48 inches (1220 mm) long minimum by 36 inches (915 mm) wide minimum at the top of the curb ramp in the port of the island intersected by the crossings. Each 48 inch (1220 mm) minimum by 36 inch (915 mm) minimum area shall be oriented so that the 48 inch (1220 mm) minimum length is in the direction of the running slope of the curb ramp it serves. The 48 inch (1220 mm) minimum by 36 inch (915 mm) minimum areas and the accessible route shall be permitted to overlap.

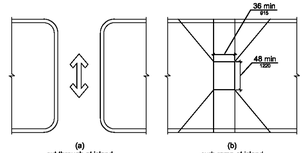


Figure 406.7 Islands in Crossings

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200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

REGISTERED ARCHITECT
JACK A. DURAN
18071
STATE OF TEXAS

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JACK A. DURAN, NO. 18071

AFFIXATION DATE: 04.22.25

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2012 TEXAS ACCESSIBILITY STANDARDS

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407 Elevators

407.1 General. Elevators shall comply with 407 and with ASME A17.1 (incorporated by reference, see "Referenced Standards" in Chapter 1). They shall be passenger elevators as classified by ASME A17.1. Elevator operation shall be automatic.
EXCEPTION: Existing conditions don't have to comply

407.2.1.2 Size. Call buttons shall be 3/4 inch (19 mm) minimum in the smallest dimension.

407.2.2.1 Visible and Audible Signals. A visible and audible signal shall be provided at each hoistway entrance to indicate which car is answering a call and the car's direction of travel. Where in-car signals are provided, they shall be visible from the floor area adjacent to the hall call buttons.

407.2.2.2 Visible Signals. Visible signal fixtures shall be centered at 72 inches (1830 mm) minimum above the finish floor or ground. The visible signal elements shall be 2 1/2 inches (64 mm) minimum measured along the vertical centerline of the element. Signals shall be visible from the floor area adjacent to the hall call button.

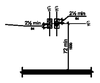

Figure 407.2.2.2 Visible Hall Signals

407.2.3.1 Floor Designations. Floor designations complying with 703.2 and 703.4.1 shall be provided on both jambs of elevator hoistway entrances. Floor designations shall be provided in both tactile characters and braille. Tactile characters shall be 2 inches (51 mm) high minimum. A tactile star shall be provided on both jambs at the main entry level.

Figure 407.2.3.1 Floor Designations on Jambs of Elevator Hoistway Entrances

407.2.3.2 Car Designations. Destination-oriented elevators shall provide tactile car identification complying with 703.2 on both jambs of the hoistway immediately below the floor designation. Car designations shall be provided in both tactile characters and braille. Tactile characters shall be 2 inches (51 mm) high minimum.

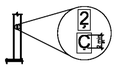

Figure 407.2.3.2 Car Designations on Jambs of Destination-Oriented Elevator Hoistway Entrances

407.3.3.1 Height. The device shall be activated by sensing an obstruction passing through the opening at 5 inches (125 mm) nominal and 29 inches (735 mm) nominal above the finish floor.

407.3.3.3 Duration. Door reopening devices shall remain effective for 20 seconds minimum.

407.3.4 Door and Signal Timing. The minimum acceptable time from notification that a car is answering a call or notification of the car assigned at the means for the entry of destination information until the doors of that car start to close shall be calculated from the following equation:

$T = D/(1.5\ ft/s)$ or $T = D/(455\ mm/s) + 5$ seconds minimum where T equals the total time in seconds and D equals the distance (in feet or millimeters) from the point in the lobby or corridor 60 inches (1525 mm) directly in front of the farthest call button controlling that car to the centerline of its hoistway door.

407.3.5 Door Delay. Elevator doors shall remain fully open in response to a car call for 3 seconds

407.3.6 Width. The width of elevator doors shall comply with Table 407.4.1.

407.4 Elevator Car Requirements. Elevator cars shall comply with 407.4.

407.4.1 Car Dimensions. Inside dimensions of elevator cars and clear width of elevator doors shall comply with Table 407.4.1.

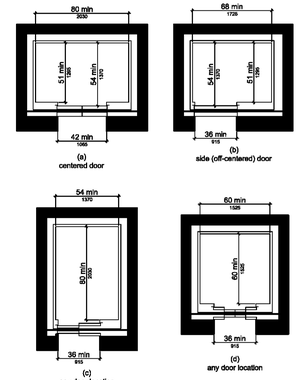

Figure 407.4.1 Elevator Car Dimensions

407.4.3 Platform to Hoistway Clearance. The clearance between the car platform sill and the edge of any hoistway landing shall be 1 1/4 inch (32 mm) maximum.

407.4.4 Leveling. Each car shall be equipped with a self-leveling feature that will automatically bring and maintain the car at floor landings within a tolerance of 1/2 inch (13 mm) under rated loading to zero loading conditions.

407.4.5 Illumination. The level of illumination at the car controls, platform, car threshold and car landing sill shall be 5 foot candles (54 lux) minimum.

407.4.6 Elevator Car Controls. Where provided, elevator car controls shall comply with 407.4.6 and 309.4.

407.4.6.1 Location. Controls shall be located within one of the reach ranges specified in 308.

407.4.6.2 Buttons. Car control buttons with floor designations shall comply with 407.4.6.2 and shall be raised or flush.

407.4.6.2.1 Size. Buttons shall be 3/4 inch (19 mm) minimum in their smallest dimension.

407.4.6.4.1 Height. Emergency control buttons shall have their centerlines 35 inches (890 mm) minimum above the finish floor.

407.4.7.1.1 Type. Control buttons shall be identified by tactile characters complying with 703.2.

407.4.7.1.3 Symbols. The control button for the emergency stop, alarm, door open, door close, main entry floor, and phone, shall be identified with tactile symbols as shown in Table 407.4.7.1.3.

407.4.8.1.1 Size. Characters shall be 1/2 inch (13 mm) high minimum.

407.4.8.2.2 Signal Level. The verbal annunciator shall be 10 dB minimum above ambient, but shall not exceed 80 dB, measured at the annunciator.

407.4.8.2.3 Frequency. The verbal annunciator shall have a frequency of 300 Hz minimum to 3000 Hz maximum.

408 Limited-Use/Limited-Application Elevators

408.1 General. Limited-use/limited-application elevators shall comply with 408 and with ASME A17.1 (incorporated by reference, see "Referenced Standards" in Chapter 1). They shall be passenger elevators as classified by ASME A17.1. Elevator operation shall be automatic.

408.2 Elevator Landings. Landings serving limited-use/limited-application elevators shall comply with 408.2.

408.2.1 Call Buttons. Elevator call buttons and keypads shall comply with 407.2.1.

408.2.2 Hall Signals. Hall signals shall comply with 407.2.2.

408.2.3 Hoistway Signs. Signs at elevator hoistways shall comply with 407.2.3.1.

408.3 Elevator Doors. Elevator hoistway doors shall comply with 408.3.

408.3.1 Sliding Doors. Sliding hoistway and car doors shall comply with 407.3.1 through 407.3.3 and 408.4.1.

408.3.2 Swinging Doors. Swinging hoistway doors shall open and close automatically and shall comply with 404, 407.3.2 and 408.3.2.

408.3.2.1 Power Operation. Swinging doors shall be power-operated and shall comply with ANSI/BHMA A156.19 (1997 or 2002 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1).

408.3.2.2 Duration. Power-operated swinging doors shall remain open for 20 seconds minimum when activated.

408.4 Elevator Cars. Elevator cars shall comply with 408.4.

408.4.1 Car Dimensions and Doors. Elevator cars shall provide a clear width 42 inches (1065 mm) minimum and a clear depth 54 inches (1370 mm) minimum. Car doors shall be positioned at the narrow ends of cars and shall provide 32 inches (815 mm) minimum clear width.

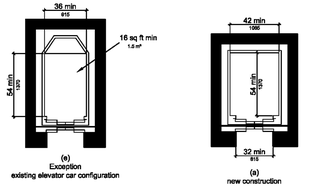

Figure 408.4.1 Limited-Use/Limited-Application (LULA) Elevator Car Dimensions

15 sq ft min

408.4.2 Floor Surfaces. Floor surfaces in elevator cars shall comply with 302 and 303.

408.4.3 Platform to Hoistway Clearance. The platform to hoistway clearance shall comply with 407.4.3.

408.4.4 Leveling. Elevator car leveling shall comply with 407.4.4.

408.4.5 Illumination. Elevator car illumination shall comply with 407.4.5.

408.4.6 Car Controls. Elevator car controls shall comply with 407.4.6. Control panels shall be centered on a side wall.

408.4.7 Designations and Indicators of Car Controls. Designations and indicators of car controls shall comply with 407.4.7.

408.4.8 Emergency Communications. Car emergency signaling devices complying with 407.4.9 shall be provided.

409 Private Residence Elevators

409.1 General. Private residence elevators that are provided within a residential dwelling unit required to provide mobility features complying with 809.2 through 809.4 shall comply with 409 and with ASME A17.1 (incorporated by reference, see "Referenced Standards" in Chapter 1). They shall be passenger elevators as classified by ASME A17.1. Elevator operation shall be automatic.

409.2 Call Buttons. Call buttons shall be 3/4 inch (19 mm) minimum in the smallest dimension and shall comply with 308.

409.3 Elevator Doors. Hoistway doors, car doors, and car gates shall comply with 408.3 and 404.

409.3.1 Power Operation. Elevator car and hoistway doors and gates shall be power operated and shall comply with ANSI/BHMA A156.19 (1997 or 2002 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1). Power operated doors and gates shall remain open for 20 seconds minimum when activated.

409.3.2 Location. Elevator car doors or gates shall be positioned at the narrow end of the clear floor spaces required by 409.4.1.

409.4 Elevator Cars. Private residence elevator cars shall comply with 409.4.

409.4.1 Inside Dimensions of Elevator Cars. Elevator cars shall provide a clear floor space of 36 inches (915 mm) minimum by 48 inches (1220 mm) minimum and shall comply with 305.

409.4.2 Floor Surfaces. Floor surfaces in elevator cars shall comply with 302 and 303.

409.4.3 Platform to Hoistway Clearance. The clearance between the car platform and the edge of any landing sill shall be 1 1/2 inch (38 mm) maximum.

409.4.4 Leveling. Each car shall automatically stop at a floor landing within a tolerance of 1/2 inch (13 mm) under rated loading to zero loading conditions.

409.4.5 Illumination Levels. Elevator car illumination shall comply with 407.4.5.

409.4.6 Car Controls. Elevator car control buttons shall comply with 409.4.6, 309.3, 309.4, and shall be raised or flush.

409.4.6.1 Size. Control buttons shall be 3/4 inch (19 mm) minimum in their smallest dimension.

409.4.6.2 Location. Control panels shall be on a side wall, 12 inches (305 mm) minimum from any adjacent wall.

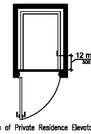

Figure 409.4.6.2 Location of Private Residence Elevator Control Panel

409.4.7.
409.4.7 Emergency Communications. Emergency two-way communication systems shall comply with

409.4.7.1 Type. A telephone and emergency signal device shall be provided in the car.

409.4.7.2 Operable Parts. The telephone and emergency signaling device shall comply with 309.3 and 309.4.

409.4.7.3 Compartment. If the telephone or device is in a closed compartment, the compartment door hardware shall comply with 309.

409.4.7.4 Cord. The telephone cord shall be 29 inches (735 mm) long minimum.

410 Platform Lifts

410.1 General. Platform lifts shall comply with ASME A18.1 (1999 edition or 2003 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1). Platform lifts shall not be attendant-operated and shall provide unassisted entry and exit from the lift.

Advisory 410.1 General. Inclined stairway chairlifts and inclined and vertical platform lifts are available for short-distance vertical transportation. Because an accessible route requires an 80 inch (2030 mm) vertical clearance, care should be taken in selecting lifts as they may not be equally suitable for use by people using wheelchairs and people standing. If a lift does not provide 80 inch (2030 mm) vertical clearance, it cannot be considered part of an accessible route in new construction.

The ADA and other Federal civil rights laws require that accessible features be maintained in working order so that they are accessible to and usable by those people they are intended to benefit. Building owners are reminded that the ASME A18 Safety Standard for Platform Lifts and Stairway Chairlifts requires routine maintenance and inspections. Isolated or temporary interruptions in service due to maintenance or repairs may be unavoidable; however, failure to take prompt action to effect repairs could constitute a violation of Federal laws and these requirements.

410.2 Floor Surfaces. Floor surfaces in platform lifts shall comply with 302 and 303.

410.3 Clear Floor Space. Clear floor space in platform lifts shall comply with 305.

410.4 Platform to Runway Clearance. The clearance between the platform sill and the edge of any runway landing shall be 1 inch (32 mm) maximum.

410.5 Operable Parts. Controls for platform lifts shall comply with 309.

410.6 Doors and Gates. Platform lifts shall have low-energy power-operated doors or gates complying with 404.3. Doors shall remain open for 20 seconds minimum. End doors and gates shall provide a clear width 32 inches (815 mm) minimum. Side doors and gates shall provide a clear width 42 inches (1065 mm) minimum.

EXCEPTION: Platform lifts serving two landings maximum and having doors or gates on opposite sides shall be permitted to have self-closing manual doors or gates.

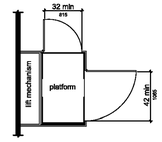

Figure 410.6 Platform Lift Doors and Gates

501 General

501.1 Scope. The provisions of Chapter 5 shall apply where required by Chapter 2 or where referenced by a requirement in this document.

502 Parking Spaces

502.1 General. Car and van parking spaces shall comply with 502. Where parking spaces are marked with lines, width measurements of parking spaces and access aisles shall be made from the centerline of the markings.

EXCEPTION: Where parking spaces or access aisles are not adjacent to another parking space or access aisle, measurements shall be permitted to include the full width of the line defining the parking space or access aisle.

502.2 Vehicle Spaces. Car parking spaces shall be 96 inches (2440 mm) wide minimum and van parking spaces shall be 132 inches (3350 mm) wide minimum, shall be marked to define the width, and shall have an adjacent access aisle complying with 502.3.

EXCEPTION: Van parking spaces shall be permitted to be 96 inches (2440 mm) wide minimum where the access aisle is 96 inches (2440 mm) wide minimum.

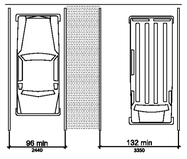

Figure 502.2 Vehicle Parking Spaces

502.3 Access Aisle. Access aisles serving parking spaces shall comply with 502.3. Access aisles shall adjoin an accessible route. Two parking spaces shall be permitted to share a common access aisle.

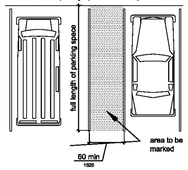

Figure 502.3 Parking Space Access Aisle

502.3.1 Width. Access aisles serving car and van parking spaces shall be 60 inches (1525 mm) wide minimum.

502.3.2 Length. Access aisles shall extend the full length of the parking spaces they serve.

502.3.3 Marking. Access aisles shall be marked so as to discourage parking in them.

502.3.4 Location. Access aisles shall not overlap the vehicular way. Access aisles shall be permitted to be placed on either side of the parking space except for angled van parking spaces which shall have access aisles located on the passenger side of the parking spaces.

502.4 Floor or Ground Surfaces. Parking spaces and access aisles serving them shall comply with 302. Access aisles shall be at the same level as the parking spaces they serve. Changes in level are not permitted. EXCEPTION: Slopes not steeper than 1:48 shall be permitted.

502.5 Vertical Clearance. Parking spaces for vans and access aisles and vehicular routes serving them shall provide a vertical clearance of 98 inches (2490 mm) minimum.

502.6 Identification. Parking space identification signs shall include the International Symbol of Accessibility complying with 703.7.2.1. Signs identifying van parking spaces shall contain the designation "van accessible." Signs shall be 60 inches (1525 mm) minimum above the finish floor or ground surface measured to the bottom of the sign.

502.7 Relationship to Accessible Routes. Parking spaces and access aisles shall be designed so that cars and vans, when parked, cannot obstruct the required clear width of adjacent accessible routes.

503 Passenger Loading Zones

503.2 Vehicle Pull-Up Space. Passenger loading zones shall provide a vehicular pull-up space 96 inches (2440 mm) wide minimum and 20 feet (6100 mm) long minimum.

503.3 Access Aisle. Passenger loading zones shall provide access aisles complying with 503 adjacent to the vehicle pull-up space. Access aisles shall adjoin an accessible route and shall not overlap the vehicular way.

503.3.1 Width. Access aisles serving vehicle pull-up spaces shall be 60 inches (1525 mm) wide minimum.

503.3.2 Length. Access aisles shall extend the full length of the vehicle pull-up spaces they serve.

503.3.3 Marking. Access aisles shall be marked so as to discourage parking in them.

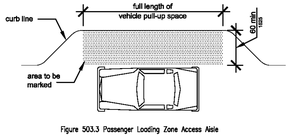

Figure 503.3 Passenger Loading Zone Access Aisle

503.4 Floor and Ground Surfaces. Vehicle pull-up spaces and access aisles serving them shall comply with 302. Access aisles shall be at the same level as the vehicle pull-up space they serve. Changes in level are not permitted. EXCEPTION: Slopes not steeper than 1:48 shall be permitted.

503.5 Vertical Clearance. Vehicle pull-up spaces, access aisles serving them, and a vehicular route from an entrance to the passenger loading zone, and from the passenger loading zone to a vehicular exit shall provide a vertical clearance of 114 inches (2895 mm) minimum.

504 Stairways

504.1 General. Stairs that are part of the means of egress is required to comply with 504

504.2 Treads and Risers. All steps on a flight of stairs shall have uniform riser heights and uniform tread depths. Risers shall be 4 inches (100 mm) high minimum and 7 inches (180 mm) high maximum. Treads shall be 11 inches (280 mm) deep minimum.

504.3 Open Risers. Open risers are not permitted.

504.4 Tread Surface. Stair treads shall comply with 302. Changes in level are not permitted.

504.5 Nosings. The radius of curvature at the leading edge of the tread shall be 1/2 inch (13 mm) maximum. Nosings that project beyond risers shall have the underside of the leading edge curved or beveled. Risers shall be permitted to slope under the tread at an angle of 30 degrees maximum from vertical. The permitted projection of the nosing shall extend 1 1/2 inches (38 mm) maximum over the tread below.

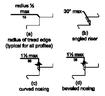

Figure 504.5 Stair Nosings

504.6 Handrails. Stairs shall have handrails complying with 505.

504.7 Wet Conditions. Stair treads and landings subject to wet conditions shall be designed to prevent the accumulation of water.

505 Handrails

505.1 General. Handrails provided along walking surfaces complying with 403, required at ramps complying with 405, and required at stairs complying with 504 shall comply with 505.

Advisory 505.1 General. Handrails are required on ramps runs with a rise greater than 6 inches (150 mm) (see 405.8) and on certain stairways (see 504). Handrails are not required on walking surfaces with running slopes less than 1:20. However, handrails are required to comply with 505 when they are provided on walking surfaces with running slopes less than 1:20 (see 403.6). Sections 505.2, 505.3, and 505.10 do not apply to handrails provided on walking surfaces with running slopes less than 1:20 as these sections only reference requirements for ramps and stairs.

505.2 Where Required. Handrails shall be provided on both sides of stairs and ramps.

505.3 Continuity. Handrails shall be continuous within the full length of each stair flight or ramp run. Inside handrails on switchback or dogleg stairs and ramps shall be continuous between flights or runs.

505.4 Height. Top of gripping surfaces of handrails shall be 34 inches (865 mm) minimum and 38 inches (965 mm) maximum vertically above walking surfaces, stair nosings, and ramp surfaces. Handrails shall be at a consistent height above walking surfaces, stair nosings, and ramp surfaces.

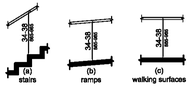

Figure 505.4 Handrail Height

505.5 Clearance. Clearance between handrail gripping surfaces and adjacent surfaces shall be 1 1/2 inches (38 mm) minimum.

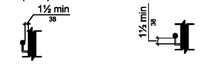

Figure 505.5 Handrail Clearance

Figure 505.6 Horizontal Projections Below Gripping Surface

505.6 Gripping Surface. Handrail gripping surfaces shall be continuous along their length and shall not be obstructed along their tops or sides. The bottoms of handrail gripping surfaces shall not be obstructed for more than 20 percent of their length. Where provided, horizontal projections shall occur 1 1/2 inches (38 mm) minimum below the bottom of the handrail gripping surface.

505.7.1 Circular Cross Section. Handrail gripping surfaces with a circular cross section shall have an outside diameter of 1 1/4 inches (32 mm) minimum and 2 inches (51 mm) maximum.

505.7.2 Non-Circular Cross Sections. Handrail gripping surfaces with a non-circular cross section shall have a perimeter dimension of 4 inches (100 mm) minimum and 6 1/4 inches (160 mm) maximum, and a cross-section dimension of 2 1/4 inches (57 mm) maximum.

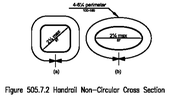

Figure 505.7.2 Handrail Non-Circular Cross Section

505.8 Surfaces. Handrail gripping surfaces and any surfaces adjacent to them shall be free of sharp or abrasive elements and shall have rounded edges.

505.9 Fittings. Handrails shall not rotate within their fittings.

505.10 Handrail Extensions. Handrail gripping surfaces shall extend beyond and in the same direction of stair flights and ramp runs in accordance with 505.10.

505.10.1 Top and Bottom Extension at Ramps. Ramp handrails shall extend horizontally above the landing for 12 inches (305 mm) minimum beyond the top and bottom of ramp runs. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent ramp run.

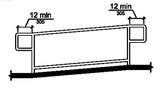

Figure 505.10.1 Top and Bottom Handrail Extension at Ramps

505.10.2 Top Extension at Stairs. At the top of a stair flight, handrails shall extend horizontally above the landing for 12 inches (305 mm) minimum beginning directly above the first riser nosing. Extensions shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent stair flight.

Figure 505.10.2 Top Handrail Extension at Stairs

Figure 505.10.3 Bottom Handrail Extension at Stairs

505.10.3 Bottom Extension at Stairs. At the bottom of a stair flight, handrails shall extend at the slope of the stair flight for a horizontal distance at least equal to one tread depth beyond the last riser nosing. Extension shall return to a wall, guard, or the landing surface, or shall be continuous to the handrail of an adjacent stair flight.

CHAPTER 6: PLUMBING ELEMENTS AND FACILITIES

602 Drinking Fountains

602.2 Clear Floor Space. Units shall have a clear floor or ground space complying with 305 positioned for a forward approach and centered on the unit. Knee and toe clearance complying with 306 shall be provided.

EXCEPTION: A parallel approach complying with 305 shall be permitted at units for children's use where the spout is 30 inches (760 mm) maximum above the finish floor or ground and is 3 1/2 inches (90 mm) maximum from the front edge of the unit, including bumpers.

602.3 Operable Parts. Operable parts shall comply with 309.

602.4 Spout Height. Spout outlets shall be 36 inches (915 mm) maximum above the finish floor or ground.

602.5 Spout Location. The spout shall be located 15 inches (380 mm) minimum from the vertical support and 5 inches (125 mm) maximum from the front edge of the unit, including bumpers.

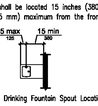

Figure 602.5 Drinking Fountain Spout Location

602.6 Water Flow. The spout shall provide a flow of water 4 inches (100 mm) high minimum and shall be located 5 inches (125 mm) maximum from the front of the unit. The angle of the water stream shall be measured horizontally relative to the front face of the unit. Where spouts are located less than 3 inches (75 mm) of the front of the unit, the angle of the water stream shall be 30 degrees maximum. Where spouts are located between 3 inches (75 mm) and 5 inches (125 mm) maximum from the front of the unit, the angle of the water stream shall be 15 degrees maximum.

602.7 Drinking Fountains for Standing Persons. Spout outlets of drinking fountains for standing persons shall be 38 inches (965 mm) minimum and 43 inches (1090 mm) maximum above the finish floor or ground.

603 Toilet and Bathing Rooms

603.2 Clearances. Clearances shall comply with 603.2.

603.2.1 Turning Space. Turning space complying with 304 shall be provided within the room.

603.2.2 Overlap. Required clear floor spaces, clearance at fixtures, and turning space shall be permitted to overlap.

603.2.3 Door Swing. Doors shall not swing into the clear floor space or clearance required for any fixture. Doors shall be permitted to swing into the required turning space.

603.3 Mirrors. Mirrors located above lavatories or countertops shall be installed with the bottom edge of the reflecting surface 40 inches (1015 mm) maximum above the finish floor or ground. Mirrors not located above lavatories or countertops shall be installed with the bottom edge of the reflecting surface 35 inches (890 mm) maximum above the finish floor or ground.

603.4 Coat Hooks and Shelves. Coat hooks shall be located within one of the reach ranges specified in 308. Shelves shall be located 40 inches (1015 mm) minimum and 48 inches (1220 mm) maximum above the finish floor.

604 Water Closets and Toilet Compartments

604.2 Location. The water closet shall be positioned with a wall or partition to the rear and to one side. The centerline of the water closet shall be 16 inches (405 mm) minimum to 18 inches (455 mm) maximum from the side wall or partition, except that the water closet shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum from the side wall or partition in the ambulatory accessible toilet compartment specified in 604.8.2. Water closets shall be arranged for a left-hand or right-hand approach.

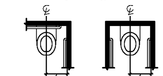

Figure 604.2 Water Closet Location

604.3.1 Size. Clearance around a water closet shall be 60 inches (1525 mm) minimum measured perpendicular from the side wall and 56 inches (1420 mm) minimum measured perpendicular from the rear wall.

Figure 604.3.1 Size of Clearance at Water Closets

604.3.2 Overlap. The required clearance around the water closet shall be permitted to overlap the water closet, associated grab bars, dispensers, sanitary napkin disposal units, coat hooks, shelves, accessible routes, clear floor space and clearances required at other fixtures, and the turning space. No other fixtures or obstructions shall be located within the required water closet clearance.

604.4 Seats. The seat height of a water closet above the finish floor shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum measured to the top of the seat. Seats shall not be sprung to return to a lifted position.

604.5 Grab Bars. Grab bars for water closets shall comply with 609. Grab bars shall be provided on the side wall closest to the water closet and on the rear wall.

604.5.1 Side Wall. The side wall grab bar shall be 42 inches (1065 mm) long minimum, located 12 inches (305 mm) maximum from the rear wall and extending 54 inches (1370 mm) minimum from the rear wall.

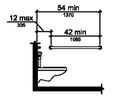

Figure 604.5.1 Side Wall Grab Bar at Water Closets

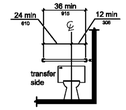

Figure 604.5.2 Rear Wall Grab Bar at Water Closets

604.5.2 Rear Wall. The rear wall grab bar shall be 36 inches (915 mm) long minimum and extend from the centerline of the water closet 12 inches (305 mm) minimum on one side and 24 inches (610 mm) minimum on the other side.

604.6 Flush Controls. Flush controls shall be hand operated or automatic. Hand operated flush controls shall comply with 309. Flush controls shall be located on the open side of the water closet except in ambulatory accessible compartments complying with 604.8.2.

604.7 Dispensers. Toilet paper dispensers shall comply with 309.4 and shall be 7 inches (180 mm) minimum and 9 inches (230 mm) maximum in front of the water closet measured to the centerline of the dispenser. The outlet of the dispenser shall be 15 inches (380 mm) minimum and 48 inches (1220 mm) maximum above the finish floor and shall not be located behind grab bars. Dispensers shall not be of a type that controls delivery or that does not allow continuous paper flow.

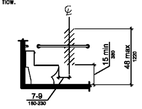

Figure 604.7 Dispenser Outlet Location

604.8 Toilet Compartments. Wheelchair accessible toilet compartments shall meet the requirements of 604.8.1 and 604.8.3. Compartments containing more than one plumbing fixture shall comply with 603. Ambulatory accessible compartments shall comply with 604.8.2 and 604.8.3.

604.8.1 Wheelchair Accessible Compartments. Wheelchair accessible compartments shall comply with 604.8.1.

604.8.1.1 Size. Wheelchair accessible compartments shall be 60 inches (1525 mm) wide minimum measured perpendicular to the side wall, and 56 inches (1420 mm) deep minimum for wall hung water closets and 59 inches (1500 mm) deep minimum for floor mounted water closets measured perpendicular to the rear wall. Wheelchair accessible compartments for children's use shall be 60 inches (1525 mm) wide minimum measured perpendicular to the side wall, and 59 inches (1500 mm) deep minimum for wall hung and floor mounted water closets measured perpendicular to the rear wall.

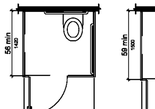

Figure 604.8.1.1 Size of Wheelchair Accessible Toilet Compartment

604.8.1.2 Doors. Toilet compartment doors, including door hardware, shall comply with 404 except that if the approach is to the latch side of the compartment door, clearance between the door side of the compartment and any obstruction shall be 42 inches (1065 mm) minimum. Doors shall be located in the front partition or in the side wall or partition farthest from the water closet. Where located in the front partition, the door opening shall be 4 inches (100 mm) maximum from the side wall or partition farthest from the water closet. Where located in the side wall or partition, the door opening shall be 4 inches (100 mm) maximum from the front partition. The door shall be self-closing. A door pull complying with 404.2.7 shall be placed on both sides of the door near the latch. Toilet compartment doors shall not swing into the minimum required compartment area.

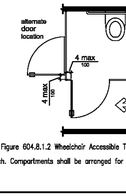

Figure 604.8.1.2 Wheelchair Accessible Toilet Compartment Doors

604.8.1.3 Approach. Compartments shall be arranged for left-hand or right-hand approach to the water closet.

604.8.1.4 Toe Clearance. The front partition and at least one side partition shall provide a toe clearance of 9 inches (230 mm) minimum above the finish floor and 6 inches (150 mm) deep minimum beyond the compartment-side face of the partition, exclusive of partition support members. Compartments for children's use shall provide a toe clearance of 12 inches (305 mm) minimum above the finish floor.

EXCEPTION: Toe clearance at the front partition is not required in a compartment greater than 62 inches (1575 mm) deep with a wall-hung water closet or 65 inches (1650 mm) deep with a floor-mounted water closet. Toe clearance at the side partition is not required in a compartment greater than 66 inches (1675 mm) wide. Toe clearance at the front partition is not required in a compartment for children's use that is greater than 65 inches (1650 mm)deep

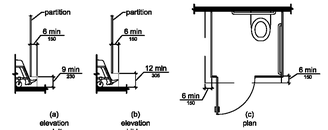

Figure 604.8.1.4 Wheelchair Accessible Toilet Compartment Toe Clearance

604.8.1.5 Grab Bars. Grab bars shall comply with 609. A side-wall grab bar complying with 604.5.1 shall be provided and shall be located on the wall closest to the water closet. In addition, a rear-wall grab bar complying with 604.5.2 shall be provided.

604.8.2 Ambulatory Accessible Compartments. Ambulatory accessible compartments shall comply with 604.8.2.

604.8.2.1 Size. Ambulatory accessible compartments shall have a depth of 60 inches (1525 mm) minimum and a width of 35 inches (890 mm) minimum and 37 inches (940 mm) maximum.

604.8.2.2 Doors. Toilet compartment doors, including door hardware, shall comply with 404, except that if the approach is to the latch side of the compartment door, clearance between the door side of the compartment and any obstruction shall be 42 inches (1065 mm) minimum. The door shall be self-closing. A door pull complying with 404.2.7 shall be placed on both sides of the door near the latch. Toilet compartment doors shall not swing into the minimum required compartment area.

604.8.2.3 Grab Bars. Grab bars shall comply with 609. A side-wall grab bar complying with 604.5.1 shall be provided on both sides of the compartment.

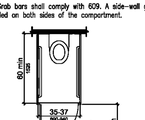

Figure 604.8.2 Ambulatory Accessible Toilet Compartment

604.8.3 Coat Hooks and Shelves. Coat hooks shall be located within one of the reach ranges specified in 308. Shelves shall be located 40 inches (1015 mm) minimum and 48 inches (1220 mm) maximum above the finish floor.

604.9 Water Closets and Toilet Compartments for Children's Use. Water closets and toilet compartments for children's use shall comply with 604.9.

604.9.1 Location. The water closet shall be located with a wall or partition to the rear and to one side. The centerline of the water closet shall be 12 inches (305 mm) minimum and 18 inches (455 mm) maximum from the side wall or partition, except that the water closet shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum from the side wall or partition in the ambulatory accessible toilet compartment specified in 604.8.2. Compartments shall be arranged for left-hand or right-hand approach to the water closet.

604.9.2 Clearance. Clearance around a water closet shall comply with 604.3.

604.9.3 Height. The height of water closets shall be 11 inches (280 mm) minimum and 17 inches (430 mm) maximum measured to the top of the seat. Seats shall not be sprung to return to a lifted position.

604.9.4 Grab Bars. Grab bars for water closets shall comply with 604.5.

604.9.5 Flush Controls. Flush controls shall be hand operated or automatic. Hand operated flush controls shall comply with 309.2 and 309.4 and shall be installed 36 inches (915 mm) maximum above the finish floor. Flush controls shall be located on the open side of the water closet except in ambulatory accessible compartments complying with 604.8.2.

604.9.6 Dispensers. Toilet paper dispensers shall comply with 309.4 and shall be 7 inches (180 mm) minimum and 9 inches (230 mm) maximum in front of the water closet measured to the centerline of the dispenser. The outlet of the dispenser shall be 14 inches (355 mm) minimum and 19 inches (485 mm) maximum above the finish floor. There shall be a clearance of 1 1/2 inches (38 mm) minimum below the grab bar. Dispensers shall not be of a type that controls delivery or that does not allow continuous paper flow.

604.9.7 Toilet Compartments. Toilet compartments shall comply with 604.8.

605 Urinals

605.2 Height and Depth. Urinals shall be the stall-type or the wall-hung type with the rim 17 inches (430 mm) maximum above the finish floor or ground. Urinals shall be 13 1/2 inches (345 mm) deep minimum measured from the outer face of the urinal rim to the back of the fixture.

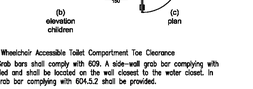

Figure 605.2 Height and Depth of Urinals

605.3 Clear Floor Space. A clear floor or ground space complying with 305 positioned for forward approach shall be provided.

605.4 Flush Controls. Flush controls shall be hand operated or automatic. Hand operated flush controls shall comply with 309.

606 Lavatories and Sinks

606.2 Clear Floor Space. A clear floor space complying with 305, positioned for a forward approach, and knee and toe clearance complying with 306 shall be provided.

606.3 Height. Lavatories and sinks shall be installed with the front of the higher of the rim or counter surface 34 inches (865 mm) maximum above the finish floor or ground.

606.4 Faucets. Controls for faucets shall comply with 309. Hand-operated metering faucets shall remain open for 10 seconds minimum.

606.5 Exposed Pipes and Surfaces. Water supply and drain pipes under lavatories and sinks shall be insulated or otherwise configured to protect against contact. There shall be no sharp or abrasive surfaces under lavatories and sinks.

607 Bathtubs

607.2 Clearance. Clearance in front of bathtubs shall extend the length of the bathtub and shall be 30 inches (760 mm) wide minimum. A lavatory complying with 606 shall be permitted at the control end of the clearance. Where a permanent seat is provided at the head end of the bathtub, the clearance shall extend 12 inches (305 mm) minimum beyond the wall at the head end of the bathtub.

607.4.1.1 Back Wall. Two grab bars shall be installed on the back wall, one located in accordance with 609.4 and the other located 8 inches (205 mm) minimum and 10 inches (255 mm) maximum above the rim of the bathtub. Each grab bar shall be installed 15 inches (380 mm) maximum from the head end wall and 12 inches (305 mm) maximum from the control end wall.

607.4.1.2 Control End Wall. A grab bar 24 inches (610 mm) long minimum shall be installed on the control end wall at the front edge of the bathtub.

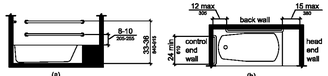

Figure 607.4.1 Grab Bars for Bathtubs with Permanent Seats

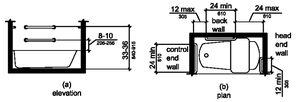

Figure 607.4.2 Grab Bars for Bathtubs with Removable In-Tub Seats

607.4.2 Bathtubs Without Permanent Seats. For bathtubs without permanent seats, grab bars shall comply with 607.4.2.

607.4.2.1 Back Wall. Two grab bars shall be installed on the back wall, one located in accordance with 609.4 and other located 8 inches (205 mm) minimum and 10 inches (255 mm) maximum above the rim of the bathtub. Each grab bar shall be 24 inches (610 mm) long minimum and shall be installed 24 inches (610 mm) maximum from the head end wall and 12 inches (305 mm) maximum from the control end wall.

607.4.2.2 Control End Wall. A grab bar 24 inches (610 mm) long minimum shall be installed on the control end wall at the front edge of the bathtub.

607.4.2.3 Head End Wall. A grab bar 12 inches (305 mm) long minimum shall be installed on the head end wall at the front edge of the bathtub.

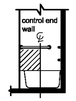

Figure 607.5 Bathtub Control Location

607.5 Controls. Controls, other than drain stoppers, shall be located on an end wall. Controls shall be between the bathtub rim and grab bar, and between the open side of the bathtub and the centerline of the width of the bathtub. Controls shall comply with 309.4.

607.6 Shower Spray Unit and Water. A shower spray unit with a hose 59 inches (1500 mm) long minimum that can be used both as a fixed-position shower head and as a hand-held shower shall be provided. The shower spray unit shall have an on/off control with a non-positive shut-off. If an adjustable-height shower head on a vertical bar is used, the bar shall be installed so as not to obstruct the use of grab bars. Bathtub shower spray units shall deliver water that is 120°F (49°C) maximum.

607.7 Bathtub Enclosures. Enclosures for bathtubs shall not obstruct controls, faucets, shower and spray units or obstruct transfer from wheelchairs onto bathtub seats or into bathtubs. Enclosures on bathtubs shall not have tracks installed on the rim of the open face of the bathtub.

608 Shower Compartments

608.2 Size and Clearances for Shower Compartments. Shower compartments shall have sizes and clearances complying with 606.2.

608.2.1 Transfer Type Shower Compartments. Transfer type shower compartments shall be 36 inches (915 mm) by 36 inches (915 mm) clear inside dimensions measured at the center points of opposing sides and shall have a 36 inch (915 mm) wide minimum entry on the face of the shower compartment. Clearance of 36 inches (915 mm) wide minimum by 48 inches (1220 mm) long minimum measured from the control wall shall be provided.

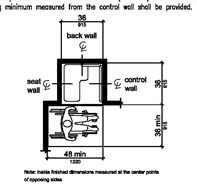

Figure 608.2.1 Transfer Type Shower Compartment Size and Clearance

608.2.2 Standard Roll-In Type Shower Compartments. Standard roll-in type shower compartments shall be 30 inches (760 mm) wide minimum by 60 inches (1525 mm) deep minimum clear inside dimensions measured at center points of opposing sides and shall have a 60 inches (1525 mm) wide minimum entry on the face of the shower compartment.

608.2.2.1 Clearance. A 30 inch (760 mm) wide minimum by 60 inch (1525 mm) long minimum clearance shall be provided adjacent to the open face of the shower compartment.

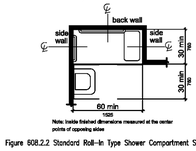

Figure 608.2.2 Standard Roll-In Type Shower Compartment Size and Clearance

608.2.3 Alternate Roll-In Type Shower Compartments. Alternate roll-in type shower compartments shall be 36 inches (915 mm) wide and 60 inches (1525 mm) deep minimum clear inside dimensions measured at center points of opposing sides. A 36 inch (915 mm) wide minimum entry shall be provided at one end of the long side of the compartment.

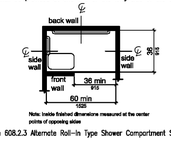

Figure 608.2.3 Alternate Roll-In Type Shower Compartment Size and Clearance

608.3 Grab Bars. Grab bars shall comply with 609 and shall be provided in accordance with 608.3. Where multiple grab bars are used, required horizontal grab bars shall be installed at the same height above the finish floor.

608.3.1 Transfer Type Shower Compartments. In transfer type compartments, grab bars shall be provided across the control wall and back wall to a point 18 inches (455 mm) from the control wall.

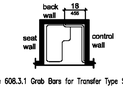

Figure 608.3.1 Grab Bars for Transfer Type Showers

608.3.2 Standard Roll-In Type Shower Compartments. Where a seat is provided in standard roll-in type shower compartments, grab bars shall be provided on the back wall and the side wall opposite the seat. Grab bars shall not be provided above the seat. Where a seat is not provided in standard roll-in type shower compartments, grab bars shall be provided on three walls. Grab bars shall be installed 6 inches (150 mm) maximum from adjacent walls.

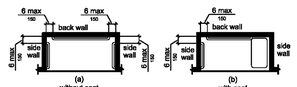

Figure 608.3.2 Grab Bars for Standard Roll-In Type Showers

608.3.3 Alternate Roll-In Type Shower Compartments. In alternate roll-in type shower compartments, grab bars shall be provided on the back wall and the side wall farthest from the compartment entry. Grab bars shall not be provided above the seat. Grab bars shall be installed 6 inches (150 mm) maximum from adjacent walls.

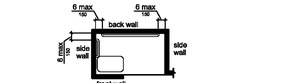

Figure 608.3.3 Grab Bars for Alternate Roll-In Type Showers

608.4 Seats. A folding or non-folding seat shall be provided in transfer type shower compartments. A folding seat shall be provided in roll-in type showers required in transient lodging guest rooms with mobility features complying with 806.2. Seats shall comply with 610.

608.5 Controls. Controls, faucets, and shower spray units shall comply with 309.4.

608.5.1 Transfer Type Shower Compartments. In transfer type shower compartments, the controls, faucets, and shower spray unit shall be installed on the side wall opposite the seat 38 inches (965 mm) minimum and 48 inches (1220 mm) maximum above the shower floor and shall be located on the control wall 15 inches (380 mm) maximum from the centerline of the seat toward the shower opening.

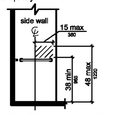

Figure 608.5.1 Transfer Type Shower Compartment Control Location

608.5.2 Standard Roll-In Type Shower Compartments. In standard roll-in type shower compartments, the controls, faucets, and shower spray unit shall be located above the grab bar, but no higher than 48 inches (1220 mm) above the shower floor. Where a seat is provided, the controls, faucets, and shower spray unit shall be installed on the back wall adjacent to the seat wall and shall be located 27 inches (685 mm) maximum from the seat wall.

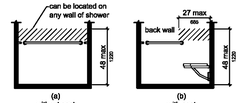

Figure 608.5.2 Standard Roll-In Type Shower Compartment Control Location

608.5.3 Alternate Roll-In Type Shower Compartments. In alternate roll-in type shower

bar, but no higher than 48 inches (1220 mm) above the shower floor. Where a seat is provided, the controls, faucets, and shower spray unit shall be located on the side wall

shower spray unit shall be installed on the side wall farthest from the compartment entry.

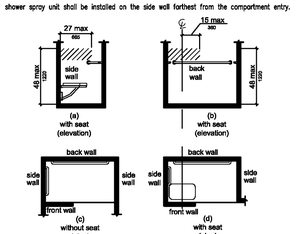

Figure 608.5.3 Alternate Roll-In Type Shower Compartment Control Location

608.6 Shower Spray Unit and Water. A shower spray unit with a hose 59 inches (1500 mm) long minimum that can be used both as a fixed-position shower head and as a hand-held shower shall be provided. The shower spray unit shall have an on/off control with a non-positive shut-off. If an adjustable-height shower head on a vertical bar is used, the bar shall be installed so as not to obstruct the use of grab bars. Shower spray units shall deliver water that is 120°F (49°C) maximum.

608.7 Thresholds. Thresholds in roll-in type shower compartments shall be 1/2 inch (13 mm) high maximum in accordance with 303. In transfer type shower compartments, thresholds 1/2 inch (13 mm) high maximum shall be beveled, rounded, or vertical.

608.8 Shower Enclosures. Enclosures for shower compartments shall not obstruct controls, faucets, and shower spray units or obstruct transfer from wheelchairs onto shower seats.

609 Grab Bars

609.1 General. Grab bars in toilet facilities and bathing facilities shall comply with 609.

609.2 Cross Section. Grab bars shall have a cross section complying with 609.2.1 or 609.2.2.

609.2.1 Circular Cross Section. Grab bars with circular cross sections shall have an outside diameter of 1 1/4 inches (32 mm) minimum and 2 inches (51 mm) maximum.

609.2.2 Non-Circular Cross Section. Grab bars with non-circular cross sections shall have a cross-section dimension of 2 inches (51 mm) maximum and a perimeter dimension of 4 inches (100 mm) minimum and 4.8 inches (120 mm) maximum.

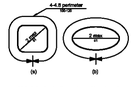

Figure 609.2.2 Grab Bar Non-Circular Cross Section

609.3 Spacing. The space between the wall and the grab bar shall be 1 1/2 inches (38 mm). The space between the grab bar and projecting objects below and at the ends shall be 1 1/2 inches (38 mm) minimum. The space between the grab bar and projecting objects above shall be 12 inches (305 mm) minimum.

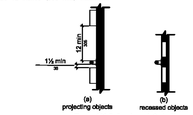

Figure 609.3 Spacing of Grab Bars

609.4 Position of Grab Bars. Grab bars shall be installed in a horizontal position, 33 inches (840 mm) minimum and 36 inches (915 mm) maximum above the finish floor measured to the top of the gripping surface, except that at water closets for children's use complying with 604.9, grab bars shall be installed in a horizontal position 18 inches (455 mm) minimum and 27 inches (685 mm) maximum above the finish floor measured to the top of the gripping surface. The height of the lower grab bar on the back wall of a bathtub shall comply with 607.4.1.1 or 607.4.2.1.

609.5 Surface Hazards. Grab bars and any wall or other surfaces adjacent to grab bars shall be free of sharp or abrasive elements and shall have rounded edges.

609.6 Fittings. Grab bars shall not rotate within their fittings.

609.7 Installation. Grab bars shall be installed in any manner that provides a gripping surface at the specified locations and that does not obstruct the required clear floor space.

609.8 Structural Strength. Allowable stresses shall not be exceeded for materials used when a vertical or horizontal force of 250 pounds (1112 N) is applied at any point on the grab bar, fastener, mounting device, or supporting structure.

610 Seats

610.2 Bathtub Seats. The top of bathtub seats shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum above the bathroom finish floor. The depth of a removable in-tub seat shall be 15 inches (380 mm) minimum and 16 inches (405 mm) maximum. The seat shall be capable of secure placement. Permanent seats at the head end of the bathtub shall be 15 inches (380 mm) deep minimum and shall extend from the back wall to or beyond the outer edge of the bathtub.

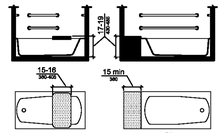

Figure 610.2 Bathtub Seats

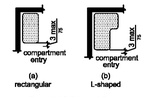

Figure 610.3 Extent of Seat

610.3 Shower Compartment Seats. Where a seat is provided in a standard roll-in shower compartment, it shall be a folding type, shall be installed on the side wall adjacent to the controls, and shall extend from the back wall to a point within 3 inches (76 mm) of the compartment entry. Where a seat is provided in an alternate roll-in type shower compartment, it shall be a folding type, shall be installed on the front wall opposite the back wall, and shall extend from the adjacent side wall to a point within 3 inches (76 mm) of the compartment entry. In transfer-type showers, the seat shall extend from the back wall to a point within 3 inches (76 mm) of the compartment entry. The top of the seat shall be 17 inches (430 mm) minimum and 19 inches (485 mm) maximum above the bathroom finish floor. Seats shall comply with 610.3.1 or 610.3.2.

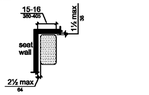

Figure 610.3.1 Rectangular Shower Seat

610.3.1 Rectangular Seats. The rear edge of a rectangular seat shall be 2 1/2 inches (64 mm) maximum and the front edge 15 inches (380 mm) minimum and 16 inches (405 mm) maximum from the seat wall. The side edge of the seat shall be 1 1/2 inches (38 mm) maximum from the adjacent wall.

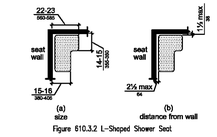

Figure 610.3.2 L-Shaped Shower Seat

610.3.2 L-Shaped Seats. The rear edge of an L-shaped seat shall be 2 1/2 inches (64 mm) maximum and the front edge 15 inches (380 mm) minimum and 16 inches (405 mm) maximum from the seat wall. The rear edge of the "L" portion of the seat shall be 1 1/2 inches (38 mm) maximum from the wall and the front edge shall be 14 inches (355 mm) minimum and 15 inches (380 mm) maximum from the wall. The end of the "L" shall be 22 inches (560 mm) minimum and 23 inches maximum (585 mm) from the main seat wall.

610.4 Structural Strength. Allowable stresses shall not be exceeded for materials used when a vertical or horizontal force of 250 pounds (1112 N) is applied at any point on the seat, fastener, mounting device, or supporting structure.

611 Washing Machines and Clothes Dryers

611.2 Clear Floor Space. A clear floor or ground space complying with 305 positioned for parallel approach shall be provided. The clear floor or ground space shall be centered on the appliance.

611.3 Operable Parts. Operable parts, including doors, lint screens, and detergent and bleach compartments shall comply with 309.

611.4 Height. Top loading machines shall have the door to the laundry compartment located 36 inches (915 mm) maximum above the finish floor. Front loading machines shall have the bottom of the opening to the laundry compartment located 15 inches (380 mm) minimum and 36 inches (915 mm) maximum above the finish floor.

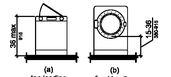

Figure 611.4 Height of Laundry Compartment Opening

612 Saunas and Steam Rooms

612.2 Bench. Where seating is provided in saunas and steam rooms, at least one bench shall comply with 903. Doors shall not swing into the clear floor space required by 903.2.

612.3 Turning Space. A turning space complying with 304 shall be provided within saunas and steam rooms

CHAPTER 7: COMMUNICATION ELEMENTS AND FEATURES

702 Fire Alarm Systems

702.1 General. Fire alarm systems shall have permanently installed audible and visible alarms complying with NFPA 72 (1999 or 2002 edition) (incorporated by reference, see "Referenced Standards" in Chapter 1), except that the maximum allowable sound level of audible notification appliances complying with section 4-3.2.1 of NFPA 72 (1999 edition) shall have a sound level no more than 110 dB at the minimum hearing distance from the audible appliance. In addition, alarms in guest rooms required to provide communication features shall comply with sections 4-3 and 4-4 of NFPA 72 (1999 edition) or sections 7.4 and 7.5 of NFPA 72 (2002 edition).

703 Signs

703.1 General. Signs shall comply with 703. Where both visual and tactile characters are required, either one sign with both visual and tactile characters, or two separate signs, one with visual, and one with tactile characters, shall be provided.

703.2 Raised Characters. Raised characters shall comply with 703.2 and shall be duplicated in braille complying with 703.3. Raised characters shall be installed in accordance with 703.4.

703.2.1 Depth. Raised characters shall be 1/32 inch (0.8 mm) minimum above their background.

703.2.2 Case. Characters shall be uppercase.

703.2.3 Style. Characters shall be sans serif. Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms.

703.2.4 Character Proportions. Characters shall be selected from fonts where the width of the uppercase letter "O" is 55 percent minimum and 110 percent maximum of the height of the uppercase letter "I".

703.2.5 Character Height. Character height measured vertically from the baseline of the character shall be 5/8 inch (16 mm) minimum and 2 inches (51 mm) maximum based on the height of the uppercase letter "I".

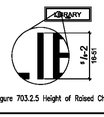

Figure 703.2.5 Height of Raised Characters

703.2.6 Stroke Thickness. Stroke thickness of the uppercase letter "I" shall be 15 percent maximum of the height of the character.

703.2.7 Character Spacing. Character spacing shall be measured between the two closest points of adjacent raised characters within a message, excluding word spaces. Where characters have rectangular cross sections, spacing between individual raised characters shall be 1/8 inch (3.2 mm) minimum and 4 times the raised character stroke width maximum. Where characters have other cross sections, spacing between individual raised characters shall be 1/16 inch (1.6 mm) minimum and 4 times the raised character stroke width maximum at the base of the cross sections, and 1/8 inch (3.2 mm) minimum and 4 times the raised character stroke width maximum at the top of the cross sections. Characters shall be separated from raised borders and decorative elements 3/8 inch (9.5 mm) minimum.

703.2.8 Line Spacing. Spacing between the baselines of separate lines of raised characters within a message shall be 135 percent minimum and 170 percent maximum of the raised character height.

703.3 Braille. Braille shall be contracted (Grade 2) and shall comply with 703.3 and 703.4.

703.3.1 Dimensions and Capitalization. Braille dots shall have a domed or rounded shape and shall comply with Table 703.3.1. The indication of an uppercase letter or letters shall only be used before the first word of sentences, proper nouns and names, individual letters of the alphabet, initials, and acronyms.

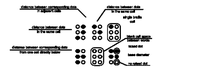

Figure 703.3.1 Braille Measurement

703.3.2 Position. Braille shall be positioned below the corresponding text. If text is multi-lined, braille shall be placed below the entire text. Braille shall be separated 3/8 inch (9.5 mm) minimum from any other tactile characters and 3/8 inch (9.5 mm) minimum from raised borders and decorative elements.

Figure 703.3.2 Position of Braille

703.4 Installation Height and Location. Signs with tactile characters shall comply with 703.4.

703.4.1 Height Above Finish Floor or Ground. Tactile characters on signs shall be located 48 inches (1220 mm) minimum above the finish floor or ground surface, measured from the baseline of the lowest tactile character and 60 inches (1525 mm) maximum above the finish floor or ground surface, measured from the baseline of the highest tactile character.

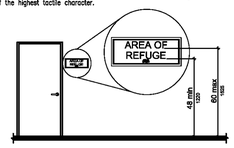

Figure 703.4.1 Height of Tactile Characters Above Finish Floor or Ground

703.4.2 Location. Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side. Where a tactile sign is provided at double doors with one active leaf, the sign shall be located on the inactive leaf. Where a tactile sign is provided at double doors with two active leafs, the sign shall be located to the right of the right hand door. Where there is no wall space at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall. Signs containing tactile characters shall be located so that a clear floor space of 18 inches (455 mm) minimum by 18 inches (455 mm) minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position.

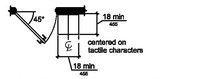

Figure 703.4.2 Location of Tactile Signs at Doors

703.5 Visual Characters. Visual characters shall comply with 703.5.

703.5.1 Finish and Contrast. Characters and their background shall have a non-glare finish. Characters shall contrast with their background with either light characters on a dark background or dark characters on a light background.

703.5.2 Case. Characters shall be uppercase or lowercase or a combination of both.

703.5.3 Style. Characters shall be conventional in form. Characters shall not be italic, oblique, script, highly decorative, or of other unusual forms.

703.5.4 Character Proportions. Characters shall be selected from fonts where the width of the uppercase letter "O" is 55 percent minimum and 110 percent maximum of the height of the uppercase letter "I".

703.5.5 Character Height. Minimum character height shall comply with Table 703.5.5. Viewing distance shall be measured as the horizontal distance between the character and an obstruction preventing further approach towards the sign. Character height shall be based on the uppercase letter "I".

703.5.6 Height From Finish Floor or Ground. Visual characters shall be 40 inches (1015 mm) minimum above the finish floor or ground.

703.5.7 Stroke Thickness. Stroke thickness of the uppercase letter "I" shall be 10 percent minimum and 30 percent maximum of the height of the character.

703.5.8 Character Spacing. Character spacing shall be measured between the two closest points of adjacent characters, excluding word spaces. Spacing between individual characters shall be 10 percent minimum and 35 percent maximum of character height.

703.5.9 Line Spacing. Spacing between the baselines of separate lines of characters within a message shall be 135 percent minimum and 170 percent maximum of the character height.

703.6 Pictograms. Pictograms shall comply with 703.6.

703.6.1 Pictogram Field. Pictograms shall have a field height of 6 inches (150 mm) minimum. Characters and braille shall not be located in the pictogram field.

Figure 703.6.1 Pictogram Field dark-on-light.

703.6.2 Finish and Contrast. Pictograms and their field shall have a non-glare finish. Pictograms shall contrast with their field with either a light pictogram on a dark field or a dark pictogram on a light field.

703.6.3 Text Descriptors. Pictograms shall have text descriptors located directly below the pictogram field. Text descriptors shall comply with 703.2, 703.3 and 703.4.

703.7 Symbols of Accessibility. Symbols of accessibility shall comply with 703.7.

703.7.1 Finish and Contrast. Symbols of accessibility and their background shall have a non-glare finish. Symbols of accessibility shall contrast with their background with either a light symbol on a dark background or a dark symbol on a light background.

704 Telephones

704.1 General. Public telephones shall comply with 704.

704.2 Wheelchair Accessible Telephones. Wheelchair accessible telephones shall comply with 704.2.

704.2.1 Clear Floor or Ground Space. A clear floor or ground space complying with 305 shall be provided. The clear floor or ground space shall not be obstructed by bases, enclosures, or seats.

Advisory 704.2.1 Clear Floor or Ground Space. Because clear floor and ground space is required to be unobstructed, telephones, enclosures and related telephone book storage cannot encroach on the required clear floor or ground space and must comply with the provisions for protruding objects. (See Section 307).

704.2.1.1 Parallel Approach. Where a parallel approach is provided, the distance from the edge of the telephone enclosure to the face of the telephone unit shall be 10 inches (255 mm) maximum.

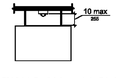

Figure 704.2.1.1 Parallel Approach to Telephone

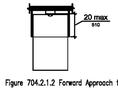

Figure 704.2.1.2 Forward Approach to Telephone

704.2.1.2 Forward Approach. Where a forward approach is provided, the distance from the front edge of a counter within the telephone enclosure to the face of the telephone unit shall be 20 inches (510 mm) maximum.

704.2.2 Operable Parts. Operable parts shall comply with 309. Telephones shall have push-button controls where such service is available.

704.2.3 Telephone Directories. Telephone directories, where provided, shall be located in accordance with 309.

704.2.4 Cord Length. The cord from the telephone to the handset shall be 29 inches (735 mm) long minimum.

704.3 Volume Control Telephones. Public telephones required to have volume controls shall be equipped with a receive volume control that provides a gain adjustable up to 20 dB minimum. For incremental volume control, provide at least one intermediate step of 12 dB of gain minimum. An automatic reset shall be provided.

704.4 TTYs. TTYs required at a public pay telephone shall be permanently affixed within, or adjacent to, the telephone enclosure. Where an acoustic coupler is used, the telephone cord shall be sufficiently long to allow connection of the TTY and the telephone receiver.

704.4.1 Height. When in use, the touch surface of TTY keypads shall be 34 inches (865 mm) minimum above the finish floor.

704.5 TTY Shelf. Public pay telephones required to accommodate portable TTYs shall be equipped with a shelf and an electrical outlet within or adjacent to the telephone enclosure. The telephone handset shall be capable of being placed flush on the surface of the shelf. The shelf shall be capable of accommodating a TTY and shall have 6 inches (150 mm) minimum vertical clearance above the area where the TTY is to be placed.

705 Detectable Warnings

705.1 General. Detectable warnings shall consist of a surface of truncated domes and shall comply with 705.

705.1.1 Dome Size. Truncated domes in a detectable warning surface shall have a base diameter of 0.9 inch (23 mm) minimum and 1.4 inches (36 mm) maximum, a top diameter of 50 percent of the base diameter minimum to 65 percent of the base diameter maximum, and a height of 0.2 inch (5.1 mm).

705.1.2 Dome Spacing. Truncated domes in a detectable warning surface shall have a center-to-center spacing of 1.6 inches (41 mm) minimum and 2.4 inches (61 mm) maximum, and a base-to-base spacing of 0.65 inch (17 mm) minimum, measured between the most adjacent domes on a square grid.

705.1.3 Contrast. Detectable warning surfaces shall contrast visually with adjacent walking surfaces either light-on-dark, or dark-on-light.

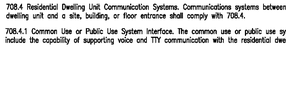

Figure 705.1 Size and Spacing of Truncated Domes

705.2 Platform Edges. Detectable warning surfaces at platform boarding edges shall be 24 inches (610 mm) wide and shall extend the full length of the public use areas of the platform.

706 Assistive Listening Systems

706.2 Receiver Jacks. Receivers required for use with an assistive listening system shall include a 1/8 inch (3.2 mm) standard mono jack.

706.3 Receiver Hearing-Aid Compatibility. Receivers required to be hearing-aid compatible shall interface with telecoils in hearing aids through the provision of neckloops.

706.4 Sound Pressure Level. Assistive listening systems shall be capable of providing a sound pressure level of 110 dB minimum and 118 dB maximum with a dynamic range on the volume control of 50 dB.

706.5 Signal-to-Noise Ratio. The signal-to-noise ratio for internally generated noise in assistive listening systems shall be 18 dB minimum.

706.6 Peak Clipping Level. Peak clipping shall not exceed 18 dB of clipping relative to the peaks of speech.

707 Automatic Teller Machines and Fare Machines

707.2 Clear Floor or Ground Space. A clear floor or ground space complying with 305 shall be provided.

707.3 Operable Parts. Operable parts shall comply with 309. Unless a clear or correct key is provided, each operable part shall be able to be differentiated by sound or touch, without activation.

EXCEPTION: Drive-up only automatic teller machines and fare machines shall not be required to comply with 309.2 and 309.3.

707.4 Privacy. Automatic teller machines shall provide the opportunity for the same degree of privacy of input and output available to all individuals.

707.5 Speech Output. Machines shall be speech enabled. Operating instructions and orientation, visible transaction prompts, user input verification, error messages, and all displayed information for full use shall be accessible to and independently usable by individuals with vision impairments. Speech shall be delivered through a mechanism that is readily available to all users, including but not limited to, an industry standard connector or a telephone handset. Speech shall be recorded or digitized human, or synthesized.

707.5.1 User Control. Speech shall be capable of being repeated or interrupted. Volume control shall be provided for the speech function.

707.5.2 Receipts. Where receipts are provided, speech output devices shall provide audible balance inquiry information, error messages, and all other information on the printed receipt necessary to complete or verify the transaction.

707.6 Input. Input devices shall comply with 707.6.

707.6.1 Input Controls. At least one tactilely discernible input control shall be provided for each function. Where provided, key surfaces not on active areas of display screens, shall be raised above surrounding surfaces. Where membrane keys are the only method of input, each shall be tactilely discernable from surrounding surfaces and adjacent keys.

707.6.2 Numeric Keys. Numeric keys shall be arranged in a 12-key ascending or descending telephone keypad layout. The number five key shall be tactilely distinct from the other keys.

707.6.3.1 Contrast. Function keys shall contrast visually from background surfaces. Characters and symbols on key surfaces shall contrast visually from key surfaces. Visual contrast shall be either light-on-dark or

707.6.3.2 Tactile Symbols. Function key surfaces shall have tactile symbols as follows: Enter or Proceed key: raised circle; Clear or Correct key: raised left arrow; Cancel key: raised letter ex; Add Value key: raised plus sign; Decrease Value key: raised minus sign.

707.7 Display Screen. The display screen shall comply with 707.7.

707.7.1 Visibility. The display screen shall be visible from a point located 40 inches (1015 mm) above the center of the clear floor space in front of the machine.

707.7.2 Characters. Characters displayed on the screen shall be in a sans serif font. Characters shall be 3/16 inch (4.8 mm) high minimum based on the uppercase letter "I". Characters shall contrast with their background with either light characters on a dark background or dark characters on a light background.

707.8 Braille Instructions. Braille instructions for initiating the speech mode shall be provided. Braille shall comply with 703.3.

708 Two-Way Communication Systems

708.1 General. Two-way communication systems shall comply with 708.

708.2 Audible and Visual Indicators. The system shall provide both audible and visual signals.

708.3 Handsets. Handset cords, if provided, shall be 29 inches (735 mm) long minimum.

708.4 Residential Dwelling Unit Communication Systems. Communications systems between a residential dwelling unit and a site, building, or floor entrance shall comply with 708.4.

708.4.1 Common Use or Public Use System Interface. The common use or public use system interface shall include the capability of supporting voice and TTY communication with the residential dwelling unit interface.

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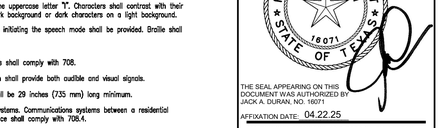

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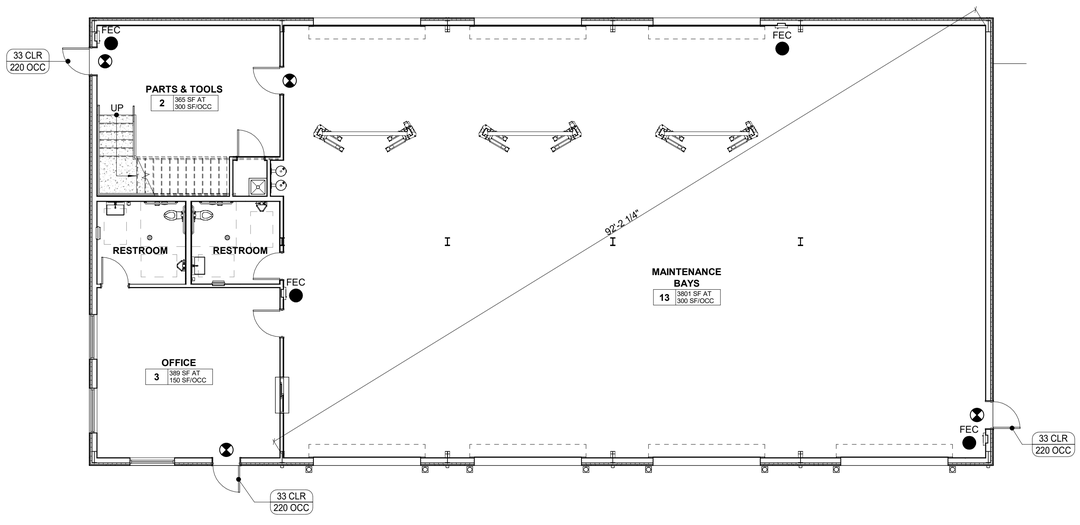
OCCUPANCY SCHEDULE

NO.	ROOM NAME	AREA	FUNCTION (TABLE 1004.5)	SF/OCC	CALC LOAD	FIXED LOAD	OCC TOTAL
101	OFFICE	389 SF	BUSINESS	150	3		3
102	RESTROOM	90 SF	N-S (NON-SIMULTANEOUS)				
103	RESTROOM	90 SF	N-S (NON-SIMULTANEOUS)				
104	PARTS & TOOLS	365 SF	ACCESSORY STORAGE, MECH EQUIP	300	2		2
105	MAINTENANCE BAYS	3801 SF	ACCESSORY STORAGE, MECH EQUIP	300	13		13
201	MEZZANINE	* 217 SF	N-S (NON-SIMULTANEOUS)				
202	JAN.	15 SF	N-S (NON-SIMULTANEOUS)				
TOTAL		4968 SF					18

TOTAL **4757 SF** **18**

*505.3 EQUIPMENT PLATFORMS:
EQUIPMENT PLATFORMS IN BUILDINGS SHALL NOT BE CONSIDERED AS A PORTION OF THE FLOOR BELOW. SUCH *EQUIPMENT PLATFORMS* SHALL NOT CONTRIBUTE TO EITHER THE *BUILDING AREA* OR THE NUMBER OF *STORIES* AS REGULATED BY SECTION 503.1. THE AREA OF THE *EQUIPMENT PLATFORM* SHALL NOT BE INCLUDED IN DETERMINING THE *FIRE AREA* IN ACCORDANCE WITH SECTION 903.



1 LEVEL 1 LIFE SAFETY PLAN
1/8" = 1'-0"

LEGEND

ROOM NAME
XX XXXX SF AT / XXX SF/OCC
- FLOOR AREA (SQUARE FEET)
- OCCUPANT LOAD FACTOR PER IBC TABLE 1004.5
- CALCULATED OCCUPANT LOAD

33" CLR / 165 OCC
- CLEAR WIDTH AT EXIT DOOR (*MIN. TO BE PROVIDED @ 36" DOOR = 33" CLEAR NET WIDTH*)
- CALCULATED MAX EGRESS CAPACITY PER CLEAR WIDTH

LONGEST LENGTH OF TRAVEL DISTANCE PER IBC TABLE 1016.2

EXIT SIGN (WITH DIRECTIONALITY)

FEC FEC — FIRE EXTINGUISHER CABINET

44" EGRESS PATH (TABLE 1020.2)

ADA CLEARANCES

1-HR FIRE RESISTANCE RATED BARRIER; SEE UL ASSEMBLIES

2-HR FIRE RESISTANCE RATED BARRIER; SEE UL ASSEMBLIES

3-HR FIRE RESISTANCE RATED BARRIER; SEE UL ASSEMBLIES

LIFE SAFETY GENERAL NOTES

FIRE-RATED CONSTRUCTION
- CONTRACTOR SHALL PERMANENTLY IDENTIFY ALL RATINGS AT RATED PARTITIONS, SMOKESTOP PARTITIONS, HORIZONTAL EXIT PARTITIONS AND EXIT ENCLOSURES BY EITHER INSTALLING SIGNS OR STENCIL PAINTING IN CONCEALED SPACES PER FIRE MARSHAL AND IBC 703.7
- AT THE INTERSECTION OF RATED INTERIOR WALLS WITH THE EXTERIOR WALL, THE RATED WALL SHALL EXTEND INTO THE STUD CAVITY TO THE INSIDE FACE OF THE EXTERIOR SHEATHING, AND THE JOINT SHALL BE FIRE CAULKED. FIRE RATED WALLS ARE TO BE FIRE CAULKED AT THE TOP AND BASE. REFER TO SPECIFICATIONS AND UL DETAILS
- G.C. TO INSTALL 1 HOUR MIN. RATED FIRE STOPPING SYSTEM AT INTERSECTION OF FLOOR SLAB AND INSIDE FACE OF EXTERIOR SHEATHING AT EXTERIOR WALLS, TYP. SYSTEM TO INCLUDE, BUT MAY NOT BE LIMITED TO, FIRE SAFING AND FIRE CAULK
- INSULATING MATERIALS INSTALLED IN ANY CONSTRUCTION TYPE, CONCEALED OR EXPOSED, SHALL HAVE A FLAMESPREAD RATING NO GREATER THAN 25 AND A SMOKE DEVELOPED RATING NO GREATER THAN 450 AS DETERMINED IN ACCORDANCE WITH ASTM E 84

FIRE ALARMS & LIGHTING
- A FIRE ALARM SYSTEM SHALL BE PROVIDED THROUGHOUT THE FACILITY. VOICE ANNUNCIATED ALARMS SHALL BE PROVIDED IF REQUIRED BY THE APPLICABLE CHAPTER OF THE CURRENTLY ADOPTED NFPA 101
- EMERGENCY FORCES NOTIFICATION TO MEET THE REQUIREMENTS OF THE APPLICABLE CHAPTER OF THE CURRENTLY ADOPTED NFPA 101
- EMERGENCY LIGHTING SHALL BE PROVIDED THROUGHOUT THE FACILITY TO MEET THE REQUIREMENTS OF THE APPLICABLE CHAPTER OF THE CURRENTLY ADOPTED NFPA 101. REFER TO ELECTRICAL DRAWINGS FOR LOCATIONS

FIRE EXTINGUISHERS
- FIRE EXTINGUISHERS SHALL BE PROVIDED PER IFC 906 AND PER THE AHJ.
- FIRE EXTINGUISHERS SHALL NOT BE OBSTRUCTED OR OBSCURED FROM VIEW. WHERE VISUAL OBSTRUCTION CANNOT BE COMPLETELY AVOIDED, PROVIDE MEANS TO INDICATE LOCATIONS OF EXTINGUISHERS

DOORS
- PANIC HARDWARE SHALL BE INSTALLED AT ALL DOOR LOCATIONS SERVING AN OCCUPANT LOAD OF MORE THAN 100 PERSONS
- CONTRACTOR TO CONFIRM KNOX BOX LOCATION WITH FIRE MARSHAL PRIOR TO INSTALLATION

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WALLER COUNTY

VEHICLE MAINTENANCE GARAGE

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

REGISTERED ARCHITECT JACK A DURAN 16071 STATE OF TEXAS

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JACK A. DURAN, NO. 16071

AFFIXATION DATE: 04.22.25

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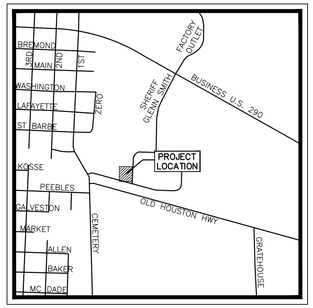
REV	DATE:	ISSUED FOR:
	04.22.25	PERMIT

PROJECT NO.: 06-25-003
DRAWN BY: XXX QC: XXX

LEVEL 1 LIFE SAFETY PLAN

G-101

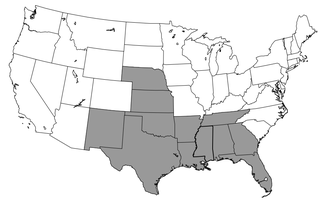
4/22/2025 3:13:24 PM Autodesk Docs://Waller County Jail Garage/25021T Waller County Jail Garage_R24.rvt



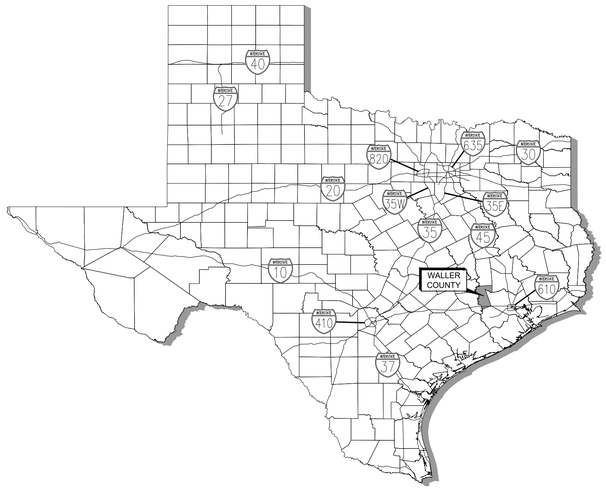
LOCATION MAP
N.T.S.

KEYMAP NO.: 279H
ZIP CODE: 77445

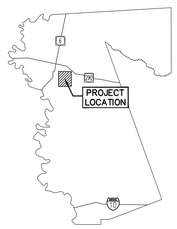
CIVIL PLANS
FOR
WALLER COUNTY
JUSTICE CENTER GARAGE
CITY OF HEMPSTEAD
WALLER COUNTY, TEXAS 77445



*LICENSED IN AL, AR, FL, GA, KS, LA, MS, NE, NM, OK, TN, & TX



WALLER COUNTY



INDEX OF SHEETS

CIVIL ENGINEERING (ALJ LINDSEY, LLC)	
SHEET NO.	DESCRIPTION
C0.0	COVER SHEET
C0.1	GENERAL NOTES
C0.2	TOPOGRAPHIC SURVEY
C0.3	PLAT
C1.0	DIMENSION CONTROL PLAN
C2.0	UTILITY PLAN
C3.0	STORM SEWER PLAN
C4.0	GRADING PLAN
C5.0	PAVING PLAN
C6.0	EROSION CONTROL PLAN
C7.0	CONSTRUCTION DETAILS (1 OF 4)
C7.1	CONSTRUCTION DETAILS (2 OF 4)
C7.2	CONSTRUCTION DETAILS (3 OF 4)
C7.3	CONSTRUCTION DETAILS (4 OF 4)

PLANS SUBMITTAL/REVIEW LOG

100% CD -ISSUE FOR BID	04/11/2025

ACCORDING TO MAP NO. 48473C0130F OF THE FEDERAL EMERGENCY MANAGEMENT AGENCY'S FLOOD INSURANCE RATE MAPS FOR WALLER COUNTY AND INCORPORATED AREAS, DATED 5/16/2019, THE SUBJECT TRACT IS SITUATED WITHIN: UNSHADED ZONE "X"

PROJECT WILL NOT ADVERSELY AFFECT ADJOINING PROPERTIES

WALLER COUNTY APPROVAL

J. ROSS MCCALL, P.E.
COUNTY ENGINEER

DATE

48 HOUR NOTICE:
CONTRACTOR SHALL CONTACT WALLER COUNTY ENGINEERING AT LEAST 48 HOURS PRIOR TO THE START OF CONSTRUCTION AT ENGINEERINGINSPECTION@WALLERCOUNTY.US OR (979) 826-7670

CALL BEFORE YOU DIG
TEXAS ONE CALL PARTICIPANTS REQUEST 72 HOURS NOTICE BEFORE YOU DIG, DRILL OR BLAST – STOP CALL
TEXAS ONE CALL SYSTEM
1-800-344-8377
IN HOUSTON
(713)-223-4567

No.	REVISIONS	DATE

ALJLindsey
Civil Engineers
18635 N. Eldridge Pkwy, Suite 200
Tomball, TX 77377
281.320.9955
FRN F-11526

STATE OF TEXAS
BRETT T. HANRAHAN
112908
REGISTERED
PROFESSIONAL ENGINEER
11 APRIL 2025

ALJ PROJECT NO. 653.25.CV.030
DATE: APR 2025
SCALE: N/A
DRAWN BY: SRH
CHECKED BY: BTH

COVER SHEET

WALLER COUNTY
JUSTICE CENTER GARAGE
CITY OF HEMPSTEAD
WALLER COUNTY, TEXAS 77445

SHEET
C0.0

GENERAL NOTES

1. THE LOCATION OF ALL UTILITIES SHOWN ON THESE PLANS WAS TAKEN FROM AVAILABLE SURVEY INFORMATION AND/OR EXISTING PUBLIC RECORDS. THE EXACT LOCATION AND ELEVATION OF ALL UNDERGROUND UTILITIES MUST BE DETERMINED BY CONTRACTOR. IT SHALL BE THE DUTY AND RESPONSIBILITY OF THE CONTRACTOR TO ASCERTAIN WHETHER ANY ADDITIONAL FACILITIES OTHER THAN THOSE SHOWN ON THE PLANS MAY BE PRESENT. CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY IF A DISCREPANCY AND/OR CONFLICT IS DISCOVERED. CONTRACTOR WILL BE RESPONSIBLE FOR ANY DAMAGE CAUSED TO EXISTING UTILITIES DURING CONSTRUCTION.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING ALL PUBLIC UTILITIES, PAVEMENT TO REMAIN, CURBS, SIDEWALKS, SIGNS, TREES, ETC., IN THE CONSTRUCTION OF THIS PROJECT. CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR ANY AND ALL DAMAGES. DURING CONSTRUCTION ALL DAMAGES SHALL BE REPAIRED IN ACCORDANCE WITH THE RULES AND REGULATIONS OF THE OWNING/OPERATING AUTHORITY, WITH NO COST TO THE CITY, COUNTY, PRIVATE UTILITY OWNERS, ENGINEER, OR THE OWNER.

3. CONTRACTOR SHALL VERIFY LOCATION OF UNDERGROUND UTILITY LINES AND SHALL NOTIFY THE FOLLOWING AGENCIES 72 HOURS PRIOR TO EXCAVATING OR AUGERING NEAR EXISTING FACILITIES.

   A. TEXAS ONE CALL SYSTEM AT 1-800-245-4545
   B. LONE STAR NOTIFICATION CENTER AT 1-800-669-8344
   C. TEXAS EXCAVATION SAFETY SYSTEM AT 1-800-344-8377

4. PRIOR TO ANY CONSTRUCTION ACTIVITY, CONTRACTOR IS TO ACQUIRE ALL REQUIRED CONSTRUCTION PERMITS FROM APPROPRIATE AUTHORITIES. CONTRACTOR SHALL GIVE AT LEAST 48 HOURS NOTICE TO ALL AUTHORIZED INSPECTORS, SUPERINTENDENTS, OR PERSONS IN CHARGE OF PUBLIC AND PRIVATE UTILITY LINES AFFECTED BY HIS OPERATIONS PRIOR TO COMMENCEMENT OF WORK.

5. THE ENGINEER AND THE AUTHORITY HAVING JURISDICTION ("A.H.J.") SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO THE CONTRACTOR CONNECTING TO ANY EXISTING UTILITY LINES.

6. NO CONNECTIONS SHALL BE MADE TO EXISTING PUBLIC WATER LINES OR PUBLIC SANITARY SEWERS UNTIL ALL PROPOSED WATER OR SEWER LINES HAVE BEEN THOROUGHLY CLEANED, TESTED (AS REQUIRED) AND APPROVED BY THE APPROPRIATE AUTHORITIES.

7. HORIZONTAL AND VERTICAL INFORMATION REGARDING UTILITY CONNECTIONS TO PROPOSED BUILDINGS ON THIS SET OF PLANS TERMINATE AT FIVE (5) FEET FROM THE NEAREST BUILDING WALL.

8. ALL MANHOLES, CLEANOUTS, VALVE BOXES, FIRE HYDRANTS, ETC MUST BE ADJUSTED TO PROPER LINE AND GRADE BY THE CONTRACTOR PRIOR TO AND AFTER THE PLACING OF PERMANENT PAVING. UTILITIES MUST BE MAINTAINED TO PROPER LINE AND GRADE DURING CONSTRUCTION OF THE PAVING FOR THIS DEVELOPMENT. ALL UTILITY STRUCTURES, BOXES, AND VALVES PLACED WITHIN EXISTING/PROPOSED PAVING SHALL BE HEAVY DUTY TRAFFIC RATED.

9. ALL APPURTENANCES WILL BE ASSUMED TO BE IN GOOD CONDITION UNLESS OTHERWISE CONFIRMED IN WRITING PRIOR TO COMMENCEMENT OF WORK.

10. OVERHEAD LINES EXIST ON THE PROPERTY. WE HAVE NOT ATTEMPTED TO MARK THOSE LINES SINCE THEY ARE CLEARLY VISIBLE, BUT YOU SHOULD LOCATE THEM PRIOR TO BEGINNING CONSTRUCTION. TEXAS LAW, SECTION 752, HEALTH AND SAFETY CODE, FORBIDS ALL ACTIVITIES IN WHICH PERSON OR EQUIPMENT MAY COME WITHIN 6 FEET OF LIVE OVERHEAD HIGH VOLTAGE LINES. CONTRACTORS ARE LEGALLY RESPONSIBLE FOR SAFETY OF CONSTRUCTION WORKERS UNDER THIS LAW. THIS LAW CARRIES BOTH CIVIL AND CRIMINAL LIABILITY.

11. CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE, AND LOCAL LAWS AND ALL REGULATIONS OF UTILITY COMPANIES CONCERNING SAFETY AND HEALTH PRACTICES. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING SITE TRENCH SAFETY REQUIREMENTS IN ACCORDANCE WITH A.H.J. STANDARDS, TEXAS STATE LAW, AND O.S.H.A. STANDARDS FOR ALL EXCAVATION.

12. PRIOR TO THE START OF CONSTRUCTION, OWNER AND CONTRACTOR ARE RESPONSIBLE FOR SUBMITTING THE "NOTICE OF INTENT" (N.O.I.) AND ANY ADDITIONAL INFORMATION REQUIRED BY THE TEXAS COMMISSION ON ENVIRONMENTAL QUALITY (TCEQ). UPON COMPLETION OF THE PROJECT, OWNER AND CONTRACTOR ARE RESPONSIBLE FOR SUBMITTING THE "NOTICE OF TERMINATION" (N.O.T.).

13. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING POSITIVE DRAINAGE AT ALL TIMES DURING CONSTRUCTION

14. CONTRACTOR SHALL REMOVE ALL MUD, DIRT, AND DEBRIS DEPOSITED OR DROPPED ON THE EXISTING ROADWAY AT THE END OF EACH WORK DAY. MATERIAL THAT IS HAZARDOUS TO TRAFFIC OR SHALL WISE PRESENTS A SAFETY CONCERN, SHALL BE REMOVED IMMEDIATELY.

15. CONTRACTOR IS RESPONSIBLE FOR COMPLYING WITH ALL STATE AND LOCAL REGULATIONS RELATED TO STORM WATER POLLUTION AND QUALITY. REFER TO EROSION CONTROL PLAN.

16. CONTRACTOR SHALL REESTABLISH ALL TURF DISTURBED DURING CONSTRUCTION TO ACCEPTABLE OPERATING CONDITION, AS DETERMINED BY OWNER AND/OR REGULATORY AGENCIES.

17. CONTRACTOR SHALL MAINTAIN A WORKSITE FREE OF TRASH AND DEBRIS.

18. CONTRACTOR IS RESPONSIBLE FOR THE PROTECTION OF ALL EXISTING TREES. NO TREE SHALL BE REMOVED OR ALTERED WITHOUT WRITTEN PERMISSION FROM OWNER OR ENGINEER. EQUIPMENT OR MATERIALS SHALL NOT BE STAGED UNDER THE DRIP LINE OF EXISTING TREES.

19. CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING A SET OF "AS-BUILT" PLANS FOR ALL WORK PERFORMED ON AND OFF SITE. UPON COMPLETION OF CONSTRUCTION, CONTRACTOR SHALL PROVIDE AS-BUILT PLANS IDENTIFYING ALL DEVIATIONS OR VARIATIONS FROM ORIGINAL PLANS TO THE OWNER AND THE ENGINEER. ANY REQUIREMENTS BY THE A.H.J. TO PROVIDE AN AS-BUILT TOPO SURVEY SHALL BE PERFORMED BY THE CONTRACTOR AND INCLUDED WITHIN THE BASE BID.

20. ALL TRAFFIC CONTROL AND WARNING SIGNS SHALL BE IN ACCORDANCE WITH THE TEXAS MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.

21. ALL SIDEWALKS, RAMPS, AND HANDRAILS TO MEET OR EXCEED A.H.J., TAS, AND ADA REQUIREMENTS.

22. ALL MATERIAL AND CONSTRUCTION SHALL CONFORM TO APPLICABLE "A.H.J. RULES AND REGULATIONS, CONSTRUCTION SPECIFICATIONS, AND CONSTRUCTION DETAILS.

23. ALL EXCESS SPOIL MATERIAL GENERATED FROM CONSTRUCTION ACTIVITY TO BE HAULED OFFSITE AND DISPOSED IN ACCORDANCE WITH LOCAL LAWS, RULES, AND REGULATIONS, UNLESS OTHERWISE NOTED ON THE PLANS.

24. AT THE END OF ALL CONSTRUCTION PROJECTS, THE CONTRACTOR SHALL RESTORE THE EXISTING FACILITIES, TO EQUAL TO BETTER THAN EXISTING SITE CONDITIONS PRIOR TO CONSTRUCTION. ALL FINISHED GRADES SHALL VARY UNIFORMLY BETWEEN THE FINISHED ELEVATIONS SHOWN.

25. CONTRACTOR IS RESPONSIBLE FOR ALL DAMAGE TO EXISTING LANDSCAPING AND IRRIGATION. NO SEPARATE PAY.

26. PRIOR TO SUBMITTAL OF BID OR PROPOSAL, CONTRACTOR SHALL VISIT PROJECT SITE AND BECOME FAMILIAR WITH THE PROJECT AND THE EXISTING CONDITIONS ON THE SITE. NO ADDITIONAL CONSIDERATION WILL BE GIVEN FOR ADDITIONAL WORK CAUSED BY FIELD CONDITIONS VISIBLE ON SITE DURING BIDDING BUT NOT SHOWN ON THESE PLANS.

27. THERE WILL BE NO SEPARATE PAYMENT FOR WORK SHOWN ON THESE PLANS, UNLESS SPECIFICALLY ESTABLISHED IN THE BID SECTION OF THE CONTRACT DOCUMENTS. INCLUDE COST OF SAME TO WHICH THIS WORK IS A COMPONENT PART.

28. IN THE EVENT OF A DISCREPANCY WITHIN THESE PLANS, OR BETWEEN THESE PLANS AND THE GEOTECHNICAL REPORT, THE MOST CONSERVATIVE CRITERIA SHALL APPLY.

29. ALL UTILITY TRENCHES BELOW PROPOSED OR FUTURE PAVING SHALL BE BACKFILLED WITH CEMENT SAND.

30. UTILITY TRENCHES ARE A COMMON SOURCE OF WATER INFILTRATION AND MIGRATION. ALL UTILITY TRENCHES THAT PENETRATE BENEATH THE BUILDING SHOULD BE EFFECTIVELY SEALED TO RESTRICT WATER INTRUSION AND FLOW THROUGH THE TRENCHES THAT COULD MIGRATE BELOW THE BUILDING. WE RECOMMEND CONSTRUCTING AN EFFECTIVE CLAY "TRENCH PLUG" THAT EXTENDS AT LEAST 5 FEET OUT FROM THE FACE OF THE BUILDING EXTERIOR. THE PLUG MATERIAL SHOULD CONSIST OF CLAY COMPACTED AT A WATER CONTENT AT OR ABOVE THE SOILS OPTIMUM WATER CONTENT. THE CLAY FILL SHOULD BE PLACED TO COMPLETELY SURROUND THE UTILITY LINE AND BE COMPACTED IN ACCORDANCE WITH RECOMMENDATIONS WITHIN THE GEOTECHNICAL REPORT.

31. CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL UTILITY TIE IN LOCATIONS FOR MATERIAL, SIZE, ELEVATION, AND FIELD CONDITIONS. IN THE EVENT THE PLANS DO NOT REPRESENT FIELD CONDITIONS, THE CONTRACTOR IS TO CONTACT THE ENGINEER AND OWNER IMMEDIATELY AND PRIOR TO PERFORMING ANY WORK.

32. PRIOR TO THE START OF CONSTRUCTION, CONTRACTOR TO CONFIRM POSSESSION OF LATEST DRAWINGS, INCLUDING ANY REVISIONS. IF THE DRAWINGS ARE NOT LABELED AS "CONSTRUCTION SET" ON THE COVER PAGE, CONTRACTOR TO CONTACT ENGINEER IMMEDIATELY.

33. CONTRACTOR TO OBTAIN ALL PERMITS. OWNER WILL PROVIDE PAYMENT AS NECESSARY AND REQUESTED BY CONTRACTOR.

34. THE REVIEW/APPROVAL OF CONTRACTOR SUBMITTALS BY THE CIVIL ENGINEER DOES NOT RELIVE THE CONTRACTOR'S RESPONSIBILITIES OF CONFIRMING THAT ALL QUANTITIES, FLOW LINES, AND MATERIALS ARE PER THE LATEST ISSUED PLANS AND SPECIFICATIONS, INCLUDING ANY REQUIREMENTS FOR WORK IN THE PUBLIC R.O.W. AS SPECIFIED BY THE A.H.J.

GRADING & EXCAVATION NOTES

1. GENERAL CONTRACTOR AND ALL SUBCONTRACTORS SHALL VERIFY THE SUITABILITY OF ALL EXISTING AND PROPOSED SITE CONDITIONS INCLUDING GRADES AND DIMENSIONS BEFORE START OF CONSTRUCTION. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCIES.

2. BEFORE STARTING CONSTRUCTION, CONTRACTOR SHALL VERIFY BENCHMARK ELEVATION AND NOTIFY ENGINEER IF ANY DISCREPANCY AND/OR CONFLICT IS FOUND.

3. CONTRACTOR SHALL ENSURE THERE IS POSITIVE DRAINAGE FROM THE PROPOSED BUILDINGS AND NO PONDING IN EITHER PAVED OR LANDSCAPE AREAS, AND SHALL NOTIFY ENGINEER IF ANY GRADING DISCREPANCIES ARE FOUND IN THE EXISTING AND PROPOSED GRADES PRIOR TO PLACEMENT OF PAVEMENT OR UTILITIES.

4. CONTRACTOR SHALL PROTECT ALL MANHOLE COVERS, VALVE COVERS, VAULT LIDS, FIRE HYDRANTS, POWER POLES, GUY WIRES, AND TELEPHONE BOXES THAT ARE TO REMAIN IN PLACE AND UNDISTURBED DURING CONSTRUCTION.

5. ALL EXISTING CONCRETE PAVING, SIDEWALK, AND CURB DEMOLITION SHALL BE REMOVED AND DISPOSED OF BY CONTRACTOR. DISPOSAL SHALL BE AT AN APPROVED OFF-SITE, LAWFUL LOCATION, UNLESS DIRECTED OTHERWISE BY THE OWNER.

6. FOR BUILDING PAD SUBGRADE PREPARATION AND GENERAL EARTHWORK OBSERVATIONS, REFER TO THE GEOTECHNICAL REPORT PREPARED BY BSW ARCHITECTS, INC., DATED AUGUST 21, 2018 (PROJECT NUMBER H180173). ALL MATERIAL SPECIFICATIONS AND TESTING SHALL BE ADHERED TO AS OUTLINED IN THIS REPORT.

7. FINAL PAVEMENT GRADES SHALL BE WITHIN 0.05' OF DESIGN ELEVATIONS, EXCEPT FOR ADA AREAS, WHICH SHALL BE WITHIN 0.01' OF DESIGN ELEVATIONS. FINAL NON-PAVEMENT ELEVATIONS SHALL BE WITHIN 0.1' OF PROPOSED GRADE.

8. ALL DETENTION PONDS SHALL BE GRADED TO WITHIN 0.1' OF PROPOSED ELEVATIONS AND WITHIN 6" OF HORIZONTAL LOCATION. AFTER COMPLETION AN AS-BUILT SURVEY WILL BE ORDERED BY OWNER, AND ANY POND NOT BUILT PER PLAN, WILL BE CORRECTED AT CONTRACTOR'S SOLE COST.

9. ALL DISTURBED AREAS NOT COVERED BY PAVEMENT OR LANDSCAPING SHALL BE HYDROSEEDED WITH 95% GRASS COVER ESTABLISHED. THIS INCLUDES, BUT IS NOT LIMITED TO, DETENTION PONDS AND ROADSIDE DITCHES.

10. GROUNDWATER MAY BE ENCOUNTERED DURING DETENTION POND AND/OR UTILITY CONSTRUCTION. THE CIVIL ENGINEER OF RECORD HAS NOT ATTEMPTED TO DEPICT THESE CONDITIONS ON THE PLANS. BUT CONTRACTOR SHALL REVIEW APPLICABLE GEOTECHNICAL REPORTS AND STUDIES PRIOR TO SUBMITTING BID AND ACCOUNT FOR REQUISITE GROUNDWATER CONTROL.

11. CONTRACTOR SHALL THE ENGINEER OF RECORD WITH AS-BUILT SURVEY IF THE POND FOR VERIFICATION OF FINAL GRADES PRIOR TO PLACEMENT OF CONCRETE PILOT CHANNEL AND/OR SEEDING.

12. CONTRACTOR IS RESPONSIBLE FOR REPAIRING ANY WASHOUT OR RILLS THAT OCCUR PRIOR TO TURF ESTABLISHMENT.

STORM SEWERS

1. STORM SEWER PIPE USED FOR CONNECTION TO STORM SEWER IN PUBLIC RIGHT-OF-WAY OR CONSTRUCTED WITHIN PUBLIC EASEMENTS SHALL BE REINFORCED CONCRETE PIPE ASTM C-76, CLASS III, WITH O-RING RUBBER GASKET JOINTS PER ASTM C-443 AND SHALL EXTEND TO FIRST PRIVATE INLET OR MANHOLE. ALL OTHER PRIVATE STORM SEWER MAY BE SELECTED PER THE FOLLOWING CRITERIA:

   A. CORRUGATED HIGH-DENSITY POLYETHYLENE (HDPE) (4 INCHES TO 60 INCHES IN DIAMETER): AASHTO M 294, DUAL WALL WITH WATER TIGHT (ASTM D3212) BELL-TO-BELL COUPLER, TRADE NAME N-12 BY ADS OR EQUAL
   B. POLYVINYL CHLORIDE (PVC) CORRUGATED PIPE WITH SMOOTH INTERIOR PER ASTM F 949 (4 INCHES TO 36 INCHES (102-MM TO 914-MM)) WITH ELASTOMETRIC GASKET JOINTS, TRADE NAME A-2000 BY CONTECH OR EQUAL
   C. STEEL REINFORCED HIGH-DENSITY POLYETHYLENE (HDPE) (24 INCHES TO 48 INCHES IN DIAMETER): AASHTO M 294, HIGH PERFORMANCE JOINTS (ASTM D3212), TRADE NAME DUROMAXX OR EQUAL
   D. REINFORCED CONCRETE PIPE (RCP): ASTM C76, CLASS III WITH O-RING RUBBER GASKET JOINTS PER ASTM C-443

2. STORM SEWERS IN PUBLIC R.O.W. OR PUBLIC EASEMENTS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST A.H.J. STANDARD CONSTRUCTION SPECIFICATIONS FOR STORM DRAINAGE INCLUDING ALL CURRENT AMENDMENTS THERETO. ALL STORM SEWER ON PRIVATE PROPERTY SHALL BE CONSTRUCTED PER SPECIFICATIONS AND DETAILS IN THESE DRAWINGS AND IN ACCORDANCE WITH THE PIPE MANUFACTURERS RECOMMENDATIONS.

3. ALL SEWERS UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE BACKFILLED WITH 1 1/2 SACK CEMENT/C.Y. STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE. CEMENT STABILIZED SAND TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM C33, LATEST EDITION

4. TRENCH BACKFILL SHALL BE SUITABLE EARTH MATERIAL PLACED IN 8 INCH LIFTS, WITH TESTS TAKEN AT 100 FOOT INTERVALS ON EACH LIFT. BACKFILL TO BE MECHANICALLY COMPACTED TO A DENSITY OF NOT LESS THAN 95% OF OF THE MAXIMUM DRY DENSITY AS DETERMINED BY THE STANDARD PROCTOR COMPACTION TEST (ASTM DESIGNATION D-698/AASHTO T99). MOISTURE CONTENT OF BACKFILL SHALL BE WITHIN PARAMETERS ESTABLISHED BY THE PROCTOR TEST.

5. PROPOSED PIPE STUB-OUTS ARE TO BE CAPPED AND MARKED WITH A VERTICAL PVC PIPE, UNLESS OTHERWISE NOTED.

6. ALL GRAVITY BASED STORM LINES ARE TO BE CONSTRUCTED FROM THE LOWEST POINT IN THE SYSTEM AND WORKED UP IN ELEVATION. PLEASE NOTIFY THE ENGINEER IMMEDIATELY OF ANY DISCREPANCIES.

PAVING AND STRIPING NOTES

1. PAVEMENT DESIGN AND SOIL PREPARATION RECOMMENDATIONS GIVEN IN THE GEOTECHNICAL REPORT PREPARED BY BSW ARCHITECTS, INC., DATED AUGUST 21, 2018 (PROJECT NUMBER H180173) SHALL BE ADHERED TO FOR BOTH MATERIALS AND PRACTICE OF INSTALLATION. CONTRACTOR SHALL ENSURE ALL SPECIFICATIONS AND TESTING ARE MET AS OUTLINED IN THIS REPORT.

2. ALL TRAFFIC CONTROL DEVICES SHALL CONFORM TO THE TEXAS MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES (M.U.T.C.D.) AND A.H.J. STANDARDS.

3. CONTRACTOR SHALL FURNISH ALL PAVEMENT MARKINGS FOR FIRE LANES, ROADWAY LANES, PARKING STALLS, HANDICAPPED PARKING SYMBOLS, ACCESS AISLES, STOP BARS AND SIGNS, AND MISCELLANEOUS STRIPING WITHIN PARKING LOT AS SHOWN ON THE PLANS.

4. ALL JOINTS SHALL BE SEALED PER A.H.J. SPECIFICATIONS. ALL JOINTS SHALL EXTEND THROUGH THE CURB.

5. THE MATERIALS AND PROPERTIES OF CONCRETE SHALL MEET THE APPLICABLE REQUIREMENTS IN THE A.C.I. (AMERICAN CONCRETE INSTITUTE) MANUAL OF CONCRETE PRACTICE AS WELL AS A.H.J. STANDARDS. IN THE EVENT OF A CONTRADICTION BETWEEN THESE TWO STANDARDS, THE MOST RESTRICTIVE (AS DETERMINED BY THE ENGINEER) SHALL APPLY.

6. PAVEMENT THICKNESS'S SHOWN IN THIS PLAN SET ARE "MINIMUM" NOT AVERAGE. PAVEMENT THICKNESS AT ALL LOCATIONS SHALL EXCEED THE THICKNESS SPECIFIED.

7. ANY DAMAGED PAVEMENT, CURB AND/OR SIDEWALK WILL BE REPAIRED BY THE CONTRACTOR AT HIS EXPENSE TO THE SATISFACTION OF THE ENGINEER AND OWNER.

8. BEFORE PLACING PAVEMENT, CONTRACTOR SHALL VERIFY THAT SUITABLE HANDICAPPED ROUTES (PER A.D.A. & T.A.S) EXIST TO AND FROM EVERY DOOR. IN NO CASE SHALL:

   A. HANDICAP RAMP SLOPES EXCEED 1 VERTICAL TO 12 HORIZONTAL.
   B. SIDEWALK CROSS SLOPES EXCEED 2.0 PERCENT.
   C. LONGITUDINAL SIDEWALK SLOPES EXCEED 5.0 PERCENT.
   D. CONTRACTOR SHALL CONTACT ENGINEER PRIOR TO PAVEMENT CONSTRUCTION IF ANY SLOPES EXCEED THE ABOVE LIMITS.

9. REINFORCING BAR SPLICES SHALL BE STAGGERED WITH NO MORE THAN 2 SPLICES ADJACENT TO EACH OTHER.

10. STABILIZED SUBGRADE SHALL EXTEND A MINIMUM OF 1 FOOT BEYOND EDGE OF ALL PAVEMENT, OR AS DIRECTED IN GEOTECHNICAL REPORT.

11. ALL CONCRETE PAVEMENT SHALL BE FLOAT FINISHED MECHANICALLY WITH APPROVED SELF-PROPELLED MACHINES. HANDING FLOATING SHALL BE PERMITTED ONLY IN AREAS INACCESSIBLE TO A FINISHING MACHINE. AFTER FLOATING, CONTRACTOR SHALL PROVIDE A FINE OR MEDIUM-COARSE "BROOM FINISH," UNLESS OTHERWISE INDICATED BY THE OWNER, FOR ALL EXTERIOR SIDEWALKS, EXTERIOR RAMPS, EQUIPMENT AND TRANSFORMER PADS, AND SITE PAVING. BROOMING SHALL BE DONE TRANSVERSELY TO THE DIRECTION OF MAIN TRAFFIC. ALL FINISHING SHALL CONFORM TO A.C.I.301. CONTRACTOR SHALL DETERMINE THE APPROPRIATE MEANS & METHODS TO PROTECT THE FINISHED CONCRETE FROM PRECIPITATION FOR A MINIMUM OF 24 HOURS.

12. CONTRACTOR SHALL PROTECT THE FINISHED CONCRETE PAVEMENT AGAINST LOSS OF MOISTURE FOR NO LESS THAN 72 HOURS IN CONFORMANCE WITH THE A.C.I. MANUAL OF CONCRETE PRACTICE.

13. ALL PROPOSED PAVEMENT WITHIN ANY PUBLIC ROW SHALL BE CONSTRUCTED IN ACCORDANCE W/ THE APPROPRIATE DETAILS FROM THE APPLICABLE GOVERNING ENTITY AND WITH PROPER CONSTRUCTION INSPECTIONS.

14. UNLESS OTHERWISE SPECIFIED IN THE PLANS PAVEMENT STRIPING SHALL MEET THE FOLLOWING CRITERIA:
   A. MARKING PAINT: HIGH SOLIDS, WATER BASED ACRYLIC PAINT CONTAINING ULTRAVIOLET RESISTANT PIGMENTS.
      A.1. ICI PAINTS; TRAFFIC MARKING PAINT, #4800
      A.2. M.A.B. PAINTS; ZONE MARKING LATEX TRAFFIC PAINT, #072 LINE
      A.3. BENJAMIN MOORE AND CO.; SAFETY AND ZONE MARKING LATEX, M58
      A.4. PITTSBURGH PAINTS; ZONE & TRAFFIC MARKING PAINT, #11-23
      A.5. PORTER PAINT CO.; PORTERGUARD ACRYLIC TRAFFIC PAINT, #2408
      A.6. THE SHERWIN WILLIAMS CO.; PROMAR TRAFFIC MARKING PAINT, B29 SERIES

   B. COLORS:
      B.1. PARKING: WHITE
      B.2. TRAFFIC LANES, DIRECTIONS, LETTERING, ETC.:
           ON PRIVATE PROPERTY: WHITE
           IN PUBLIC R.O.W.: PER LOCAL CODE
      B.3. HANDICAPPED EMBLEMS: BLUE.
      B.4. FIRE LANE: RED.

15. CONTRACTOR TO CONFIRM AND/OR ADJUST ALL EXISTING AND PROPOSED UTILITIES AND APPURTENANCES TO FINISH GRADE PRIOR TO PLACEMENT OF ANY PAVEMENT.

WATER LINES

1. WATER LINES SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST A.H.J. AND TCEQ REGULATIONS, STANDARD SPECIFICATIONS, AND CONSTRUCTION DETAILS.

2. 4" THRU 12" WATER LINES SHALL BE P.V.C. CLASS 150, DR-18, AWWA C-900 AND 1" THRU 3" WATER LINES SHALL BE PVC SCHEDULE 40. 4" THRU 54" D.I.P. WATER LINES SHALL BE AWWA C151 (ANSI A21.51) AND DOUBLE WRAPPED IN 8-MIL POLYETHYLENE. PIPE SHALL BE LINED IN ACCORDANCE WITH AWWA C104 (ANSI A21.4).

3. CONCRETE THRUST BLOCKS SHALL BE PROVIDED AS NECESSARY TO PREVENT PIPE MOVEMENT. WHERE PREVENTING MOVEMENT OF 16" OR GREATER PIPE IS NECESSARY DUE TO THRUST, USE RESTRAINED JOINTS.

4. ALL WATER LINES UNDER PROPOSED OR FUTURE PAVING AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE ENCASED IN BANK SAND TO 12" OVER PIPE AND BACKFILLED WITH CEMENT STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE.

5. ALL WATER LINE AND SEWER LINE CROSSINGS SHALL BE CONSTRUCTED PER A.H.J. AND TCEQ REGULATIONS.

6. ALL WATER VALVES SHALL BE SUPPLIED AND INSTALLED IN ACCORDANCE WITH THE LATEST EDITION OF AWWA C-500 AND SHALL BE OF THE RESILIENT SEAT TYPE.

7. ALL WATER LINES TO BE DISINFECTED IN CONFORMANCE WITH AWWA C-651 AND THE TEXAS STATE DEPARTMENT OF HEALTH. AT LEAST ONE BACTERIOLOGICAL SAMPLE SHALL BE COLLECTED FOR EACH 1,000 LINEAR FEET OF WATER LINE AND SHALL BE REPEATED IF CONTAMINATION PERSISTS.

8. ALL BELOW GRADE VALVES SHALL BE GASKETED, HUB-END GATE VALVES WITH A CAST IRON BOX, EXCEPT WHERE FLANGES ARE CALLED OUT ON THE PLANS.

9. 4" THRU 12" FITTINGS SHALL BE CEMENT MORTAR LINED COMPACT DUCTILE IRON PRESSURE FITTINGS PER ANSI A21.53, OR PUSH ON FITTINGS PER ANSI A21.10 PRESSURE RATED AT 250 PSIG.

10. HYDROSTATIC TESTING: ALL WATER PIPE SHALL BE TESTED FOR LEAKAGE IN ACCORDANCE WITH THE LATEST A.H.J. AND TCEQ REQUIREMENTS. TESTS ARE TO BE PERFORMED ON THE TOTAL FOOTAGE OF WATER PIPE LINE INCLUDED IN THE PROJECT.

11. ALL WATER LINES TO HAVE 5' MINIMUM COVER TO FINISHED GRADE AND MINIMUM 12" CLEAR TO OTHER UTILITIES AT CROSSING UNLESS OTHERWISE NOTED ON PLANS. ALL WATER LINE INSTALLED OVER 8' DEEP SHALL UTILIZE RESTRAINED JOINT FITTINGS.

12. CONTRACTOR SHALL KEEP WATER PIPE CLEAN AND CAP (OR OTHERWISE EFFECTIVELY COVER) OPEN PIPE ENDS TO EXCLUDE INSECTS, ANIMALS OR OTHER SOURCES OF CONTAMINATION FROM UNFINISHED PIPE LINES AT TIMES WHEN CONSTRUCTION IS NOT IN PROGRESS.

13. ALL FIRE LINES ARE TO BE DESIGNED AND INSTALLED BY A LICENSED RME-U, INCLUDING BUT NOT LIMITED TO MATERIALS, THRUST BLOCKING, AND APPURTENANCES, AND ARE TO BE TESTED PER NFPA REGULATIONS.

14. ALL UTILITY STRUCTURES, BOXES, AND VALVES PLACED WITHIN EXISTING/PROPOSED PAVING SHALL BE HEAVY DUTY TRAFFIC RATED.

SANITARY SEWERS

1. ALL SEWERS SHALL BE CONSTRUCTED IN ACCORDANCE WITH THE LATEST A.H.J. AND TCEQ CRITERIA AND BE SUBJECT TO A REQUIRED FIELD TESTING. TESTS ARE TO BE PERFORMED ON THE TOTAL FOOTAGE OF SEWER LINE INCLUDED IN THE PROJECT. REQUIREMENTS OF TEXAS ADMINISTRATIVE CODE, TITLE 30 CHAPTER 217, "DESIGN CRITERIA FOR SEWERAGE SYSTEMS" SHALL GOVERN WHERE CONFLICTS EXIST EXCEPT WHERE A.H.J. REQUIREMENTS ARE OF HIGHER STANDARDS.

2. SANITARY SEWER PIPE USED FOR CONNECTION TO SEWER IN PUBLIC RIGHT-OF-WAY SHALL BE C900 P.V.C. PIPE MEETING ASTM SPECIFICATION D3034 WITH RUBBER GASKET JOINTS. ALL OTHER PRIVATE SANITARY SEWER PIPE MATERIAL SHALL CONFORM TO THE FOLLOWING CRITERIA:

   A. POLYVINYL CHLORIDE (PVC) SCHEDULE 40 TO BE USED FOR PIPE SIZES 6 INCHES AND SMALLER.

   B. STANDARD DIMENSION RATIO (SDR) 35 PVC OR 26 PVC CAN BE USED FOR PIPE SIZES 8 INCHES AND LARGER. SEE NOTE 6 BELOW REGARDING SDR 26 FITTINGS.

3. ALL SEWERS UNDER PROPOSED OR FUTURE PAVEMENT AND TO A POINT ONE (1) FOOT BACK OF ALL PROPOSED OR FUTURE CURBS SHALL BE BACKFILLED WITH 1 1/2 SACK CEMENT/C.Y. STABILIZED SAND TO WITHIN ONE (1) FOOT OF SUBGRADE. CEMENT STABILIZED SAND TO BE IN ACCORDANCE WITH THE REQUIREMENTS OF ASTM C33, LATEST EDITION

4. ALL SANITARY SEWERS AND WATER LINES CROSSINGS SHALL BE CONSTRUCTED IN ACCORDANCE WITH A.H.J. AND TCEQ REGULATIONS.

5. SANITARY SEWER MANHOLE RIMS OUTSIDE OF PROPOSED PAVING WILL BE SET 3"- 6" ABOVE THE SURROUNDING LEVEL FINISHED GRADE AFTER PAVING AND GRADING OPERATIONS.

6. SDR 26 P.V.C. PIPE USES "FULL BODIED" SDR 26 P.V.C. FITTINGS OR D.I.P. FITTINGS WITH APPROPRIATE ADAPTERS. AWWA C-900 DR-18 P.V.C. PIPE USES EITHER AWWA C900 DR-18 P.V.C. FITTINGS OR D.I.P. FITTINGS.

7. DEFLECTION TEST: DEFLECTION TESTS SHALL BE PERFORMED ON ALL FLEXIBLE AND SEMI-RIGID SEWER PIPE BETWEEN MANHOLES. SERVICE LEADS SHALL NOT BE TESTED. THE TEST SHALL BE CONDUCTED AFTER THE FINAL BACKFILL HAS BEEN IN PLACE AT LEAST 30 DAYS. NO PIPE SHALL EXCEED A DEFLECTION OF 5%. THE DEFLECTION TEST SHALL USE A RIGID 7-SIDED MANDREL, WITH A DIAMETER EQUAL TO 95% OF THE INSIDE DIAMETER OF THE PIPE. NO MECHANICAL PULLING IS ALLOWED.

8. INFILTRATION, EXFILTRATION OR LOW-PRESSURE AIR TEST: EITHER OF THE FOLLOWING TESTS SHALL BE PERFORMED AS PER TAC, TITLE 30 217.2 WITHIN THE SPECIFIED TOLERANCES ON ALL GRAVITY SEWERS.

9. NO CONNECTIONS SHALL BE MADE TO THE EXISTING SANITARY SEWER LINES UNTIL ALL PROPOSED SEWER LINES HAVE BEEN THOROUGHLY CLEANED, TESTED AND APPROVED BY THE ENGINEER. THE ENGINEER AND A.H.J. SHALL BE NOTIFIED AT LEAST 48 HOURS PRIOR TO THE CONTRACTOR CONNECTING TO ANY EXISTING SEWER LINES.

10. THE CONTRACTOR SHALL NOTIFY THE ENGINEER AND THE A.H.J. AT LEAST 48 HOURS PRIOR TO PRESSURE AND DEFLECTION TEST ON ALL SANITARY LINES.

11. ALL SEWER LINES ENTERING A MANHOLE AT A FLOWLINE HIGHER THAN 3.0' OR 36" ABOVE THE MANHOLE INVERT MUST BE PROVIDED WITH A DROP PIPE OUTSIDE OF THE MANHOLE.

12. PROPOSED SANITARY SEWER CONNECTIONS AND/OR PROPOSED SANITARY SEWER MANHOLES TO BE CONNECTED TO AN EXISTING SANITARY SEWER MAIN MAY REQUIRE BYPASS PUMPING OPERATIONS OR OTHER MEANS AS REQUIRED BY THE A.H.J. TO AVOID THE INTERRUPTION OF SERVICE DURING CONSTRUCTION. CONTRACTOR SHALL INCLUDE THIS COST IN THE BASE BID.

13. ALL GRAVITY BASED SANITARY SEWER LINES ARE TO BE CONSTRUCTED FROM THE POINT OF CONNECTION AND WORKED UP IN ELEVATION. PLEASE NOT

CITY PLANNING LETTER PROVIDED BY: STEWART TITLE COMPANY
DATED: MARCH 29, 2018
FILE NO.: 1850151CPL

1. RESTRICTIONS: THOSE RECORDED IN VOLUME 583, PAGE 571, VOLUME 583, PAGE 618, AND VOLUME 583, PAGE 623 OF THE OFFICIAL PUBLIC RECORDS OF WALLER COUNTY, TEXAS, BUT OMITTING ANY COVENANTS, CONDITIONS OR RESTRICTIONS, IF ANY, BASED ON RACE, COLOR, RELIGION, SEX, HANDICAP, FAMILIAL STATUS OR NATIONAL ORIGIN, UNLESS AND ONLY TO THE EXTENT THAT THE COVENANT, CONDITION OR RESTRICTION (A) IS EXEMPT UNDER TITLE 42 OF THE UNITED STATES CODE OR (B) RELATES TO HANDICAP, BUT DOES NOT DISCRIMINATE AGAINST HANDICAPPED PERSONS. SUBJECT TO

2. EASEMENTS/OTHER EXCEPTIONS:

TITLE TO, AND EASEMENTS IN, ANY PORTION OF THE LAND LYING WITHIN ANY HIGHWAYS, ROADS, STREETS, OR OTHER WAYS. RIGHT OF WAY EASEMENT 60 FEET WIDE GRANTED TO COUNTY OF WALLER, TEXAS, AND FURTHER DESCRIBED IN VOLUME 148, PAGE 519 OF THE DEED RECORDS, WALLER COUNTY, TEXAS, AND LOCATED AS SHOWN THEREIN. (AS TO A 1.148 OF WHICH UNDER CLERK'S FILE NO. 1606505 OF THE OFFICIAL PUBLIC RECORDS OF WALLER COUNTY, TEXAS (APPURTENANT TO 15.058 ACRES, GIVES ACCESS TO HWY 290) DOES AFFECT, SHOWN HEREON

RIGHT OF WAY EASEMENT 20 FEET WIDE GRANTED TO SAN BERNARD ELECTRIC COOPERATIVE, INC. DATED JANUARY 3, 1977, RECORDED IN VOLUME 272, PAGE 658 OF THE DEED RECORDS, WALLER COUNTY, TEXAS, AND LOCATED AS SHOWN THEREIN. (AS TO A 13.168 OF WHICH 12.831 ACRE TRACT IS A PART) DOES NOT AFFECT, UNABLE TO PLOT

RIGHT OF WAY 100 FEET WIDE GRANTED TO STATE OF TEXAS, DATED MARCH 13, 1930, RECORDED IN VOLUME 53, PAGE 517 OF THE DEED RECORDS OF WALLER COUNTY, TEXAS AND ALSO IN VOLUME 53, PAGE 520 DATED MARCH 11, 1930 OF THE DEED RECORDS OF WALLER COUNTY, TEXAS. (AS TO 1.998 AC TRACT OUT OF A 63.4223 ACRE TRACT) DOES AFFECT, SHOWN HEREON

TRANSMISSION LINE RIGHT OF WAY GRANTED TO SAN BERNARD ELECTRIC COOPERATIVE, INC. DATED JUNE 17, 1959, RECORDED IN VOLUME 159, PAGE 36 OF THE DEED RECORDS OF WALLER COUNTY, TEXAS. DOES AFFECT, BLANKET IN NATURE, UNABLE TO PLOT

RIGHT OF WAY EASEMENT 20 FEET WIDE GRANTED TO SAN BERNARD ELECTRIC COOPERATIVE, INC. DATED MARCH 1, 1988, RECORDED IN VOLUME 418, PAGE 257 OF THE DEED RECORDS OF WALLER COUNTY, TEXAS, AND LOCATED AS SHOWN THEREIN. (AS TO 1.998 ACRE TRACT PART OF 63.4223 ACRE TRACT) DOES AFFECT, SHOWN HEREON

RIGHT OF WAY EASEMENT 20 FEET WIDE GRANTED TO SAN BERNARD ELECTRIC COOPERATIVE, INC. DATED MARCH 1, 1988, RECORDED IN VOLUME 418, PAGE 259 OF THE DEED RECORDS OF WALLER COUNTY, TEXAS, AND LOCATED AS SHOWN THEREIN. (AS TO 2.00 ACRE TRACT PART OF 63.4223 ACRE TRACT) DOES AFFECT, SHOWN HEREON

RIGHT OF WAY EASEMENT 20 FEET WIDE GRANTED TO SAN BERNARD ELECTRIC COOPERATIVE, INC. DATED FEBRUARY 25, 1988, RECORDED IN VOLUME 418, PAGE 261 OF THE DEED RECORDS OF WALLER COUNTY, TEXAS, AND LOCATED AS SHOWN THEREIN. (AS TO 60.914 ACRES TRACT PART OF 63.4223 AC TRACT) DOES AFFECT, SHOWN HEREON (SEE NOTE 4)

RIGHT OF WAY EASEMENT 20 FEET WIDE GRANTED TO SAN BERNARD ELECTRIC COOPERATIVE, INC. DATED MARCH 30, 2001, RECORDED IN VOLUME 683, PAGE 846 OF THE OFFICIAL PUBLIC RECORDS WALLER COUNTY, TEXAS, AND LOCATED AS SHOWN THEREIN. (AS TO A 63.4223 ACRE TRACT COMPOSED OF 1.998 ACRES AND 61.4243 ACRES) DOES AFFECT, SHOWN HEREON

RIGHT OF WAY EASEMENT 20 FEET WIDE GRANTED TO SAN BERNARD ELECTRIC COOPERATIVE, INC. DATED SEPTEMBER 25, 2007, RECORDED IN VOLUME 1068, PAGE 659 OF THE OFFICIAL PUBLIC RECORDS WALLER COUNTY, TEXAS, AND LOCATED AS SHOWN THEREIN. (AS TO A 63.4223 ACRE TRACT COMPOSED OF 1.998 ACRES AND 61.4243 ACRES) DOES AFFECT, SHOWN HEREON (SEE NOTE 4)

RIGHT OF WAY EASEMENT GRANTED TO SAN BERNARD ELECTRIC COOPERATIVE, INC. DATED DECEMBER 30, 1985, RECORDED IN VOLUME 393, PAGE 585 DEED RECORDS WALLER COUNTY, TEXAS, LOCATED AS SHOWN THEREIN, AND AS SHOWN ON SURVEY PREPARED BY RONALD K. BRYANT, R.P.L.S. NO. 4361, DATED AUGUST 29, 2016. (AS TO 15.058 ACRES) DOES AFFECT, SHOWN HEREON

RIGHT OF WAY EASEMENT GRANTED TO SAN BERNARD ELECTRIC COOPERATIVE, INC. DATED FEBRUARY 25, 1986, RECORDED IN VOLUME 393, PAGE 583 DEED RECORDS WALLER COUNTY, TEXAS, LOCATED AS SHOWN THEREIN. (AS TO 1.998 ACRES) DOES AFFECT, SHOWN HEREON

Scale 1" = 100'

LEGEND

MANHOLE	IR	IRON ROD
SIGN	IP	IRON PIPE
IRON ROD	FND	FOUND
FENCE CORNER	PP	POWER POLE
OVERHEAD POLE	GW	GUY WIRE
GUY WIRE	EM	ELECTRIC METER
WATER VALVE	GM	GAS METER
FIRE HYDRANT	FH	FIRE HYDRANT
WATER METER	GM	GAS METER
IRON PIPE	TMH	TELEPHONE MANHOLE
INLET	CO	CLEANOUT
ELECTRIC JUNCTION BOX	CMP	CORRUGATED METAL PIPE
PEDESTAL	RCP	REINFORCED CONCRETE PIPE
ELECTRIC METER	DMPT	DUMPSTER
CLEANOUT	WM	WATER METER
TELEPHONE MANHOLE	WV	WATER VALVE
PIPELINE MARKER	ROW	RIGHT OF WAY
VAULT	EPB	ELECTRIC PULL BOX
	EJB	ELECTRIC JUNCTION BOX
	SWB	SOUTHWESTERN BELL
	S.B.E.C.I.	SAN BERNARD ELECTRIC COOPERATIVE, INC.
	W.C.D.R.	WALLER COUNTY DEED RECORDS
	W.C.C.F.	WALLER COUNTY CLERK'S FILE
	W.C.D.R.	WALLER COUNTY DEED RECORDS

GRAVEL | CONCRETE | ASPHALT

HIGH BANK
FLOWLINE DITCH
CHAINLINK FENCE
BARBWIRE FENCE
OVERHEAD ELECTRIC ——— OHE ———

NOTES:
1. BEARINGS BASED ON TEXAS STATE PLANE COORDINATE SYSTEM, SOUTH CENTRAL ZONE(4204) NAD83 2007ADJ. COORDINATES SHOWN ARE SURFACE COORDINATES TO REACH GRID COORDINATES APPLY THE SCALE FACTOR OF 0.99994279SB.
2. SURVEY PREPARED IN CONJUNCTION WITH METES AND BOUNDS DESCRIPTION PROJECT NUMBER LJAS001–2536–1701A DATED MARCH. 7, 2018.
3. THIS SURVEY WAS PERFORMED IN CONJUNCTION WITH METES AND BOUNDS DESCRIPTION PROJECT NUMBER LJAS001–2536–1701A DATED MARCH 6, 2018.
4. THE LOCATION OF S.B.E.C.I. EASEMENTS RECORDED IN (VOL. 418, PG. 261) & (VOL. 1068, PG. 659) IS AMBIGUOUS. LOCATION OF EASEMENT SHOWN HEREON BASED ON SKETCH AS I INTERPRETED IT.

FLOOD STATEMENT:
BASED ON THE FLOOD INSURANCE RATE MAP, COMMUNITY PANEL NO. 48473C0150E, DATED FEBRUARY 18, 2009, THE TRACT HEREBY SURVEYED LIES WHOLLY WITHIN ZONE "X", AREAS DETERMINED TO BE OUTSIDE OF THE 0.2% ANNUAL CHANCE FLOODPLAIN.

NOTE: THIS STATEMENT IS BASED ON THE SCALED LOCATION OF SAID SURVEY ON THE ABOVE REFERENCED MAP. THIS INFORMATION IS TO BE USED TO DETERMINE FLOOD INSURANCE RATES ONLY AND IS NOT INTENDED TO IDENTIFY SPECIFIC FLOOD CONDITIONS.

Line Table		
Line #	Direction	Length
L1	N02° 57' 26"W	12.68' CALLED 12.91'
L2	S88° 51' 39"E	133.53'
L3	S89° 15' 10"E	60.00'
L4	S89° 34' 35"E	134.03'
L5	S59° 35' 17"W	25.38'
L6	S28° 00' 32"E	36.70'
L7	N75° 43' 00"E	132.78'
L8	S88° 37' 42"E	133.00'
L9	S62° 43' 53"E	115.95'
L10	S27° 31' 18"W	40.44'
L11	N86° 20' 55"E	17.64'

Curve Table					
Curve #	Arc Length	Radius	Delta	Chord Bearing	Chord Distance
C1	66.22'	120.00	31°36'58"	S11° 42' 46"W	65.38'
C2	154.86	234.21	37°53'05"	S14° 50' 44"W	152.06'

95.193 ACRES
4,146,607 SQ. FT.

I, SCOT LOWE, DO HEREBY CERTIFY THIS PLAT CORRECTLY REPRESENTS A BOUNDARY SURVEY MADE UNDER MY SUPERVISION ON THE GROUND, IN ACCORDANCE WITH THE INFORMATION PROVIDED ME AND CORRECTLY REPRESENTS THE FACTS AS FOUND AT THE TIME OF THIS SURVEY. THERE ARE NO ENCROACHMENTS EXCEPT AS SHOWN HEREON.

WITNESS MY HAND AND SEAL THIS THE 6TH DAY OF MARCH, 2018.
REVISED APRIL 10, 2018–CITY PLANNING LETTER

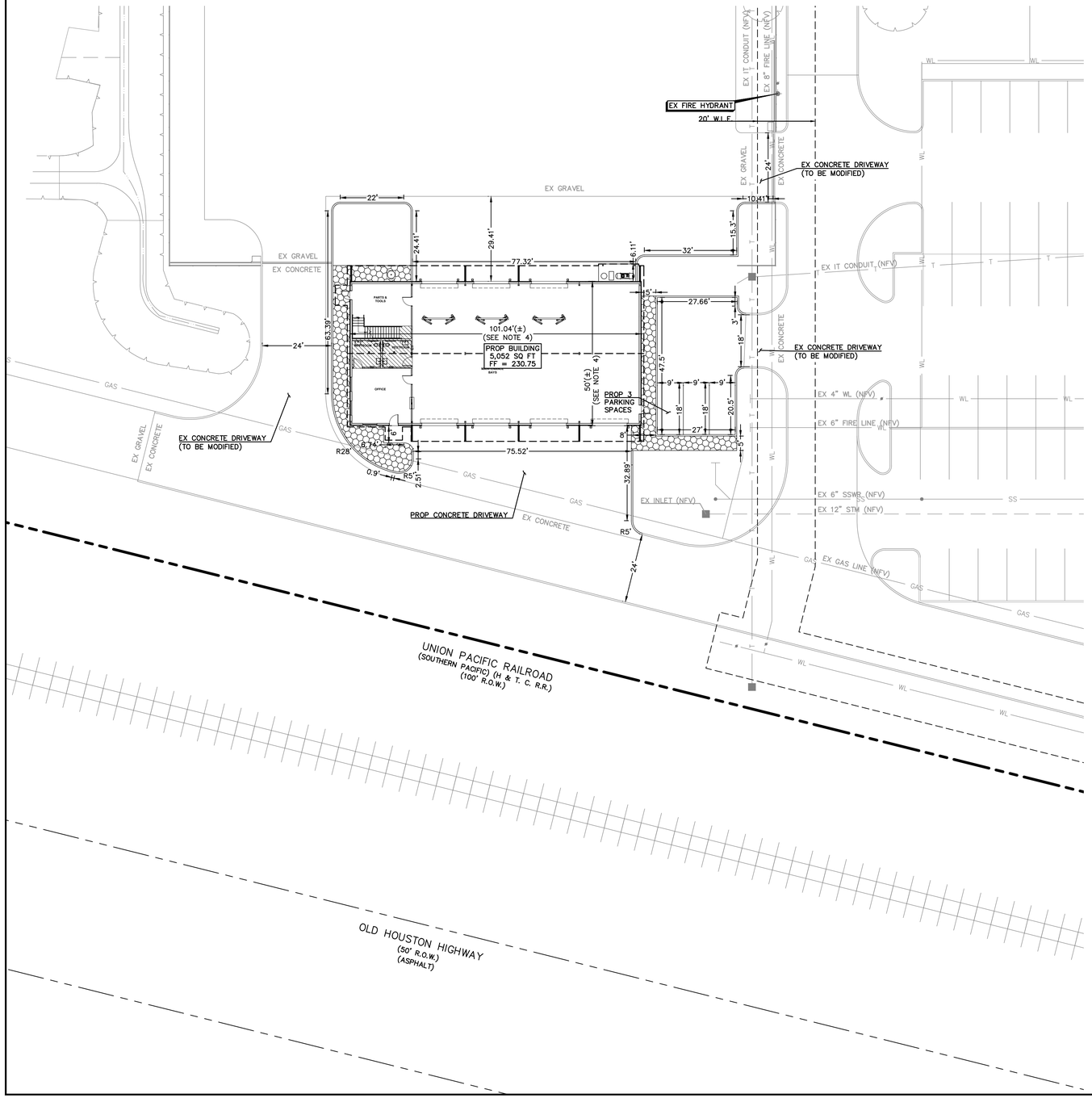
SCOT LOWE
R.P.L.S. NO. 5007

PRELIMINARY

BOUNDARY SURVEY OF 95.193 ACRES IN JUSTO LIENDO, A-41 & IN JARED E. GROCE, A-131 WALLER COUNTY, TEXAS

MARCH 2018 JOB NO. LJAS001–2536–1701A

LJA Surveying, Inc.
7438 Evie Lane
Deer Park, Texas
77536
Phone 281.930.0201
T.B.P.L.S. Firm No. 10193971



0 10 20 40

1 inch = 20 ft.

GRAPHIC SCALE

LEGEND

- PROPOSED BUILDING PERIMETER SIDEWALK
- EX. MANHOLE
- EX. STORM SEWER
- WL — EX. WATER LINE
- SS — EX. SANITARY SEWER LINE
- OH — EX. OVERHEAD POWER LINE
- GAS — EX. UNDERGROUND GAS LINE
- 100 — EX. MAJOR CONTOUR
- 99 — EX MINOR. CONTOUR

GENERAL NOTES

1. PAVEMENT DIMENSIONS AND RADII ARE FACE TO FACE OF CURB, UNLESS OTHERWISE NOTED.
2. RADII ARE 3' UNLESS OTHERWISE NOTED.
3. REFER TO SITE ELECTRICAL PLAN FOR PROPOSED SITE LIGHTING LAYOUT.
4. REFER TO ARCHITECTURAL PLANS FOR EXACT BUILDING/FOUNDATION DIMENSIONS.

MULTIPLE EXISTING PUBLIC AND PRIVATE UTILITY LINES EXIST ON THIS SITE. THE UTILITY LINES SHOWN ON THESE DRAWINGS REFLECT INFORMATION OBTAINED FROM RECORD DRAWINGS AND MAY NOT INCLUDE ALL EXISTING UTILITIES. CONTRACTOR IS TO USE EXTREME CAUTION DURING ALL CONSTRUCTION ACTIVITIES AND IS SOLELY RESPONSIBLE FOR DAMAGE TO EXISTING FACILITIES.

CALL BEFORE YOU DIG
TEXAS ONE CALL PARTICIPANTS REQUEST
72 HOURS NOTICE BEFORE YOU DIG, DRILL
OR BLAST – STOP CALL
TEXAS ONE CALL SYSTEM
1-800-344-8377
IN HOUSTON
(713)-223-4567

No.	REVISIONS	DATE

ALJLindsey
Civil Engineers
18635 N. Eldridge Pkwy, Suite 200
Tomball, TX 77377
281.320.8555
FRN F-11526

STATE OF TEXAS
BRETT T. HANRAHAN
112908
REGISTERED
PROFESSIONAL ENGINEER

11 APRIL 2025

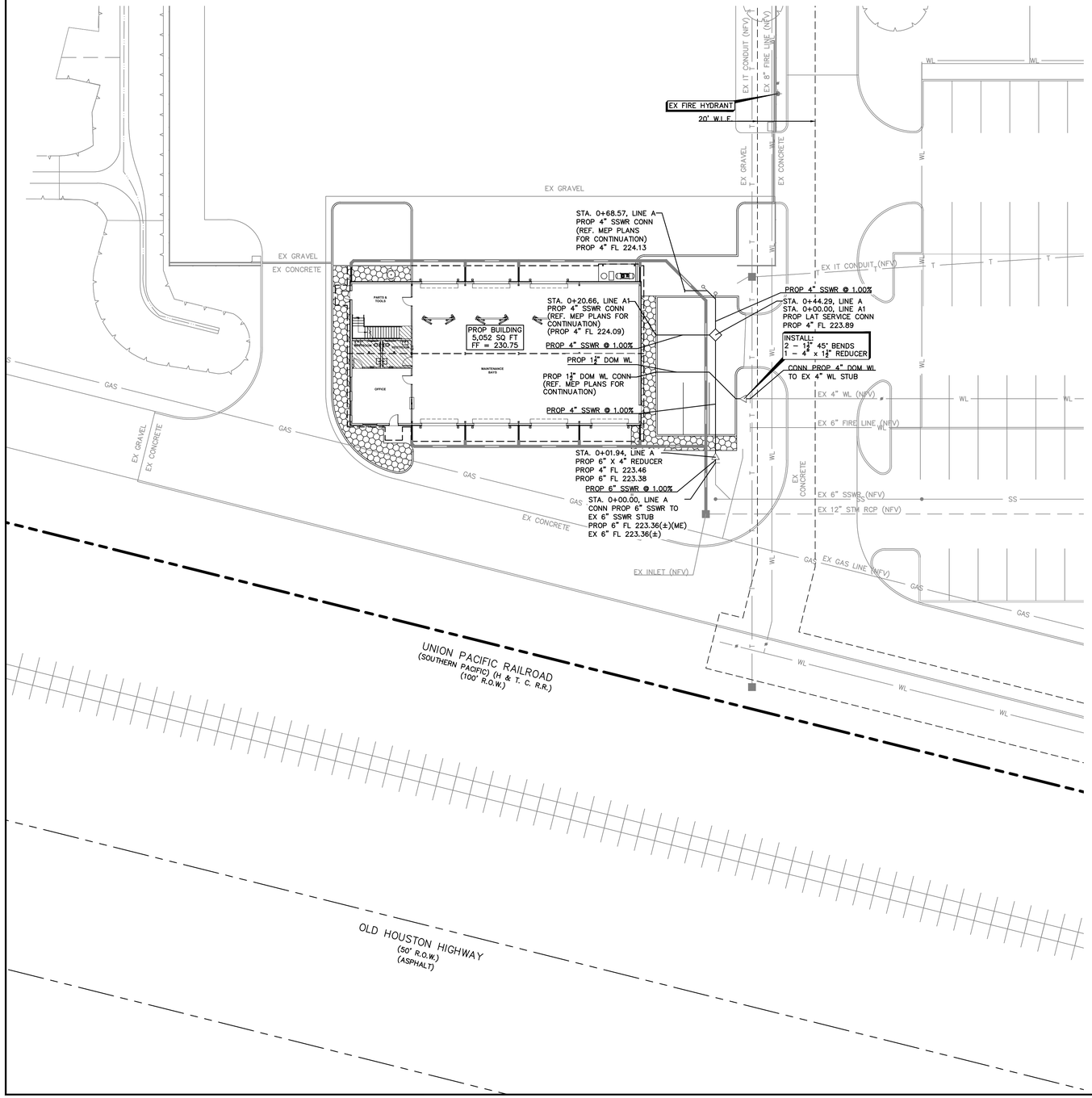
ALJ PROJECT NO. 653.25.CV.030
DATE: APR 2025
SCALE: 1" = 20'
DRAWN BY: SRH
CHECKED BY: BTH

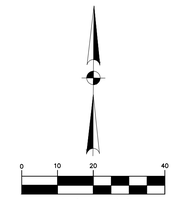
DIMENSION CONTROL PLAN

WALLER COUNTY JUSTICE CENTER GARAGE

CITY OF HEMPSTEAD
WALLER COUNTY, TEXAS 77445

SHEET
C1.0





GRAPHIC SCALE

LEGEND

SS (W/ CLEAN OUT)	PROPOSED SANITARY SEWER
WL	PROPOSED WATER LINE
FIRE	PROPOSED FIRE LINE
	PROPOSED STORM SEWER
	EX. STORM SEWER
WL	EX. WATER LINE
SS	EX. SANITARY SEWER LINE
100	EX. MAJOR CONTOUR
99	EX. MINOR CONTOUR

GENERAL NOTES

1. REFERENCE SANITARY SEWER AND WATER LINE NOTES ON SHEET C0.1 FOR PIPE MATERIAL REQUIREMENTS.
2. REFER TO SITE ELECTRICAL PLAN FOR PROPOSED SITE LIGHTING LAYOUT.
3. REFERENCE MEP PLANS FOR CONTINUATION OF SANITARY AND WATER FACILITIES INSIDE BUILDING.
4. ALL CLEANOUTS LOCATED WITHIN CONCRETE PAVEMENT TO BE TRAFFIC RATED.
5. CONTRACTOR TO VERIFY ALL PROPOSED UTILITY CONNECTIONS FOR BOTH LOCATION AND DEPTH PRIOR TO ORDERING MATERIALS OR COMMENCEMENT OF WORK.
6. FIRE LINE IS SHOWN FOR ALIGNMENT AND POINT OF CONNECTION PURPOSES ONLY. ALL FIRE LINES ARE TO BE DESIGNED AND INSTALLED BY A LICENSED RME–U, INCLUDING BUT NOT LIMITED TO MATERIALS, THRUST BLOCKING, APPURTENANCES, ETC..
7. ALL GRAVITY BASED SANITARY SEWER LINES ARE TO BE CONSTRUCTED FROM POINT OF CONNECTION AND WORKED UP IN ELEVATION.

EXISTING METER AND BACKFLOW NOTE

THE EXISTING 4" DOMESTIC WATER LINE AND THE 6" FIRE LINE STUBBED TO THE SUBJECT DEVELOPMENT ARE LOCATED UPSTREAM OF EXISTING BACKFLOW PREVENTERS AND A DOMESTIC WATER METER NEAR THE ULTIMATE POINT OF CONNECTION TO THE PUBLIC WATERLINE. NO ADDITIONAL APPURTENANCES ARE PROPOSED UNDER THIS SCOPE.

1

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OR BLAST – STOP CALL
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IN HOUSTON
(713)–223–4567

NO.	REVISIONS	DATE

ALJLindsey
Civil Engineers
18635 N. Eldridge Pkwy, Suite 200
Tomball, Texas 77377
281.907.4555
FRN F-11526

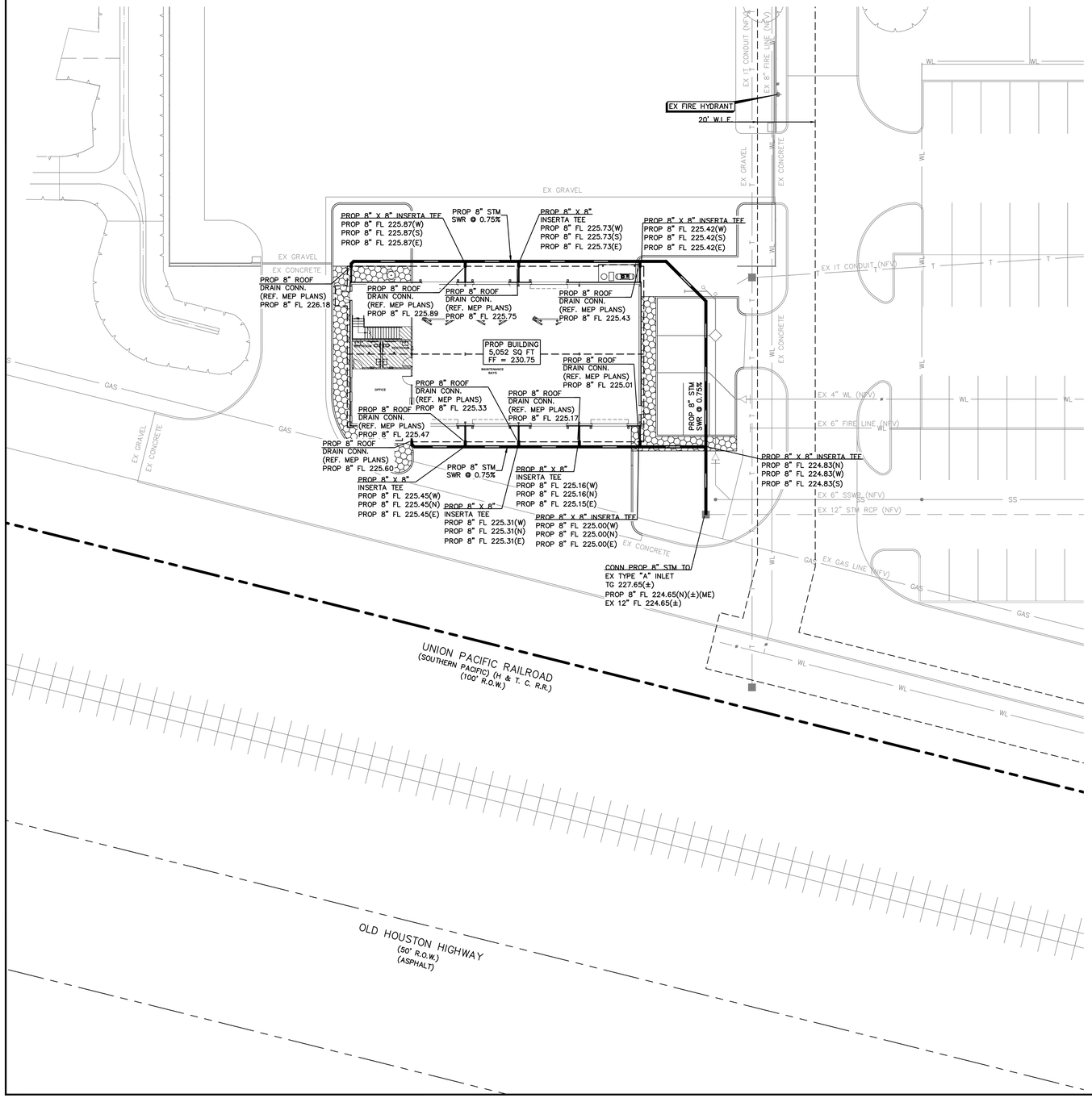
STATE OF TEXAS
BRETT T. HANRAHAN
112908
REGISTERED
PROFESSIONAL ENGINEER
11 APRIL 2025

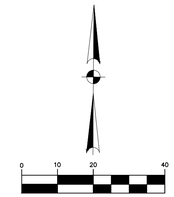
ALJ PROJECT NO. 653.25.CV.030
DATE: APR 2025
SCALE: 1" = 20'
DRAWN BY: SRH
CHECKED BY: BTH

UTILITY PLAN

WALLER COUNTY
JUSTICE CENTER GARAGE
CITY OF HEMPSTEAD
WALLER COUNTY, TEXAS 77445

SHEET
C2.0





GRAPHIC SCALE

LEGEND

- EE — EXTREME EVENT OVERLAND FLOW
- PROPOSED STORM SEWER
- SS — PROPOSED SANITARY SEWER LINE
- WL — PROPOSED WATER LINE
- EX. STORM SEWER
- WL — EX. WATER LINE
- SS — EX. SANITARY SEWER LINE
- 100 — EX. MAJOR CONTOUR
- 99 — EX. MINOR CONTOUR

GENERAL NOTES

1. REFERENCE STORM SEWER NOTES SHEET C0.1 FOR PIPE MATERIAL REQUIREMENTS.
2. REFERENCE MEP PLANS FOR EXACT CONTINUATION OF PROPOSED STORM SEWER INSIDE OF BUILDING.
3. FOR BACKFILL DETAILS, SEE SHEET C7.2.
4. CONTRACTOR TO VERIFY STORM SEWER CONNECTION FOR LOCATION AND DEPTH PRIOR TO ORDERING MATERIALS OR COMMENCEMENT OF WORK.
5. ALL GRAVITY STORM LINES TO BE CONSTRUCTED STARTING FROM THE LOWEST POINT.

MULTIPLE EXISTING PUBLIC AND PRIVATE UTILITY LINES EXIST ON THIS SITE. THE UTILITY LINES SHOWN ON THESE DRAWINGS REFLECT INFORMATION OBTAINED FROM RECORD DRAWINGS AND MAY NOT INCLUDE ALL EXISTING UTILITIES. CONTRACTOR IS TO USE EXTREME CAUTION DURING ALL CONSTRUCTION ACTIVITIES AND IS SOLELY RESPONSIBLE FOR DAMAGE TO EXISTING FACILITIES.

PROJECT WILL NOT ADVERSELY AFFECT ADJOINING PROPERTIES

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112908
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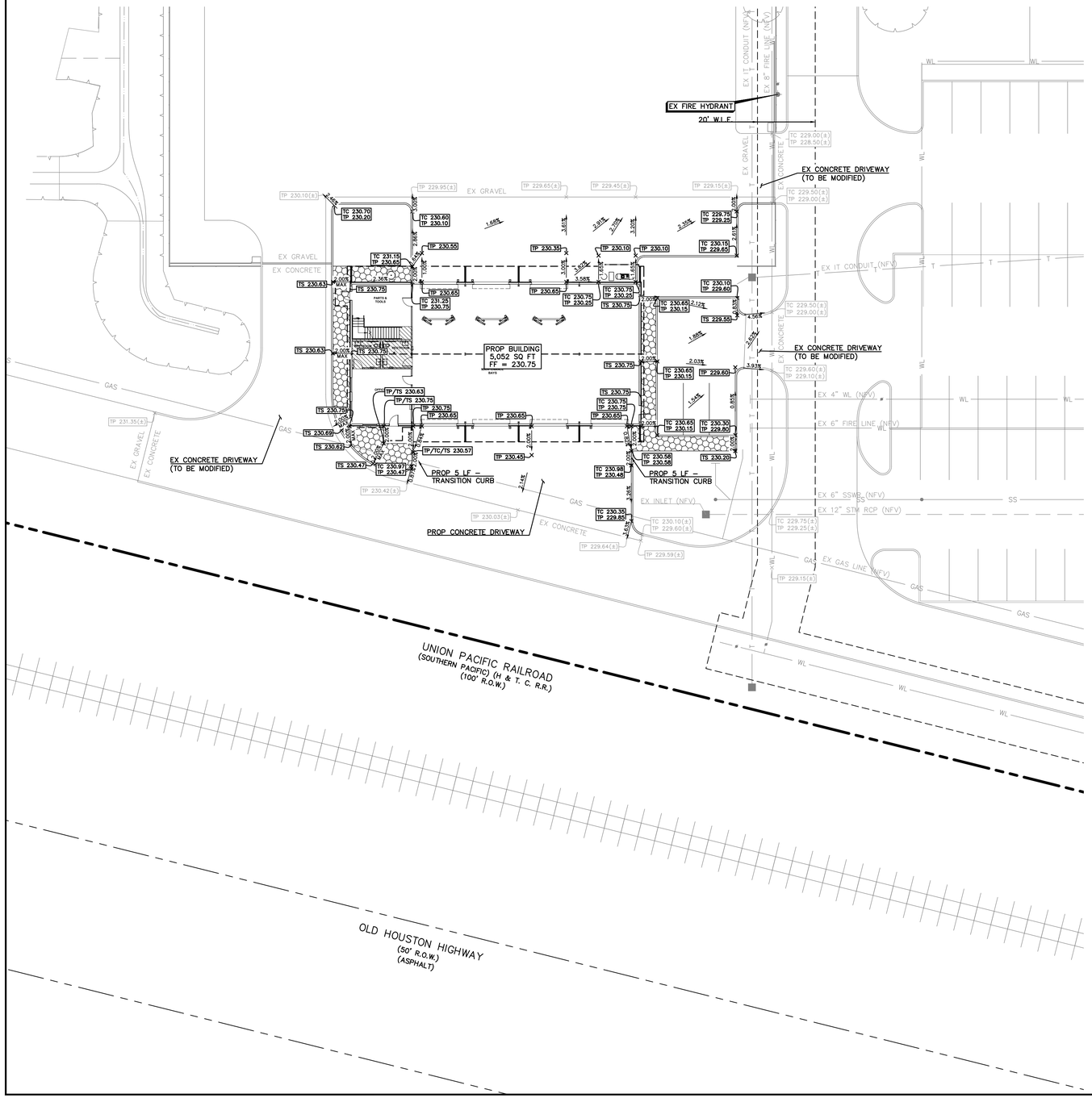
STORM SEWER PLAN

WALLER COUNTY
JUSTICE CENTER GARAGE
CITY OF HEMPSTEAD
WALLER COUNTY, TEXAS 77445

SHEET
C3.0



0 10 20 40

1 inch = 20 ft.

GRAPHIC SCALE

LEGEND

TP	TOP OF PAVEMENT
TC	TOP OF CURB
TS	TOP OF SIDEWALK
FF	FINISHED FLOOR
	EXISTING SANITARY OR STORM SEWER MANHOLE
	PROPOSED HIGH POINT OF PAVEMENT
	DRAINAGE FLOW ARROWS
100	EXISTING MAJOR CONTOUR
99	EXISTING MINOR CONTOUR

GENERAL NOTES

1. REFER TO ARCHITECTURAL PLANS FOR GRADES INSIDE THE BUILDING ENVELOPE.
2. PAVING CONTRACTOR TO CONFIRM AND/OR ADJUST ALL EXISTING AND PROPOSED UTILITIES AND APPURTENANCES TO FINISHED GRADE PRIOR TO PLACEMENT OF ANY PAVING.
3. CONTRACTOR TO MATCH EXISTING TOP OF PAVEMENT AND CURB ELEVATIONS.
4. CONTRACTOR TO INSTALL NEW SIDEWALK IN ADA ACCESSIBLE ROUTES AT MAXIMUM 5% LONGITUDINAL SLOPE AND 2% CROSS SLOPE.

MULTIPLE EXISTING PUBLIC AND PRIVATE UTILITY LINES EXIST ON THIS SITE. THE UTILITY LINES SHOWN ON THESE DRAWINGS REFLECT INFORMATION OBTAINED FROM RECORD DRAWINGS AND MAY NOT INCLUDE ALL EXISTING UTILITIES. CONTRACTOR IS TO USE EXTREME CAUTION DURING ALL CONSTRUCTION ACTIVITIES AND IS SOLELY RESPONSIBLE FOR DAMAGE TO EXISTING FACILITIES.

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281.304.2000
FRN F-11526

STATE OF TEXAS
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11 APRIL 2025

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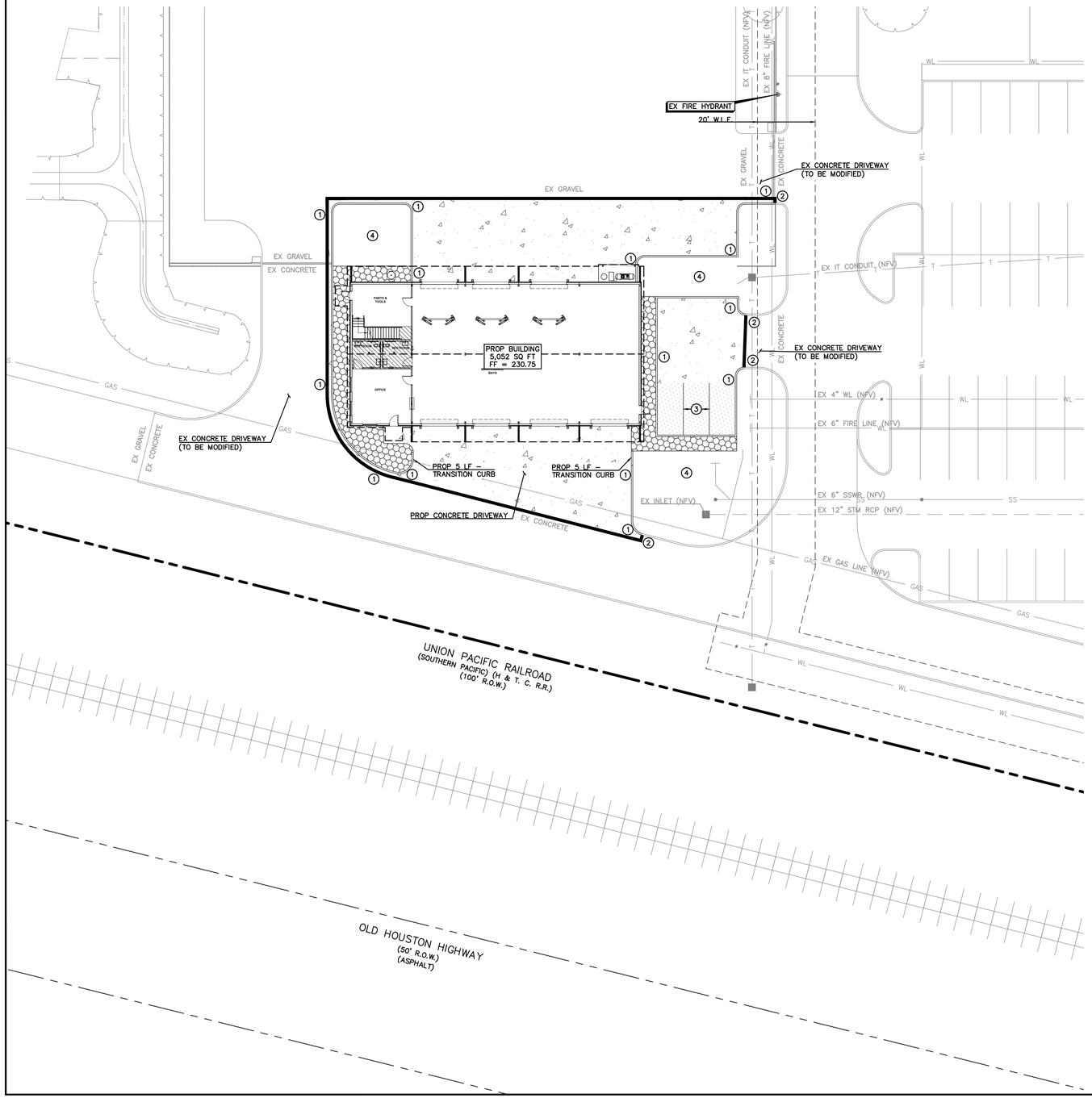
GRADING PLAN

WALLER COUNTY
JUSTICE CENTER GARAGE
CITY OF HEMPSTEAD
WALLER COUNTY, TEXAS 77445

SHEET
C4.0



0 10 20 40

1 inch = 20 ft.

GRAPHIC SCALE

KEYED NOTES

1. PROPOSED 6" MONOLITHIC CONCRETE CURB (SEE DETAIL, SHEET C7.0)
2. TIE PROPOSED CURB INTO EXISTING CURB
3. 90° WHITE PARKING LOT STRIPING
4. LANDSCAPED AREA (REF. LANDSCAPE PLANS)

PROPOSED LIGHT DUTY CONCRETE PAVEMENT WITH STABILIZED SUBGRADE (SEE NOTE 2 BELOW)

PROPOSED MEDIUM DUTY CONCRETE PAVEMENT WITH STABILIZED SUBGRADE (SEE NOTE 2 BELOW)

PROPOSED BUILDING PERIMETER SIDEWALK (REF. ARCHITECTURAL PLANS FOR SURFACE FINISH, SEE GRADING ON SHEET C4.0)

CONCRETE TO CONCRETE PAVEMENT CONNECTION (INCLUDING 2' SAWCUT, EXISTING PAVEMENT REMOVAL, EXISTING CURB REMOVAL, DOWEL INTO EXISTING PAVEMENT, CONCRETE PAVEMENT HEADER AND SEALED JOINTS)

100 EX. MAJOR CONTOUR

99 EX. MINOR CONTOUR

GENERAL NOTES

1. REFER TO SITE ELECTRICAL PLAN FOR PROPOSED SITE LIGHTING LAYOUT.
2. PAVEMENT AND SUBGRADE THICKNESS INCLUDED ON THIS SHEET FOR REFERENCE ONLY. REFER TO GEOTECHNICAL REPORT PREPARED BY BSW ARCHITECTS, INC., DATED AUGUST 21, 2018 (PROJECT NO. H180173).
3. REFER TO IRRIGATION PLAN FOR EXACT LOCATION, SIZE, AND QUANTITY OF IRRIGATION SLEEVES.
4. MAXIMUM CONTROL JOINT SPACING TO BE 15-FT AND EXPANSION JOINT SPACING TO BE 60-FT.
5. CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 4,000 PSI AT 28 DAYS AND ALL STEEL TO BE GRADE 60, UNLESS OTHERWISE SPECIFIED IN GEOTECHNICAL REPORT.
6. PAVING CONTRACTOR TO CONFIRM AND/OR ADJUST ALL EXISTING AND PROPOSED UTILITIES AND APPURTENANCES TO FINISHED GRADE PRIOR TO PLACEMENT OF ANY PAVING.

MULTIPLE EXISTING PUBLIC AND PRIVATE UTILITY LINES EXIST ON THIS SITE. THE UTILITY LINES SHOWN ON THESE DRAWINGS REFLECT INFORMATION OBTAINED FROM RECORD DRAWINGS AND MAY NOT INCLUDE ALL EXISTING UTILITIES. CONTRACTOR IS TO USE EXTREME CAUTION DURING ALL CONSTRUCTION ACTIVITIES AND IS SOLELY RESPONSIBLE FOR DAMAGE TO EXISTING FACILITIES.

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BRETT T. HANRAHAN
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11 APRIL 2025

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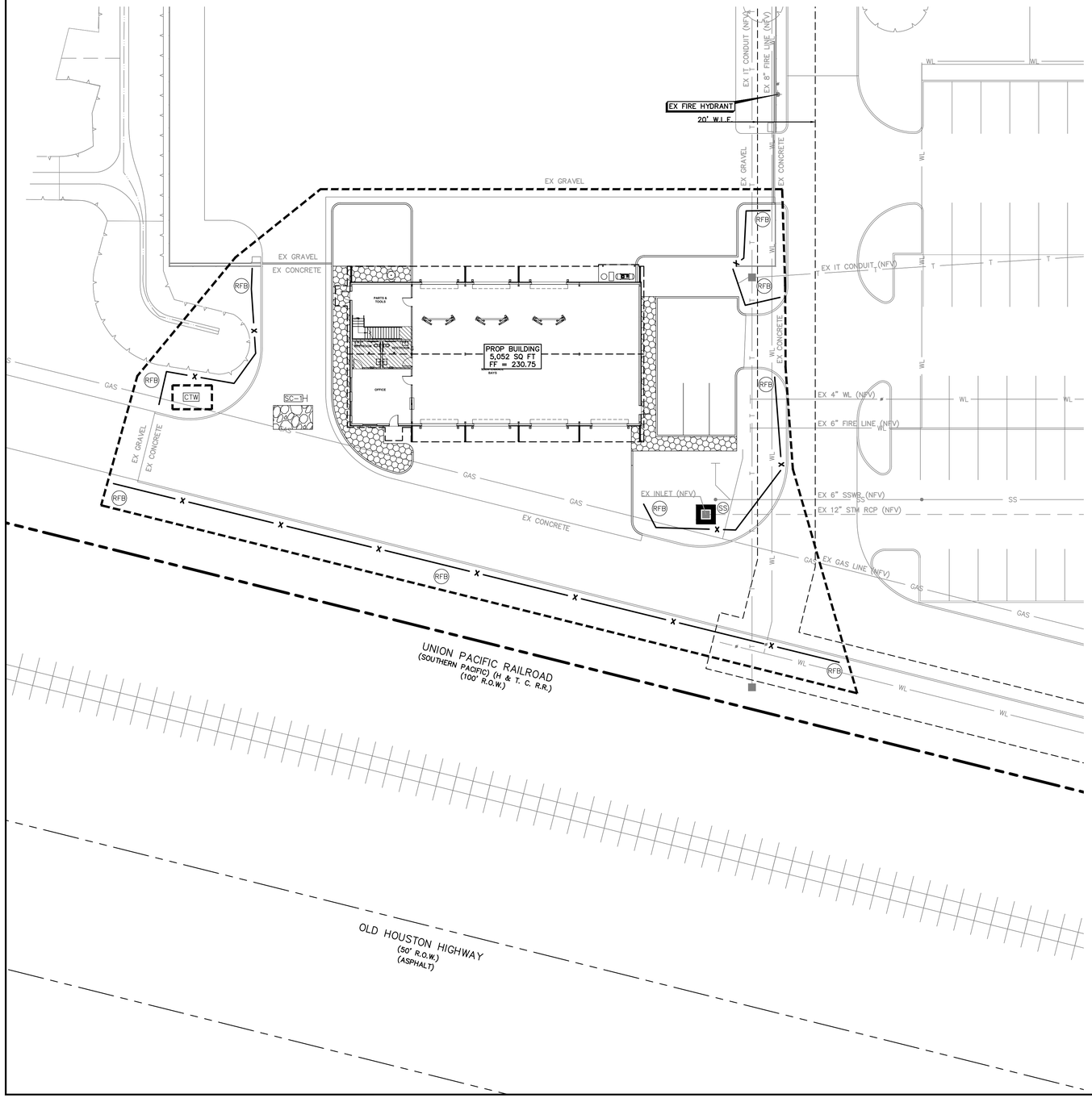
PAVING PLAN

WALLER COUNTY
JUSTICE CENTER GARAGE
CITY OF HEMPSTEAD
WALLER COUNTY, TEXAS 77445

SHEET
C5.0



0 10 20 40

1 inch = 20 ft.

GRAPHIC SCALE

LEGEND

- SC — STABILIZED CONSTRUCTION ENTRANCE (SEE DETAIL, SHEET C7.3)
- CTW — CONCRETE TRUCK WASHOUT (SEE DETAIL, SHEET C7.3)
- RFB — SILT FENCE (SEE DETAIL, SHEET C7.3)
- IPB — INLET PROTECTION BARRIER (SEE DETAIL, SHEET C7.3)
- SS — SILT STACK INLET PROTECTION BARRIER (SEE DETAIL, SHEET C7.3)
- LIMITS OF DISTURBED AREA
- 100 — EX. MAJOR CONTOUR
- 99 — EX. MINOR CONTOUR

GENERAL NOTES

1. CONTRACTOR TO MAINTAIN A CLEAN PROJECT SITE AND ENSURE THAT ALL DEBRIS IS PLACED IN DESIGNATED AREA PER PLANS. ALL SPOIL MATERIAL GENERATED FROM CONSTRUCTION ACTIVITY TO BE HAULED OFFSITE AND DISPOSED IN ACCORDANCE WITH LOCAL LAWS, RULES, AND REGULATIONS.
2. A STABILIZED CONSTRUCTION ENTRANCE IS NOT PROVIDED, AS WE ANTICIPATE THAT CONSTRUCTION TRAFFIC WILL ENTER AND EXIT THE SITE FROM PRIVATE PROPERTY. IF OFFSITE TRACKING IS EXPERIENCED, A STABILIZED CONSTRUCTION ENTRANCE SHALL BE PROVIDED.

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EROSION CONTROL PLAN

WALLER COUNTY
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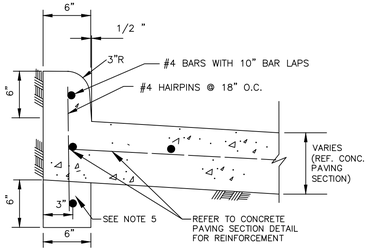
CITY OF HEMPSTEAD
WALLER COUNTY, TEXAS 77445

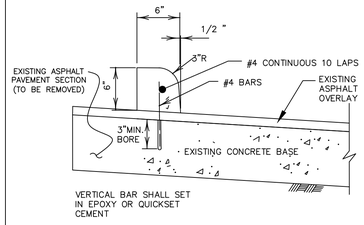
SHEET
C6.0



1. PROVIDE EXPANSION JOINTS AT ALL CURVES, TANGENTS AND CORNERS.
2. SUBGRADE TO EXTEND 1' PAST BACK OF CURB.
3. SACK FINISH EXPOSED SURFACES.
4. FINISH TO BE ACCOMPLISHED BY FLOATING, STEEL TROWELLING AND THEN BRUSHING. HAND FINISH NOT REQUIRED WHEN CURB IS NOT POURED BY A MACHINE, BUT CURB WILL HAVE THE SAME OUTSIDE DIMENSIONS, AND HAVE A BRUSHED FINISH.
5. ADD ONLY IF RECOMMENDED BY GEOTECH REPORT

6" MONOLITHIC CONCRETE CURB

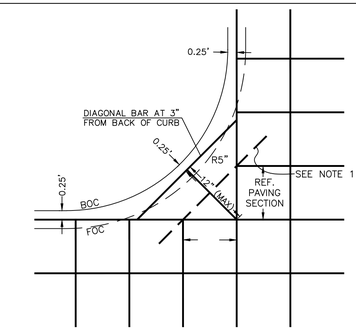
N.T.S.



FINISH TO BE ACCOMPLISHED BY FLOATING,STEEL TROWELLING AND THEN BRUSHING HAND FINISH NOT REQUIRED WHEN CURB IS NOT POURED BY A MACHINE, BUT CURB WILL HAVE THE SAME OUTSIDE DIMENSIONS, AND HAVE A BRUSHED FINISH.

6" DOWELED ON CONCRETE CURB

N.T.S.

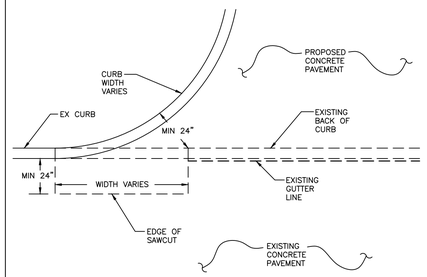


NOTES

1. CONTRACTOR TO ADD EXTRA DIAGONAL BAR IF DISTANCE TO NEAREST CORNER EXCEEDS 12".
2. FOR RADIUS OVER 10', CONTRACTOR TO PLACE LONG BAR AT 3" FROM BACK OF CURB ALONG ENTIRE RADIUS.

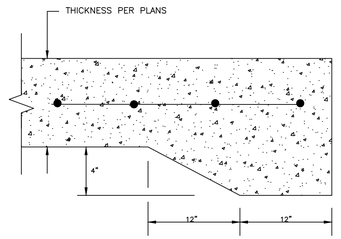
BAR SCHEMATIC FOR SMALL RADIUS CURVE

N.T.S.



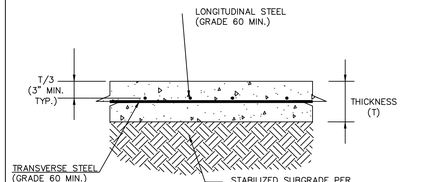
SAWCUT DETAIL

N.T.S.



STANDARD PAVING HEADER

N.T.S.



GENERAL NOTES:

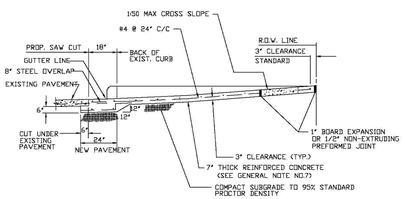
1. SEE GEOTECH REPORT PREPARED BY BSW ARCHITECTS, INC., DATED AUGUST 21, 2018 (PROJECT NO. H180173), FOR ALL RECOMMENDATIONS. THIS IS PROVIDED FOR PICTORIAL REPRESENTATION ONLY.
2. IN THE EVENT THE GEOTECHNICAL REPORT DOES NOT SPECIFY, THE FOLLOWING CRITERIA SHALL BE APPLIED:
   - A. LONGITUDINAL & TRANSVERSE STEEL:
     - LIGHT DUTY: #4 @ 24" O.C.E.W. OR #3 @ 18" O.C.E.W.
     - MEDIUM DUTY: #4 @ 18" O.C.E.W. OR #3 @ 12" O.C.E.W.
     - HEAVY DUTY: #4 @ 18" O.C.E.W.
   - B. SUBGRADE SHALL BE LIME/FLY ASH STABILIZED TO A MIN. DEPTH OF 6" IN CONFORMANCE WITH TXDOT 2004 STANDARD SPECIFICATIONS ITEM 260

CONCRETE PAVING SECTION

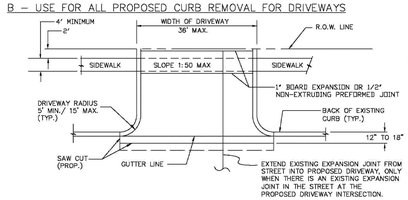
N.T.S.

WHEN A COMMERCIAL DRIVEWAY OR CURB & GUTTER IS CONSTRUCTED, RECONSTRUCTED, REPAIRED OR REGRADED ON COUNTY RIGHT OF WAY USE THE FOLLOWING:

A – USE FOR ALL PROPOSED DRIVES ON CURBED TYPE STREETS:



B – USE FOR ALL PROPOSED CURB REMOVAL FOR DRIVEWAYS



DRIVEWAY ON CURBED CONCRETE OR ASPHALT STREETS
COMMERCIAL AREA

DW-1

NOT TO SCALE

WALLER COUNTY • ROAD AND BRIDGE DEPARTMENT • HEMPSTEAD, TEXAS

GENERAL NOTES:

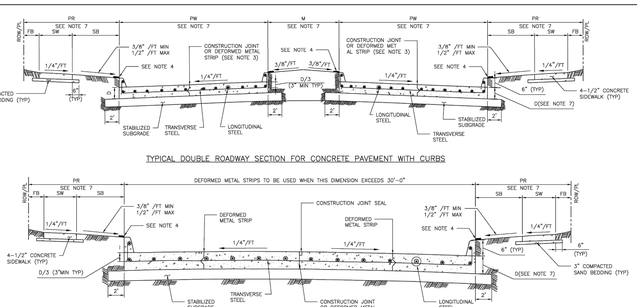
1. PROPOSED DRIVEWAY, SIDEWALK, CURB, GUTTER LINE AND GRADE SHALL MATCH EXISTING STREET.
2. PROPOSED SIDEWALK SHALL BE CONSTRUCTED WITH PORTLAND CEMENT CONCRETE, 4-1/2 SACK CEMENT PER CUBIC YARD, 4-1/2 INCHES THICK AND 4 FEET MINIMUM WIDTH. SEE DRAWING NO.3 FOR ADDITIONAL INFORMATION AND DETAILS.
3. PROPOSED DRIVEWAY SHALL BE CONSTRUCTED WITH PORTLAND CEMENT CONCRETE, 5 SACK CEMENT PER CUBIC YARD, 7 INCHES THICK, FROM PROPOSED SAW CUT TO RIGHT-OF-WAY LINE (PROPERTY LINE).
4. PROPOSED DRIVEWAY REINFORCING STEEL IS TO BE #4 DEFORMED SPACED AT 24 INCHES C.C., EACH WAY, WITH 10 INCHES MINIMUM LAP (6"x12" W5xW4 AS ALTERNATE) FROM PROPOSED SAW CUT TO RIGHT-OF-WAY LINE.
5. PROPOSED DRIVEWAY REINFORCING STEEL IS TO BE TIED TO EXISTING ROADWAY REINFORCING STEEL WITH A MINIMUM LAP OF 8 INCHES.
6. PROPOSED GUTTER LINE IS TO BE MAINTAINED AT FACE OF EXISTING CURB.
7. SAW CUT EXISTING CURB AT EACH END AND KNOCK OUT CURB FROM BEGINNING TO END OF PROPOSED DRIVEWAY.
8. SAW CUT EXISTING PAVEMENT A MINIMUM OF 12 INCHES AWAY FROM FACE OF CURB (GUTTER LINE) AND BREAK OUT TO EXPOSE EXISTING REINFORCEMENT STEEL.
9. COMPACT SUBGRADE FOR PROPOSED DRIVEWAY CONNECTION FROM PROPOSED SAW CUT AT EXISTING PAVEMENT TO RIGHT-OF-WAY LINE, COMPACT TO 95% OF STANDARD PROCTOR DENSITY (+/- 2% OPT. MOISTURE). THE COUNTY ENGINEER RESERVES THE RIGHT TO REQUIRE LABORATORY TESTS TO BE CONDUCTED.
10. IF MORE THAN ONE PROPOSED DRIVEWAY IS BUILT ON THE SAME PROPERTY, SAID DRIVEWAYS SHALL BE SEPARATED BY A MINIMUM DISTANCE OF 20 FEET (ROADWAYS WITH CURBS AND SIDEWALKS).
11. REINFORCING STEEL TO BE ELEVATED A MINIMUM OF 3" ABOVE SUBGRADE. (3 INCHES MANUFACTURED CHAIRS ARE REQUIRED WITH MAXIMUM SPACING OF 72 INCHES C/C EACH WAY).

CONSTRUCTION NOTES FOR SIDEWALKS & DRIVEWAYS ON CURBED TYPE STREETS,

DW-4

NOT TO SCALE

WALLER COUNTY • ROAD AND BRIDGE DEPARTMENT • HEMPSTEAD, TEXAS



TYPICAL DOUBLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

TYPICAL SINGLE ROADWAY SECTION FOR CONCRETE PAVEMENT WITH CURBS

TABLE 1

REINFORCING STEEL BAR SIZES AND SPACINGS FOR VARIOUS PAVEMENT THICKNESSES (D) WITH: MAXIMUM TRANSVERSE CONTROL JOINT SPACING = 20'-0"
MAXIMUM EXPANSION JOINT SPACING = 80'-0"
f'c = 4,000 PSI/28 DAYS AND FY = 60,000 PSI

PAVEMENT THICKNESS 'D' (IN)	PAVEMENT WIDTH 'PW' (FT)	LONGITUDINAL STEEL						TRAVERSE STEEL					
		#4 BARS			#5 BARS			#6 BARS			#4 BARS	#5 BARS	#6 BARS
		NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	NUMBER OF BARS	SPACING (IN)	END BAR SPACING (IN)	SPACING (IN)	SPACING (IN)	SPACING (IN)
6	28	17	20.50	4.00	–	–	–	–	–	–	36	–	–
7	25	17	18.25	4.00	–	–	–	–	–	–	36	–	–
7	35	24	18.00	3.00	–	–	–	–	–	–	36	–	–
7	36	25	17.75	3.00	–	–	–	–	–	–	36	–	–
7	37	25	18.25	3.00	–	–	–	–	–	–	36	–	–
7	41	28	18.00	3.00	–	–	–	–	–	–	36	–	–
7	45	31	17.75	3.75	–	–	–	–	–	–	36	–	–
8	25	20	15.50	2.75	13	24.50	3.0	–	–	–	36	36	–
8	34	27	15.50	2.50	17	25.00	4.0	–	–	–	36	36	–
8	35	27	16.00	2.00	18	24.25	4.0	–	–	–	36	36	–
8	36	28	15.75	3.25	18	25.00	3.0	–	–	–	30	36	–
8	44	24	15.75	4.00	22	24.75	4.0	–	–	–	30	36	–
8	45	35	15.75	2.25	23	24.25	3.0	–	–	–	30	36	–
9	25	22	14.00	3.00	14	22.50	4.0	–	–	–	36	36	–
9	34	31	13.50	2.00	19	22.25	3.5	–	–	–	30	36	–
9	35	31	13.75	3.75	20	21.75	3.5	–	–	–	30	36	–
9	36	32	13.75	3.00	21	21.25	3.5	–	–	–	30	36	–
9	44	39	13.75	2.75	25	21.75	3.0	–	–	–	24	36	–
9	45	39	14.00	4.00	26	21.25	4.5	–	–	–	24	36	–
10	25	24	12.75	3.50	17	18.25	4.0	–	–	–	36	36	36
10	34	33	12.50	4.00	21	20.00	4.0	–	–	–	30	36	36
10	35	34	12.50	3.75	23	18.75	4.0	–	–	–	30	36	36
10	36	35	12.50	3.50	24	18.50	3.0	–	–	–	30	36	36
10	44	44	12.00	4.00	29	18.50	4.5	–	–	–	24	36	36
10	45	44	12.50	3.00	29	19.00	3.0	–	–	–	24	36	36
11	25	27	11.25	3.00	17	18.25	4.0	12	25.75	3	36	36	36
11	34	36	11.50	2.75	24	17.50	2.5	17	25.00	4	24	36	36
11	35	37	11.50	3.00	24	18.00	3.0	17	25.75	4	24	36	36
11	36	40	11.00	2.00	25	17.75	3.0	17	26.50	4	24	36	36
11	44	48	11.125	2.50	30	18.00	3.0	21	26.00	4	24	36	36
11	45	49	11.125	3.00	31	17.75	4.0	22	25.50	3	24	36	36
12	25	–	–	–	19	16.25	4.0	13	24.50	3	36	36	36
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12	35	–	–	–	26	16.50	4.0	19	23.00	3	24	36	36
12	36	–	–	–	27	16.25	4.5	20	22.25	4.5	24	36	36
12	44	–	–	–	33	16.25	4.0	24	22.50	5	24	30	36
12	45	–	–	–	35	15.75	3.0	25	22.25	3	24	30	36

MINIMUM LAP LENGTH (L):
A. # 4 BARS ; L = 22 INCHES
B. # 5 BARS ; L = 27 INCHES
C. # 6 BARS ; L = 32 INCHES

NOTES:

1. THE MAXIMUM WIDTH BETWEEN LONGITUDINAL JOINTS SHALL NOT EXCEED 15'-0".
2. ALL EARTHEN AREAS ARE TO BE HYDROMULCHED UNLESS SHOWN OTHERWISE ON DRAWINGS.
3. CONTRACTOR MAY SAW CUT IN LIEU OF DEFORMED METAL STRIP.
4. USE STRIP OF SOD GRASS TO PREVENT EROSION UNTIL STAND OF GRASS IS ESTABLISHED.
5. AN EQUAL OR LARGER AREA OF WELDED REINFORCEMENT BAR CONFORMING TO ASTM A497, MAY BE SUBSTITUTED FOR REBARS LISTED IN TABLE 1.
6. IF AVAILABLE ROW IS NOT SUFFICIENT TO ACCOMMODATE SIDEWALK WIDTH (SW) ACCORDING TO IDM REQUIREMENTS, ENGINEER SHALL OBTAIN A VARIANCE FROM THE CITY ENGINEER.
7. REFER TO CONTRACT DRAWINGS FOR PAVEMENT WIDTH (PW) AND PAVEMENT THICKNESS (D), MEDIAN (M), PEDESTRIAN REALM (PR), SIDEWALK (SW), FRONTAGE BUFFER (FB), AND SAFETY BUFFER (SB) WIDTHS.

APPROVED BY:	APPROVED BY:
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY:	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02751-01

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CONCRETE PAVEMENT DETAILS

FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE
NOT TO SCALE

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE SEVEN REQUIREMENTS ON THE STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONDITIONS ASSOCIATED WITH THE USE OF THE STANDARD. IT IS THE RESPONSIBILITY OF THE ENGINEER OR AUTHORIZED REPRESENTATIVE WHO USES ACCEPTS RESPONSIBILITY FOR PROPER APPLICATION OF THE STANDARD. ANY ALTERATION OF THE STANDARD BY ANY PERSON OTHER THAN THE ENGINEER OF RECORD OR AUTHORIZED REPRESENTATIVE, AND BY AUTHORIZED ISSUING AUTHORITY, IS THE RESPONSIBILITY OF THAT PERSON ONLY. THE ENGINEER OF RECORD OR AUTHORIZED REPRESENTATIVE AND BY AUTHORIZED ISSUING AUTHORITY ASSUMES NO RESPONSIBILITY FOR DAMAGES RESULTING FROM ANY SUCH ALTERATION OF THE STANDARD BY ANY PERSON OTHER THAN THE ENGINEER OF RECORD OR AUTHORIZED REPRESENTATIVE AND BY AUTHORIZED ISSUING AUTHORITY.

No.	REVISIONS	DATE

ALJ Lindsey
Civil Engineers
18635 N. Eldridge Pkwy, Suite 200
Tomball, TX 77377
281.251.2000
FRN F-11526

BRETT T. HANRAHAN
112908
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS
11 APRIL 2025

ALJ PROJECT NO. 653.25.CV.030
DATE: APR 2025
SCALE: N/A
DRAWN BY: SRH
CHECKED BY: BTH

CONSTRUCTION DETAILS (1 OF 4)

WALLER COUNTY
JUSTICE CENTER GARAGE
CITY OF HEMPSTEAD
WALLER COUNTY, TEXAS 77445

SHEET
C7.0

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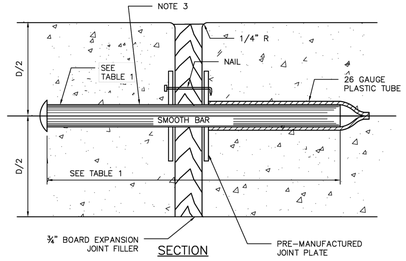
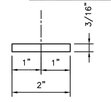


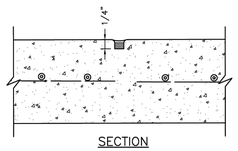
SECTION

DOWEL TYPE EXPANSION JOINT



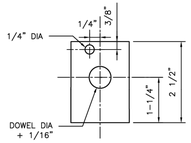
PLAN VIEW

JOINT PLATE



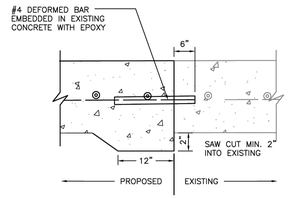
SECTION

CONTROL JOINT



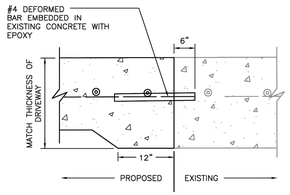
ELEVATION VIEW

JOINT PLATE



SECTION

SIDEWALK TO EXISTING SIDEWALK



SECTION

SIDEWALK TO EXISTING DRIVEWAY

TABLE 1

PAVEMENT THICKNESS (IN)	DOWEL SIZES AND SPACINGS		
	DIAMETER (IN)	LENGTH (IN)	SPACING (IN)
4 1/2	1/2	18	12
5	1/2	18	12
6	3/4	18	12
7	1	18	12

NOTES:

1. STEEL TO MEET ASTM STANDARD SPECIFICATIONS FOR CONCRETE REINFORCING BARS.
2. EXPANSION JOINT TO BE PLACED AT THE END OF EACH CURB RADIUS AND SPACED AT A MAXIMUM DISTANCE OF 3 FEET MAXIMUM SPACING FOR CONTROL JOINTS SHALL BE 5 FEET.
3. CENTER DOWEL HORIZONTALLY ON JOINT.
4. CENTER DOWEL VERTICALLY IN CONCRETE AS NEEDED TO MAINTAIN A 2 INCH MINIMUM COVER.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

SIDEWALK EXPANSION AND CONSTRUCTION JOINT DETAILS

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukul Tanwar — CITY ENGINEER
DocuSigned by: Khang Nguyen — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Stockbridge — DIRECTOR OF HPW

EFF DATE: NOV-27-2023 | DWG NO: 02752-02

DISCLAIMER:
THE USE OF THIS STANDARD IS GOVERNED BY THE TEXAS ENGINEERING PRACTICE ACT. THE DESIGN REQUIREMENTS ON THIS STANDARD DO NOT PURPORT TO ADDRESS ALL OF THE SAFETY CONCERNS ASSOCIATED WITH THEIR USE. THE ENGINEER OF RECORD (EOR) IS TO REVIEW THESE DESIGN REQUIREMENTS AND BY AUTHORIZING THEIR USE ACCEPTS RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE. ANY MODIFICATIONS TO THESE DESIGN REQUIREMENTS BY THE EOR SHALL BE SUBMITTED TO THE CITY OF HOUSTON FOR REVIEW AND APPROVAL. WHATSOEVER, THE CITY OF HOUSTON ASSUMES NO RESPONSIBILITY FOR INCORRECT RESULTS OR DAMAGES RESULTING FROM ITS USE.

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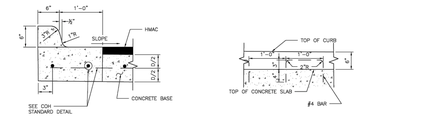
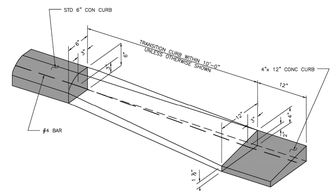


ESPLANADE CURB CONNECTED TO CONCRETE BASE

ALTERNATE CONCRETE CURB REINFORCEMENT

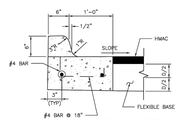


CURB TRANSITION

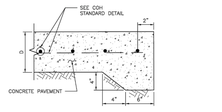
(SEE NOTES)

4"x12" MONOLITHIC AND TRANSITION CURB NOTES:

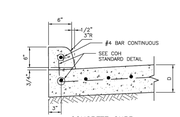
1. 6-INCH CONCRETE CURB TO BE CONSTRUCTED ON ALL ESPLANADES, ISLANDS, NON-RESIDENTIAL STREETS, AND RESIDENTIAL STREETS.
2. TRANSITIONS FROM 6- INCH CONCRETE CURB TO 4-INCH x 12-INCH CONCRETE CURB TO BE ACCOMPLISHED WITHIN 10 FEET, UNLESS OTHERWISE SHOWN. IF THIS 10-FEET TRANSITION CURB IS NOT POURED MONOLITHICALLY WITH THE PAVEMENT, THEN REINFORCING STEEL AS SHOWN IN "4-INCH x 12-INCH TRANSITION CURB" IS TO BE INSTALLED.



ESPLANADE CURB CONNECTED TO FLEXIBLE BASE

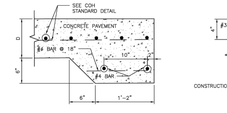


STANDARD CONCRETE PAVING HEADER

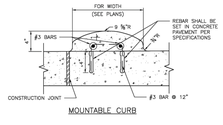


CONCRETE CURB

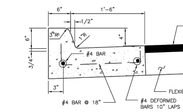
WHEN CONCRETE CURB IS TO BE PLACED EXISTING CONCRETE USE BASE #4 BAR @ 18x10" LONG, DOWELED AND SET IN EPOXY GROUT. SET #4 DOWEL BARS, 25" LONG AT 12" C-C WHEN PAVEMENT SECTION POURED.



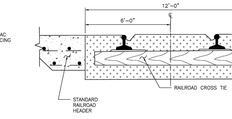
STANDARD RAILROAD HEADER



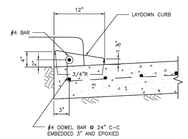
MOUNTABLE CURB



MONOLITHIC CURB AND GUTTER

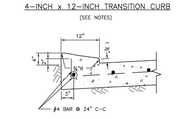


STANDARD RAILROAD CROSSING – SINGLE TRACK



4-INCH x 12-INCH TRANSITION CURB

(SEE NOTES)



4-INCH x 12-INCH MONOLITHIC CURB

(SEE NOTES)

APPROVED BY:	APPROVED BY:
Sukul Tanwar	Khang Nguyen
CITY ENGINEER	CITY TRAFFIC ENGINEER
APPROVED BY: Carl Stockbridge	
DIRECTOR OF HOUSTON PUBLIC WORKS	
EFF DATE: NOV-27-2023	DWG NO: 02771-01

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

CURB, CURB AND GUTTER AND HEADER DETAILS

FOR CITY OF HOUSTON USE ONLY

DRAWING SCALE

NOT TO SCALE

DISCLAIMER:
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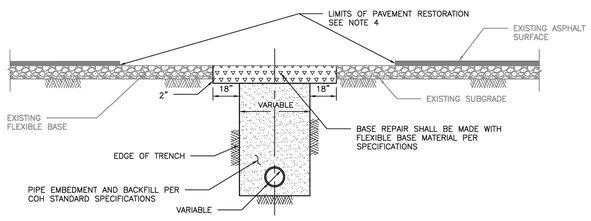
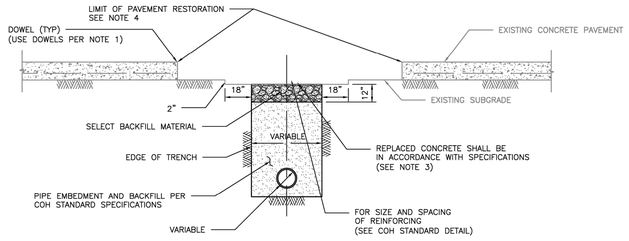


ELEVATION A

REPAIR OF FLEXIBLE BASE PAVEMENT



ELEVATION B

REPAIR OF REINFORCED CONCRETE PAVEMENT

NOTES:

1. EXPOSE 15" OF REINFORCING STEEL AT PROPOSED SAWED JOINT. IF NO REINFORCING STEEL EXISTS, USE HORIZONTAL DOWELS. HORIZONTAL DOWELS SHALL BE #6 BAR, 24" LONG, 24" C-C, DRILLED AND EMBEDDED 8" INTO THE CENTER OF THE EXISTING SLAB. WITH "PO ROC" OR EQUAL.
2. IF REINFORCED CONCRETE IS OVERLAYED WITH ASPHALT, REPLACE WITH 2" MIN HMAC SURFACING.
3. REFER TO STANDARD DETAIL 02751-01 FOR REINFORCING STEEL REQUIREMENTS.
4. REFER TO STANDARD DETAIL 02951-01 THROUGH 03 FOR PAVEMENT RESTORATION LIMITS.

CITY OF HOUSTON
HOUSTON PUBLIC WORKS STANDARD

PAVEMENT REPAIR DETAIL FOR STREET CUTS

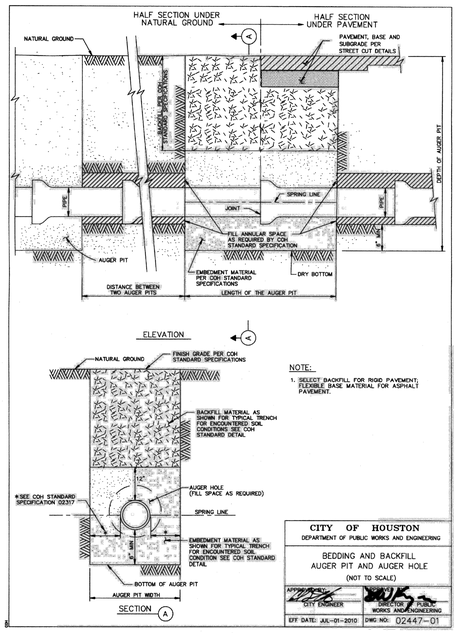
(FLEX-BASE PAVEMENT & CONCRETE PAVEMENT)

(SCALE: NOT TO SCALE)

APPROVED BY:

DocuSigned by: Sukul Tanwar — CITY ENGINEER
DocuSigned by: Khang Nguyen — CITY TRAFFIC ENGINEER
DocuSigned by: Carl Stockbridge — DIRECTOR OF HPW

EFF DATE: NOV-27-2023 | DWG NO: 02951-04



NOTE:

1. SELECT BACKFILL FOR RIGID PAVEMENT, FLEXIBLE BASE MATERIAL FOR ASPHALT PAVEMENT.

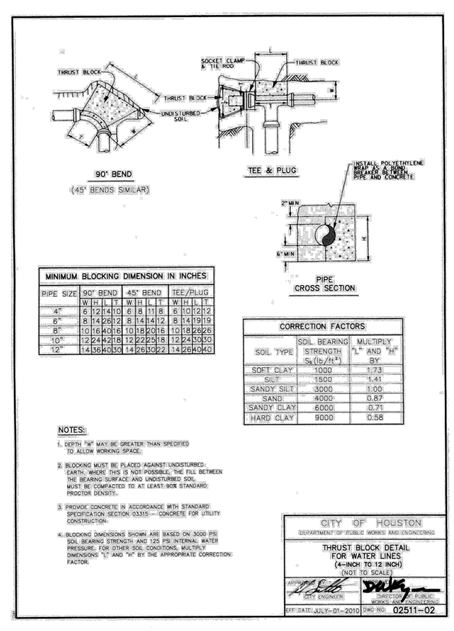
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

BEDDING AND BACKFILL AUGER PIT AND AUGER HOLE

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — DIRECTOR DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2010 | DWG NO: 02447-01



MINIMUM BLOCKING DIMENSION IN INCHES:												
PIPE SIZE	90° BEND				45° BEND				TEE/PLUG			
	W	H	L	T	W	H	L	T	W	H	L	T
4"	6	12	14	10	6	8	11	8	6	10	12	12
6"	8	14	26	12	8	14	14	12	8	14	19	19
8"	10	16	40	16	10	18	20	16	10	18	26	26
10"	12	24	42	18	12	22	25	18	12	24	30	30
12"	14	36	45	30	14	26	30	22	14	26	40	40

CORRECTION FACTORS:		
SOIL TYPE	SOIL BEARING STRENGTH (lb/ft²)	MULTIPLY "L" AND "H" BY
SOFT CLAY	1000	1.73
SILT	1500	1.41
SANDY SILT	3000	1.00
SAND	4000	0.87
SANDY CLAY	6000	0.71
HARD CLAY	9000	0.58

NOTES:

1. DEPTH "H" MAY BE GREATER THAN SPECIFIED TO ALLOW WORKING SPACE.
2. BLOCKING MUST BE PLACED AGAINST UNDISTURBED EARTH. WHERE THIS IS NOT POSSIBLE, THE FILL BETWEEN THE BEARING SURFACE AND UNDISTURBED SOIL MUST BE COMPACTED TO AT LEAST 90% STANDARD PROCTOR DENSITY.
3. PROVIDE CONCRETE IN ACCORDANCE WITH STANDARD SPECIFICATION SECTION 03305 – CONCRETE FOR UTILITY CONSTRUCTION.
4. BLOCKING DIMENSIONS SHOWN ARE BASED ON 3000 PSF SOIL BEARING STRENGTH AND 125 PSI INTERNAL WATER PRESSURE. FOR OTHER SOIL CONDITIONS, MULTIPLY DIMENSIONS "L" AND "H" BY THE APPROPRIATE CORRECTION FACTOR.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

THRUST BLOCK DETAIL FOR WATER LINES (4-INCH TO 12 INCH)

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — DIRECTOR DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2010 | DWG NO: 02511-02

ALJ Lindsey
Civil Engineers
18635 N. Eldridge Pkwy, Suite 200
Tomball, Texas 77377
281.516.8600
FRN F-11526

BRETT T. HANRAHAN
112908
REGISTERED PROFESSIONAL ENGINEER
STATE OF TEXAS

11 APRIL 2025

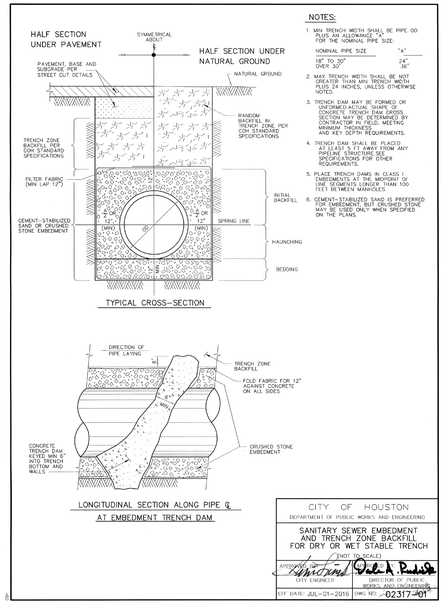
NO.	REVISIONS	DATE

ALJ PROJECT NO. 653.25.CV.030
DATE: APR 2025
SCALE: N/A
DRAWN BY: SRH
CHECKED BY: BTH

WALLER COUNTY
JUSTICE CENTER GARAGE
CITY OF HEMPSTEAD
WALLER COUNTY, TEXAS 77445

CONSTRUCTION DETAILS (2 OF 4)

SHEET
C7.1



NOTES:

1. MIN TRENCH WIDTH SHALL BE PIPE OD PLUS 16 INCHES, UNLESS OTHERWISE NOTED FOR THE NOMINAL PIPE SIZE:

NOMINAL PIPE SIZE	"A"
18" TO 30"	24"
OVER 30"	36"

2. MAX TRENCH WIDTH SHALL BE NOT GREATER THAN MIN TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.
3. TRENCH DAM MAY BE FORMED OR UNFORMED ACTUAL SHAPE OF UNFORMED TRENCH DAM AT EACH SECTION MAY BE DETERMINED BY CONTRACTOR IN FIELD, MEETING MINIMUM THICKNESS AND KEY DEPTH REQUIREMENTS.
4. TRENCH DAM SHALL BE PLACED IN CLASS I EMBEDMENTS AWAY FROM ANY AVAILABLE STRUCTURES. SEE SPECIFICATIONS FOR OTHER REQUIREMENTS.
5. PLACE TRENCH DAMS IN CLASS I EMBEDMENTS AT THE MIDPOINT OF LINE SEGMENTS LONGER THAN 100 FEET BETWEEN MANHOLES.
6. CEMENT-STABILIZED SAND IS PREFERRED FOR EMBEDMENT, BUT CRUSHED STONE MAY BE USED ONLY WHEN SPECIFIED ON THE PLANS.

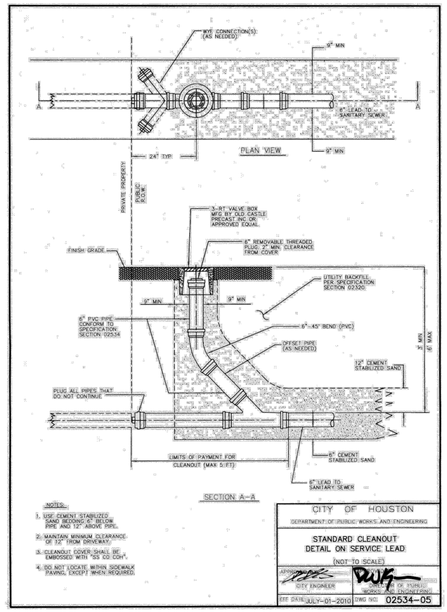
CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

SANITARY SEWER EMBEDMENT AND TRENCH ZONE BACKFILL FOR DRY OR WET STABLE TRENCH

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JUL-01-2016 DWG NO.: 02317-01



NOTES:

1. USE CEMENT STABILIZED SAND BEDDING AT BELOW PIPE AND 12" ABOVE PIPE.
2. MAINTAIN MINIMUM CLEARANCE OF 12" FROM DRIVEWAY.
3. CLEANOUT COVER SHALL BE EMBOSSED WITH "SS CO COH".
4. DO NOT LOCATE WITHIN SIDEWALK PAVING, EXCEPT WHEN REQUIRED.

CITY OF HOUSTON
DEPARTMENT OF PUBLIC WORKS AND ENGINEERING

STANDARD CLEANOUT DETAIL ON SERVICE LEAD

(NOT TO SCALE)

APPROVED BY: CITY ENGINEER — APPROVED BY: DIRECTOR OF PUBLIC WORKS AND ENGINEERING

EFF DATE: JULY-01-2010 DWG NO: 02534-05

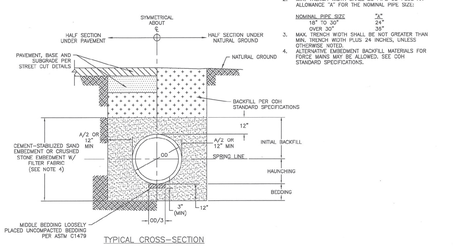
02317-03

NOTES:

1. THIS DETAIL MAY BE USED ONLY FOR DRY STABLE TRENCH CONDITIONS PER COH STANDARD. SEE COH STANDARD SPECIFICATION FOR REQUIREMENTS IN OTHER CONDITIONS.
2. MIN. TRENCH WIDTH SHALL BE PIPE OD PLUS AN ALLOWANCE "A" FOR THE NOMINAL PIPE SIZE:

NOMINAL PIPE SIZE	"A"
18" TO 30"	24"
OVER 30"	36"

3. MAX. TRENCH WIDTH SHALL BE NOT GREATER THAN MIN. TRENCH WIDTH PLUS 24 INCHES, UNLESS OTHERWISE NOTED.
4. ALTERNATIVE EMBEDMENT BACKFILL MATERIALS FOR FORCE MAINS MAY BE ALLOWED, SEE COH STANDARD SPECIFICATIONS.

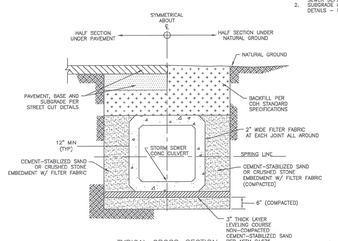


SANITARY OR STORM SEWER BEDDING AND BACKFILL FOR DRY STABLE TRENCH
NTS

02317-05

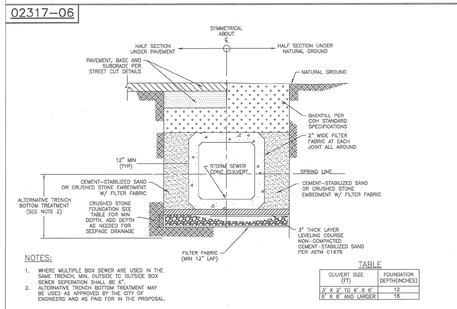
NOTES:

1. WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN. OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
2. SUBGRADE AND PAVEMENT FOR STREET CUT DETAILS = 02951.



PRECAST CONCRETE BOX STORM SEWER
BEDDING AND BACKFILL FOR DRY STABLE TRENCH
NTS

02317-06



NOTES:

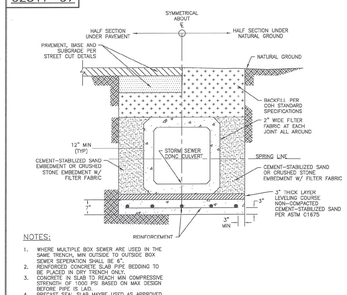
1. WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN. OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
2. ALTERNATIVE TRENCH BOTTOM TREATMENT MAY BE USED AS APPROVED BY THE CITY OF ENGINEERS AND AS FND FOR IN THE PROPOSAL.

TABLE

CULVERT SIZE (IT)	FOUNDATION DEPTH(INCHES)
3' X 3' TO 8' X 8'	12
8' X 8' AND LARGER	18

PRECAST CONCRETE BOX STORM SEWER
BEDDING AND BACKFILL FOR WET STABLE TRENCH
NTS

02317-07



NOTES:

1. WHERE MULTIPLE BOX SEWER ARE USED IN THE SAME TRENCH, MIN. OUTSIDE TO OUTSIDE BOX SEWER SEPERATION SHALL BE 6".
2. REINFORCED CONCRETE SLAB PIPE BEDDING TO BE PLACED IN DRY TRENCH ONLY.
3. CONCRETE IN SLAB TO REACH MIN COMPRESSIVE STRENGTH OF 1000 PSI BASED ON MAX DESIGN STRENGTH OF PIPE.
4. PRECAST SEAL SLAB MAYBE USED AS APPROVED BY CITY ENGINEER.

PRECAST CONCRETE BOX STORM SEWER
BEDDING AND BACKFILL WITH SEAL SLAB
NTS

FIRM INFORMATION | ENGINEER'S SEAL

CITY OF HOUSTON
HOUSTON PUBLIC WORKS

STORM SEWER
02317-03 THROUGH 07

APPROVED BY: CITY ENGINEER — APPROVED BY: DEPUTY DIRECTOR

APPROVED BY: DIRECTOR

EFFECTIVE DATE: JUL-01-2019

FOR CITY OF HOUSTON USE ONLY

SHEET NO.

No.	REVISIONS	DATE

ALJ Lindsey
Civil Engineers
18635 N. Eldridge Pkwy, Suite 200
Tomball, TX 77377
281.907.4000
FRN F-11526

STATE OF TEXAS
BRETT T. HANRAHAN
112908
REGISTERED
PROFESSIONAL ENGINEER

11 APRIL 2025

ALJ PROJECT NO. 653.25.CV.030
DATE: APR 2025
SCALE: N/A
DRAWN BY: SRH
CHECKED BY: BTH

CONSTRUCTION DETAILS (3 OF 4)

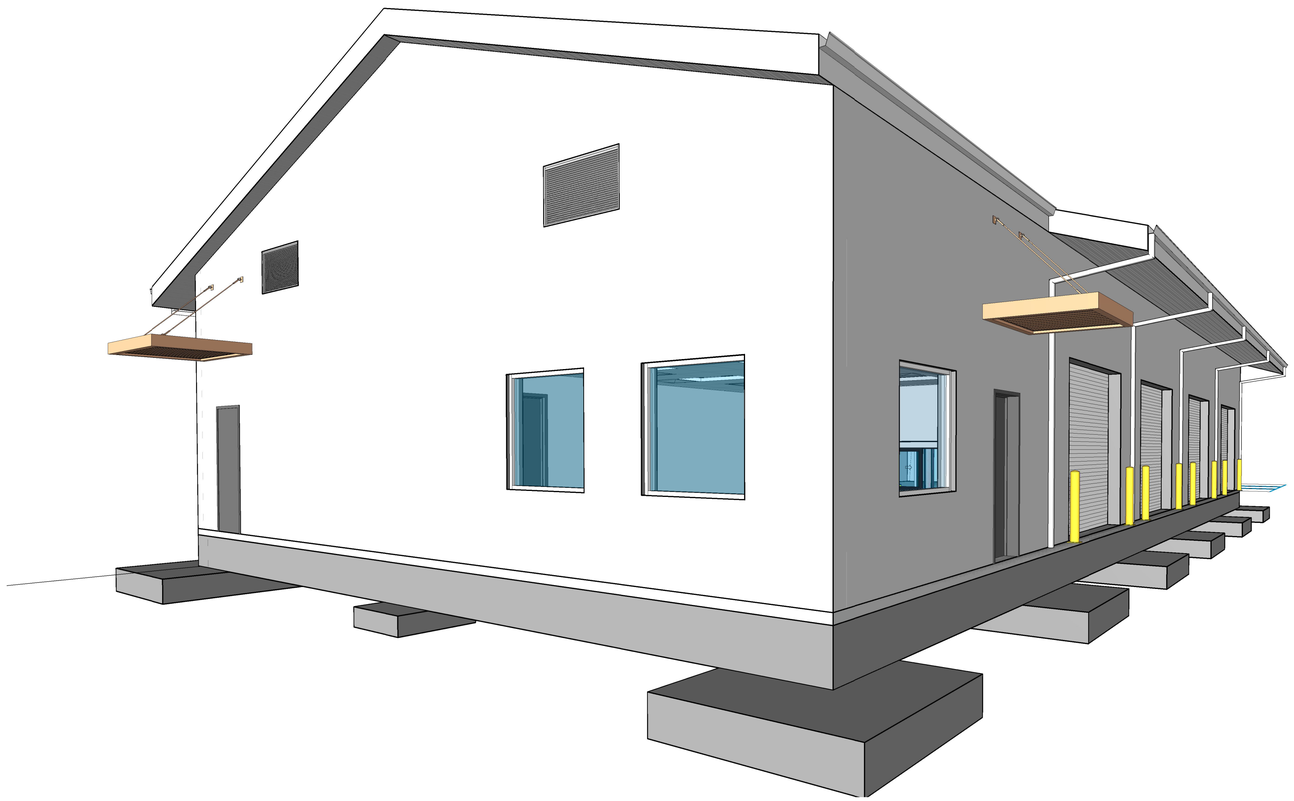
WALLER COUNTY
JUSTICE CENTER GARAGE
CITY OF HEMPSTEAD
WALLER COUNTY, TEXAS 77445

SHEET
C7.2

WALLER COUNTY JAIL GARAGE

WALLER COUNTY, TX

JOB #25033S



STRUCTURAL ENGINEER

SkyDancing
CONSULTANTS ASSOCIATES, INC.

12511 EMILY COURT,
SUGAR LAND, TEXAS 77478
SCAENGINEERS.COM
713-779-7252

Drawing List	
Sheet Number	Sheet Name
S0.00	Cover Sheet
S0.10	General Notes
S0.11	General Notes
S0.12	General Notes
S0.13	General Notes
S1.10	Foundation and Mezzaning Framing Plan
S3.10	Typical Foundation Sections
S3.20	Foundation Sections
S3.21	Framing Sections
S4.01	Typical Metal Stud Framing Details
S4.02	Metal Stud Framing Details - Load Bearing

- STRUCTURAL SHOP DRAWINGS SUBMITTED ELECTRONICALLY ARE TO BE EMAILED TO: **shops@scaengineers.com**
- RFI'S AND FIELD ISSUES SUBMITTED ELECTRONICALLY ARE TO BE EMAILED TO: **rfi@scaengineers.com**
- STRUCTURAL FIELD REPORTS ARE TO BE EMAILED TO: **fieldreports@scaengineers.com**

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TEXAS FIRM #24110

WALLER COUNTY
JAIL GARAGE
WALLER COUNTY, TX

STATE OF TEXAS
WESTLEY J. HINTON
100622
LICENSED PROFESSIONAL ENGINEER
4/11/25

REV	DATE:	ISSUED FOR:
	03-28-2025	PROGRESS SET
	04-11-2025	100% CD SET

PROJECT NO.: 25033S
DRAWN BY: WF/TP QC: WH

Cover Sheet

S0.00

4/11/2025 1:32:44 PM P:\25\25033S Waller County Sheriffs Dept Maintenance Building\Structural BIM Model\25033S Waller County Jail Garage R24.rvt

ABBREVIATIONS

&	AND
L	ANGLE
@	AT
℄	CENTERLINE
Ø	DIAMETER OR ROUND
#	POUND OR NUMBER
AB	ANCHOR BOLT
ABV	ABOVE
ADJ	ADJACENT
AFF	ABOVE FINISHED FLOOR
ALT	ALTERNATE
ANCH	ANCHOR
APPROX	APPROXIMATE
ARCH	ARCHITECTURAL OR ARCHITECT
B-	BEAM TENDON (TENDON #)
	OR BOTTOM
BALC	BALCONY
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BEAM
BOT	BOTTOM
BRD	BOARD
BRG	BEARING
CANT	CANTILEVER
CGS	CENTER OF GRAVITY OF STRAND
CIP	CAST IN PLACE
CJ	CEILING JOIST OR CONTROL JOINT
CL	CENTER LINE
CLG	CEILING
CLR	CLEAR
CLT	CROSS LAMINATED TIMBER
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUOUS
CONST JT	CONSTRUCTION JOINT
CORR	CORRIDOR
CTR	CENTER
DB	DROPPED BEAM
DBA	DEFORMED BAR ANCHOR
DBL	DOUBLE
DEG	DEGREE
DTL	DETAIL
DF	DRAG FORCE OR DOUG FIR
DFL	DOUG FIR LARCH
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DN	DOWN
DT	DRAG TRUSS
DWG	DRAWING
DWL	DOWEL
EA	EACH
EJ	EXPANSION JOINT
ELEV	ELEVATION
EMBED	EMBEDMENT
EQ	EQUAL
EW	EACH WAY
EXIST	EXISTING
EXP	EXPANSION
EXT	EXTERIOR
FB	FLUSH BEAM
FD	FLOOR DRAIN
FDN	FOUNDATION
FF	FINISH FLOOR
FIN	FINISH
FLR	FLOOR
FOC	FACE OF CONCRETE
FOS	FACE OF STUDS
FRMG	FRAMING
FAST	FASTENER
FS	FAR SIDE
FT	FOOT OR FEET
FTG	FOOTING
GA	GAUGE
GALV	GALVANIZED
GB	GRADE BEAM
GC	GENERAL CONTRACTOR
GL	GLU LAM
GT	GIRDER TRUSS
GB	GYPSUM BOARD
GYP	GYPSUM
HB	HOIST BEAM
HC	HANDICAPPED
HDR	HEADER
HD	HOLDOWN
HORZ	HORIZONTAL
HP	HIGH POINT
HR	HOUR
HSA	HEADED STUD ANCHOR
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT
INSUL	INSULATION
INT	INTERIOR
JT	JOINT
JST	JOIST

K OR KIPS	THOUSAND POUNDS (KIP)
KB	KNEE BRACE
LLV	LONG LEG VERTICAL
LLH	LONG LEG HORIZONTAL
LP	LOW POINT
LSL	LAMINATED STRAND LUMBER
LVL	LAMINATED VENEER LUMBER
LSH	LONG SIDE HORIZONTAL
LSV	LONG SIDE VERTICAL
MAX	MAXIMUM
MC	MOMENT CONNECTION
MECH	MECHANICAL
MANUF	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MTL	METAL
N/A	NOT AVAILABLE/NOT APPLICABLE
NIC	NOT IN CONTRACT
NO. OR #	NUMBER
NS	NEAR SIDE
NTS	NOT TO SCALE
OA	OVERALL
O/O	OUT TO OUT
OC	ON CENTER
OA	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OSB	ORIENTED STRAND BOARD
PAF	POWDER ACTUATED FASTENER OR
	POWER ACTUATED FASTENER
PB	POCKET BEAM
PIP	POURED IN PLACE
PL	PLATE
PLF	POUNDS PER LINEAR FOOT
PLYWD	PLYWOOD
PREFAB	PREFABRICATED
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSL	PARALLEL STRAND LUMBER
PSW	PERFORATED SHEAR WALL
PT	POST TENSION
RAD	RADIUS
RD	ROOF DRAIN
RE:	REFERENCE
REINF	REINFORCED
REQ'D	REQUIRED
RO	ROUGH OPENING
RS	ROUGH SAWN
S-	SLAB TENDON (TENDON NUMBER)
SEC	SECTION
SF	SQUARE FEET/ FOOT
SCHED	SCHEDULE
SHT	SHEET
SIM	SIMILAR
SLP	SLOPE
SPEC(S)	SPECIFICATION(S)
SPF	SPRUCE PINE FIR
SQ	SQUARE
STIFF	STIFFENER
STD	STANDARD
STIR	STIRRUP
STL	STEEL
STRUCT	STRUCTURAL
SW	SHEAR WALL
SYM	SYMMETRICAL
SYP	SOUTHERN YELLOW PINE
T&B	TOP AND BOTTOM
THK	THICK
T&G	TONGUE & GROOVE
TJI	TRUSS JOIST "I-JOIST"
TEMP	TEMPERATURE
TOC	TOP OF CONCRETE
TO CURB	TOP OF CURB
TOP	TOP OF PAVING OR TOP OF PLYWOOD
TOS	TOP OF STEEL OR TOP OF SLAB
TOT	TOP OF TRUSS
TOW	TOP OF WALL
TPL	TRIPLE
TS	TUBE STEEL
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
UWA	UNDER WALL ABOVE
VERT	VERTICAL
VB	VAPOR BARRIER
VR	VAPOR RETARDER
W/	WITH
W/C	WATER / CEMENT
W/O	WITHOUT
WP	WORK POINT
WSP	WOOD STRUCTURAL PANEL
WT	WEIGHT
WWM	WELDED WIRE MESH
WWF	WELDED WIRE FABRIC
WWR	WELDED WIRE REINFORCING

STAIR & HANDRAIL NOTES:

ALL STAIRS AND HANDRAILS SHALL BE DESIGNED BY A LICENSED ENGINEER BASED ON THE FOLLOWING DESIGN CRITERIA.
ALL DRAWINGS AND CALCULATIONS SHALL BE SIGNED AND SEALED AND SUBMITTED AS SHOP DRAWINGS:

1. STAIR STRINGERS, TREADS AND RISERS SHALL BE DESIGNED TO SUPPORT 100 PSF LIVE LOAD.
2. INDIVIDUAL STAIR TREADS SHALL BE DESIGNED TO SUPPORT A 300 POUND CONCENTRATED LOAD PLACED IN A POSITION THAT WOULD CAUSE MAXIMUM STRESS.
3. THE TOP RAIL OF HANDRAILS SHALL BE DESIGNED TO WITHSTAND A LOAD OF 50 PLF APPLIED HORIZONTALLY AT RIGHT ANGLES, OR A 200 POUND CONCENTRATED LOAD APPLIED IN ANY DIRECTION. INTERMEDIATE RAILS, PANEL FILLERS, AND THEIR CONNECTIONS SHALL BE DESIGNED TO WITHSTAND A LOAD OF 50 PSF APPLIED HORIZONTALLY AT RIGHT ANGLES OVER THE ENTIRE TRIBUTARY AREA, INCLUDING OPENINGS AND SPACES BETWEEN RAILS.

GENERAL DESIGN CRITERIA:

1. THE FOLLOWING SPECIFICATIONS ARE AN OUTLINE OF MINIMUM MATERIAL REQUIREMENTS AND THEIR APPLICATION. MANUFACTURER SPECIFICATION AND LOCAL CODE REQUIREMENTS, WHEN IN EXCESS OF MINIMUM SPECIFICATION, SHALL CONTROL. IT IS THE CONTRACTOR'S RESPONSIBILITY TO REVIEW AND SUBMIT ALL SHOP DRAWINGS AND REPORT ALL DOCUMENT DISCREPANCIES TO THE STRUCTURAL ENGINEER PRIOR TO FABRICATION OR ERECTION.
2. AT CONSTRUCTION ISSUE, THESE DRAWINGS REPRESENT STRUCTURAL COMPONENTS IN THEIR FINAL AND FINISHED STATE. CONSTRUCTION PROCEDURES, BRACING, METHODS, SAFETY PRECAUTIONS OR MECHANICAL REQUIREMENTS USED TO ERECT THEM ARE THE SOLE RESPONSIBILITY OF THE GENERAL CONTRACTOR OR SUBCONTRACTOR DOING THE WORK.
3. CONSTRUCTION COMPLIANCE LETTER:
   THE GENERAL CONTRACTOR SHALL DETERMINE FROM THE LOCAL BUILDING AUTHORITY AT THE TIME THAT THE BUILDING PERMIT IS OBTAINED, WHETHER ANY PERIODIC OR FINAL CONSTRUCTION COMPLIANCE LETTERS WILL BE REQUIRED OR REQUESTED FROM THE STRUCTURAL ENGINEER. THE GENERAL CONTRACTOR SHALL NOTIFY THE STRUCTURAL ENGINEER OF ALL SUCH REQUIREMENTS IN WRITING PRIOR TO THE START OF CONSTRUCTION.
   - WHEN STRUCTURAL OBSERVATIONS ARE REQUIRED FOR PERIODIC OR FINAL COMPLIANCE LETTERS A TWO-DAY ADVANCE NOTICE SHALL BE GIVEN TO THE STRUCTURAL ENGINEER OF THE SUCH OBSERVATION.
   - ONE WEEK PRIOR TO NEEDING THE FINAL COMPLIANCE LETTER THE GENERAL CONTRACTOR SHALL PROVIDE COPIES OF ALL TESTING REPORTS, OBSERVATION REPORTS AND FINAL SIGN OFF LETTERS BY THIRD PARTY TESTING LABS TO THE ARCHITECT AND STRUCTURAL ENGINEER. THIS INFORMATION IS TO BE PROVIDED A MINIMUM OF ONE WEEK PRIOR TO WHEN THE CONSTRUCTION COMPLIANCE LETTER IS NEEDED.
4. BUILDING CODE: ..... IBC 2021

GRAVITY DESIGN LOADS:

ROOF LOAD ..... 20 PSF LIVE LOAD

	LIVE LOADS:	DEAD LOADS:
1. FLOOR LIVE LOADS:		
• PUBLIC AREAS (PUBLIC ROOMS AND CORRIDORS SERVING THEM)	100 PSF	
• LOBBY	100 PSF	2,000 LBS
• LIGHT STORAGE	125 PSF	
• PARKING	40 PSF	
• OFFICE	50 PSF	
• MECHANICAL ROOM	125 PSF	
2. SUPERIMPOSED DEAD LOADS (INCLUDED IN THE DEAD LOADS PROVIDED ABOVE)		
• CEILING & MECHANICAL	5 PSF	
• FIXED PARTITIONS (NON-OFFICE BUILDING)	10 PSF	

WIND LOADING CRITERIA:

1. BASIC WIND SPEED (3-SECOND GUST)
   A. ULTIMATE DESIGN V_{ULT} ..... 122 MPH
2. RISK CATEGORY II
3. WIND EXPOSURE ..... B
4. INTERNAL PRESSURE COEFFICIENT ..... ± 0.18
5. COMPONENT AND CLADDING PRESSURES: (NET, SEE PRESSURE ZONE DETAILS)

SEISMIC LOADING CRITERIA:

1. SITE CLASSIFICATION: ..... D
2. SEISMIC IMPORTANCE FACTOR: ..... I = 1.0
3. DESIGN SPECTRAL RESPONSE RESPONSE ACCELERATIONS: ..... S_S .066; S_1 .039
4. SPECTRAL RESPONSE COEFFICIENTS: ..... S_{DS} .070; S_{D1} .062
5. SEISMIC DESIGN CATEGORY: ..... A
6. BASIC SEISMIC-FORCE RESISTING SYSTEM: ..... STEEL SYSTEM NOT SPECIFICALLY DETAILED FOR SEISMIC
7. DESIGN BASE SHEAR: ..... .023W KIPS
8. SEISMIC RESPONSE COEFFICIENT (Cs): ..... .023
9. RESPONSE MODIFICATION FACTOR (R): 3
10. DEFLECTION AMPLIFICATION FACTOR (Cd): 3
11. ANALYSIS PROCEDURE (ELFP OR MRSA): ..... ELFP

FOUNDATION NOTES (SPREAD / STRIP FOOTINGS):

1. FOOTINGS SHALL BEAR ON SOIL SUITABLE FOR SUPPORTING 2500 P.S.F. NET ALLOWABLE BEARING CAPACITY. IF QUESTIONABLE SOIL IS ENCOUNTERED, THE STRUCTURAL ENGINEER SHALL BE NOTIFIED IMMEDIATELY. THESE FOUNDATIONS ARE SUITABLE FOR THE SITE AND HAVE BEEN BASED ON GEOTECHNICAL REPORT NO.H180173 BY ALPHA TESTING ISSUED 8/21/2018. ALL RECOMMENDATIONS THEREIN THAT RELATE TO THE WORK SHOWN ON THESE DRAWINGS MUST BE FOLLOWED.
2. EXCAVATION FOR FOOTINGS SHALL BE NEAT. SIDES SHALL BE SHORED OR SLOPED AS REQUIRED IN GEOTECHNICAL REPORT.
3. FOOTINGS SHALL BE POURED IMMEDIATELY AFTER EXCAVATION.
4. ALL REINFORCING STEEL MARKED "CONTINUOUS" SHALL BE LAPPED PER THE REINFORCING SPLICE SCHEDULE AT SPLICES AND AROUND CORNERS OR INTERSECTIONS WITH A STANDARD 90 DEGREE BEND ON CORNER BARS.
5. LAP TOP BARS AT CENTER OF SPAN; LAP BOTTOM BARS AT SUPPORTS.
6. PLUMBING LINES SHALL BE COORDINATED WITH THE EOR AND SHALL NOT OCCUR BELOW, PARALLEL TO, OR WITHIN ANY FOUNDATION ELEMENT WITHOUT PRIOR REVIEW FROM BOTH THE STRUCTURAL AND GEOTECHNICAL ENGINEERS.
7. PLACE A MINIMUM 10 MIL VAPOR RETARDER UNDER ALL CONCRETE SLABS. VAPOR RETARDER TO HAVE A PERMEANCE OF LESS THAN 0.3 US PERMS (ASTM E 96). REFER TO GEOTECHNICAL REPORT FOR EXACT LOCATIONS.
8. FOUNDATION PLAN AND ALL RELATED DETAILS SHALL BE REVIEWED AND APPROVED BY THE GEOTECHNICAL ENGINEER.

DEFERRED SUBMITTALS

1. DEFERRED SUBMITTALS IN ACCORDANCE WITH IBC 107.3.4.1 AND SHALL FIRST BE SUBMITTED TO THE PROJECT ARCHITECT AND/OR ENGINEER OF RECORD FOR REVIEW AND COORDINATION. FOLLOWING THE COMPLETION OF THE REVIEW AND COORDINATION BY THE ARCHITECT/ENGINEER OF RECORD, A SUBMITTAL MAY THEN BE MADE TO THE CITY BUILDING DEPARTMENT FOR REVIEW AND APPROVAL, WHICH SHALL INCLUDE A LETTER STATING THIS REVIEW AND COORDINATION HAS BEEN PERFORMED AND COMPLETED AND PLANS AND CALCULATIONS FOR THE DEFERRED ITEMS ARE FOUND TO BE ACCEPTABLE (E.G., WITH REGARD TO GEOMETRY, LOAD CONDITIONS, ETC.) WITH NO EXCEPTIONS. THE LIST SHOULD CONTAIN BUT NOT NECESSARILY BE LIMITED TO THE FOLLOWING ITEMS:

   A. STEEL STAIRS

2. **DEFERRED SUBMITTALS SHOP DRAWINGS MUST BE SIGNED AND SEALED PRIOR TO BEING SUBMITTED FOR REVIEW. THE SUBMITTAL MUST BE SIGNED AND SEALED BY ENGINEER LICENSED IN THE STATE IN WHICH THE PROJECT IS LOCATED**

CONCRETE SAMPLING:

1. MOLDING AND TESTING: CYLINDERS FOR STRENGTH TESTS SHALL BE MOLDED AND LABORATORY CURED IN ACCORDANCE WITH ASTM C31 AND TESTED IN ACCORDANCE WITH ASTM C39.
2. FIELD SAMPLES: FIELD SAMPLES FOR STRENGTH TESTS SHALL BE TAKEN IN ACCORDANCE WITH ASTM C172.
3. FREQUENCY OF TESTING: EACH SET OF TEST CYLINDERS SHALL CONSIST OF A MINIMUM (U.N.O.) OF FOUR STANDARD TEST CYLINDERS. A SET OF TEST CYLINDERS SHALL BE MADE ACCORDING TO THE FOLLOWING MIN. FREQUENCY GUIDELINES:
   A. ONE SET FOR EACH CLASS OF CONCRETE TAKEN NOT LESS THAN ONCE A DAY.
   B. MAT FOUNDATION: ONE SET FOR EACH 250 CUBIC YARDS OR FRACTION THEREOF.
   C. PIERS: ONE SET FOR EACH 50 CUBIC YARDS OR FRACTION THEREOF.
   D. UNDER-REAMED FOOTINGS: ONE SET FOR EACH 50 CUBIC YARDS OR FRACTION THEREOF.
   E. PILES: ONE SET FOR EACH 50 CUBIC YARDS OR FRACTION THEREOF BUT NOT LESS THAN ONE SET FOR EACH PILE GROUP UNDER EACH COLUMN OR WALL.
   F. BASEMENT WALLS: ONE SET FOR EACH 150 CUBIC YARDS.
   G. SPREAD FOOTINGS AND PILE CAPS: ONE SET FOR EACH 50 CUBIC YARDS OR FRACTION THEREOF.
   H. FLOORS: ONE SET FOR EACH 150 CUBIC YARDS OR FRACTION THEREOF BUT NOT LESS THAN ONE SET FOR EACH 5000 SQUARE FOOT OF FLOOR AREA.
   I. COLUMNS: ONE SET FOR EACH 50 CUBIC YARDS OR FRACTION THEREOF WITH A MINIMUM OF 2 SETS PER FLOOR.
   J. SHEAR WALLS: ONE SET FOR EACH 50 CUBIC YARDS BUT NOT LESS THAN 2 SETS PER FLOOR.
   K. ALL OTHER CONCRETE: A MINIMUM OF ONE SET FOR EACH 150 CUBIC YARDS OR FRACTION THEREOF.
   L. NO MORE THAN ONE SET OF CYLINDERS AT A TIME SHALL BE MADE FROM ANY SINGLE TRUCK.
   M. IF THE TOTAL VOLUME OF CONCRETE IS SUCH THAT THE FREQUENCY OF TESTING AS SPECIFIED ABOVE WOULD PROVIDE LESS THAN FIVE STRENGTH TESTS FOR A GIVEN CLASS OF CONCRETE, TESTS SHALL BE MADE FROM AT LEAST FIVE RANDOMLY SELECTED BATCHES OR FROM EACH BATCH IF FEWER THAN FIVE BATCHES ARE USED.
   N. THE ABOVE FREQUENCIES ASSUME THAT ONE BATCH PLANT WILL BE USED FOR EACH POUR. IF MORE THAN ONE BATCH PLANT IS USED, THE FREQUENCIES CITED ABOVE SHALL APPLY FOR EACH PLANT USED.

EXPOSED-TO-VIEW STRUCTURAL CONCRETE GENERAL NOTES

1. ALL EXPOSED-TO-VIEW CONCRETE (REFERENCE ARCHITECTURAL DRAWINGS) SHALL HAVE A FINISH OF "SF-2.0" OR BETTER AS DEFINED BY THE AMERICAN CONCRETE INSTITUTE. EXPOSED CONCRETE IS ALSO TO BE SEALED WITH A WATER BASED ACRYLIC SEALER (PROSOCO SILOXANE PD OR SURE KLEAN WEATHER SEAL SILOXANE PD OR OWNER-APPROVED EQUIVALENT).
2. CONCRETE SUBCONTRACTOR SHALL USE MDO BOARD FOR ALL EXPOSED-TO-VIEW CEILING AND COLUMN FORM-WORK. CONCRETE SUBCONTRACTOR SHALL ALSO REPLACE MDO FORM-WORK MIDWAY THROUGH CONSTRUCTION OF CONCRETE STRUCTURE TO ENSURE CONSISTENT QUALITY APPEARANCE SUCH THAT THERE IS NO DEGRADATION OF REQUIRED FINISH.
3. CONCRETE CEILINGS SHALL HAVE TIGHT BUTT JOINTS, WITH LARGE PIECES REMOVED, HOWEVER, JOINTS SHALL NOT BE GROUND (UNLESS MISALIGNMENT EXCEEDS A.C.I. STANDARDS, BUT NOT WITHOUT OWNER CONSULTATION AND APPROVAL).
4. ALL EXPOSED-TO-VIEW CONCRETE COLUMNS, COLUMN TRANSITION CAPS, BEAMS, SLAB EDGES, AND WALLS SHALL HAVE A 3/4" CHAMFERED EDGE.
5. JOINTS BETWEEN POUR STRIPS (IF SHOWN) AND SLAB CEILINGS SHALL BE FLUSH BUTT JOINTS, NOT CHAMFERED.
6. ALL EXPOSED TO VIEW CONCRETE ELEMENTS SHALL HAVE A SHRINKAGE LIMIT OF 0.040 PERCENT AT 28 DAYS. CONFORM TO REQUIREMENTS UNDER ITEM #11 OF CONCRETE NOTES.
7. SHOULD CONTRACTOR CHOOSE TO POUR EXPOSED TO VIEW CONCRETE ELEMENTS WITH HIGHER STRENGTH CONCRETE THAN SPECIFIED, CONTRACTOR SHALL UTILIZE AN APPROVED SHRINKAGE REDUCING ADMIXTURE PER MANUFACTURER'S RECOMMENDATION TO MEET THE 0.040 SHRINKAGE LIMIT.

POST-INSTALLED ANCHORS

POST-INSTALLED ANCHORS SHALL ONLY BE USED WHERE SPECIFIED ON THE CONSTRUCTION DOCUMENTS. THE CONTRACTOR SHALL OBTAIN APPROVAL FROM THE ENGINEER–OF-RECORD PRIOR TO INSTALLING POST-INSTALLED ANCHORS IN PLACE OF MISSING OR MISPLACED CAST-IN-PLACE ANCHORS. CARE SHALL BE TAKEN IN PLACING POST-INSTALLED ANCHORS TO AVOID CONFLICTS WITH EXISTING REBAR AND/OR POST TENSIONED CABLES. HOLES SHALL BE DRILLED AND CLEANED IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN INSTRUCTIONS. SUBSTITUTION REQUESTS FOR PRODUCTS OTHER THAN THOSE SPECIFIED BELOW SHALL BE SUBMITTED BY THE CONTRACTOR TO THE ENGINEER-OF-RECORD. SIGNED AND SEALED CALCULATIONS MAY BE REQUESTED BY THE ENGINEER-OF-RECORD FOR SUBSTITUTIONS. THE CALCULATIONS SHALL DEMONSTRATE THAT THE SUBSTITUTED PRODUCT IS CAPABLE OF ACHIEVING THE PERTINENT EQUIVALENT PERFORMANCE VALUES (MINIMUM) OF THE SPECIFIED PRODUCT USING THE APPROPRIATE DESIGN PROCEDURE AND/OR STANDARD(S) AS REQUIRED BY THE BUILDING CODE. IF REQUIRED, PROVIDE CONTINUOUS SPECIAL INSPECTION FOR ALL MECHANICAL AND ADHESIVE ANCHORS PER THE APPLICABLE EVALUATION REPORT (ICC-ES ESR). CONTACT MANUFACTURER'S REPRESENTATIVE FOR THE INITIAL TRAINING AND INSTALLATION OF ANCHORS AND FOR PRODUCT RELATED QUESTIONS AND AVAILABILITY.

1. **CONCRETE ANCHORS:**
   - **A. MECHANICAL ANCHORS** SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ACI 355.2 AND ICC-ES AC193 FOR CRACKED AND UN-CRACKED CONCRETE RECOGNITION. PRE-APPROVED MECHANICAL ANCHORS INCLUDE:
     - **a. SIMPSON STRONG-TIE TITEN-HD AND TITEN-HD ROD HANGER (ICC-ES ESR-2713)**
     - **b. HILTI KWIK HUS EZ AND KWIK HUS EZ-I SCREW ANCHORS (ICC ESR-3027)**
     - **c. SIMPSON STRONG-TIE STRONG-BOLT (ICC-ES ESR-1771)**
     - **d. SIMPSON STRONG-TIE STRONG-BOLT 2 (ICC-ES ESR-3037)**
     - **e. HILTI KWIK BOLT TZ (ICC-ES ESR-1917)**
     - **f. HILTI HDA UNDERCUT (ICC-ES ESR-1546)**
     - **g. HILTI HSL-3 EXPANSION ANCHORS PER ICC ESR 1545**
   - **B. ADHESIVE ANCHORS** SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC308 FOR CRACKED AND UN-CRACKED CONCRETE RECOGNITION. PRE-APPROVED ADHESIVE ANCHORS INCLUDE:
     - **a. SIMPSON STRONG-TIE SET-XP (ICC-ES ESR-2508)**
     - **b. HILTI HIT-HY 200 SAFE SET SYSTEM WITH THE HILTI HIT-Z ROD (ICC ESR-3187)**
     - **c. HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI HOLLOW DRILL BIT (TE-CD OR TE-YD) WITH HAS-ED THREADED ROD (ICC ESR-3187)**
     - **d. HILTI RE 500-V3 (ICC-ESR-3814)**
   - **C. REBAR DOWELING**
     - **a. SIMPSON STRONG-TIE SET-XP (ICC-ES ESR-2508)H**
     - **b. HILTI HIT-HY 200 SAFE SET SYSTEM WITH HILTI HOLLOW DRILL BIT (TE-CD OR TE-YD) WITH CONTINUOUSLY DEFORMED REBAR PER ICC ESR-3187 ,**
     - **c. HILTI HIT-RE 500-V3 EPOXY ADHESIVE ANCHORING SYSTEM WITH CONTINUOUSLY DEFORMED REBAR PER ICC ESR-3814**
2. **MASONRY ANCHORS:**
   - **ANCHORAGE TO SOLID-GROUTED CONCRETE MASONRY**
     - **A. MECHANICAL ANCHORS** SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC01 OR AC106. PRE-APPROVED MECHANICAL ANCHORS INCLUDE:
       - **a. SIMPSON STRONG-TIE TITEN-HD (ICC-ES ESR-1056)**
       - **b. SIMPSON STRONG-TIE WEDGE-ALL (ICC-ES ESR-1396)**
       - **c. HILTI KWIK BOLT 3 (ICC-ES ESR-1385)**
       - **d. HILTI KWIK HUS EZ SCREW ANCHORS (PER ICC ESR-3056)**
     - **B. ADHESIVE ANCHORS** SHALL HAVE BEEN TESTED AND QUALIFIED FOR USE IN ACCORDANCE WITH ICC-ES AC58. PRE-APPROVED ADHESIVE ANCHORS INCLUDE:
       - **a. SIMPSON STRONG-TIE SET (ICC-ES ESR-1772)**
       - **b. SIMPSON STRONG-TIE ACRYLIC-TIE (ICC-ES ESR-5791)**
       - **c. HILTI HY 70 (ICC-ES ESR-3342)**
   - **ANCHORAGE TO HOLLOW CONCRETE MASONRY/UNREINFORCED CLAY BRICK MASONRY**
     - **A. MECHANICAL ANCHORS FOR** SHALL HAVE BEEN TESTED AND QUALIFIED IN ACCORDANCE WITH ICC-ES AC106. PRE-APPROVED SCREW ANCHORS INCLUDE:
       - **a. SIMPSON STRONG-TIE TITEN-HD (ICC-ES ESR-1056)**
     - **B. ADHESIVE ANCHORS WITH SCREEN TUBES** SHALL BE TESTED AND QUALIFIED IN ACCORDANCE WITH ICC-ES AC58 OR AC60, AS APPROPRIATE. THE APPROPRIATE SCREEN TUBE SHALL BE USED AS RECOMMENDED BY THE ADHESIVE MANUFACTURER. PRE-APPROVED ADHESIVE ANCHORS WITH SCREEN TUBES INCLUDE:
       - **a. SIMPSON STRONG-TIE SET (ICC-ES ESR-1772)**
       - **b. HILTI HY 70 (ICC-ES ESR-3342)**

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SkyDancing
CONSULTANTS ASSOCIATES, INC.
12511 EMILY COURT,
SUGAR LAND, TEXAS 77478
SCAENGINEERS.COM 713-779-7252

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TEXAS FIRM #24110

WALLER COUNTY

JAIL GARAGE

WALLER COUNTY, TX

STATE OF TEXAS
WESTLEY J. HINTON
100622
LICENSED PROFESSIONAL ENGINEER
4/11/25

REV	DATE:	ISSUED FOR:
	03-28-2025	PROGRESS SET
	04-11-2025	100% CD SET

PROJECT NO.: 25033S
DRAWN BY: Author QC: Checker

General Notes

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CONCRETE NOTES AND SPECIFICATIONS:

1. ALL CONCRETE WORK SHALL CONFORM TO THE ACI 318 AND ACI 301 BUILDING CODES, LATEST EDITIONS.
2. DETAILING, FABRICATION AND PLACING OF REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ACI 315, "ACI DETAILING MANUAL", LATEST EDITION.
3. REINFORCING BARS #6 AND BELOW SHALL CONFORM TO ASTM A-615 GRADE 60 (60,000 PSI YIELD) AND BARS #7 AND ABOVE SHALL BE GRADE 75 (75,000 PSI YIELD) OR GRADE 80 (80,000 PSI YIELD) UNLESS NOTED OTHERWISE. REINFORCING SHALL BE FREE FROM OIL, DIRT AND OTHER MATERIALS THAT WOULD REDUCE THE BOND WITH THE CONCRETE.
4. WELDED WIRE REINFORCING (WWR) SHALL CONFORM TO ASTM A-185. WELDED WIRE REINFORCING SHALL BE CHAIRED TO MAINTAIN THE REINFORCING AT ONE-THIRD THE DEPTH BELOW THE TOP SURFACE DURING CONCRETE PLACEMENT. SUPPORTS SHALL BE AT 2'-0" O.C. EACH WAY. LAP WELDED WIRE MESH ONE FULL MESH AT SIDE AND END LAPS.
5. UNLESS OTHERWISE NOTED, CONCRETE PROTECTION FOR REINFORCING SHALL BE AS SPECIFIED IN THE ACI 318 BUILDING CODE LATEST EDITION.
6. CONCRETE STRENGTH & PROTECTION:

A. STRUCTURAL ELEMENT	MINIMUM COVER (INCHES)	CONCRETE STRENGTH (PSI)	W/C RATIO (MAX)
a. FOOTINGS	3" ALL SURFACES	3,000	SEE TABLE
b. GRADE BEAMS	3" BOT / 3" EA. FACE / 1 1/2" TOP	3,000	SEE TABLE
c. SLAB ON GRADE	1 1/2" TOP & BOT	3,000	SEE TABLE
d. RETAINING WALLS	1" T&B / 3" EXT FACE / 3/4" INT FACE	3,000	SEE TABLE
e. ELEVATOR PITS	1" T&B / 3" EXT FACE / 3/4" INT FACE	3,000	SEE TABLE

   - (*) EXT. EXPOSURE = INDICATES SLABS EXPOSED TO WEATHER (i.e. GARAGE SLABS, BALCONIES, ETC.) ROOFS AND THEIR SLABS THAT ARE WATER-PROOFED ARE NOT CONSIDERED EXTERIOR EXPOSURE UNLESS NOTED OTHERWISE.
   - CONCRETE STRENGTH NOTED AT 28 DAYS
   - PORTLAND CEMENT SHALL CONFORM TO ASTM C150, TYPE 1 - MINIMUM OF 5 SACKS OF CEMENT PER CUBIC YARD.

WATER CEMENT RATIO (W/C)		
CONCRETE f'c	NON-AIR ENTRAINED	AIR ENTRAINED**
3000	0.52 (MAX.)	0.50 (MAX.)
4000	0.50 (MAX.)	0.48 (MAX.)
4500	0.45 (MAX.)	0.45 (MAX.)
5000	0.40 (MAX.)	0.40 (MAX.)
6000	0.40 (MAX.)	0.40 (MAX.)
7000	0.38 (MAX.)	0.38 (MAX.)
8000	0.38 (MAX.)	0.38 (MAX.)

   - * *CONCRETE EXPOSED TO FREEZING WEATHER AND/OR CORROSIVE ENVIRONMENTS SHALL BE AIR ENTRAINED
7. FLY-ASH MAY BE USED TO REPLACE A PORTION OF THE PORTLAND CEMENT. THE RATIO OF FLY-ASH TO THE TOTAL OF THE FLY-ASH AND CEMENT IN A MIX SHALL NOT EXCEED 20%. FLY-ASH SHALL CONFORM TO ASTM C618, TYPE C OR F.
8. NO WATER SHALL BE ADDED TO THE CONCRETE AT THE JOBSITE UNLESS IT IS EXPLICITLY NOTED ON THE BATCH TICKET THAT WATER WAS WITH HELD AT THE BATCH PLANT. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO COORDINATE WITH THE CONCRETE SUPPLIER TO ENSURE A PUMP-ABLE AND WORK-ABLE MIX WITHOUT THE ADDITION OF WATER AT THE JOBSITE. THE USE OF PLASTICIZERS, RETARDANTS AND OTHER ADDITIVES SHALL BE AT THE OPTION OF THE CONTRACTOR SUBJECT TO THE APPROVAL OF THE STRUCTURAL ENGINEER. FOLLOW THE RECOMMENDATIONS OF THE MANUFACTURER FOR THE PROPER USE OF ADDITIVES. THE USE OF CALCIUM CHLORIDE OR OTHER CHLORIDE BEARING SALTS SHALL NOT BE PERMITTED.
9. CONCRETE SLUMP TESTS SHALL BE MADE BEFORE AND AFTER THE ADDITION OF ADMIXTURES AND MAY BE TAKEN AT THE BACK OF THE TRUCK. CONCRETE FOR THE PREPARATION OF TEST CYLINDERS SHALL BE TAKEN FROM THE HOSE END FOR CONCRETE PLACED BY PUMP.
10. REINFORCING STEEL SPLICE NOTES:
    - ALL REINFORCING STEEL SHALL BE SPLICED AS NOTED BELOW AND AS REQUIRED IN THE ACI BUILDING CODE LATEST EDITION.
      A. Ld NOTED IN THE DETAILS AND TABLES BELOW IS THE STRAIGHT BAR DEVELOPMENT LENGTH PER ACI-318.
      B. CLASS B LAP SPLICE TABLE SHALL BE USED FOR ALL LAP SPLICES AND BAR DEVELOPMENT UNLESS NOTED OTHERWISE.
      C. ALL REINFORCING STEEL MARKED "CONTINUOUS" SHALL BE LAPPED WITH A CLASS B LAP SPLICE AND AROUND CORNERS OR INTERSECTIONS WITH A STANDARD 90 DEGREE HOOK.
      D. SPLICE TOP BARS AT CENTER OF SPAN; SPLICE BOTTOM BARS AT SUPPORTS WITH CLASS B LAP SPLICE.
      E. SPLICE ALL VERTICAL BARS IN COLUMNS AND VERTICAL AND HORIZONTAL BARS IN SHEAR WALLS WITH A CLASS B LAP SPLICE UNLESS NOTED OTHERWISE.
      F. LAP SPLICES FOR #14 AND LARGER BARS SHALL BE MADE WITH MECHANICAL COUPLERS TO DEVELOP 125% OF THE BARS CAPACITY.
      G. INCREASE DEVELOPMENT LENGTH SHOWN IN TABLES BELOW BY 1.25 FOR 75 KSI STEEL OR 1.33 FOR 80 KSI STEEL.
      H. INCREASE DEVELOPMENT LENGTH SHOWN IN TABLES BELOW BY 1.50 FOR EPOXY COATED BARS.
      I. INCREASE DEVELOPMENT LENGTH SHOWN IN TABLES BELOW BY 1.30 IF BAR IS TO BE USED AS A TOP BAR IN A BEAM OR SLAB WITH 12" OF FRESH CONCRETE BELOW THE BAR.
      J. INCREASE DEVELOPMENT LENGTH SHOWN IN TABLES BELOW BY 1.20 FOR THREE-BAR BUNDLES AND 1.33 FOR FOUR-BAR BUNDLES. BAR BUNDLES SHALL NOT EXCEED FOUR BARS PER BUNDLE.
      K. THE FOLLOWING TABLES ASSUME ONE OF THE BELOW CONDITIONS, PER ACI, ARE MET:
         a. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED IS NOT LESS THAN db, CLEAR COVER NOT LESS THAN db AND STIRRUPS OR TIES THROUGHOUT Ld NOT LESS THAN CODE MINIMUM
         b. CLEAR SPACING OF BARS BEING DEVELOPED OR SPLICED NOT LESS THAN 2db AND CLEAR COVER NOT LESS THAN db

CLASS B SPLICE (TO BE USED U.N.O.)

A.C.I. REINFORCING DEVELOPMENT LENGTH SCHEDULE (1.3 Ld)

REINF. SIZE	CONCRETE STRENGTH (PSI)						
	3000	4000	5000	6000	7000	8000	10000	12000
#3	23"	20"	17"	16"	16"	16"	16"	16"
#4	29"	25"	23"	21"	20"	19"	16"	16"
#5	37"	32"	29"	26"	24"	23"	16"	16"
#6	43"	38"	34"	32"	29"	28"	20"	20"
#7	63"	55"	50"	45"	42"	39"	36"	36"
#8	72"	63"	56"	51"	47"	45"	39"	39"
#9	81"	71"	63"	58"	54"	50"	45"	45"
#10	91"	80"	71"	65"	60"	56"	51"	51"
#11	102"	88"	78"	72"	67"	63"	56"	56"

CLASS A SPLICE (USE ONLY IF NOTED ON DRAWINGS)

A.C.I. REINFORCING DEVELOPMENT LENGTH SCHEDULE (Ld)

REINF. SIZE	CONCRETE STRENGTH (PSI)						
	3000	4000	5000	6000	7000	8000	10000	12000
#3	17"	15"	13"	12"	12"	12"	12"	12"
#4	22"	19"	17"	16"	15"	14"	12"	12"
#5	28"	24"	22"	20"	18"	17"	12"	12"
#6	33"	29"	26"	24"	22"	21"	15"	15"
#7	48"	42"	38"	34"	32"	30"	27"	27"
#8	55"	48"	43"	39"	36"	34"	30"	30"
#9	62"	54"	48"	44"	41"	38"	34"	34"
#10	70"	61"	54"	50"	46"	43"	39"	39"
#11	78"	67"	60"	55"	51"	48"	43"	43"

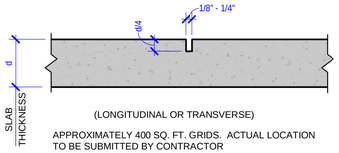
   L. ALL HOOKED REINFORCING STEEL SHALL BE AS NOTED BELOW AND AS REQUIRED IN THE ACI BUILDING CODE LATEST EDITION.

      a. Lhb NOTED IN THE SCHEDULE BELOW IS THE BASIC TENSION DEVELOPMENT LENGTH FOR STANDARD ACI HOOKS, MEASURED FROM THE CRITICAL SECTION TO THE END OF THE HOOK.
      b. Ldh = 1.25*Lhb FOR GRADE 75 (75,000 PSI YIELD) REINFORCEMENT AND 1.33*Lhb FOR GRADE 80 (85,000 PSI YIELD) REINFORCEMENT.
      c. Ldh = 1.2*Lhb FOR EPOXY COATED REINFORCEMENT.
      d. Ldh = Lhb UNLESS CONDITIONS NOTED IN B. OR C. ARE MET AND SHALL BE NOT BE LESS THAT 6" OR 8 BAR DIAMETERS.

A.C.I. STANDARD HOOK REINFORCING DEVELOPMENT LENGTH SCHEDULE (Lhb)

REINF. SIZE	CONCRETE STRENGTH (PSI)								
	3000	4000	5000	6000	7000	8000	9000	10000	12000
#3	9"	8"	7"	6"	6"	6"	6"	6"	6"
#4	11"	10"	9"	8"	8"	7"	7"	6"	6"
#5	14"	12"	11"	10"	9"	9"	8"	8"	8"
#6	17"	15"	13"	12"	11"	11"	10"	9"	9"
#7	20"	17"	15"	14"	13"	12"	12"	11"	11"
#8	22"	19"	17"	16"	15"	14"	13"	12"	12"
#9	25"	22"	20"	18"	17"	16"	15"	14"	14"
#10	28"	25"	22"	20"	19"	18"	17"	16"	16"
#11	31"	27"	24"	22"	21"	19"	18"	17"	17"

11. REFER TO ARCHITECTURAL, MECHANICAL, ELECTRICAL AND PLUMBING DRAWINGS FOR ANY OTHER ADDITIONAL SLEEVES, ANCHORS, VENT OPENINGS, ETC., NOT SHOWN ON STRUCTURAL PLANS THAT MIGHT BE REQUIRED.
12. PLACE CONCRETE IN A MANNER SO AS TO PREVENT SEGREGATION OF THE MIX. DELAY FLOATING AND TROWELING OPERATIONS UNTIL CONCRETE HAS LOST SURFACE WATER SHEEN OR ALL FREE WATER. DO NOT SPRINKLE FREE CEMENT ON THE SLAB SURFACE. FINISHING OF SLAB SURFACES SHALL COMPLY WITH THE RECOMMENDATIONS OF AC1 302.1 AND 304.
13. UNLESS NOTED OTHERWISE ON PLAN, CONTROL JOINTS TO BE LOCATED AT APPROXIMATELY 400 SQ. FT. GRIDS. ACTUAL LOCATION TO BE DETERMINED BY CONTRACTOR AND SUBMITTED TO THE STRUCTURAL ENGINEER FOR REVIEW. CONTROL JOINT TO BE ZIP STRIP OR EQUAL.



APPROXIMATELY 400 SQ. FT. GRIDS. ACTUAL LOCATION TO BE SUBMITTED BY CONTRACTOR

TYP. CONTROL JOINT DETAIL (SLAB ON GRADE)

14. PROVIDE 7 DAY CURING OF SLAB IMMEDIATELY AFTER FINISHING USING ONE OF THE FOLLOWING METHODS:
    A. CONTINUOUSLY WATERED BURLAP
    B. WATERPROOF MEMBRANES
    C. SPRAYED-ON LIQUID MEMBRANE
15. PROTECT THE CONCRETE SURFACE BETWEEN FINISHING OPERATIONS ON HOT, DRY DAYS OR ANY OTHER TIME THAT PLASTIC SHRINKAGE CRACKS COULD DEVELOP BY USING WET BURLAP, PLASTIC MEMBRANE OR FOGGING. PROTECT CONCRETE SLAB AT ALL TIMES FROM RAIN, HAIL OR OTHER INJURIOUS EFFECTS.
16. UNLESS SPECIFIED, CONCRETE MUST REACH THE FOLLOWING PERCENTAGES OF ITS 28-DAY COMPRESSIVE STRENGTH (F'c), BEFORE FORMS MAY BE REMOVED.
    A. WALLS, COLUMNS, & BEAM SIDES_____40%
    B. JOIST PANS & BEAM BOTTOMS & FLOOR SYSTEMS (IF RE-SHORED)_____70%
    C. JOIST PANS & BEAM BOTTOMS & FLOOR SYSTEMS (IF NOT RE-SHORED)____100%
17. **SHORING AND RE-SHORING** WHEN REQUIRED, TO EXTEND AT LEAST TWO FLOORS BELOW FLOOR SUPPORTING FALSE-WORK (OR GROUND FLOOR). LAYOUT AND PROCEDURE TO BE SUBMITTED TO STRUCTURAL ENGINEER FOR APPROVAL AND SHALL BE SIGNED AND SEALED BY AN ENGINEER REGISTERED IN THE STATE THE PROJECT IS LOCATED.
18. AN INDEPENDENT CERTIFIED TESTING LABORATORY SHALL VERIFY AND PROVIDE REPORTS CERTIFYING THE FOLLOWING:
    A. CONCRETE PLANT BATCH TICKETS FOR EACH TRUCK VERIFY THAT THE CONCRETE MATCHES THE APPROVED DESIGN MIX.
    B. CONCRETE SLUMP IS IN ACCORDANCE WITH APPROVED DESIGN MIX.
    C. CONCRETE PLACEMENT OPERATIONS ARE IN ACCORDANCE WITH ACI SPECIFICATIONS.
    D. CONTROL JOINTS ARE INSTALLED WITHIN THE ACI TIME ALLOWANCE.
    E. PROPER CURING METHODS ARE BEING UTILIZED.
19. NO CONCRETE SHALL BE PLACED OUTSIDE OF THESE SPECIFICATIONS WITHOUT THE ENGINEER'S PRIOR APPROVAL. ANY ITEMS NOT IN COMPLIANCE WITH THE OUTLINED SPECIFICATION SHALL BE REPORTED TO THE OWNER AND STRUCTURAL ENGINEER WITHIN 24 HOURS.
20. CONSTRUCTION VEHICLE LOADS SHALL NOT BE PERMITTED ON ELEVATED SLABS AT ANY TIME.
21. ALL RETAINING WALLS TO BE BRACED UNTIL UPPER SLAB IS IN PLACE AND HAS REACHED 70% OF ITS DESIGN STRENGTH. FOR CANTILEVER RETAINING WALLS, BRACING SHALL REMAIN IN PLACE UNTIL WALL HAS REACHED 100% OF ITS DESIGN STRENGTH. PROVIDE GRANULAR BACKFILL AND PERFORATED DRAIN PIPE CONNECTED TO SITE DRAINAGE, RE: CIVIL DRAWINGS.

PRE-ENGINEERED STEEL BUILDING SPECIFICATIONS

DRAWINGS:

1. THE BUILDING MANUFACTURER SHALL FURNISH COMPLETE ERECTION DRAWINGS SHOWING ANCHOR BOLT SETTINGS, SIDEWALL, END-WALL AND ROOF FRAMING, TRANSVERSE CROSS SECTIONS, COVERING AND FLASHING DETAILS, AND NECESSARY INSTALLATION DETAILS TO CLEARLY INDICATE THE PROPER ASSEMBLY OF ALL BUILDING PARTS.
2. ALL ERECTION DRAWINGS SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER FOR APPROVAL PRIOR TO FABRICATION. CALCULATIONS SHALL BE SEALED BY A REGISTERED ENGINEER AND SUBMITTED FOR APPROVAL.

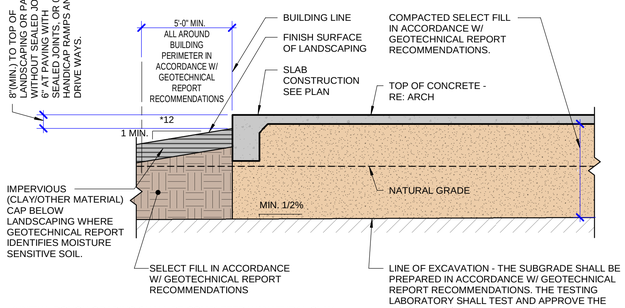
DESIGN:

1. STRUCTURAL STEEL SECTIONS AND WELDED PLATE MEMBERS SHALL BE DESIGNED IN ACCORDANCE WITH THE APPLICABLE SECTIONS, RELATING TO THE DESIGN REQUIREMENTS AND ALLOWABLE STRESSES, OF THE AISC "SPECIFICATION FOR THE DESIGN, FABRICATION, AND ERECTION OF STEEL FOR BUILDINGS".
2. COLD-FORMED STRUCTURAL MEMBERS AND EXTERIOR COVERING SHALL BE DESIGNED IN ACCORDANCE WITH THE APPLICABLE SECTIONS, RELATING TO THE DESIGN REQUIREMENT AND ALLOWABLE STRESSES, OF THE AISI "SPECIFICATION FOR THE DESIGN OF COLD-FORMED STEEL STRUCTURAL MEMBERS, (LATEST EDITION).
3. FRAMING MEMBERS SHALL BE SHOP-FABRICATED FOR BOLTED FIELD ASSEMBLY.
4. COLD-FORMED SECTIONS SHALL BE MANUFACTURED BY ROLL OR BRAKE FORMING.
5. WELDS SHALL BE DESIGNED TO MEET THE STRESS REQUIREMENTS OF AWS "STRUCTURAL WELDING CODE".
6. FIELD CONNECTIONS SHALL BE BOLTED WITH A-307 (CLEAR ZINC PLATED), A-325 (BRONZE ZINC PLATED), OR A-490 BOLTS AS SHOWN ON DRAWINGS. A-325 AND A-490 BOLTS ARE TO BE TIGHTENED BY THE TURN OF THE NUT METHOD.
7. FRAMING MEMBERS SHALL CARRY AN IDENTIFYING MARK, EITHER STAMPED, STENCILED OR PAINTED.
8. WIND BRACING:
   A. WHEN THE WIND LOAD IS APPLIED IN SUCH A DIRECTION THAT IT IS NOT RESISTED BY THE TRANSVERSE RIGID FRAMES, BRACING SHALL BE PROVIDED TO ADEQUATELY TRANSMIT ALL WIND FORCES ON THE BUILDING TO THE FOUNDATION. MAXIMUM LATERAL DEFLECTION SHALL BE L/240. THE BRACING SHALL CONSIST OF:
      - DIAGONAL BRACING, SUCH THAT THE FORCES ARE CARRIED BY THE TRUSS ACTION; OR
      - WIND COLUMNS SHALL BE USED IN THE WALLS.

1. PAINTING OF FRAMING:
   A. FRAMING MEMBERS WHICH ARE NOT GALVANIZED SHALL BE PAINTED. ALL MATERIALS TO RECEIVE SHOP PRIMER SHALL BE CLEANED OF LOOSE RUST, LOOSE MILL SCALE AND OTHER FOREIGN MATERIAL BY THE MANUFACTURER. CLEANING SHALL BE DONE IN ACCORDANCE WITH SSPC-2.
2. PANEL MATERIAL:
   A. THE PANEL MATERIAL AS SPECIFIED SHALL BE ONE OF THE FOLLOWING:
      - GALVALUME ALUMINUM-ZINC ALLOY; OR
      - GALVANIZED STEEL PANELS AS PER ASTM SPECIFICATION A653.

1. FASTENERS:
   A. SELF-TAPPING SHEET METAL SCREWS SHALL HAVE TYPE "A" OR TYPE "AB" THREADS. WHERE REQUIRED FOR WEATHER TIGHTNESS, SCREWS SHALL BE EQUIPPED WITH METAL AND NEOPRENE WASHERS. SCREWS SHALL HAVE HEX HEADS, SHALL BE ZINC PLATED AND, WHEN NECESSARY, COLOR COATED TO MATCH ROOF OR WALL PANELS.
2. ANCHORAGE:
   A. THE BUILDING ANCHOR BOLTS SHALL BE DESIGNED TO RESIST THE MAXIMUM COLUMN REACTIONS RESULTING FROM THE SPECIFIC COMBINATIONS OF LOADINGS. THE ANCHOR BOLT DIAMETER AND PROJECTION SHALL BE SPECIFIED BY THE BUILDING MANUFACTURER.

SITE PREPARATION SCHEMATIC: GRADE BEAM



* INITIAL ROUGH GRADING SHALL BE COMPLETED W/ NATURAL CLAY MATERIALS (NO SAND ALLOWED) PRIOR TO FORM SETTING. IT SHALL SLOPE 1"/FT. FOR THE FIRST 5' & 6" MIN. IN 10' TO INSURE POSITIVE DRAINAGE AWAY FROM THE SLAB.

NOTE TO OWNER:
DRAINAGE OF THE SITE MUST BE MAINTAINED THROUGHOUT THE LIFE OF THE STRUCTURE. THE SOIL AT THIS SITE (SEE GEOTECHNICAL REPORT) MAY BE HIGHLY SENSITIVE TO CHANGE IN THE SOIL MOISTURE CONTENT AND WILL DAMAGE THE STRUCTURE IF THE MOISTURE CONTENT DECREASES OR INCREASES.

NOTE TO CONTRACTOR:
PROVIDE PUMPS ON SITE AND REMOVE ANY WATER FROM THE SITE 100% OF THE TIME. STANDING WATER IN THE EXCAVATION AT ANYTIME DAY OR NIGHT IS UNACCEPTABLE.

COLD ROLLED STEEL SPECIFICATIONS (SSMA):

1. PRIOR TO FABRICATION THE CONTRACTOR SHALL SUBMIT SIGNED AND SEALED CALCULATIONS AND ERECTION DRAWINGS FOR COLD ROLLED STEEL TO THE STRUCTURAL ENGINEER FOR APPROVAL. REQUIREMENTS IN THESE NOTES AND DRAWINGS SHALL BE A MINIMUM BASIS FOR DESIGN.
2. ALL STUDS AND/OR JOISTS AND ACCESSORIES SHALL BE OF THE MINIMUM SIZE, GAUGE AND SPACING SHOWN ON THE DRAWINGS.
3. IT IS THE CONTRACTOR'S RESPONSIBILITY TO VERIFY/COORDINATE THAT THE STUD GAUGE MEETS THE MINIMUM MANUFACTURE REQUIREMENTS OF ALL EXTERIOR FINISHES (BRICK, EFIS, STUCCO, ETC.).
4. ALL STRUCTURAL MEMBERS AND CONNECTIONS SHALL BE DESIGNED IN ACCORDANCE WITH AMERICAN IRON AND STEEL INSTITUTE (AISI) "SPECIFICATION FOR THE DESIGN OF COLD FORMED STEEL STRUCTURAL MEMBERS", LATEST EDITION.
5. ALL STUDS, RUNNERS, JOISTS AND TRUSSES SHALL BE FORMED FROM GALVANIZED STEEL, CORRESPONDING TO THE REQUIREMENTS OF ASTM A553, WITH A MINIMUM YIELD STRENGTH OF 50 KSI FOR .097, .068, .054 THICK MEMBERS AND 33 KSI FOR .043 AND .033 THICK MEMBERS AND FLAT STRAP BRACING.
6. PREFABRICATED PANELS SHALL BE SQUARE, WITH COMPONENTS ATTACHED IN A MANNER AS TO PREVENT RACKING. HANDLING AND LIFTING SHALL BE DONE IN A MANNER SO AS NOT TO CAUSE DISTORTION IN ANY MANNER.
7. ALL FRAMING COMPONENTS SHALL BE CUT SQUARELY FOR ATTACHMENT TO PERPENDICULAR MEMBERS OR, AS REQUIRED, FOR AN ANGULAR FIT AGAINST ABUTTING MEMBERS.
8. AXIALLY LOADED STUDS SHALL BE INSTALLED IN A MANNER WHICH WILL ASSURE THAT THEIR ENDS ARE POSITIONED AGAINST THE INSIDE OF TRACK WEB PRIOR TO FASTENING. ALL PANEL STUDS SHALL BE COMPRESSED TO ENSURE THAT ALL STUDS ARE SEATED IN THE TRACK, SO THAT CONNECTIONS ARE NOT COMPROMISED WHEN PANELS ARE LOADED.
9. FASTENING OF COMPONENTS SHALL BE WITH SELF-DRILLING SCREWS OR WELDS. SCREWS OR WELDS SHALL BE OF SUFFICIENT SIZE TO INSURE THE STRENGTH OF THE CONNECTION. WIRE TYING OF COMPONENTS SHALL NOT BE PERMITTED. ALL WELDS SHALL BE TOUCHED-UP WITH A ZINC-RICH PAINT.
10. RUNNERS SHALL BE SECURELY ANCHORED TO THE SUPPORTING STRUCTURE. PROPOSED CONNECTION TO BE SUBMITTED FOR APPROVAL.
11. ABUTTING LENGTHS OF TRACK SHALL EACH BE SECURELY ANCHORED TO A COMMON STRUCTURAL ELEMENT OR SPLICED.
12. STUDS SHALL BE PLUMB, ALIGNED AND SECURELY ATTACHED TO FLANGES OF BOTH UPPER AND LOWER TRACKS.
13. JACK STUDS OR CRIPPLES SHALL BE INSTALLED BELOW WINDOW SILLS, ABOVE WINDOW AND DOOR HEADERS, AND WHERE NEEDED TO FURNISH SUPPORT, AND SHALL BE SECURELY ATTACHED TO CONNECTING MEMBERS.
14. RESISTANCE TO MINOR AXIS BENDING AND ROTATION SHALL BE PROVIDED BY GYPSUM BOARD OR GYPSUM SHEATHING AND BY HORIZONTAL STRAP AND BLOCKING OR COLD-ROLLED CHANNEL BRACING AT THIRD POINTS.
15. SPLICES IN AXIALLY LOADED STUDS SHALL NOT BE PERMITTED.
16. PROVIDE A MINIMUM OF (3) #12 SCREWS FOR ALL STUD TO STUD CONNECTIONS.
17. BRIDGING SHALL BE INSTALLED IMMEDIATELY AFTER JOISTS ARE ERECTED AND BEFORE CONSTRUCTION LOADS ARE APPLIED TO PREVENT FLANGE ROTATION AND TO SUPPORT FLANGES IN COMPRESSION.
    A. BRIDGING SHALL CONSIST OF SOLID BLOCKING PLUS STRAP BRACING OR 1 1/2" COLD-ROLLED CHANNELS SCREW-ATTACHED OR WELDED TO BOTTOM JOIST FLANGES.
    B. BRIDGING SHALL BE INSTALLED AT MID SPAN FOR SPANS 16'-0" OR LESS AND AT 8'-0" O.C. MAX. FOR SPANS GREATER THAN 16'-0" U.N.O. SOLID BLOCKING, OF FIELD-CUT TRACK OR JOIST SECTION, SHALL BE PROVIDED, WELDED OR SCREW-ATTACHED BETWEEN OUTER JOISTS, OVER ALL INTERIOR SUPPORTS AND ADJACENT TO OPENINGS AT 10'-0" O.C. MAX. COLD-ROLLED CHANNELS OR STRAP BRACING OF 1 1/2" X 33 MIL (0.033") CORROSION-RESISTANT STEEL SHALL BE SCREW-ATTACHED TO BOTTOM JOIST FLANGE BETWEEN SOLID BLOCKING. REFERENCE MANUFACTURER INSTALLATION INSTRUCTIONS.
18. SSMA STEEL FRAMING CARRIES A FOUR PART CODE THAT IDENTIFIES THE WEB SIZE, STYLE, FLANGE WIDTH AND STEEL THICKNESS:

362 S 162-43

WEB SIZE:		STYLE:	FLANGE WIDTH	STEEL THICKNESS (MIL):
250 - 2 1/2"	600 - 6"	S OR J - STUD/JOIST	125 - 1 1/4"	33
350 - 3 1/2"	800 - 8"	T - TRACK	137 - 1 3/8"	43
362 - 3 5/8"	1000 - 10"		162 - 1 5/8"	54
400 - 4"	1200 - 12"		200 - 2"	68
550 - 5 1/2"	1400 - 14"		250 - 2 1/2"	97

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SkyDancing
CONSULTANTS ASSOCIATES, INC.
12511 EMILY COURT,
SUGAR LAND, TEXAS 77478
SCAENGINEERS.COM 713-779-7252

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TEXAS FIRM #24110

WALLER COUNTY
JAIL GARAGE
WALLER COUNTY, TX

STATE OF TEXAS
WESTLEY J. HINTON
100622
LICENSED PROFESSIONAL ENGINEER
4/11/25

REV	DATE:	ISSUED FOR:
	03-28-2025	PROGRESS SET
	04-11-2025	100% CD SET

PROJECT NO.: 25033S
DRAWN BY: Author QC: Checker

General Notes

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STRUCTURAL STEEL FRAMING NOTES:

1. ALL STRUCTURAL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH "THE SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS", AISC 360 AND THE "CODE OF STANDARD PRACTICE FOR STEEL BUILDINGS AND BRIDGES", AISC 303, LATEST APPROVED EDITIONS.
2. ALL STRUCTURAL STEEL SHALL BE FABRICATED IN ACCORDANCE WITH THE LATEST OSHA SAFETY STANDARDS FOR STEEL ERECTION. STRUCTURAL DOCUMENTS INDICATE TYPICAL CONDITIONS. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE THAT ALL OSHA REQUIREMENTS ARE MET.
3. STEEL MATERIALS SHALL CONFORM TO THE FOLLOWING MINIMUM REQUIREMENTS UNLESS OTHERWISE NOTED ON THE CONTRACT DOCUMENTS:

A. WIDE FLANGE SHAPES	ASTM A992 (50 KSI)
B. CHANNELS	ASTM A36 (36 KSI)
C. ANGLES	ASTM A36 (36 KSI)
D. SQUARE AND RECTANGULAR TUBES (HSS)	ASTM A500, GRADE C (50 KSI)
E. ROUND TUBES (HSS)	ASTM 500, GRADE C (46 KSI)
F. STEEL PIPE	ASTM A53, GRADE B (35 KSI)
G. PLATES AND BARS	ASTM A36 (36 KSI)
H. BOLTS	ASTM A325 OR A490
I. NUTS	ASTM A563
J. WASHERS	ASTM F436
K. ANCHOR RODS	ASTM F1554 (36 KSI)
L. HEADED STUDS	ASTM A108
M. WELDED ELECTRODES	E70XX

4. ALL NON-SHRINK GROUTS FOR LEVELING OF BASE PLATES SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 5000 P.S.I. AT 28 DAYS. GROUT SHALL COMPLY WITH CORP OF ENGINEERS SPECIFICATION CRD-C 621.
5. SPLICING OF STRUCTURAL STEEL MEMBERS IS PROHIBITED WITHOUT PRIOR APPROVAL OF THE STRUCTURAL ENGINEER AS TO LOCATION AND TYPE OF SPLICE TO BE MADE.
6. CAMBER INDICATED ON THESE DRAWINGS IS THE REQUIRED CAMBER AT TIME OF ERECTION. CAMBERED BEAMS SHALL BE ERECTED SUCH THAT THE PROFILE OF THE BEAMS ARE CROWNED UPWARD.
7. ALL STEEL AT OR BELOW FINISHED GRADE OR BELOW FLOOR SLAB SHALL RECEIVE 2 COATS OF BITUMINOUS PAINT OR 3" MINIMUM CONCRETE COVER.
8. ALL STRUCTURAL STEEL THAT IS EXPOSED TO WEATHER SHALL BE HOT-DIPPED GALVANIZED.
9. "MC" AND / OR " ⊢⊣ " DENOTES COMPLETE PENETRATION MOMENT CONNECTIONS
10. ALL SHOP DRAWINGS SHALL BE REVIEWED BY THE STRUCTURAL ENGINEER. DRAWINGS TO HAVE CONTRACTORS STAMP AFFIXED PRIOR TO REVIEW. CERTIFIED COPIES OF MILL TEST REPORTS SHALL BE AVAILABLE UPON REQUEST.
11. THE GENERAL CONTRACTOR SHALL NOTIFY THE STRUCTURAL ENGINEER OF ANY FABRICATION OR ERECTION ERRORS OR DEVIATIONS AND RECEIVE WRITTEN APPROVAL BEFORE ANY FIELD CORRECTIONS ARE MADE. GAS CUTTING TORCHES SHALL NOT BE USED TO CORRECT FABRICATION ERRORS WITHOUT THE APPROVAL OF THE STRUCTURAL ENGINEER.

STRUCTURAL STEEL CONNECTION NOTES:

1. ALL CONNECTIONS, SPLICES AND ERECTION PIECES SHALL BE DESIGNED AND DETAILED BY THE FABRICATOR'S STRUCTURAL ENGINEER LICENSED IN THE JURISDICTION OF THE PROJECT UNLESS INDICATED AS BEING FULLY DESIGNED ON THE STRUCTURAL DRAWINGS. SHOP DRAWINGS SHALL BE SUBMITTED BEARING THE ENGINEER'S SEAL AND SIGNATURE. CALCULATIONS BEARING THE ENGINEER'S SEAL AND SIGNATURE SHALL BE SUBMITTED TO THE STRUCTURAL ENGINEER. DESIGN, DETAIL, FURNISH AND INSTALL STIFFENERS, CONTINUITY PLATES, DOUBLER PLATES, OR OTHER NECESSARY ADDITIONAL PARTS AS REQUIRED FOR LOCAL STRENGTHENING.
2. UNLESS NOTED OTHERWISE, DETAILS INDICATED ON DRAWINGS INDICATE GENERAL CRITERIA FOR DESIGN AND DETAILING OF CONNECTIONS. DETAILS INDICATED ON DRAWINGS ARE NOT INTENDED TO CONVEY COMPLETE CONNECTOR SIZES, PLATE SIZES, WELD SIZES, NUMBER OF BOLTS, OR ANY OTHER SPECIFIC INFORMATION THAT IS OBTAINED THROUGH DESIGNING OF A CONNECTION FOR A GIVEN SET OF LOADS. DETAILS SHOWN ON THE DRAWINGS DO NOT SHOW ERECTION AIDS. PROVIDE ERECTION AIDS AS REQUIRED AND REMOVE THEM AFTER WORK IS COMPLETE.
3. ALL SHOP AND FIELD CONNECTIONS SHALL BE MADE WITH HIGH STRENGTH BOLTS OR WELDS. ALL HIGH STRENGTH BOLTS AND NUTS SHALL BE CLEARLY MARKED AS REQUIRED BY AISC SPECIFICATIONS.
4. DESIGN ALL GRAVITY CONNECTIONS FOR FORCES INDICATED ON THE DRAWINGS. CONNECTION DESIGN FORCES INDICATED ON THE DRAWINGS ARE UN-FACTORED U.N.O.. WHERE THE REACTION IS OMITTED FROM THE DRAWINGS, DESIGN THE CONNECTION FOR ONE HALF OF THE MAXIMUM TOTAL UNIFORM LOAD AS DEFINED IN THE AISC STEEL CONSTRUCTION MANUAL, TABLE 3-6 FOR NON-COMPOSITE BEAMS. FOR COMPOSITE BEAM CONNECTIONS, MULTIPLY ONE HALF OF THE AISC TABLE VALUE BY FACTORS NOTED BELOW.

DESIGN REACTION TABLE	
BEAM WEIGHT	FACTOR
UP TO 36# / FT.	2.0
37 TO 44# / FT.	1.8
45 TO 60# / FT.	1.7
61# / FT. AND OVER	1.6

COMPOSITE BEAM CONNECTION SHALL DEVELOP ONE-HALF OF THE TOTAL NON-COMPOSITE UNIFORM LOAD CAPACITY OF THE MEMBER MULTIPLIED BY THE FACTORS SHOWN U.N.O. ON PLAN

MOMENT CONNECTIONS SHALL BE DESIGNED FOR THE FULL PLASTIC MOMENT OF THE BEAM IF THE MOMENT IS OMITTED FROM THE DRAWINGS.

5. BRACE AND / OR TRUSS CONNECTIONS SHALL DEVELOP FULL FORCES SHOWN ON DRAWINGS AT EACH END OF MEMBER. CONNECTION DESIGN FORCES INDICATED ON THE DRAWINGS ARE UN-FACTORED U.N.O. WHERE BRACE AND / OR TRUSS (VERTICAL, HORIZONTAL AND DIAGONAL) FORCES ARE OMITTED FROM THE DRAWINGS DESIGN THE CONNECTIONS TO DEVELOP THE ALLOWABLE TENSILE AND COMPRESSIVE STRENGTH OF THE MEMBER SIZES SHOWN.
6. NO CONNECTION SHALL CONSIST OF LESS THAN (2) ¾" DIA. A325-N BOLTS OR WELDS DEVELOPING LESS THAN 10 KIPS. MINIMUM WELD SIZE SHALL BE A 3/16" FILLET WELD, OR MIN. PER ACIS D1.1, WHICHEVER IS LARGER.
7. FOR CONNECTION DESIGN AND DETAILING, SET CONNECTION WORK POINT AT INTERSECTION OF MEMBER CENTERLINES, U.N.O.
8. DO NOT USE OVERSIZED OR SLOTTED HOLES FOR ANY CONNECTIONS UNLESS SPECIFICALLY INDICATED ON HE DRAWINGS OR APPROVED BY THE STRUCTURAL ENGINEER OF RECORD.
9. ALL BOLTS SHALL BE TIGHTENED TO THE "SNUG-TIGHT" CONDITION DEFINED AS THE TIGHTNESS ATTAINED BY A FEW IMPACTS OF AN IMPACT WRENCH OR THE FULL EFFORT OF AN IRONWORKER USING AN ORDINARY SPUD WRENCH AS A MINIMUM U.N.O. THE "SNUG-TIGHT" CONDITION MUST ENSURE THAT THE PLIES OF THE CONNECTED MATERIAL HAVE BEEN BROUGHT INTO SNUG CONTACT.
10. ALL BOLTS SUBJECT TO DIRECT TENSION OR DESIGNATED "SC" (SLIP-CRITICAL) SHALL BE PRE-TENSIONED IN ACCORDANCE WITH ONE OF THE FOLLOWING METHODS AS DESCRIBED IN THE AISC "MANUAL OF STEEL CONSTRUCTION": TURN OF NUT TIGHTENING, CALIBRATED WRENCH TIGHTENING OR DIRECT TENSION INDICATOR TIGHTENING.
11. EXPANSION JOINT CONNECTIONS AND SLIP CONNECTION INDICATED SHALL PROVIDE FREE MOVEMENT. BOLTS SHALL HAVE NUTS FINGER TIGHTENED AND THREADS CRIMPED.
12. PROVIDE ACCESS FOR INSPECTION OF ALL SHOP AND FIELD CONNECTIONS FOR PROPER MATERIALS AND WORKMANSHIP. ALL CONNECTIONS SHALL BE INSPECTED BY AN INDEPENDENT TESTING LABORATORY.
13. ALL WELDING INCLUDING WELDING ELECTRODES, WELDING PROCESS, MINIMUM PREHEAT AND INTERPASS TEMPERATURES SHALL BE IN ACCORDANCE WITH THE AISC AND AWS SPECIFICATIONS. ANY STRUCTURAL STEEL DAMAGED IN WELDING IS TO BE REPLACED OR REINFORCED AS ACCEPTABLE TO THE STRUCTURAL ENGINEER. WELDERS SHALL HAVE CURRENT EVIDENCE OF PASSING THE APPROPRIATE AWS QUALIFICATION TESTS. THE ENGINEER MAY REQUEST SUCH EVIDENCE AT ANY TIME DURING THE PROJECT.
14. COMPLETE JOINT PENETRATION WELDS SHALL HAVE A MINIMUM CHARPY V-NOTCH IMPACT TESTING VALUE AS FOLLOWS:
    A. ASTM A6 HOT ROLLED SHAPES WITH A FLANGE THICKNESS EXCEEDING 2 INCHES AND BUILT UP HEAVY SHAPES WITH PLATES EXCEEDING 2 INCHES IN THICKNESS: 20 FT-LB @ 70 DEG. F
    B. REGARDLESS OF THICKNESS, ALL TRUSSES, LATERAL FORCE RESISTING MEMBERS: 20 FT-LB @ 7 0 DEG. F
    C. WELD METAL: 20 FT-LB @ MINUS 20 DEG. F AND 40 FT-LB @ 70 DEG. F
    D. WELD METAL EXPOSED TO TEMPERATURES IN SERVICE BELOW 50 DEG. F: 25 FT-LB @ 40 DEG. F
15. REMOVE WELD BACK UP BARS AND GRIND SMOOTH AFTER WELD IS COMPLETED, U.N.O..
16. WELDING EXPOSED TO LOW TEMPERATURES IN SERVICE SHALL CONFORM TO AWS D1.5
17. ALL WELD LENGTHS ARE CONTINUOUS U.N.O.
18. ALL GROOVE WELDS ARE COMPLETE JOINT PENETRATION U.N.O.
19. DIRECT CONTACT JOINTS BETWEEN TWO MEMBERS SHALL BE WELDED TO DEVELOP THE ALLOWABLE TENSILE CAPACITY OF THE SMALLER MEMBER U.N.O.

SPECIAL INSPECTION

WHEN INDICATED WITH A ' ✓ ' THE FOLLOWING SHALL BE INSPECTED IN ACCORDANCE WITH IBC SECTION 1704 BY A CERTIFIED SPECIAL INSPECTOR FROM AN ESTABLISHED TESTING AGENCY. ALL INSPECTION SHALL BE CONTINUOUS UNLESS OTHERWISE NOTED. FOR MATERIAL SAMPLING AND TESTING REQUIREMENTS, REFER TO MATERIAL SAMPLING AND TESTING SECTION BELOW. THE TESTING AGENCY SHALL SEND COPIES OF ALL STRUCTURAL TESTING AND INSPECTION REPORTS TO THE STRUCTURAL ENGINEER, ARCHITECT, CONTRACTOR, OWNER AND BUILDING DEPARTMENT (IF REQUIRED). ANY DISCREPANCIES SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTOR FOR CORRECTION, THEN IF LEFT UNCORRECTED TO THE STRUCTURAL ENGINEER, ARCHITECT, AND BUILDING DEPARTMENT (IF REQUIRED).

ITEM	REQUIRED	REMARKS
GRADING, EXCAVATIONS, FILL, FOOTINGS	✓	BY GEOTECHNICAL ENGINEER
DRILLED PIERS/PILES	✓	CONTINUOUS
CONCRETE - BATCH PLANT INSPECTION	✓	PERIODIC
CONCRETE - VERIFY USE OF PROPER MIX DESIGN	✓	PERIODIC
CONCRETE - CONCRETE PLACEMENT	✓	CONTINUOUS
CONCRETE - REBAR PLACEMENT	✓	INSPECT FINAL PLACEMENT
CONCRETE- REBAR WELDING	✓	CONTINUOUS
CONCRETE - ANCHOR BOLTS AND PLATES	✓	INSPECT FINAL PLACEMENT
CONCRETE - POST-TENSIONING STEEL PLACEMENT	✓	INSPECT FINAL PLACEMENT
CONCRETE - POST-TENSIONING STRESSING AND GREASE CAP (PART OF ENCAPSULATED SYSTEM) INSTALLATION		CONTINUOUS
CONCRETE - POST INSTALLED ANCHORS (MECHANICAL AND ADHESIVE)	✓	PERIODIC
CONCRETE - EPOXY	✓	PERIODIC
CONCRETE - SHOTCRETE PLACEMENT		CONTINUOUS
CONCRETE - PRECAST CONCRETE ERECTION		PERIODIC
MASONRY - VERIFICATION OF PROPORTIONS OF SITE PREPARED MORTAR		PERIODIC
MASONRY - VERIFICATION OF MORTAR JOINT		PERIODIC
MASONRY - VERIFICATION OF LOCATION OF REBAR AND CONNECTORS		PERIODIC
MASONRY - SIZE AND LOCATION OF STRUCTURAL ELEMENTS		PERIODIC
MASONRY - TYPE, SIZE AND LOCATION OF ANCHORS		PERIODIC
MASONRY - SIZE, GRADE AND TYPE OF REBAR		PERIODIC
MASONRY - REBAR WELDING		PERIODIC
MASONRY - PROTECTION OF MASONRY DURING HOT (TEMPERATURE ABOVE 90 DEG.) AND COLD WEATHER (TEMPERATURE BELOW 40 DEG.)		PERIODIC
MASONRY - VERIFICATION OF CLEAN GROUT SPACE PRIOR TO GROUT PLACEMENT		PERIODIC
MASONRY - REBAR PLACEMENT		PERIODIC
MASONRY - GROUT PLACEMENT		PERIODIC
MASONRY - COMPLIANCE WITH REQUIRED INSPECTION PROVISIONS OF THE CONSTRUCTION DOCUMENTS AND THE APPROVED SUBMITTALS SHALL BE VERIFIED		PERIODIC
LIGHT GAGE STUD FRAMING; SHOP AND FIELD WELDING	✓	PERIODIC
COMPOSITE METAL DECK	✓	PERIODIC
STRUCTURAL STEEL, SHOP WELDING - FILLET WELDS	✓	PERIODIC
STRUCTURAL STEEL, SHOP WELDING - PARTIAL OR FULL PENETRATION WELDS	✓	CONTINUOUS
STRUCTURAL STEEL, FIELD WELDING - FILLET WELDS	✓	PERIODIC
STRUCTURAL STEEL, FIELD WELDING - PARTIAL OR FULL PENETRATION WELDS	✓	CONTINUOUS
STRUCTURAL WOOD, NAILING, BOLTING, UPLIFT ANCHORS, HOLD-DOWNS		PERIODIC
STRUCTURAL WOOD, SHEARWALLS, DIAPHRAGMS, DRAG STRUTS, BRACES		PERIODIC
DRYWALL - SHEARWALL NAILING/SCREWS		PERIODIC

UPON COMPLETION OF THE JOB, THE TESTING LABORATORY PROVIDING SERVICES SHALL FURNISH TO THE OWNER, ARCHITECT, AND ENGINEER OF RECORD, A STATEMENT SIGNED BY A LICENSED PROFESSIONAL ENGINEER THAT, TO THE BEST OF THEIR KNOWLEDGE, ALL REQUIRED TESTS AND INSPECTIONS WERE MADE IN ACCORDANCE WITH THE REQUIREMENTS OF THE CONTRACT DOCUMENTS.

MATERIAL SAMPLING AND TESTING:

WHEN INDICATED WITH A ' ✓ ' THE FOLLOWING SHALL BE SAMPLED AND TESTED BY A CERTIFIED INSPECTOR FROM AN ESTABLISHED TESTING AGENCY IN ACCORDANCE WITH THE PROJECT SPECIFICATIONS, GENERAL NOTES OR PREVAILING BUILDING CODE, WHICH EVER IS MORE STRINGENT. ALL MATERIAL SAMPLING AND TESTING SHALL BE PERFORMED IN ACCORDANCE WITH ASTM REQUIREMENTS. FOR ADDITIONAL INFORMATION ON MATERIAL SAMPLING AND TESTING, REFER TO PROJECT SPECIFICATIONS AND GENERAL NOTES. THE TESTING AGENCY SHALL SEND COPIES OF ALL STRUCTURAL TESTING REPORTS DIRECTLY TO THE STRUCTURAL ENGINEER, ARCHITECT, CONTRACTOR, OWNER AND BUILDING DEPARTMENT (IF REQUIRED). ANY MATERIALS WHICH FAIL TO MEET THE PROJECT SPECIFICATIONS SHALL IMMEDIATELY BE BROUGHT TO THE ATTENTION OF THE STRUCTURAL ENGINEER.

ITEM	REQUIRED	REMARKS
CONCRETE - REINFORCING	✓	MILL CERTIFICATES
CONCRETE - CYLINDERS	✓	AS REQ. PER SPECIFICATIONS
CONCRETE - DESIGN MIX	✓	CONTINUOUS
CONCRETE -SAMPLING FRESH CONCRETE AND PERFORMING SLUMP, AIR CONTENT AND DETERMINING THE TEMPERATURE OF FRESH CONCRETE AT THE TIME OF MAKING SPECIMENS FOR STRENGTH TESTS	✓	CONTINUOUS
CONCRETE - MAINTENANCE OF SPECIFIED CURING TEMPERATURE AND TECHNIQUES	✓	PERIODIC
CONCRETE - VERIFICATION OF IN-SITU CONCRETE STRENGTH, PRIOR TO STRESSING OF TENDONS IN POSITIONED CONCRETE, AND PRIOR TO REMOVAL OF SHORES AND FORMS FROM BEAMS AND STRUCTURAL SLABS	✓	CONTINUOUS
CONCRETE - LARGE CONCRETE MAT TEMPERATURE MONITORING DURING INITIAL CURING		MONITOR TEMPERATURE DURING CURING
POST-TENSIONING TENDONS		(2) 5 FT. SAMPLES PER REEL. ONE FROM EACH END
STRUCTURAL STEEL, ULTRASONIC TESTING	✓	
STRUCTURAL STEEL, BEND TESTS ON WELDED STUDS	✓	
POST INSTALLED ANCHORS (MECHANICAL AND ADHESIVE)	✓	COORDINATE WITH ENGINEER ON FREQUENCY OF TESTING
MASONRY - PREPARATION OF ANY REQUIRED GROUP SPECIMENS, MORTAR SPECIMENS AND/OR PRISMS		PERIODIC

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SCAENGINEERS.COM 713-779-7252

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TEXAS FIRM #24110

WALLER COUNTY

JAIL GARAGE

WALLER COUNTY, TX

STATE OF TEXAS
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REV	DATE:	ISSUED FOR:
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PROJECT NO.: 25033S
DRAWN BY: Author QC: Checker

General Notes

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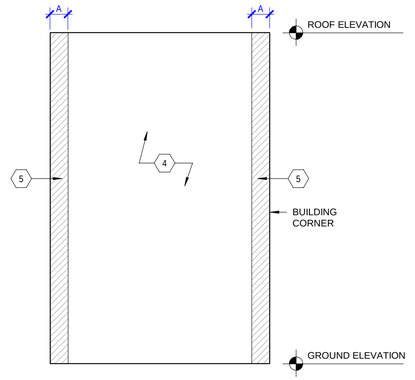
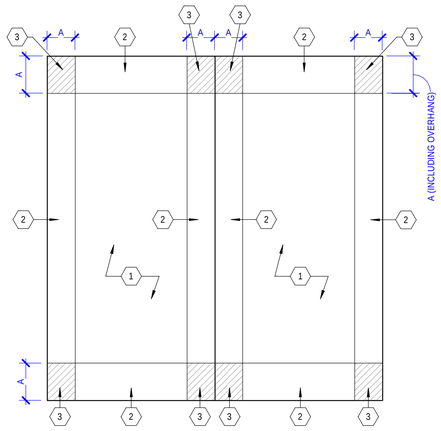


WALL ELEVATION

ZONE LENGTH	
A	_5_'-_0_"

TRIB AREA FT²	DESIGN WIND PRESSURE (LOADS SHOWN ARE SERVICE LOADS)	
	ZONE 4	ZONE 5
10	-14.49 PSF +13.17 PSF	-18.44 PSF +13.17 PSF
25	-13.56 PSF +12.25 PSF	-16.59 PSF +12.25 PSF
50	-12.86 PSF +11.55 PSF	-15.19 PSF +11.55 PSF



GABLE ROOF

TRIB AREA FT²	DESIGN WIND PRESSURE - GABLE/HIP ROOFS WITH SLOPE GREATER THAN 7° & LESS THAN OR EQUAL TO 20°				
	ZONE 1	ZONE 2	ZONE 3	OVERHANG 2	OVERHANG 3
10	-26.34 PSF +7.05 PSF	+39.51 PSF +7.05 PSF	+47.42 PSF +7.05 PSF	+46.10 PSF +7.05 PSF	+61.91 PSF +7.05 PSF
50	-15.09 PSF +4.89 PSF	-26.34 PSF +4.89 PSF	-30.85 PSF +4.89 PSF	-36.22 PSF +4.89 PSF	-39.81 PSF +4.89 PSF
100	-6.59 PSF +3.95 PSF	-20.67 PSF +3.95 PSF	-23.71 PSF +3.95 PSF	-31.27 PSF +3.95 PSF	-30.29 PSF +3.95 PSF

NOTES:

1. ALL BUILDING COMPONENTS, CLADDING, FINISHES AND CONNECTIONS SHALL BE DESIGNED FOR WIND PRESSURES INDICATED FOR THE CORRESPONDING ZONE. CALCULATIONS AND/OR DESIGN DATA MUST BE AVAILABLE FOR REVIEW BY THE STRUCTURAL ENGINEER OF RECORD IF REQUESTED. PRESSURES SHOWN REPRESENT SERVICE LEVEL LOADS.
2. ZONE LENGTH INCLUDES OVERHANG.
3. ALL PARAPETS SHALL BE DESIGNED IN ACCORDANCE WITH THE WIND PRESSURES DETERMINED FROM THE ASCE7 EDITION THAT IS NOTED IN THE GOVERNING BUILDING CODE.
4. ALL ARCHED ROOFS SHALL BE DESIGNED IN ACCORDANCE WITH WIND PRESSURES DETERMINED FROM THE ASCE7 EDITION THAT IS NOTED IN THE GOVERNING BUILDING CODE.
5. PER IBC CHAPTER 16, EXTERIOR GLAZING SHALL BE IMPACT RESISTANT MEETING ASTM E 1886 AND ASTM E 1996 FOR STRUCTURES LOCATED IN WIND-BORNE DEBRIS REGIONS OF HURRICANE-PRONE REGIONS.
   A. IBC DEFINES WIND-BORNE DEBRIS REGIONS AS PORTIONS OF HURRICANE-PRONE REGIONS THAT ARE WITHIN 1 MILE OF THE COASTAL MEAN HIGH WATER LINE WHERE THE BASIC WIND SPEED IS 110 MPH OR GREATER FOR ASCE 7-05 (OR WHERE THE ULTIMATE DESIGN WIND SPEED IS 130 MPH OR GREATER FOR ASCE 7-16 CALCULATED WIND SPEEDS); OR PORTIONS OF HURRICANE-PRONE REGIONS WHERE THE BASIC WIND SPEED IS 120 MPH OR GREATER FOR ASCE 7-05 CALCULATED WIND SPEEDS (OR WHERE THE ULTIMATE DESIGN WIND SPEED IS 140 MPH OR GREATER FOR ASCE 7-16 CALCULATED WIND SPEEDS); OR HAWAII. ADDITIONAL RESTRICTIONS FOR WIND SPEEDS CALCULATED BY ASCE 7-16 ARE STATED IN THE IBC CHAPTER 2.

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WALLER COUNTY

JAIL GARAGE

WALLER COUNTY, TX

STATE OF TEXAS
WESTLEY J. HINTON
100622
LICENSED
PROFESSIONAL ENGINEER
4/11/25

REV	DATE:	ISSUED FOR:
	03-28-2025	PROGRESS SET
	04-11-2025	100% CD SET

PROJECT NO.: 25033S
DRAWN BY: Author QC: Checker

General Notes

S0.13

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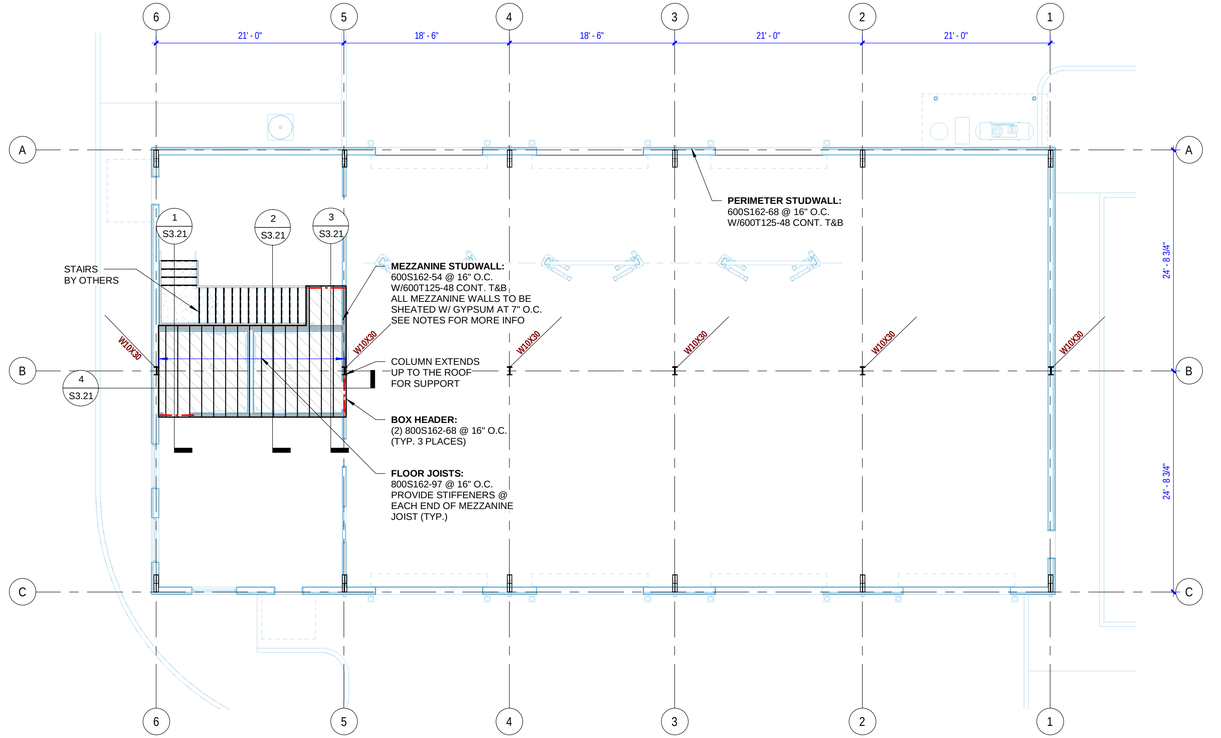
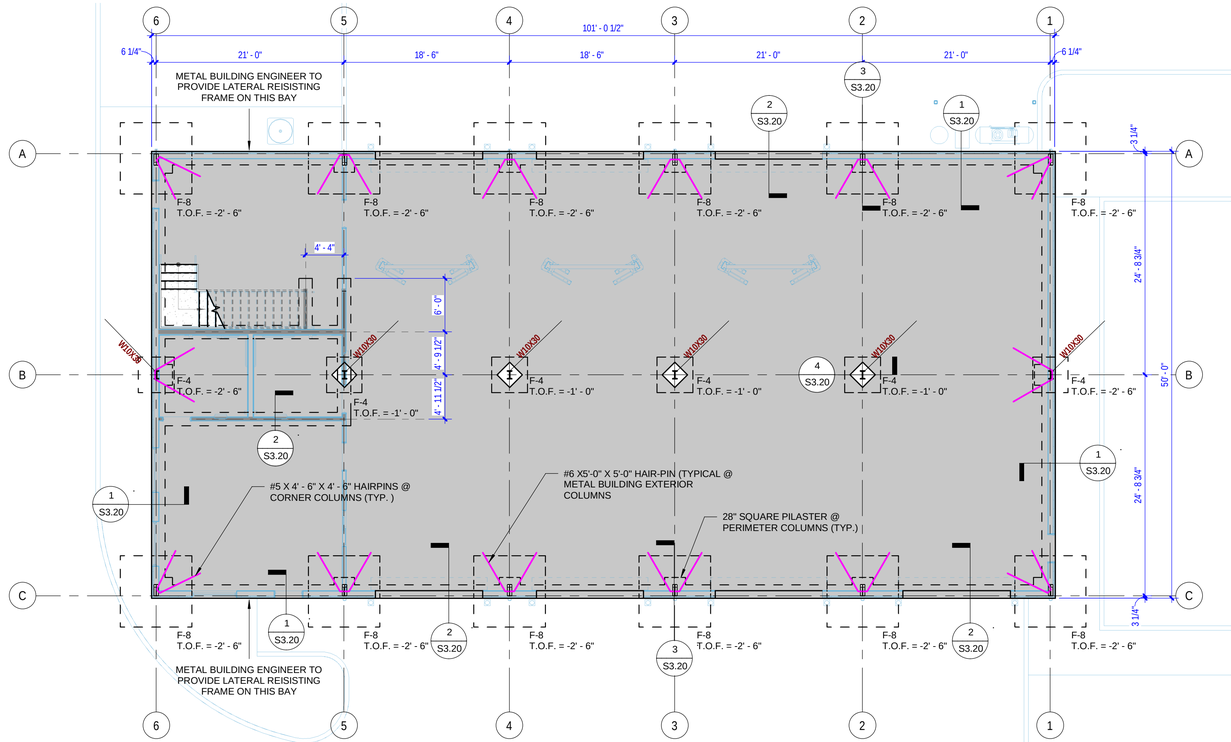
MEZZANINE SHEATHER WITH GYPSUM BOARD SHEAR-WALL:
1. GYPSUM BOARD (GYP) TO BE 1/2" THICK MINIMUM.
2. ALL GYP EDGES TO BE ATTACHED TO STRUCTURAL MEMBERS OR BLOCKING AND SCREWED AS SPECIFIED IN THE SHEAR WALL SCHEDULE.
3. SCREWS ATTACHING GYP SHEATHING TO BE SELF TAPPING SCREWS IN ACCORDANCE WITH ASTM C954 OR ASTMC1002.
4. STRAP BLOCKING IS TO BE ATTACHED TO THE STEEL FRAMING THEN GYP SHEATHING IS TO BE SCREWED TO THE STRAP. STRAP BLOCKING TO BE MIN. THICKNESS OF 33 MILS AND 1 1/2" WIDE.
5. SCREW EDGE DISTANCE IS 3/8" MIN.



Mezzanine Framing Plan

1/8" = 1'-0"



Foundation Plan - Level 1

1/8" = 1'-0"

Schedule - Footing Schedule					
Type	Width	Length	Thickness	Reinforcement (BOTTOM)	Reinforcement (TOP)
F-4	4' - 0"	4' - 0"	1' - 0"	(4) #5 EACH WAY	(4) #5 EACH WAY
F-8	8' - 0"	8' - 0"	1' - 6"	(8) #6 EACH WAY	(8) #5 EACH WAY

NOTE:
1. METAL BUILDING ENGINEER TO PROVIDE COLUMN REACTIONS TO SKYDANCING CONSULTANT ASSOCIATES, INC. BEFORE FOUNDATION CONSTRUCTION BEGINS AND STEEL HAS BEEN ORDERED/BOUGHT.
2. THE METAL BUILDING ENGINEER IS RESPONSIBLE FOR ENSURING THAT THE LOADS FROM THE BUILDING ARE ADEQUATELY TRANSFERRED TO THE FOUNDATIONS. RE: METAL BUILDING DRAWINGS FOR ANCHORAGE DETAILS AND ANY ADDITIONAL REINFORCING REQUIRED.
3. CONTRACTOR TO VERIFY ALL DIMENSIONS AND EXISTING CONDITION AND REPORT ANY DISCREPANCIES TO THE ARCHITECT OR STRUCTURAL ENGINEER PRIOR TO CONSTRUCTION.
4. MAX. 1" OF PVR WAS ASSUMED FOR DESIGN OF FOUNDATION SYSTEM. CONTRACTOR TO FOLLOW GEOTECH REPORT REQUIREMENTS AND RECOMMENDATIONS TO ACHIEVE THIS.

FOUNDATION NOTES:
1. TOP OF CONCRETE ELEVATION = SEE PLAN
2. SLAB THICKNESS = SEE PLAN

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Foundation and Mezzaning Framing Plan

S1.10

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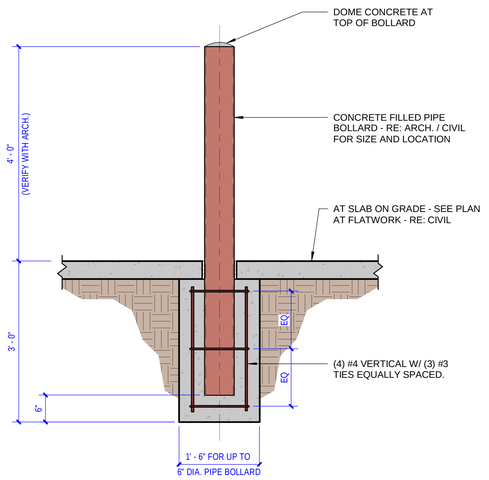
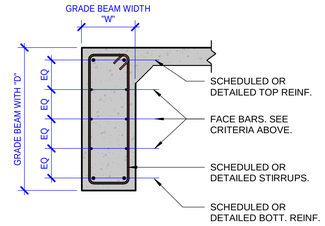


6 Pipe Bollard Foundation

3/4" = 1'-0"

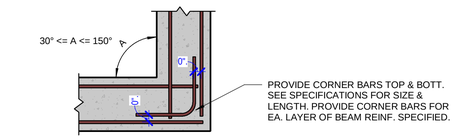
FACE BAR CRITERIA	
BEAM DEPTH	BARS EACH FACE
36 <= D < 42	(5) #4
42 <= D < 48	(5) #4
48 <= D < 54	(5) #5
54 <= D < 60	(5) #6
60 <= D < 72	(5) #7
72 <= D < 84	(6) #8
84 <= D < 96	(8) #8



NOTES:
1. PROVIDE FACE BARS BY CRITERIA SHOWN FOR ALL GRADE BEAMS UNLESS GIVEN OTHERWISE IN SCHEDULES OR DETAIL.
2. CONSTRUCTION JOINT LOCATIONS:
   A. LAP FACE BARS W/ CLASS B LAP AT SPLICES.
   B. SPACE FACE BARS EVENLY EA. FACE BETWEEN TOP & BOTT. REINF.

3 Typical Detail at Grade Beam

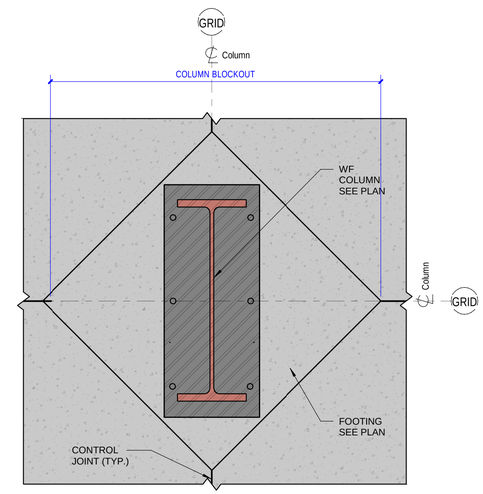
3/4" = 1'-0"



NOTE:
GRADE BEAM SHALL BE POURED MONOLITHICALLY AROUND CORNERS. SEE TYP. GRADE BEAM CONSTRUCTION JOINT DETAIL FOR ACCEPTABLE CONSTRUCTION JOINT LOCATIONS.

2 Grade Beam Splice at Corner

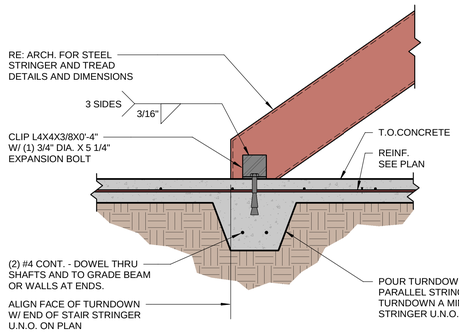
3/4" = 1'-0"



INTERIOR WF COLUMN

1 Typical Steel Column Blockout

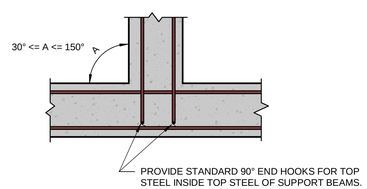
1" = 1'-0"



NOTES:
1. GENERAL CONTRACTOR IS RESPONSIBLE FOR THE COORDINATION OF STAIR STRINGER LOCATIONS WITH ARCHITECTURAL DRAWINGS AND PROVIDE TURNDOWNS WHERE REQUIRED WHETHER SHOWN ON STRUCTURAL DRAWINGS OR NOT.
2. CLIP ANGLE TO BE HIDDEN BENEATH FIRST TREAD. WHERE OPEN RISERS ARE USED, COORDINATE THE LOCATION WITH THE ARCHITECT.

5 Typical Interior Turndown at Stair

1" = 1'-0"

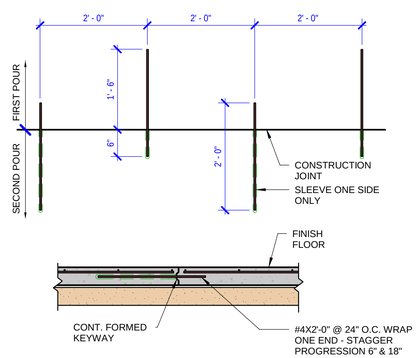


NOTE:
GRADE BEAM SHALL BE POURED MONOLITHICALLY AT INTERSECTIONS. SEE TYP. GRADE BEAM CONSTRUCTION JOINT DETAIL FOR ACCEPTABLE CONSTRUCTION JOINT LOCATIONS.

4 Grade Beam Reinforcement at "T" Intersection

3/4" = 1'-0"

NOTE:
CONTRACTOR MAY CHANGE THE LOCATION OF JOINT WITH STRUCTURAL ENGINEER'S PRIOR APPROVAL.



7 Typical Detail at Construction Joint

3/4" = 1'-0"

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Typical Foundation Sections

S3.10

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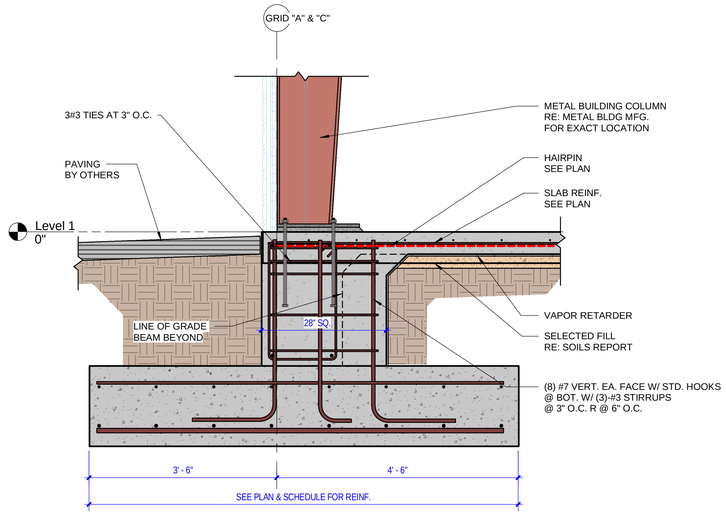
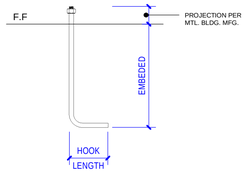


3 Exterior Section at Pilaster

3/4" = 1'-0"



BOLT DIA.	EMBEDED	HOOK LENGTH
1/2"	5"	2"
5/8"	10"	3"
3/4"	1' - 0"	3"
1"	1' - 3"	4"
1 1/4"	1' - 6"	6"

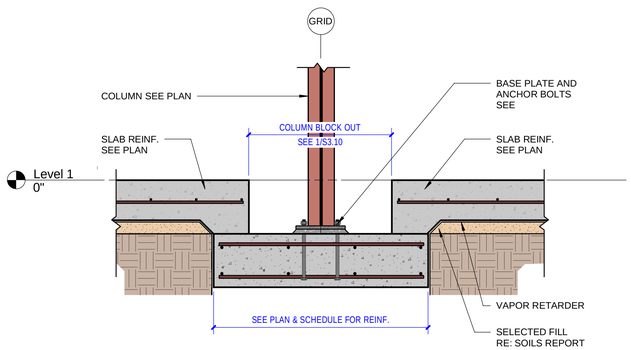
NOTE:
DIMS. FOR BOLTS ON METAL BUILDING MFG.
SHOP DRAWINGS TAKE PRECEDENCE

5 Achor Bolt Chart

1" = 1'-0"

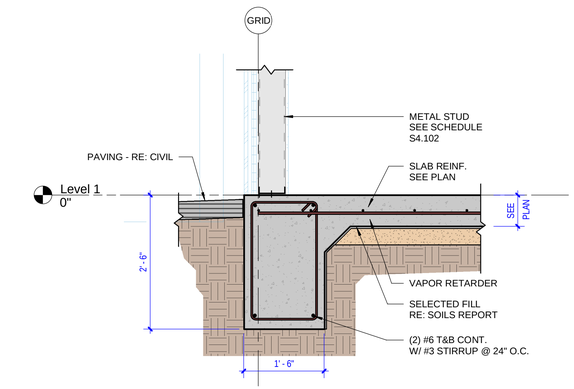
2 Exterior Section at Bay Door

3/4" = 1'-0"



4 Section at Interior Blockout

3/4" = 1'-0"



1 Typical Exterior Section

3/4" = 1'-0"

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Foundation Sections

S3.20

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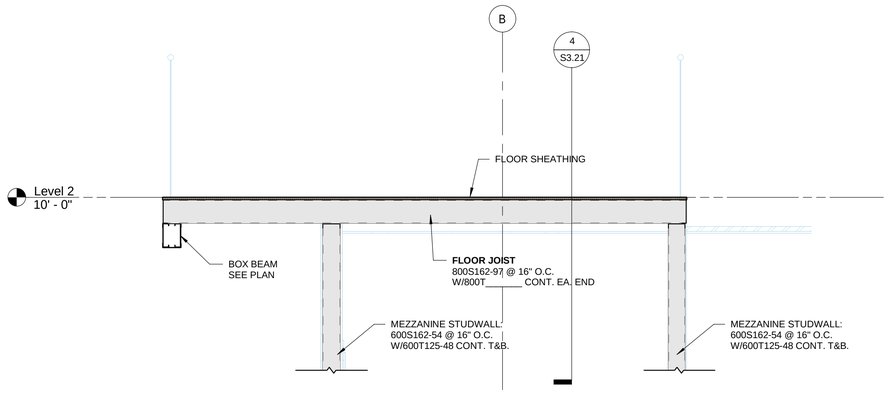
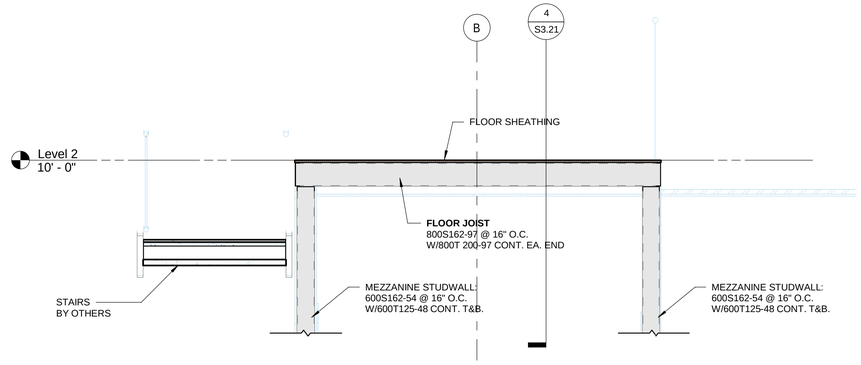


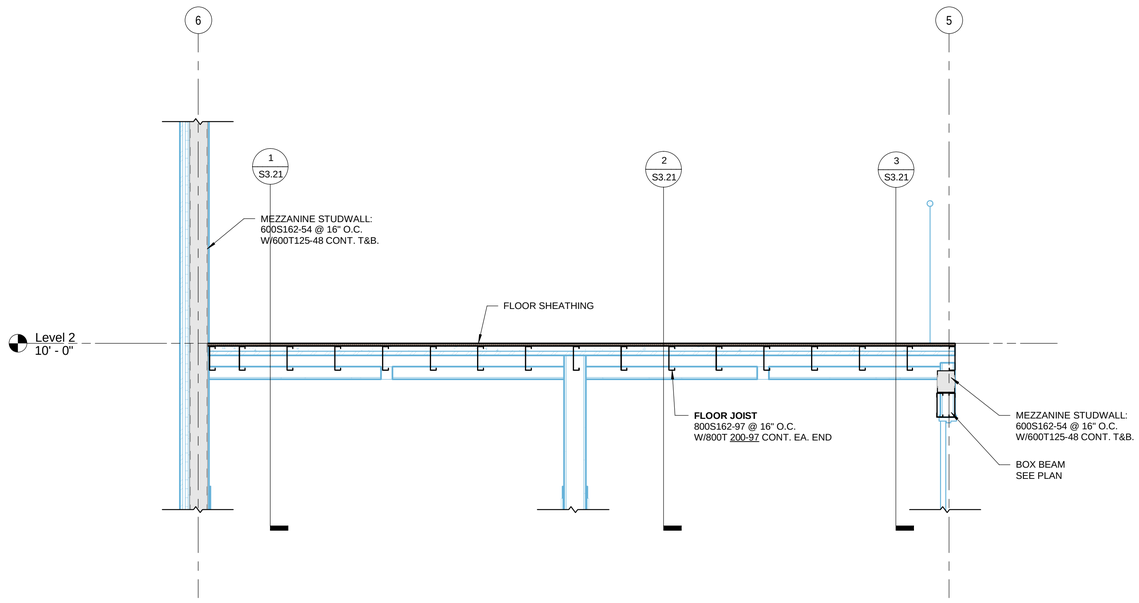
3 Section at Mazzanine

1/2" = 1'-0"



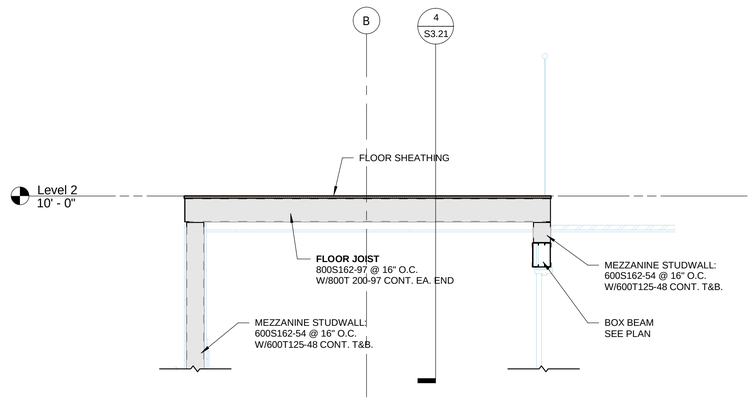
2 Section at Mazzanine

1/2" = 1'-0"



4 Section at Mazzanine

1/2" = 1'-0"



1 Section at Mazzanine

1/2" = 1'-0"

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Framing Sections

S3.21

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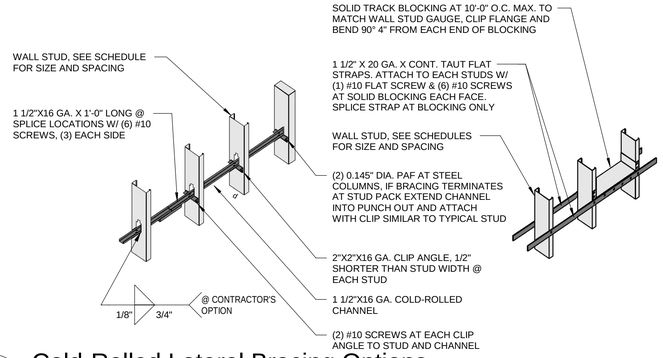


6 Cold-Rolled Lateral Bracing Options

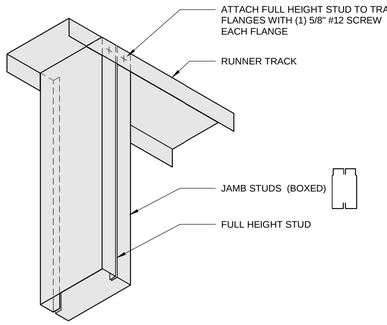
3/4" = 1'-0"

METAL STUD SCHEDULE EXTERIOR NON-LOAD BEARING (AT NON-PRECAST AREAS)		
HEIGHT	STUD	TRACK
0' TO 10'-0"	600S200-43 @ 16" O.C.	600T125-54
10'-1" TO 18'-0"	800S200-54 @ 16" O.C.	800T125-54
18'-1" TO 20'-0"	800S200-68 @ 16" O.C.	800T125-68
20'-1" TO 22'-0"	(2) 800S200-54 @ 16" O.C.	800T125-68

NOTE:
FASTEN TRACKS TO CONCRETE SLAB AND/OR STEEL BEAM W/ 0.145" DIA. P.A.F. AT 24" O.C. OR AT EA. STUD, WHICH EVER IS LESS (TYP. U.N.O.).

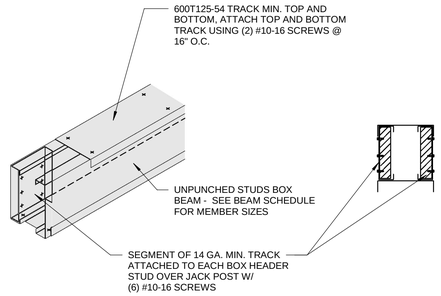
3 Non-Load Bearing Stud Schedule

3/4" = 1'-0"



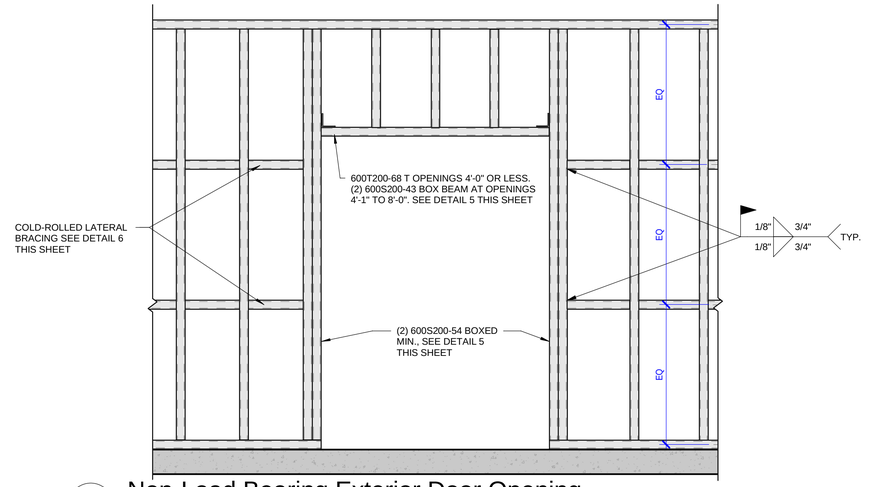
9 Stud to Top Track Attachment

3/4" = 1'-0"



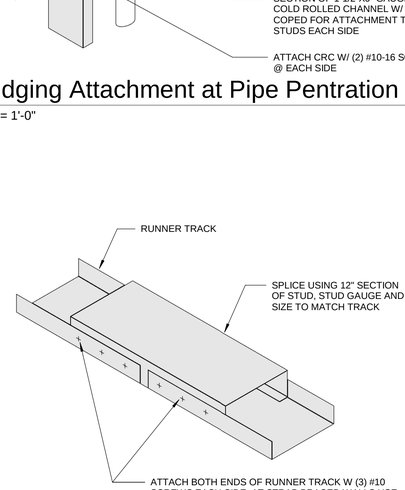
5 Box Beam / Web Stiffner Detail

3/4" = 1'-0"



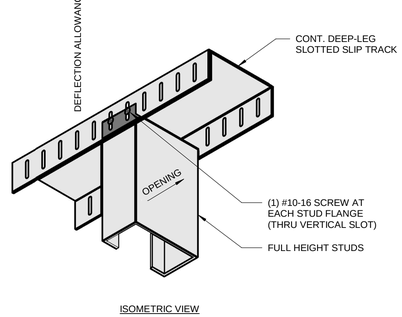
2 Non-Load Bearing Exterior Door Opening

3/4" = 1'-0"

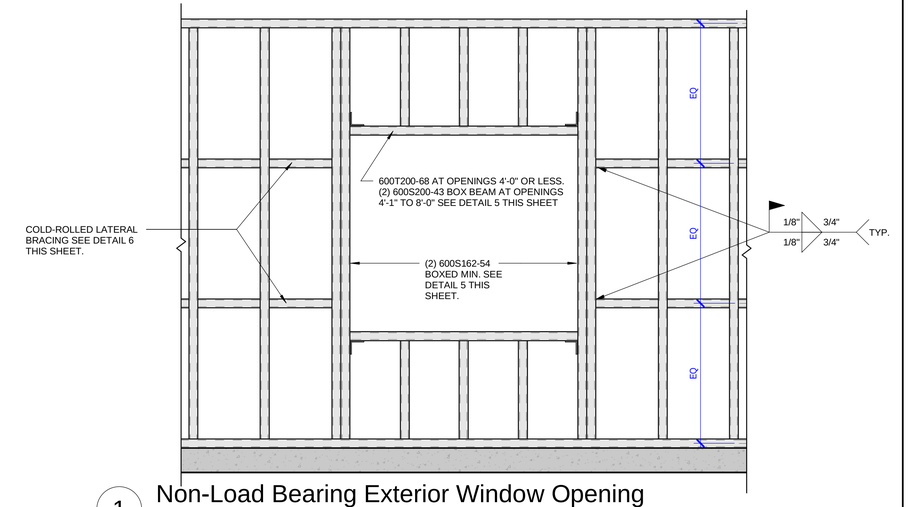


8 Bridging Attachment at Pipe Pentration

3/4" = 1'-0"



ISOMETRIC VIEW

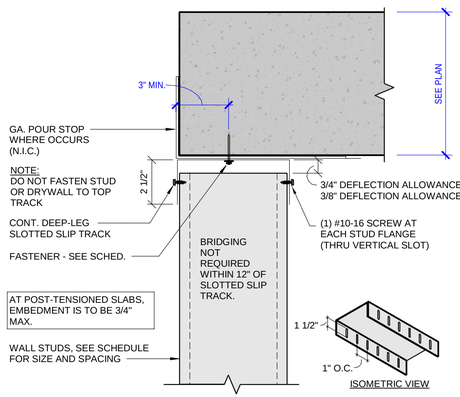


1 Non-Load Bearing Exterior Window Opening

3/4" = 1'-0"

7 Track Splice

3/4" = 1'-0"



ISOMETRIC VIEW

4 Non-Load Bearing Stud to Top Track Attachment

3" = 1'-0"

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TEXAS FIRM #24110

WALLER COUNTY

JAIL GARAGE

WALLER COUNTY, TX

STATE OF TEXAS
WESTLEY J. HINTON
100622
LICENSED PROFESSIONAL ENGINEER
4/11/25

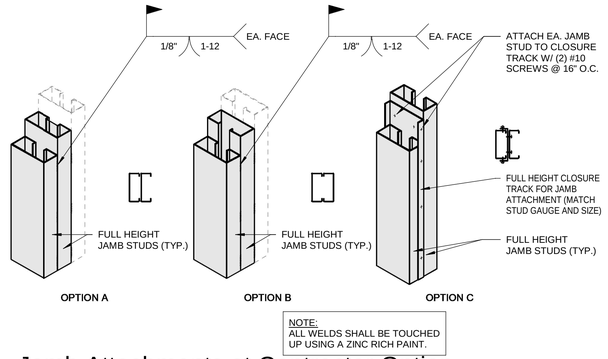
REV	DATE:	ISSUED FOR:
	03-28-2025	PROGRESS SET
	04-11-2025	100% CD SET

PROJECT NO.: 25033S
DRAWN BY: Author QC: Checker

Typical Metal Stud Framing Details

S4.01

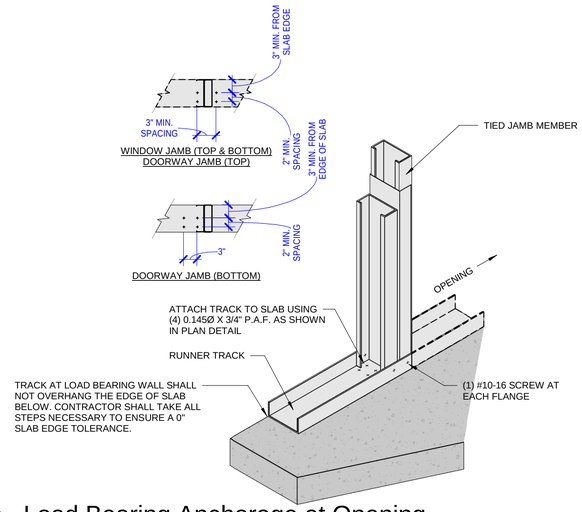
4/11/2025 1:56:15 PM P:\2025\25033S Waller County Sheriffs Dept Mezzanine\Revit\Current BIM Model\25033S Waller County Jail Garage R24.rvt



NOTE:
ALL WELDS SHALL BE TOUCHED UP USING A ZINC RICH PAINT.

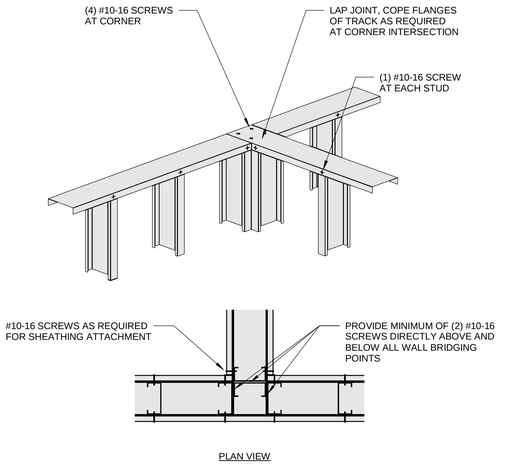
9 Jamb Attachments at Contractor Option

3/4" = 1'-0"



6 Load Bearing Anchorage at Opening

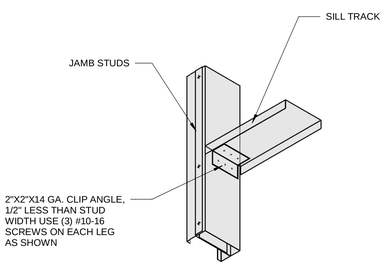
3/4" = 1'-0"



PLAN VIEW

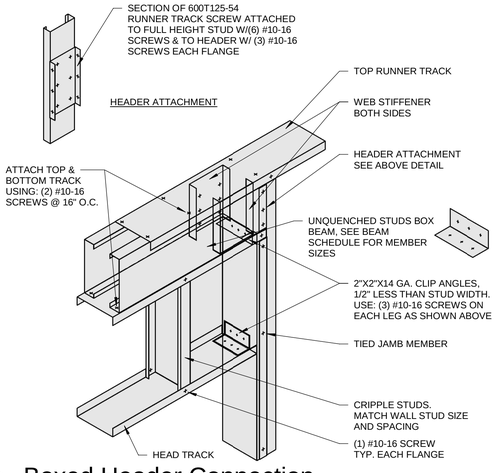
3 Intersection Framing

3/4" = 1'-0"



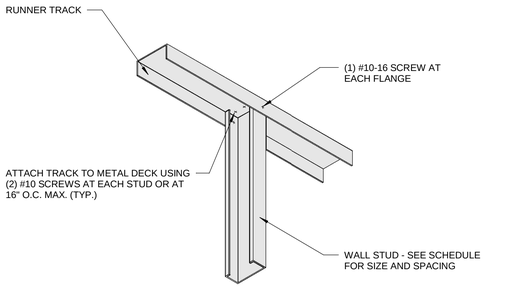
8 Sill Track Connection

3/4" = 1'-0"



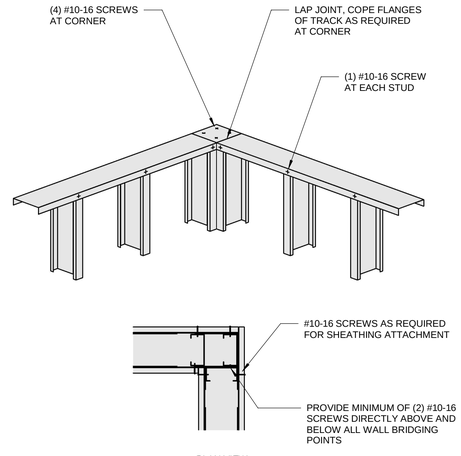
5 Boxed Header Connection

3/4" = 1'-0"



2 Load Bearing Stud to Top Track Detail

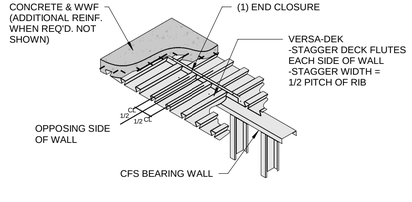
3/4" = 1'-0"



PLAN VIEW

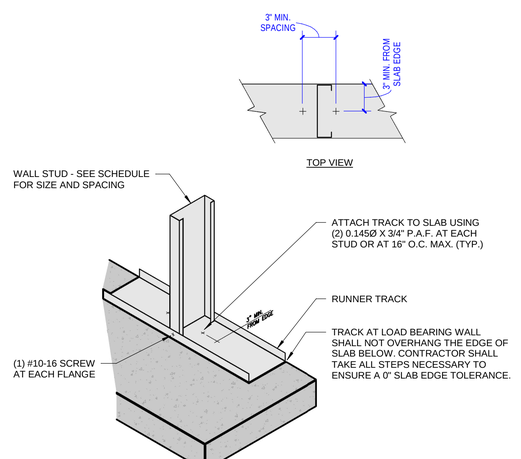
7 Corner Framing

3/4" = 1'-0"



4 Head of Wall Detail

3/4" = 1'-0"



1 Load Bearing Stud to Bottom Track Detail

3/4" = 1'-0"

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WALLER COUNTY, TX

STATE OF TEXAS
WESTLEY J. HINTON
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LICENSED PROFESSIONAL ENGINEER
4/11/25

REV	DATE:	ISSUED FOR:
	03-28-2025	PROGRESS SET
	04-11-2025	100% CD SET

PROJECT NO.: 25033S
DRAWN BY: Author QC: Checker

Metal Stud Framing Details - Load Bearing

S4.02

4/11/2025 1:04:25 PM P:\2025\25033 Waller County Sheriff's Dept Maintenance Building\Structural\Bid Model\25033S Waller County Jail Garage R24.rvt

8'H GALV. CHAIN LINK FENCE W 3 BARBED WIRES AT TOP

EQUAL

19'-6"

12'-0" MANUAL ROLLING GATE

LIMITS OF CONSTRUCTION

1 ARCHITECTURAL SITE PLAN - OVERALL
1/64" = 1'-0"

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WALLER COUNTY

VEHICLE MAINTENANCE GARAGE

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

REGISTERED ARCHITECT
JACK A. DURAN
16071
STATE OF TEXAS

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AFFIXATION DATE: 04.22.25

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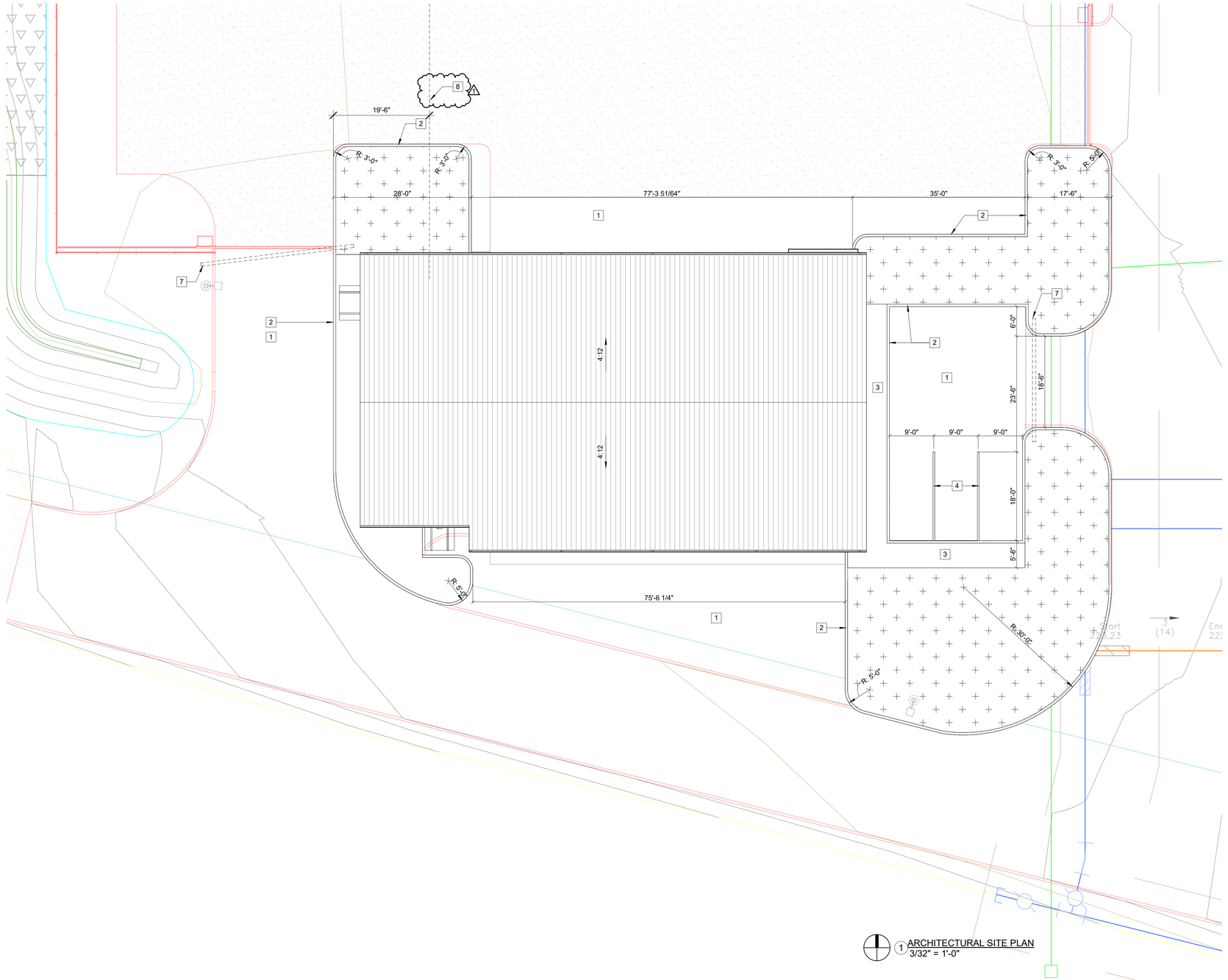
1	06.12.25	COMMENTS

PROJECT NO.: 06-25-003
DRAWN BY: BH QC: JD

OVERALL SITE PLAN

A-001

6/12/2025 5:58:16 PM Autodesk Docs://Waller County Jail Garage/25017 Waller County Jail Garage_BIM.rvt



1 ARCHITECTURAL SITE PLAN
3/32" = 1'-0"

CODED NOTES

1. NEW CONCRETE DRIVE, RE: CIVIL
2. NEW CONCRETE CURB, RE: CIVIL
3. NEW SIDEWALK, RE: CIVIL
4. 4" WIDE PAINTED WHITE STRIPE, TYP. RE: CIVIL
5. CABLE SUPPORTED PRE-FINISHED ALUMINUM CANOPY
6. GALV. STEEL BOLLARDS, PTD.
7. 4" IRRIGATION SLEEVES FOR FUTURE OWNER INSTALLED IRRIGATION SYSTEM
8. 8'H GALV. CHAIN LINK FENCE W 3 BARBED WIRES AT TOP, WITH MANUAL ROLLING GATE, 12' CLEAR

LEGEND

- NEW CONCRETE PAVING
- HATCHED AREA INDICATES CROSS SLOPE NOT TO EXCEED 25% IN EITHER DIRECTION
- PROVIDE HYDROMULCH IN CONSTRUCTION CONTRACT LIMITS AND ALL AREAS DISTURBED DURING CONSTRUCTION
- NEW 4" PVC SLEEVES FOR OWNER INSTALLED IRRIGATION SYSTEM
- EJ EXPANSION JOINT

SITE PLAN GENERAL NOTES

- INFORMATION CONTAINED ON THE ARCHITECTURAL SITE DRAWING(S) HAS BEEN TAKEN FROM SURVEYS AND CIVIL DRAWINGS. THE INTENT OF THE ARCHITECTURAL SITE DRAWING(S) IS TO INDICATE THE OVERALL RELATIONSHIP OF THE BUILDINGS, PAVING & OTHER SITE FEATURES. NO GUARANTEE IS MADE TO THE ACCURACY OF THE ARCHITECTURAL SITE DRAWING(S)
- ARCHITECTURAL FINISHED FLOOR ELEVATION 0'-0" IS EQUAL TO FINISHED FLOOR ELEVATION [xxxx.xx] INDICATED ON CIVIL DRAWINGS
- DO NOT EXCEED 1:20 (5%) SLOPE ON PAVING & SIDEWALKS. DO NOT EXCEED 1:50 (2%) SLOPE ON LANDINGS AT DOORS & CROSS SLOPE ON SIDEWALKS & RAMPS. IF ELEVATIONS & DIMENSIONS INDICATED ON DRAWING(S) EXCEED THESE SLOPES, CONSULT ARCHITECT AND CIVIL ENGINEER
- VERIFY ALL INFORMATION SHOWN WITH CIVIL, MEP, AND OTHER DRAWINGS. IF DISCREPANCIES EXIST, CONSULT WITH ARCHITECT AND ENGINEER(S) PRIOR TO CONSTRUCTION
- ALL APPROVALS SHALL BE OBTAINED FROM AUTHORITIES HAVING JURISDICTION ON THIS PROPERTY PRIOR TO CONSTRUCTION
- THE ARCHITECTURAL SITE DRAWING(S) SHOWS LOCATION OF SIDEWALKS. SEE CIVIL FOR CONSTRUCTION & PAVING DETAILS, JOINTS, ETC.
- SEE CIVIL DRAWINGS FOR PARKING REQUIREMENTS, & OTHER ITEMS NOT SHOWN ON ARCHITECTURAL THAT MAY BE REQUIRED FOR PERMITTING AND/OR CONSTRUCTION
- SIZE AND LOCATION OF MECHANICAL AND ELECTRICAL EQUIPMENT PADS AND TRENCHES ARE APPROXIMATE. VERIFY FINAL SIZE AND LOCATION WITH FINAL EQUIPMENT REQUIREMENTS

DUMPSTER NOTES:

- DUMPSTER CONSTRUCTION TO COMPLY WITH INTERNATIONAL FIRE CODE 304.3
- G.C. TO COORDINATE DUMPSTER ENCLOSURE SIZE W/ CIVIL. CONFIRM DUMPSTERS TO BE PROVIDED WILL FIT WITHIN DUMPSTER ENCLOSURE EXTENTS. CLEAR WIDTH OF GATE OPENINGS TO ACCESS DUMPSTERS MUST BE CONFIRMED BY THE G.C. WITH THE OWNER BASED ON THE SOLID WASTE REMOVAL COMPANY (MUNICIPALITY OR PRIVATE AS DETERMINED BY OWNER)

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WALLER COUNTY

VEHICLE MAINTENANCE GARAGE

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

REGISTERED ARCHITECT
JACK A DURAN
18071
STATE OF TEXAS

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AFFIXATION DATE: 04.22.25

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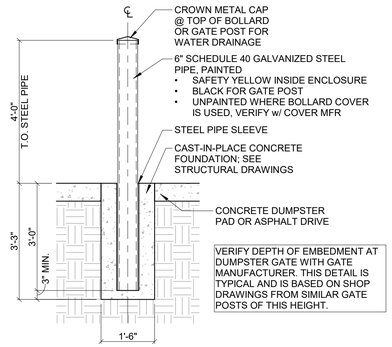
1	06.12.25	COMMENTS

PROJECT NO.: 06-25-003
DRAWN BY: XXX QC: XXX

ARCHITECTURAL SITE PLAN

A-002

6/12/2025 1:56:18 PM Autodesk Docs://Waller County Jail Garage/25017 Waller County Jail Garage_R24.rvt



1 TYPICAL BOLLARD DETAIL
1/2" = 1'-0"

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HEMPSTEAD, TX 77445

REGISTERED ARCHITECT
JACK A DURAN
16071
STATE OF TEXAS

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PROJECT NO.: 06-25-003
DRAWN BY: XXX QC: XXX

SITE DETAILS

A-003

4/22/2025 3:13:26 PM Autodesk Docs://Waller County Jail Garage/25017 Waller County Jail Garage_R24.rvt

PARTITION GENERAL NOTES

1. PROVIDE CONTROL JOINTS AS SPECIFIED.
2. PROVIDE TILE BACKER BOARD AS SPECIFIED BEHIND & ADJACENT TO ALL PLUMBING FIXTURES, BEHIND ALL CERAMIC TILE, AND AT ALL DAMP LOCATIONS
3. PROVIDE SPECIFIED CORNER GUARDS PROTECTORS AT ALL CORRIDOR OUTSIDE CORNERS.
4. PROVIDE DEFLECTION TRACK AT ALL STUD CONNECTIONS TO DECK AS SPECIFIED.
5. REFER TO DRAWINGS & SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS NOT NOTED ON THIS PAGE.
6. FIREBLOCKING
   A. MATERIALS
      a. 2-INCH (NOMINAL) THICKNESS OF LUMBER WITH TIGHT JOINTS, 2 THICKNESSES OF 1-INCH (NOMINAL) LUMBER WITH BROKEN LAP JOINTS, OR 1 THICKNESS OF 23/32-INCH PLYWOOD OR OSB PANEL WITH JOINTS BACKED BY SAME MATERIAL.
   B. REQUIRED
      a. IN CONCEALED WALL SPACES AT THE CEILING & FLOOR OR ROOF LEVELS.
      b. AT CONNECTIONS BETWEEN HORIZONTAL & VERTICAL SPACES, SUCH AS SOFFITS & DROPPED CEILINGS.
      c. AT OPENINGS AROUND VENTS, PIPES, DUCTS AND OTHER PENETRATIONS THROUGH CEILING AND FLOOR LEVELS.
      d. WITHIN CONCEALED SPACES OF EXTERIOR WALL FINISH & OTHER EXTERIOR ARCHITECTURAL ELEMENTS AT MAXIMUM INTERVALS OF 20 FEET.
      e. IN ANY SPACES BEHIND COMBUSTIBLE FINISH & TRIM AT MAXIMUM INTERVALS OF 10 FEET.

CODED NOTES

1 FLOOR STRUCTURE

2 CONTINUOUS METAL TRACK

2A 2x BASE PLATE

3 5/8" GYPSUM WALL BOARD, U.N.O.

3A 5/8" TYPE "X" FIRE RATED GYPSUM WALLBOARD

4 SOUND ATTENUATION BATT (SAB) ACOUSTICAL INSULATION

5 METAL/WOOD STUDS @ 16" O.C., U.N.O.

6 SCHEDULED CEILING; SEE FINISH SCHEDULE & REFLECTED CEILING PLAN

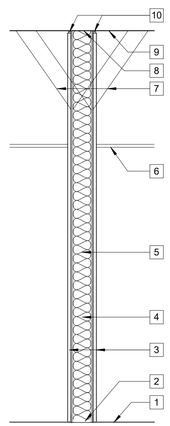
7 BRACING @ 48" O.C. ALTERNATING DIRECTIONS @ PARTITIONS OVER 10'-0" LONG WITHOUT INTERSECTIONS

8 CONTINUOUS METAL TRACK - DEEP-LEG DEFLECTION TRACK AT TOP TRACK WHEN ATTACHED TO STRUCTURE ABOVE. DO NOT SCREW INTO DEFLECTION TRACK.

8A DOUBLE 2x TOP PLATE

9 STRUCTURE ABOVE

10 SEAL GAPS UNDERSIDE OF DECK W/ ACOUSTICAL INSULATION & PROVIDE CONT. BEAD OF ACOUSTICAL SEALANT ON BOTH SIDES OF PARTITION



1 3 5/8" METAL STUDS 5/8" GWB BOTH SIDES (4 7/8" TOTAL WIDTH)

1A 3 5/8" METAL STUDS 5/8" GWB ONE SIDE ONLY (4 1/4" TOTAL WIDTH)

1B 6" METAL STUDS 5/8" GWB BOTH SIDES (7 1/4" TOTAL WIDTH)

1C 6" METAL STUDS 5/8" GWB ONE SIDE ONLY (6 5/8" TOTAL WIDTH)

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WALLER COUNTY

VEHICLE MAINTENANCE GARAGE

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

REGISTERED ARCHITECT JACK A. DURAN 16071 STATE OF TEXAS

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AFFIXATION DATE: 04.22.25

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PARTITION TYPES

A-004

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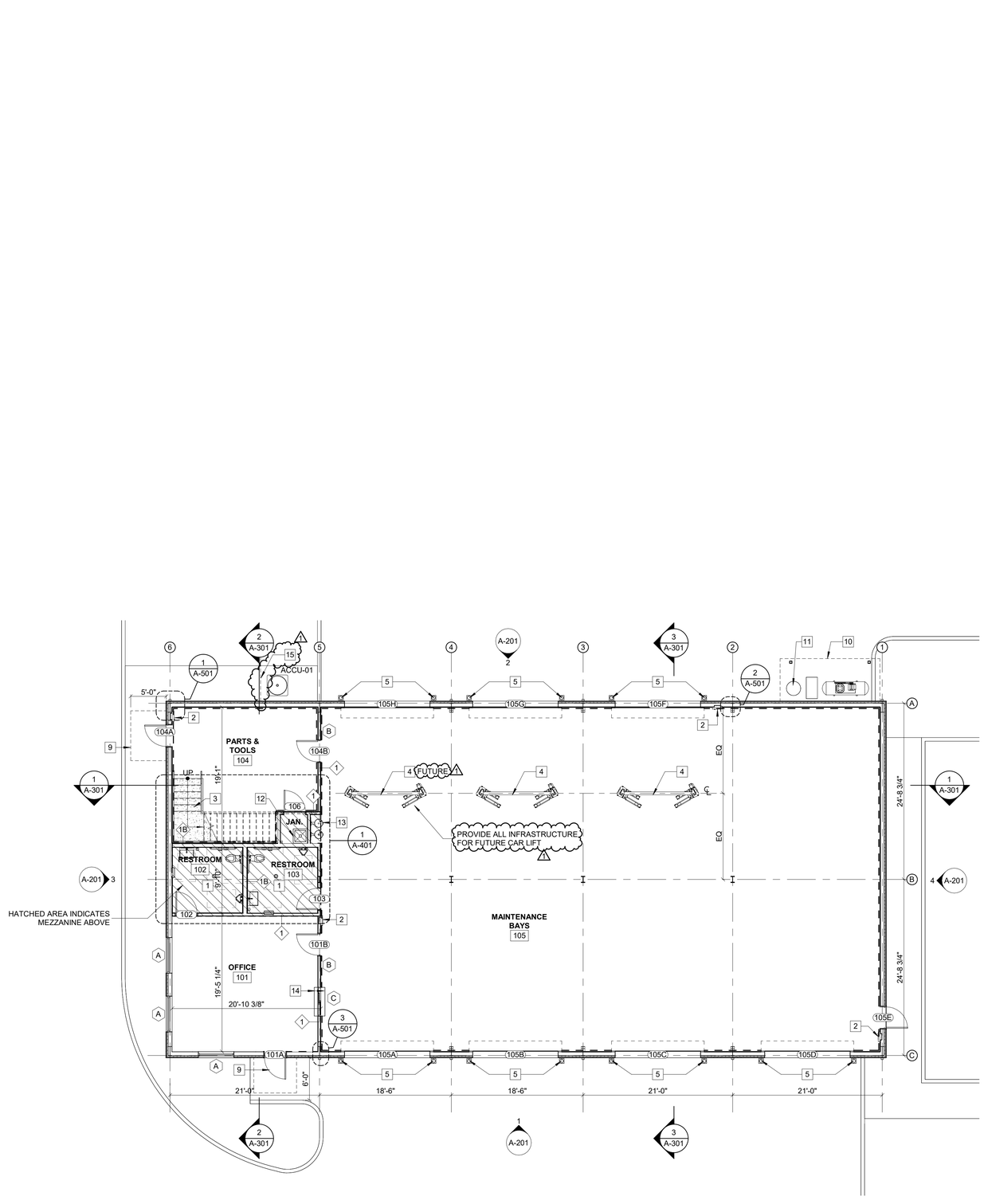
CODED NOTS

1. FLOOR DRAIN, RE: PLUMBING
2. SEMI-RECESSED FIRE EXTINGUSHER CABINET
3. CONCRETE FILLED PAN METAL STAIRS
4. TWO POST OVERHEAD CAR LIFT
5. 4' HIGH CONCRETE FILLED GALV. STEEL BOLLARD
6. 42" HIGH CHAIN LINK FENCE
7. CABLE SUPPORTED PRE-FINISHED ALUMINUM CANOPY
8. INFRARED HEATERS ABOVE
9. CABLE SUPPORTED PRE-FINISHED ALUMINUM CANOPY
10. DASHED LINE INDICATES 6' X 14' CANOPY BY PEMB ABOVE AT 11' A.F.F.
11. 50' GALLON OIL TANK, OWNER TO PROVIDE
12. MOP SINK, RE: PLUMBING
13. EDF, REMOTE CHILLER, RE: MEP
14. SOLID SURFACE COUNTER
15. 10'H GALV. CHAINLINK FENCE W 3 BARBED WIRES AT TOP, MATCH EXISTING, FIELD VERIFY, WITH MANUAL ROLLING GATE, 12' CLEAR



1 LEVEL 1 FLOOR PLAN
1/8" = 1'-0"

LEGEND

- (101) DOOR TAG; SEE SHEET A-601
- (A) WINDOW TAG; SEE SHEET A-601
- (1) PARTITION TAG; SEE SHEET A-003
- DASHED LINE INDICATES 10' HIGH METAL PANEL, GWB ABOVE

FLOOR PLAN GENERAL NOTES

- VERIFY ALL INFORMATION WITH CIVIL, STRUCTURAL, MEP AND ALL OTHER CONSTRUCTION DOCUMENTS PRIOR TO START OF CONSTRUCTION - IF ANY DISCREPANCIES EXIST, CONSULT THE ARCHITECT, ENGINEER, AND APPLICABLE CONSULTANTS
- STRUCTURAL COLUMNS ARE SHOWN FOR REFERENCE ONLY; REFER TO STRUCTURAL DRAWINGS FOR DIMENSIONS AND ADDITIONAL INFORMATION
- DIMENSIONS TO EXTERIOR WALLS ARE TO FACE OF SHEATHING, U.N.O.
- INTERIOR DIMENSIONS ARE TO FACE OF STUD AND TO CENTERLINE OF COLUMNS, U.N.O.
- REFER TO ENLARGED PLANS & DETAILS FOR ADDITIONAL INFORMATION AND DIMENSIONS
- ALL EXPOSED STEEL TO BE PAINTED, U.N.O.
- ASSEMBLY SEATING IS SHOWN FOR REFERENCE & QUANTITY PURPOSE ONLY
- PROVIDE BRICK CONTROL JOINT AT INSIDE CORNERS AND AS INDICATED ON DRAWINGS

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WALLER COUNTY

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LEVEL 1 FLOOR PLAN

A-101

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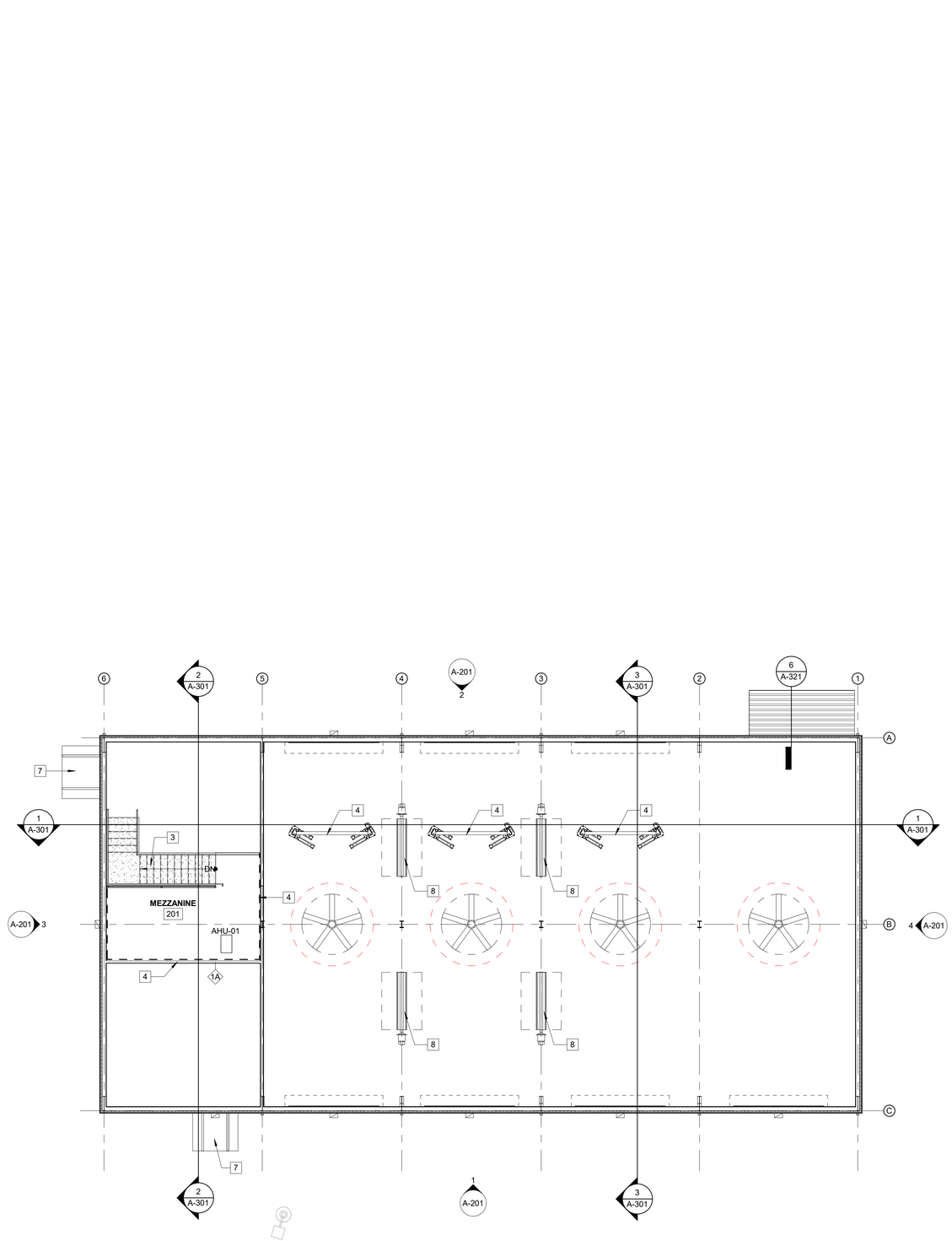

1 PLATFORM FLOOR PLAN
1/8" = 1'-0"

CODED NOTS

1. FLOOR DRAIN, RE: PLUMBING
2. SEMI-RECESSED FIRE EXTINGUSHER CABINET
3. CONCRETE FILLED PAN METAL STAIRS
4. TWO POST OVERHEAD CAR LIFT
5. 4' HIGH CONCRETE FILLED GALV. STEEL BOLLARD
6. 42" HIGH CHAIN LINK FENCE
7. CABLE SUPPORTED PRE-FINISHED ALUMINUM CANOPY
8. INFRARED HEATERS ABOVE
9. CABLE SUPPORTED PRE-FINISHED ALUMINUM CANOPY
10. DASHED LINE INDICATES 6' X 14' CANOPY BY PEMB ABOVE AT 11' A.F.F.
11. 50' GALLON OIL TANK, OWNER TO PROVIDE
12. MOP SINK, RE: PLUMBING
13. EDF, REMOTE CHILLER, RE: MEP
14. SOLID SURFACE COUNTER

LEGEND

- (101) DOOR TAG; SEE SHEET A-601
- (A) WINDOW TAG; SEE SHEET A-601
- (1) PARTITION TAG; SEE SHEET A-003
- DASHED LINE INDICATES 10' HIGH METAL PANEL, GWB ABOVE

FLOOR PLAN GENERAL NOTES

- VERIFY ALL INFORMATION WITH CIVIL, STRUCTURAL, MEP AND ALL OTHER CONSTRUCTION DOCUMENTS PRIOR TO START OF CONSTRUCTION - IF ANY DISCREPANCIES EXIST, CONSULT THE ARCHITECT, ENGINEER, AND APPLICABLE CONSULTANTS
- STRUCTURAL COLUMNS ARE SHOWN FOR REFERENCE ONLY; REFER TO STRUCTURAL DRAWINGS FOR DIMENSIONS AND ADDITIONAL INFORMATION
- DIMENSIONS TO EXTERIOR WALLS ARE TO FACE OF SHEATHING, U.N.O.
- INTERIOR DIMENSIONS ARE TO FACE OF STUD AND TO CENTERLINE OF COLUMNS, U.N.O.
- REFER TO ENLARGED PLANS & DETAILS FOR ADDITIONAL INFORMATION AND DIMENSIONS
- ALL EXPOSED STEEL TO BE PAINTED, U.N.O.
- ASSEMBLY SEATING IS SHOWN FOR REFERENCE & QUANTITY PURPOSE ONLY
- PROVIDE BRICK CONTROL JOINT AT INSIDE CORNERS AND AS INDICATED ON DRAWINGS

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WALLER COUNTY

VEHICLE MAINTENANCE GARAGE

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

REGISTERED ARCHITECT
JACK A DURAN
16071
STATE OF TEXAS

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY JACK A. DURAN, NO. 16071

AFFIXATION DATE: 04.22.25

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PLATFORM FLOOR PLAN

A-102

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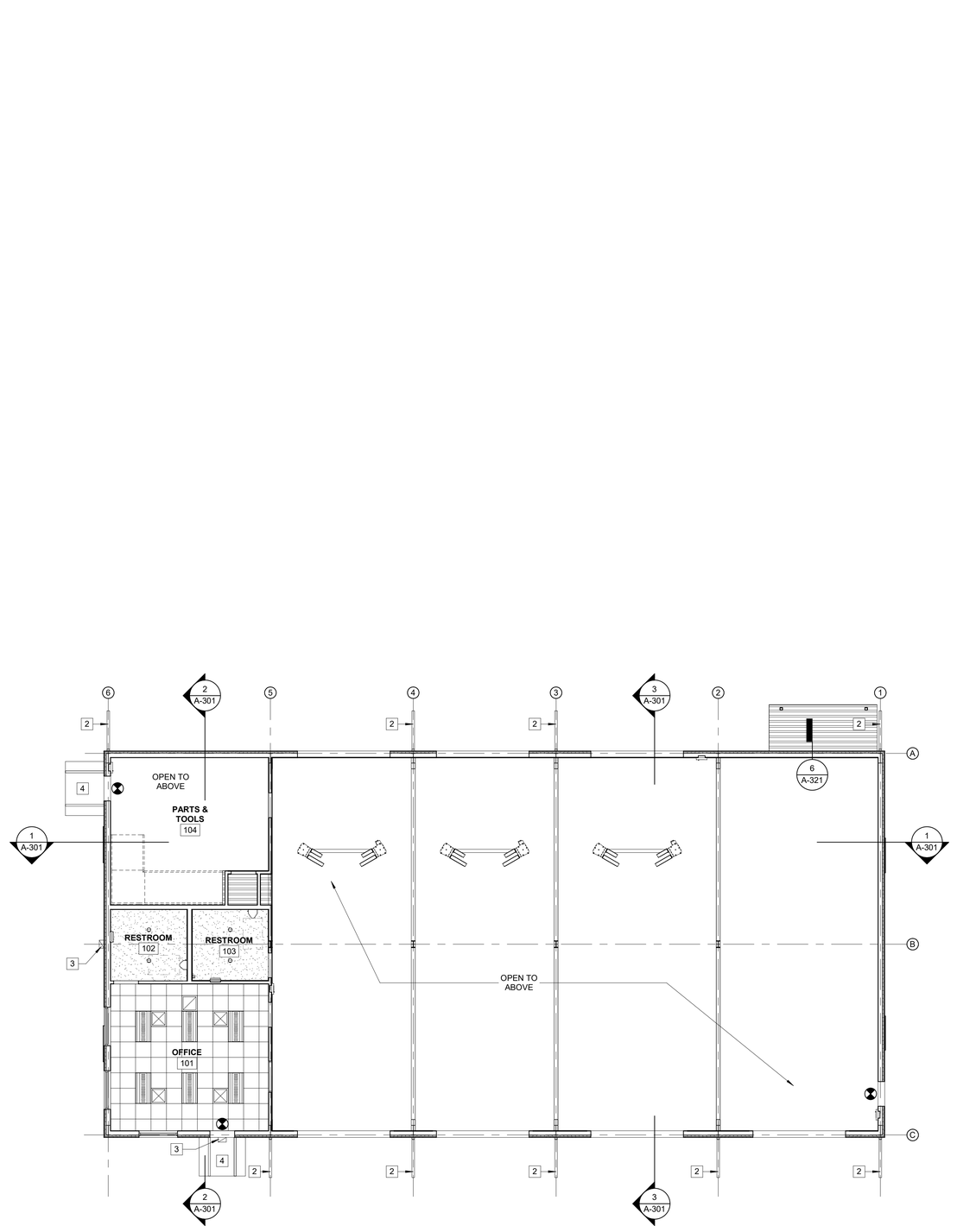

1 LEVEL 1 RCP
1/8" = 1'-0"

CODED NOTES

1. CENTER LIGHT IN ROOM
2. PRE-FINISHED METAL DOWNSPOUT CONNECTED TO STORM, RE: CIVIL
3. EXTERIOR WALL PACK, RE: ELEC.
4. CABLE SUPPORTED PRE-FINISHED ALUMINUM CANOPY
5. INFRARED HEATERS

LEGEND

- 10'-0" / MAT — CEILING ELEVATION & MATERIAL
- EMERGENCY ILLUMINATED EXIT SIGNAGE
- EXTERIOR WALL PACK
- 2' X 4' LAY-IN LED FIXTURE
- 2' X 4' LAY-IN LED FIXTURE
- SUSPENDED LED FIXTURE
- RECESSED LED DOWNLIGHT
- PENDANT LIGHT FIXTURE
- SUPPLY AIR DIFFUSER
- RETURN AIR GRILLE
- 8' HVLS CEILING FAN
- 2' X 2' SUSPENDED ACOUSTICAL CEILING TILE & GRID
- PAINTED GYPSUM BOARD CEILING
- PAINTED EXPOSED CEILING

RCP GENERAL NOTES

- REFLECTED CEILING PLAN INDICATES LAYOUT & ARRANGEMENT OF MOST MECHANICAL & ELECTRICAL DEVICES ON CEILINGS AS WELL AS OF BASIC CEILING MATERIALS.
- SEE ELECTRICAL & MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION ON CEILING DEVICES & COMPONENTS WHICH MAY NOT BE SHOWN ON REFLECTED CEILING PLAN.
- REVIEW LAYOUT & COORDINATE LOCATION OF ALL EQUIPMENT PRIOR TO STARTING WORK. REPORT ANY DISCREPANCIES TO ARCHITECT & ENGINEER.
- ALL CEILING PENETRATIONS SUCH AS, BUT NOT LIMITED TO LIGHT FIXTURES, SPRINKLER HEADS & EXIT SIGNS SHALL BE CENTERED IN CEILING TILE.
- PROVIDE EMERGENCY LIGHTING, STROBES, ALARMS, FIRE PULLS, AND SMOKE DETECTORS AS REQUIRED BY CODE.
- ALL CEILINGS SHALL BE 9'-0" UNLESS NOTED OTHERWISE.

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LEVEL 1 RCP

A-111

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1 PLATFORM RCP
1/8" = 1'-0"

CODED NOTES

1. CENTER LIGHT IN ROOM
2. PRE-FINISHED METAL DOWNSPOUT CONNECTED TO STORM, RE: CIVIL
3. EXTERIOR WALL PACK, RE: ELEC.
4. CABLE SUPPORTED PRE-FINISHED ALUMINUM CANOPY
5. INFRARED HEATERS

LEGEND

- 10'-0" / MAT — CEILING ELEVATION & MATERIAL
- EMERGENCY ILLUMINATED EXIT SIGNAGE
- EXTERIOR WALL PACK
- 2' X 4' LAY-IN LED FIXTURE
- 2' X 4' LAY-IN LED FIXTURE
- SUSPENDED LED FIXTURE
- RECESSED LED DOWNLIGHT
- PENDANT LIGHT FIXTURE
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- RETURN AIR GRILLE
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- PAINTED GYPSUM BOARD CEILING
- PAINTED EXPOSED CEILING

RCP GENERAL NOTES

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- ALL CEILINGS SHALL BE 9'-0" UNLESS NOTED OTHERWISE.

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REGISTERED ARCHITECT JACK A DURAN 16071 STATE OF TEXAS

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PLATFORM RCP

A-112

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CODED NOTES

1 INFRARED HEATER

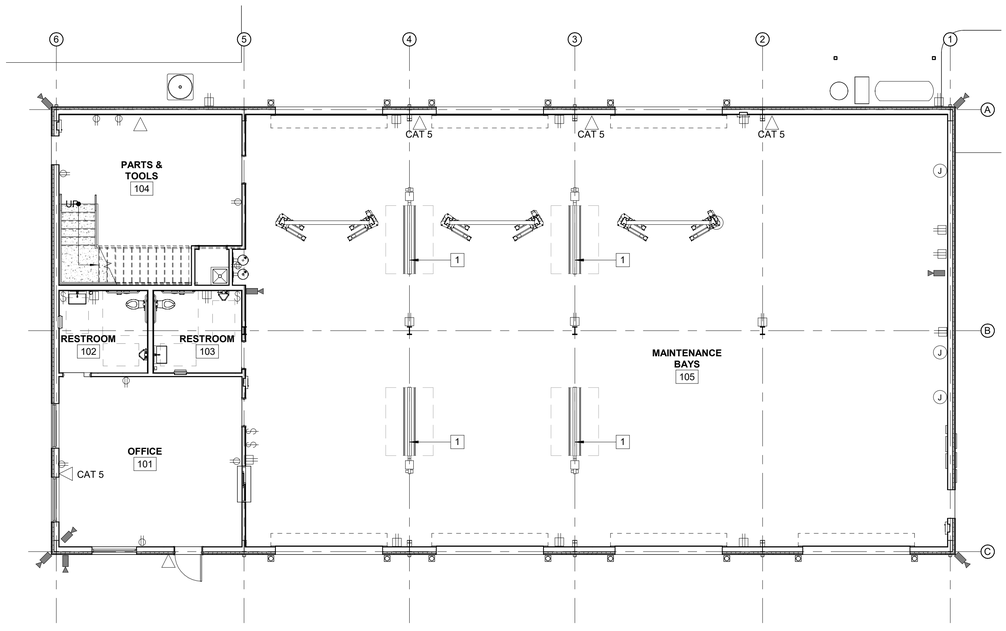
2 8' HVLS CEILING FAN

LEGEND

- $ SWITCH
- $3 3-WAY SWITCH
- $4 4-WAY SWITCH
- $D DIMMER SWITCH
- RECEPTACLE - DUPLEX
- RECEPTACLE - GFI
- RECEPTACLE - QUAD
- RECEPTACLE - SPECIALTY EQUIPMENT
- FLOOR RECEPTACLE - DUPLEX
- FLOOR RECEPTACLE - QUAD
- DATA/PHONE OUTLET
- DATA/PHONE FLOOR OUTLET
- T THERMOSTAT
- SD SMOKE DETECTOR
- CO CARBON MONOXIDE DETECTOR
- V FIRE ALARM - STROBE
- A/V FIRE ALARM - STROBE & SIREN
- SECURITY CAMERA
- CR CARD READER
- J JUNCTION BOX
- TV TV OUTLET

POWER & DATA GENERAL NOTES

- VERIFY EXISTING ELECTRICAL PANELS AND CONDITIONS. ANY NECESSARY CHANGES TO ARCHITECTURAL DRAWINGS DUE TO EXISTING CONDITIONS MUST BE DIRECTED TO THE OWNER AND/OR ARCHITECT BEFORE WORK IS STARTED
- ALL OUTLETS TO BE INSTALLED AT 18" A.F.F. ON CENTER UNLESS OTHERWISE NOTED
- VERIFY AND COORDINATE INSTALLATION OF OUTLETS IN MILLWORK, FREE STANDING FURNITURE, AND EQUIPMENT. OUTLETS ARE NOT TO BE LOCATED BEHIND CABINETS
- WALL-MOUNTED OUTLETS SHALL BE SUPPORTED BY STUD AT ALL LOCATIONS
- OUTLETS OCCURRING IN OR ABOVE BACKSPLASH OF COUNTERTOPS SHALL BE MOUNTED HORIZONTALLY
- GANG ALL OUTLETS TOGETHER SIDE BY SIDE. DO NOT SPREAD OUT. 6" MAXIMUM FROM CENTER TO CENTER
- G.C. TO COORDINATE WITH ELECTRICAL ENGINEERS DRAWINGS AND ARCHITECTURAL DRAWINGS FOR ALL OUTLETS AND DATA LOCATIONS AND REQUIREMENTS. NOTIFY ARCHITECT IMMEDIATELY OF ANY DISCREPANCIES
- COORDINATE ALL LOCATIONS AND REQUIREMENTS OF JUNCTION BOXES FOR SYSTEMS FURNITURE WITH TENANT AND FURNITURE VENDOR PRIOR TO CONSTRUCTION AND INSTALLATION
- COORDINATE EXACT LOCATION OF FLOOR OUTLETS WITH OWNER
- G.C. TO COORDINATE WITH ELECTRICAL ENGINEERS DRAWINGS FOR TWO ELECTRIC GATES TO RECIEVE POWER



1 LEVEL 1 POWER/DATA PLAN
1/8" = 1'-0"

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16071
STATE OF TEXAS

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LEVEL 1 POWER & DATA PLAN

A-121

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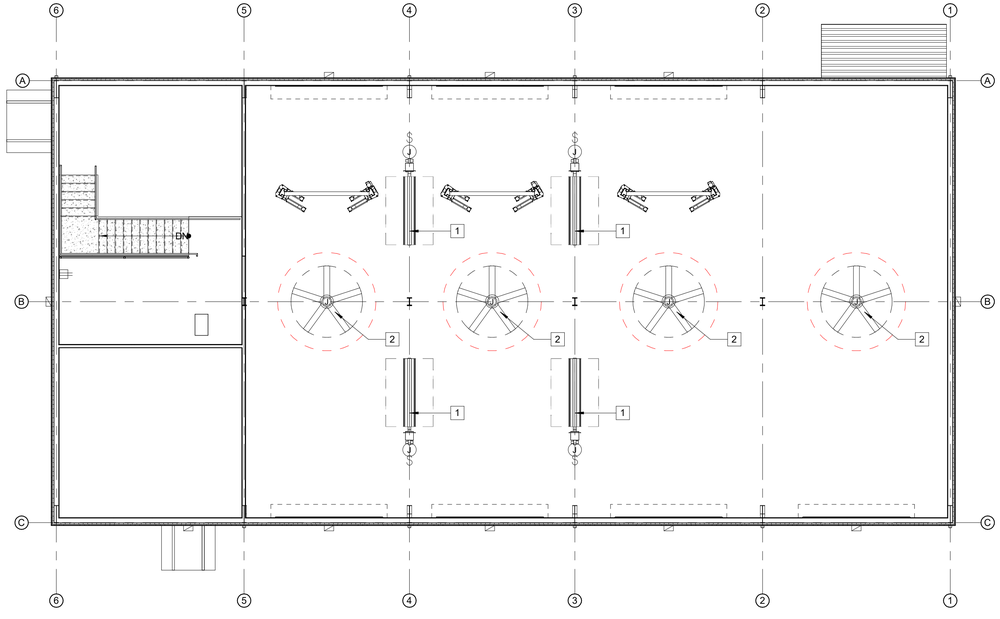

1 PLATFORM POWER/DATA PLAN
1/8" = 1'-0"

CODED NOTES

1 INFRARED HEATER
2 8' HVLS CEILING FAN

LEGEND

- $ SWITCH
- $3 3-WAY SWITCH
- $4 4-WAY SWITCH
- $D DIMMER SWITCH
- RECEPTACLE - DUPLEX
- RECEPTACLE - GFI
- RECEPTACLE - QUAD
- RECEPTACLE - SPECIALTY EQUIPMENT
- FLOOR RECEPTACLE - DUPLEX
- FLOOR RECEPTACLE - QUAD
- DATA/PHONE OUTLET
- DATA/PHONE FLOOR OUTLET
- T THERMOSTAT
- SD SMOKE DETECTOR
- CO CARBON MONOXIDE DETECTOR
- V FIRE ALARM - STROBE
- AV FIRE ALARM - STROBE & SIREN
- SECURITY CAMERA
- CR CARD READER
- J JUNCTION BOX
- TV TV OUTLET

POWER & DATA GENERAL NOTES

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HEMPSTEAD, TX 77445

NOT FOR CONSTRUCTION

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PLATFORM POWER & DATA PLAN

A-122

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1 ROOF PLAN
1/8" = 1'-0"

CODED NOTES

1. PRE-FINISHED STANDING SEAM METAL ROOF BY MBM
2. PRE-FINISHED METAL GUTTER
3. PRE-FINISHED METAL DOWNSPOUT TIED TO STORM, RE: CIVIL
4. CABLE SUPPORTED PRE-FINISHED ALUMINUM CANOPY
5. 6' X 14' CANOPY BY PEMB ABOVE AT 11' A.F.F.

LEGEND

- X:X — ROOF SLOPE ARROW
- HATCH INDICATES EXTENTS OF ICE & WATER SHIELD
- HATCH INDICATES TAPERED INSULATION CRICKET

ROOF PLAN GENERAL NOTES

- VERIFY LOCATIONS OF ALL ROOF PENETRATIONS WITH STRUCTURAL, MECHANICAL, AND PLUMBING DRAWINGS
- PROVIDE CRICKETS TO DIVERT WATER FROM ANY ROOFTOP EQUIPMENT
- ALL ROOFS SHALL HAVE A MINIMUM SLOPE OF 1/4" PER FOOT; ALL CRICKETS SHALL HAVE A MINIMUM SLOPE OF 1/2" PER FOOT
- PROVIDE PRE-FINISHED METAL GUTTERS & DOWNSPOUTS IN SIZES AND PROFILES INDICATED
- COORDINATE DOWNSPOUT DRAINAGE, PER LOCATIONS INDICATED, WITH CIVIL DRAWINGS
- ALL WOOD BLOCKING TO BE FIRE RETARDANT TREATED

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ROOF PLAN

A-130

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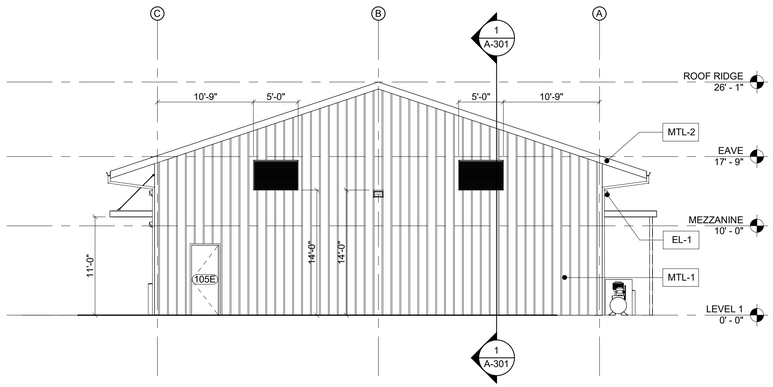
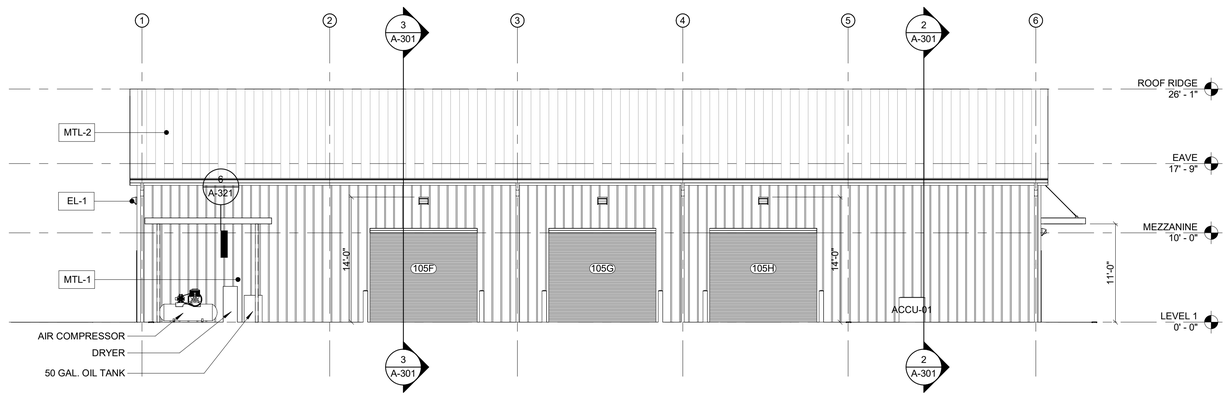
EXTERIOR FINISH SCHEDULE

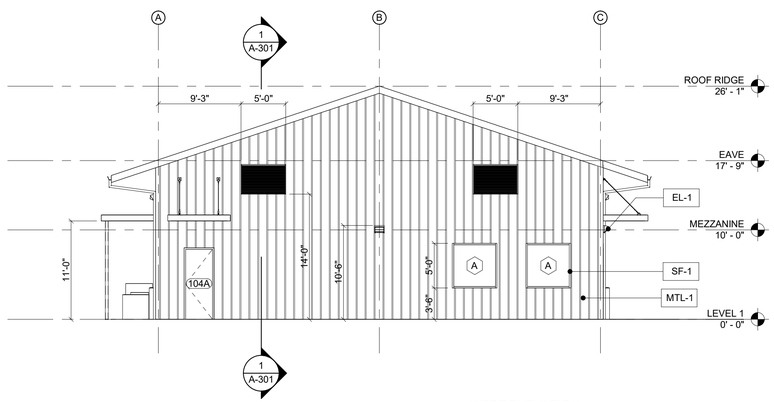
MARK	DESCRIPTION	BASIS OF DESIGN	COMMENTS
EL-1	EXTERIOR LIGHT FIXTURE		
MTL-1	PRE-FINISHED METAL R-PANEL		
MTL-2	PRE-FINISHED STANDING SEAM ROOF		
MTL-3	PRE-FINISHED METAL, PAINTED		
MTL-4	STEEL - PAINTED		
SF-1	PRE-FINISHED ALUMINUM STOREFRONT SYSTEM		
STL-1	20-GAUGE EXTERIOR STEEL, PAINTED		



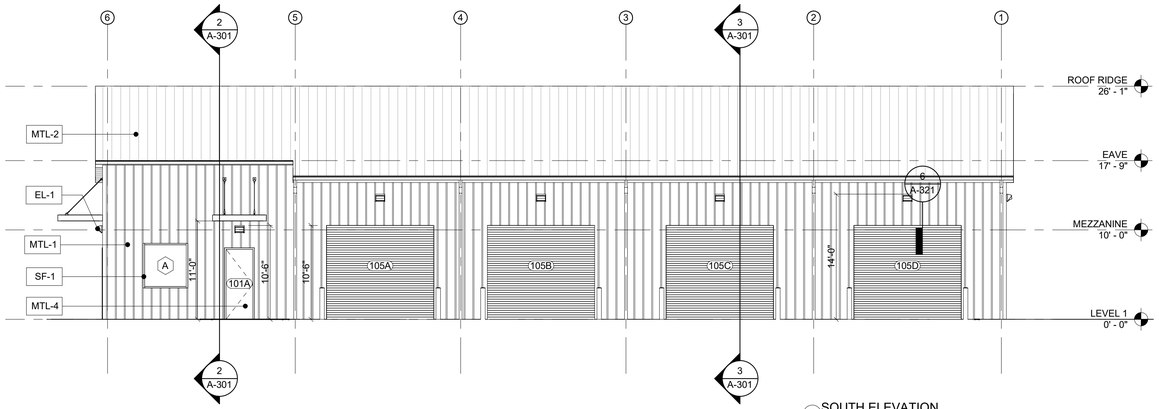
4 EAST ELEVATION
1/8" = 1'-0"



2 NORTH ELEVATION
1/8" = 1'-0"



3 WEST ELEVATION
1/8" = 1'-0"



1 SOUTH ELEVATION
1/8" = 1'-0"

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EXTERIOR ELEVATIONS

A-201

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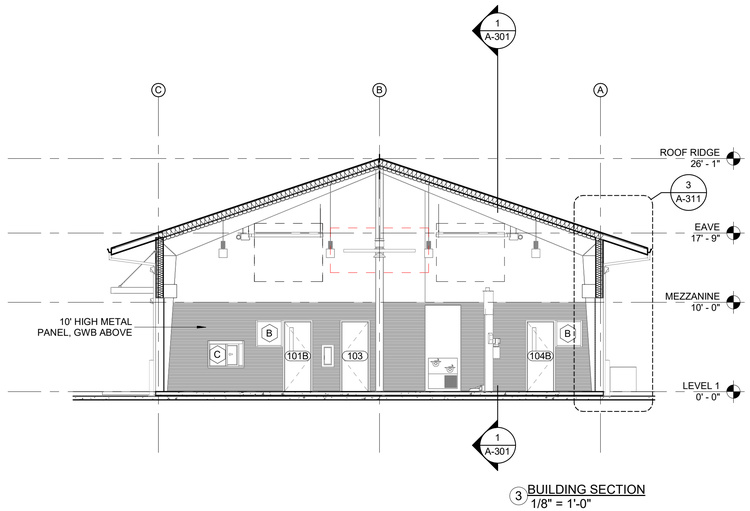
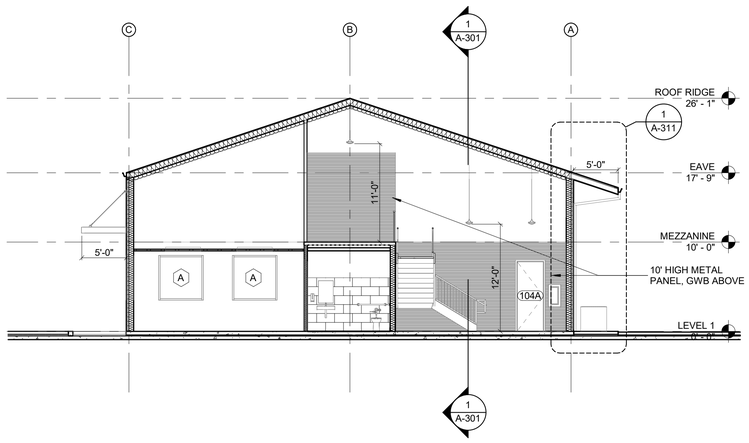
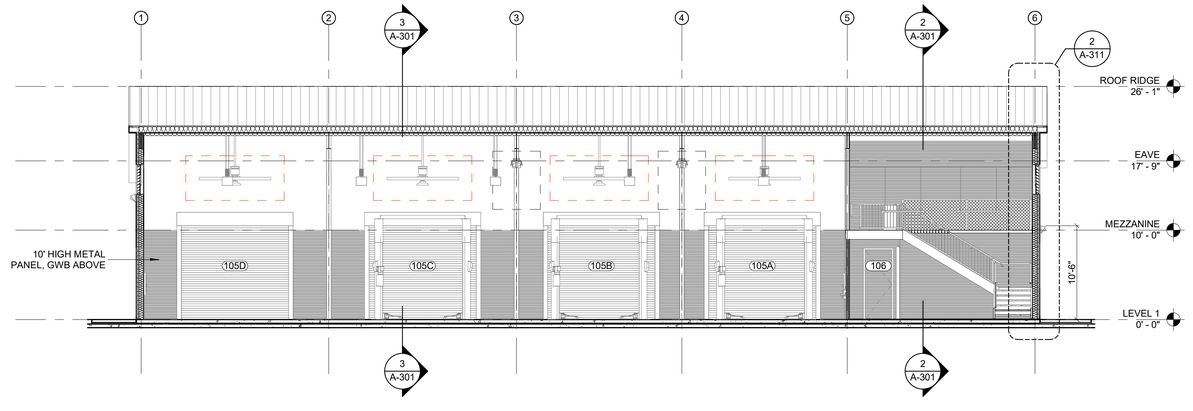


3 BUILDING SECTION
1/8" = 1'-0"



2 BUILDING SECTION
1/8" = 1'-0"



1 BUILDING SECTION
1/8" = 1'-0"

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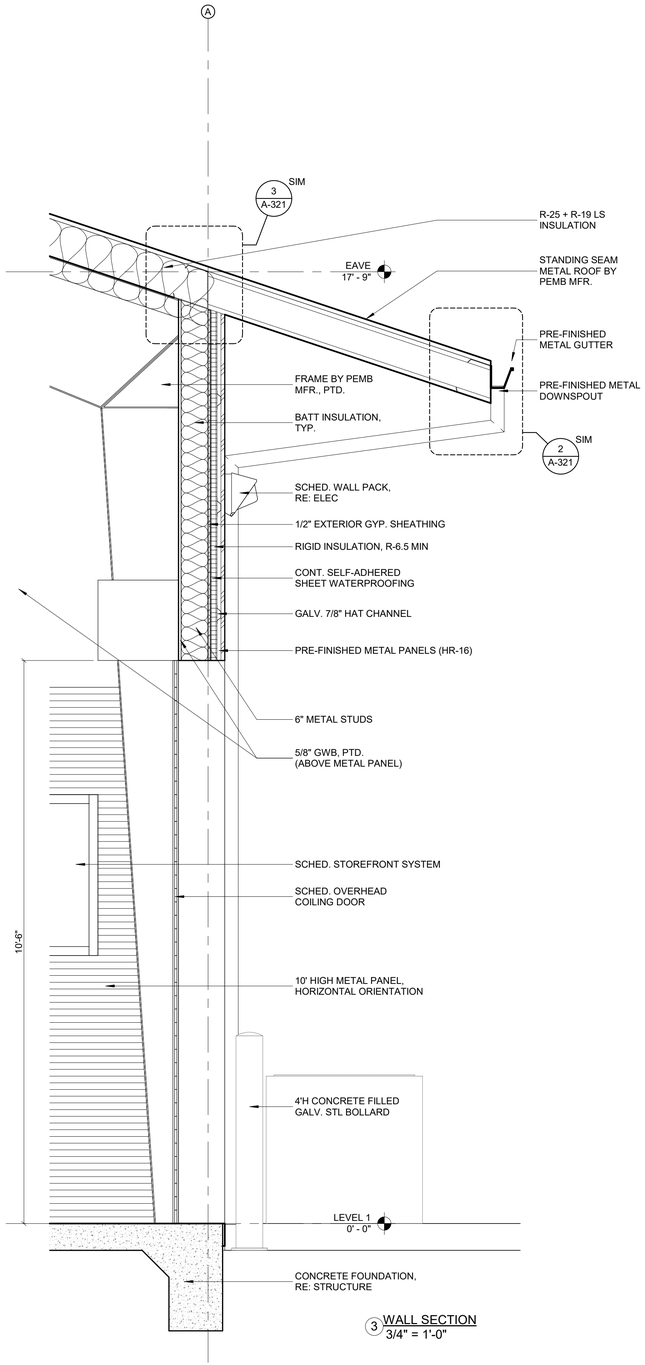
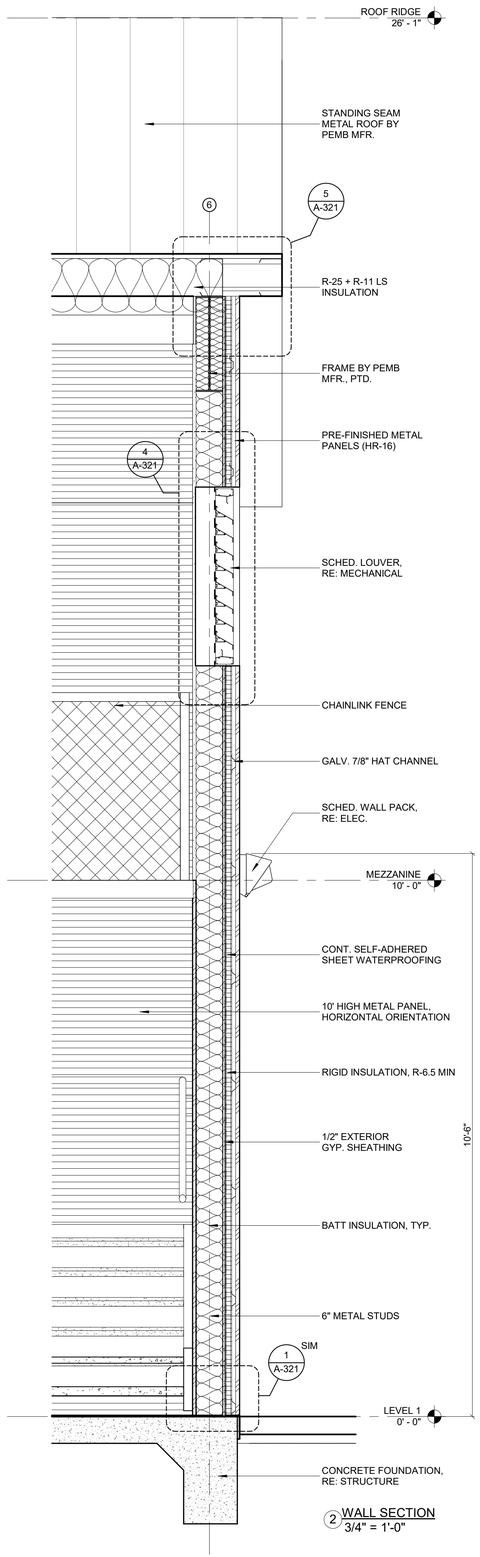
BUILDING SECTIONS

A-301

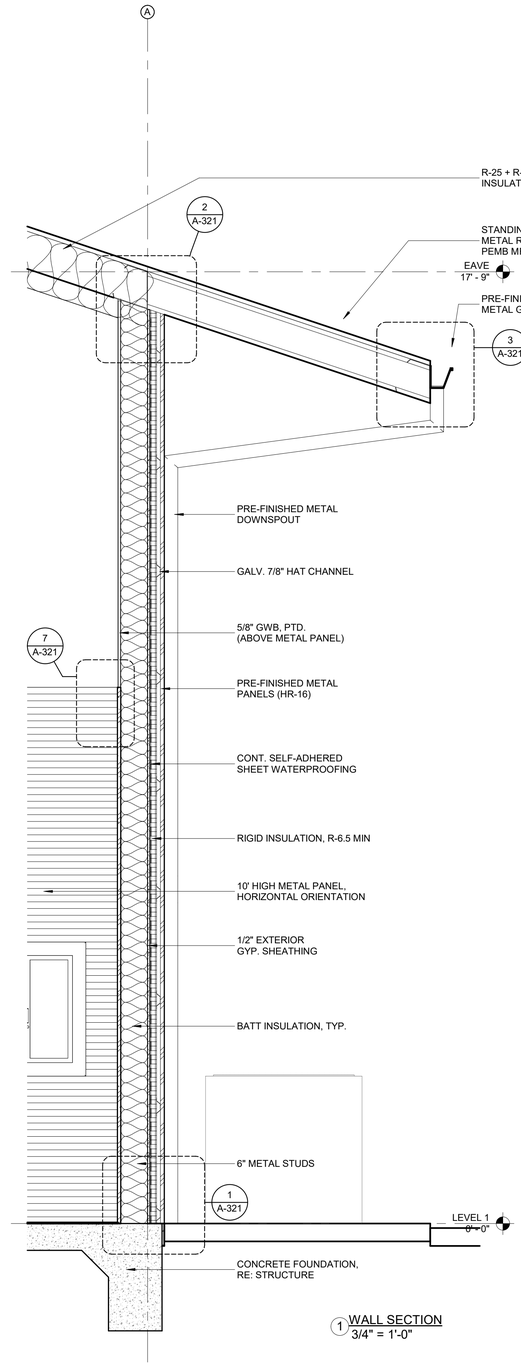
4/22/2025 3:13:46 PM Autodesk Docs://Waller County Jail Garage/25021T Waller County Jail Garage_R24.rvt



3 WALL SECTION
3/4" = 1'-0"



2 WALL SECTION
3/4" = 1'-0"



1 WALL SECTION
3/4" = 1'-0"

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WALLER COUNTY

VEHICLE MAINTENANCE GARAGE

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

REGISTERED ARCHITECT
JACK A. DURAN
16071
STATE OF TEXAS

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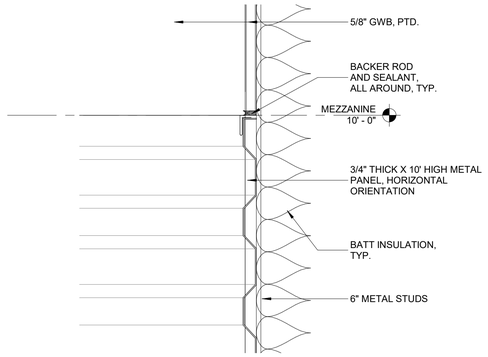
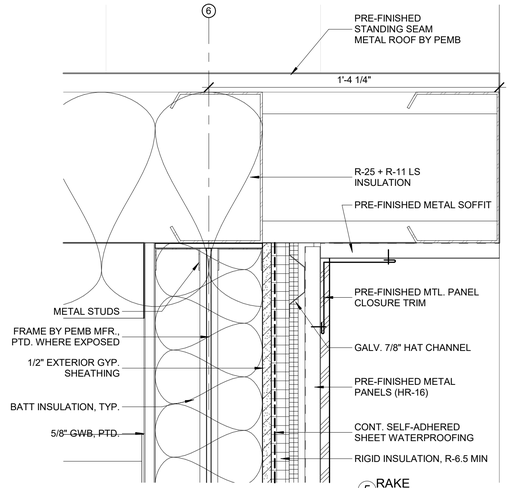
WALL SECTIONS

A-311

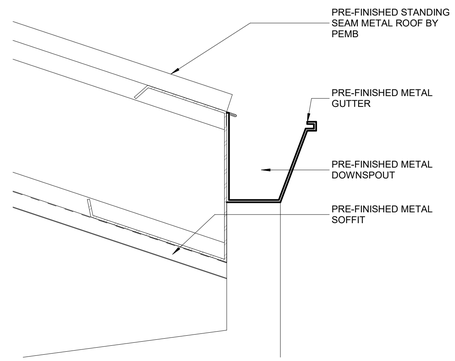
4/22/2025 3:13:47 PM Autodesk Docs://Waller County Vehicle Maintenance Garage/25012-17 Waller County Vehicle Maintenance Garage_R24.rvt



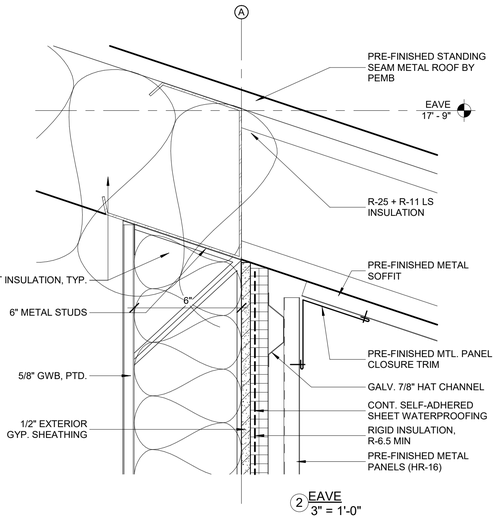
7 INTERIOR METAL PANEL AT GWB
3" = 1'-0"



5 RAKE
3" = 1'-0"

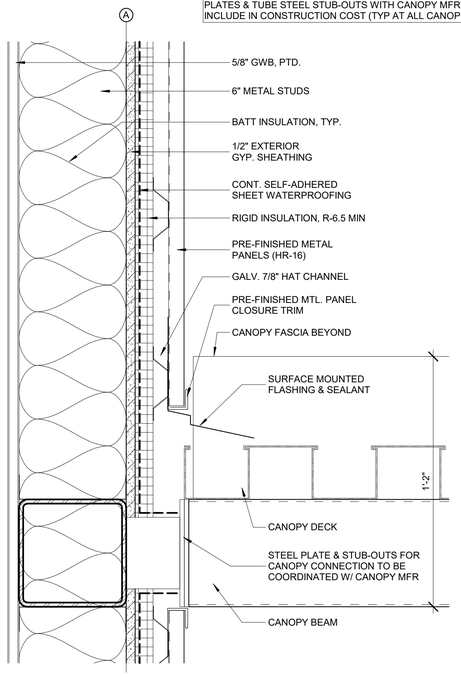


3 GUTTER
3" = 1'-0"

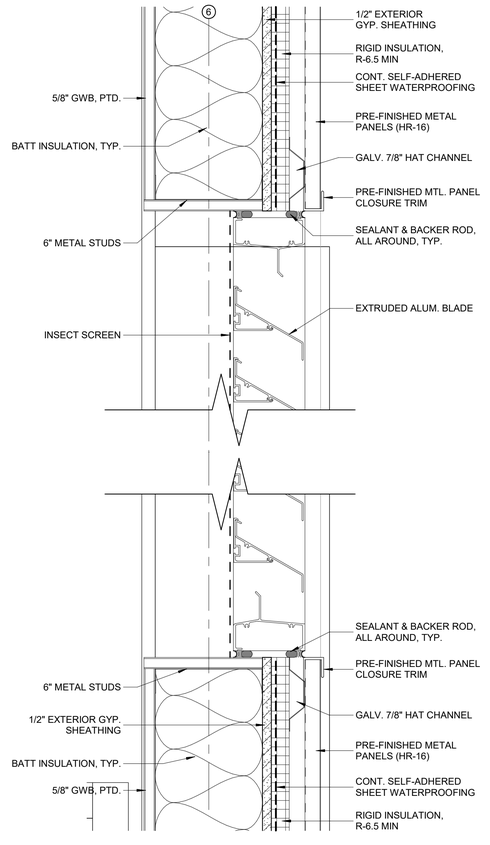


2 EAVE
3" = 1'-0"

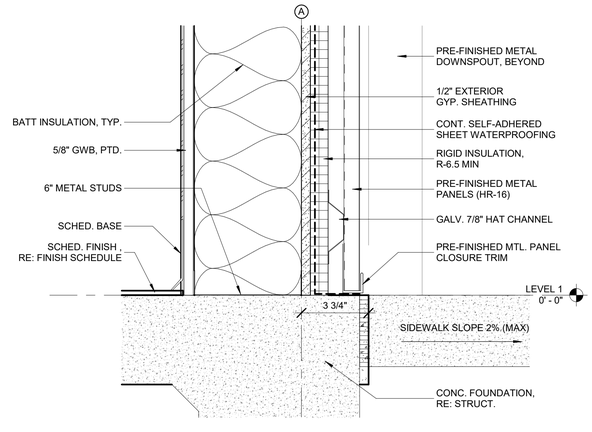
NOTE:
CONTRACTOR TO COORDINATE SUPPORTING CANOPY CONNECTION INCLUDING, BUT NOT LIMITED TO, STEEL PLATES & TUBE STEEL STUB-OUTS WITH CANOPY MFR & INCLUDE IN CONSTRUCTION COST (TYP AT ALL CANOPIES)



6 CANOPY
3" = 1'-0"



4 LOUVER
3" = 1'-0"



1 METAL PANEL LEDGE, TYP.
3" = 1'-0"

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WALLER COUNTY

VEHICLE MAINTENANCE GARAGE

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

REGISTERED ARCHITECT
JACK A. DURAN
16071
STATE OF TEXAS

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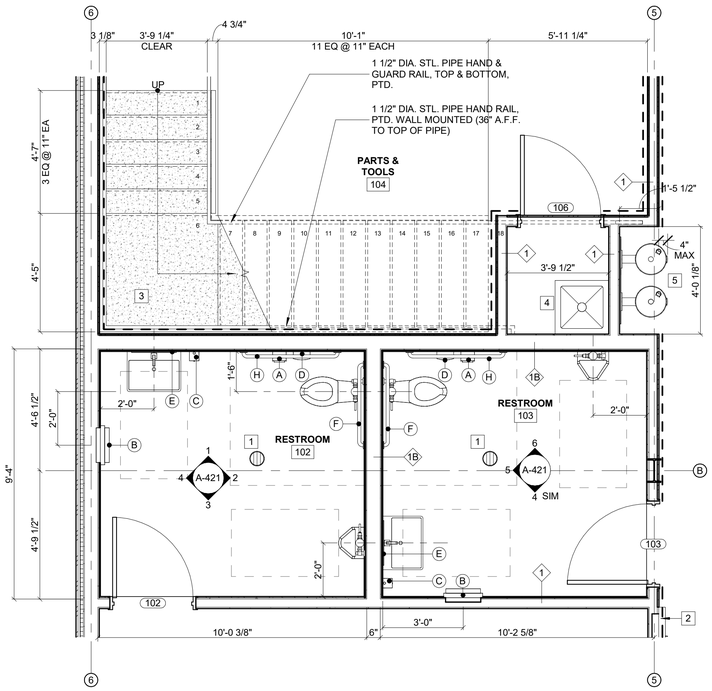
SECTION DETAILS

A-321

4/22/2025 3:13:49 PM Autodesk Docs://Waller County Jail Garage/25017 Waller County Jail Garage_R24.rvt



1 ENLARGED PLAN
3/8" = 1'-0"

CODED NOTS

1. FLOOR DRAIN, RE: PLUMBING
2. SEMI-RECESSED FIRE EXTINGUSHER CABINET
3. CONCRETE FILLED PAN METAL STAIRS
4. MOP SINK, RE: PLUMBING
5. EDF, REMOTE CHILLER, RE: MEP

TOILET ACCESSORY SCHEDULE

MARK	MODEL
A	B-4288
B	B-43944
C	B-4112
D	B-270
E	B-165
F	B-6806 x 36
H	B-6806 x 42

LEGEND

DASHED LINE INDICATES 10' HIGH METAL PANEL, GWB ABOVE

ENLARGED PLAN GENERAL NOTES

- REFER TO OVERALL FLOOR PLANS FOR ADDITIONAL INFORMATION
- INTERIOR DIMENSIONS ARE TO FACE OF STUD AND TO CENTERLINE OF COLUMNS U.N.O.
- REQUIRED CLEARANCES SHALL BE TO FACE OF FINISH
- USE WATER RESISTANT GYPSUM WALL BOARD AT ALL WET WALLS, WALLS w/ PORCELAIN TILE, AND WALLS w/ FRP (TYPICAL THROUGHOUT)
- VERIFY ALL INFORMATION WITH CIVIL, STRUCTURAL, MEP AND ALL OTHER CONSTRUCTION DOCUMENTS PRIOR TO START OF CONSTRUCTION - IF ANY DISCREPANCIES EXIST, CONSULT THE ARCHITECT, ENGINEER, AND APPLICABLE CONSULTANTS.

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WALLER COUNTY

VEHICLE MAINTENANCE GARAGE

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

REGISTERED ARCHITECT JACK A. DURAN 16071 STATE OF TEXAS

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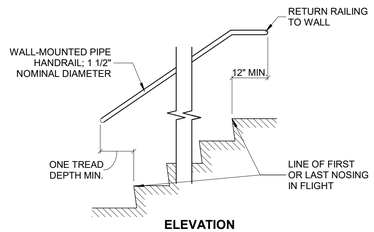
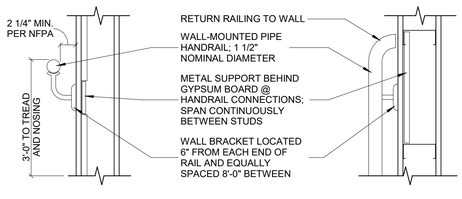
ENLARGED PLANS

A-401

4/22/2025 3:13:30 PM Autodesk Docs://Waller County Jail Garage/25217 Waller County Jail Garage_R24.rvt



ELEVATION



SECTION

NOTE: INSIDE RAIL BRACKET IS MOUNTED TO BALUSTER; SIMILAR

PLAN

② HANDRAIL DETAILS
1 1/2" = 1'-0"

4/22/2025 3:13:51 PM Autodesk Docs://Waller County Jail Garage/25017 Waller County Jail Garage_R24.rvt

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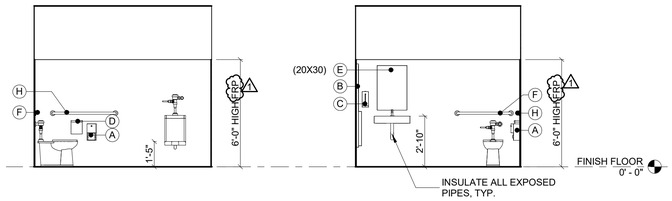
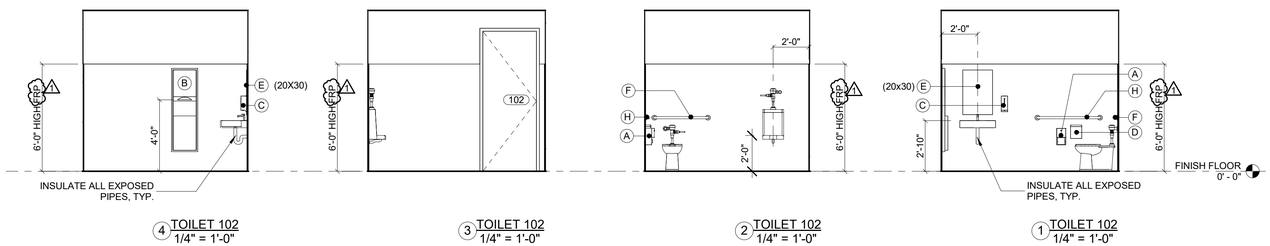
VERTICAL CIRCULATION

A-411



6 TOILET 103 1/4" = 1'-0"

5 TOILET 103 1/4" = 1'-0"

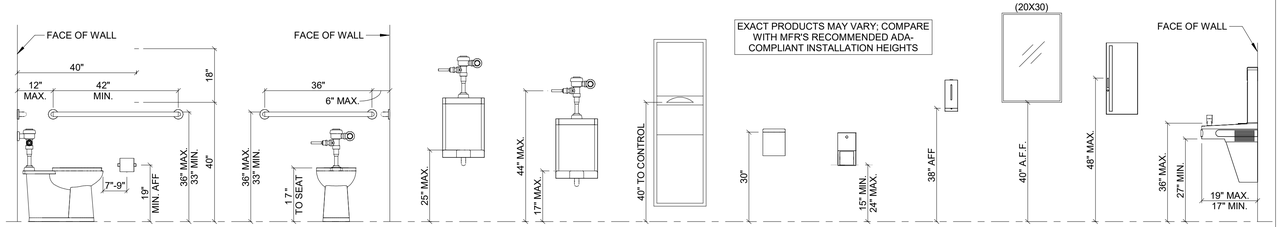


4 TOILET 102 1/4" = 1'-0"

3 TOILET 102 1/4" = 1'-0"

2 TOILET 102 1/4" = 1'-0"

1 TOILET 102 1/4" = 1'-0"

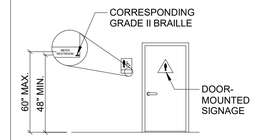


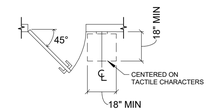
ADA TOILET & GRAB BARS | ADA TOILET & GRAB BARS | URINAL | ADA URINAL | PAPER TOWEL DISPENSER | SANITARY NAPKIN DISPOSAL | TOILET PAPER DISPENSER | SOAP DISPENSER | MIRROR | FIRE EXTINGUISHER CABINET | ADA DRINKING FOUNTAIN

ADA MOUNTING HEIGHTS
NOT TO SCALE

ADA SIGNAGE MOUNTING

PICTOGRAMS AND/OR LETTERING ARE NOT REQ'D ON DOOR-MOUNTED SIGNAGE.





ADA SIGNAGE GENERAL NOTES

GENERAL:
ANY ADDITIONAL TEXT REQUIRED DUE TO LOCAL ORDINANCES (FINES FOR PARKING IN ACCESSIBLE SPACES, ETC.) SHALL COMPLY WITH THE SIGNAGE REQUIREMENTS BELOW.

CHARACTER PROPORTIONS:
LETTERS AND NUMBERS ON SIGNS SHALL HAVE A WIDTH-TO-HEIGHT RATIO BETWEEN 3:5 AND 1:1 AND A STROKE-WIDTH-TO-HEIGHT RATIO BETWEEN 1:5 AND 1:10, UTILIZING AN UPPERCASE 'X' FOR MEASUREMENT.

CHARACTER HEIGHT:
WHERE THE HEIGHT ABOVE FLOOR OR GROUND LEVEL IS MORE THAN 120", THE MINIMUM CHARACTER HEIGHT SHALL BE 3". WHERE HEIGHT ABOVE FLOOR OR GROUND IS MORE THAN 70" BUT NOT MORE THAN 120", THE MINIMUM CHARACTER HEIGHT SHALL BE 2". WHERE HEIGHT ABOVE FLOOR OR GROUND IS MORE THAN 40" BUT NOT MORE THAN 70", THE MINIMUM CHARACTER HEIGHT SHALL BE 5/8". EXCEPTION: CHARACTER HEIGHT SHALL BE 5/8" HIGH MINIMUM FOR BUILDING DIRECTORIES

PICTOGRAMS:
WHERE PICTOGRAMS ARE REQUIRED, THEY SHALL HAVE A 6" MINIMUM SIZE MEASURED AT THE BORDER. WHERE TEXT DESCRIPTORS FOR PICTOGRAMS ARE REQUIRED, THEY SHALL COMPLY WITH THE TACTILE CHARACTER PROVISIONS OF RAISED CHARACTERS AND SYMBOLS, BRAILLE, AND LOCATION OF TACTILE SIGNAGE PORTIONS BELOW.

FINISH AND CONTRAST:
THE CHARACTERS, SYMBOLS, AND BACKGROUND OF SIGNS SHALL BE EGGSHELL, MATTE, OR OTHER NON-GLARE FINISH. CHARACTERS AND SYMBOLS SHALL CONTRAST WITH THEIR BACKGROUND, WITH EITHER LIGHT CHARACTERS ON A DARK BACKGROUND OR DARK CHARACTERS ON A LIGHT BACKGROUND.

RAISED CHARACTERS AND SYMBOLS:
CHARACTERS AND SYMBOLS ON TACTILE SIGNS SHALL BE RAISED 1/32" MINIMUM, SHALL BE IN UPPERCASE CHARACTERS, SHALL BE 5/8" HIGH MINIMUM AND 2" MAXIMUM, AND SHALL BE ACCOMPANIED BY BRAILLE IN ACCORDANCE WITH THE PROVISIONS OUTLINED BELOW.

BRAILLE:
BRAILLE SHALL BE SEPARATED 1/2" MINIMUM FROM THE CORRESPONDING RAISED CHARACTERS OR SYMBOLS. BRAILLE PROVIDED IN ACCORDANCE WITH THE REQUIREMENTS FOR ELEVATOR CONTROLS SHALL BE PLACED 3/16" MINIMUM BELOW THE CORRESPONDING CHARACTERS OR SYMBOLS. BRAILLE SHALL BE GRADE II AND SHALL CONFORM TO SPECIFICATION #800, NATIONAL LIBRARY SERVICE, LIBRARY OF CONGRESS.

LOCATION OF TACTILE SIGNAGE:
TACTILE SIGNAGE SHALL BE LOCATED ALONGSIDE THE DOOR ON THE LATCH SIDE AND SHALL BE MOUNTED AS SHOWN IN DIAGRAM. IN LOCATIONS HAVING DOUBLE DOORS, TACTILE SIGNS SHALL BE MOUNTED TO THE RIGHT OF THE RIGHT HAND DOOR. WHERE THERE IS NO WALL SPACE ON THE LATCH SIDE OF THE DOOR, INCLUDING DOUBLE LEAF DOORS, SIGNS SHALL BE PLACED ON THE NEAREST ADJACENT WALL. SIGNS CONTAINING TACTICLE CHARACTERS SHALL BE LOCATED SO THAT A CLEAR FLOOR SPACE OF 18 INCHES MINIMUM BY 18 INCHES MINIMUM, CENTERED ON THE TACTILE CHARACTERS, IS PROVIDED BEYOND THE ARC OF ANY DOOR SWING BETWEEN THE CLOSED POSITION AND 45 DEGREE OPEN POSITION.

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1	06.12.25	COMMENTS

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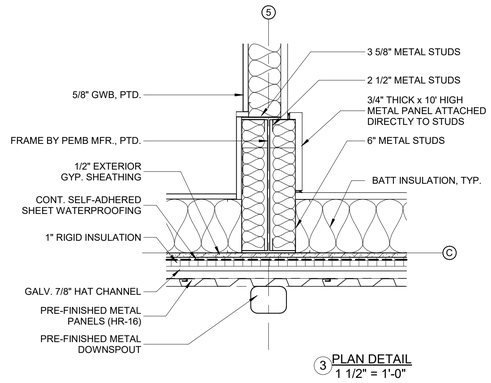
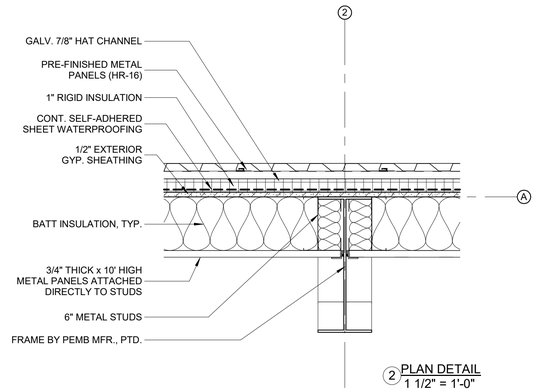
INTERIOR ELEVATIONS

A-421

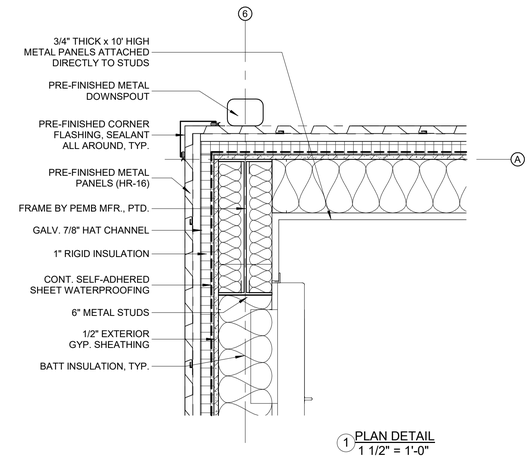
04/22/2025 3:05:35 PM Autodesk Docs://Waller County Jail Garage/25021T Waller County Jail Garage_Bld.rvt



3 PLAN DETAIL
1 1/2" = 1'-0"



2 PLAN DETAIL
1 1/2" = 1'-0"



1 PLAN DETAIL
1 1/2" = 1'-0"

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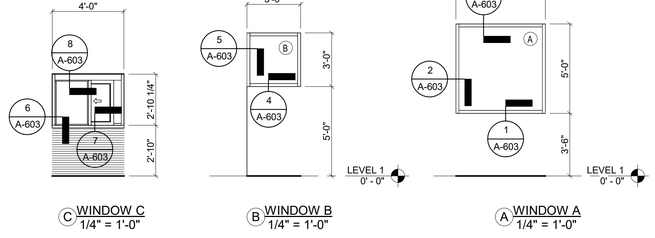
PLAN DETAILS

A-501

4/22/2025 3:13:24 PM Autodesk Docs://Waller County Jail Garage/20217 Waller County Jail Garage_R24.rvt



C WINDOW C
1/4" = 1'-0"

B WINDOW B
1/4" = 1'-0"

A WINDOW A
1/4" = 1'-0"

GLAZING SCHEDULE

(A) 1" INSULATED GRAY TINTED LOW-E, TEMPERED SAFETY GLASS

(B) 1/4" CLEAR TEMPERED SAFETY GLASS (INTERIOR DOOR LITES)

WINDOW GENERAL NOTES

1. OVERALL DIMENSIONS INDICATE ROUGH OPENINGS. ACTUAL WINDOW UNIT SIZE SHALL BE 3/4" LESS ON ALL SIDES TO ACCOMMODATE THE CONTINUOUS BACKER ROD AND SEALANT JOINTS.
2. FIELD VERIFY ALL OPENINGS PRIOR TO ORDERING.
3. INCLUDE LOCATIONS OF TEMPERED GLAZING ON SHOP DRAWINGS.
4. ALL STOREFRONT FRAMING TO HAVE CLOSURE PANELS.
5. ALL STOREFRONT TO HAVE HIGH PREFORMANCE SILL FLASHING WITH END DAMS.
6. DO NOT ATTACH ANY ITEM TO STOREFRONT MULLIONS WITHOUT WRITTEN PERMISSION FROM THE STOREFRONT MANUFACTURER.

TEMPERED GLAZING GENERAL NOTES

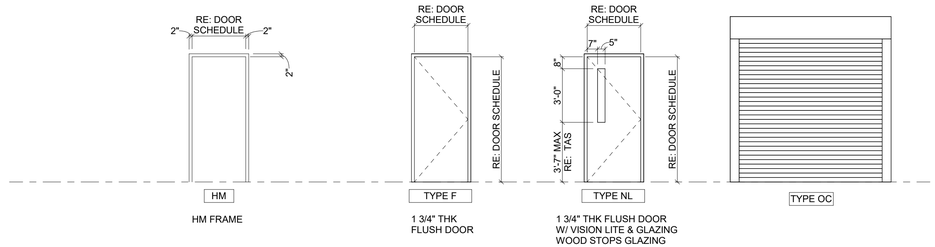
IN ACCORDANCE WITH IBC 2406.4, TEMPERED GLAZING SHALL BE PROVIDED IN:

1. ALL FIXED AND OPERABLE DOOR PANELS
2. INDIVIDUAL FIXED OR OPERABLE PANELS ADJACENT TO A DOOR WHERE THE NEAREST VERTICAL EDGE OF THE GLAZING IS WITHIN A 24-INCH ARC OF EITHER VERTICAL EDGE OF THE DOOR IN A CLOSED POSITION AND WHERE THE BOTTOM EXPOSED EDGE OF THE GLAZING IS LESS THAN 60 INCHES ABOVE THE WALKING SURFACE
3. INDIVIDUAL FIXED OR OPERABLE WINDOW PANELS THAT MEET ALL OF THE FOLLOWING CONDITIONS;
   A. THE EXPOSED AREA OF AN INDIVIDUAL PANE IS GREATER THAN 9 SQUARE FEET;
   B. THE BOTTOM EDGE OF THE GLAZING IS LESS THAN 18 INCHES ABOVE THE FLOOR;
   C. THE TOP EDGE OF THE GLAZING IS GREATER THAN 36 INCHES ABOVE THE FLOOR; AND
   D. ONE OR MORE WALKING SURFACE(S) ARE WITHIN 36 INCHES, MEASURED HORIZONTALLY AND IN A STRAIGHT LINE, OF THE PLANE OF THE GLAZING.
4. GLAZING WHERE THE BOTTOM EXPOSED EDGE OF THE GLAZING IS LESS THAN 60 INCHES ABOVE THE PLANE OF THE ADJACENT WALKING SURFACE OF STAIRWAYS, LANDINGS BETWEEN FLIGHTS OF STAIRS, AND RAMPS.
5. GLAZING ADJACENT TO THE LANDING AT THE BOTTOM OF A STAIRWAY WHERE THE GLAZING IS LESS THAN 36 INCHES ABOVE THE LANDING AND WITHIN 60 INCHES HORIZONTALLY OF THE BOTTOM TREAD.

DOOR SCHEDULE

NO.	ROOM	SIZE		DOOR			FRAME		FIRE RATING	DETAIL			HARDWARE				REMARKS
		WIDTH	HEIGHT	TYPE	MAT.	FIN.	TYPE	FIN.		HEAD	JAMB	SILL	FUNCTION	ACCESS CTRL	PANIC	CLOSER	
101A	OFFICE	3'-0"	7'-10"	F	HM	PT	HM	PT		3A-602/	4/A-602	1/A-602	ENTRY			X	
101B	OFFICE	3'-0"	7'-10"	NL	HM	PT	HM	PT		5A-602	5/A-602	2/A-602	OFFICE			X	
102	RESTROOM	3'-0"	7'-10"	F	HM	PT	HM	PT		5A-602	5/A-602	2/A-602	PRIVACY			X	
103	RESTROOM	3'-0"	7'-10"	F	HM	PT	HM	PT		5A-602	5/A-602	2/A-602	PRIVACY			X	
104A	PARTS & TOOLS	3'-0"	7'-10"	F	HM	PT	HM	PT		3A-602/	4/A-602	1/A-602	EXIT			X	
104B	PARTS & TOOLS	3'-0"	7'-10"	NL	HM	PT	HM	PT		5A-602	5/A-602	2/A-602	OFFICE			X	
105A	MAINTENANCE BAYS	12'-0"	10'-6"	OC	AL	AN	AL	AN		7/A-602	6/A-602	8/A-602	STOREROOM				
105B	MAINTENANCE BAYS	12'-0"	10'-6"	OC	AL	AN	AL	AN		7/A-602	6/A-602	8/A-602	STOREROOM				
105C	MAINTENANCE BAYS	12'-0"	10'-6"	OC	AL	AN	AL	AN		7/A-602	6/A-602	8/A-602	STOREROOM				
105D	MAINTENANCE BAYS	12'-0"	10'-6"	OC	AL	AN	AL	AN		7/A-602	6/A-602	8/A-602	STOREROOM				
105E	MAINTENANCE BAYS	3'-0"	7'-10"	F	HM	PT	HM	PT		3A-602/	4/A-602	1/A-602	ENTRY			X	
105F	MAINTENANCE BAYS	12'-0"	10'-6"	OC	AL	AN	AL	AN		7/A-602	6/A-602	8/A-602	STOREROOM				
105G	MAINTENANCE BAYS	12'-0"	10'-6"	OC	AL	AN	AL	AN		7/A-602	6/A-602	8/A-602	STOREROOM				
105H	MAINTENANCE BAYS	12'-0"	10'-6"	OC	AL	AN	AL	AN		7/A-602	6/A-602	8/A-602	STOREROOM				
106	PARTS & TOOLS	3'-0"	7'-10"	F	HM	PT	HM	PT		5A-602	5/A-602	2/A-602					

FRAME & DOOR TYPES



DOOR SCHEDULE ABBREVIATIONS

AL - ALUMINUM	HM - HOLLOW METAL
AN - ANODIZED	NL - NARROW LITE
AP - ACCESS PANEL	PF - PREFINISHED
CO - CASED OPENING	PN - PANELED
DA - DOUBLE-ACTING	PT - PAINTED
DG - DUMPSTER GATE	SF - STOREFRONT
F - FLUSH	SN - STAINED
FL - FULL LITE	ST - STEEL
HL - HALF LITE	WD - WOOD

DOOR SCHEDULE REMARKS

1. PREPARE FRAME FOR ELECTRONIC STRIKE BY OWNER'S SECURITY CONTRACTOR; PROVDE POWER FOR OWNER'S ACCESS CONTROL SYSTEM
2. PREPARE FRAME FOR ELECTRONIC STRIKE; POWER TRANSFER THROUGH DOOR
3. DOOR TO BE USED AS EXIT ONLY; PROVIDE HARDWARE BLANK AND TAMPERPROOF STRIKE ON EXTERIOR
4. PROVIDE "REQUEST TO EXIT" FEATURE
5. ONE LEAF TO BE PROVIDED WITH AUTOMATIC OPENER; SEE HARDWARE SET
6. ONE LEAF INACTIVE; PROVIDE HEAD AND FLOOR FLUSHBOLTS
7. PROVIDE MAGNETIC HOLD-OPEN
8. PROVIDE FILM OVER GLAZING
9. PREP FOR CARD READER

DOOR SCHEDULE HARDWARE FUNCTIONS

(MORTISE / CYLINDRICAL)

F01 / F75 PASSAGE: LATCH RETRACTED BY LEVER AT ALL TIMES

F02 / F76 PRIVACY LOCK: OUTSIDE LEVER LOCKED BY PUSH-BUTTON ON INSIDE LEVER. TURNING INSIDE LEVER RELEASES/ UNLOCKS BUTTON. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EGRESS.

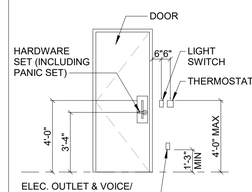
F04 / F82 ENTRY/OFFICE LOCK: OUTSIDE LEVER LOCKED BY PUSH-BUTTON ON INSIDE LEVER UNTIL IT IS UNLOCKED BY KEY OR BY TURNING INSIDE LEVER. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EGRESS. DEADLOCKING LATCHBOLT.

F07 / F86 STOREROOM LOCK: OUTSIDE LEVER ALWAYS LOCKED. LATCH RETRACTED BY KEY IN OUTSIDE LEVER OR BY TURNING INSIDE LEVER. INSIDE LEVER ALWAYS FREE FOR IMMEDIATE EGRESS. DEADLOCKING LATCHBOLT.

DOOR SCHEDULE GENERAL NOTES

- GENERAL CONTRACTOR TO COORDINATE ALL JAMB DEPTHS, SWING HANDING, AND QUANTITIES
- ALL EXTERIOR FRAMES TO BE SEALED WITH BACKER ROD AND SEALANT
- SEE CODE COMPLIANCE SECTION FOR U-FACTOR AND SHGC REQUIREMENTS FOR EXTERIOR DOORS
- ALL GLAZING IN EXTERIOR DOORS TO BE INSULATED
- GLAZING IN ALL DOORS TO BE TEMPERED
- GENERAL CONTRACTOR TO COORDINATE KEYING SYSTEM WITH OWNER
- PROVIDE SOLID BLOCKING AT ALL WALL STOPS. USE FIRE RETARDANT TREATED WOOD WHERE REQUIRED
- STOREFRONT CONTRACTOR TO PROVIDE HARDWARE FOR STOREFRONT DOORS U.N.O.
- ALL HOLLOW METAL FRAMES TO BE FACE WELDED, RE: SPECS
- SEE HARDWARE SET AND SPECIFICATIONS FOR SPECIFIC DOOR AND HARDWARE PRODUCTS
- DOOR HARDWARE TO COMPLY WITH GRASPABILITY AND MOUNTING REQUIREMENTS OF IBC SECTION 1008

DOOR HARDWARE MOUNTING HEIGHTS



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VEHICLE MAINTENANCE GARAGE

200 SHERIFF R GLENN SMITH DR.
HEMPSTEAD, TX 77445

REGISTERED ARCHITECT
JACK A. DURAN
16071
STATE OF TEXAS

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AFFIXATION DATE: 04.22.25

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DRAWN BY: BH QC: JD

DOORS & WINDOWS

A-601

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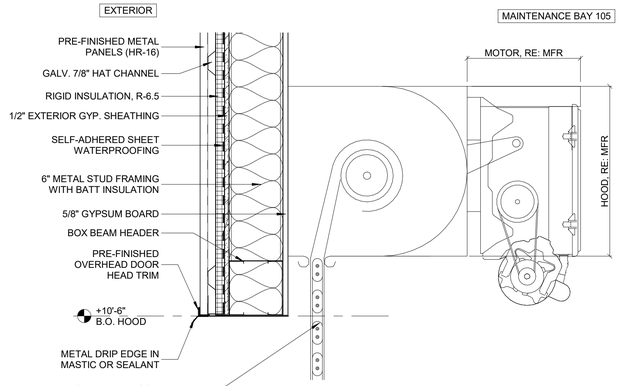
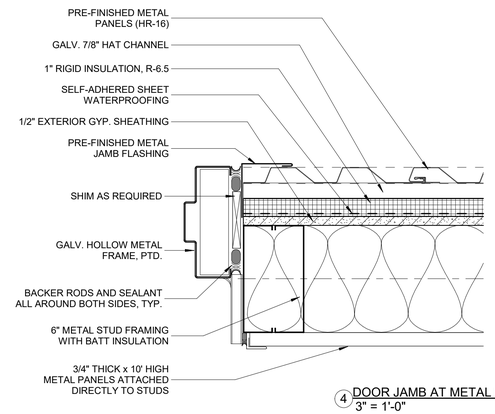
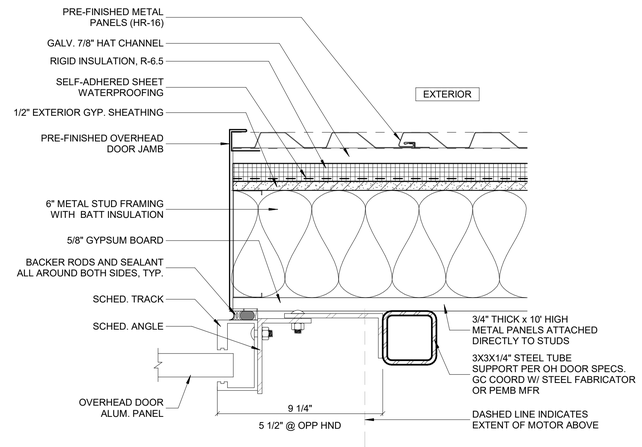


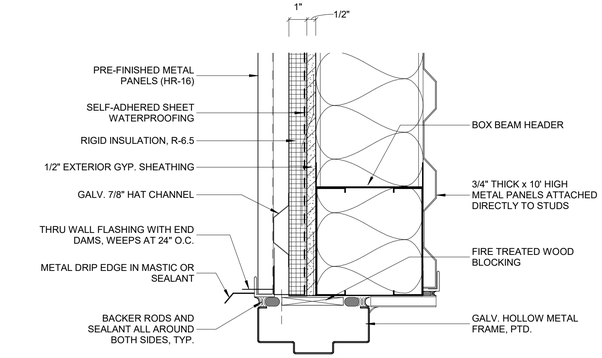
7 DR OH DOOR HEAD
1 1/2" = 1'-0"



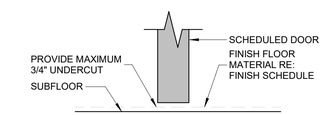
4 DOOR JAMB AT METAL PANEL
3" = 1'-0"



6 DR OH DOOR JAMB
3" = 1'-0"



3 DOOR HEAD AT METAL PANEL
3" = 1'-0"



2 DR INTERIOR THRESHOLD
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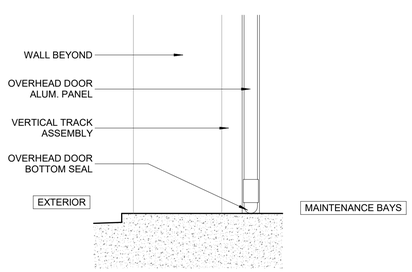
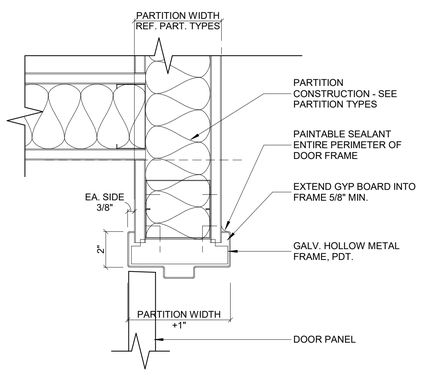
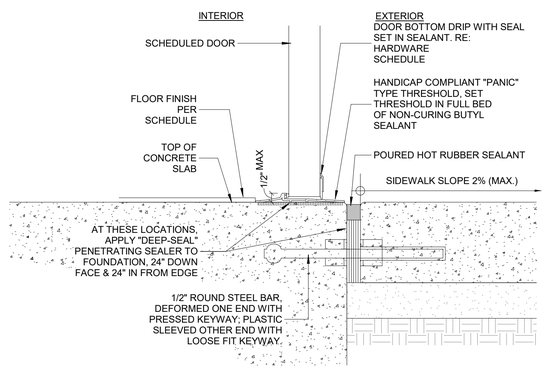


8 DR OH DOOR SILL
1 1/2" = 1'-0"



5 HM HEAD/JAMB DETAIL @ INTERIOR
3" = 1'-0"



1 DR DOOR THRESHOLD EXT
3" = 1'-0"

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HEMPSTEAD, TX 77445

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DOOR DETAILS

A-602

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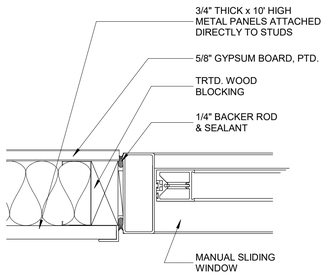
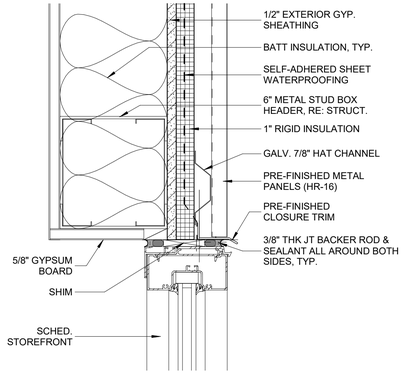


6 SLIDING WINDOW JAMB DETAIL
3" = 1'-0"



3 SF HEAD DETAIL
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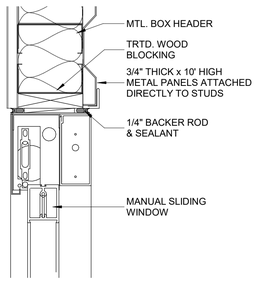
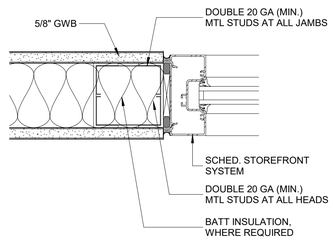


8 SLIDING WINDOW HEAD DETAIL
3" = 1'-0"



5 SF INT JAMB/HEAD
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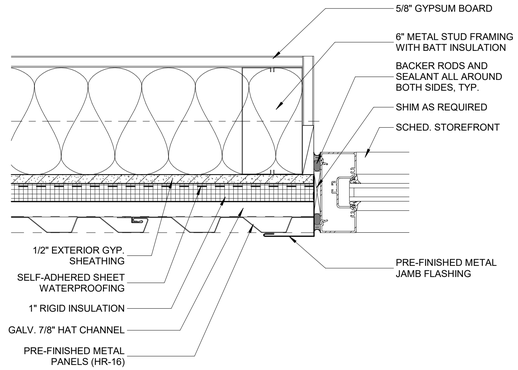

2 SF JAMB DETAIL
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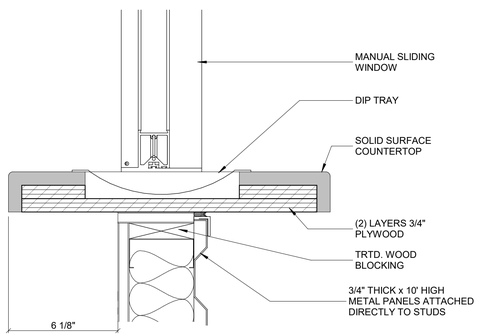
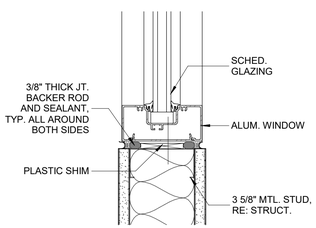
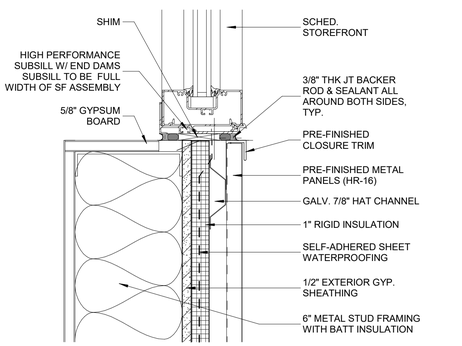


7 SLIDING WINDOW SILL DETAIL
3" = 1'-0"



4 SF INT SILL AT PARTITION
3" = 1'-0"



1 SF SILL DETAIL
3" = 1'-0"

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WINDOW DETAILS

A-603

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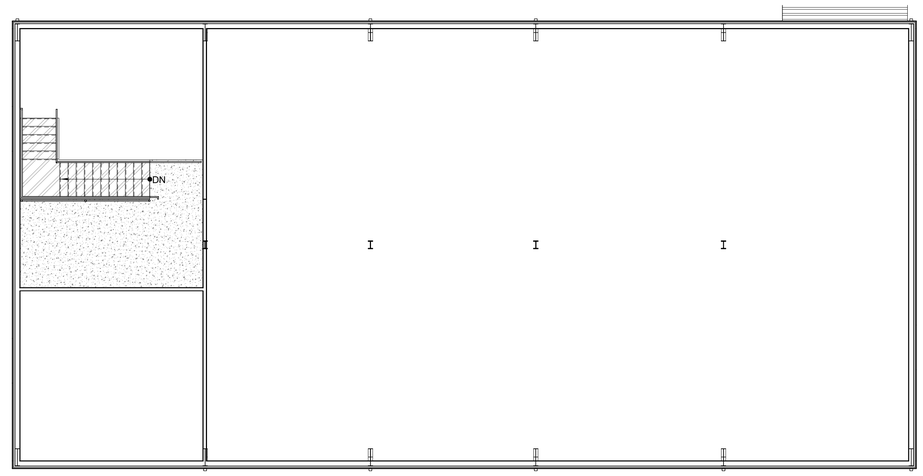
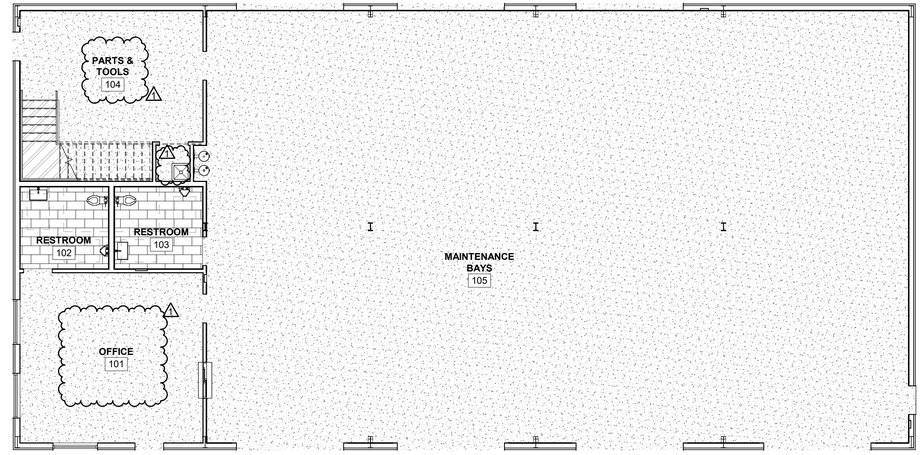
ROOM FINISH SCHEDULE

NO.	ROOM NAME	FLOOR	BASE	WALLS				CEILING
				NORTH	EAST	SOUTH	WEST	
101	OFFICE	SEALED CONCRETE	RESILIENT	GWB PTD	GWB PTD	GWB PTD	GWB PTD	2X2 LAY-IN
102	RESTROOM	PORCELAIN TILE	PORCELAIN TILE	6' HIGH FRP	6' HIGH FRP	6' HIGH FRP	6' HIGH FRP	GWB. PTD.
103	RESTROOM	PORCELAIN TILE	PORCELAIN TILE	6' HIGH FRP	6' HIGH FRP	6' HIGH FRP	6' HIGH FRP	GWB. PTD.
104	PARTS & TOOLS	SEALED CONCRETE	RESILIENT	GWB PTD. OVER 10' METAL PANEL	GWB PTD. OVER 10' METAL PANEL	GWB PTD. OVER 10' METAL PANEL	GWB PTD. OVER 10' METAL PANEL	EXPOSED PAINTED
105	MAINTENANCE BAYS	SEALED CONCRETE	RESILIENT	GWB PTD. OVER 10' METAL PANEL	GWB PTD. OVER 10' METAL PANEL	GWB PTD. OVER 10' METAL PANEL	GWB PTD. OVER 10' METAL PANEL	EXPOSED PAINTED
201	MEZZANINE	SEALED CONCRETE	RESILIENT	CHAIN LINK FENCE	GWB PTD. OVER 10' METAL PANEL	GWB PTD. OVER 10' METAL PANEL	GWB PTD. OVER 10' METAL PANEL	EXPOSED PAINTED
202	JAN.	SEALED CONCRETE	RESILIENT	GWB PTD.	GWB PTD. OVER 6H FRP	GWB PTD. OVER 6H FRP	GWB PTD.	EXPOSED PAINTED



2 PLATFORM FINISH PLAN
1/8" = 1'-0"



1 LEVEL 1 FINISH PLAN
1/8" = 1'-0"

LEGEND

ROOM NAME
101
Floor Finish
Base Finish
Wall Finish
ROOM FINISH TAG

SEALED CONCRETE

PORCELAIN TILE

NOT USED

RUBBER TREADS, RISERS & LANDINGS

FINISH PLAN GENERAL NOTES

- SEE FINISH SCHEDULE FOR ADDITIONAL INFORMATION

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1	06.12.25	COMMENTS

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FINISH PLANS & SCHEDULE

A-811

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MECHANICAL SYMBOLS LEGEND

SYMBOL	DESCRIPTION	ABBV.
	SUPPLY AIR CEILING DIFFUSER	SAG/SAR
	RETURN AIR GRILLE / REGISTER	RAG / RAR
	EXHAUST GRILLE / REGISTER	EG / ER
	SUPPLY AIR CEILING DIFFUSER	CD
	LINEAR SLOT DIFFUSER	LD
	SIDEWALL SUPPLY AIR GRILLE/REGISTER	SAG/SAR
	SIDEWALL RETURN AIR GRILLE/REGISTER	RAG/RAR
	DUCT MT'D. SIDEWALL SUPPLY AIR GRILLE/REGISTER	SAG/SAR
	SUPPLY DUCT RISE/DROP	
	RETURN DUCT RISE/DROP	
	EXHAUST DUCT RISE/DROP	
	DOOR GRILLE	DG
UC 3/4"	UNDERCUT DOOR	UC
WxD TD	LINED RETURN TRANSFER DUCT ABOVE CEILING (SIZE AS INDICATED)	TD
	SQUARE ELBOW WITH DOUBLE THICKNESS TURNING VANES	
	VOLUME DAMPER	MVD
	FLEXIBLE DUCT	FLEX.CONN.
	NEW DUCTWORK	
	DEMO DUCTWORK	
	EXISTING DUCTWORK	
	NEW MECHANICAL EQUIPMENT	
T	THERMOSTAT	T-STAT
H	HUMIDISTAT	H-STAT
T1	COMBINATION TEMPERATURE AND CO2 SENSOR	
T2	COMBINATION TEMPERATURE, HUMIDITY, & CO2 SENSOR	
T3	COMBINATION TEMPERATURE & HUMIDITY SENSOR	
SD	SMOKE DAMPER	SD
FD	FIRE DAMPER	FD
FS	COMBINATION FIRE AND SMOKE DAMPER	F/SD
CO2	CARBON DIOXIDE SENSOR	CO2
CO	CARBON MONOXIDE SENSOR	CO
BD	BAROMETRIC DAMPER	BD
	SMOKE DETECTOR (BY DIVISION 16)	
A	PNEUMATIC DAMPER ACTUATOR	A
BDD	BACKDRAFT DAMPER	BDD
FMS	FLOW MEASURING STATION	FMS
	SPIN-IN VOLUME DAMPER	
M	MOTORIZED DAMPER	M
	AIRFLOW DIRECTION	
	SUPPLY AIR	SA
	RETURN AIR	RA
	OUTSIDE AIR	OA
	EXHAUST AIR	EA
	OWNER-FURNISHED EQUIPMENT	OFE
	ABOVE FINISHED FLOOR	AFF
	BOTTOM OF DUCT	BOD
	NOT IN CONTRACT	NIC
	FURNISHED BY OTHERS	FBO
	CONNECT TO EXISTING	
1 / M.401 — PLAN SECTION / SECTION NUMBER / SHEET NUMBER		
A 22"x22" 500 (TYP #) — DIFFUSER TYPE / DIFFUSER NECK SIZE / CFM	NOTE: DUCT RUNOUT TO NECK SAME SIZE UNLESS OTHERWISE NOTED	
RE:01/M-401 — DRAWING REFERENCE / DETAIL NUMBER / SHEET NUMBER		

MECHANICAL GENERAL NOTES

1. ALL WORK SHALL BE PERFORMED AS PER THE LOCAL MECHANICAL CODE, THE LOCAL BUILDING CODES AND LOCAL ENERGY CONSERVATION CODE.
2. PROVIDE ALL MATERIALS, LABOR, EQUIPMENT AND ANY OTHER INCIDENTALS ESSENTIAL FOR A COMPLETE AND OPERATIONAL INSTALLATION OF THE HVAC WORK SHOWN ON THE PLANS.
3. ALL DUCTWORK SHALL BE FABRICATED PER THE LATEST SMACNA STANDARDS.
4. DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL INFO FOR COORDINATION AND POTENTIAL CONFLICTS. THE MECHANICAL SUBCONTRACTOR SHALL, WITHOUT EXTRA COST TO THE PROJECT SHALL MAKE REASONABLE MODIFICATIONS IN THE LAYOUT AS NEEDED TO PREVENT CONFLICTS WITH OTHER TRADES, OR FOR PROPER EXECUTION OF THE WORK.
5. DUCT DIMENSIONS INDICATED ON DRAWINGS ARE CLEAR INSIDE AIR STREAM DIMENSIONS.
6. ALL NEW HVAC EQUIPMENT SHALL BE CLEANED AFTER THE FINISHING OF DRYWALL AND PRIOR TO THE RELEASE OF BUILDING TO THE OWNER. IF THE DUCTWORK AND AIR DEVICES ARE NOT PROPERLY PROTECTED DURING CONSTRUCTION THAN IT SHALL BE CLEANED AS WELL. CONTRACTOR TO PROVIDE DOCUMENTATION WITH DATE AND TIME OF ALL THE PERFORMED SERVICES.
7. ALL WALL MOUNTED TEMPERATURE, HUMIDITY AND CO2 SENSORS SHALL BE MOUNTED AT THE SAME ELEVATION AS THE LIGHT SWITCHES. COORDINATE WITH ELECTRICAL DRAWINGS AND ARCHITECTURAL ELEVATION PLAN.
8. REFER TO MECHANICAL ROOF PLAN FOR ROOF MOUNTED EQUIPMENTS.
9. PRIOR TO INSTALLATION OF EQUIPMENT, VERIFY MANUFACTURER'S RECOMMENDED AND CODE REQUIRED CLEARANCES ARE AVAILABLE.
10. COORDINATE ALL WORK WITH ALL OTHER TRADES.
11. PROVIDE FIRE DAMPERS, SMOKE DAMPERS, OR COMBINATION FIRE/SMOKE DAMPERS IN ALL DUCTWORK AND RETURN AIR OPENINGS WHICH PENETRATE FIRE OR SMOKE RATED WALL OR FLOOR SLABS. FIRE OR SMOKE RATED WALLS CAN INCLUDE BUT NOT LIMITED TO CORRIDOR WALLS, MECHANICAL ROOMS, ELECTRICAL ROOMS, AND STORAGE ROOMS. REFER TO ARCHITECTURAL PLANS FOR PARTITION AND WALL TYPES INDICATING FIRE OR SMOKE RATED WALL LOCATION AND RATING.
12. REFER TO ARCHITECTURAL LOUVER SCHEDULE AND ELEVATION PLANS FOR EXACT SIZE, LOCATION AND ELEVATION.
13. REFER TO AIR TERMINAL DETAIL AND DRAWINGS FOR INLET AND DUCT SIZING REQUIREMENT.
14. ALL TERMINAL UNITS AND INLINE EXHAUST FANS SHALL BE INSTALLED IN PROPER ACCESSIBLE AREA ABOVE LAY-IN CEILING AND IN BETWEEN LIGHT FIXTURES.
15. PROVIDE 24"x24" ACCESS PANEL IN THE GYP BOARD CEILING WHERE TERMINAL UNITS AND INLINE EXHAUST FANS ARE INSTALLED. COORDINATE WITH ARCHITECTURAL CEILING PLANS.
16. COORDINATE ALL AIR DEVICES LOCATIONS WITH FINAL ARCHITECTURAL REFLECTED CEILING PLAN.
17. ALL SUPPLY AND RETURN AIR CEILING DEVICES SHALL BE INSULATED ON TOP OF DEVICES TO PREVENT CONDENSATION. INSULATE DEVICES WITH 1-1/2" WRAPAROUND INSULATION AND TOTALLY COVER ALL SURFACES; SECURE INSULATION IN PLACE AND APPLY INSULATION PRIOR TO MOUNTING AIR DEVICES.
18. PRIOR TO INSTALLATION OF EQUIPMENT, VERIFY MANUFACTURER'S RECOMMENDED AND CODE REQUIRED CLEARANCES ARE AVAILABLE.
19. PROVIDE TURNING VANES ON ALL RECTANGULAR ELBOWS.
20. ALL EXPOSED DUCTWORK SHALL BE DOUBLE WALL DUCT. REFER TO SPECIFICATION. PAINT DUCTWORK. COORDINATE COLOR WITH THE ARCHITECT.
21. PROVIDE 16x16 RETURN AIR OPENING IN WALL ABOVE CEILING WHERE WALLS GO UP TO DECK AND RETURN OPENING NOT SHOWN ON THE DRAWINGS. SHOW RETURN AIR OPENINGS IN DUCT SHOP DRAWINGS. RETURN AIR OPENINGS SHALL BE PLACED NEAR RETURN AIR GRILLES.
22. PROVIDE INTERNALLY LINED DUCT FOR THE FOLLOWING DUCTWORK UNLESS OTHERWISE NOTED ON THE DRAWINGS:

    FIRST 20'-0" OF SUPPLY AND RETURN DUCT FROM ROOF MOUNTED AIR HANDLING UNITS.

    FIRST 10'-0" OF ROOF MOUNTED EXHAUST FANS.

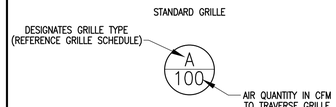
    ALL RETURN AIR BOOTS AND TRANSFER DUCTS.
23. CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH THE MECHANICAL, ELECTRICAL,PLUMBING, ARCHITECTURAL, AND STRUCTURAL CHANGES FOR EQUIPMENT PROPOSED THAT DIFFERS FROM THE BASIS OF DESIGN.
24. ANY CHANGES REQUIRED TO ELIMINATE CONFLICTS OR THAT RESULT FROM A FAILURE TO COORDINATE BETWEEN CONTRACTORS SHALL BE WITHOUT ANY ADDITIONAL COST TO THE PROJECT.
25. ALL SUPPLY, RETURN, AND OUTSIDE AIR DUCTWORK IN UNCONDITIONED / NON-RETURN PLENUM SHALL BE PROVIDED WITH DUCT WRAP INSULATION.
26. PROVIDE INSULATED CONDENSATE DRAIN PIPE FROM FLOOR MOUNTED OR SUSPENDED UNIT TO NEAREST FLOOR DRAIN. REFER TO PLUMBING DRAWINGS FOR EXACT DRAIN LOCATION. ALL CONDENSATE LOCATED OUTDOORS SHALL BE INSULATED WITH ALUMINUM JACKETING AS SPECIFIED.
27. ANY SENSING DEVICE SUCH AS TEMPERATURE, HUMIDITY, CO2, ETC. LOCATED IN OPEN SPACES SUCH AS CORRIDORS, LIBRARY, GYMNASIUM, CAFETERIA, ETC. SHALL BE PLACED WITHIN A CLEAR LOCKABLE ENCLOSURE PROVIDED BY EQUIPMENT MANUFACTURER; PROVIDE TWO SETS OF KEYS.
28. ALL EXPOSED REFRIGERANT (LIQUID AND SUCTION LINES) AND CONDENSATE PIPING SHALL BE INSULATED AND PROVIDED WITH ALUMINUM JACKET.
29. ALL OUTSIDE AIR INTAKE OPENINGS SHALL BE LOCATED A MINIMUM OF 15'-0" FROM ANY PLUMBING VENT, FUEL-FIRED APPLIANCE VENT OR EXHAUST AIR DISCHARGE.
30. ALTHOUGH NOT SHOWN ON PLANS ALL SUPPLY, RETURN, EXHAUST, OUTSIDE AIR, ETC. TAPS, BRANCH TAKE-OFFS, WYE'S, TEE SPLIT ETC. SHALL BE PROVIDED WITH A A VOLUME DAMPER FOR AIR REGULATION; REFER TO BRANCH DUCT DETAIL WITHIN MECHANICAL DETAIL DRAWING AND SPECIFICATION 23 33 00 AIR DUCT ACCESSORIES - 2.6 VOLUME CONTROL DAMPERS.
31. NOT ALL SYMBOLS OR ABBREVIATIONS MAY BE USED ON THESE DRAWINGS.
32. ALL REFRIGERANT LIQUID AND SUCTION LINES ASSOCIATED WITH ANY SPLIT-SYSTEM AIR-CONDITIONER SHALL BE SIZED BASED ON THE MANUFACTURERS RECOMMENDATION. BOTH LIQUID AND SUCTION LINES SHALL BE INSULATED; PROVIDE ALUMINUM JACKETING IF LOCATED OUTDOORS (ROOF OR GRADE LEVEL).
33. EACH SINGLE SYSTEM PROVIDING HEATING OR COOLING AIR 2,000 CFM AND GREATER SHALL BE EQUIPPED WITH AN AUTOMATIC SHUT-OFF. THE SMOKE DETECTOR SHALL BE INSTALLED IN THE MAIN SUPPLY AIR DUCT DOWNSTREAM OF THE FILTERS OR THEY MAY BE INSTALLED IN EACH ROOM OR SPACE SERVED BY THE SUPPLY AIR DUCT. DETECTORS SHALL ALSO BE INSTALLED IN THE MAIN RETURN DUCT AHEAD OF OSA INTAKE.

GAS SPLIT SYSTEM SCHEDULE

MARK (INDOOR)	MFG. (INDOOR)	(FCU)	MARK (OUTDOOR)	MFG. (OUTDOOR)	MODEL # (OUTDOOR)	MIN EFF.	NOM. TON.	EVAPORATOR FAN DATA						COOLING DATA					GAS HEATING DATA					ELECTRICAL DATA - AHU			ELECTRICAL DATA - CU		
								SUPPLY CFM	OSA CFM	ESP (IN. WC.)	MAX FAN HP	FAN TYPE	RPM	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	EAT (DB/WB) (°F)	LAT (DB/WB) (°F)	OSA (DB/WB) (°F)	HEAT INPUT	HEAT OUTPUT	HEATING EAT (°F)	HEATING LAT (°F)	OSA (°F)	V/PH/HZ	MCA (AMPS)	MOP (AMPS)	V/PH/HZ	MCA (AMPS)	MOP (AMPS)
AHU-01	DAIKIN	DM80VC0604B / CHPE2430B	ACCU-01	DAIKIN	DC6VSA241	16.2 SEER2	2.0	700	105	0.50	3/4	FC	1,050	22.9	17.9	78.0 / 65.0	54.4 / 53.5	102.0 / 78.0	60.0	48.6	60.0	124.0	25.0	240/1/60	10.6	15.0	240/1/60	16.8	20.0

1. PROVIDE ALL CONDENSING UNITS WITH LOUVERED HAIL GUARDS. WIRE MESH NOT ACCEPTABLE.
2. PROVIDE DAIKIN ONE+ 7 DAY PROGRAMMABLE WIFI THERMOSTAT WITH HUMIDITY CONTROL
3. PROVIDE IEQ360 BIPOLAR IONIZATION, MOUNTED INSIDE FCU. DUCT MOUNT NOT ACCEPTABLE.
4. PROVIDE RAWAL APR MODULATING CAPACITY CONTROL VALVE KIT, HOT GAS REHEAT, OR INVERTER COMPRESSOR WITH ACTIVE DEHUMIDIFICATION SEQUENCE INCLUDING REDUCED FAN SPEED (SETPOINT REDUCTION UNTIL %RH SATISFIED IS NOT ACCEPTABLE)
5. CONTACT DERRICK VAN WEST WITH HDH FOR PRICING & LEADTIME. DERRICK.VANWEST@HVACDH.COM. 214-846-8668

GRILLE SIZING SCHEDULE



ALL GRILLES SHOWN SHALL BE FOUR-WAY THROW UNLESS OTHERWISE SHOWN.

RETURN FLEX DUCT SIZING SCHEDULE

SIZE	AIRFLOW (CFM)
4"ø	0 – 50
6"ø	50 – 100
8"ø	100 – 200
10"ø	200 – 300
12"ø	300 – 400
14"ø	400 – 500

SUPPLY DIFFUSER NECK SIZING SCHEDULE

SIZE	AIRFLOW (CFM)
4"ø	0 – 50
6"ø	50 – 100
8"ø	100 – 210
10"ø	210 – 380
12"ø	380 – 500
14"ø	500 – 700

CONDENSATE DRAIN SIZING SCHEDULE

PIPE DIA.	EQUIPMENT CAPACITY
3/4"ø	UP TO 10 TONS
1"ø	OVER 10 TONS TO 30 TONS
1-1/4"ø	OVER 30 TONS TO 75 TONS
1-1/2"ø	OVER 75 TONS TO 125 TONS
2"ø	OVER 125 TONS TO 200 TONS

FAN SCHEDULE

MARK	MFG.	MODEL	TYPE	SERVICE	AIRFLOW (CFM)	ESP (IN WC)	MTR. POWER (AMPS/HP)	V/PH/HZ	NOTES
EF-01	COOK	GN-146	CEILING	SEE PLANS	50	0.38	0.313	115/1/60	1,3,4
EF-02	COOK	GN-146	CEILING	SEE PLANS	50	0.38	0.313	115/1/60	1,3,4
EF-03	COOK	EWD	WALL	SEE PLANS	2,250 / 8,000	0.20	2 HP	240/3/60	5,6,7
EF-04	COOK	EWD	WALL	SEE PLANS	2,250 / 8,000	0.20	2 HP	240/3/60	5,6,7
EF-05	COOK	GN-146	CEILING	SEE PLANS	50	0.38	0.313	115/1/60	1,3,4
HVLS-01	MACROAIR	AVD-370-8FT	HVLS	SEE PLANS	-	-	2.50	240/1/60	1
HVLS-02	MACROAIR	AVD-370-8FT	HVLS	SEE PLANS	-	-	2.50	240/1/60	1
HVLS-03	MACROAIR	AVD-370-8FT	HVLS	SEE PLANS	-	-	2.50	240/1/60	1
HVLS-04	MACROAIR	AVD-370-8FT	HVLS	SEE PLANS	-	-	2.50	240/1/60	1

NOTES:
1. COORDINATE FINAL SELECTION AND FINISH WITH OWNER PRIOR TO ORDER.
2. PROVIDE MANUFACTURER'S RECOMMENED ROOF CURB. CURB SHALL ACCOMMODATE ROOF PITCH AND CONSTRUCTION.
3. PROVIDE FAN SPEED CONTROLS FOR AIRFLOW BALANCING.
4) FAN SHALL BE PROVIDED WITH DEDICATED WALL SWITCH.
5) FAN SHALL BE INTERLOCKED WITH CO2 AND NO SYSTEM AS WELL AS GRAVITY INTAKE LOW VOLTAGE DAMPER ACTUATORS.
6) FAN SHALL COME WITH SPEED CONTROL AND STARTER CAPABLE OF CONTROLLING BASED ON DESCRIBED SET POINTS.
7) FAN SHALL OPERATE AT THE MINIMUAL SETTING AND MODULATE TO THE MAXIMUM SET POINT UPON CO2 AND NO2 THRESHOLD DETECTION.

GAS UNIT HEATER SCHEDULE

MARK	MFG.	MODEL	SERVICE	AIRFLOW (CFM)	HTG. CAPACITY (BTU IN / BTU OUT)	TEMP. RISE (°F)	V/PH/HZ	NOTES
IRH-01	MODINE	IPT200S0111	GARAGE	-	200,000 / -	47.0	115/1/60	1,2
IRH-02	MODINE	IPT200S0111	GARAGE	-	200,000 / -	47.0	115/1/60	1,2
IRH-03	MODINE	IPT200S0111	GARAGE	-	200,000 / -	47.0	115/1/60	1,2
IRH-04	MODINE	IPT200S0111	GARAGE	-	200,000 / -	47.0	115/1/60	1,2
GUH-01	MODINE	HD 60AS0111FDAN	PARTS	990	60,000 / 49,800	47.0	115/1/60	1,2

NOTES:
1) PROVIDE WALL MOUNTED LINE VOLTAGE THERMOSTAT WITH 60°F TEMPERATURE SETPOINT (ADJ.).
2) INSTALL PER MANUFACTURER'S RECOMMENDATIONS. FOLLOW ALL APPLICABLE CODES.

DIFFUSER, REGISTERS & GRILLES SCHEDULE

MARK	MFG.	MODEL	SERVES	MATERIAL	DESCRIPTION	FACTORY FINISH	BLOW PATTERN	NOTES
A	TITUS	TMS	SUPPLY	STEEL	SQUARE CONE DIFFUSER	ARCH. TO SPEC.	4-WAY	24X24
B	TITUS	350RL	RETURN	STEEL	LOUVERED GRILLE	ARCH. TO SPEC.	N/A	24X24
C	TITUS	TMS	SUPPLY	STEEL	SQUARE CONE DIFFUSER	ARCH. TO SPEC.	4-WAY	12X12

NOTES:
1. AIR DEVCIE B SHALL INLCUDE INSULATED PLENUM BOX. BOX HEIGHT SHALL BE 2" TALLER THAN CONNECTING RETURN DUCT.
2. ALL AIR DEVICES SHOULD HAVE R-6 FACTORY MOLDED INSULATION

MECHANICAL INDEX OF DRAWINGS

MECHANICAL

M-001	MECHANICAL LEGENDS AND SCHEDULE
M-101	MECHANICAL PLAN
M-201	MECHANICAL DETAILS
M-301	MECHANICAL SPECIFICATIONS
M-401	MECHANICAL COMCHECK

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832.643.0368 phone
ko@kodesign-mep.com

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WALLER COUNTY

JAIL GARAGE

200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

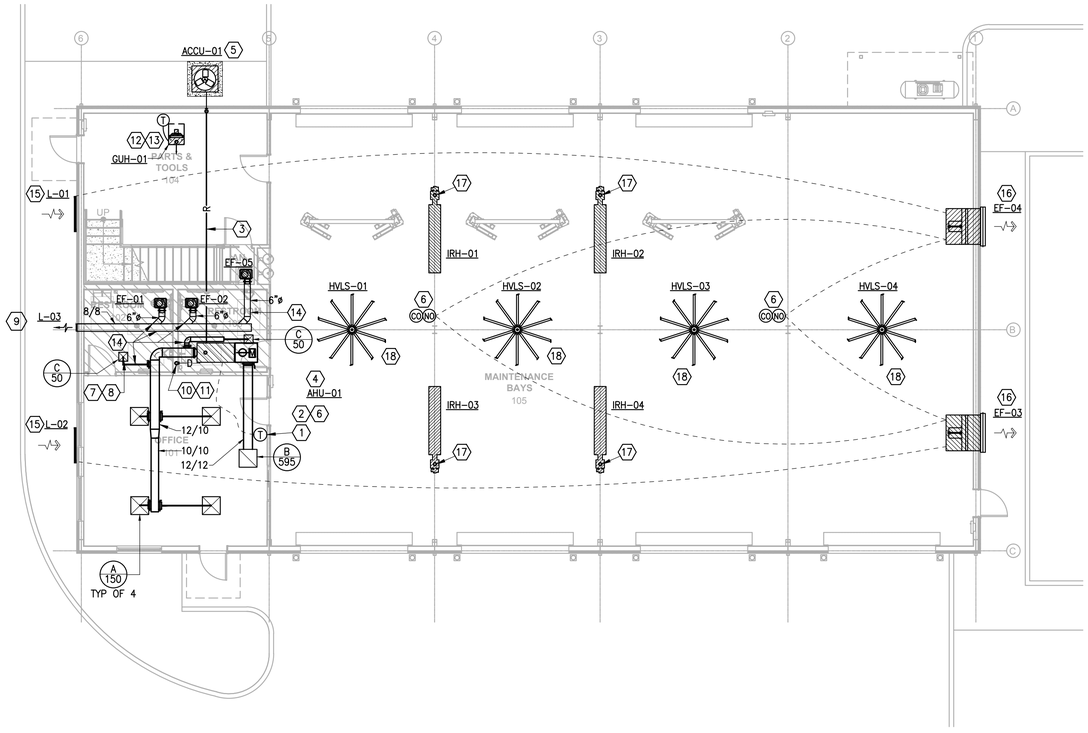
4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

PROJECT NO.: .
DRAWN BY: MP QC: KO

MECHANICAL LEGENDS & SCHEDULES

M-001



MECHANICAL PLAN - LEVEL 1

SCALE: 1/8" = 1'-0"

TRUE NORTH

PLAN NORTH

MECHANICAL KEYED NOTES:

(FOR SHEET M-101)

1. PROVIDE 7-DAY PROGRAMMABLE SETBACK THERMOSTAT.
2. OUTSIDE AIR DUCT UP TO ROOF. TERMINATE WITH ROOF RAIN VENT CAP. CONTRACTOR TO COORDINATE WITH OWNER FOR FINAL LOCATION.
3. SIZE REFRIGERANT LINES PER MANUFACTURER'S RECOMMENDATIONS.
4. PROVIDE AIR HANDLING UNIT WITH ALL PROPER CLEARANCES FOR MAINTENANCE AND OPERATIOIN. REFER TO MANUFACTURER FOR RECOMMENDATIONS. PROVIDE AIR HANDLING UNIT WITH 3" DEEP GALVANIZED AUXILIARY DRAIN PAN. AUXILIARY DRAIN PAN SHALL BE 3" LARGER THAN AIR HANDLING UNIT ON ALL SIDES. SUSPEND FROM STRUCTURE AND POSITION HEIGHT FOR PROPER MAINTENANCE ACCESS.
5. PROVIDE CONDENSING UNIT WITH ALL PROPER CLEARANCES FOR MAINTENANCE AND OPERATIOIN. REFER TO MANUFACTURER FOR RECOMMENDATIONS. PROVIDE CONDENSING UNIT WITH 4" THICK CONCRETE MAINTENANCE PAD. COORDINATE FINAL LOCATION WITH OWNER PRIOR TO ANY WORK BEING DONE.
6. PROVIDE MOTORIZED VOLUME DAMPER (MVD) IN OUTSIDE AIR DUCT. MVD TO INTERLOCK WITH ASSOCIATED AIR HANDLER SUCH THAT MVD IS 100% OPEN WHEN FAN IS ENERGIZED AND MVD IS 100% CLOSED WHEN FAN IS DE-ENERGIZED. ROUTE DUCT TO ROOF INTAKE HOOD RUSKIN PR OR APPROVED EQUIVALENT.
7. RE: 11/M-201 FOR FLEX DUCT CONNECTION AT A SUPPLY AIR DIFFUSER DETAIL. (TYPICAL)
8. RE: 1/M-201 FOR FLEXIBLE DUCT TAP DETAIL. (TYPICAL)
9. EXHAUST DUCT THRU EXTERIOR WALL. TERMINATE WITH WITH AN ALUMINUM WEATHER RESISTANT 12X12 WALL VENT CAP WITH BACKDRAFT DAMPER AND BIRDSCREEN. MUST COMPLY WITH 2015 UMC WITH COUNTY AMENDMENTS.
10. ROUTE CONDENSATE DRAIN PIPE DOWN TO SINK TAIL PIECE. REFER TO PLUMBING CONTRACTOR FOR EXACT LOCATION.
11. PROVIDE AND INSTALL PIPE SUPPORT ON 4'-0" CENTERS AND IN EVERY CHANGE IN DIRECTION. SLOPE PIPE TO PROVIDE PROPER DRAINAGE. RE: 8/M-201 FOR CONDENSATE DRAIN SUPPORT AND INSULATION DETAIL. INSULATE ENTIRE LENGTH.
12. ELECTRIC UNIT HEATER MOUNTED ON WALL WITH FACTORY PROVIDED WALL BRACKET.
13. PROVIDE A LINE VOLTAGE T-STAT.
14. DUCT BELOW MEZZANINE FLOOR.
15. PROVIDE 60W X 40H RUSKIN ELF6375DXD OR APPROVED EQUIVALENT. LOUVER SHALL HAVE LOW VOLTAGE MODULATING DAMPER SECTION INTERLOCKED WITH CORRESPONDING FAN. CONTRACTOR SHALL INSTALL BOTTOM OF LOUVER NO LOWER THAN 14'-0" A.F.F. COORDINATE FINAL LOCATION & HEIGHT WITH ARCHITECT PRIOR TO CONSTRUCTION.
16. PROVIDE WALL FAN AS SCHEDULED OR APPROVED EQUIVALENT. FAN SHALL BE INTERLOCKED WITH CORRESPONDING INTAKE LOUVER VIA LOW VOLTAGE CONNECTION. CONTRACTOR SHALL INSTALL FAN BOTTOM NO HIGHER THAN 8'-0" FOR PROPER OCCUPANT VENTILATION. COORDINATE FINAL LOCATION WITH ARCHITECT PRIOR TO CONSTRUCTION.
17. VENT 4"ø FLUE PIPE THROUGH ROOF. PROVIDE MANUFACTURER RECOMMENDED RAIN CAP.
18. BOTTOM OF FANS SHALL BE MOUNTED AT SAME HEIGHT AS SHOP BAY LIGHTS. COORDINATE FINAL MOUNTING HEIGHT WITH ARCHITECT AND ELECTRICAL PLANS PRIOR TO CONSTRUCTION.

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Suite 46
Tomball, Texas 77375
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ko@kodesign-mep.com

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WALLER COUNTY

JAIL GARAGE

200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

STATE OF TEXAS
JOHN ROBERT BUNT
85353
REGISTERED
PROFESSIONAL ENGINEER
4/10/2025

REV	DATE:	ISSUED FOR:
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PROJECT NO.: .
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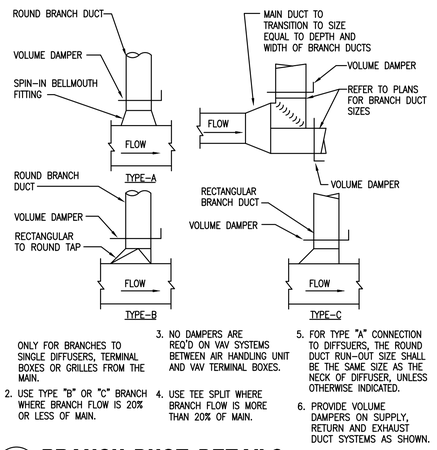
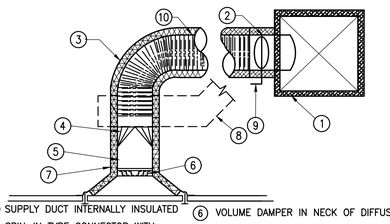
MECHANICAL PLAN - LEVEL 1

M-101



1. ONLY FOR BRANCHES TO SINGLE DIFFUSERS, TERMINAL BOXES OR GRILLES FROM THE MAIN.
2. USE TYPE "B" OR "C" BRANCH WHERE BRANCH FLOW IS 20% OR LESS OF MAIN.
3. NO DAMPERS ARE REQ'D ON VAV SYSTEMS BETWEEN AIR HANDLING UNIT AND VAV TERMINAL BOXES.
4. USE TEE SPLIT WHERE BRANCH FLOW IS MORE THAN 20% OF MAIN.
5. FOR TYPE "A" CONNECTION TO DIFFSUERS, THE ROUND DUCT RUN-OUT SIZE SHALL BE THE SAME SIZE AS THE NECK OF DIFFUSER, UNLESS OTHERWISE INDICATED.
6. PROVIDE VOLUME DAMPERS ON SUPPLY, RETURN AND EXHAUST DUCT SYSTEMS AS SHOWN.

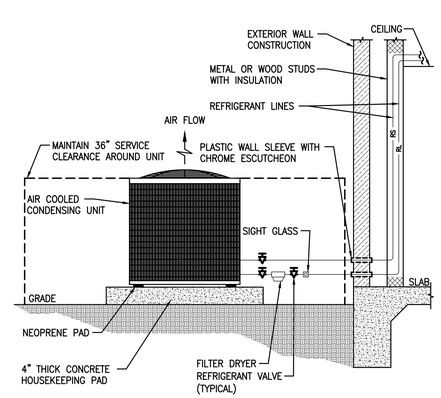
13 BRANCH DUCT DETAILS
SCALE: NONE



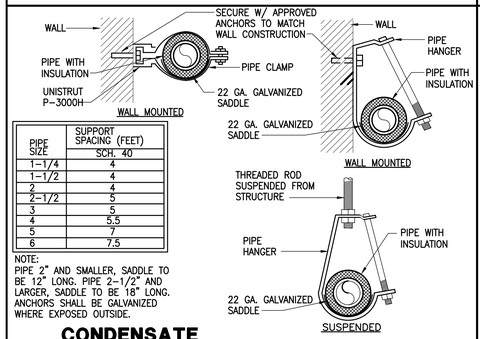
1. SUPPLY DUCT INTERNALLY INSULATED
2. SPIN-IN TYPE CONNECTOR WITH VOL. DAMPER AND AIR SCOOP. EXTERNALLY INSULATE
3. PRE-INSULATED FLEX. DUCT SAME SIZE AS DIFFUSER NECK MAXIMUM 6'-0" IN LENGTH SECURE TO DUCT AND ADAPTOR WITH METAL STRAPS.
4. SQUARE TO ROUND ADAPTOR AT DIFFUSER NECK, IF REQ'D.
5. CEILING DIFFUSER WITH VOLUME DAMPER WITH FRAME SUITABLE FOR TYPE OF CEILING IN WHICH INSTALLED. EXTERNALLY INSULATE CONE OF DIFFUSER.
6. VOLUME DAMPER IN NECK OF DIFFUSER
7. ALL SURFACE MOUNTED DIFFUSERS SHALL HAVE RIGID DUCT CONNECTION
8. PROVIDE SHEET METAL PLENUM ABOVE OUTLET WHERE SPACE IS LIMITED
9. LOCKING QUADRANT ON SPIN-IN FITTING
10. RIGID ROUND DUCT SAME SIZE AS FLEXIBLE DUCT. EXTERNALLY INSULATED. PROVIDE AS REQUIRED TO LIMIT FLEX. DUCT TO 6'-0" IN LENGTH

NOTE: ALL AIR DEVICES AND DUCTWORK SERVING MR ROOM SHALL BE OF NON-FERROUS MATERIAL.

14 CEILING DIFFUSER DETAIL
SCALE: NONE



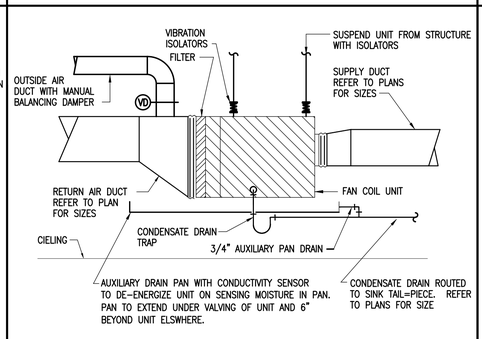
15 AIR-COOLED CONDENSING UNIT PIPING DETAIL
SCALE: NONE



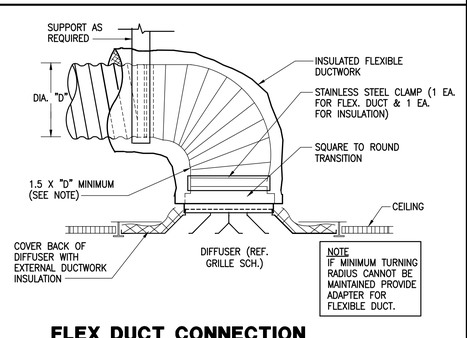
PIPE SIZE	SUPPORT SPACING (FEET) SCH. 40
1-1/4	4
1-1/2	4
2	4
2-1/2	5
3	5
4	5.5
5	7
6	7.5

NOTE:
PIPE 2" AND SMALLER, SADDLE TO BE 12" LONG. PIPE 2-1/2" AND LARGER, SADDLE TO BE 18" LONG. ANCHORS SHALL BE GALVANIZED WHERE EXPOSED OUTSIDE.

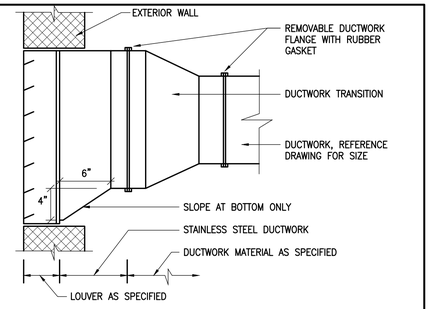
9 CONDENSATE DRAIN SUPPORT & INSULATION
SCALE: NONE



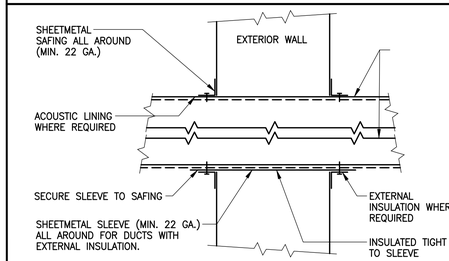
10 FAN COIL UNIT DETAIL
SCALE: NONE



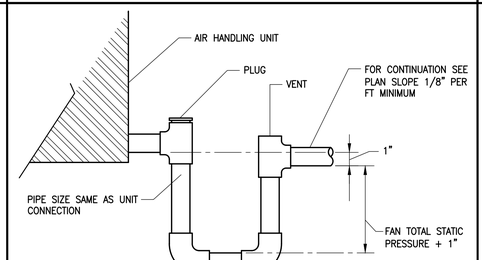
11 FLEX DUCT CONNECTION AT SUPPLY AIR DIFFUSER
SCALE: NONE



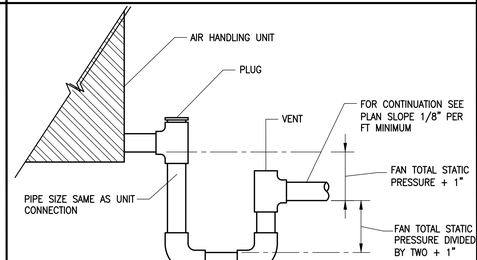
12 DUCTWORK AT LOUVER
SCALE: NONE



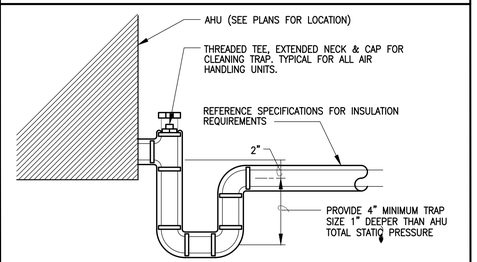
5 DUCT PENETRATION THRU WALL DETAIL
SCALE: NONE



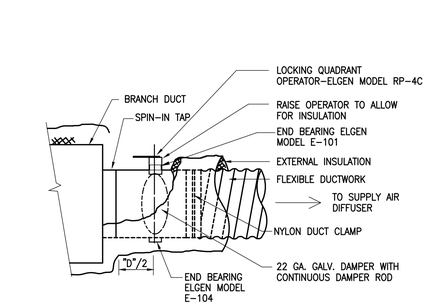
6 CONDENSATE TRAP FOR BLOW THRU
SCALE: NONE



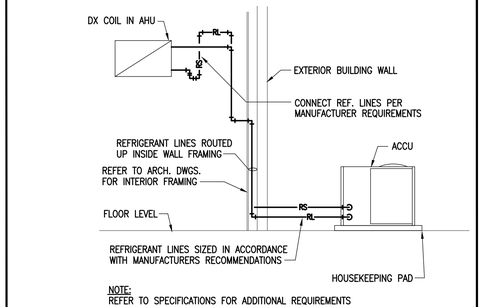
7 CONDENSATE TRAP FOR DRAW THRU
SCALE: NONE



8 CONDENSATE DRAIN PIPING AT FCU
SCALE: NONE

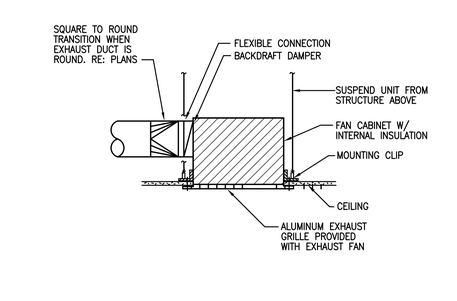


1 FLEXIBLE DUCT TAP
SCALE: NONE

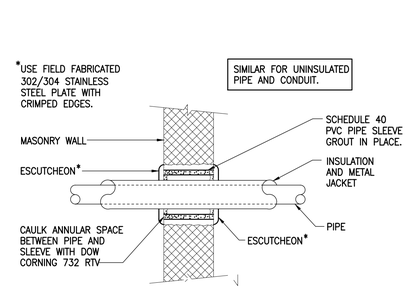


NOTE:
REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS

2 REFRIGERANT PIPING DETAIL
SCALE: NONE



3 CENTRIFUGAL CEILING EXHAUST FAN DETAIL
SCALE: NONE



4 PIPE THROUGH EXTERIOR WALL
SCALE: NONE

PS007

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455 School St.
Suite 46
Tomball, Texas 77375
832.643.0368 phone
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JOHN ROBERT BUNT
85353
REGISTERED
PROFESSIONAL ENGINEER
4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

PROJECT NO.: .
DRAWN BY: MP QC: KO

MECHANICAL DETAILS

M-201

MECHANICAL SPECIFICATIONS

GENERAL MECHANICAL REQUIREMENTS

1.1 SCOPE
A. THE WORK OF THIS DIVISION CONSISTS OF PROVIDING LABOR, MATERIALS, PRODUCTS, AND IN PERFORMING ALL OPERATIONS REQUIRED FOR THE COMPLETE OPERATING INSTALLATION OF ALL MECHANICAL AND PLUMBING SYSTEMS IN ACCORDANCE WITH THE SPECIFICATIONS AS WELL AS APPLICABLE DRAWINGS, TERMS, CONDITIONS OF THE CONTRACT AND ALL APPLICABLE CODES AND ORDINANCES GOVERNING THE INSTALLATION OF THE VARIOUS MECHANICAL AND PLUMBING SYSTEMS. ALL WORK SHALL BE FULLY CORRELATED WITH THE WORK OF OTHER CRAFTS.
B. EACH CONTRACTOR SHALL STUDY THE CONTRACT DOCUMENTS TO DETERMINE THE EXTENT OF WORK PROVIDED UNDER THIS CONTRACT AS WELL AS ASCERTAIN THE DIFFICULTY TO BE ENCOUNTERED IN PERFORMING THE WORK ON THE DRAWINGS AND OUTLINED HEREINAFTER AND IN MAKING CONNECTIONS TO EXISTING UTILITIES, INSTALLING NEW EQUIPMENT AND SYSTEMS AND COORDINATING THE WORK WITH THE OTHER TRADES.
C. EXAMINATION OF THE SITE: THE CONTRACTOR SHALL THOROUGHLY EXAMINE SITE AND SATISFY HIMSELF AS THE CONDITIONS UNDER WHICH THE WORK IS TO BE PERFORMED. THE CONTRACTOR SHALL VERIFY, AT THE SITE, ALL MEASUREMENTS AFFECTING HIS WORK AND SHALL BE RESPONSIBLE FOR THE CORRECTNESS OF THE SAME. NO EXTRA COMPENSATION WILL BE ALLOWED TO THE CONTRACTOR FOR EXPENSES DUE TO HIS NEGLECT TO EXAMINE OR FAILURE TO DISCOVER CONDITIONS WHICH AFFECT HIS WORK. NO EXTRA COMPENSATION WILL BE ALLOWED ON ACCOUNT OF DIFFERENCES BETWEEN ACTUAL DIMENSIONS AND THOSE INDICATED ON THE DRAWINGS.

1.2 REGULATORY REQUIREMENTS
A. CODES AND ORDINANCES/PERMIT AND FEES: PERFORM ALL WORK IN ACCORDANCE WITH ALL STATE AND LOCAL CODES AND ORDINATES, THE CURRENT EDITION OF NFPA, THE INTERNATIONAL BUILDING CODE, INTERNATIONAL MECHANICAL CODE, INTERNATIONAL PLUMBING CODE, AND ALL CURRENT SUPPLEMENTS THERETO, AND ANY OTHER AUTHORITIES HAVING JURISDICTION OVER THE WORK. PROCURE AND PAY FOR ALL PERMITS, LICENSES, FEES AND CHARGES, AND GIVE ALL NOTICES NECESSARY.
B. IN CASE OF CONFLICT BETWEEN THE CONTRACT DOCUMENTS AND REQUIREMENTS OF ANY CODE OR AUTHORITIES HAVING JURISDICTION, THE MOST STRINGENT REQUIREMENTS OF THE AFOREMENTIONED SHALL BE GOVERNED.
C. SHOULD THE CONTRACTOR PERFORM ANY WORK THAT DOES NOT COMPLY WITH THE REQUIREMENTS OF THE APPLICABLE BUILDING CODES, STATE LAWS, AND LOCAL ORDINANCES AND INDUSTRY STANDARDS, HE SHALL BEAR ALL COSTS ARISING IN CORRECTING THE DEFICIENCIES, AS APPROVED BY THE ARCHITECT.
D. INTENT: THE DRAWINGS SHOW GENERAL ARRANGEMENTS AND THE EXTENT OF THE WORK. THE DRAWINGS DO NOT SHOW, IN MINUTE DETAIL, ALL FEATURES OF THE INSTALLATION. FOLLOW THE DRAWINGS AS CLOSELY AS ACTUAL CONSTRUCTION WILL PERMIT. ALL MATERIAL AND LABOR NECESSARY TO COMPLETE THE WORK IN ACCORDANCE WITH THE INTENT OF THE SPECIFICATIONS AND DRAWINGS SHALL BE FURNISHED BY THE CONTRACTOR WITHOUT ADDITIONAL CHARGE. THE JOB SHALL BE BID AND INSTALLED COMPLETE AND CONSISTENT IN EVERY REQUEST.

1.3 COORDINATION OF WORK
A. EACH CONTRACTOR SHALL COMPARE HIS DRAWINGS AND SPECIFICATIONS WITH THOSE OF OTHER TRADES. ALL WORK SHALL BE INSTALLED IN COOPERATION WITH ALL OTHER TRADES INSTALLING INTERRELATED WORK. BEFORE INSTALLATION, ALL TRADES SHALL MAKE PROPER PROVISIONS TO AVOID INTERFERENCES.
B. EACH CONTRACTOR SHALL COORDINATE THE LOCATION OF HIS SYSTEMS TO THAT ALL OUTSIDE AIR INTAKES, PLUMBING VENTS, AND EXHAUST FANS ARE LOCATED IN SUCH A WAY AS TO PREVENT CROSS-CONTAMINATION. SUCH A DISTANCE SHALL BE NOT LESS THAN 10'-0"FT.
C. LOCATIONS OF CONDUIT, DUCTS, PIPING, SPRINKLER HEADS AND EQUIPMENT SHALL BE ADJUSTED TO ACCOMMODATE THE WORK WITH INTERFERENCES ANTICIPATED AND ENCOUNTERED. EXACT ROUTING AND LOCATION OF SYSTEMS SHALL BE DETERMINED PRIOR TO FABRICATION OR INSTALLATION.
D. OFFSETS AND CHANGES OF DIRECTION IN ALL CONDUIT, DUCTS AND PIPING SYSTEMS SHALL BE MADE AS REQUIRED TO MAINTAIN PROPER HEADROOM AND PITCH OF SLOPING LINES.

1.4 REGULATORY REQUIREMENTS
A. COMPLY WITH ALL CURRENT LOCAL, STATE, AND NATIONAL CODES, INCLUDING THE AMERICANS WITH DISABILITIES ACT (MOST CURRENT EDITION) AND SECURE AND PAY FOR ALL APPLICABLE COSTS, FEES, PERMITS AND LICENSES. NO ADDITIONAL COSTS SHALL BE PAID BY THE OWNER FOR THESE ITEMS.

B. PERFORM ALL WORK WITH HIGHEST REGARD TO SAFETY. EXCAVATE BY HAND AND WITH CAUTION TO LOCATE ALL UTILITIES IN THE BOUNDS OF THE AREA TO BE EXCAVATED PRIOR TO MACHINE EXCAVATING. PROCEED WITH SAFETY AND CAUTION SO THAT NO UTILITY IS DAMAGED OR INTERRUPTED.
C. PRIOR TO BID, VERIFY AND COORDINATE ALL REQUIRED CONNECTIONS AND/OR RELOCATIONS OF UTILITIES WITH UTILITY COMPANIES. PERFORM SUCH WORK IN ACCORDANCE WITH UTILITY COMPANY REGULATIONS. PAY ALL APPLICABLE FEES AND COSTS INCLUDING THOSE FOR ANY EXTENSIONS, RELOCATIONS AND/OR CONNECTIONS.
D. CONTRACTOR SHALL VERIFY LOCATIONS OF ALL ABOVE GROUND AND MARKED UTILITIES.

1.5 SUBMITTALS
A. SUBMITTALS SHALL BE COMPLETE FOR SYSTEM(S) INVOLVED. PROVIDE SUBMITTALS FOR ALL HVAC EQUIPMENT.
B. WHERE EQUIPMENT OF THE ACCEPTABLE MANUFACTURERS REQUIRE DIFFERENT ARRANGEMENT OR CONNECTIONS FROM THOSE SHOWN, IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO INSTALL THE EQUIPMENT TO OPERATE PROPERLY AND IN HARMONY WITH THE ORIGINAL INTENT OF THE DRAWINGS AND SPECIFICATIONS. THE CONTRACTOR SHALL MAKE ALL NECESSARY CHANGES IN ALL AFFECTED RELATED WORK PROVIDED UNDER OTHER SECTIONS INCLUDING LOCATIONS OF ROUGH-IN CONNECTIONS BY OTHER TRADES, CONDUIT SUPPORTS, INSULATION, ETC. ALL CHANGES SHALL BE MADE AT NO INCREASE IN THE CONTRACT AMOUNT OR ADDITIONAL COSTS TO THE OTHER TRADES AND/OR OWNER.

1.6 GUARANTEE
A. ALL EQUIPMENT AND WORK SHALL BE GUARANTEED FOR A PERIOD OF 12 MONTHS AFTER ACCEPTANCE. ANY DEFECTS IN EQUIPMENT OR WORKMANSHIP SHALL BE PROMPTLY REPAIRED OR REPLACED BY THE CONTRACTOR WITHOUT ADDITIONAL EXPENSE TO THE OWNER. THE GUARANTEE PERIOD OF ANY PART OF THE REPAIRED ITEMS SHALL BE EXTENDED FOR A PERIOD OF ONE YEAR FROM THE DATE OF SUCH REPAIR OR REPLACEMENT.

1.7 COMPLETION
A. UPON COMPLETION OF THE MECHANICAL INSTALLATION, DEMONSTRATE TO THE OWNER'S SATISFACTION THAT THE SYSTEMS HAVE BEEN INSTALLED IN A SATISFACTORY MANNER IN ACCORDANCE WITH THE PLANS AND APPLICABLE CODES. SHOW THAT ALL CONTROLS ARE OPERABLE AND ARE PROPERLY ADJUSTED IN ACCORDANCE WITH THE REQUIREMENTS OF THE FINAL SYSTEMS BALANCE, THAT ALL SYSTEMS ARE PROPERLY BALANCED, THAT ALL EQUIPMENT OPERATES PROPERLY, THAT FILTERS AND STRAINERS ARE CLEAN, AND THAT ALL COMPONENTS OF ALL SYSTEMS ARE INSTALLED AND ADJUSTED FOR PROPER OPERATION.

PRODUCTS
2.1 GENERAL
A. ALL MATERIALS SHALL BE NEW AND OF THE QUALITY SPECIFIED. MATERIALS SHALL BE FREE FROM DEFECTS. MANUFACTURERS SHALL BE AS SPECIFIED HEREIN, OR BY ADDENDA. ALL PIPING EQUIPMENT, ETC., WHICH NEEDS TO BE INSULATED TO CONSERVE HEAT OR COLD, OR TO PREVENT FREEZING OR CONDENSATION, SHALL BE INSULATED. ALL MATERIALS SHALL HAVE THE UNDERWRITERS LABORATORIES, INC. LABEL.

BASIC MECHANICAL METHODS

1.1 DIMENSION AND FIT
A. CUT MATERIALS ACCURATELY FROM MEASUREMENTS TAKEN ON THE JOB SITE.
B. DO NOT SPRING OR BEND PIPE TO FIT CONDITIONS OR MAKE UP JOINTS

1.2 SERVICEABILITY OF PRODUCTS
A. FURNISH ALL PRODUCTS TO PROVIDE THE PROPER ORIENTATION OF SERVICEABLE COMPONENTS TO ACCESS SPACE PROVIDED.
B. COORDINATE INSTALLATION OF PIPING, DUCTWORK, EQUIPMENT, SYSTEM COMPONENTS, AND OTHER PRODUCTS TO ALLOW PROPER SERVICE OF ALL ITEMS REQUIRING PERIODIC MAINTENANCE OR REPLACEMENT.
C. REPLACE OR RELOCATE ALL PRODUCTS INCORRECTLY ORDERED OR INSTALLED TO PROVIDE PROPER SERVICEABILITY.
D. PROVIDE ACCESS DOORS AND ACCESS PANELS IN CEILINGS, WALLS, FLOORS, ETC. FOR ACCESS TO TRAPS, VALVES, PRIMERS, DAMPERS, AUTOMATIC DEVICES, AND ALL SERVICEABLE OR OPERABLE EQUIPMENT IN CONCEALED SPACES.
E. PROVIDE VIBRATION ISOLATORS ON ALL EQUIPMENT HAVING MOTORS AND SUPPORTED BY THE BUILDINGS STRUCTURE.

1.3 ROUTING
A. ROUTE ALL PIPELINES AND DUCTWORK PARALLEL WITH BUILDINGS LINES AND AS HIGH AS POSSIBLE.
B. ROUTE PIPING AND DUCTS TO CLEAR ALL DOORS, WINDOWS, AND OTHER OPENINGS AND TO AVOID ALL OTHER PIPES AND DUCTS, LIGHT FIXTURES AND SIMILAR PRODUCTS.
C. PROVIDE UNIONS ADJACENT TO ALL EQUIPMENT AND WHERE REQUIRED FOR DISCONNECT AND MAINTENANCE OF EQUIPMENT.
D. SECURELY FASTEN ALL MECHANICAL/PLUMBING WORK TO THE STRUCTURE TO PREVENT HAZARD HUMAN LIFE AND LIMB, AND TO PREVENT DAMAGE TO PRODUCTS OF CONSTRUCTION UNDER ALL CONDITIONS OF OPERATION.
E. DO ALL SLEEVING, CUTTING, AND PATCHING OF ROUGH CONSTRUCTION FOR PIPING. ALL CUTTING, REPAIRING AND REQUIRED STRUCTURAL REINFORCING FOR INSTALLATION OF THIS WORK SHALL BE DONE IN CONFORMANCE WITH ARCHITECT'S DIRECTIONS AND ANY DAMAGE CAUSED BY CUTTING SHALL BE REPAIRED EQUAL TO ORIGINAL CONDITIONS. NO CUTTING WITHOUT ARCHITECT'S APPROVAL.
F. PLACE ANY SLEEVES, CHASES, CONCRETE INSERTS, ANCHOR BOLTS, ETC., BEFORE CONCRETE IS POURED, AND BE RESPONSIBLE FOR CORRECT LOCATION AND INSTALLATION OF THESE ITEMS.

VIBRATION AND SEISMIC CONTROL FOR HVAC PIPING AND EQUIPMENT

1.1 PERFORMANCE REQUIREMENTS
A. SEISMIC-RESTRAINT LOADING:
a. SITE CLASS AS DEFINED IN THE IBC: AS REQUIRED BY LOCAL JURISDICTION.
b. ASSIGNED SEISMIC USE GROUP OR BUILDING CATEGORY AS DEFINED IN THE IBC: AS REQUIRED BY LOCAL JURISDICTION.
c. DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS (0.2 SECOND).
d. DESIGN SPECTRAL RESPONSE ACCELERATION AT 1-SECOND PERIOD.

1.2 COMPONENTS:
A. VIBRATION ISOLATORS:
a. ISOLATOR PADS: NEOPRENE.
b. MOUNTS: DOUBLE-DEFLECTION TYPE.
c. RESTRAINED MOUNTS: ALL DIRECTIONAL MOUNTINGS WITH SEISMIC RESTRAINT; CAST-DUCTILE-IRON HOUSING.
d. SPRING ISOLATORS: FREESTANDING, LATERALLY STABLE, OPEN-SPRING TYPE.
e. RESTRAINED SPRING ISOLATORS: FREESTANDING, STEEL, OPEN-SPRING TYPE WITH SEISMIC RESTRAINT.
f. HOUSED SPRING MOUNTS: DUCTILE-IRON OR STEEL HOUSING, WITH INTEGRAL, VERTICALLY ADJUSTABLE SEISMIC SNUBBERS.
g. ELASTOMERIC HANGERS: DOUBLE-DEFLECTION TYPE.
h. SPRING HANGERS: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION.
i. SPRING HANGERS WITH VERTICAL-LIMIT STOP: COMBINATION COIL-SPRING AND ELASTOMERIC-INSERT HANGERS WITH SPRING AND INSERT IN COMPRESSION AND WITH VERTICAL-LIMIT STOP.
j. PIPE RISER RESILIENT SUPPORT: ALL-DIRECTIONAL, ACOUSTICAL PIPE ANCHOR.
k. RESILIENT PIPE GUIDES.
B. AIR-MOUNTING SYSTEMS:
a. AIR MOUNTS: FREESTANDING, SINGLE OR MULTIPLE, COMPRESSED-AIR BELLOWS.
b. RESTRAINED AIR MOUNTS: HOUSED COMPRESSED-AIR BELLOWS.
C. RESTRAINED VIBRATION ISOLATION ROOF-CURB RAILS: FACTORY-ASSEMBLED, FULLY ENCLOSED, INSULATED, AIR- AND WATERTIGHT CURB RAIL; WITH SPRING ISOLATORS MOUNTED ON ELASTOMERIC ISOLATION PADS, AND SNUBBER BUSHINGS.
D. VIBRATION ISOLATION EQUIPMENT BASES:
a. STEEL BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS.
b. INERTIA BASE: FACTORY-FABRICATED, WELDED, STRUCTURAL-STEEL BASES AND RAILS READY FOR FIELD-APPLIED, CAST-IN-PLACE CONCRETE.
E. SEISMIC-RESTRAINT DEVICES:
a. SNUBBERS: WELDED STRUCTURAL-STEEL SHAPES AND REPLACEABLE RESILIENT ISOLATION WASHERS AND BUSHINGS.
b. CHANNEL SUPPORT SYSTEM: MFMA-3 SLOTTED STEEL CHANNELS.
c. RESTRAINT CABLES: STAINLESS-STEEL CABLES.
d. ANCHOR BOLTS: MECHANICAL TYPE, SEISMIC RATED.
e. RESILIENT ISOLATION WASHERS AND BUSHINGS: MOLDED NEOPRENE.

1.3 FIELD QUALITY CONTROL
A. TESTING: BY CONTRACTOR.

AIR DISTRIBUTION

1.1 FILTERS
A. MANUFACTURERS: AAFOR APPROVED EQUIVALENT.
a. PLEATED FILTERS OR APPROVED EQUIVALENT, OR AS NOTED ON THE DRAWINGS.

1.2 DUCTWORK

A. MATERIALS:
a. STEEL DUCTS: GALVANIZED STEEL SHEET, LOCK-FORMING QUALITY, MINIMUM GAUGE PER SMACNA STANDARDS.
b. INSULATED FLEXIBLE DUCTS: FLEXIBLE DUCT WRAPPED WITH FLEXIBLE GLASS FIBER INSULATION, ENCLOSED BY METALIZED VAPOR BARRIER JACKET.
c. SEALANT: NON-HARDENING, WATER RESISTANT, FIRE RESISTIVE, USED ALONE OR WITH TAPE.
B. METAL DUCTWORK:
a. FABRICATE AND SUPPORT IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE EXCEPT AS INDICATED.
b. CONSTRUCT T'S, BENDS, AND ELBOWS WITH RADIUS OF 1-1/2 TIMES WIDTH OF DUCT ON CENTER LINE. WHERE NOT POSSIBLE PROVIDE TURNING VANES.
c. INCREASE DUCT SIZES GRADUALLY, NOT EXCEEDING 30 DEGREES DIVERGENCE AND 45 DEGREES CONVERGENCE.
d. CONNECT FLEXIBLE DUCTS TO METAL DUCTS WITH DRAW BANDS
e. USE CRIMP JOINTS WITH OR WITHOUT BEAD FOR JOINING ROUND DUCT SIZES 8 INCHES AND SMALLER WITH CRIMP IN DIRECTION OF AIR FLOW.
C. NON-METAL DUCTWORK:
a. INSTALLATION STANDARDS: NFPA 90A AND NFPA 90B.
b. MOCKUPS FOR SYSTEM STATIC-PRESSURE CLASSIFICATIONS HIGHER THAN 3-INCH WG.
c. MATERIALS:
1. FIBROUS-GLASS DUCTS AND FITTINGS: FACTORY-MOLDED DUCT BOARD FOR RECTANGULAR DUCTS, AND FACTORY-MOLDED STRAIGHT ROUND DUCTS AND SMOOTH FITTINGS FOR ROUND DUCTS.
1.1. CLOSURES: TWO-PART TAPE SEALING SYSTEM.
1.2. FABRICATION AND REINFORCEMENTS: SMACNA'S "FIBROUS GLASS DUCT CONSTRUCTION STANDARDS." AND NAIMA AH116.
1.3. DUCT SCHEDULE:
1.3.1. INDOOR:
1.3.1.1. MINIMUM FLEXURAL RIGIDITY: EI-800
1.3.1.2. MINIMUM BOARD THICKNESS: 1-1/2 INCHES
2. PHENOLIC-FOAM DUCTS AND FITTINGS: CFC-FREE PHENOLIC FOAM BONDED ON BOTH SIDES WITH ALUMINUM-FOIL REINFORCED FIBERGLASS SCRIM.
2.1. CLOSURES: POLYMERIC SEALING SYSTEM.
2.2. FABRICATION AND REINFORCEMENTS: KNAUF INSULATION'S "KNAUF KOOLDUCT SYSTEM DESIGN GUIDE."
2.3. DUCT SCHEDULE:
2.3.1. INDOOR:
2.3.1.1. MINIMUM PANEL THICKNESS: 7/8 INCH
2.3.1.2. ALUMINUM CLADDING: MINIMUM 0.025 INCH THICK.
2.3.2. OUTDOOR:
2.3.2.1. MINIMUM PANEL THICKNESS: 1-3/32 INCHES
2.3.2.2. ALUMINUM CLADDING: MINIMUM 0.032 INCH THICK.
2.3.2.3. POLYMERIC SEALING SYSTEM: COAT DUCTS, INCLUDING GANG-NAIL COUPLINGS, GRIP FLANGES, AND COUPLINGS.
3. THERMOSET FRP DUCTS: GLASS-FIBER-REINFORCED PLASTIC.
3.1. DUCT SCHEDULE:
3.1.1. OUTDOOR:
3.1.1.1. DOUBLE-WALL INSULATED DUCTS: MINIMUM 7/8-INCH INSULATION THICKNESS.
d. SEISMIC-RESTRAINT DEVICES
1. CHANNEL SUPPORT SYSTEM.
2. GALVANIZED STEEL RESTRAINT CABLES.
3. HANGER ROD STIFFENER: STEEL TUBE OR STEEL SLOTTED-SUPPORT-SYSTEM SLEEVE WITH INTERNALLY BOLTED CONNECTIONS OR REINFORCING STEEL ANGLE CLAMPED TO HANGER ROD.

1.3 VOLUME CONTROL DAMPERS
C. PROVIDE ALL BRANCHES AND DUCT TAKE-OFFS, FABRICATE IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS - METAL AND FLEXIBLE, AND AS INDICATED.
D. FABRICATE SPLITTER DAMPERS OF MATERIAL SAME GAGE AS DUCT TO 24 INCHES SIZE IN EITHER DIRECTION, OR TWO GAGES HEAVIER FOR LARGER SIZES. SECURE WITH CONTINUOUS HINGE OR ROD. OPERATE WITH MINIMUM ¼ INCH DIAMETER ROD.
E. FABRICATE SINGLE BLADE DAMPERS FOR DUCT SIZES TO 12X30 INCH.
F. EXCEPT IN ROUND DUCTWORK 12 INCHES AND SMALLER, PROVIDE END BEARINGS.
G. PROVIDE LOCKING, INDICATING QUADRANT REGULATORS ON SINGLE AND MULTI-BLADE DAMPERS. WHERE WIDTH EXCEEDS 30 INCHES PROVIDE REGULATOR AT BOTH ENDS.

1.4 FLEXIBLE DUCT CONNECTIONS
A. UL LISTED FIRE-RETARDANT NEOPRENE COATED WOVEN GLASS FIBER FABRIC TO NFPA 90, APPROXIMATELY 3 INCHES (75 MM) WIDE, CRIMPED INTO METAL EDGING STRIP.

1.5 AIR OUTLETS
A. MANUFACTURERS: PRICE, TITUS, TUTTLE AND BAILEY, KRUEGER, OR APPROVED EQUIVALENT.
B. DIFFUSERS/REGISTERS/GRILLES: PROVIDE AIR DEVICE TYPE, OPERATION, COLOR, ETC. AS SCHEDULED.

2.1 INSTALLATION
A. INSTALL PRODUCTS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
B. INSTALL FLEXIBLE CONNECTIONS SPECIFIED BETWEEN FAN INLET AND DISCHARGE DUCTWORK. FLEXIBLE CONNECTORS SHALL NOT BE IN TENSION WHILE RUNNING.
C. PROVIDE BACK DRAFT DAMPERS ON DISCHARGE OF EXHAUST FANS AND AS INDICATED.
D. PREVENT PASSAGE OF UNFILTERED AIR AROUND FILTERS WITH FELT, RUBBER, OR NEOPRENE GASKETS.
E. LOCATE DUCTS WITH SUFFICIENT SPACE AROUND EQUIPMENT TO ALLOW NORMAL OPERATING AND MAINTENANCE ACTIVITIES.
F. PROVIDE FLEXIBLE CONNECTIONS IMMEDIATELY ADJACENT TO EQUIPMENT IN DUCTS ASSOCIATED WITH FANS AND MOTORIZED EQUIPMENT.
G. CHECK LOCATION OF AIR OUTLETS AND INLETS AND MAKE NECESSARY ADJUSTMENTS IN POSITION TO CONFORM TO ARCHITECTURAL FEATURES, SYMMETRY, AND LIGHTING ARRANGEMENTS.
H. PROVIDE BALANCING DAMPERS ON DUCT TAKE-OFF TO DIFFUSERS, AND GRILLES AND REGISTERS, REGARDLESS OF WHETHER DAMPERS ARE SPECIFIED AS PART OF THE DIFFUSER, OR GRILLE AND REGISTER ASSEMBLY.

MECHANICAL INSULATION

1.1 SCOPE
A. GENERAL: FURNISH ALL LABOR AND MATERIALS NECESSARY FOR THE COMPLETE INSTALLATION OF THERMAL INSULATION ON ALL HOT AND COLD PIPING SURFACE AND DUCTWORK INSTALLED UNDER THIS CONTRACT WHICH REQUIRE INSULATIONS FOR HEAT OR COLD CONSERVATION: FREEZE PROTECTION, PREVENTION OF CONDENSATION OR DRIPPINGS; COMFORT FOR OCCUPANTS; EFFICIENCY OR BASE OF OPERATION. MECHANICAL INSULATION SHALL BE COMPLETE AND EFFECTIVE THROUGHOUT THE PROJECT.
B. SYSTEMS TO RECEIVE INSTALLATION INCLUDE, BUT ARE NOT NECESSARILY LIMITED TO:
a. CONDENSATE DRAINAGE.
b. REFRIGERANT LINES (BOTH HIGH AND LOW PRESSURES).
c. PIPING ACCESSORIES AND SPECIALTIES.
d. DUCTWORK

1.2 PIPE INSULATION
A. ALL ABOVE GRADE INSULATION SHALL HAVE COMPOSITE (INSULATION, JACKET OR FACING, ALL ADHESIVE OR CEMENT USED TO ADHERE THE JACKET TO THE INSULATION) FIRE AND SMOKE HAZARD RATINGS AS TESTED UNDER PROCEDURE ASTM E-84 AND NFPA 225.
B. APPROVED MANUFACTURERS: CERTAINEED, OWENS/CORNING, JOHNS-MANVILLE, UPJOHN, ARMSTRONG, OR APPROVED EQUIVALENT.
C. LOCATE INSULATION AND COVER SEAMS IN LEAST VISIBLE LOCATIONS.
D. NEATLY FINISH INSULATION AT SUPPORTS, PROTRUSIONS, AND INTERRUPTIONS.
E. PROVIDE INSULATED DUAL TEMPERATURE PIPES OR COLD PIPES CONVEYING FLUIDS BELOW AMBIENT TEMPERATURE WITH VAPOR BARRIER JACKETS. FINISH WITH GLASS CLOTH AND VAPOR BARRIER ADHESIVE. INSULATE COMPLETE SYSTEM.
F. FOR INSULATED PIPES CONVEYING FLUIDS ABOVE AMBIENT TEMPERATURE, PROVIDE STANDARD JACKETS. BEVEL AND SEAL ENDS OF INSULATION AT EQUIPMENT, FLANGES, AND UNIONS.
G. PROVIDE INSERT BETWEEN SUPPORT SHIELD AND PIPING ON PIPING 2 INCHES (50 MM) DIAMETER OR LARGER. FABRICATE OF CORK OR OTHER HEAVY DENSITY INSULATING MATERIAL SUITABLE FOR TEMPERATURE, NOT LESS THAN 6INCHES (150 MM) LONG.
H. SCHEDULE:
a. CONDENSATE DRAINS: 1" FLEXIBLE ELASTOMERIC.
b. REFRIGERANT LINES; 1" FLEXIBLE ELASTOMERIC, ON PIPING EXPOSED TO WEATHER, PROVIDE METAL JACKETING.

1.3 DUCTWORK INSULATION
A. MANUFACTURERS: KNAUF, OR APPROVED EQUIVALENT.
B. MINERAL-FIBER BLANKET INSULATION: MINERAL OR GLASS FIBERS BONDED WITH A THERMOSETTING RESIN. COMPLY WITH ASTM C 553, TYPE II AND ASTM C 1290, TYPE III WITH FACTORY-APPLIED FSK JACKET. FACTORY-APPLIED JACKET REQUIREMENTS ARE SPECIFIED IN "FACTORY-APPLIED JACKETS" ARTICLE.
a. 'K' (KSI) VALUE: 0.29 AT 75 DEGREES F (0.042 AT 24 DEGREES C).
b. DENSITY: 0.75 LB/CU FT (24 KG/CU M).
c. VAPOR BARRIER JACKET: ALUMINUM-FOIL, FIBERGLASS-REINFORCED SCRIM WITH KRAFT-PAPER BACKING; COMPLYING WITH ASTM C 1136, TYPE II.
C. INSULATION PINS AND HANGERS:
a. METAL, ADHESIVELY ATTACHED, PERFORATED-BASE INSULATION HANGERS: BASEPLATE WELDED TO PROJECTING SPINDLE THAT IS CAPABLE OF HOLDING INSULATION, OF THICKNESS INDICATED, SECURELY IN POSITION INDICATED WHEN SELF-LOCKING WASHER IS IN PLACE. COMPLY WITH THE FOLLOWING REQUIREMENTS:
D. MINERAL-FIBER BLANKET INSULATION SCHEDULE (UNLESS SPECIFIED ON PLANS):
i. EXHAUST DUCTS EXPOSED TO OUTDOOR AIR: 1-1/2"
ii. VENTILATION DUCTS: 2"
iii. SUPPLY DUCTS: 2"
iv. RETURN DUCTS IN UNCONDITIONED SPACES: 1-1/2"

1.4 INSTALLATION
A. INSTALL MATERIALS IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
B. CONTINUE INSULATION VAPOR BARRIER THROUGH PENETRATIONS.
C. MASTICS
a. MATERIALS SHALL BE COMPATIBLE WITH INSULATION MATERIALS, JACKETS, AND SUBSTRATES; COMPLY WITH MIL-PRF-19565C, TYPE II.

FOR INDOOR APPLICATIONS, USE MASTICS THAT HAVE A VOC CONTENT OF 50 G/L OR LESS WHEN CALCULATED ACCORDING TO 40 CFR 59, SUBPART D (EPA METHOD 24).

SYSTEM TESTING, ADJUSTING, AND BALANCING

A. TESTING, ADJUSTING AND BALANCING OF ALL WORK SHALL BE MADE BY AN INDEPENDENT NEBB, OR AABC CONTRACTOR WHO IS CURRENTLY LICENSED. THE HVAC CONTRACTOR SHALL INSTALL NEW FILTERS IN ALL UNITS PRIOR TO THE AIR BALANCE. THE COMPLETE AIR BALANCE SHALL TAKE PLACE WITH OUTSIDE AIR DAMPERS IN MINIMUM POSITION.

B. BALANCE AIR AND WATER QUANTITIES TO WITHIN +/- 10% OF THAT INDICATED ON THE DRAWINGS. ANY REQUIRED CHANGES IN SHEAVES, BELTS, PULLEYS, OR THE ADDITION OF DAMPERS REQUIRED TO ACHIEVE SPECIFIED FLOW RATES SHALL BE PERFORMED BY THE HVAC CONTRACTOR WITH NO ADDITIONAL COST.
C. THE BALANCE REPORT SHALL INCLUDE AS A MINIMUM THE FOLLOWING INFORMATION:
a. CERTIFICATION NUMBER AND SIGNATURE OF BALANCING CONTRACTOR.
b. INSTRUMENTATION LIST WITH LAST CALIBRATION DATES.
c. MAKE AND MODEL NUMBERS OF ALL HVAC EQUIPMENT.
d. AIR CFM AND STATIC PRESSURE READINGS (DISCHARGE AND SUCTION) AS MEASURED BY PITOT TUBE DUCT TRAVERSE AT THE UNIT.
e. MOTOR NAMEPLATE DATA WITH ACTUAL FIELD VOLTAGE AND AMPERAGE READINGS FOR EACH LEG.
f. MOTOR AND FAN RPMS, SHEAVE SIZES AND BELT SIZES.
g. OUTSIDE, RETURN, MIXED AND SUPPLY AIR TEMPERATURES AT FULL COOLING AND HEATING.
h. WATER BALANCE DATA INCLUDING GPM WITH INLET AND OUTLET TEMPERATURE AND PRESSURE READINGS (WHERE APPLICABLE)
i. MAKE AND MODEL NUMBERS OF ALL AIR DISTRIBUTION EQUIPMENT.
j. FINAL BALANCED AIR VOLUMES AT ALL OUTLETS (INCLUDING RETURNS WHERE DUCTED).
k. INDEXED PLAN WITH DIFFUSER AND RETURN LOCATIONS.
E. ALL CONTROL SEQUENCES SHALL BE TESTED (INTERLOCKED EQUIPMENT, SMOKE DETECTORS, SMOKE EVACUATION, ECONOMIZER, ETC.) AND OPERATING STATUS RECORDED IN THE REPORT.
F. THREE COPIES OF THE BALANCE REPORT SHALL BE SUBMITTED THROUGH THE GENERAL CONTRACTOR TO THE TENANT'S CONSTRUCTION MANAGER FOR APPROVAL.
G. THE BALANCING CONTRACTOR SHALL PERFORM ALL APPLICABLE TESTING AND BALANCING FUNCTIONS AS REQUIRED FOR THE SYSTEM DESIGNED IN THESE DRAWINGS. THE BALANCING CONTRACTOR SHALL RECHECK ANY ITEMS THAT THE TENANT DEEMS NECESSARY AT NO ADDITIONAL COST TO THE TENANT.
H. FINAL BALANCE REPORT SHALL BE INCLUDED IN THE OPERATION AND MAINTENANCE MANUALS.

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KO DESIGN MEP ENGINEERS
455 School St.
Suite 46
Tomball, Texas 77375
832.643.0368 phone
ko@kodesign-mep.com

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WALLER COUNTY

JAIL GARAGE

200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

STATE OF TEXAS
JOHN ROBERT BUNT
85353
REGISTERED
PROFESSIONAL
ENGINEER
4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

PROJECT NO.: .
DRAWN BY: MP QC: KO

MECHANICAL SPECIFICATIONS

M-301

COMcheck Software Version COMcheckWeb

Mechanical Compliance Certificate

Project Information

Energy Code:	2021 IECC
Project Title:	Waller County Jail Garage
Location:	Hempstead, Texas
Climate Zone:	2a
Project Type:	New Construction

Construction Site:
200 Sheriff R Glenn Dr
Hempstead, Texas 77445

Owner/Agent:

Designer/Contractor:

Additional Efficiency Package(s)

Credits: 10.0 Required 0.0 Proposed

Mechanical Systems List

Quantity System Type & Description

1 AHU-01/ACCU-01 (Single Zone):
Heating: 1 each - Central Furnace, Gas, Capacity = 60 kBtu/h
Proposed Efficiency = 81.00% Et, Required Efficiency: 80.00 % Et or 80% AFUE
Cooling: 1 each - Split System, Capacity = 23 kBtu/h, Air-Cooled Condenser, Unknown Economizer
Proposed Efficiency = 16.20 SEER2, Required Efficiency = 13.40 SEER2
Proposed Part Load Efficiency = 0.00 , Required Part Load Efficiency = 0.00

1 HVAC System (Unknown w/ PerimeterSystem):
Heating: 4 each - Unit Heater (IRH-01,02,03,04), Gas, Capacity = 200 kBtu/h
Proposed Efficiency = 90.00% Ec, Required Efficiency: 80.00 % Ec

1 HVAC System (Unknown w/ PerimeterSystem):
Heating: 4 each - Unit Heater (GUH-01), Gas, Capacity = 60 kBtu/h
Proposed Efficiency = 83.00% Ec, Required Efficiency: 80.00 % Ec

1 Water Heater:
Gas Instantaneous Water Heater, Capacity: 1 gallons, Input Rating: 150 kBtu/h
No minimum efficiency requirement applies

Mechanical Compliance Statement

Compliance Statement: The proposed mechanical design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed mechanical systems have been designed to meet the 2021 IECC requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Michael Pitts - Mechanical Designer — Name - Title

Signature

04.08.2025 — Date

STATE OF TEXAS
JOHN ROBERT BUNT
85353
REGISTERED
MECHANICAL ENGINEER

COMcheck Software Version COMcheckWeb

Inspection Checklist

Energy Code: 2021 IECC

Requirements: 98.0% were addressed directly in the COMcheck software
Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR2][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the mechanical and service water heating systems and document where exceptions to the standard are claimed. Load calculations per acceptable engineering standards and handbooks. Hot water system sized per manufacturer's sizing guide.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-001 + M-301
C406 [PR9][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-001

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Plumbing Rough-In Inspection	Complies?	Comments/Assumptions
C404.5, C404.5.1, C404.5.2 [PL6][1]	Heated water supply piping conforms to pipe length and volume requirements. Refer to section details.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C402.2.6 [ME41][1]	Thermally ineffective panel surfaces of sensible heating panels have insulation >= R-3.5.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.12.3 [ME61][2]	HVAC piping insulation insulated in accordance with Table C403.11.3. Insulation exposed to weather is protected from damage and is provided with shielding from solar radiation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301
C403.8.1 [ME65][1]	HVAC fan systems at design conditions do not exceed allowable fan system motor nameplate hp or fan system bhp.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. *See the Mechanical Systems list for values.*
C403.8.3 [ME117][2]	Fans have a fan energy index (FEI) >= 1.00. Variable volume fans will have an FEI >= 0.95.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-001
C403.8.3 [ME117][2]	Fans have a fan energy index (FEI) >= 1.00. Variable volume fans will have an FEI >= 0.95.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-001
C403.8.3 [ME117][2]	Fans have a fan energy index (FEI) >= 1.00. Variable volume fans will have an FEI >= 0.95.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-001
C403.9 [ME144][2]	Large diameter fans where installed shall be tested and labeled in accordance with AMCA 230.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.13.1 [ME71][2]	Systems that heat outside the building envelope are radiant heat systems controlled by an occupancy sensing device or timer switch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301
C403.3 [ME55][2]	HVAC equipment efficiency verified.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Mechanical Systems list for values.*
C403.2.2 [ME59][1]	Natural or mechanical ventilation is provided in accordance with International Mechanical Code Chapter 4. Mechanical ventilation has capability to reduce outdoor air supply to minimum per IMC Chapter 4.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.7.1 [ME59][1]	Demand control ventilation provided for spaces >500 ft2 and >15 people/1000 ft2 occupant density and served by systems with air side economizer, auto modulating outside air damper control, or design airflow >3,000 cfm.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. **Location on plans/spec:** M-001
C403.7.2 [ME115][1]	Enclosed parking garage ventilation has automatic contaminant detection and capacity to stage or modulate fans to 50% or less of design capacity.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Mechanical Rough-In Inspection	Complies?	Comments/Assumptions
C403.7.6 [ME141][1]	HVAC systems serving guestrooms in Group R-1 buildings with > 50 guestrooms: Each guestroom is provided with controls that automatically manage temperature setpoint and ventilation (see sections C403.7.6.1 and C403.7.6.2).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply. **Location on plans/spec:** M-101
C403.7.4 [ME57][1]	Exhaust air energy recovery on systems meeting Table C403.7.4(1) and C403.7.4(2).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.7.5 [ME116][1]	Kitchen exhaust systems comply with replacement air and conditioned supply air limitations, and satisfy hood rating requirements and maximum exhaust rate criteria.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.12.1 C403.12.2 [ME60][2]	HVAC ducts and plenums insulated in accordance with C403.11.1 anc constructed in accordance with C403.11.2, verification may need to occur during Foundation Inspection.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301
C403.4.1.4 [ME63][2]	Heating for vestibules and air curtains with integral heating include automatic controls that shut off the heating system when outdoor air temperatures > 45F. Vestibule heating and cooling systems controlled by a thermostat in the vestibule with heating setpoint <= 60F and cooling setpoint >= 80F.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C403.3.3 [ME35][1]	Hot gas bypass limited to: <=240 kBtu/h – 50% >240 kBtu/h – 25%	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-001
C408.2.2.1 [ME53][3]	Air outlets and zone terminal devices have means for air balancing.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.11.3 .1, C403.11.3 .2 [ME123][3]	Refrigerated display cases, walk-in coolers or walk-in freezers served by remote compressors and remote condensers not located in a condensing unit, have fan-powered condensers that comply with Sections C403.11.3.1 and refrigeration compressor systems that comply with C403.11.3.2..	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.7 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.8 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.9.1, C405.9.2 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.10 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.1.1 [EL30][2]	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.11, C405.11.1 [EL31][2]	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-201

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.3 [FI8][3]	Furnished O&M manuals for HVAC systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.1.1 [FI50][1]	HVAC systems and equipment design loads calculated in accordance with ANSI/ASHRAE/ACCA Standard 183 or by an approved equivalent computational procedure	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Load Calculation Document
C403.3.1 [FI27][3]	HVAC systems and equipment capacity does not exceed calculated loads.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** LOAD CALCULATION DOCUMENT + M-001
C403.4.1 [FI47][3]	Heating and cooling to each zone is controlled by a thermostat control. Minimum one humidity control device per installed humidification/dehumidification system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301
C403.4.1.2 [FI38][3]	Thermostatic controls have a 5 °F deadband.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301
C403.4.1.3 [FI20][3]	Temperature controls have setpoint overlap restrictions.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C403.4.2 [FI39][3]	Each zone equipped with setback controls using automatic time clock or programmable control system.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301
C403.4.2.1, C403.4.2.2 [FI40][3]	Automatic Controls: Setback to 55°F (heat) and 85°F (cool); 7-day clock, 2-hour occupant override, 10-hour backup	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301
C404.3 [FI11][3]	Heat traps installed on supply and discharge piping of non-circulating systems.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	
C408.1.1 [FI57][2]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.1 [FI28][1]	Commissioning plan developed by registered design professional or approved agency.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C408.2.3.1 [FI31][1]	HVAC equipment, systems and system-to-system relationships have been tested to ensure proper operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301
C408.2.3.2 [FI10][1]	HVAC and service water heating control systems have been tested to ensure proper operation, calibration and adjustment of controls.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301
C408.2.4 [FI29][1]	Preliminary commissioning report completed and certified by registered design professional or approved agency.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301
C408.2.5 [FI7][1]	Furnished HVAC as-built drawings submitted within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5.1 [FI43][1]	An air and/or hydronic system balancing report is provided for HVAC systems.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301
C408.2.5.2 [FI30][1]	Final commissioning report due to building owner within 90 days of receipt of certificate of occupancy.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** M-301

Additional Comments/Assumptions:

1 High Impact (Tier 1) 2 Medium Impact (Tier 2) 3 Low Impact (Tier 3)

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KO DESIGN MEP ENGINEERS
455 School St.
Suite 46
Tomball, Texas 77375
832.643.0368 phone
ko@kodesign-mep.com

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WALLER COUNTY

JAIL GARAGE

200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

STATE OF TEXAS
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REV	DATE:	ISSUED FOR:
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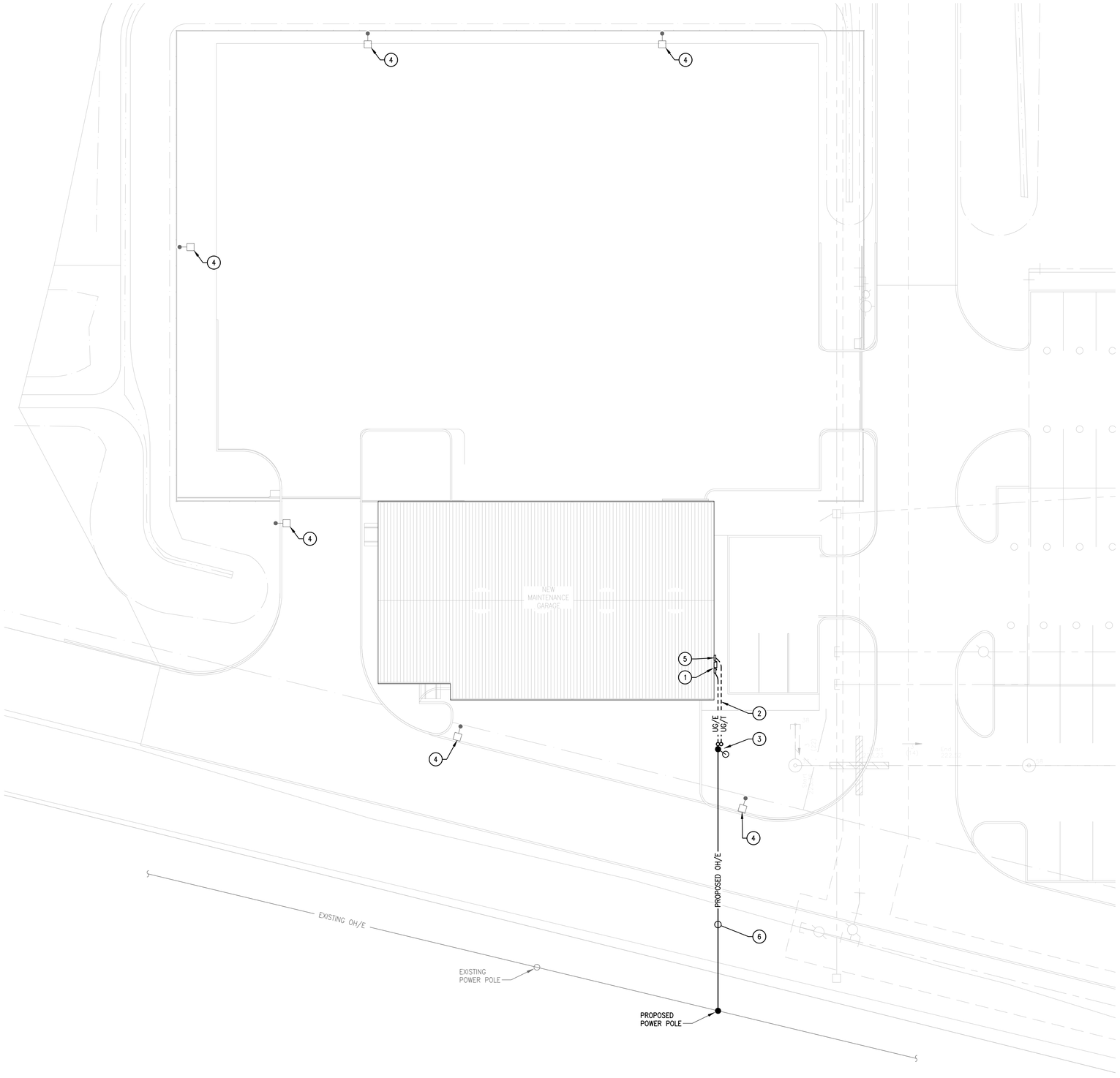
PROJECT NO.: .
DRAWN BY: MP QC: KO

MECHANICAL COMCHECK

M-401



1 **ELECTRICAL SITE PLAN**
SCALE: 1/16" = 1'-0"

TRUE NORTH PLAN NORTH

NOTE TO CONTRACTOR FOR COORDINATION WITH LOCAL ELECTRIC UTILITY COMPANY DESIGN STANDARDS:

1. ALTHOUGH THE ENGINEER HAS MADE EVERY EFFORT TO VERIFY & COORDINATE THE PROJECT SITE UTILITIES, THE SITE UTILITY SERVICE LOCATIONS ARE NOT NECESSARILY FINAL AND ARE SUBJECT TO REVISIONS PER REVIEW BY THE RESPECTIVE UTILITY COMPANIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN APPROVALS FROM, AND COORDINATE WITH THE LOCAL UTILITY COMPANY TERMS & CONDITIONS PACKAGE, TO PROVIDE UTILITY SERVICE TO THE PROJECT. CONTRACTOR SHALL BASE HIS BID ON CONFORMANCE TO ALL UTILITY REQUIREMENTS AND SPECIFICATIONS DRAWINGS & NOTES.
2. CONTRACTOR SHALL CONTACT LOCAL ELECTRIC UTILITY COMPANY IMMEDIATELY UPON AWARD OF CONTRACT. CONTRACTOR SHALL COORDINATE ALL UTILITIES AND THEIR REQUIREMENTS, ROUTING, METERING, AND DISCONNECTING MEANS PRIOR TO INSTALLATION OF ANY CONDUITS OR PIPING AS ESTABLISHED ELECTRICAL SERVICE DESIGN STANDARDS MAY HAVE CHANGED DURING THE DESIGN PHASE OF THIS PROJECT TO WHEN THE ACTUAL CONSTRUCTION PHASE STARTS.

SITE COMMUNICATIONS GENERAL NOTE:

(FOR DRAWING ES-100)

1. TELE/COMM CONDUIT INSTALLATION SHALL ADHERE TO LOCAL TELE COMM COMPANY TRENCH CRITERIA. THE COMM CONDUITS ARE SHOWN FOR PRICING PURPOSES ONLY AND SHALL BE COORDINATED WITH THE DATA/COMM UTILITY PROVIDER AND OWNER PRIOR TO BEGINNING WORK. QUANTITY OF CONDUITS, SIZES, ROUTING, AND PULL BOX LOCATIONS ARE TO BE FULLY COORDINATED PRIOR TO PURCHASE OF ANY MATERIALS OR BEGINNING OF ANY DIRT WORK. COORDINATE ROUTING WITH ALL OTHER UTILITIES NEW OR EXISTING.

ELECTRICAL KEYED NOTES:

(FOR DRAWING ES-100)

1. REFER TO DRAWING E-301 FOR ELECTRICAL RISER FOR ADDITIONAL INFORMATION FOR MAIN ELECTRICAL SERVICE ENTRANCE.
2. TELE/COMM CABINET WITH (1) 2"C. FROM SERVING TELEPHONE COMPANY.
3. PROPOSED LOCATION OF LOCAL POWER COMPANY POLE MOUNTED TRANSFORMER.
4. EXISTING SITE LIGHTING POLE TO REMAIN.
5. TELEPHONE TERMINAL CABINET.
6. TELE/COMM TO RUN AT 3RD PARTY SPACE ON POWER COMPANY POWER POLES.

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Hempstead, TX 77445

STATE OF TEXAS
JOHN ROBERT BUNT
85353
REGISTERED
PROFESSIONAL ENGINEER
4/10/2025

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PROJECT NO.: .
DRAWN BY: GR QC: KO

ELECTRICAL SITE PLAN

ES-100

SYMBOL LEGEND

SYMBOL	DESCRIPTION (DISREGARD ITEMS NOT SHOWN ON PLANS)
LIGHTING (LETTER DENOTES TYPE – SEE LIGHT FIXTURE SCHEDULE)	
	LED FIXTURE
	LED FIXTURE ON EMERGENCY CIRCUIT
	DOWNLIGHT FIXTURE
	LIGHT FIXTURE – WALL MOUNTED
	DOWNLIGHT FIXTURE ON EMERGENCY CIRCUIT
	LIGHT FIXTURE – WALL MOUNTED ON EMERGENCY CIRCUIT
	EXIT LIGHT–CEILING MTD WITH DIRECTIONAL ARROWS AS REQUIRED
	EXIT LIGHT–WALL MTD WITH DIRECTIONAL ARROWS AS REQUIRED
	EMERGENCY LIGHTING UNIT EQUIPMENT
SWITCHES	
$	SINGLE POLE SWITCH
$2	2–POLE SWITCH
$3	3–WAY SWITCH
$K	KEYED SWITCH
$D	WALL DIMMER SWITCH, SIZE AND TYPE AS REQUIRED
$PL	SWITCH WITH PILOT LIGHT
$MC	MOMENTARY CONTACT SWITCH
RECEPTACLES AND TELE/DATA/COMMUNICATION OUTLETS	
	SIMPLEX RECEPTACLE
	DUPLEX RECEPTACLE
	125/250 VOLT, 1 PHASE, 3–WIRE, 20 AMPS UNLESS NOTED OTHERWISE
	DOUBLE DUPLEX IN 2–GANG BOX WITH SINGLE COVER PLATE
	DOUBLE DUPLEX ISOLATED GROUND IN 2–GANG BOX WITH SINGLE COVER PLATE
	ISOLATED GROUND DUPLEX RECEPTACLE
	ISOLATED GROUND SIMPLEX RECEPTACLE
	250 VOLT, 1 PHASE, SPECIAL PURPOSE OUTLET, 20 AMPS UNLESS NOTED OTHERWISE
	JUNCTION BOX
	FLUSH FLOOR DUPLEX RECEPTACLE OUTLET
	DUPLEX GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLE
	DOUBLE DUPLEX GROUND FAULT CIRCUIT INTERRUPTER RECEPTACLE IN 2–GANG BOX WITH SINGLE COVER PLATE
	FLUSH FLOOR JUNCTION BOX
R	REMOTE GFCI RESET BUTTON
	TWO CHANNEL POWER/DATA, NON–METALLIC SURFACE RACEWAY, LENGTH AS REQUIRED
	DATA OUTLET, 1–GANG BOX WITH 3/4" CONDUIT TO ABOVE CEILING
	TELEPHONE OUTLET, 1–GANG BOX WITH 3/4" CONDUIT TO ABOVE CEILING
	TELEPHONE/DATA OUTLET, 1–GANG BOX WITH (2)3/4" CONDUIT TO ABOVE CEILING
	TELEVISION OUTLET (COAX), OWNER TO DETERMINE MOUNTING HEIGHT.
MOTOR CONTROLLERS AND EQUIPMENT	
	MOTOR, MAKE FINAL MOTOR CONNECTION
	3–PHASE MOTOR, MAKE FINAL MOTOR CONNECTION
	DISCONNECT SWITCH AS REQUIRED
	COMBINATION MOTOR STARTER/DISCONNECT SWITCH AS REQUIRED
	MOTOR STARTER
	MOTOR CONTROLLER PUSH BUTTON CONTROL, P=PILOT LIGHT
$M	MANUAL MOTOR SWITCH AS REQUIRED
	PREWIRED DEVICE, MAKE ELECTRICAL FINAL CONNECTIONS
VFD	VARIABLE FREQUENCY DRIVE MOTOR CONTROLLER FURNISHED BY DIVISION 15 AND INSTALLED BY DIVISION 16
ELECTRICAL EQUIPMENT	
	277/480 VOLT DISTRIBUTION OR PANELBOARD
	120/208 VOLT PANELBOARD
	TELEPHONE CABINET
	PLYWOOD TELEPHONE BACKBOARD
	DRY TYPE TRANSFORMER
CIRCUITING	
	CONDUIT
	TRAVELER
	CONDUIT BELOW FLOOR, SLAB, OR GRADE
	3/4"C. UNLESS OTHERWISE NOTED; LONG HATCH, NEUTRAL; SHORT HATCH, PHASE; "2" HATCH, INSULATED GROUND. NO HATCHES INDICATES 2 CONDUCTORS. ARROW INDICATES HOMERUN.
	PARTIAL ELECTRICAL HOME RUN
SUBSCRIPTS AND ABBREVIATIONS	
WP	NEXT TO ANY SYMBOL INDICATES WEATHERPROOF
WG	NEXT TO ANY SYMBOL INDICATES WIREGUARD
NL	LIGHT FIXTURE ON NIGHT LIGHT CIRCUIT
(E)	NEXT TO ANY SYMBOL INDICATES EXISTING TO REMAIN
U	NEXT TO ANY RECEPTACLE INDICATES A RECEPTACLE WITH USB CHARGING PORT(S)
XFMR	INDICATES TRANSFORMER
UG/E	INDICATES UNDERGROUND ELECTRICAL CONDUIT(S)
OH/E	INDICATES OVERHEAD ELECTRICAL LINES
T	INDICATES TAMPER RESISTANT
UG/T	INDICATES UNDERGROUND TELEPHONE CONDUIT(S)
•	NEXT TO ANY SYMBOL INDICATES FINAL ROUGH–IN FIELD COORDINATION BY CONTRACTOR WITH ARCHITECTURAL MILLWORK DRAWINGS AND OTHER TRADES

GENERAL NOTES:

1. ALL EXTERIOR BUILDING ELECTRICAL EQUIPMENT TO BE WEATHERPROOF NEMA–3R MINIMUM.
2. DISREGARD ANY SYMBOLS THAT ARE NOT USED ON PLANS.

LIGHTING CONTROLS LEGEND

SYMBOL	SENSOR-SWITCH-POWER PACK INFORMATION (SEE IECC C405.2.1.1.3, C4052.2.1 & C405.2.1.1.2)	SEQUENCE OF OPERATION	MOUNTING HEIGHT
$O	OCCUPANCY – AUTO "ON/OFF" TIMEOUT – 20 MINUTES WALL MOUNTED DIGITAL SWITCH WITH DUAL TECHNOLOGY AND 180° DETECTION.	1. AUTO SWITCH "ON" DRIVERS IN ALL FIXTURES TO 100% AFTER OCCUPANT ENTERS SPACE. 2. TURN OFF ALL FIXTURES WHEN TIMEOUT EXPIRES AFTER OCCUPANT LEAVES SPACE.	MOUNT TO CENTER OF JUNCTION BOX AT +48" A.F.F UNLESS NOTED OTHERWISE.
$V	VACANCY – MANUAL "ON" AUTO "OFF" TIMEOUT – 20 MINUTES WALL MOUNTED DIGITAL SWITCH WITH DUAL TECHNOLOGY AND 180° DETECTION.	1. MANUAL SWITCH "ON" DRIVERS IN ALL FIXTURES TO 100% BY OCCUPANT ENTERING SPACE. 2. TURN OFF ALL FIXTURES WHEN TIMEOUT EXPIRES AFTER OCCUPANT LEAVES SPACE.	MOUNT TO CENTER OF JUNCTION BOX AT +48" A.F.F UNLESS NOTED OTHERWISE.
$VMD	VACANCY – MANUAL "ON" AUTO "OFF" TIMEOUT – 20 MINUTES 5–BUTTON SWITCH WITH RAISE/LOWER 0–10V DIMMING, 100%, 50%, OFF WALL MOUNTED DIGITAL SWITCH WITH DUAL TECHNOLOGY AND 180° DETECTION.	1. MANUAL SWITCH "ON" DRIVERS IN ALL FIXTURES TO 100% BY OCCUPANT ENTERING SPACE. 2. TURN OFF ALL FIXTURES WHEN TIMEOUT EXPIRES AFTER OCCUPANT LEAVES SPACE.	MOUNT TO CENTER OF JUNCTION BOX AT +48" A.F.F UNLESS NOTED OTHERWISE.
$OMD	OCCUPANCY – AUTO "ON" AUTO "OFF" TIMEOUT – 20 MINUTES 5–BUTTON SWITCH WITH RAISE/LOWER 0–10V DIMMING, 100%, 50%, OFF, AUTO "ON" @50% WALL MOUNTED DIGITAL SWITCH WITH DUAL TECHNOLOGY AND 180° DETECTION.	1. AUTO SWITCH "ON" DRIVERS TO 100% IN ALL FIXTURES BY OCCUPANT ENTERING SPACE. 2. TURN OFF ALL FIXTURES WHEN TIMEOUT EXPIRES AFTER OCCUPANT LEAVES SPACE.	MOUNT TO CENTER OF JUNCTION BOX AT +48" A.F.F UNLESS NOTED OTHERWISE.
$S1	OCCUPANCY – "ON/OFF" TIMEOUT – 20 MINUTES 2–BUTTON WALL MOUNTED DIGITAL SWITCH.	1. AUTO SWITCH "ON" DRIVERS IN ALL FIXTURES TO 100% AFTER OCCUPANT ENTERS SPACE. 2. TURN OFF ALL FIXTURES WHEN TIMEOUT EXPIRES AFTER OCCUPANT LEAVES SPACE.	MOUNT TO CENTER OF JUNCTION BOX AT +48" A.F.F UNLESS NOTED OTHERWISE.
$RL	3–BUTTON WALL MOUNTED DIGITAL SWITCH WITH ON/OFF AND RAISE/LOWER 0–10V DIMMING. COORDINATE DIMMER SWITCH TYPE WITH LIGHT FIXTURE DIMMING CAPABILITY.	1. DIMS SPECIFIED FIXTURES PER SWITCH GROUP, SEE PLANS.	MOUNT TO CENTER OF JUNCTION BOX AT +48" A.F.F UNLESS NOTED OTHERWISE.
$MS	WALL MOUNTED DIGITAL MASTER 2–HOUR OVERRIDE SWITCH.	1. ALLOWS OCCUPANT TO TURN ON LIGHTS AFTER AN UNSCHEDULED OCCUPANT INTERVENTION.	MOUNT TO CENTER OF JUNCTION BOX AT +48" A.F.F UNLESS NOTED OTHERWISE.
OS	OCCUPANCY – AUTO "ON/OFF" TIMEOUT – 20 MINUTES. CEILING MOUNTED, STANDARD RANGE, DUAL TECHNOLOGY WITH WITH 360° DETECTION, 1500 SQUARE FEET OR LESS.	1. SENSOR TO ACTIVATE POWER PACK WITHIN THE OCCUPIED SPACE, SEE PLANS FOR POWER PACK TYPE.	MOUNT VISIBLE IN CEILING.
OEX	OCCUPANCY – AUTO "ON/OFF" TIMEOUT – 20 MINUTES. CEILING MOUNTED, EXTENDED RANGE, DUAL TECHNOLOGY WITH WITH 360° DETECTION, 2000 SQUARE FEET OR MORE.	1. SENSOR TO ACTIVATE POWER PACK WITHIN THE OCCUPIED SPACE, SEE PLANS FOR POWER PACK TYPE.	MOUNT VISIBLE IN CEILING.
VS	VACANCY – MANUAL "ON" AUTO "OFF" TIMEOUT – 20 MINUTES. CEILING MOUNTED, STANDARD RANGE, DUAL TECHNOLOGY WITH WITH 360° DETECTION, 1500 SQUARE FEET OR LESS.	1. SENSOR TO ACTIVATE POWER PACK WITHIN THE OCCUPIED SPACE, SEE PLANS FOR POWER PACK TYPE.	MOUNT VISIBLE IN CEILING.
VEX	VACANCY – MANUAL "ON" AUTO "OFF" TIMEOUT – 20 MINUTES. CEILING MOUNTED, EXTENDED RANGE, DUAL TECHNOLOGY WITH WITH 360° DETECTION, 2000 SQUARE FEET OR MORE.	1. SENSOR TO ACTIVATE POWER PACK WITHIN THE OCCUPIED SPACE, SEE PLANS FOR POWER PACK TYPE.	MOUNT VISIBLE IN CEILING.
PO	POWER PACK WITH AUTO "ON". CLASS 2 LOW VOLTAGE WIRING. OCCUPANCY MODE – AUTO "ON/OFF"		ABOVE CEILING IN AN ACCESSIBLE AREA.
PV	POWER PACK WITH MANUAL "ON". CLASS 2 LOW VOLTAGE WIRING. VACANCY MODE – MANUAL "ON" AUTO "OFF"		ABOVE CEILING IN AN ACCESSIBLE AREA.
OSEX	EXTENDED RANGE, ADJUSTABLE WALL MOUNTED OCCUPANCY SENSOR WITH DUAL TECHNOLOGY DETECTION.	1. SENSOR TO ACTIVATE POWER PACK WITHIN THE OCCUPIED SPACE, SEE PLANS FOR POWER PACK TYPE.	MOUNT VISIBLE ON WALL.
DS	CEILING MOUNTED PHOTOCELL DAYLIGHT SENSOR FOR DIMMING/DAYLIGHT HARVESTING. (SEE IECC C405.2.4)	1. SENSOR TO ACTIVATE POWER PACK WITHIN THE OCCUPIED SPACE, SEE PLANS FOR POWER PACK TYPE.	MOUNT VISIBLE IN CEILING.
LCR EL–25 (INDICATES EMERGENCY CIRCUIT)	PROVIDE 20 AMP LOAD CONTROL DEVICE (LCR). LCR SHALL BE U.L. 924 LISTED, (0–10 VDC COMPATIBLE WHERE REQUIRED FOR DIMMING), AND SHALL SWITCH EMERGENCY FIXTURES IN EACH LIGHTING SWITCHED ZONE.	SWITCHES ON DESIGNATED EMERGENCY (SHADED) FIXTURES REGARDLESS OF SWITCH POSITION. TURNS FIXTURES TO FULL ON IF DIMMED.	VISIBLY FLUSH MOUNT DEVICE IN CEILING OR WITHIN ACCESSIBLE CEILING.

NOTES:

1. DISREGARD ANY SYMBOLS THAT ARE NOT USED ON PLANS.
2. APPROVED LIGHTING CONTROLS BY: COOPER GREENGATE, ACUITY nLIGHT, HUBBELL, AND LEGRAND WATT STOPPER. FOR AN APPROVED EQUAL, THE CONTRACTOR SHALL SUBMIT TO KO MEP ENGINEERING PRODUCT DATA ON AN EQUALLY PERFORMING DIGITAL LIGHTING CONTROL SYSTEM AND PROVIDE A LAYOUT DEMONSTRATING DESIGN CONFORMANCE FOR REVIEW AND APPROVAL.

LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER	CATALOG NUMBER	MOUNTING	LAMPS TYPE	VOLTS	DESCRIPTION	LOCATION
A	LITHONIA	#CPX–2X4–4000LM–80CRI–40K–SWL–MIN10 ZT–MVOLT	RECESSED	36.7 WATT LED 4936 LUMENS 4000°K	MVOLT	2'X4' LAY–IN FLAT PANEL.	INTERIOR, SEE PLANS.
AE	LITHONIA	#CPX–2X4–4000LM–80CRI–40K–SWL–MIN10 ZT–MVOLT–E10WLCP	RECESSED	36.7 WATT LED 4936 LUMENS 4000°K	MVOLT	SAME AS TYPE 'A' EXCEPT WITH AN EMERGENCY BACK–UP BATTERY.	INTERIOR, SEE PLANS.
B	LITHONIA	#LDN6–40K–L06–AR–LSS–TRW–MVOLT–GZ10	RECESSED	10.4 WATT LED 950 LUMENS 4000°K	MVOLT	6" OPEN DOWN LIGHT WITH A SEMI–SPECULAR CLEAR REFLECTOR AND SUITABLE FOR WET LOCATIONS.	INTERIOR, SEE PLANS.
BE	LITHONIA	#LDN6–40K–L06–AR–LSS–TRW–MVOLT–GZ10 –ELSD	RECESSED	10.4 WATT LED 950 LUMENS 4000°K	MVOLT	SAME AS TYPE 'B' EXCEPT WITH AN EMERGENCY BACK–UP BATTERY.	INTERIOR, SEE PLANS.
C	LITHONIA	#CLX–L48–4000LM–SEF–FDL–WD–MVOLT– GZ10–40K–80CRI	RECESSED	32 WATT LED 4000 LUMENS 4000°K	MVOLT	4'–0" LINEAR STRIP.	INTERIOR, SEE PLANS.
CE	LITHONIA	#CLX–L48–4000LM–SEF–FDL–WD–MVOLT– GZ10–40K–80CRI–E10WLCP	RECESSED	32 WATT LED 4000 LUMENS 4000°K	MVOLT	SAME AS TYPE 'C' EXCEPT WITH AN EMERGENCY BACK–UP BATTERY.	INTERIOR, SEE PLANS.
D	LITHONIA	#WDGE2LED–P4–40K–80CRI–VF–MVOLT–SRM –DDBXD–PE	SURFACE	35 WATT LED 4412 LUMENS 4000°K	MVOLT	EXTERIOR WALL PACK WITH INTEGRAL PHOTOCELL.	EXTERIOR, SEE PLANS.
DE	LITHONIA	#WDGE2LED–P4–40K–80CRI–VF–MVOLT–SRM –DDBXD–E10WH–PE	SURFACE	35 WATT LED 4412 LUMENS 4000°K	MVOLT	SAME AS TYPE 'G' EXCEPT WITH AN EMERGENCY BACK–UP BATTERY.	EXTERIOR, SEE PLANS.
E	LITHONIA	#TWX2LED–P4–40K–MVOLT–PE–DDBXD	SURFACE	54 WATT LED 6850 LUMENS 4000°K	MVOLT	EXTERIOR WALL PACK WITH INTEGRAL PHOTOCELL.	EXTERIOR, SEE PLANS.
EM	LITHONIA	#AFB–OEL–DDBTXD–UVOLT–N–SDRT–WT	SURFACE	LED	MVOLT	EXTERIOR RATED EMERGENCY EGRESS FIXTURE WITH BACK–UP BATTERY.	EXTERIOR, SEE PLANS.
F	LITHONIA	#CPHB–12000LM–SEF–GCL–MD–MVOLT–GZ10 –40K–70CRI–LSXR6–DWH	SUSPENDED	87 WATT LED 12273 LUMENS 4000°K	MVOLT	2'x2' HIGH–BAY WITH INTEGRAL OCCUPANCY CONTROLS.	INTERIOR, SEE PLANS.
FE	LITHONIA	#CPHB–12000LM–SEF–GCL–MD–MVOLT–GZ10 –40K–70CRI–E15WMCP–LSXR6–DWH	SUSPENDED	87 WATT LED 12273 LUMENS 4000°K	MVOLT	SAME AS TYPE 'F' EXCEPT WITH AN EMERGENCY BACK–UP BATTERY.	INTERIOR, SEE PLANS.
G	LITHONIA	#FEM–4000LM–LPAFL–MD–MVOLT–GZ10– 40K–80CRI	SURFACE	26 WATT LED 4159 LUMENS 4000°K	MVOLT	24" LED VAPOR TIGHT.	EXTERIOR, SEE PLANS.
X	LITHONIA	#EXRGELM6	UNIVERSAL	1 WATT LED	MVOLT	SINGLE FACE EXIT SIGN WITH RED LETTERS, DIRECTIONAL CHEVRONS AS INDICATED ON PLANS AND AN EMERGENCY BACK–UP BATTERY.	INTERIOR, SEE PLANS.

NOTES:

1. ANY LIGHTING MANUFACTURER(S) SUBSTITUTED NOT AS SPECIFIED IN THE LIGHT FIXTURE SCHEDULE DOES NOT GUARANTEE APPROVAL. SUBSTITUTIONS MUST MEET THE QUALIFICATIONS OF THE IECC (INTERNATIONAL ENERGY CONSERVATION CODE) AND MUST BE SUBMITTED TO KO DESIGN MEP ENGINEERS FOR CONSIDERATION OF APPROVAL. APPROVAL WILL BE DETERMINED BY WRITTEN REQUESTS SUBMITTED TO THE ENGINEER OF RECORD AND PRIOR TO REVIEW OF SHOP DRAWINGS TO DETERMINE IF THE SUBSTITUTED FIXTURE MEETS OR EXCEEDS THE DESIGN STANDARDS AND PERFORMANCE REQUIRED OF THE ACTUAL FIXTURE SPECIFIED IN THE LIGHT FIXTURE SCHEDULE. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO SUBMIT A PASSING IECC COMCHECK ALONG WITH ANY SUBSTITUTION LIGHT FIXTURE PACKAGE. SHOP DRAWING DELAYS AS A RESULT OF INAPPROPRIATE SUBSTITUTIONS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR AND AT NO ADDITIONAL COST TO THE OWNER.
2. ALL COLORS SPECIFIED FOR FIXTURES SHALL BE COORDINATED WITH ARCHITECT/OWNER PRIOR TO PURCHASING.
3. COORDINATE AND CONFIRM ALL MOUNTING HEIGHTS AND LOCATIONS WITH THE ARCHITECT/OWNER PRIOR TO CONSTRUCTION.
4. COLOR TEMPERATURE IN DEGREES OF KELVIN SHALL BE CONFIRMED WITH ARCHITECT/OWNER PRIOR TO PURCHASING.
5. ALL LIGHTING SYSTEMS TO BE TESTED AND PROGRAMMED/CALIBRATED TO ENSURE WORKING PROPERLY.
6. ALL DIMMING SCHEMES SHALL BE COORDINATED WITH OWNER/ARCHITECT. COORDINATE WITH LIGHTING MANUFACTURER'S FOR COMPATIBLE DIMMERS FOR ALL DIMMED LIGHT FIXTURES SO THAT DIMMED CIRCUITS DO NOT EXCEED THE RATING OF THE PROVIDED AND INSTALLED DIMMER SWITCH AND TO ELIMINATE THE POTENTIAL CROSS TALK BETWEEN FIXTURES THAT COULD CAUSE FIXTURE FLICKERING.

ELECTRICAL INDEX OF DRAWINGS

ELECTRICAL

ES–100	ELECTRICAL SITE PLAN
E–001	ELECTRICAL LEGENDS AND SCHEDULE
E–101	ELECTRICAL LIGHTING PLAN – LEVEL 1
E–102	ELECTRICAL LIGHTING PLAN – LEVEL 2
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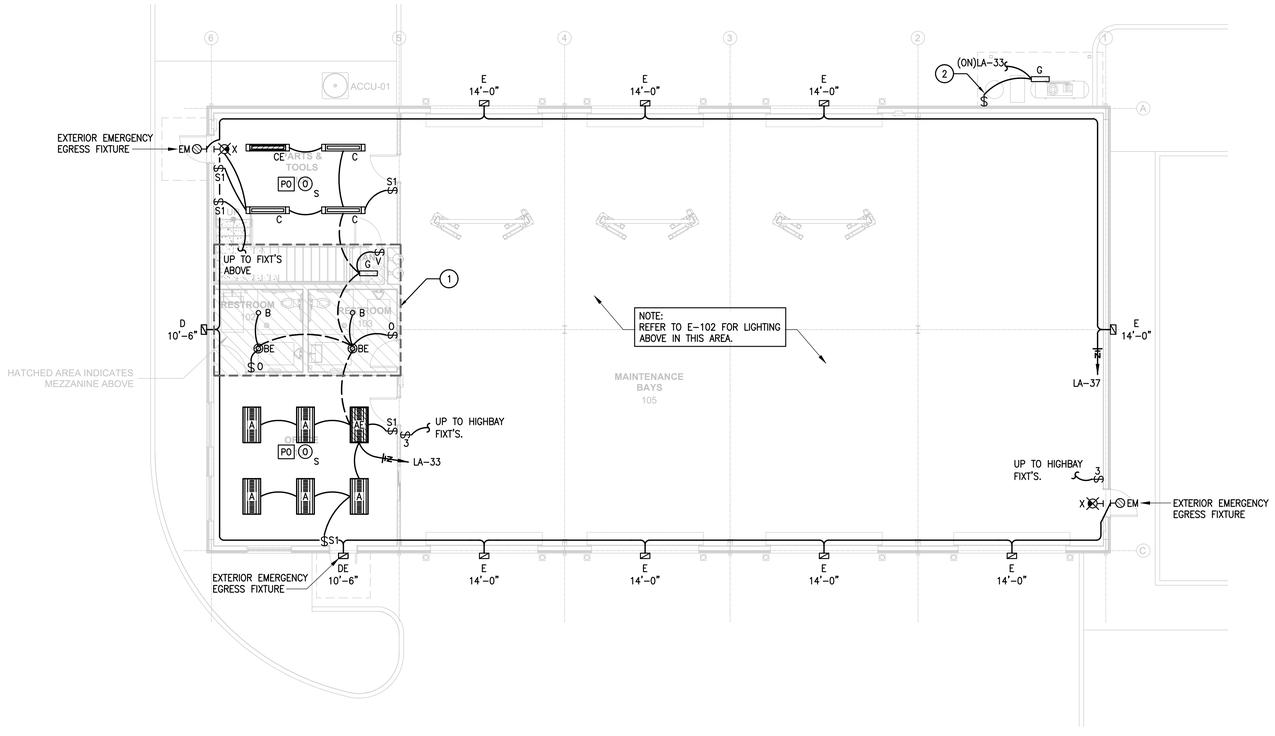
ELECTRICAL LEGENDS AND SCHEDULE

E–001



1 ELECTRICAL LIGHTING PLAN - LEVEL 1

SCALE: 1/8" = 1'-0"

TRUE NORTH PLAN NORTH

ELECTRICAL GENERAL NOTES:

(FOR DRAWING E-101)

1. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF ALL LIGHTING FIXTURES.
2. EACH CONDUIT SHALL BE LIMITED TO (3) CIRCUITS MAXIMUM.
3. ALL LIGHTING BRANCH CIRCUIT CONDUITS SHALL CONTAIN A GROUND WIRE. USING THE CONDUIT SYSTEM AS THE ONLY GROUND PATH IS NOT ACCEPTABLE.
4. ELECTRICIAN OF RECORD, & BONDED PER DIVISION 0-"CONTRACT" SPECIFICATIONS, AND BE FAMILIAR & EXPERIENCED WITH SUCH WORK INDICATED HEREIN, & QUALIFIED BY MOST RECENT OSHA CERTIFICATION TO WORK ON ENERGIZED EQUIPMENT. REFER TO & COMPLY WITH OSHA 29CFR.1910 & 1926 ELECTRICAL SAFETY PORTIONS. CONSTRUCTION METHOD AND MEANS AND THEIR REQUIREMENTS. CONTRACTOR SHALL PROVIDE WORK WITHIN STANDARD OF CARE FOR PROFESSION.
5. MOUNT ALL LIGHT SWITCHES AT +48" A.F.F. TO CENTER OF JBOX UNLESS OTHERWISE NOTED.
6. COORDINATE FINAL LOCATION OF ALL LIGHT SWITCHES WITH OWNER PRIOR TO ROUGH-IN. SWITCHES LOCATED SIDE BY SIDE SHALL BE GANGED UNDER COMMON COVERPLATE.
7. ALL EXIT SIGNS SHALL BE WIRED WITH A CONSTANT HOT AND CONNECTED TO 120V LIGHTING CIRCUIT SERVING SAME AREA UNLESS OTHERWISE NOTED.
8. REFER TO SHEET E-001 FOR LIGHT FIXTURE SCHEDULE.
9. ALL ELECTRICAL WORK INCLUDED IN THIS PROJECT SHALL MEET THE REQUIREMENTS OF THE 2023 NATIONAL ELECTRICAL CODE (N.E.C.).
10. LIGHTING CONTROL DESIGN INTENT IS TO COMPLY WITH THE 2021 IECC SECTION C405. CONTROL SYSTEM SHALL BE A CONTROL SYSTEM SIMILAR OR EQUAL TO ACUITY BRANDS nLIGHT SYSTEM.
11. INTERIOR LIGHTING GROUP/ZONES ARE REPRESENTED BY LOWER-CASE LETTER ADJACENT TO FIXTURES. E.G., "a", "b", "c", etc. TYPICAL FOR ALL INTERIOR LIGHTING GROUPS/ZONES.

ELECTRICAL KEYED NOTES:

(FOR DRAWING E-101)

1. REFER TO E-102 FOR MEZZANINE ABOVE THIS AREA.
2. MOUNT SWITCH IN A WEATHERPROOF ENCLOSURE SIMILAR TO BELL #5121-0.

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WALLER COUNTY

JAIL GARAGE

200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

STATE OF TEXAS
JOHN ROBERT BUNT
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ELECTRICAL LIGHTING PLAN - LEVEL 1

E-101

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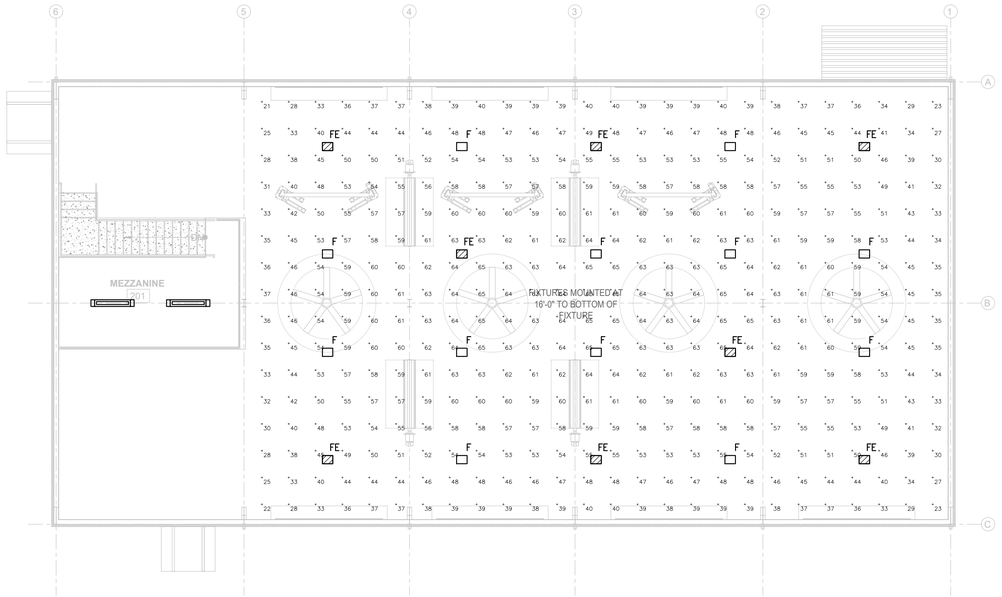
KO DESIGN MEP ENGINEERS
455 School St.
Suite 46
Tomball, Texas 77375
832.643.0368 phone
ko@kodesign-mep.com

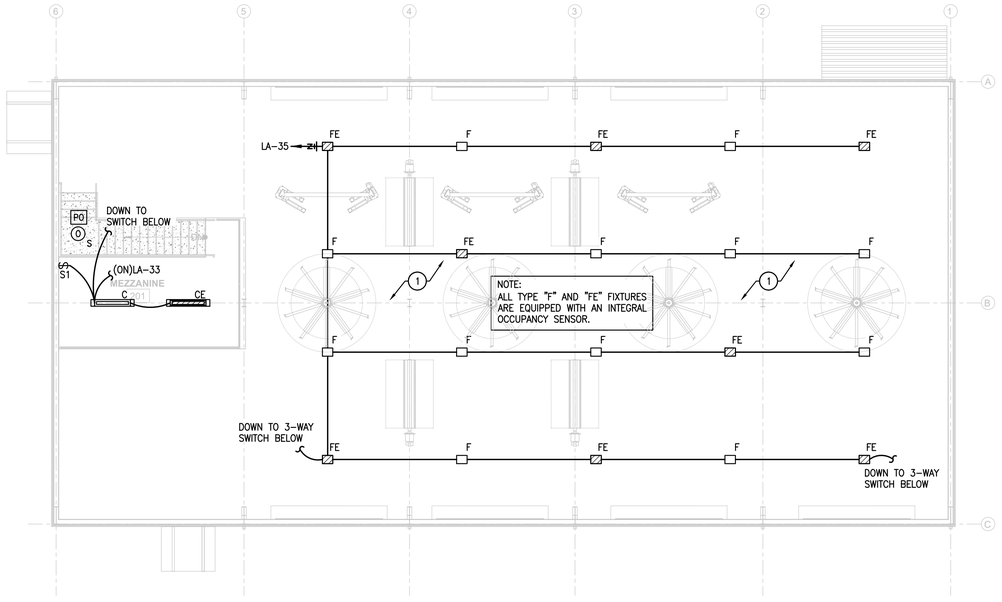
Schedule							
Label	QTY	Manufacturer	Catalog	Description	Lamp Output	LLF	Input Power
F	20	Lithonia Lighting	CPHB 12000LM SEF GCL MD 40K 80CRI	Compact Pro Highbay, 12000 lumens, Standard efficiency, Glare control lens, Medium distribution, 40 K, 80CRI,	12272	0.9	87.95

Statistics						
Description	Symbol	Avg	Max	Min	Max/Min	Avg/Min
Warehouse	+	51 fc	65 fc	21 fc	3.1:1	2.4:1
Mezzanine	+	3 fc	4 fc	2 fc	2.0:1	1.5:1



1 **ELECTRICAL PHOTOMETRIC PLAN**
SCALE: 1/8" = 1'-0"

TRUE NORTH PLAN NORTH



1 **ELECTRICAL LIGHTING PLAN - LEVEL 2**
SCALE: 1/8" = 1'-0"

TRUE NORTH PLAN NORTH

ELECTRICAL GENERAL NOTES:

(FOR DRAWING E-102)

1. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF ALL LIGHTING FIXTURES.
2. EACH CONDUIT SHALL BE LIMITED TO (3) CIRCUITS MAXIMUM.
3. ALL LIGHTING BRANCH CIRCUIT CONDUITS SHALL CONTAIN A GROUND WIRE. USING THE CONDUIT SYSTEM AS THE ONLY GROUND PATH IS NOT ACCEPTABLE.
4. ELECTRICIAN OF RECORD, & BONDED PER DIVISION 0-"CONTRACT" SPECIFICATIONS, AND BE FAMILIAR & EXPERIENCED WITH SUCH WORK INDICATED HEREIN, & QUALIFIED BY MOST RECENT OSHA CERTIFICATION TO WORK ON ENERGIZED EQUIPMENT. REFER TO & COMPLY WITH OSHA 29CFR.1910 & 1926 ELECTRICAL SAFETY PORTIONS. CONSTRUCTION METHOD AND MEANS AND THEIR REQUIREMENTS. CONTRACTOR SHALL PROVIDE WORK WITHIN STANDARD OF CARE FOR PROFESSION.
5. MOUNT ALL LIGHT SWITCHES AT +48" A.F.F. TO CENTER OF JBOX UNLESS OTHERWISE NOTED.
6. COORDINATE FINAL LOCATION OF ALL LIGHT SWITCHES WITH OWNER PRIOR TO ROUGH-IN. SWITCHES LOCATED SIDE BY SIDE SHALL BE GANGED UNDER COMMON COVERPLATE.
7. ALL EXIT SIGNS SHALL BE WIRED WITH A CONSTANT HOT AND CONNECTED TO 120V LIGHTING CIRCUIT SERVING SAME AREA UNLESS OTHERWISE NOTED.
8. REFER TO SHEET E-001 FOR LIGHT FIXTURE SCHEDULE.
9. ALL ELECTRICAL WORK INCLUDED IN THIS PROJECT SHALL MEET THE REQUIREMENTS OF THE 2023 NATIONAL ELECTRICAL CODE (N.E.C.).
10. LIGHTING CONTROL DESIGN INTENT IS TO COMPLY WITH THE 2021 IECC SECTION C405. CONTROL SYSTEM SHALL BE A CONTROL SYSTEM SIMILAR OR EQUAL TO ACUITY BRANDS nLIGHT SYSTEM.
11. INTERIOR LIGHTING GROUP/ZONES ARE REPRESENTED BY LOWER-CASE LETTER ADJACENT TO FIXTURES. E.G., "a", "b", "c", etc. TYPICAL FOR ALL INTERIOR LIGHTING GROUPS/ZONES.

ELECTRICAL KEYED NOTES:

(FOR DRAWING E-102)

1. FINAL LIGHTING ELEVATION AND PLACEMENT SHALL BE COORDINATED WITH LARGE SHOP FAN LOCATIONS TO AVOID OBSTRUCTIONS.

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WALLER COUNTY

JAIL GARAGE

200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

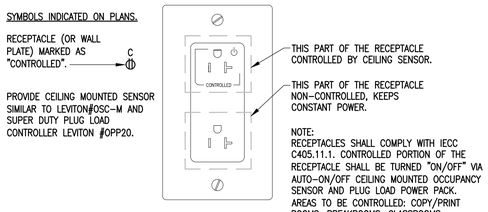
PROJECT NO.: .
DRAWN BY: GR QC: KO

ELECTRICAL LIGHTING PLAN - LEVEL 2

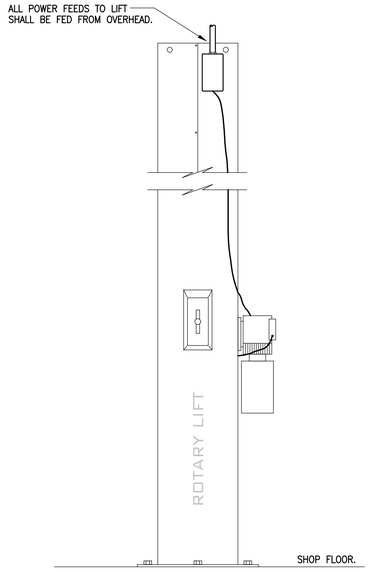
E-102

TEXAS BOARD OF PROFESSIONAL ENGINEERS
FIRM REGISTRATION #: F-9072
EXPIRES: 31 MARCH 2026

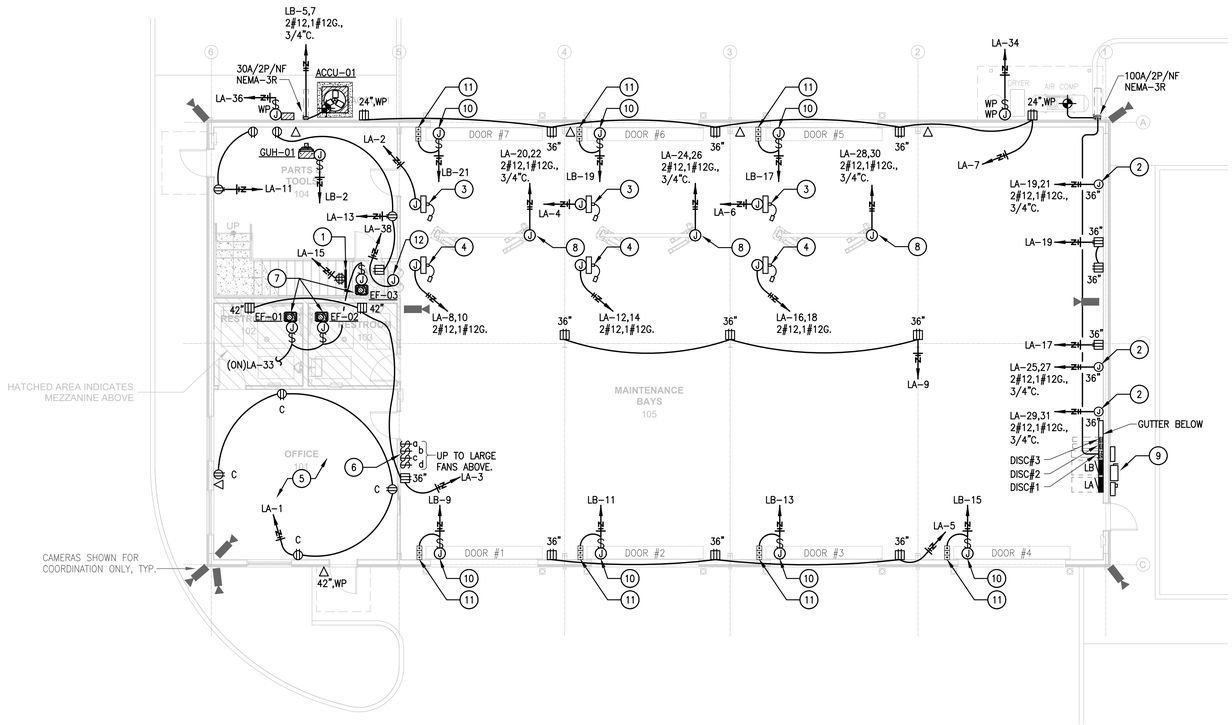
KO DESIGN MEP ENGINEERS
455 School St.
Suite 46
Tomball, Texas 77375
832.643.0368 phone
ko@kodesign-mep.com



2 **CONTROLLED RECEPTACLE DETAIL**
SCALE: NONE



3 **ROTARY LIFT COLUMN DETAIL**
SCALE: NONE



1 **ELECTRICAL POWER PLAN - LEVEL 1**
SCALE: 1/8" = 1'-0"

TRUE NORTH PLAN NORTH

ELECTRICAL GENERAL NOTES:

(FOR DRAWING E-201)

1. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF ALL ELECTRICAL OUTLETS.
2. EACH CONDUIT SHALL BE LIMITED TO (3) CIRCUITS MAXIMUM.
3. NO MORE THAN THREE SINGLE PHASE CIRCUITS AND NO MORE THAN SIX CURRENT CARRYING CONDUCTORS SHALL BE INSTALLED IN A SINGLE RACEWAY. WHEN FOUR, FIVE, OR SIX CURRENT CARRYING CONDUCTORS ARE INSTALLED IN A SINGLE RACEWAY, THEIR CURRENT CARRYING AMPACITIES SHALL BE DERATED AS REQUIRED BY THE NEC FOR NON-DIVERSIFIED LOADS. THE INSTALLED WIRE SIZE SHALL HAVE A NOMINAL AMPACITY RATING OF 125% OF THAT REQUIRED OR SPECIFIED WHEN FOUR OR MORE CURRENT CARRYING CONDUCTORS ARE INSTALLED IN A SINGLE RACEWAY. NEUTRAL CONDUCTORS SHALL BE CONSIDERED A CURRENT CARRYING CONDUCTOR IN ALL NON-LINEAR LOADED CIRCUITS AS REQUIRED BY THE (N.E.C).
4. VERIFY MOUNTING HEIGHTS OF RECEPTACLES WITH CASEWORK ELEVATIONS PRIOR TO ROUGH-IN. REFER TO ARCHITECTURAL DRAWINGS FOR ROOM ELEVATIONS FOR LOCATION AND COORDINATION OF ELECTRICAL OUTLETS. AT KNEESPACE LOCATIONS, LOCATE ELECTRICAL OUTLETS WITHIN KNEESPACE, UNLESS NOTED OTHERWISE. AT COUNTERS WITH OUT KNEESPACE, LOCATE OUTLETS HORIZONTALLY 6" ABOVE BACK SPLASH, UNLESS NOTED OTHERWISE.
5. ALL RECEPTACLE, AND EQUIPMENT BRANCH CIRCUIT CONDUITS SHALL CONTAIN A GROUND WIRE. USING THE CONDUIT SYSTEM AS THE ONLY GROUND PATH IS NOT ACCEPTABLE.
6. ELECTRICIAN OF RECORD, & BONDED PER DIVISION 0-"CONTRACT" SPECIFICATIONS, AND BE FAMILIAR & EXPERIENCED WITH SUCH WORK INDICATED HEREIN, & QUALIFIED BY MOST RECENT OSHA CERTIFICATION TO WORK ON ENERGIZED EQUIPMENT. REFER TO & COMPLY WITH OSHA 29CFR.1910 & 1926 ELECTRICAL SAFETY PORTIONS. CONSTRUCTION METHOD AND MEANS AND THEIR REQUIREMENTS. CONTRACTOR SHALL PROVIDE WORK WITHIN STANDARD OF CARE FOR PROFESSION.
7. MOUNT ALL RECEPTACLES/DATA-TELE OUTLETS +12" TO CENTER OF JBOX UNLESS OTHERWISE NOTED.
8. EXTEND 1"C. WITH JET LINE FROM TELE/DATA OUTLET BOX TO ABOVE ACCESSIBLE CEILING. CONDUIT SHALL HAVE A NYLON BUSHING.
9. ALL ELECTRICAL WORK INCLUDED IN THIS PROJECT SHALL MEET THE REQUIREMENTS OF THE 2023 NATIONAL ELECTRICAL CODE (N.E.C.).
10. REFER TO SHEET E0.1 FOR ELECTRICAL SYMBOL LEGEND.

ELECTRICAL KEYED NOTES:

(FOR DRAWING E-201)

1. PROVIDE 2' WIDE x 4' TALL x 3/4" THICK GRADE B/C PLYWOOD BACKBOARD FOR TELEPHONE BOARD.
2. 220 VOLT, COORDINATE WITH OWNER FOR EXACT REQUIREMENTS AND NEMA CONFIGURATION.
3. INDUSTRIAL CORD REEL MOUNTED FROM STRUCTURE ABOVE. SIMILAR TO (OR AS APPROVED BY OWNER) REELCRAFT #H-7121 WITH 45' CORD LENGTH, NEMA 5-15P OUTLET. COORDINATE CORD LOCK LENGTH AND EXACT LOCATION WITH OWNER. COORDINATE ALL ELECTRICAL REQUIREMENTS WITH OWNER PRIOR TO PURCHASING.
4. INDUSTRIAL CORD REEL MOUNTED FROM STRUCTURE ABOVE. SIMILAR TO (OR AS APPROVED BY OWNER) REELCRAFT #L 7000 WITH 45' CORD LENGTH. COORDINATE RECEPTACLE NEMA CONFIGURATION AND AMPERAGE WITH OWNER. COORDINATE CORD LOCK LENGTH AND EXACT LOCATION WITH OWNER. COORDINATE ALL ELECTRICAL REQUIREMENTS WITH OWNER PRIOR TO PURCHASING.
5. REFER TO DETAIL #2 THIS DRAWING FOR CONTROLLED RECEPTACLES.
6. SHOP FAN SWITCHES PROVIDED WITH FANS, ELECTRICAL CONTRACTOR TO INSTALL. COORDINATE EXACT LOCATION WITH OWNER PRIOR TO ROUGH-IN.
7. INTERLOCK EXHAUST FAN WITH OCCUPANCY SENSOR IN THIS ROOM. FAN TO BE ON SAME CIRCUIT AS LIGHTING CIRCUIT.
8. REFER TO DETAIL #3 THIS DRAWING FOR VEHICLE LIFT POWER FEED, COORDINATE WITH FINAL VEHICLE LIFT SUBMITTALS.
9. REFER TO DRAWING E-301 FOR ONE-LINE AND ADDITIONAL INFORMATION.
10. JBOX FOR OVERHEAD DOOR POWER.
11. UP-STOP-DOWN SWITCH PROVIDED WITH OVERHEAD DOOR.
12. DRINKING FOUNTAIN REMOTE CHILLER. COORDINATE WITH PLUMBING DRAWINGS.

COMPRESSOR COORDINATION NOTE:

EXACT SITE SPECIFIC POWER REQUIREMENTS FOR THE AIR COMPRESSOR WAS NOT PROVIDED TO THE ENGINEER OF RECORD; THEREFORE, IT SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO COORDINATE WITH OWNER PROVIDED EQUIPMENT PRIOR TO ORDERING ANY ELECTRICAL EQUIPMENT. IT ALSO SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO ALERT THE ENGINEER OF RECORD AND ARCHITECT OF ANY DISCREPANCIES FOUND WITHIN THE ELECTRICAL CONSTRUCTION DOCUMENTS VERSUS THE FINAL DELIVERED AIR COMPRESSOR SO A RESOLUTION CAN BE PROVIDED. A 30-15 HORSEPOWER AIR COMPRESSOR WAS DESIGNED AND CALCULATED FOR LOAD REQUIREMENTS, DISCONNECT SIZE, WIRE SIZE, AND CONDUIT SIZE.

SPECIALS SYSTEMS NOTE:

ALL ROUGH-INS REQUIRED FOR TECHNOLOGY, AUDIO-VISUAL, PUBLIC ADDRESS, SURVEILLANCE CAMERAS, AND SECURITY SHALL BE VERIFIED WITH THE OWNER AND OR HIS/HER LOW-VOLTAGE VENDOR. NO CABLING OR EQUIPMENT PROVISIONS HAVE BEEN SPECIFIED WITHIN THESE DRAWINGS OTHER THAN CONDUIT AND JUNCTION BOX INFRASTRUCTURE.

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200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

4/10/2025

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PROJECT NO.: .
DRAWN BY: GR QC: KO

ELECTRICAL POWER PLAN - LEVEL 1

E-201

ELECTRICAL GENERAL NOTES:

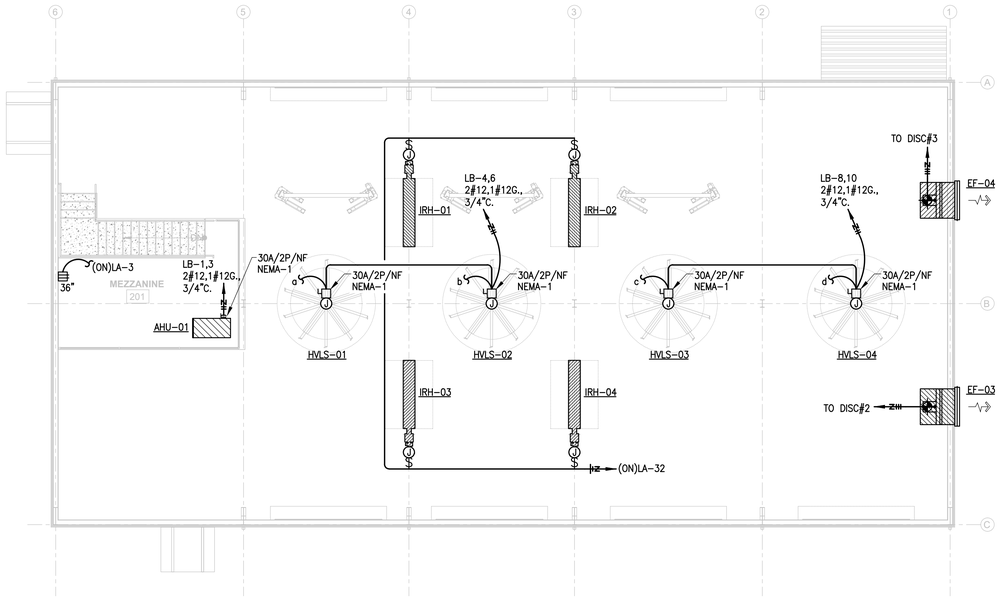
(FOR DRAWING E-202)

1. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION AND MOUNTING HEIGHTS OF ALL ELECTRICAL OUTLETS.
2. EACH CONDUIT SHALL BE LIMITED TO (3) CIRCUITS MAXIMUM.
3. NO MORE THAN THREE SINGLE PHASE CIRCUITS AND NO MORE THAN SIX CURRENT CARRYING CONDUCTORS SHALL BE INSTALLED IN A SINGLE RACEWAY. WHEN FOUR, FIVE, OR SIX CURRENT CARRYING CONDUCTORS ARE INSTALLED IN A SINGLE RACEWAY, THEIR CURRENT CARRYING AMPACITIES SHALL BE DERATED AS REQUIRED BY THE NEC FOR NON-DIVERSIFIED LOADS. THE INSTALLED WIRE SIZE SHALL HAVE A NOMINAL AMPACITY RATING OF 125% OF THAT REQUIRED OR SPECIFIED WHEN FOUR OR MORE CURRENT CARRYING CONDUCTORS ARE INSTALLED IN A SINGLE RACEWAY. NEUTRAL CONDUCTORS SHALL BE CONSIDERED A CURRENT CARRYING CONDUCTOR IN ALL NON-LINEAR LOADED CIRCUITS AS REQUIRED BY THE (N.E.C).
4. VERIFY MOUNTING HEIGHTS OF RECEPTACLES WITH CASEWORK ELEVATIONS PRIOR TO ROUGH-IN. REFER TO ARCHITECTURAL DRAWINGS FOR ROOM ELEVATIONS FOR LOCATION AND COORDINATION OF ELECTRICAL OUTLETS. AT KNEESPACE LOCATIONS, LOCATE ELECTRICAL OUTLETS WITHIN KNEESPACE, UNLESS NOTED OTHERWISE. AT COUNTERS WITH OUT KNEESPACE, LOCATE OUTLETS HORIZONTALLY 6" ABOVE BACK SPLASH, UNLESS NOTED OTHERWISE.
5. ALL RECEPTACLE, AND EQUIPMENT BRANCH CIRCUIT CONDUITS SHALL CONTAIN A GROUND WIRE. USING THE CONDUIT SYSTEM AS THE ONLY GROUND PATH IS NOT ACCEPTABLE.
6. ELECTRICIAN OF RECORD, & BONDED PER DIVISION 0-"CONTRACT" SPECIFICATIONS, AND BE FAMILIAR & EXPERIENCED WITH SUCH WORK INDICATED HEREIN, & QUALIFIED BY MOST RECENT OSHA CERTIFICATION TO WORK ON ENERGIZED EQUIPMENT. REFER TO & COMPLY WITH OSHA 29CFR.1910 & 1926 ELECTRICAL SAFETY PORTIONS. CONSTRUCTION METHOD AND MEANS AND THEIR REQUIREMENTS. CONTRACTOR SHALL PROVIDE WORK WITHIN STANDARD OF CARE FOR PROFESSION.
7. MOUNT ALL RECEPTACLES/DATA-TELE OUTLETS +12" TO CENTER OF JBOX UNLESS OTHERWISE NOTED.
8. EXTEND 1"C. WITH JET LINE FROM TELE/DATA OUTLET BOX TO ABOVE ACCESSIBLE CEILING. CONDUIT SHALL HAVE A NYLON BUSHING.
9. ALL ELECTRICAL WORK INCLUDED IN THIS PROJECT SHALL MEET THE REQUIREMENTS OF THE 2023 NATIONAL ELECTRICAL CODE (N.E.C.).
10. REFER TO SHEET E0.1 FOR ELECTRICAL SYMBOL LEGEND.

ELECTRICAL KEYED NOTES:

(FOR DRAWING E-202)

1. ....



1 **ELECTRICAL POWER PLAN - LEVEL 2**

SCALE: 1/8" = 1'-0"

TRUE NORTH

PLAN NORTH

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Tomball, Texas 77375
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WALLER COUNTY

JAIL GARAGE

200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

STATE OF TEXAS
JOHN ROBERT BUNT
85351
REGISTERED
PROFESSIONAL ENGINEER
4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

PROJECT NO.: .
DRAWN BY: GR QC: KO

ELECTRICAL POWER PLAN - LEVEL 2

E-202

PANEL LA

22,000 AIC Rating
Existing
X New

120/240 Volt,1-Phase,3-Wire, 1 Section, 1 -Nema Rating | X MCB MLO | 125 AMP MCB AMP BUS (Copper) ISO. GRND. BUS | X Single Double Feed - Thru | Mounting X Surface Flush

Notes	Load (VA)	Description	Type	Wire	CB	CKT #	PH	CKT #	CB	Wire	Type	Description	Load (VA)	Notes
	720	Rec's Office	R	12	20/1	1	A	2	20/1	12	R	Rec Drop Cord	180	
	720	Rec's RR's,Maint,Mez	R	12	20/1	3	C	4	20/1	12	R	Rec Drop Cord	180	
	540	Rec's Maint	R	12	20/1	5	A	6	20/1	12	R	Rec Drop Cord	180	
	900	Rec's Maint,Exterior	R	12	20/1	7	C	8	20/2	12	R	Rec Drop Cord	200	
	540	Rec's Maint Columns	R	12	20/1	9	A	10	-	-	R	- -	200	
	360	Rec's Parts/Tools	R	12	20/1	11	C	12	20/2	12	R	Rec Drop Cord	200	
	360	Rec's Parts/Tools	R	12	20/1	13	A	14	-	-	R	- -	200	
	360	Tele Term Board	R	12	20/1	15	C	16	20/2	12	R	Rec Drop Cord	200	
	500	Rec's Maint	R	12	20/1	17	A	18	-	-	R	- -	200	
	1000	Rec's Maint	R	12	20/1	19	C	20	20/2	12	M	Vehicle Lift	1248	
	1000	Rec Maint Equip	R	12	20/2	21	A	22	-	-	M	- -	1248	
	1000	- -	R	-	-	23	C	24	20/2	12	M	Vehicle Lift	1248	
	1000	Rec Maint Equip	R	12	20/2	25	A	26	-	-	M	- -	1248	
	1000	- -	R	-	-	27	C	28	20/2	12	M	Vehicle Lift	1248	
	1000	Rec Maint Equip	R	12	20/2	29	A	30	-	-	M	- -	1248	
	1000	- -	R	-	-	31	C	32	20/1	12	M	Radiant Htr Ctrls	400	
	600	Ltg Off,RR,Mezz,Tool,EFs	L	12	20/1	33	A	34	20/1	12	M	Compressor Dryer	696	
	1740	Ltg Highbays	L	12	20/1	35	C	36	20/1	12	WH	GWH-1	300	
	448	Ltg bldg Exterior	EL	12	20/1	37	A	38	20/1	12	M	EDF Remote Chiller	500	1
		Spare			20/1	39	C	40	20/1			Spare		
		Spare			20/1	41	A	42	20/1			Spare		
	14,788	Subtotal										Subtotal	11,124	

N.E.C.	Load Type	Conn.	Fct.	Diversity	N.E.C.		Conn.	Fct.	Diversity
220.44	(R) Recept.	13,740		11,870	220.12	(L) Lighting	2,340	125%	2,925
220.56	(K) Kitchen	0	100%	0		(EL) Ext. Ltg.	448	125%	560
220.60	(C) Cooling	0	0%	0	620.14	(E) Elevators	0	100%	0
220.60	(H) Heating	0	0%	0		(WH) Water Ht.	300	100%	300
220.14	(F) Fans	0	100%	0	220.50	(MT) Lrg. Mot.	0	125%	0
220.14	(M) Misc.	8,388	100%	8,388		(SP) Sub Panel	0	100%	0

Total Connected Load = 25,216 VA = 105.1 AMPS
Total Load (Diversified)= 24,043 VA = 100.2 AMPS

Location of Panel: Building Interior

NOTE:
1. GFCI BREAKER.

PANEL LB

22,000 AIC Rating
Existing
X New

120/240 Volt,1-Phase,3-Wire, 1 Section, 1 -Nema Rating | X MCB MLO | 125 AMP MCB AMP BUS (Copper) ISO. GRND. BUS | X Single Double Feed - Thru | Mounting X Surface Flush

Notes	Load (VA)	Description	Type	Wire	CB	CKT #	PH	CKT #	CB	Wire	Type	Description	Load (VA)	Notes
	1272	AHU-01	H	12	15/2	1	A	2	20/1	12	M	GHU-01 Controls	100	
	1272	- -	H	-	-	3	C	4	20/2	12	F	HVLS-01,02	1870	
	2016	ACCU-01	C	12	20/2	5	A	6	-	-	F	- -	1870	
	2016	- -	C	-	-	7	C	8	20/2	12	F	HVLS-03,04	1870	
	1000	Overhead Door #1	M	12	20/1	9	A	10	-	-	F	- -	1870	
	1000	Overhead Door #2	M	12	20/1	11	C	12	20/1			Spare		
	1000	Overhead Door #3	M	12	20/1	13	A	14	20/1			Spare		
	1000	Overhead Door #4	M	12	20/1	15	C	16	20/1			Spare		
	1000	Overhead Door #5	M	12	20/1	17	A	18	20/1			Spare		
	1000	Overhead Door #6	M	12	20/1	19	C	20	20/1			Spare		
	1000	Overhead Door #7	M	12	20/1	21	A	22	20/1			Spare		
		Prepared Space				23	C	24				Prepared Space		
		Prepared Space				25	A	26				Prepared Space		
		Prepared Space				27	C	28				Prepared Space		
		Prepared Space				29	A	30				Prepared Space		
		Prepared Space				31	C	32				Prepared Space		
		Prepared Space				33	A	34				Prepared Space		
		Prepared Space				35	C	36				Prepared Space		
		Prepared Space				37	A	38				Prepared Space		
		Prepared Space				39	C	40				Prepared Space		
		Prepared Space				41	A	42				Prepared Space		
	13,576	Subtotal										Subtotal	7,580	

N.E.C.	Load Type	Conn.	Fct.	Diversity	N.E.C.		Conn.	Fct.	Diversity
220.44	(R) Recept.	0		0	220.12	(L) Lighting	0	125%	0
220.56	(K) Kitchen	0	100%	0		(EL) Ext. Ltg.	0	125%	0
220.60	(C) Cooling	4,032	100%	4,032	620.14	(E) Elevators	0	100%	0
220.60	(H) Heating	2,544	0%	0		(WH) Water Ht.	0	100%	0
220.14	(F) Fans	7,480	100%	7,480	220.50	(MT) Lrg. Mot.	0	125%	0
220.14	(M) Misc.	7,100	100%	7,100		(SP) Sub Panel	0	100%	0

Total Connected Load = 21,156 VA = 88.2 AMPS
Total Load (Diversified)= 18,612 VA = 77.6 AMPS

Location of Panel: Building Interior

ELECTRICAL RISER/SERVICE NOTES

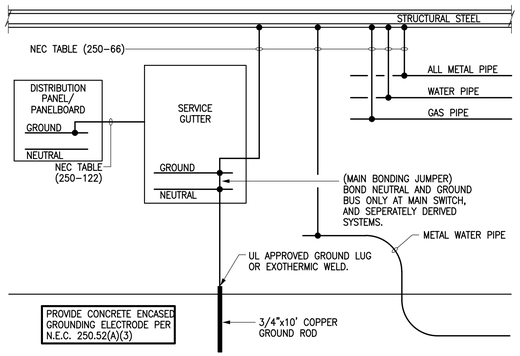
1. THE CONTRACTOR SHALL MAKE EVERY FEASIBLE EFFORT TO INSTALL THE REPRESENTED ELECTRICAL SERVICE DESIGN IN AS LITTLE SPACE AS POSSIBLE.
2. IT SHALL NOT BE ACCEPTABLE TO ALTER OR DEVIATE FROM THE ELECTRICAL RISER DESIGN REPRESENTED. ANY ALTERATIONS OR DESIGN DEVIATIONS SHALL BE SUBMITTED TO AND APPROVED BY KO MEP ENGINEERING PRIOR TO ANY ROUGH-IN OR EQUIPMENT PURCHASES.
3. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO ENSURE THAT THE ELECTRICAL INSTALLATION, EQUIPMENT, DEVICES, CONDUIT, ENCLOSURES, METERS, ETC., ARE IN ACCORDANCE WITH THE LOCAL UTILITY REQUIREMENTS AND THE LOCAL AHJ REQUIREMENTS.

DESIGNATION RANGE (ID)	GROUNDING ELECTRODE CONDUCTOR CU WIRE SIZE FOR: GROUND ROD	CONCRETE-ENCASED ELECTRODE	STRUCTURAL STEEL AND METAL WATER PIPING (IF ANY)
20G-100G	#8	#8	#8
125G-150G	#6	#6	#6
175G-200G	#6	#4	#4
225G-300G	#6	#4	#2
350G-500G	#6	#4	#1/0
600G-800G	#6	#4	#2/0
1000G+	#6	#4	#3/0

NOTES:
1. DESIGNATIONS REFER TO AMPERAGE FOLLOWED BY A "G." FOR EXAMPLE, 30G WOULD FALL WITHIN THE 20G-100G RANGE.
2. CONDUCTOR CONNECTED TO FIRST ELECTRODE IN SYSTEM SHALL BE SIZED ACCORDING TO THE GROUNDING ELECTRODE REQUIRING THE LARGEST CONDUCTOR. ONLY AVAILABLE GROUNDING ELECTRODES IN SYSTEM SHALL BE CONSIDERED. ALL BONDING BETWEEN REMAINING ELECTRODES SHALL BE SIZED ACCORDING TO VALUE LISTED IN TABLE.
3. GROUNDING ELECTRODE SYSTEMS SHALL CONSIST OF ALL AVAILABLE GROUNDING ELECTRODES.
4. THIS TABLE IS BASED ON ARTICLE 250.66 OF THE NEC.

ELECTRICAL LOAD ANALYSIS

LOAD DESCRIPTION 120/240V., 3ø - 4W GUTTER	LOAD KVA	LOAD (FULL LOAD AMPS) Aø	Bø	Cø	N
LIGHTING CONNECTED LOAD = 2.3 KVA AT 1.25% = 2.9	2.9	12.0	–	12.0	12.0
RECEPTACLES - FIRST 10 KW OF 13.7 KVA AT 100% = 10.0 REMAINDER - 3.7 KVA AT 50% (N.E.C. 220-44) = 1.8	11.8	49.1	–	49.1	49.1
HVAC: AIR HANDLING UNITS AT 100% = 2.5 KVA (HEATING)	–	–	–	–	–
CONDENSING UNITS AT 100% = 4.0 KVA (COOLING *GREATER*)	4.0	16.7	–	16.7	–
1ø FANS AT 100% =	0.7	2.9	–	2.9	2.9
3ø FANS AT 100% =	2.8	11.7	11.7	11.7	–
VEHICLE LIFTS AT 7.4 KVA AT 50% =	3.7	15.4	–	15.4	–
OVERHEAD DOORS 7.0 KVA AT 50% =	3.5	14.5	–	14.5	–
PLUMBING EQUIPMENT AT 100% =	0.3	1.3	–	1.3	1.3
25% LARGEST MOTOR (AIR COMPRESSOR 15HP 3ø 101.2 KVA) (N.E.C. 430-24) =	25.3	60.9	60.9	60.9	–
MISCELLANEOUS 240V 1ø VOLT EQUIPMENT AT 100% =	6.0	25.0	–	25.0	–
MISCELLANEOUS 120V AT 100% =	2.0	8.3	–	8.3	8.3
TOTAL ESTIMATED CONNECTED LOAD =	–	217.8	72.6	217.8	73.6
SERVICE PROVIDED		310.0	200.0	310.0	200.0



2 **SERVICE GROUNDING DETAIL**
SCALE: NONE

SHORT CIRCUIT CALCULATIONS

Equipment Name	Feeder Length (ft)	Parallel Sets	Conduit	Wire Type	Wire Size	KVA	L-L Voltage	%Z	C-Value	Load Served (A)	Upstream I[SCA]	f-Value	Multiplier (M)	Calculated Values (A)
Utility Transformer*						100	240	1.4		416.7			71.429	29762
Meter Can	73	2	Non-Mag	Copper	#350kcmil		240		22737		29762	0.345	0.744	22131
Main Disconnect	6	2	Steel	Copper	#350kcmil		240		19704		22131	0.024	0.976	21606
Gutter	6	2	Steel	Copper	#350kcmil		240		19704		21606	0.024	0.977	21105
Panel LA	4	1	Steel	Copper	#1		240		7293		21105	0.084	0.923	19478
Panel LB	4	1	Steel	Copper	#1		240		7293		21105	0.084	0.923	19478
Disc#1	4	1	Steel	Copper	#4		240		3806		21105	0.160	0.862	18193
Disc#2	4	1	Steel	Copper	#12		240		617		21105	0.987	0.503	10619
Disc#3	4	1	Steel	Copper	#12		240		617		21105	0.987	0.503	10619

*=Assumed Value

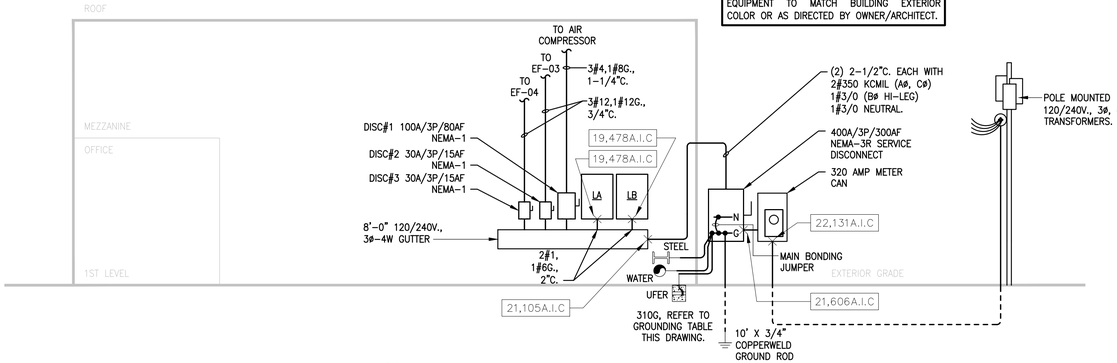
SHORT CIRCUIT FAULT CURRENT NOTE:

THE SHORT CIRCUIT FAULT CALCULATIONS ARE BASED ON ASSUMED POWER COMPANY TRANSFORMER SIZE AND AVAILABLE FAULT CURRENT VALUE. ELECTRICAL FEEDER LENGTHS ARE CALCULATED BASED ON UTILIZING THE SHORTEST DISTANCE BETWEEN ELECTRICAL PANELS, DISCONNECTS, GUTTERS, AND TRANSFORMERS. THE CALCULATIONS ARE STRICTLY REPRESENTED TO DEMONSTRATE A MINIMUM EXPECTATION OF A.I.C. RATINGS FOR EACH PIECE OF ELECTRICAL GEAR. DUE TO MANY UNFORESEEN CONSTRUCTION LIMITATIONS OR OBSTRUCTIONS WITH OTHER TRADES, BUILDING METHODS, AND STRUCTURE, EXACT FEEDER LENGTHS MAY BE INSTALLED WITH SHORTER OR LONGER DISTANCES. IT SHALL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR TO SUBMIT FEEDER LENGTHS TO THE ELECTRICAL GEAR MANUFACTURER/SUPPLIER (SQUARE D, GE, SIEMENS, ETC.) TO CONFIRM A.I.C. RATINGS PRIOR TO SUBMITTAL REVIEW TO PRESENT TO THE ENGINEER OF RECORD ANY DISCREPANCIES BETWEEN THE ASSUMED A.I.C. RATINGS VERSUS THE INTENDED CONSTRUCTION INSTALLATION.

WARNING LABELS:

CONTRACTOR TO PROVIDE WARNING LABELS ON ALL SERVICE DISCONNECTS, METER SOCKETS, PANELS, AND TRANSFORMERS MEETING THE MINIMUM REQUIREMENTS OF NFPA 70E PPE REQUIREMENTS STATING: ! WARNING ARC FLASH HAZARD APPROPRIATE PPE REQUIRED.

ALL EXTERIOR EQUIPMENT SHALL BE IN NEMA-3R ENCLOSURES. PAINT ALL EXTERIOR EQUIPMENT TO MATCH BUILDING EXTERIOR COLOR OR AS DIRECTED BY OWNER/ARCHITECT.



1 **ELECTRICAL ONE-LINE DIAGRAM**
SCALE: NONE

TEXAS BOARD OF PROFESSIONAL ENGINEERS
FIRM REGISTRATION #: F-9072
EXPIRES: 31 MARCH 2026

KO DESIGN MEP ENGINEERS
455 School St.
Suite 46
Tomball, Texas 77375
832.643.0368 phone
ko@kodesign-mep.com

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WALLER COUNTY

JAIL GARAGE

200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

STATE OF TEXAS
JOHN ROBERT BUNT
85353
REGISTERED
PROFESSIONAL ENGINEER
4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

PROJECT NO.: .
DRAWN BY: GR QC: KO

ELECTRICAL
ONE-LINE & LOAD
ANALYSIS

E-301

NOTE:
WHITE PLASTIC NAMEPLATE WITH ENGRAVED BLACK LETTERING FOR ELECTRICAL EQUIPMENT. SECURELY ATTACH NAMEPLATE TO EQUIPMENT USING SCREWS. THE USE OF "STICK-ON" NAMEPLATES SHALL NOT BE PERMITTED.

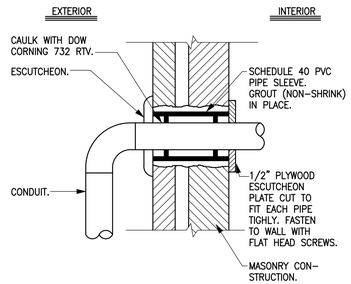
PANEL LA
120/240 VOLT, 1ø-3W
FED FROM MAIN DISCONNECT

(TYPICAL PANEL LABEL)

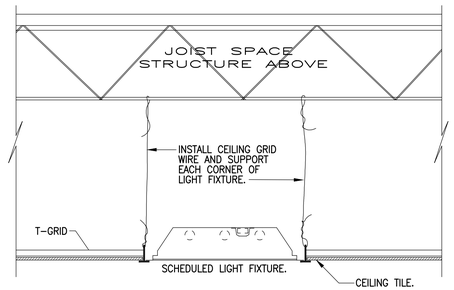
120/240 VOLT
FED FROM PANEL LA
FEEDS WATER HEATER

(TYPICAL DISCONNECT LABEL)

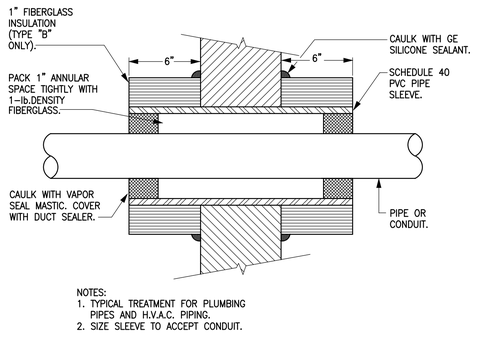
3 EQUIPMENT LABELING - DETAIL
SCALE: NONE



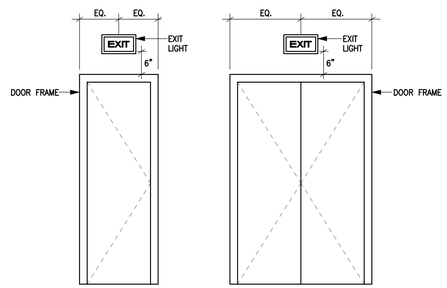
5 CONDUIT ENTRY THRU EXTERIOR WALL - DETAIL
SCALE: NONE



2 LIGHT FIXTURE MOUNTING DETAIL
SCALE: NONE



4 CONDUIT SEALANT THRU EXTERIOR WALLS - DETAIL
SCALE: NONE



1 TYPICAL EXIT SIGN LOCATION - DETAIL
SCALE: NONE

TEXAS BOARD OF PROFESSIONAL ENGINEERS
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455 School St.
Suite 46
Tomball, Texas 77375
832.643.0368 phone
ko@kodesign-mep.com

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STATE OF TEXAS
JOHN ROBERT BUNT
85353
REGISTERED
PROFESSIONAL ENGINEER
4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

PROJECT NO.: .
DRAWN BY: GR QC: KO

ELECTRICAL DETAILS

E-401

ELECTRICAL SPECIFICATIONS:

PART 1 – GENERAL

1.01 SCOPE OF WORK:
FURNISH AND INSTALL ALL MATERIALS AND EQUIPMENT AND PROVIDE ALL LABOR, TOOLS, TRANSPORTATION, SUPERINTENDENCE AND SERVICES REQUIRED AND NECESSARY TO COMPLETE THE WORK SHOWN ON THE DRAWINGS AND/OR SPECIFIED HEREIN.

ALSO INCLUDED WILL BE ALL OTHER WORK AND MISCELLANEOUS ITEMS, NOT SPECIFICALLY MENTIONED, BUT REASONABLY INFERRED FOR A COMPLETE INSTALLATION INCLUDING ALL ACCESSORIES AND APPURTENANCES REQUIRED FOR TESTING THE SYSTEM. IT IS THE INTENT OF THE DRAWINGS AND SPECIFICATIONS THAT ALL SYSTEMS BE COMPLETE AND READY FOR OPERATION.

1.02 REGULATORY REQUIREMENTS:
ALL WORK AND MATERIALS SHALL COMPLY WITH THE LATEST RULES, CODES AND REGULATIONS, INCLUDING, BUT NOT LIMITED TO THE FOLLOWING:

A. 2021 INTERNATIONAL BUILDING CODE
B. 2021 INTERNATIONAL FIRE CODE
C. 2021 INTERNATIONAL PLUMBING CODE
D. 2021 INTERNATIONAL FUEL GAS CODE
E. 2021 INTERNATIONAL MECHANICAL CODE
F. 2021 INTERNATIONAL ENERGY CONSERVATION CODE
G. 2023 NATIONAL ELECTRIC CODE
H. LOCAL CODE ORDINANCES AND AMENDMENTS
I. NATIONAL ELECTRICAL MANUFACTURER ASSOCIATION (NEMA)
J. AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)
K. NATIONAL ELECTRICAL SAFETY CODE (NESC)
L. INSTITUTE OF ELECTRICAL AND ELECTRONIC ENGINEERS (IEEE)
M. UNDERWRITERS' LABORATORIES (UL)
N. AMERICAN NATIONAL STANDARDS INSTITUTE (ANSI)
O. NATIONAL FIRE PROTECTION ASSOCIATION (NFPA)
P. OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION (OSHA)
Q. AMERICANS WITH DISABILITIES ACT (ADA)
R. APPLICABLE UTILITY COMPANIES

1.03 LICENSE, FEES AND PERMITS:
ELECTRICAL CONTRACTOR SHALL PAY FOR ALL LICENSES, PERMITS AND INSPECTION FEES REQUIRED BY THE AUTHORITY HAVING JURISDICTION AND SHALL ARRANGE FOR ALL REQUIRED INSPECTIONS.

1.04 SAFETY AND INDEMNITY:
THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS OF THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING PERFORMANCE OF WORK. THIS REQUIREMENT WILL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.

NO ACT, SERVICE, DRAWING REVIEW OR CONSTRUCTION REVIEW BY THE OWNER, THE ENGINEERS OR THEIR CONSULTANTS, IS INTENDED TO INCLUDE REVIEW OF THE ADEQUACY OF THE CONTRACTOR'S SAFETY MEASURES, IN, ON, OR NEAR THE CONSTRUCTION SITE.

1.05 DRAWINGS AND SPECIFICATIONS:
ALL DRAWINGS AND SPECIFICATIONS SHALL BE CONSIDERED AS A WHOLE AND WORK OF THIS DIVISION SHOWN ANYWHERE THEREIN SHALL BE FURNISHED UNDER THIS DIVISION.

DRAWINGS ARE DIAGRAMMATIC AND INDICATE THE GENERAL ARRANGEMENT OF EQUIPMENT AND WIRING. MOST DIRECT ROUTING OF CONDUITS AND WIRING IS NOT ASSURED. EXACT REQUIREMENTS SHALL BE GOVERNED BY CONDITIONS OF THE JOB. CONSULT ALL OTHER DRAWINGS IN PREPARATION OF THE BID. EXTRA LENGTHS OF WIRING OR ADDITION OF PULL OR JUNCTION BOXES, ETC. NECESSITATED BY SUCH CONDITIONS SHALL BE INCLUDED.

1.06 CONDITIONS AT SITE:
THE ELECTRICAL CONTRACTOR SHALL HAVE EXAMINED THE SITE AND FAMILIARIZED THEMSELVES WITH ALL DISCERNIBLE EXISTING CONDITIONS. NO EXTRA PAYMENT WILL BE ALLOWED FOR WORK REQUIRED BECAUSE OF THESE CONDITIONS, WHETHER SPECIFICALLY MENTIONED OR NOT.

1.07 WORKMANSHIP AND CONTRACTOR'S QUALIFICATIONS:
ONLY QUALITY WORKMANSHIP WILL BE ACCEPTED. HAPHAZARD OR POOR INSTALLATION WILL BE CAUSE FOR REJECTION OF WORK. THE CONTRACTOR SHALL BE LICENSED IN THE STATE IN WHICH THE JOB IS LOCATED.

1.08 SHOP DRAWINGS AND MATERIALS LIST:
SUBMIT TO OWNER IN A SINGLE PACKAGE SIX (6) COPIES OF COMPLETE SHOP DRAWINGS AND MATERIALS LIST, AS NOTED BELOW, FOR REVIEW WITHIN FIFTEEN (15) DAYS AFTER AWARD OF CONTRACT. SUBMITTALS REQUIRED AS FOLLOWS:

A. WIRING DEVICES: SWITCHES, RECEPTACLES, DEVICE PLATES.
B. ENCLOSURES FOR UTILITY COMPANY METERING.
C. MAIN FUSED DISCONNECT SWITCH OR ENCLOSED CIRCUIT BREAKER.
D. PANELBOARDS.
E. DISCONNECT SWITCHES.
F. LIGHTING FIXTURES, AND LIGHTING CONTROL EQUIPMENT.

1.09 SUBSTITUTIONS:

ONE OR MORE MAKES OF MATERIALS OR METHODS MAY HAVE BEEN SPECIFIED TO ESTABLISH THE STANDARD OF QUALITY, WORKMANSHIP, FINISH AND DESIGN REQUIRED, BUT OTHER MATERIALS OR METHODS EQUAL IN QUALITY, WORKMANSHIP, FINISH, DESIGN, AND GUARANTEED PERFORMANCE WILL BE ACCEPTED. HOWEVER, ALL CHANGES AND SUBSTITUTIONS SHALL BE REQUIRED IN LETTER FORM AND SHALL BE ACCOMPANIED WITH A STATEMENT OF THE AMOUNT OF MONEY TO BE RETURNED TO THE CONTRACT IF THE SUBSTITUTION IS PERMITTED.

NO WORK INVOLVING MATERIALS SUBMITTED FOR SUBSTITUTION SHALL PROCEED UNTIL WRITTEN ACCEPTANCE IS RECEIVED FROM THE OWNER. THE OWNER IS THE SOLE JUDGE OF ACCEPTABILITY OF PREFERRED SUBSTITUTIONS. IF A SUBSTITUTION ITEM IS PERMITTED, AND ANY RE-DESIGN EFFORT IS THEREBY NECESSITATED, THE REQUIRED RE-DESIGN SHALL BE AT THE CONTRACTOR'S EXPENSE.

1.10 COORDINATION:

COORDINATE WORK WITH OTHER TRADES TO AVOID CONFLICT AND TO PROVIDE CORRECT ROUGH-IN AND CONNECTION FOR EQUIPMENT FURNISHED UNDER OTHER TRADES THAT REQUIRE ELECTRICAL CONNECTIONS. INFORM CONTRACTORS OF OTHER TRADES OF THE REQUIRED ACCESS TO AND CLEARANCES AROUND ELECTRICAL EQUIPMENT TO MAINTAIN SERVICE ABILITY AND CODE COMPLIANCE.

VERIFY EQUIPMENT DIMENSIONS AND REQUIREMENTS WITH PROVISIONS SPECIFIED UNDER THIS SECTION. CHECK ACTUAL JOB CONDITIONS BEFORE FABRICATING WORK. REPORT NECESSARY CHANGES IN TIME TO PREVENT NEEDLESS WORK. CHANGES OR ADDITIONS, SUBJECT TO ADDITIONAL COMPENSATION, WHICH ARE MADE WITHOUT WRITTEN AUTHORIZATION AND IN AGREED PRICE, SHALL BE AT THE CONTRACTOR'S RISK AND EXPENSE.

1.11 ROUTINGS:

ALL CONDUIT ROUTINGS, INCLUDING MC CABLE, SHALL BE PARALLEL AND PERPENDICULAR TO THE BUILDING STRUCTURE AND LINES. CONDUITS SHALL BE CONCEALED WHERE POSSIBLE UNLESS NOTED OTHERWISE. AESTHETIC APPEARANCE IS VERY IMPORTANT FOR THE WORK OF THIS PROJECT – THE CONTRACTOR WILL BE REQUIRED TO REMOVE AND REPLACE WORK THAT IS NOT NEAT AND ACCURATE. UNDERGROUND ROUTINGS, IF ANY, BETWEEN BUILDINGS MAY TAKE MOST DIRECT ROUTE.

1.12 CUTTING AND PATCHING:

ALL CUTTING AND PATCHING REQUIRED FOR WORK OF THIS DIVISION IS INCLUDED HEREIN. COORDINATION WITH GENERAL CONTRACTOR AND OTHER TRADES IS IMPERATIVE. CONTRACTOR SHALL BEAR THE RESPONSIBILITY FOR AND THE ADDED EXPENSE OF ADJUSTING FOR IMPROPER HOLES, SUPPORTS, ETC.

1.13 ACCEPTANCE DEMONSTRATION:

UPON COMPLETION OF THE WORK, AT A TIME TO BE DESIGNATED BY THE OWNER, THE CONTRACTOR SHALL DEMONSTRATE FOR THE OWNER THE OPERATION OF THE ELECTRICAL INSTALLATION, INCLUDING ANY AND ALL SPECIAL ITEMS INSTALLED BY HIM/HER OR INSTALLED UNDER THEIR SUPERVISION.

1.14 RECORD DRAWINGS, EQUIPMENT DATA:

MAINTAIN ONE SET OF CLEAN WORKING DRAWINGS AT THE JOB SITE AND ENTER DAILY SUCH "AS-BUILTS" INFORMATION AS FEEDER AND SERVICE ROUTES, PULL BOX LOCATIONS AND CHANGES IN LAYOUT OR ARRANGEMENT WHICH OCCUR DURING CONSTRUCTION. DELIVER COMPLETED DRAWINGS TO THE OWNER.

DELIVER TO THE OWNER'S REPRESENTATIVE THREE COPIES OF DATA SHEETS OR OTHER CURRENT MANUFACTURERS' PUBLICATIONS FOR EACH ITEM OF ELECTRICAL EQUIPMENT FURNISHED FOR THE PROJECT INCLUDING AT LEAST THESE DATA:

A. TECHNICAL DESCRIPTION AND REPLACEABLE PARTS LIST.
B. PHYSICAL DESCRIPTION AND INSTALLATION INSTRUCTIONS.
C. USER'S MANUAL AND OPERATING INSTRUCTIONS.
D. MANUFACTURER'S WARRANTY.

1.15 CLEAN-UP:

RID THE PREMISES OF SCRAP MATERIALS, TRASH AND DEBRIS BOTH DURING CONSTRUCTION AND AT COMPLETION OF THE PROJECT. LEAVE THE BUILDING AND SURROUNDING AREA IN A CLEAN AND ORDERLY CONDITION.

1.16 TEMPORARY SERVICES:

PROVIDE ADEQUATE AND SAFE TEMPORARY ELECTRICAL POWER AND LIGHTING THROUGHOUT THE CONSTRUCTION AND FINISHING OF THE PREMISES FOR BENEFICIAL OCCUPANCY. IN ADDITION TO SPECIAL OR UNUSUAL REQUIREMENTS, PROVIDE AT LEAST THESE ITEMS:

A. SIX 20-AMP CIRCUITS FOR CONSTRUCTION POWER TOOLS. PROVIDE GFI TEMPORARY CIRCUITS WITH COVERPLATES TO MEET OSHA REQUIREMENTS.

B. FLOOD LIGHTING AND TASK LIGHTING FOR PAINTING AND OTHER FINISH WORK. WHEN PERMANENT ELECTRICAL SERVICE IS OPERABLE, DISCONNECT AND REMOVE FROM THE PREMISES THE MATERIALS AND EQUIPMENT USED FOR TEMPORARY POWER AND LIGHTING, AND RESTORE MODIFICATIONS AND REPAIR DAMAGE CAUSED BY THE INSTALLATION, USE OR REMOVAL OF TEMPORARY SERVICE PROVISIONS.

1.17 WARRANTY:

THE CONTRACTOR SHALL UNCONDITIONALLY WARRANT ALL WORK TO BE FREE OF DEFECTS IN MATERIAL AND WORKMANSHIP FOR A PERIOD OF ONE (1) YEAR FROM THE DATE OF FINAL ACCEPTANCE AND WILL REPAIR OR REPLACE ANY DEFECTIVE WORK PROMPTLY AND WITHOUT CHARGE AND RESTORE ANY OTHER EXISTING WORK DAMAGED IN THE COURSE OF REPAIRING DEFECTIVE MATERIALS AND WORKMANSHIP.

PART 2 – PRODUCTS

2.01 MATERIAL APPROVAL:

ALL MATERIALS MUST BE NEW AND BEAR UNDERWRITER'S LABORATORIES LABEL. MATERIALS THAT ARE NOT COVERED BY UL TESTING STANDARDS SHALL BE TESTED AND APPROVED BY AN INDEPENDENT TESTING LABORATORY OR A GOVERNMENTAL AGENCY.

MATERIAL NOT IN ACCORDANCE WITH THESE SPECIFICATIONS MAY BE REJECTED EITHER BEFORE OR AFTER INSTALLATION.

2.02 CONDUITS AND OTHER RACEWAYS:

A. RIGID STEEL: HOT-DIPPED GALVANIZED.

B. INTERMEDIATE METAL CONDUIT (IMC): HOT-DIPPED GALVANIZED.

C. ELECTRICAL METALLIC TUBING (EMT): ELECTRO-GALVANIZED.

D. WIREWAY: CODE GAUGE STEEL, WITH KNOCKOUTS AND HINGED COVER, CORROSION RESISTANT, GRAY BAKED ENAMEL FINISH.

E. PROVIDE FITTINGS AND ACCESSORIES APPROVED FOR THE PURPOSE EQUAL IN ALL RESPECTS TO THE CONDUIT OR RACEWAY. EMT CONNECTORS AND COUPLINGS SHALL BE STEEL SETSCREW TYPE INDOORS AND STEEL COMPRESSION TYPE IN WET LOCATIONS AND OUTDOORS.

2.03 WIRES AND CABLES:

A. FOR POWER AND LIGHTING SYSTEM 600V OR LESS:

1. CONDUCTOR: MINIMUM SIZE #12 AWG.

a. #12 AND #10 AWG SOLID COPPER.
b. #8 AWG AND LARGER SHALL BE STRANDED COPPER FOR BRANCH CIRCUITS.

2. INSULATION TYPE:

a. #12 TO #1 AWG: THWN FOR WET OR UNDERGROUND AND THHN FOR DRY LOCATIONS.
b. #1/0 THROUGH #4/0 AWG: XHHW (55 MILS).
c. #250 KCMIL AND LARGER: XHHW (65 MILS).
d. GROUNDING WIRE: TW.

B. FOR SIGNAL AND COMMUNICATIONS CIRCUIT:

1. CONDUCTORS FOR GENERAL USE SHALL BE STRANDED COPPER CONDUCTOR, #16 AWG MINIMUM, WITH THWN INSULATION FOR UNDERGROUND OR WET LOCATIONS AND THHN INSULATION FOR DRY LOCATIONS.

C. ACCEPTABLE PRODUCTS: GENERAL ELECTRIC, ANACONDA, OKONITE, PARANITE OR TRIANGLE PRODUCTS CONFORMING OR EXCEEDING APPLICABLE IPCEA STANDARDS.

2.04 OUTLET BOXES, JUNCTION AND PULL BOXES:

A. OUTLET BOXES: 4" SQUARE X 1-1/2" DEEP (OR LARGER) GALVANIZED SHEET STEEL KO-TYPE WITH PLASTER RING AND COVER FOR GENERAL INTERIOR USE AND CAST METAL TYPE FS OR FD WITH MATCHING SCREW COVERS FOR EXTERIOR AND EXPOSED INTERIOR LOCATIONS (GASKETED IN DAMP OR WET LOCATIONS).

B. JUNCTION BOXES SHALL BE SAME AS OUTLET BOXES UP TO 42 CU. IN. AND CODE-GAUGE STEEL IN LARGER SIZES WITH SURFACE OR FLUSH-TYPE SCREW-MOUNTED TRIM COVERS, BOTH BOXES AND COVERS INHIBITOR-PRIMED AND PAINTED INSIDE OUT.

C. PULL BOXES SHALL BE SAME AS JUNCTION BOXES UNLESS INDICATED OTHERWISE ON THE DRAWINGS, WITH COVERS.

D. TELEDATA OUTLET BOXES SHALL BE THE TYPE AND SIZE REQUIRED BY THE SERVING TELEDATA COMPANY BUT NOT SMALLER THAN 4-11/16" SQUARE X 2-1/8" DEEP WITH SINGLE-GANG RING AND FACE PLATE AS DICTATED BY TELEDATA COMPANY.

E. ALL BOXES AND ASSOCIATED COMPONENTS SHALL BE STEEL CITY 663 SERIES, WITH P60-3B COVERPLATE OR EQUAL.

2.05 WIRING DEVICES AND PLATES SHALL BE HUBBELL, ARROW HART, LEVITON, GE OR P&S WITH HUBBELL NUMBERS USED TO SPECIFY TYPE USED.

A. STANDARD DESIGN:

1. SWITCH AND RECEPTACLE DEVICES SHALL BE APPROVED BY ARCHITECT/ONWER.

2. WALL PLATES SHALL BE APPROVED BY ARCHITECT/OWNER.

3. SWITCHES SHALL BE 20 AMP, 120/277 VOLT A.C. RATED: SINGLE POLE SWITCHES SHALL BE #1221, 3-WAY SWITCHES SHALL BE #1223 (HUBBELL NUMBERS).

4. RECEPTACLES SHALL BE GROUNDING TYPE #5362 (HUBBELL NUMBER).

2.06 CONDUIT HANGERS:

FOR INDIVIDUAL CONDUIT RUNS NOT DIRECTLY FASTENED TO THE STRUCTURE, USE ROD HANGERS MANUFACTURED BY CADDY, UNISTRUT, OR POWERSTRUT. FOR MULTIPLE CONDUIT RUNS, USE UNISTRUT OR POWERSTRUT TRAPEZE TYPE CONDUIT SUPPORT DESIGNED FOR MAXIMUM DEFLECTION NOT GREATER THAN 1/8".

2.07 WIRE CONNECTORS:

FOR WIRE SIZES #8 AWG AND SMALLER: INSULATED PRESSURE TYPE (WITH LIVE SPRING) RATED 105 DEGREES C., 600V. FOR BUILDING WIRING AND 1000V IN SIGNS OR FIXTURES: SCOTCHLOK OR IDEAL. FOR WIRE SIZE #6 AWG AND LARGER: T & B OR EQUIVALENT COMPRESSION TYPE WITH 3M #33+ OR PLYMOUTH "SLIPKNOT GRAY" TAPE INSULATION.

2.08 PANELBOARDS:

A. CONSTRUCTION: CABINETS SHALL BE OF CODE GAUGE, GALVANIZED STEEL, SURFACE OR FLUSH MOUNTED AS INDICATED. DOORS SHALL BE OF COLD-ROLLED STEEL WITH CONCEALED HINGES AND FLUSH CATCH AND LOCK. ALL PANELS SHALL BE KEYED ALIKE. PANELS LOCATED ADJACENT TO EACH OTHER SHALL HAVE IDENTICALLY SIZED ENCLOSURE AND TRIMS. MINIMUM PANEL WIDTH SHALL BE 20". FINISH EXPOSED PART WITH ONE COAT OF PRIMER AND ONE COAT OF LIGHT GRAY ENAMEL SUITABLE FOR OVERPAINTING IN FIELD IF DESIRED.

B. BUS BARS: PROVIDE GROUND BLOCK WITH FULL COMPLEMENT OF TERMINALS IN ADDITION TO INSULATED NEUTRAL BUS. FUTURE BREAKER SPACES SHALL HAVE COMPLETE PROVISION INCLUDING BUSSES AND CONNECTING HARDWARE.

C. MANUFACTURERS: PANELBOARDS SHALL BE GENERAL ELECTRIC, SQUARE D, EATON, OR SIEMENS-ITE.

D. CIRCUIT BREAKERS: SHALL BE QUICK-MAKE, QUICK-BREAK, MOLDED CASE TYPE:

1. 120/208-240 VOLT PANELS: SHALL BE BOLT-ON TYPE WITH MINIMUM SYMMETRICAL INTERRUPTING CAPACITY AS SHOWN ON THE PLANS.

2. ALL BREAKERS MUST BE FULLY RATED. SERIES RATING NOT ALLOWED.

3. PROVIDE MULTI-POLE UNITS WITH COMMON TRIP ELEMENT.

E. IDENTIFICATION: PROVIDE SCREWED-ON (NO ADHESIVES) BAKELITE OR PHOTO-ETCHED METALLIC NAMEPLATE IDENTIFICATION ON OUTSIDE OF EACH PANEL SHOWING PANEL DESIGNATION, VOLTAGE, AND PHASE IN MINIMUM 1/4" HIGH LETTERS. EACH PANEL SHALL CONTAIN A METAL-FRAMED CIRCUIT DIRECTORY INSIDE COVER, WITH PLASTIC PROTECTOR.

F. COMPLETE SHOP DRAWINGS ARE REQUIRED. SEE ARTICLE 1.08.

2.09 MISCELLANEOUS MATERIALS:

A. SAFETY SWITCHES: HEAVY DUTY TYPE, 600V, HORSEPOWER RATED FOR MOTORS, FUSED OR NON-FUSED AS REQUIRED. MOUNT IN ENCLOSURE WITH NEMA RATING AS REQUIRED FOR THE SPECIFIC APPLICATION. GENERAL ELECTRIC, SQUARE D, EATON OR SIEMENS-ITS.

2.10 LIGHTING:

A. LIGHTING TO BE PROVIDED BY THE ELECTRICAL CONTRACTOR AS INDICATED ON THE DRAWINGS. SUBCONTRACTORS TO INSTALL ALL FIXTURES COMPLETE, INCLUDING LAMPS AND BALLASTS, READY FOR SERVICE.

B. SUPPORTS: PROPER SUPPORTS AND MOUNTING ACCESSORIES, SUCH AS HANGERS, STEMS, YOKES, PLASTER FRAMES, ETC. SHALL BE PROVIDED AS REQUIRED BY THE TYPE OF CEILING INSTALLED. FIXTURES SHALL HANG PLUMB REGARDLESS OF CEILING SLOPE.

C. FIXTURE DESIGNATION: FIXTURE TYPES ARE DESIGNATED ON DRAWINGS. FOR EXACT FIXTURE COUNT AND LOCATION, REFER TO REFLECTED CEILING PLAN.

PART 3 – EXECUTION

3.01 GENERAL:

A. ELECTRIC SYSTEM LAYOUTS INDICATED ON THE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND SHALL BE FOLLOWED AS CLOSELY AS ACTUAL CONSTRUCTION AND WORK OF OTHER TRADES WILL PERMIT. GOVERN EXACT ROUTING OF CABLE AND WIRING AND THE LOCATIONS OF OUTLETS BY THE STRUCTURE AND EQUIPMENT SERVED. TAKE ALL DIMENSIONS FROM ARCHITECTURAL DRAWINGS.

B. CONSULT ALL OTHER DRAWINGS, VERIFY SCALES AND REPORT ANY DIMENSIONAL DISCREPANCIES OR OTHER CONFLICTS WITH THE ARCHITECT BEFORE SUBMITTING BID.

C. ALL HOME RUNS TO PANELBOARDS ARE INDICATED AS STARTING FROM THE OUTLET NEAREST THE PANEL AND CONTINUING IN THE GENERAL DIRECTION OF THAT PANEL. CONTINUE SUCH CIRCUITS TO THE PANEL AS THOUGH THE ROUTES WERE COMPLETELY INDICATED. TERMINATE HOMERUNS OF SIGNAL, ALARM, AND COMMUNICATION SYSTEMS IN A SIMILAR MANNER.

D. AVOID CUTTING AND BORING HOLES THROUGH STRUCTURE OR STRUCTURAL MEMBERS WHEREVER POSSIBLE. OBTAIN PRIOR APPROVAL OF OWNER AND CONFORM TO ALL STRUCTURAL REQUIREMENTS WHEN CUTTING OR BORING THE STRUCTURE IS NECESSARY AND PERMITTED.

E. FURNISH AND INSTALL ALL NECESSARY HARDWARE, HANGERS, BLOCKING, BRACKETS, BRACING, RUNNERS, ETC. REQUIRED FOR EQUIPMENT SPECIFIED UNDER THIS SECTION.

F. PROVIDE NECESSARY BACKING REQUIRED TO INSURE RIGID MOUNTING OF OUTLET BOXES.

3.02 WIRING METHODS:

A. NO "ROMEX" OR ARMORED CABLE WIRING IS PERMITTED – ALL ELECTRICAL WIRING MUST BE IN CONDUIT.

B. CONDUIT SHALL BE RIGID STEEL, IMC, EMT, METAL CLAD (MC) CABLE, OR SCHEDULE 40 PVC AS FOLLOWS:

1. ABOVE GROUND: USE RIGID STEEL, IMC, MC, OR EMT. MC CABLE SHALL BE INSTALLED ONLY WHERE PERMITTED BY CODE AND THE AUTHORITY HAVING JURISDICTION.

a. WET LOCATIONS: RIGID STEEL OR IMC ONLY.
b. LOCATIONS SUBJECT TO MECHANICAL DEFORMATION: RIGID STEEL OR IMC ONLY.
c. DRY INTERIOR LOCATIONS FOR BRANCH CIRCUIT WIRING AND NOT SUBJECT TO MECHANICAL DEFORMATION: EMT, IMC, MC, OR RIGID STEEL CONDUIT.
d. DRY INTERIOR LOCATIONS FOR OTHER THAN BRANCH CIRCUIT WIRING AND NOT SUBJECT TO MECHANICAL DEFORMATION: EMT, IMC, OR RIGID STEEL CONDUIT.

2. UNDERGROUND: USE RIGID STEEL OR SCHEDULE 40 PVC WITH RIGID STEEL ELLS AND RIGID STEEL CONDUIT/FITTINGS WHEN EMERGING FROM GRADE, UNLESS NOTED OTHERWISE.

3. IN SLAB: USE SCHEDULE 40 PVC WITH RIGID STEEL ELLS AND RIGID STEEL CONDUIT/FITTINGS WHEN EMERGING FROM GRADE, UNLESS NOTED OTHERWISE.

C. USE FLEXIBLE CONDUITS IN THE FOLLOWING APPLICATIONS (MAX 6-FT):

1. RECESSED LIGHTING FIXTURES.

2. MOTOR CONNECTIONS.

3. AT BUILDING JOINTS.

4. AT WET LOCATIONS, FLEXIBLE CONDUIT SHALL BE LIQUIDTIGHT TYPE.

D. LIGHT FIXTURES INSTALLED IN GYP BOARD CEILINGS MAY BE WIRED FROM FIXTURE TO FIXTURE USING MC CABLE UNLESS PROHIBITED BY THE AHJ. VERIFY THAT LIGHT FIXTURES ARE PROVIDED WITH JUNCTION BOXES APPROVED FOR THIS PURPOSE. MC TYPE CABLE TO MEET ANSI/NFPA 70 REQUIREMENTS. CABLE ARMOR TO BE INTERLOCKED STEEL METAL TAPE. MC TYPE CABLE MANUFACTURED BY AFC CABLE SYSTEMS, PIRELLI CABLE CORPORATION AND SOUTHWIRE COMPANY ARE APPROVED. MC CABLE SHALL NOT BE USED TO WIRE LIGHT FIXTURES INSTALLED IN EXPOSED CEILINGS FROM FIXTURE TO FIXTURE (6-FT LIGHT FIXTURE WHIPS ARE PERMITTED).

E. ALL WIRING SHALL BE IN CONDUIT.

F. ALL CONDUIT AND MC CABLE SHALL BE SUPPORTED AS REQUIRED BY THE NEC.

3.03 INSTALLATION OF CONDUITS:

A. GENERAL:

1. RUN ALL CONDUIT CONCEALED, IF POSSIBLE, UNLESS NOTED OTHERWISE ON THE PLANS.

2. RUN ALL CONDUIT PARALLEL TO OR AT RIGHT ANGLES TO CENTER LINES OF COLUMNS AND BEAMS.

3. CONDUITS ABOVE CEILINGS SHALL NOT OBSTRUCT REMOVAL OF CEILING TILES, LIGHTING FIXTURES, AIR DIFFUSERS, ETC.

4. CONDUITS SHALL NOT CROSS ANY DUCT SHAFT OR AREA DESIGNATED AS FUTURE DUCT SHAFT HORIZONTALLY. CONDUIT RISERS, WHEN ALLOWED IN DUCT SHAFT, MUST BE COORDINATED WITH MECHANICAL WORK TO AVOID ANY CONFLICT.

5. INSTALL NO MORE THAN THE EQUIVALENT OF THREE 90-DEGREE BENDS IN ANY CONDUIT RUN EXCEPT FOR COMMUNICATIONS CONDUITS, FOR WHICH ONLY TWO BENDS ARE ALLOWED. PROVIDE J-BOXES AS NEEDED WHERE MORE BENDS ARE NEEDED.

B. CONDUIT SUPPORTS:

1. SUPPORT CONDUITS WITH UNDERWRITER'S LABORATORIES LISTED STEEL CONDUIT SUPPORTS AT INTERVALS REQUIRED BY THE NATIONAL ELECTRIC CODE. WIRES OR SHEET METAL STRIPS ARE NOT ACCEPTABLE FOR CONDUIT SUPPORT. USE CONDUIT HANGERS FOR ALL CONDUITS NOT DIRECTLY FASTENED TO STRUCTURE AND FOR ALL MULTIPLE CONDUIT RUNS. DO NOT ATTACH ANY CONDUIT TO MECHANICAL DUCTS OR PIPES.

2. AVOID ATTACHING CONDUIT TO AIR MOVING SYSTEM. WHEN IT IS NECESSARY TO SUPPORT CONDUIT FROM AIR MOVING SYSTEM, PROVIDE A LENGTH OF FLEXIBLE CONDUIT BETWEEN PORTION ATTACHED TO AIR MOVING SYSTEM AND PORTION ATTACHED TO THE BUILDING TO MINIMIZE TRANSMISSION OF VIBRATION TO THE BUILDING STRUCTURE.

3. AN NFPA 251 TESTED AND APPROVED CEILING SYSTEM CAN BE USED TO SUPPORT BRANCH CIRCUIT CABLING WHERE APPROVED BY THE AHJ.

C. CONDUIT PENETRATION:

1. PENETRATING FIRE RATED FLOOR OR WALL: INSTALL CONDUIT IN CONDUIT SLEEVE OR FRAMED OPENING. SEAL PENETRATION WITH FIRE RETARDANT SEALANT.

2. PENETRATING ROOF OR EXTERIOR WALL: AVOID PENETRATING ROOF OR EXTERIOR WALL WHERE POSSIBLE. WHERE PENETRATIONS ARE NECESSARY, BUILDING WEATHERPROOF INTEGRITY MUST BE PRESERVED. CONDUITS PENETRATING THROUGH ROOF SHALL HAVE ROOF FLASHING WITH CAULK TYPE COUNTERFLASHING SLEEVE.

3. PENETRATING SOUND INSULATED OR AIR PLENUM WALL: INSTALL CONDUIT IN CONDUIT SLEEVE AND SEAL PENETRATION AS DETAILED ON THE DRAWINGS.

4. PENETRATING NON-FIRE RATED DRY WALL: CONDUIT SLEEVES ARE NOT REQUIRED. PENETRATIONS MUST BE SEALED WITH PLASTER PRIOR TO PAINTING. PENETRATIONS MADE AFTER WALL FINISH IS APPLIED MUST BE AS SMALL AS POSSIBLE AND PROVIDED WITH ESCUTCHEONS, ONE ON EACH SIDE OF WALL.

5. PENETRATING SUSPENDED CEILING: CUT HOLE AS SMALL AS POSSIBLE TO PERMIT CONDUIT PENETRATION. PROVIDE ESCUTCHEON FOR EACH CONDUIT BELOW CEILING.

3.04 CONNECTIONS TO EQUIPMENT:

A. GENERAL:

1. FURNISH AND INSTALL REQUIRED POWER SUPPLY CONDUIT AND WIRING TO ALL EQUIPMENT. SEE BELOW FOR OTHER WIRING REQUIRED.

2. FURNISH AND INSTALL A DISCONNECT SWITCH IMMEDIATELY AHEAD OF AND ADJACENT TO EACH MAGNETIC MOTOR STARTER OR APPLIANCE UNLESS THE MOTOR APPLIANCE IS LOCATED ADJACENT AND WITHIN SIGHT OF THE SERVING PANELBOARD, CIRCUIT BREAKER OR SWITCH. VERIFY ALL EQUIPMENT NAMEPLATE CURRENT RATINGS PRIOR TO INSTALLATION.

3. INSTALL ALL ROUGH-IN WORK FOR EQUIPMENT FROM APPROVED SHOP DRAWINGS TO SUIT THE SPECIFIC REQUIREMENTS OF THE EQUIPMENT.

4. FURNISH AND INSTALL MANUAL THERMAL PROTECTION FOR ALL MOTORS NOT INTEGRALLY EQUIPPED WITH THERMAL PROTECTION.

5. FURNISH 120 VOLT POWER TO EACH CONTROL PANEL AND TIME SWITCH REQUIRING A SOURCE OF POWER TO OPERATE.

3.05 INSTALLATION OF CONDUCTORS:

A. PULL NO WIRE INTO ANY PORTION OF THE CONDUIT SYSTEM UNTIL ALL CONSTRUCTION WORK WHICH MIGHT DAMAGE THE WIRE HAS BEEN COMPLETED.

B. INSTALL ALL WIRE CONTINUOUS FROM OUTLET TO OUTLET OR TERMINAL TO TERMINAL. SPLICES IN CABLES WHEN REQUIRED SHALL BE MADE IN HAND HOLES, PULL BOXES OR JUNCTION BOXES. MAKE BRANCH CIRCUIT SPLICES IN OUTLET BOXES WITH 8" OF CORRECTLY COLOR-CODED TAILS LEFT IN THE BOX.

C. SPLICES IN WIRES AND CABLES SHALL BE MADE UTILIZING MATERIALS AND METHODS DESCRIBED HEREIN BEFORE.

D. MAKE ALL GROUND, NEUTRAL AND LINE CONNECTIONS TO RECEPTACLE AND WIRING DEVICE TERMINALS AS RECOMMENDED BY MANUFACTURER.

E. PROVIDE BRADY WIRE MARKERS WHERE NUMBER OF CONDUCTORS IN A BOX EXCEEDS FOUR.

3.06 WIRE COLOR CODE:

COLOR CODING SHALL BE CONTINUOUS FOR WIRE #12 THROUGH #10 AWG. PHASE CONDUCTORS #8 AND LARGER AND CONDUCTORS OF ANY SIZE IN CABLE ASSEMBLIES MAY HAVE COLORED PHASING TAPE AT TERMINATIONS. COLOR CODE WIRES AS FOLLOWS:

VOLTAGE	PHASE A	PHASE B	PHASE C	NEUTRAL	GND
120/240V	RED	BLACK	BLUE	WHITE	GREEN

3.07 IDENTIFICATION:

A. PROVIDE NAMEPLATES FOR PANELBOARDS, AND ALL SIMILAR DEVICES. NAMEPLATES SHALL BE SCREWED (NO ADHESIVES) ENGRAVED BAKELITE OR PHOTO-ETCHED METALLIC NAMEPLATE IDENTIFICATION SHOWING PANEL DESIGNATION, VOLTAGE AND PHASE IN MINIMUM 1/4" HIGH LETTERS.

B. EACH PANELBOARD SHALL CONTAIN A METAL-FRAMED CIRCUIT DIRECTORY INSIDE COVER, WITH PLASTIC PROTECTOR.

C. PANELBOARD SCHEDULE: AFTER COMPLETION OF WORK, PROVIDE TYPEWRITTEN UPDATED PANELBOARD SCHEDULES FOR ALL PANELBOARDS. INCLUDE ROOM/EQUIPMENT DESIGNATIONS TO IDENTIFY ROOM/EQUIPMENT SERVED BY CIRCUIT.

3.08 GROUNDING:

A. ELECTRICAL SERVICE AND SHALL BE GROUNDED IN ACCORDANCE WITH NEC ARTICLE 250.3 TO 250.30, INCLUSIVE.

B. GROUND NON-CURRENT CARRYING METAL PARTS OF ELECTRICAL ENCLOSURES, FRAMES, OR CONDUCTOR RACEWAYS TO PROVIDE A LOW IMPEDANCE PATH FOR LINE-TO-GROUND FAULT CURRENT AND TO BOND ALL NON-CURRENT CARRYING METAL PARTS TOGETHER. PROVIDE GROUND CONDUCTOR IN EACH RACEWAY SYSTEM, WHETHER GROUND WIRE IS SPECIFICALLY LISTED OR NOT. EQUIPMENT GROUND CONDUCTOR SHALL BE ELECTRICALLY AND MECHANICALLY CONTINUOUS FROM THE ELECTRICAL CIRCUIT SOURCE TO THE EQUIPMENT TO BE GROUNDED. SIZE GROUND CONDUCTORS PER NEC ARTICLE 250.122 UNLESS LARGER CONDUCTORS ARE SHOWN ON DRAWINGS.

C. GROUNDING CONDUCTORS SHALL BE IDENTIFIED WITH GREEN INSULATION

COM*check* Software Version COMcheckWeb

Interior Lighting Compliance Certificate

Project Information

Energy Code: 2021 IECC
Project Title: Waller County Jail Garage
Project Type: New Construction

Construction Site:
200 Sheriff R Glenn Dr
Hempstead, Texas 77445

Owner/Agent:

Designer/Contractor:

Additional Efficiency Package(s)

Credits: 10.0 Required 0.0 Proposed

Allowed Interior Lighting Power

A Area Category	B Floor Area (ft2)	C Allowed Watts / ft2	D Allowed Watts
1-Maintenance Garage (Automotive Facility)	5052	0.75	3789
		Total Allowed Watts =	3789

Proposed Interior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
1-Maintenance Garage (Automotive Facility)				
LED: A: 2'X4' Flat Panel: Other:	1	5	37	184
LED: AE: 2'X4' Flat Panel Emergency: Other:	1	1	37	37
LED: B: 6" Down Light: Other:	1	2	10	21
LED: BE: 6" Down Light Emergency: Other:	1	2	10	21
LED: C: 4'-0" Strip: Other:	1	4	32	128
LED: CE: 4'-0" Strip Emergency: Other:	1	2	32	64
LED: F: 2'X2' High-bay: Other:	1	12	87	1044
LED: FE: 2'X2' High-bay Emergency: Other:	1	8	87	696
LED: G: 24" Vapor Tight: Other:	1	1	26	26
		Total Proposed Watts =		2220

Interior Lighting PASSES: Design 41% better than code

Interior Lighting Compliance Statement

Compliance Statement: The proposed interior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed interior lighting systems have been designed to meet the 2021 IECC requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Geoffrey Robical Electrical Design Engr — Geoffrey Robical — 4-10-2025

Name - Title | Signature | Date

STATE OF TEXAS · JOHN ROBERT BUNT · 85353 · REGISTERED · ENGINEER · John Robert Bunt

COM*check* Software Version COMcheckWeb

Exterior Lighting Compliance Certificate

Project Information

Energy Code: 2021 IECC
Project Title: Waller County Jail Garage
Project Type: New Construction
Exterior Lighting Zone 1 (Developed rural area (LZ1))

Construction Site:
200 Sheriff R Glenn Dr
Hempstead, Texas 77445

Owner/Agent:

Designer/Contractor:

Allowed Exterior Lighting Power

A Area/Surface Category	B Quantity	C Allowed Watts /	D Tradable Wattage	E Allowed Watts (B X C)
Building Exterior (Illuminated area of facade wall or surface)	4018 ft2	0	No	0
Compressor Area (Special feature area)	84 ft2	0.1	Yes	8
			Total Tradable Watts (a) =	8
			Total Allowed Watts =	8
			Total Allowed Supplemental Watts (b) =	350

(a) Wattage tradeoffs are only allowed between tradable areas/surfaces.
(b) A supplemental allowance equal to 350 watts may be applied toward compliance of both non-tradable and tradable areas/surfaces.

Proposed Exterior Lighting Power

A Fixture ID : Description / Lamp / Wattage Per Lamp / Ballast	B Lamps/ Fixture	C # of Fixture	D Fixture Watt.	E (C X D)
Building Exterior (Illuminated area of facade wall or surface, 4018 ft2): Non-tradable Wattage				
LED: D: Wall Pack: Other:	1	1	35	35
LED: DE: Wall Pack Emergency: Other:	1	1	35	35
LED: E: Wall Pack: Other:	1	8	54	432
Compressor Area (Special feature area, 84 ft2): Tradable Wattage				
LED: G: 24" Vapor Tight: Other:	1	1	28	28
			Total Tradable Proposed Watts =	28

Exterior Lighting PASSES: Design 92% better than code

Exterior Lighting Compliance Statement

Compliance Statement: The proposed exterior lighting design represented in this document is consistent with the building plans, specifications, and other calculations submitted with this permit application. The proposed exterior lighting systems have been designed to meet the 2021 IECC requirements in COMcheck Version COMcheckWeb and to comply with any applicable mandatory requirements listed in the Inspection Checklist.

Geoffrey Robical Electrical Design Engr — Geoffrey Robical — 4-10-2025

Name - Title | Signature | Date

STATE OF TEXAS · JOHN ROBERT BUNT · 85353 · REGISTERED · ENGINEER · John Robert Bunt

COM*check* Software Version COMcheckWeb

Inspection Checklist

Energy Code: 2021 IECC

Requirements: 98.0% were addressed directly in the COM*check* software

Text in the "Comments/Assumptions" column is provided by the user in the COMcheck Requirements screen. For each requirement, the user certifies that a code requirement will be met and how that is documented, or that an exception is being claimed. Where compliance is itemized in a separate table, a reference to that table is provided.

Section # & Req.ID	Plan Review	Complies?	Comments/Assumptions
C103.2 [PR4][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the interior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include interior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-001
C103.2 [PR8][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the exterior lighting and electrical systems and equipment and document where exceptions to the standard are claimed. Information provided should include exterior lighting power calculations, wattage of bulbs and ballasts, transformers and control devices.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-001
C406 [PR9][1]	Plans, specifications, and/or calculations provide all information with which compliance can be determined for the additional energy efficiency package options.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-001

Additional Comments/Assumptions:

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.3.1 [EL22][1]	Spaces required to have light-reduction controls have a manual control that allows the occupant to reduce the connected lighting load in a reasonably uniform illumination pattern >= 50 percent.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-201
C405.2.1, C405.2.1.1 [EL18][1]	Occupancy sensors installed in classrooms/lecture/training rooms, conference/meeting/multipurpose rooms, copy/print rooms, lounges/breakrooms, enclosed offices, open plan office areas, restrooms, storage rooms, locker rooms, corridors, warehouse storage areas, and other spaces <= 300 sqft that are enclosed by floor-to-ceiling height partitions. Reference section language C405.2.1.2 for control function in warehouses and section C405.2.1.3 for open plan office spaces.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-101
C405.2.1.2 [EL19][1]	Occupancy sensors control function in warehouses: In warehouses, the lighting in aisleways and open areas is controlled with occupant sensors that automatically reduce lighting power by 50% or more within 20 minutes of when the areas are unoccupied. The occupant sensors control lighting in each aisleway independently and do not control lighting beyond the aisleway being controlled by the sensor. Lights not turned off by occupant sensors is done so by time-switch.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.1.3 [EL20][1]	Occupant sensor control function in open plan office areas: Occupant sensor controls in open office spaces >= 300 sq.ft. have controls 1) configured so that general lighting can be controlled separately in control zones with floor areas <= 600 sq.ft. within the space, 2) general lighting in each zone permitted to turn on upon occupancy in control zone, 3) automatically turn off general lighting in all control zones within 20 minutes after all occupants have left the space, 4) are configured so that general lighting power in each control zone is reduced by >= 80% of the full zone general lighting power within 20 minutes of all occupants leaving that control zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-101
C405.2.2, C405.2.2.1 [EL21][2]	Each area not served by occupancy sensors (per C405.2.1.1) have time-switch controls and functions detailed in sections C405.2.2.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-201

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)

Section # & Req.ID	Rough-In Electrical Inspection	Complies?	Comments/Assumptions
C405.2.4, C405.2.4.1, C405.2.4.2 [EL23][2]	Daylight zones provided with individual controls that control the lights independent of general area lighting. See code section C405.2.3 Daylight-responsive controls for applicable spaces, C405.2.3.1 Daylight responsive control function and section C405.2.3.2 Sidelit zone.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.2.5 [EL27][1]	Additional interior lighting power allowed for special functions per the approved lighting plans and is automatically controlled and separated from general lighting.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.2.7 [EL28][1]	Automatic lighting controls for exterior lighting installed. Controls will be daylight controlled, set based on business operation time-of-day, or reduce connected lighting > 30%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-001
C405.7 [EL26][2]	Low-voltage dry-type distribution electric transformers meet the minimum efficiency requirements of Table C405.6.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.8 [EL27][2]	Electric motors meet the minimum efficiency requirements of Tables C405.7(1) through C405.7(4). Efficiency verified through certification under an approved certification program or the equipment efficiency ratings shall be provided by motor manufacturer (where certification programs do not exist).	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.9.1, C405.9.2 [EL28][2]	Escalators and moving walks comply with ASME A17.1/CSA B44 and have automatic controls configured to reduce speed to the minimum permitted speed in accordance with ASME A17.1/CSA B44 or applicable local code when not conveying passengers.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.10 [EL29][2]	Total voltage drop across the combination of feeders and branch circuits <= 5%.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.1.1 [EL30][2]	At least 90% of dwelling unit permanently installed lighting shall have lamp efficacy >= 65 lm/W or luminaires with efficacy >= 45 lm/W or comply with C405.2.4 or C405.3.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	**Exception:** Requirement does not apply.
C405.11, C405.11.1 [EL31][2]	50% of 15/20 amp receptacles installed in enclosed offices, conference rooms, copy rooms, break rooms, classrooms and workstations and > 25% of branch circuit feeders for modular furniture will have automatic receptacle control in accordance with C405.11.1.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-201

Additional Comments/Assumptions:

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)

Section # & Req.ID	Final Inspection	Complies?	Comments/Assumptions
C303.3, C408.2.5.2 [FI17][3]	Furnished O&M instructions for systems and equipment to the building owner or designated representative.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C405.5.1 [FI19][1]	Exterior lighting power is consistent with what is shown on the approved lighting plans, demonstrating proposed watts are less than or equal to allowed watts.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	*See the Exterior Lighting fixture schedule for values.*
C408.1.1 [FI57][1]	Building operations and maintenance documents will be provided to the owner. Documents will cover manufacturers' information, specifications, programming procedures and means of illustrating to owner how building, equipment and systems are intended to be installed, maintained, and operated.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.2.5 [FI16][3]	Furnished as-built drawings for electric power systems within 90 days of system acceptance.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met.
C408.3 [FI33][1]	Lighting systems have been tested to ensure proper calibration, adjustment, programming, and operation.	☐Complies ☐Does Not ☐Not Observable ☐Not Applicable	Requirement will be met. **Location on plans/spec:** Drawing E-001

Additional Comments/Assumptions:

1 High Impact (Tier 1) | 2 Medium Impact (Tier 2) | 3 Low Impact (Tier 3)

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WALLER COUNTY

JAIL GARAGE

200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

STATE OF TEXAS · JOHN ROBERT BUNT · 85353 · REGISTERED · ENGINEER · John Robert Bunt
4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

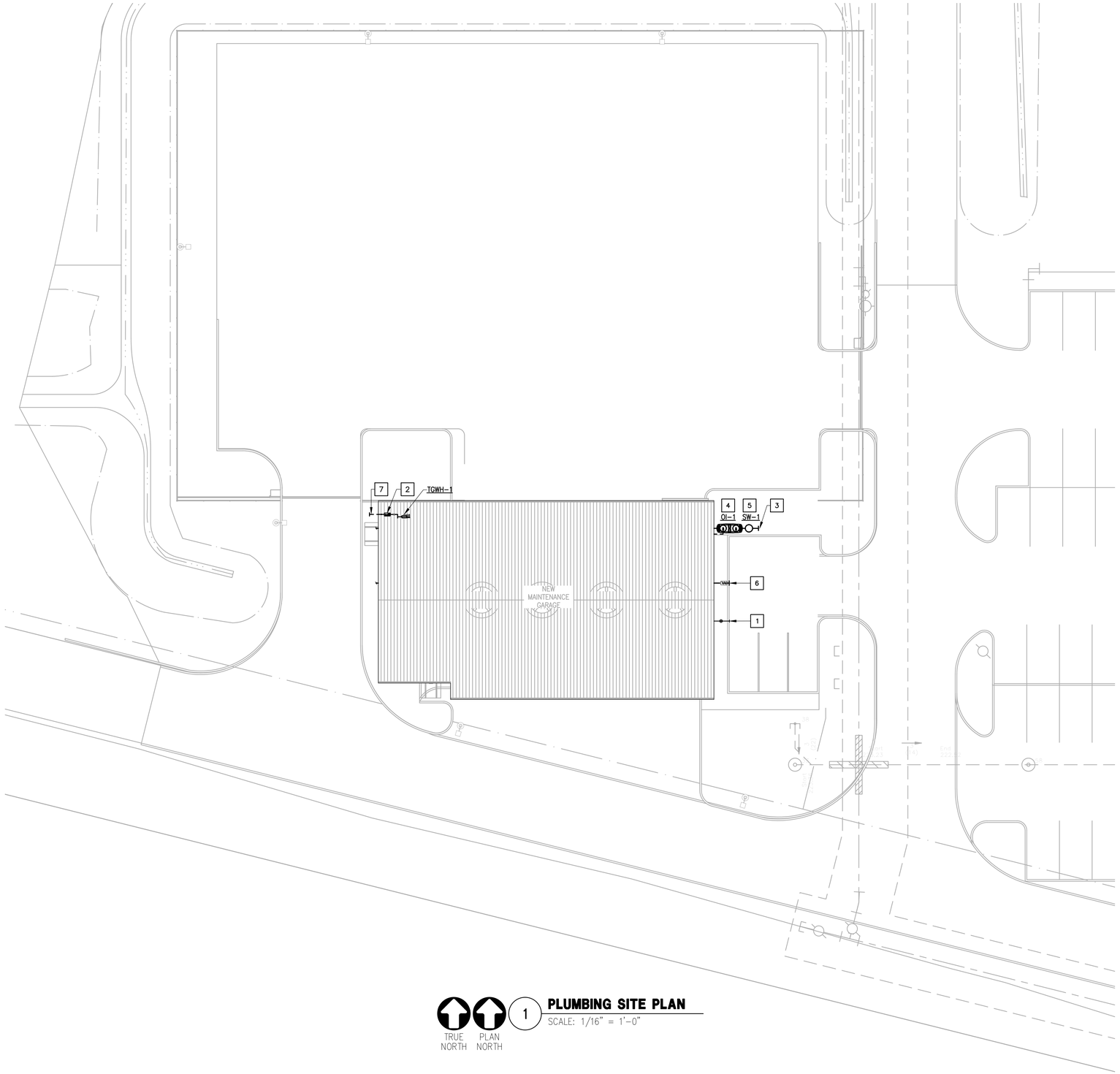
PROJECT NO.: .
DRAWN BY: GR QC: KO

LIGHTING COMCHECK

E-601

TEXAS BOARD OF PROFESSIONAL ENGINEERS
FIRM REGISTRATION #: F-9072
EXPIRES: 31 MARCH 2026

KO DESIGN MEP ENGINEERS
455 School St.
Suite 46
Tomball, Texas 77375
832.643.0368 phone
ko@kodesign-mep.com



1 **PLUMBING SITE PLAN**
SCALE: 1/16" = 1'-0"

TRUE NORTH PLAN NORTH

SITE GENERAL NOTES

1. CONTRACTOR SHALL OBTAIN FROM THE UTILITY COMPANIES INFORMATION AND INSTALLATION STANDARDS FOR SERVICES TO BE INSTALLED. CONTRACTOR SHALL CONTACT UTILITY COMPANIES WITHIN 10 DAYS OF NOTICE TO PROCEED. CONTRACTOR SHALL COORDINATE WITH ARCHITECT/OWNER A MINIMUM OF 60-DAYS PRIOR TO THE REQUESTED DATE OF EACH PERMANENT UTILITY SERVICE FOR INFORMATION REQUIRED BY THE UTILITY COMPANY REGARDING THE OWNER'S PERMANENT RETAIL/WHOLESALE UTILITY SERVICE PROVIDER. THIS CONTRACTOR SHALL INCLUDE IN HIS BID ALLOWANCES FOR PROVIDING BOTH TEMPORARY AND PERMANENT ELECTRICAL SERVICE TO THE SITE.

2. CONTRACTOR TO LOCATE LIGHTING STANDARDS 10'-0" MINIMUM CLEAR OF ALL UTILITY POWER LINES. IF, UPON SITE INSPECTION, IT IS DETERMINED THAT PROPER CLEARANCE CANNOT BE ATTAINED, IT WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO NOTIFY THE POWER COMPANY OF THE CONFLICT, AND CONTACT THE ENGINEER AND ARCHITECT TO COORDINATE LIGHT POLE LOCATIONS.

3. CONTRACTOR TO RESTRICT ENCROACHMENT INTO EXISTING UTILITY EASEMENTS TO TRAVERSING WITH UNDERGROUND CONDUITS FOR PARKING LOT LIGHTING CIRCUITS ONLY. ANY ENCROACHMENT INTO EASEMENTS SHALL BE COORDINATED WITH, AND PERMISSION OBTAINED FROM, THOSE ORGANIZATIONS WHOSE UTILITIES EXIST IN SAID EASEMENTS. SEE CIVIL DRAWINGS AND/OR SURVEY FOR EXISTING EASEMENTS, UTILITIES, ETC.

4. REMOVAL OF ANY EXISTING UTILITIES SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR. CONTRACTOR SHALL CONTACT THE APPROPRIATE UTILITY PROVIDER TO COORDINATE THE REMOVAL OR RELOCATION OF EXISTING ELECTRICAL, COMMUNICATIONS, GAS, WATER AND/OR SEWER LINES REQUIRED FOR THE PROJECT, AND SHALL INCLUDE ALLOWANCES FOR ALL RELATED COSTS IN HIS BID. THE REMOVAL OF ALL NON-UTILITY ITEMS SHALL BE THE RESPONSIBILITY OF THE GENERAL CONTRACTOR AND/OR THE SUB-CONTRACTORS. EXISTING UTILITIES OR EASEMENTS SHOWN ON THIS DRAWING ARE FOR GENERAL REFERENCE ONLY. IT IS NOT THE INTENT OF THIS DRAWING TO PRECISELY INDICATE OR LOCATE ANY OR ALL EXISTING UTILITIES OR EASEMENTS.

5. VISITING THE SITE: EACH BIDDER SHALL VISIT THE SITE OF PROPOSED WORK TO FULLY INFORM THEMSELVES REGARDING THE UTILITIES. NO ADDITIONAL COMPENSATION WILL BE ALLOWED FOR WORK AND/OR MATERIALS OMITTED FROM THE BIDDERS' CONTRACT PROPOSALS DUE TO THEIR FAILURE TO SO INFORM THEMSELVES BY SUCH INVESTIGATION AND COORDINATION WITH THE APPROPRIATE UTILITY.

PLUMBING KEYED NOTES:

1. PROVIDE 1-1/2" DOMESTIC WATER TAP AND METER WITH 1-1/2" SERVICE LINE FROM METER TO BUILDING ENTRANCE ((43.75 WFU'S) ESTIMATED PEAK FLOW = 48.0 GPM). REFER TO CIVIL DRAWINGS FOR CONTINUATION AND LOCATION OF WATER METER. MINIMUM WATER PRESSURE REQUIREMENT: 50 PSI AT 5'-0" MARK FROM BUILDING LIMITS. PROVIDE SHUT-OFF VALVE IN VALVE BOX. PROVIDE WALL HYDRANT FOR DRAINING SYSTEM. PROVIDE SHUT-OFF VALVE INSIDE BUILDING ABOVE GRADE IN ACCESSIBLE AREA.
2. NEW NATURAL GAS SERVICE, METER, AND REGULATOR SET. COORDINATE METER LOCATION AND INSTALLATION IN ADVANCE WITH LOCAL GAS PROVIDER. MAKE ADJUSTMENTS AS REQUIRED. TOTAL CONNECTED LOAD: (1,070,000 BUT/H) AT 2 PSI OUTLET PRESSURE.
3. 4" SANITARY WASTE LINE WITH 2-WAY EXTERIOR CLEANOUT. (80.5 DFU's) MINIMUM STARTING I.E. = 5'-6" B.F.G.. COORDINATE EXACT LOCATION WITH CIVIL ENGINEER. REFER TO CIVIL DRAWINGS FOR CONTINUATION.
4. APPROXIMATE LOCATION OF SAND/OIL INTERCEPTOR OI-1. COORDINATE EXACT LOCATION WITH BUILDING OWNER AND ARCHITECT PRIOR TO ROUGH IN. REFER TO DETAIL #1 ON SHEET P-302 FOR MORE INFORMATION.
5. APPROXIMATE LOCATION OF SAMPLE WELL TRAP SW-1. COORDINATE EXACT LOCATION WITH BUILDING OWNER AND ARCHITECT PRIOR TO ROUGH IN. REFER TO DETAIL #2 ON SHEET P-302 FOR MORE INFORMATION.
6. 4" SANITARY WASTE LINE WITH 2-WAY EXTERIOR CLEANOUT. (32.5 DFU's) MINIMUM STARTING I.E. = 4'-0" B.F.G.. COORDINATE EXACT LOCATION WITH CIVIL ENGINEER. REFER TO CIVIL DRAWINGS FOR CONTINUATION.
7. NATURAL GAS SERVICE LINE TO METER BY LOCAL UTILITY PROVIDER.

CAUTION NOTES

1. UNDERGROUND UTILITIES EXIST WITHIN AND ADJACENT TO THE LIMITS OF CONSTRUCTION. AN ATTEMPT HAS BEEN MADE TO LOCATE THESE UTILITIES ON THE PLANS, HOWEVER, ALL EXISTING UTILITIES MAY NOT BE SHOWN AND THE ACTUAL LOCATIONS OF THE UTILITIES MAY VARY FROM THE LOCATIONS SHOWN. PRIOR TO BEGINNING ANY TYPE OF EXCAVATION, THE CONTRACTOR SHALL CONTACT THE UTILITIES INVOLVED AND MAKE ARRANGEMENTS FOR THE LOCATION OF THE UTILITIES ON THE GROUND. THE CONTRACTOR SHALL MAINTAIN THE UTILITY LOCATION MARKING UNTIL THEY ARE NO LONGER NECESSARY.
2. TEXAS STATE LAW, THE UNDERGROUND FACILITIES DAMAGE PREVENTION ACT, REQUIRES TWO WORKING DAYS ADVANCE NOTIFICATION THROUGH THE TEAS ON-CALL SYSTEM CENTER BEFORE EXCAVATING USING MECHANIZED EQUIPMENT OR EXPLOSIVES (EXCEPT IN THE CASE OF AN EMERGENCY). THE ONE-CALL SYSTEM PHONE NUMBER IS 1-800-245-4545. THE CONTRACTOR IS ADVISED THAT THERE IS A SEVER PENALTY FOR NOT MAKING THIS CALL. NOT ALL UTILITY COMPANIES ARE MEMBERS OF THE TEXAS ONE-CALL SYSTEM; THEREFORE, THE CONTRACTOR IS ADVISED TO CONTACT ALL NON-MMEMBER UTILITIES AS WELL AS THE ONE-CALL SYSTEM.

NOTE TO CONTRACTOR:

ALTHOUGH THE ENGINEER HAS MADE EVERY EFFORT TO VERIFY & COORDINATE THE PROJECT SITE UTILITIES, THE SITE UTILITY SERVICE LOCATIONS ARE NOT NECESSARILY FINAL AND ARE SUBJECT TO REVISIONS PER REVIEW BY THE RESPECTIVE UTILITY COMPANIES. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO OBTAIN APPROVALS FROM, AND COORDINATE WITH THE LOCAL UTILITY COMPANY TERMS & CONDITIONS PACKAGE, TO PROVIDE UTILITY SERVICE TO THE PROJECT. CONTRACTOR SHALL BASE HIS BID ON CONFORMANCE TO ALL UTILITY REQUIREMENTS. ALL SPECIFICATIONS DRAWINGS & NOTES.

UTILITY COMPANIES CONTACTS:

CONTRACTOR TO CONTACT UTILITY COMPANY IMMEDIATELY UPON AWARD OF CONTRACT. CONTRACTOR TO COORDINATE ALL UTILITIES AND THEIR REQUIREMENTS, ROUTING, ETC. PRIOR TO INSTALLATION OF ANY CONDUITS OR PIPING.

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WALLER COUNTY

JAIL GARAGE

200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

STATE OF TEXAS
JOHN ROBERT BUNT
85353
REGISTERED
PROFESSIONAL
ENGINEER
4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

PROJECT NO.: .
DRAWN BY: AL QC: KO

PLUMBING SITE PLAN

PS-100

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FIRM REGISTRATION #: F-9072
EXPIRES: 31 MARCH 2026

KO DESIGN MEP ENGINEERS
455 School St.
Suite 46
Tomball, Texas 77375
832.643.0368 phone
ko@kodesign-mep.com

PLUMBING LEGEND

SYMBOL	DESCRIPTION
SAN	SANITARY OR WASTE PIPING ABOVE GRADE (SAN)
SAN	SANITARY OR WASTE PIPING BELOW GRADE (SAN)
V	VENT PIPING ABOVE OR BELOW GRADE (V)
CW	COLD WATER PIPING (CW)
FIRE	FIRE PROTECTION WATER PIPING (FIRE)
HW	HOT WATER PIPING (HW)
HWR	HOT WATER RETURN PIPING (HWR)
GAS	NATURAL GAS PIPING (G)
GV	GAS VENT PIPING (GV)
	FLOW DIRECTIONAL ARROW
	SHUT-OFF VALVE
	SOLENOID VALVE (SV)
	BALL VALVE (BV)
	BUTTERFLY VALVE
	GAS PLUG VALVE (GPV)
	HORIZONTAL SWING CHECK
	UNION
	Y-STRAINER
	REDUCER OR INCREASER
	ECCENTRIC REDUCER
	REDUCED PRESSURE BACKFLOW PREVENTER (RPZ)
	PIPING DOWN
	RISE OR DROP PIPING
	PIPING UP -OR- PIPING UP & DOWN
	CAP ON END OF PIPE
	CLEANOUT (WALL OR CEILING) (CO)
	FLOOR CLEANOUT (FCO)
	EXTERIOR CLEANOUT WITH 18"x18"x4" CONCRETE PAD (ECO)
	TWO-WAY CLEANOUT (PROVIDE 18"x24"x4" CONCRETE PAD OUTSIDE)
	PRESSURE REDUCING VALVE (PRV)
	BRANCH CONNECTION OUT OF TOP
	BRANCH CONNECTION OUT OF BOTTOM
	BRANCH CONNECTION OUT OF SIDE
	WYE & 1/8TH BEND BRANCH CONNECTION
	WYE BRANCH CONNECTION
	HOSE BIBB
	PRESSURE GAUGE WITH COCK
	THERMOMETER
	GAS PRESSURE REGULATOR
	TEST COCK
	GAS METER
	WALL HYDRANT
	VALVE IN RISE
	ASME TEMPERATURE & PRESSURE RELIEF VALVE
	VACUUM RELIEF VALVE
	ANGLE VALVE
1	REFER TO KEYED NOTE
	FLOOR SINK (FS)
	FLOOR DRAIN (FD)
	FLOOR DRAIN WITH P-TRAP (FD)
	FLOOR DRAIN WITH P-TRAP AT 45° ANGLE (FD)
	HUB DRAIN (HD)
	ACCESS PANEL FOR TRAP PRIMER
AP	ACCESS PANEL LOCATION SYMBOL
	SHOCK ABSORBER WITH ACCESS PANEL
	AIR CHAMBER
(E)	EXISTING
	UNDERGROUND
	CONNECT NEW TO EXISTING
	DELTA CHANGE SYMBOL
	RISER FLAG

NOTE: NOT ALL SYMBOLS MAY APPLY TO THIS PROJECT.

PLUMBING SCOPE & SPECIFICATION

THE WORK OF THIS SECTION SHALL INCLUDE, BUT NOT BE LIMITED TO:

A. A DOMESTIC HOT AND COLD WATER DISTRIBUTION SYSTEM TO SERVE ALL FIXTURES, AND EQUIPMENT.
B. SANITARY SOIL WASTE AND VENT SYSTEMS TO SERVE ALL FIXTURES AND EQUIPMENT.
C. NOT USED.

DRAWINGS ARE DIAGRAMMATIC; CONFIRM DIMENSIONS AND LOCATIONS IN THE FIELD, ADVISE OF MAJOR DISCREPANCIES.
GUARANTEE LABOR AND MATERIALS FOR ONE YEAR.
ADHERE TO ALL APPLICABLE LOCAL CODES AND REGULATIONS.
CONTRACTOR SHALL OBTAIN REQUIRED PERMITS AND PAY ALL FEES.

VALVES

VALVES SHALL BE MANUFACTURED BY NIBCO, HAMMOND, POWELL, STOCKHAM, WATTS OR EQUIVALENT APPROVED BY THE ENGINEER.
BALL VALVES SHALL HAVE CAST BRONZE BODY, BLOWOUT PROOF STEMS, FULL SIZE PORT, 316 STAINLESS STEEL TRIM, TEFLON SEAT AND SEAL AND THRUST WASHERS. VALVES 2" AND SMALLER SHALL BE NIBCO T-585-70-66 OR APPROVED EQUIVALENT.

UNIONS

UNIONS IN COPPER OR BRASS LINES SHALL BE BRASS, THREADED PATTERN UNIONS.

EXCAVATION

EXCAVATE TRENCHES FOR UNDERGROUND PIPING TO THE REQUIRED DEPTH.
CUT THE BOTTOM OF THE TRENCH OR EXCAVATION TO UNIFORM GRADE.
EXCAVATE 6" BELOW GRADE, FILL WITH BEDDING MATERIAL (SAND) AND TAMP WELL.
LAY OUT ALIGNMENT OF PIPE TRENCHES TO AVOID OBSTRUCTIONS. PROVIDE ASSURANCE THAT PROPOSED ROUTE OF PIPE WILL NOT INTERFERE WITH BUILDING FOUNDATION BEFORE ANY CUTTING IS BEGUN. SHOULD INTERFERENCE BE FOUND, CONTACT THE ARCHITECT/ENGINEER BEFORE PROCEEDING.

BACKFILL

BACKFILL SHALL NOT BE PLACED UNTIL THE WORK HAS BEEN INSPECTED, TESTED AND APPROVED. USE SUITABLE FRIABLE SOILS AS BACKFILL MATERIAL. DO NOT USE PEAT, SILT, MUCK, DEBRIS OR OTHER ORGANIC MATERIALS. DEPOSIT BACKFILL IN UNIFORM LAYERS. PLACE BACKFILL MATERIAL IN UNIFORM LAYERS, 8" MAXIMUM LOOSE MEASURE. COMPACT TO NOT LESS THAN 95% OF MAXIMUM SOIL DENSITY AS DETERMINED BY ASTM D698 STANDARD PROCTOR.

PLUMBING PIPING HANGER SPACING

MAXIMUM SPACING SHALL BE 10 FOOT.

CLEANING, TESTING AND ADJUSTING

THIS CONTRACTOR SHALL FURNISH ALL LABOR, TOOLS, INSTRUCTIONS, AND SUPERVISION REQUIRED FOR THE PERFORMANCE OF ALL TESTS, CLEANING, AND MAKING NECESSARY ADJUSTMENTS TO OPERATION OF ALL FIXTURES AND EQUIPMENT.

PIPING INSULATION

ALL COLD & HOT WATER PIPING, FITTINGS AND VALVES SHALL BE INSULATED WITH NOMINAL 1-1/2" WALL THICKNESS FIBERGLASS PIPE INSULATION, OR AN APPROVED EQUAL HAVING FLAME SPREAD RATING OF 25 OR LESS AND A SMOKE DENSITY OF 50 OR LESS WHEN TESTED BY ASTM E-84 METHOD.

PIPE INSULATION SHALL BE INSTALLED ACCORDING TO THE PROCEDURES OUTLINED BY THE MANUFACTURE.

FITTING COVER INSULATION SHALL BE FABRICATED AND INSTALLED ACCORDING TO THE MANUFACTURER'S RECOMMENDED PROCEDURES. SWEAT FITTINGS SHALL BE INSULATED WITH MITER CUT PIECES OF FIBERGLASS PIPE INSULATION THE SAME SIZE AS ON ADJACENT PIPING. THREADED FITTINGS SHALL BE INSULATED WITH SLEEVED FITTING COVERS FABRICATED FROM MITER CUT PIECES OF FIBERGLASS PIPE INSULATION ACCORDING TO THE MANUFACTURER'S SLEEVING SIZE RECOMMENDATIONS AND SHALL BE OVERLAPPED 2" AND SEALED TO THE ADJACENT PIPE INSULATION. ALL VALVES SHALL BE INSULATED WITH CUT PIECES OF FIBERGLASS PIPE INSULATIONS. ALL JOINTS AND MITER CUT PIECES ARE TO BE SEALED PER MANUFACTURER'S RECOMMENDATIONS.

SUPPORTING HANGERS SHALL BE DESIGNED TO RESIST COMPRESSION; SUPPORTING DEVICES SUCH AS SHORT WOOD DOWELS OR WOOD BLOCKS SHALL BE USED IN COMBINATION WITH GALVANIZED SHEET METAL HANGER SHIELDS. THE WOOD SUPPORTING DEVICES SHALL BE THE SAME THICKNESS AS THE INSULATION AND SEALED TO THE INSULATION WITH FACTORY APPROVED CONTACT ADHESIVE.

INSTALL THERMAL INSULATION ON CLEAN, DRY SURFACES AFTER ALL TESTING AND INSPECTION IS COMPLETED. INSTALLATION SHALL BE IN STRICT ACCORDANCE WITH THESE SPECIFICATIONS AND WITH MANUFACTURER'S INSTRUCTIONS.

PIPE MATERIAL LIST

DOMESTIC WATER PIPING

ABOVE SLAB INSIDE THE BUILDING SHALL BE SEAMLESS ASTM B 88 TYPE L COPPER WATER TUBE WITH WROUGHT COPPER FITTINGS, ANSI B16.22. SOLDER MATERIAL SHALL BE 99.8% LEAD LEAD FREE AND COMPLIANT WITH THE "SAFE WATER DRINKING ACT". THE USE OF DRILLED-T CONNECTIONS IS NOT PERMITTED. PEX TUBING CONFORMING TO ALL STANDARD APPLICABLE CODE REQUIREMENTS FOR COMMERCIAL APPLICATIONS IS APPROVED AS ALTERNATE TO COPPER.

BELOW SLAB SHALL BE ASTM B 88 TYPE K COPPER WATER TUBE WITH WROUGHT COPPER FITTINGS, ANSI B16.22. ALL JOINTS SHALL BE BRAZED.

CONDENSATE AND INDIRECT DRAIN PIPING SHALL BE

TYPE M COPPER TUBING UP TO 1" ID, TYPE DWV TUBING AND COPPER FITTINGS FOR 1-1/4" AND LARGER SIZES, AND 95-5 SOLDER JOINTS. PEX TUBING CONFORMING TO ALL STANDARD APPLICABLE CODE REQUIREMENTS FOR COMMERCIAL APPLICATIONS IS APPROVED AS ALTERNATE.

SANITARY SOIL WASTE AND VENT PIPING SHALL BE

ABOVE SLAB INSIDE BUILDING SHALL BE SCHEDULE 40 DWV POLYVINYL CHLORIDE PIPE AND FITTINGS CONFORMING TO ASTM D-1784-82 WITH SOLVENT WELDED JOINTS.
IN AIR SUPPLY OR RETURN PLENUMS, AND/OR WHERE FIRE RATED WALLS, PARTITIONS, OR FLOORS ARE PENETRATED, CONTRACTOR SHALL PROVIDE NO-HUB CAST IRON SYSTEM CONFORMING TO CISPI STANDARD NO. 301-75. NEOPRENE GASKETS SHALL CONFORM TO ASTM STANDARD C564-75.

BELOW SLAB SHALL BE SCHEDULE 40 DWV POLYVINYL CHLORIDE PIPE AND FITTINGS CONFORMING TO ASTM D-1784-82 WITH SOLVENT WELDED JOINTS.

COMPRESSED AIR PIPING SHALL BE:

PIPING SHALL BE STANDARD GALVANIZED SCHEDULE 40 STEEL PIPE, IN ACCORDANCE WITH ASA SPECIFICATION B36.10. FITTINGS FOR USE WITH GALVANIZED PIPE SHALL BE STANDARD MALLEABLE IRON FITTINGS.

NATURAL GAS PIPING SHALL BE

ABOVE GRADE SHALL BE SCHEDULE 40 BLACK STEEL, SEAMLESS, OR ELECTRIC RESISTANCE WELDED, ASTM A-53 WITH WELDED JOINTS AND STEEL FITTINGS OF THE SAME THICKNESS AS PIPE. PIPING 2 INCHES AND SMALLER MAY BE SCHEDULE 40 BLACK STEEL PIPE WITH MALLEABLE IRON 150 PSI CLASS FITTINGS ANSI B16.3, BANDED AIR TESTED, AND SCREWED JOINTS. ALL GAS PIPING AND FITTINGS OUTDOORS SHALL BE PAINTED WITH TWO COATS OF BRUSHED ON RUST PREVENTATIVE SILVER PAINT. ONE COAT OF RUST PREVENTATIVE PRIMER SHALL BE APPLIED TO THE PIPE IMMEDIATELY AFTER INSTALLATION.

BELOW GRADE OUTSIDE BUILDING SHALL BE MEDIUM DENSITY POLYETHYLENE MANUFACTURED BY POLY PIPE INDUSTRIES, INC. OR PERFORMANCE PIPE. POLYETHYLENE PIPE SHALL BE ASTM D3350 GRADE PE24 CELL CLASSIFICATION AND ASTM D1248 CLASS B MATERIAL CLASSIFICATION.

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455 School St.
Suite 46
Tomball, Texas 77375
832.643.0368 phone
ko@kodesign-mep.com

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WALLER COUNTY

JAIL GARAGE

200 Sheriff R Glenn Smith Dr.
Hempstead, TX 77445

STATE OF TEXAS
JOHN ROBERT BUNT
85353
REGISTERED
PROFESSIONAL ENGINEER
4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

PROJECT NO.: .
DRAWN BY: AL QC: KO

PLUMBING LEGENDS & SPEC'S

P-001

PLUMBING FIXTURE SCHEDULE

PLAN MARK	WASTE /TRAP	VENT	CW	HW	DESCRIPTION
WC-1	4"	2"	1"	--	WATER CLOSET: AMERICAN STANDARD MADERA-FLOWISE 16-1/2" HEIGHT #3043.001 (A.D.A. COMPLIANT) HIGH EFFICIENCY TOILET, FLOOR MOUNTED, VITREOUS CHINA, 1.28 GALLONS PER FLUSH, ELONGATED BOWL, SIPHON JET, 1-1/2-INCH TOP SPUD, 14" HIGH WITH FLOOR OUTLET AND BOLT CAPS. 10 OR 12" ROUGH-IN. FLUSH VALVE: SLOAN ROYAL #111-1.28TP LOW CONSUMPTION, 1.28 GALLONS PER FLUSH, 1-1/2- INCH TOP SPUD, 1-INCH SCREWDRIVER ANGLE STOP, VACUUM BREAKER AND TRAP PRIMER, #VBF-72-A TOILET SEAT: CHURCH #9500SSCT ELONGATED, SOLID PLASTIC OPEN FRONT, LESS COVER WITH HEAVY DUTY STAINLESS STEEL HARDWARE AND CHECK HINGES, GLASS FILLED NYLON NUT WITH BREAK-AWAY NUT. MOUNTING HEIGHT: INSTALLED IN ACCORDANCE WITH A.D.A. REGULATIONS FOR KINDERGARTEN AGE. RE: NOTE 2
U-1	2"	2"	3/4"	--	URINAL: AMERICAN STANDARD WASHBROOK FLOWISE #6590.005 (A.D.A. COMPLIANT) HIGH EFFICIENCY URINAL, WALL HUNG, VITREOUS CHINA, 0.125 GALLON PER FLUSH, WASHOUT ACTION, 3/4-INCH TOP SPUD, INTEGRAL TRAP WITH 2-INCH FEMALE FLANGED OUTLET AND WALL HANGER. FLUSH VALVE: SLOAN ROYAL #186-0.125 MANUAL OPERATED, 0.125 GALLON PER FLUSH, 3/4-INCH TOP SPUD, 3/4-INCH SCREWDRIVER ANGLE STOP AND VACUUM BREAKER. CARRIER: WADE #400 SERIES UNIVERSAL HANGER PLATE CARRIER WITH HEAVY DUTY PIPE UPRIGHTS AND WELDED BASE FEET. MOUNTING HEIGHT: INSTALLED IN ACCORDANCE WITH A.D.A. REGULATIONS. RE: NOTE 2
L-1	2"	2"	1/2"	1/2"	LAVATORY: KOHLER KINGSTON K-2005-0 (T.A.S. COMPLIANT) WALL MOUNTED, WHITE VITREOUS CHINA, NOMINAL 21" X 18" RECTANGULAR LAVATORY WITH CONCEALED FRONT OVERFLOW. FAUCET: DELTA B501LF SINGLE HANDLE MANUAL FAUCET. ROUGH-INS, FAUCET INSTALLATION, AND FINAL CONNECTIONS BY PLUMBING CONTRACTOR. PLUMBING CONTRACTOR TO PROVIDE STRAINER, ESCUTCHEONS AT WALL, SUPPLIES AND STOPS, ETC. AS REQUIRED IN ORDER TO PROPERLY INSTALL FIXTURE.
MS-1	3"	2"	3/4"	3/4"	MOP SINK: FIAT PRODUCTS: MSB-2424. MOP SINK BASIN, 24" X 24" X 10" HIGH, MOLDED STONE, AND GRID STRAINER DRAIN. PROVIDE STAINLESS STEEL WALL GUARDS IN QUANTITY AS REQUIRED TO PROTECT ADJACENT WALLS. FAUCET: CHICAGO #897-RCF WALL MOUNTED 26" ABOVE TOP LEDGE OF BASIN, ALL BRASS SUPPLY FAUCET, 10" SPOUT WITH WALL BRACE AND PAIL HOOK, 3/4" MALE HOSE THREADED OUTLET AND VACUUM BREAKER, LEVER HANDLES, INTERGRAL STOP ARMS, WALL FLANGES, 1/2" FEMALE THREADED INLETS AND ADJUSTABLE CENTERS.
EDF-1	2"	2"	1/2"	--	ELECTRIC DRINKING FOUNTAIN: ELKAY #EDFPBM117C (T.A.S. COMPLIANT). INDOR ELKAY SWIRLFLOW BI-LEVEL FOUNTAIN MECHANICAL BUBBLER WITH IN-WALL CARRIER NON-FILTERED NON-REFRIGERATED STAINLESS. FURNISHED WITH FLEXIGUARD, SAFETY BUBBLER. MECHANICAL FRONT BUBBLER BUTTON ACTIVATION. PRODUCT SHALL BE WALL MOUNT (ON WALL). PLUMBING CONTRACTOR TO PROVIDE ESCUTCHEONS AT WALL, SUPPLIES AND STOPS, ETC. AS REQUIRED IN ORDER TO PROPERLY INSTALL FIXTURE. CARRIER: PROVIDE MANUFACTURER'S RECOMMENDED CARRIER. REMOTE WATER CHILLER: ELKAY ECH8 REMOTE TYPE, ELECTRIC REFRIGERATED WATER CHILLER UNIT. CHILLING CAPACITY OF 8.0 GPH (GALLONS PER HOUR) OF 50° F DRINKING WATER, BASED ON 80° F INLET WATER AND 90° F AMBIENT, PER ASHRAE 18 TESTING. INSTALLS DIRECTLY UNDER FOUNTAIN OR OTHER APPLICATION, OR MAY BE LOCATED IN SERVICE AREA TO SERVE UP TO 2 REMOTE OUTLETS (WITHIN 15 FEET RECOMMENDED) ELECTRICAL INFORMATION: 120V/60Hz, 5 FULL LOAD AMPS (370 WATTS)
EWS-1	2"	2"	1-1/4"	--	EMERGENCY EYE WASH STATION: GUARDIAN #GBF1909-GC BARRIER-FREE COMBINATION WIDE AREA EYE/FACE WASH AND SHOWER SAFETY STATION. SHOWER HEAD AND PULL ROD ARE EXTENDED FOR IMPROVED ACCESS. BOWL IS LOWERED AND EXTENDED TO PERMIT ACCESS BY WHEELCHAIR USER. PROFILE OF UNIT IS FLATTENED TO COMPLY WITH MAXIMUM HEIGHT AND KNEE CLEARANCE REQUIREMENTS. ROTATE DRAIN TEE TO FLOOR DRAIN, IF PRESENT.
RVB-1	--	--	1/2"	--	REFRIGERATOR VALVE BOX: SIOUX CHIEF 696-G101(X)F REFRIGERATOR VALVE BOX, 7-1/4" X 5-3/4" X 3-1/2" ABS OUTLET BOX, 1/4" OUTLET CONNECTION. SUPPLY CONNECTION TO BE SELECTED BY CONTRACTOR (X) = (C = 1/2" MALE CPVC, M = 1/2" MIP/F.SWT P = 1/2" MALE SWEAT/PRESS/PUSH, V = VIEGA PUREFLOW PEX, W = 1/2" PEX F1960 GRIP, X = 1/2" PEX F1807/F2159 CRIMP)
HB-1	--	--	3/4"	--	HOSE BIBB: MIFAB HY-1000 HOSE BIBB. EXPOSED TYPE WALL FAUCET WITH 3/4" F.P.T. INLET AND 3/4" MALE HOSE THREAD OUTLET AND SELF DRAINGING ANTI-SIPHON VACUUM BREAKER. ROUGH CHROME PLATED BRASS FINISH W/ CLEAR PLASTIC WHEEL.
WH-1	--	--	3/4"	--	WALL HYDRANT: MIFAB MHY-20, CONCEALED BOX TYPE, NON-FREEZE, 3/4" MALE HOSE THREAD OUTLET, SELF-DRAINING WITH ANTI-SIPHON VACUUM BREAKER. COORDINATE WALL THICKNESS PRIOR TO ORDER.
FD-1	REF. TO FLOOR PLANS	2"	--	--	FLOOR DRAIN: SIOUX CHIEF 832-XX-NR-V PVC BODY WITH 6.5"ROUND STAINLESS STEEL GRATE, ALLOWS ADJUSTMENT BEFORE AND AFTER THE CONCRETE POUR. TRAP PRIMER PORT SHALL BE THREADED 1/2" FIP FOR OPTIONAL CONNECTION. STRAINER WITH VANDAL PROOF SCREWS. XX = SIZE OF FLOOR DRAIN. REFER TO FLOOR PLAN FOR SIZING.
4"TD-1	4"	2"	--	--	TRENCH DRAIN: SIOUX CHIEF 865 GRATE: SIOUX CHIEF 865-GHC END CAP: SIOUX CHIEF 865-EC TRENCH DRAIN CHANNEL SHALL BE SLOPED (0.75%) OR NEUTRAL AND SEAMLESSLY MOLDED FROM LIGHTWEIGHT, DURABLE, CHEMICALRESISTANT MATERIAL. CHANNEL SHALL INCLUDE CONSTRUCTION COVERS (2), STAINLESS STEEL GRATE ANCHORS (6), AND INTEGRAL BOTTOM OUTLET FOR OPTIONAL CONNECTION. CHANNEL SHALL BE DESIGNED WITH STRUCTURE-REINFORCING RIBS AND SIDE ANCHORS (12 PER CHANNEL) FOR SECURING CHANNEL TO RE-BAR (⅜" #4). CHANNELS SHALL CONNECT END-TO-END, IN PROPER SEQUENCE, WITH MECHANICAL, TONGUE-IN-GROOVE STYLE JOINT. CHANNEL SHALL HAVE A MODIFIED BOTTOM RADIUS TO IMPROVE FLOW RATE AND REDUCE SEDIMENT BUILDUP. DESIGNED IN ACCORDANCE WITH ASME A112.6.3-01 REFER TO FLOOR PLAN FOR SLOPPED PIECE CALLOUTS.
WCO	REFER TO PLANS	--	--	--	WALL CLEANOUT: SIOUX CHIEF 873-V 20 GAUGE 430 STAINLESS STEEL KIT SHALL INCLUDE A REMOVABLE STAINLESS STEEL ACCESS COVER, WHICH SHALL FASTEN WITH A STAINLESS STEEL SCREW TO A CAST BRASS CLEANOUT PLUG. PLUG SHALL BE TAPPED TO ACCEPT SCREW. KIT SIZE TO BE SELECTED BY CONTRACTOR (240 = 2" PLUG WITH 4" COVER, 350 = 3" PLUG WITH 5" COVER & 460 4" PLUG WITH 6" COVER.)
FCO	REFER TO PLANS	--	--	--	FLOOR CLEANOUT: SIOUX CHIEF 851-4-X-N-V STAINLESS FINISHED CLEANOUT SHALL HAVE A SCH. 40 HUB CONNECTION, WHICH CONFORMS TO ASTM D2665 {PVC). CONNECTION TO DRAINAGE SYSTEM SHALL BE MADE WITH A SOLVENT WELD JOINT TO PVC PIPE. CLEANOUT COVER SHALL MEET APPLICABLE LOAD REQUIREMENTS FOR INTENDED USE. CLEANOUT SHALL INCLUDE A SLOTTED, POLYPROPYLENE CLEANOUT PLUG, WITH THREADED BRASS INSERT TO ACCEPT COVER SCREW. CONNECTION SIZE TO BE SELECTED BY CONTRACTOR X = (3 = 3" SCH.40 HUB, 4 = 4" SCH.40 HUB & 6 = 6" SCH.40 HUB,) ADD OPTION C FOR CARPET MARKER.
ECO	REFER TO PLANS	--	--	--	EXTERIOR CLEANOUT: SIOUX CHIEF 851-4-X-I-V STAINLESS CLEANOUT SHALL HAVE A SCH. 40 HUB CONNECTION, WHICH CONFORMS TO ASTM D2665 {PVC). CONNECTION TO DRAINAGE SYSTEM SHALL BE MADE WITH A SOLVENT WELD JOINT TO PVC PIPE. CLEANOUT COVER SHALL MEET APPLICABLE LOAD REQUIREMENTS FOR INTENDED USE. CLEANOUT SHALL INCLUDE A SLOTTED, POLYPROPYLENE CLEANOUT PLUG, WITH THREADED BRASS INSERT TO ACCEPT COVER SCREW. CONNECTION SIZE TO BE SELECTED BY CONTRACTOR X = (3 = 3" SCH.40 HUB, 4 = 4" SCH.40 HUB & 6 = 6" SCH.40 HUB,) IF LOCATED IN ASPHALT OR DIRT PROVIDE 18" X 18" X 4" CONCRETE PAD FOR SINGLE CLEANOUT AND 24" X 18" X 4" CONCRETE PAD FOR DOUBLE CLEANOUT.

NOTE:
1. CONTRACTOR SHALL VERIFY ALL PLUMBING FIXTURES SELECTIONS WITH OWNER/ARCHITECT PRIOR TO PURCHASE AND INSTALLATION.
2. SENSOR LOCATION AND POSITIONING IS CRITICAL. FAILURE TO PROPERLY POSITION THE SENSOR BOXES TO THE PLUMBING ROUGH-INS WILL RESULT IN IMPROPER INSTALLATION AND IMPAIR PRODUCT PERFORMANCE. ALL TRADESMEN INVOLVED WITH THE INSTALLATION OF THE SENSOR OPERATE FLUSH VALVES MUST COORDINATE ALL THEIR WORK TO ASSURE PROPER PRODUCT INSTALLATION. OWNER WILL BEAR NO ADDITIONAL EXPENSE.
3. ROUGH-INS, FAUCET INSTALLATION, AND FINAL CONNECTIONS BY PLUMBING CONTRACTOR. PLUMBING CONTRACTOR TO PROVIDE STRAINER, ESCUTCHEONS AT WALL, SUPPLIES AND STOPS, ETC. AS REQUIRED IN ORDER TO PROPERLY INSTALL FIXTURE.

TANKLESS GAS WATER HEATER

ITEM NO.	TOTAL BTUH INPUT (NATURAL GAS)	MAXIMUM GPM DELIVERED AT 45°F RISE	MINIMUM FLOW RATE (GPM)	ELECTRICAL REQUIRED	TEMPERATURE SETTING (°F)	AIR INTAKE, EX. GAS VENT, HW, GAS, HWR, COND., CW.	MANUFACTURER COMMENT
TGWH-1	150,000 (3.5-10.5 I.W.C.)	8.7	0.5	120V/1ø/60HZ (350W)	120°	2" 2" 3/4", 3/4" 3/4", 3/4" 3/4"	NAVIEN #NPE-150A2 OUTDOOR, WALL MOUNTED, POWER VENTED TANKLESS GAS WATER HEATER

NOTES:
1. CONTRACTOR SHALL FOLLOW MANUFACTURER'S INSTALLATION INSTRUCTIONS. CONTRACTOR SHALL FOLLOW ALL APPLICABLE CODE REQUIREMENTS.
2. PROVIDE HOT WATER EXPANSION TANK DOWNSTREAM OF CHECK VALVE ON COLD WATER SUPPLY. (THERM-X-TROL ST-5).
3. WATER HEATERS ARE PROVIDED WITH INTEGRAL HOT WATER RECIRCULATION PUMPS. PUMPS SHALL CIRCULATE HOT WATER INTERNALLY DURING OCCUPIED HOURS.

THERMOSTATIC MIXING VALVES

ITEM NO.	INLET HOT WATER TEMP (°F)	OUTLET MIXED WATER TEMP (°F)	MINIMUM FLOW (GPM)	DESIGN FLOW (GPM)	PRESSURE DROP @ DESIGN FLOW (PSI)	VALVE FINISH	MANUFACTURER / MODEL NO.
TMV-1	140°	110°	0.5	4	5.0	ROUGH BRONZE	WATTS LFMMV SERIES

NOTES:
1. MAKE WATER CONNECTIONS TO THERMOSTATIC MIXING VALVE(S) IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDATIONS.
2. PROVIDE PIPE INCREASERS AND/OR VALVES AS REQUIRED.

SHOCK ARRESTORS

P.D.I. SYMBOL	FIXTURE UNITS	CHAMBER LENGTH	SWEAT CONNECTION
A	1-11	9-5/8"	1/2"
B	12-32	11-3/4"	3/4"
C	33-60	14-11/18"	1"
D	61-113	12-3/8"	1"
E	114-154	15-3/8"	1"
F	155-330	17-3/8"	1"

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STATE OF TEXAS
JOHN ROBERT BUNT
85353
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4/10/2025

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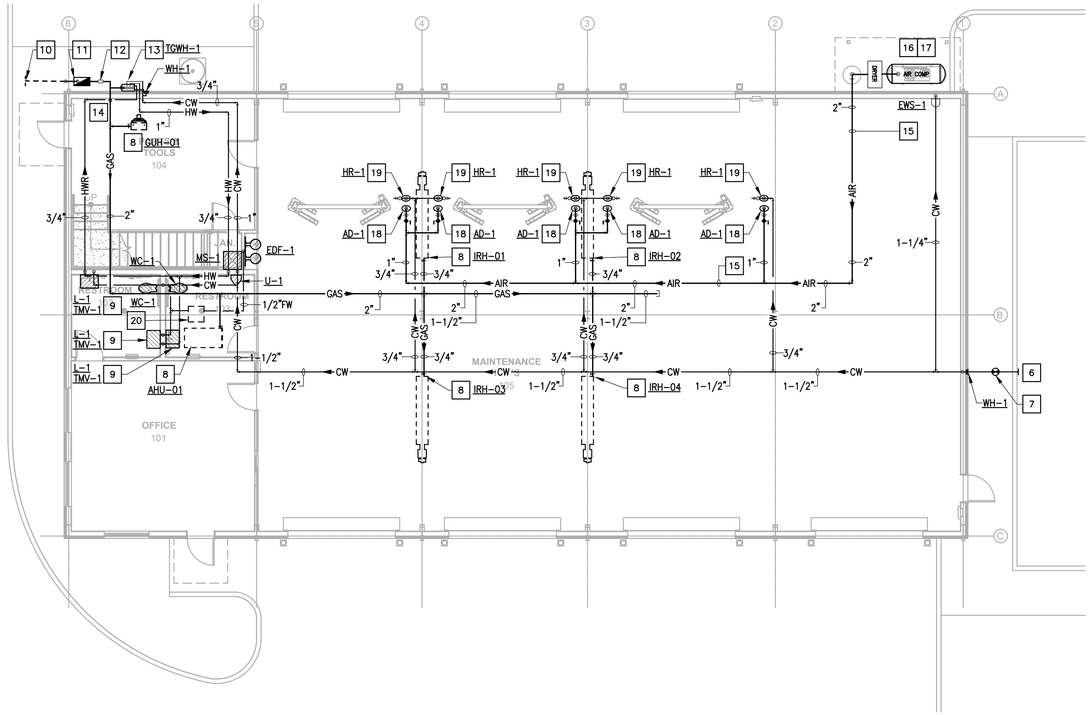
PLUMBING PLAN SCHEDULES

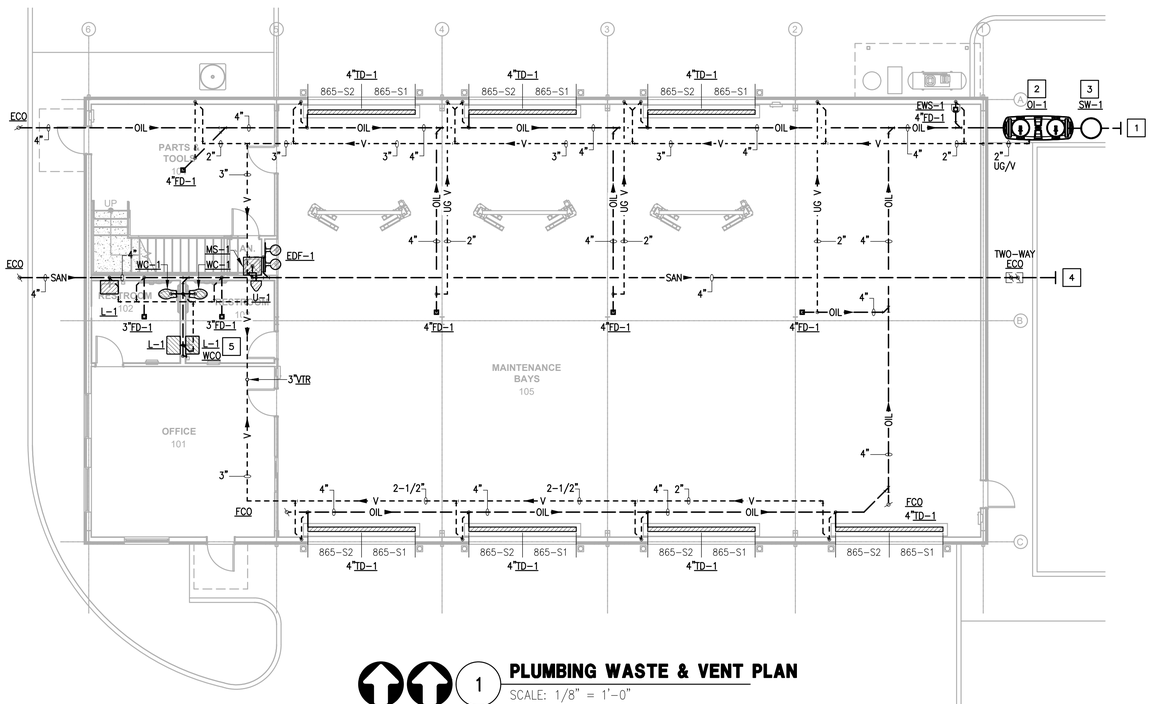
P-002



1 PLUMBING WATER, AIR & GAS PLAN

SCALE: 1/8" = 1'-0"

TRUE NORTH PLAN NORTH



1 PLUMBING WASTE & VENT PLAN

SCALE: 1/8" = 1'-0"

TRUE NORTH PLAN NORTH

PLUMBING GENERAL NOTES:

1. REFER TO CIVIL DRAWINGS FOR CONTINUATION OF DOMESTIC WATER AND SANITARY WASTE UTILITIES.
2. REFER TO CIVIL DRAWINGS FOR SIZE AND LOCATION OF DOMESTIC WATER METER ON SITE.
3. REFER TO ARCHITECTURAL/CIVIL DRAWINGS FOR BUILDING FINISHED FLOOR ELEVATION.
4. FIELD VERIFY EXACT LOCATION, SIZE, DEPTH, DIRECTION OF FLOW, CAPACITY, PIPE MATERIAL AND CONDITION OF EXISTING SITE DOMESTIC WATER AND SANITARY WASTE PIPING PRIOR TO BEGINNING CONSTRUCTION TO ENSURE THAT PROPER CONNECTIONS TO AND EXTENSION OF SUCH UTILITIES CAN BE MADE.
5. INVERT ELEVATIONS LISTED ARE APPROXIMATE. PRIOR TO CONSTRUCTION, COORDINATE FINAL INVERT ELEVATIONS OF BUILDING SANITARY OUTFALLS AND SITE PIPING WITH SITE UTILITY CONTRACTOR. MAKE ADJUSTMENTS AS REQUIRED TO ENSURE PROPER CONNECTIONS TO SITE UTILITIES.
6. PRIOR TO BEGINNING CONSTRUCTION, COORDINATE PLUMBING BACKFLOW PREVENTION REQUIREMENTS WITH THE LOCAL CODE AUTHORITY AND PROVIDE AS DIRECTED.
7. CONTRACTOR SHALL COORDINATE ROUTING OF PIPING BELOW SLAB WITH COLUMN FOOTINGS, GRADE BEAMS, UNDERGROUND PLUMBING AND ELECTRICAL UTILITIES, AND OTHER SUB-SURFACE BUILDING ELEMENTS.
8. INSULATE ALL PEX PIPING LOCATED IN EXTERIOR WALLS, AND AS REQUIRED BY LOCAL CODE REQUIREMENTS.
9. CONTRACTOR SHALL COORDINATE ROUTING OF PIPING IN CEILING SPACES WITH MECHANICAL AND ELECTRICAL EQUIPMENT, DUCTWORK AND CONDUIT. SHOULD A CONFLICT OCCUR THE CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER PRIOR TO INSTALLING AN ALTERNATE PIPING PLAN.
10. MAINTAIN MINIMUM 10'-0" DISTANCE BETWEEN VENT TERMINALS THROUGH ROOF AND ALL FRESH AIR INTAKES.
11. COORDINATE ALL FIXTURE AND EQUIPMENT LOCATIONS AND CONNECTION REQUIREMENTS WITH LATEST ARCHITECTURAL DRAWINGS, SPECIFICATIONS, AND MANUFACTURER RECOMMENDATIONS PRIOR TO ANY ROUGH-INS.
12. DO NOT ROUGH-IN FROM THESE DRAWINGS. REFER TO LATEST ARCHITECTURAL DRAWINGS FOR DIMENSIONED LOCATIONS.
13. CONTRACTOR TO COORDINATE ALL WORK WITH THE WORK OF OTHER TRADES TO AVOID CONFLICTS AND TO MINIMIZE INTERRUPTION OF SERVICES.
14. ALL WORK, METHODS AND INSTALLATIONS INVOLVED IN THE PLUMBING DESIGN SHALL BE IN ACCORDANCE WITH THE CITY BUILDING CODE AND INSPECTION REGULATIONS AND ALL OTHER OFFICIALS HAVING JURISDICTION.
15. UPON COMPLETION OF WORK, THOROUGHLY ROD OUT AND FLUSH ALL SANITARY PIPING TO ENSURE IT IS FREE FROM BLOCKAGES.
16. ALL INSTALLATION OF PEX PIPING SYSTEM IS TO BE IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND LOCAL CODE REQUIREMENTS.

PLUMBING KEYED NOTES:

1. 4" SANITARY WASTE LINE WITH 2-WAY EXTERIOR CLEANOUT. (80.5 DFU's) MINIMUM STARTING I.E. = 5'-6" B.F.G.. REFER TO DETAIL #1 ON SHEET PS-001 FOR CONTINUATION.
2. APPROXIMATE LOCATION OF NEW SAND/OIL INTERCEPTOR. COORDINATE EXACT LOCATION WITH BUILDING OWNER AND ARCHITECT. REFER TO DETAIL #1 ON SHEET P-302 FOR MORE INFORMATION.
3. APPROXIMATE LOCATION OF NEW SAMPLING WELL SW-1. COORDINATE EXACT LOCATION WITH BUILDING OWNER AND ARCHITECT. REFER TO DETAIL #2 ON SHEET P-302 FOR MORE INFORMATION.
4. 4" SANITARY WASTE LINE WITH 2-WAY EXTERIOR CLEANOUT. (32.5 DFU's) MINIMUM STARTING I.E. = 4'-0" B.F.G.. REFER TO DETAIL #1 ON SHEET PS-001 FOR CONTINUATION.
5. PROVIDE BRANCH WYE TAILPIECE AT FIXTURE FOR HVAC CONDENSATE LINE. LOWER ROUGH-IN HEIGHT ACCORDINGLY. COORDINATE WITH MECHANICAL CONTRACTOR.
6. PROVIDE 1-1/2" DOMESTIC WATER SERVICE (43.75 WFU). ESTIMATED PEAK FLOW = 48.0 GPM. MINIMUM WATER PRESSURE REQUIREMENT: 60 PSI RESIDUAL AT PEAK FLOW AT 5'-0" MARK FROM BUILDING LIMITS. REFER TO DETAIL #1 ON SHEET PS-001 FOR CONTINUATION.
7. DOMESTIC WATER ENTRY WITH SHUT-OFF VALVE IN VALVE BOX. REFER TO DETAIL #1 ON SHEET P-301 FOR MORE INFORMATION.
8. COORDINATE FINAL LOCATION AND POINT OF GAS CONNECTION WITH PLUMBING CONTRACTOR. PROVIDE SHUT-OFF VALVE. REFER TO NATURAL GAS RISER DIAGRAM ON SHEET P-201 DETAIL #3 FOR MORE INFORMATION.
9. PROVIDE PLUMBING FIXTURE WITH THERMOSTATIC MIXING VALVE TMV-1 TO TEMPER HOT WATER TO 110°F.
10. NATURAL GAS SERVICE LINE TO METER BY LOCAL UTILITY PROVIDER.
11. NEW NATURAL GAS SERVICE, METER, AND REGULATOR SET. COORDINATE METER LOCATION AND INSTALLATION IN ADVANCE WITH LOCAL GAS PROVIDER. MAKE ADJUSTMENTS AS REQUIRED. TOTAL CONNECTED LOAD: (1,070,000 BTU/H) AT 2-PSI OUTLET PRESSURE.
12. PROVIDE NEW GAS REGULATOR NORGAS #NGR04. (OR APPROVED EQUAL) COORDINATE EXACT LOCATION WITH PLUMBING CONTRACTOR PRIOR TO ROUGH-IN.
13. PROVIDE TANKLESS GAS WATER HEATER TGWH-1 (150,000 BTU) MOUNTED TO INTERIOR WALL COMPLETE WITH WATER, GAS, SUPPLY AIR, GAS VENT AND ISOLATION VALVES, ETC. IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS AND LOCAL CODE REQUIRMENTS. COORDINATE FINAL LOCATION WITH OWNER. PROVIDE 3/4" HOT, COLD AND HOT WATER RETURN CONNECTIONS. ROUTE WATER HEATER T&P RELIEF AND DRAIN LINES DOWN EXTERIOR GRADE WITH ELBOWS TURNED DOWN.
14. SLEEVE 2" NATURAL GAS WATER TIGHT THROUGH EXTERIOR WALL. COORDINATE ROUTING & PAINTING OF EXTERIOR GAS PIPING WITH ARCHITECT PRIOR TO ROUGH-IN.
15. ROUTE ALL PIPING TIGHT TO STRUCTURE, CLEAR FROM OVERHEAD DOORS. TYPICAL ALL PIPING.
16. COORDINATE ALL REQUIREMENTS OF COMPRESSED AIR SYSTEM WITH OWNER & EQUIPMENT SUPPLIER PRIOR TO INSTALLATION.
17. AC-1, DUPLEX TANK MOUNTED AIR COMPRESSOR WITH AFTERCOOLERS AND REFRIGERATED AIR DRYERS TO SERVE SHOP AREA WALL-MOUNTED AIR DROPS AND OVERHEAD HOSE REELS. REFER TO SCHEDULE AND DETAIL SHEETS. MOUNT ON 6" CONCRETE PAD.
18. PROVIDE 3/4" AIR SUPPLY TO OVERHEAD HOSE REEL. COORDINATE FINAL LOCATION, POINT OF CONNECTION, AND CONNECTION REQUIREMENTS WITH OWNER/EQUIPMENT SUPPLIER. MAKE ADJUSTMENTS AS REQUIRED. MAKE CONNECTION TO HOSE REEL IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. TYPICAL.
19. PROVIDE CEILING MOUNTED HOSE RHEEL WITH RETRACTABLE HOSE. COORDIANTE EXACT SELECTION, LOCATION AND MOUNTING WITH OWNER PRIOR TO ANY WORK BEING DONE.
20. PROVIDE REMOTE WATER CHILLER ON MEZZANINE ABOVE FOR ELECTRIC DRINKING FOUNTAIN EDF-1. COORDINATE EXACT LOCATION WITH OWNER/ARCHITECT PRIOR TO ROUGH-IN.

WATER HEATER CALC'S

Fixture	Quanity	GALLONS PER Min (GPH's per type of fixture)	Total Gallons per Minute
Lavatory	3	0.5	1.50
Mop Sink	1	2.2	2.20
GPM Demand	-	-	3.70

Plumbing Calculations

Fixture	Quanity	Water Fixture units (WFU's per type of fixture)	Drainage/Vent Fixture units (DFU's per type of fixture)	Total Water Fixture Units Per Fixture	Total Drainage Fixture units Per Fixture
Water Closet	2	10	4	20	8
Urinal	1	5	2	5	2
Lavatory	4	2	1	8	4
Drining Fountain	1	0.25	0.5	0.25	0.5
Floor Drain	2	-	6	-	12
Mop Sink	1	3	6	3	6
Drains on San/Oil System	10	-	8	-	80
Hose Bib / Wall Hydrant	5	2.5 for first & 1.0 for rest	-	7.5	-
Total Fixture Units				43.75	112.50

NOTE TO CONTRACTOR:

ALTHOUGH THE ENGINEER HAS MADE EVERY EFFORT TO VERIFY COMPRESSED AIR EQUIPMENT & DROPS. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING WITH THE EQUIPMENT SUPPLIER /OWNER FOR FINAL LOCATIONS, SIZING AND ANY ADDITIONAL EQUIPMENT & PIPING TO ENSURE THERE IS A COMPLETE WORKING SYSTEM.

NOTES TO CONTRACTOR:

ROUTE DOMESTIC WATER LINES ABOVE CONCEALED CEILING SPACES WHEREVER POSSIBLE. IN EXPOSE CEILING SPACES CONTRACTOR SHALL COORDINATE EXACT ROUTING WITH ARCHITECT/OWNER AND OTHER DISCIPLINES OWNER PRIOR TO CONSTRUCTION.

CONTRACTOR TO BE AWARE OF OBSTRUCTIONS AND BE PREPARED TO OFFSET PIPING BOTH VERTICAL AND HORIZONTALLY TO ROUTE PLUMBING SYSTEM.

ALL WATER PIPES ARE TO BE JACKETED & INSULATED.

OIL SEPARATOR CALCULATIONS	
SERVICE AREA	3800 SQ. FT.
OIL SEPARATOR SIZING	
6.0 CU. FT. FOR FIRST 100 SQ. FT. OF DRAINAGE AREA	6 CU. FT.
1.0 CU. FT. FOR EACH ADDITIONAL 100 SQ. FT. OF DRAINAGE AREA	37 CU. FT.
CU. FT. REQUIREMENT	43 CU. FT.
GAL. REQUIREMENT	322 GAL

Sizing methodology complies with UPC section 1017.2 and IPC section 1003.4.2.2.

SAND-OIL SEPARATOR CALCULATIONS

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PROFESSIONAL ENGINEER
6/10/2025

REV	DATE:	ISSUED FOR:
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1	06.10.25	COMMENTS

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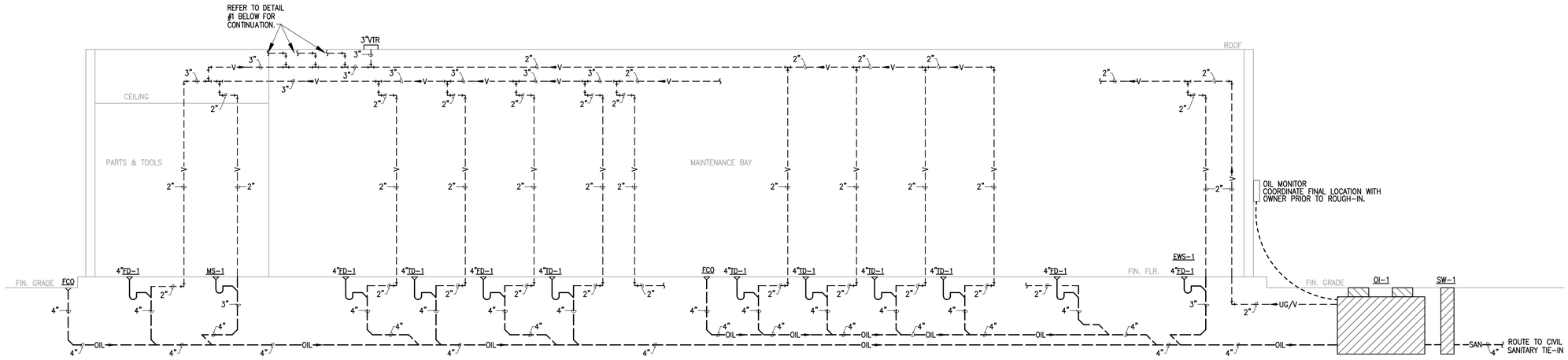
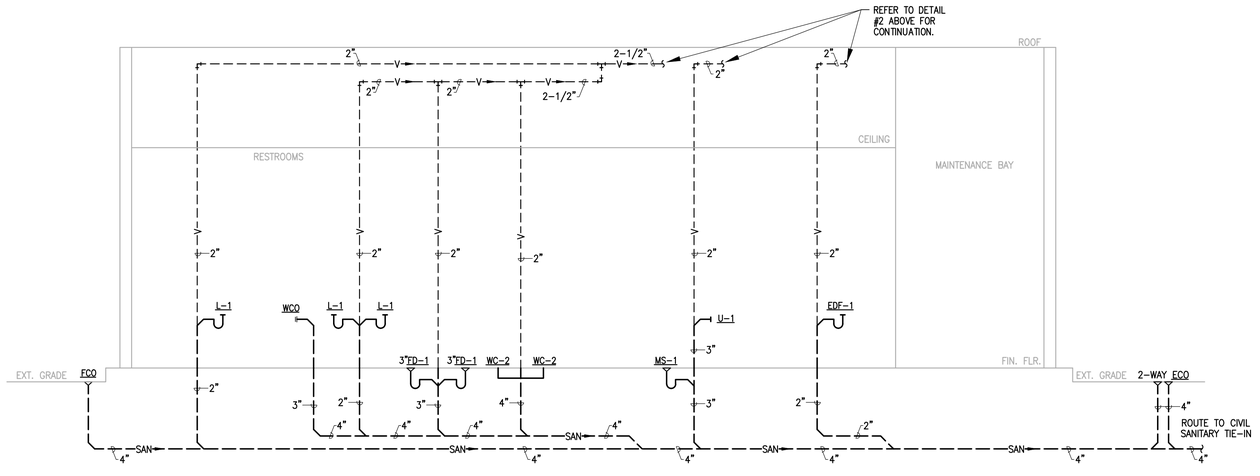
PLUMBING FLOOR PLANS

P-101



2 **PLUMBING SAND/OIL WASTE & VENT RISER DIAGRAM**
SCALE: NONE



1 **PLUMBING WASTE & VENT RISER DIAGRAM**
SCALE: NONE

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STATE OF TEXAS
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85353
REGISTERED
PROFESSIONAL ENGINEER
4/10/2025

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PLUMBING WASTE & VEST RISERS

P-201

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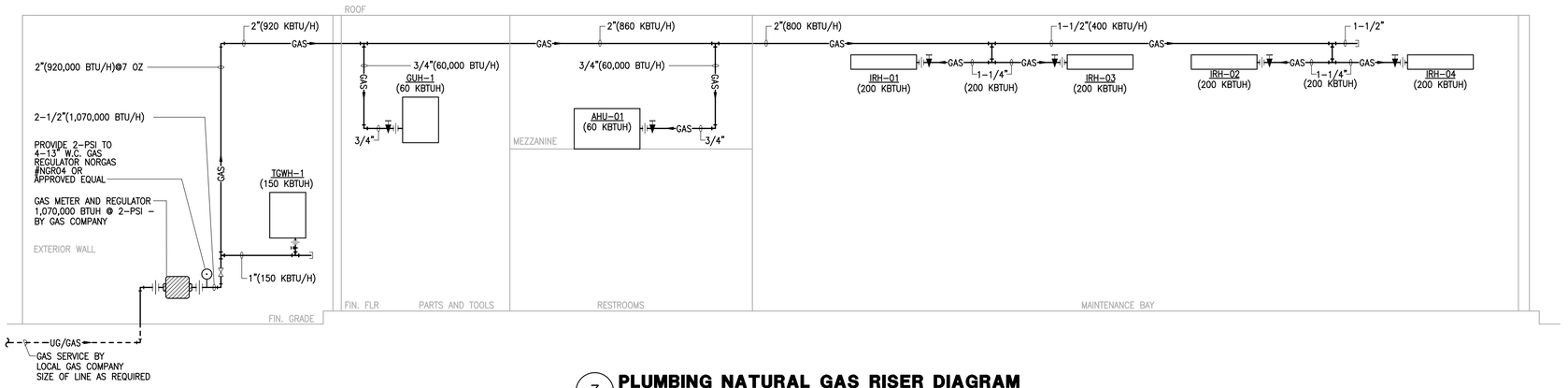


3 PLUMBING NATURAL GAS RISER DIAGRAM

SCALE: NONE

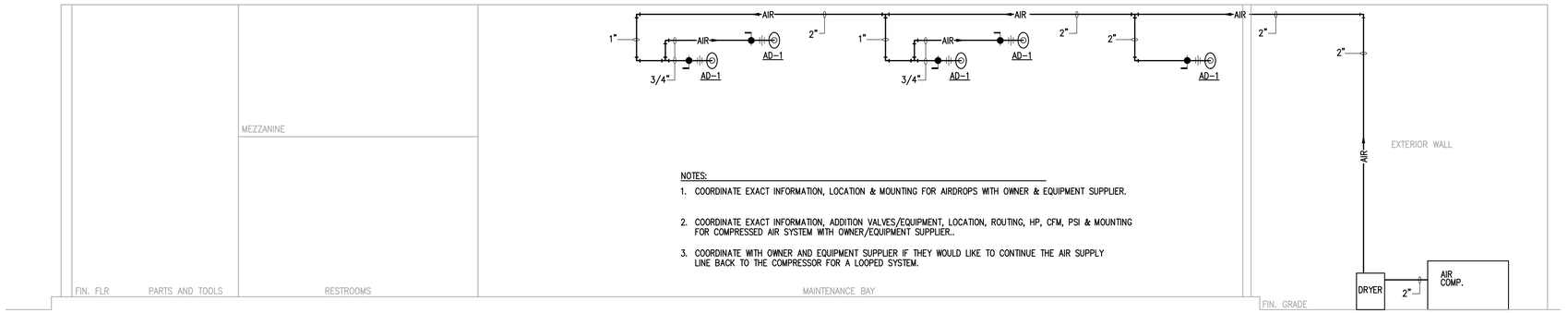
GAS PIPING SIZED ON A MAXIMUM DEVELOPED LENGTH OF 120' LINEAL FEET

NOTES:

1. GAS PIPING RUN CONCEALED IN WALLS, CHASES, OR ABOVE CEILINGS SHALL BE INSTALLED IN CHASES VENTILATED TO THE OUTSIDE ATMOSPHERE AT TOP AND BOTTOM, OR IN METAL SLEEVES OR CONDUIT VENTED TO THE OUTSIDE ATMOSPHERE. INACCESSIBLE PIPING SHALL BE ALL WELDED. COMPLY WITH APPLICABLE NFPA REGULATIONS.
2. GAS PIPING INSTALLED BELOW GRADE SHALL BE COATED WITH REPUBLIC STEEL CORPORATION (US) "X-TRU-COAT HIGH DENSITY POLYETHYLENE EXTRUDED COATING, FACTORY-APPLIED WITH A FLUID MASTIC TO A MINIMUM THICKNESS OF 0.040-INCH. FIELD WELDS, JOINTS, AND FITTINGS SHALL BE PROTECTED WITH A MASTIC UNDERCOAT AND BY WRAPPING AT LEAST TWO LAYERS OF "X-TRU-TAPE" INSTALLED AS INSTRUCTED BY MANUFACTURER. COMPLY WITH APPLICABLE NFPA REGULATIONS. ALL GAS PIPING BELOW GRADE SHALL ALSO BE INSTALLED WITH A PVC SLEEVE.
3. PLUMBING CONTRACTOR TO VERIFY PRESSURE FOR EACH PIECE OF EQUIPMENT AND PROVIDE PRESSURE REGULATOR(S) AS REQUIRED FOR A COMPLETE WORKING SYSTEM.

GAS PIPE CALCULATIONS

MEASURED LENGTH LONGEST RUN	= 100'
ADD FOR VALVES AND FITTINGS (20%)	= 20'
TOTAL EQUIVALENT LENGTH	= 120'

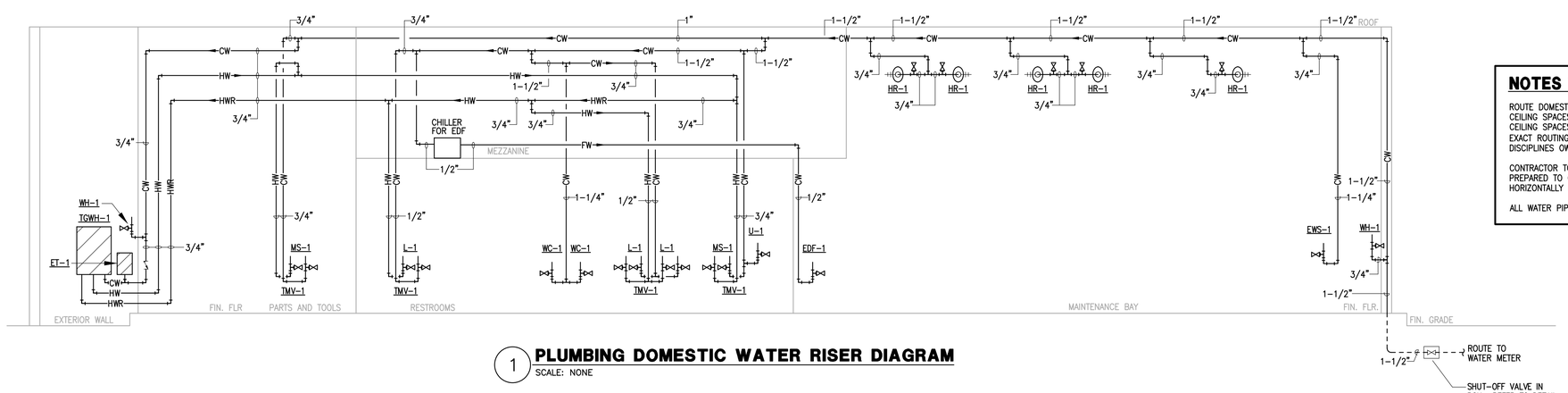


NOTES:

1. COORDINATE EXACT INFORMATION, LOCATION & MOUNTING FOR AIRDROPS WITH OWNER & EQUIPMENT SUPPLIER.
2. COORDINATE EXACT INFORMATION, ADDITION VALVES/EQUIPMENT, LOCATION, ROUTING, HP, CFM, PSI & MOUNTING FOR COMPRESSED AIR SYSTEM WITH OWNER/EQUIPMENT SUPPLIER..
3. COORDINATE WITH OWNER AND EQUIPMENT SUPPLIER IF THEY WOULD LIKE TO CONTINUE THE AIR SUPPLY LINE BACK TO THE COMPRESSOR FOR A LOOPED SYSTEM.

2 PLUMBING COMPRESSED AIR RISER DIAGRAM

SCALE: NONE



1 PLUMBING DOMESTIC WATER RISER DIAGRAM

SCALE: NONE

NOTES TO CONTRACTOR:

ROUTE DOMESTIC WATER LINES ABOVE CONCEALED CEILING SPACES WHEREVER POSSIBLE. IN EXPOSE CEILING SPACES CONTRACTOR SHALL COORDINATE EXACT ROUTING WITH ARCHITECT/OWNER AND OTHER DISCIPLINES OWNER PRIOR TO CONSTRUCTION.

CONTRACTOR TO BE AWARE OF OBSTRUCTIONS AND BE PREPARED TO OFFSET PIPING BOTH VERTICAL AND HORIZONTALLY TO ROUTE PLUMBING SYSTEM.

ALL WATER PIPES ARE TO BE JACKETED & INSULATED.

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85353
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4/10/2025

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PROJECT NO.: .
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PLUMBING WATER, AIR & GAS RISERS

P-202

Applications

The LFMMVM1 Thermostatic Mixing Valves are ideal for supplying sinks, baths, showers or lavatories with tempered water. The LFMMVM1 valves can be used in residential, commercial and institutional environments. These thermostatically modulated mixing valves can be used anywhere preset water temperature is required for point-of-use installations such as in homes, schools, restaurants, hospitals, beauty salons, and public restrooms. The LFMMVM1 is provided with an adjustment cap that includes a locking feature.

The LFMMVM1 valves should be used prior to the fixture to reduce the hot water supply to a safe temperature.

Materials

Body:	Lead Free* cast copper silicon alloy
Disc:	Stainless steel
Thermostat Assembly:	Copper
O-rings:	Buna-N; EPDM
Pistons:	Polysulfone (PSU)
Springs:	Stainless Steel

Pressure — Temperature — Flow Rate

Minimum Supply Pressure Static: 30psi (207 kPa)

Inlet Temperatures: hot inlet, 120°F – 180°F (49°C – 82°C), cold inlet, 39°F – 85°F (4°C – 29°C)

Hot Water Inlet to Outlet Differential Temperature: 5°F (3°C) above set point

Temperature Out: Field range: 80°F – 120°F (27°C – 49°C), adjustable. Accurate within ±3°F (1.7°C)

Maximum Temperature: 200°F (93°C)

Maximum Pressure: 150psi (1034 kPa)

Minimum Flow: 0.5 gpm (1.9 lpm) @ 0.8psi (0.55 kPa)†

Maximum Flow: 20 gpm (76 lpm) @ 125psi (862 kPa)†

Maximum Pressure Differential between Hot & Cold Water Supplies: 25%

Standards

ASSE 1017 Certified

ASSE 1069 Certified

ASSE 1070 Certified

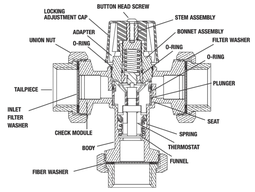
IAPMO cUPC Certified and approved to CSA B125.3 and CSA B125.70

NSF/ANSI/CAN 61 & NSF/ANSI/CAN 372 Certified

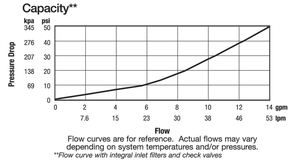
† When tested in accordance with ASSE 1017, ASSE 1069 & ASSE 1070

Vega Pro-Press™ connections are optional factory installed fitting on each end of the approved/certified assembly.

Basic Construction

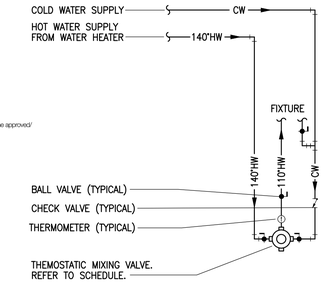


Capacity**



Flow curves are for reference. Actual flows may vary depending on system temperatures and/or pressures.

**Flow curve with integral inlet filters and check valves*

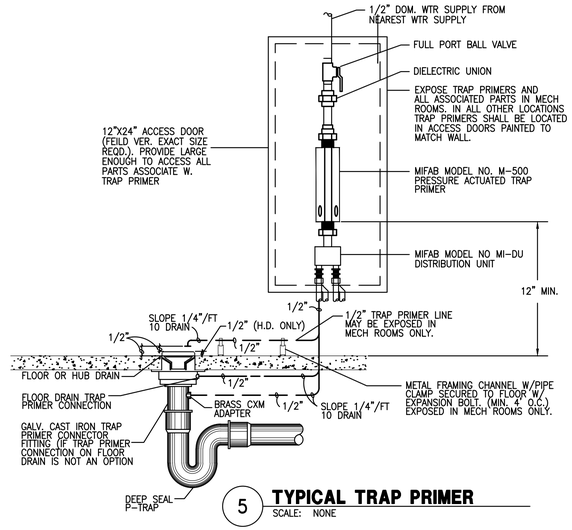


GENERAL NOTES:

1. REFER TO PLANS FOR ALL PIPE SIZES. PROVIDE PIPE INCREASERS/DECREASERS AS REQUIRED.
2. REFER TO PLANS FOR ALL EQUIPMENT LOCATIONS.
3. TERMINATE HOT AND COLD WATER INSULATION 3'-0" FROM MIXING VALVE.

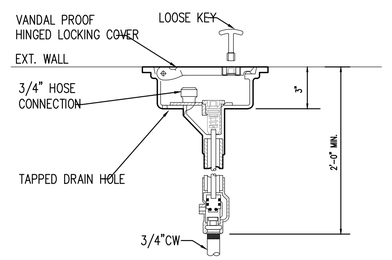
4 THERMOSTATIC MIXING VALVE PIPING

SCALE: NONE



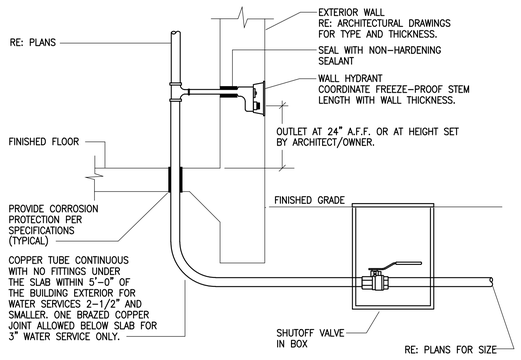
5 TYPICAL TRAP PRIMER

SCALE: NONE



6 WALL HYDRANT DETAIL

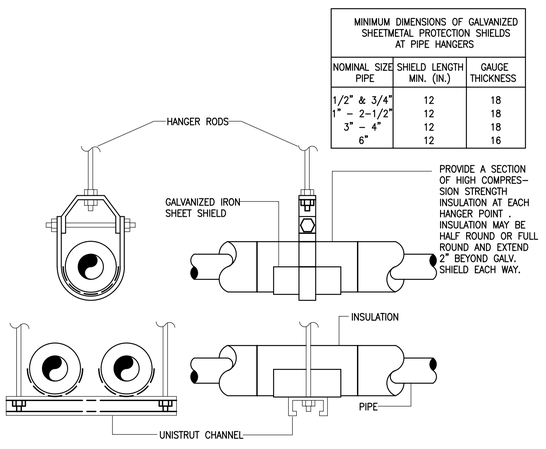
SCALE: NONE



1 DOMESTIC WATER SERVICE ENTRY

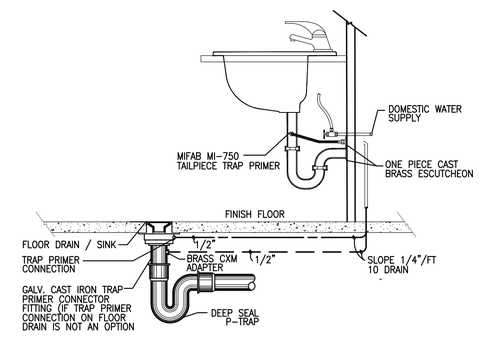
SCALE: NONE

MINIMUM DIMENSIONS OF GALVANIZED SHEETMETAL PROTECTION SHIELDS AT PIPE HANGERS		
NOMINAL SIZE PIPE	SHIELD LENGTH MIN. (IN.)	GAUGE THICKNESS
1/2" & 3/4"	12	18
1" – 2-1/2"	12	18
3" – 4"	12	18
6"	12	16



2 HANGER FOR WATER PIPING

SCALE: NONE



3 LAV / SINK TRAP PRIMER

SCALE: NONE

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EXPIRES: 31 MARCH 2026

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Hempstead, TX 77445

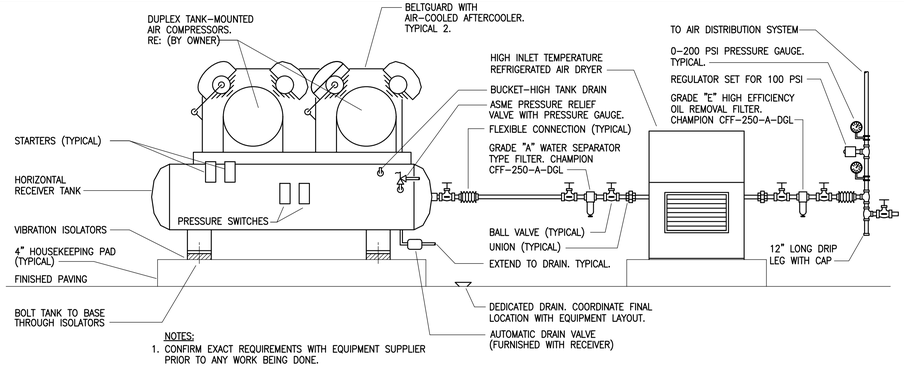
STATE OF TEXAS
JOHN ROBERT BUNT
85353
LICENSED
PROFESSIONAL ENGINEER
4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

PROJECT NO.: .
DRAWN BY: AL QC: KO

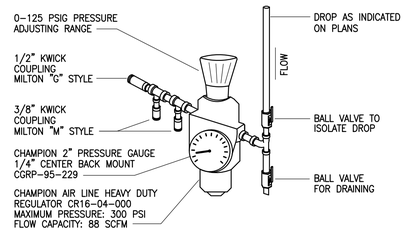
PLUMBING DETAILS

P-301



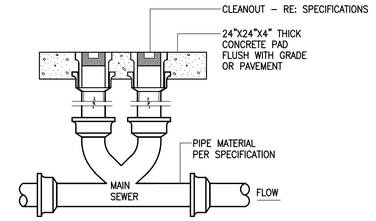
NOTES:
1. CONFIRM EXACT REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ANY WORK BEING DONE.

6 AIR COMPRESSOR PIPING
SCALE: NONE

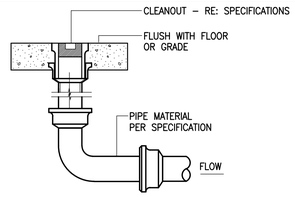


NOTES:
1. CONFIRM AIR DROP LOCATIONS AND MOUNTING HEIGHT(S) WITH OWNER PRIOR TO ROUGH–INS.
2. CONFIRM COUPLING STYLE AND SIZES WITH OWNER IN ADVANCE.
3. CONFIRM SUITABILITY OF REGULATOR WITH EQUIPMENT TO BE SERVED.
4. DUAL AIR DROP IS SIMILAR. PROVIDE ADDITIONAL TEE IN VERTICAL DROP. PROVIDE ADDITIONAL REGULATOR, PRESSURE GAUGE, AND COUPLINGS ON OPPOSITE SIDE OF DROP.

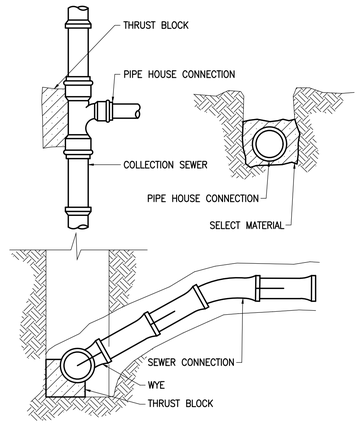
3 AIR DROP (AD-1) WITH REGULATOR (TYPICAL)
SCALE: NONE



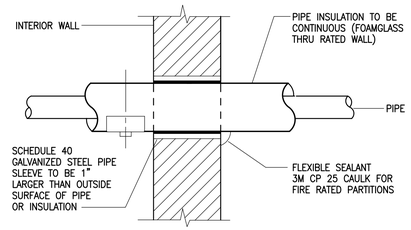
7 TWO-WAY EXTERIOR CLEANOUT
SCALE: NONE



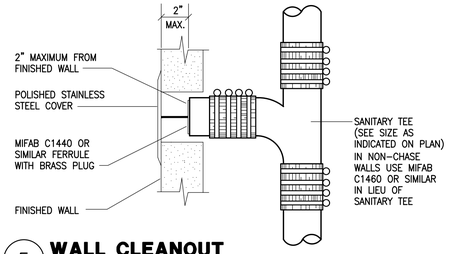
9 FLOOR CLEANOUT
SCALE: NONE



4 SANITARY SEWER CONNECTION
SCALE: NONE



8 INTERIOR WALL PENETRATION
SCALE: NONE



5 WALL CLEANOUT
SCALE: NONE

SPECIFICATIONS
1. 4" Plain End inlet/outlet, 3" Plain End vents, C24-HP covers standard.
2. Certified max flow rate: 100 GPM.
3. Liquid capacity: 350 Gallons (46.8 cu. ft.).
4. Oil capacity: 87.5 Gallons.
5. Solids capacity: 114 Gallons.
6. Unit weight w/ standard covers: 410 lbs.; w/ C24-H covers: 290 lbs.
7. Maximum operating temperature 140˚F continuous.

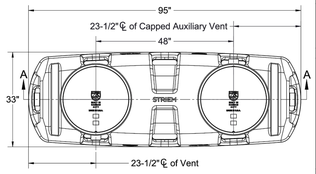
NOTES
1. Engineered inlet diffuser efficiently separates oil from water.
2. Capped auxiliary vent provided to allow flexibility with vent piping and design. Provided cap can be moved to unused vent location, or discarded if two chamber vents are required per local code.
3. For gravity drainage applications only.
4. Do not use for pressure applications.
5. Cover placement allows full access to tank for proper maintenance.
6. Maximum burial depth: 90" from standard cover height.

ENGINEER SPECIFICATION GUIDE

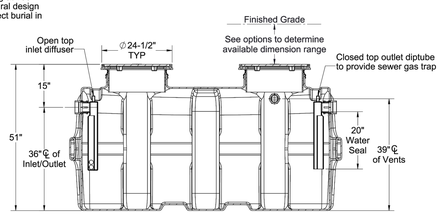
Striem high efficiency oil/water separator model OS-350 shall be lifetime guaranteed and made in the USA. Separator shall be certified to IAPMO IGC 325 and carry a UPC listing. Separator shall be constructed of polyethylene. Separator shall be manufactured for above- or below-grade installation. Field-adjustable riser system is available as an option to bring manhole covers to grade. Separator flow rate shall be 100 GPM. Separator liquid holding capacity shall be 350 gallons and oil capacity shall be 87.5 gallons. Solids capacity shall be 114 gallons. Covers shall be H20 rated pickable cast iron.

IAPMO IGC 325 CERTIFICATION

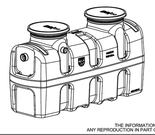
The OS-350 has been third party certified by IAPMO to the IGC 325 standard. The OS-350 achieved an average 99% efficiency rating at 100 GPM up to the maximum oil capacity of 87.5 gallons. The structural design has been approved and stamped by a structural engineer for direct burial in accordance with Striem's installation instructions.



TOP VIEW



SECTION A-A



UPC

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MODEL NUMBER:	OS-350	**SPECIFICATION SHEET**	
DESCRIPTION:	100 GPM POLYETHYLENE HIGH EFFICIENCY OIL/WATER SEPARATOR	**Striem** Kansas City, KS Tel: 913-222-1500 orders@striemco.com www.striemco.com Made in the U.S.A	STRIEM
DWG BY: ENG	**DATE:** 1/15/2025	**REV:** 0	

OPTIONS

Connection Options (Plain End Only)

Inlet / Outlet
- ☐ 4"
- ☐ 6"

Riser Options

From Factory: Up to 5"
- ☐ Up to 24": **SR24** (2)
- ☐ Up to 39": **LR24** (2)
- ☐ Up to 43": **SR24** (4)
- ☐ Up to 58": **SR24** (2) + **LR24** (2)
- ☐ Up to 72": **LR24** (4)
- ☐ Up to 90": **SR24** (2) + **LR24** (4)

-OR-
- ☐ **CPRK** (2): 11" - 90" (See specification for more detail.)

Additional Options

High Water Table Hold Down Kits (Choose One)
- ☐ **HDK-11:** With Steel Plates Included
- ☐ **HDK-12:** For Concrete Deadmen (By Others)

- ☐ **C24-H** (2): Highway Rated Bolted Composite Cover*
- ☐ **SS:** Slick Stick™ Oil Level Monitoring System**

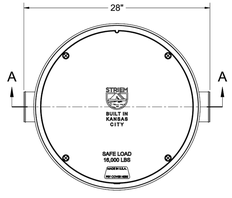
*For above-grade installations.
**Monitoring system will raise covers by 3".

1 SAND-OIL SEPARATOR
SCALE: NONE

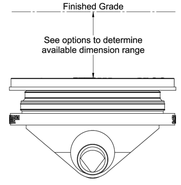
SPECIFICATIONS
1. 4" Plain End inlet/outlet, C24-H cover standard.
2. Weight w/ standard cover: 65 lbs.; w/ cast iron cover: 125 lbs.
3. Maximum operating temperature 140˚F continuous.

ENGINEER'S SPECIFICATION GUIDE

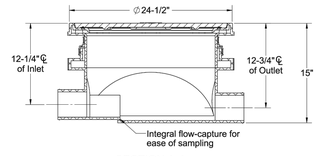
Striem sampling port model INSPECTOR-4 shall be lifetime guaranteed and made in the USA. Sampling port shall be constructed of polyethylene. Sampling port shall be manufactured for above- or below-grade installation. Sampling port shall provide integral flow-capture feature for ease of sampling. Field-adjustable riser system is available as an option to bring manhole cover to grade. Cover shall provide water/gas-tight seal and have a maximum 16,000 lbs. load capacity.



TOP VIEW



END VIEW



SECTION A-A

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MODEL NUMBER:	INSPECTOR-4	**SPECIFICATION SHEET**	
DESCRIPTION:	POLYETHYLENE WASTEWATER SAMPLING PORT	**Striem** Kansas City, KS Tel: 913-222-1500 orders@striemco.com www.striemco.com Made in the U.S.A	STRIEM
DWG BY: ENG	**DATE:** 4/17/2023	**REV:** 1	

OPTIONS

Riser Options

From Factory: Up to 5"
- ☐ Up to 24": **SR24**
- ☐ Up to 39": **LR24**
- ☐ Up to 43": **SR24** (2)
- ☐ Up to 58": **SR24** + **LR24**
- ☐ Up to 72": **LR24** (2)
- ☐ Up to 90": **SR24** + **LR24** (2)
- ☐ Up to 106": **LR24** (3)

- OR -
- ☐ **CPRK**: 11" - 106" (See specification for more detail.)

Additional Options
- ☐ **C24-HP:** H20 Rated Pickable Cast Iron Cover

2 SAMPLE WELL (SW-1)
SCALE: NONE

SPECIAL NOTE
SAMPLING WELL SHALL BE IN ACCORDANCE WITH LOCAL UTILITY DISTRICT STANDARDS.

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EXPIRES: 31 MARCH 2026

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PROFESSIONAL ENGINEER
4/10/2025

REV	DATE:	ISSUED FOR:
	04.10.25	ISSUE

PROJECT NO.: .
DRAWN BY: AL QC: KO

PLUMBING DETAILS

P-302

NGR04 Series

PRESSURE REDUCING REGULATORS
for Residential, Commercial or Industrial Applications

The NGR04 Series spring loaded gas regulators with internal relief provide consistent and controlled pressure in a variety of residential, industrial and commercial applications. The NGR04 is fully certified to ANSI Z21.80/CSA 6.22 for Class I, Class II, Vent Limiting and OPD (Overpressure Protection Device) applications and are designed to be used in many applications where non-corrosive dry gases are used.

FEATURES

- ANSI Z21.80/CSA 6.22 CERTIFIED
- Vent Limiting Option
- Internal Relief - OPD
- Outlet pressures up to 3 psig
- Conforms to ANSI B109.4
- Corrosion resistant exterior
- Inlet pressure tap standard

SPECIFICATIONS

Pipe Sizes:	1-1/4" NPT to 3" FL	
Gas Types:	Natural Gas, LPG, other non-corrosive dry gases	
Maximum Inlet Pressure:	10 to 125 psig per Orifice	
Outlet Pressure Range:	3"w.c. to 3 psig	
Maximum Emergency Inlet Pressure:	175 psig	
Operating Temp:	-40F - +140F	
Materials:	Housing	Epoxy Coated Aluminum
	Valve Body	Cast Iron
	Diaphragm/Valve Seat	Buna N
	Orifice	High Strength Brass

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NAVIEN

THE LEADER IN CONDENSING TECHNOLOGY

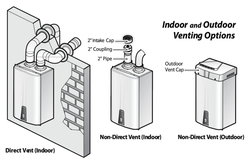
Premium Condensing
Tankless Gas Water Heater

NPE-2 Series Tankless Water Heaters
Specification Sheet

- Certified design according to **ANSI Z21.10.3 - CSA 4.3 latest** standards for both indoor or outdoor installations (with optional Outdoor Vent Kit)
- Compatible with **1/2" gas pipe up to a length of 24 ft*** (*see Installation Manual for additional information)
- Compatible with **2" PVC vent up to 75 ft** and 150 ft** using 3" PVC vent** (**with no elbows)
- Designed for use in **Residential** and **Commercial** applications (see below for available models and warranty terms)
- Gas Input Ranges
  NPE-180A2/S2 - 150,000 to 10,000 BTU/h
  NPE-210A2/S2 - 180,000 to 12,000 BTU/h
  NPE-240A2/S2 - 199,900 to 13,300 BTU/h
  NPE-150S2 - 120,000 to 18,000 BTU/h
- Hot Water Flow Rate Capacity (*based on 35°F temperature rise)
  NPE-180A2/S2 8.4 GPM
  NPE-210A2/S2 10.1 GPM
  NPE-240A2/S2 11.2 GPM
  NPE-150 S2 6.8 GPM
- **TDR** (Turn Down Ratio) up to15:1
- **Dual Primary and Secondary Stainless Steel Heat Exchangers** for optimum efficiency and durability
- **Built-In - Advanced Multi-Lines Control Panel with setup wizard** allows adjustment of temperature settings and displays of operating status and error codes
- **ComfortFlow Technology. "A2"** models come included with built-in 0.5 gallon **Buffer Tank** and **Recirculation Pump** to provide maximum comfort
- **INTELLIGENT Preheating** - recognizes hot water usage patterns to intelligently provide hot water when needed **(optional for "S" models)**
- **Temperature Options** - available temperature settings for *Residential* applications range from 97°F up to 140°F with high temperature *Commercial* mode capable of up to 185°F
- **Ready-Link Cascade Compatible** for up to 32 units for increased hot water production
  Common Vent Compatible - allows for cascade systems to use a single exhaust and/or intake pipe for up to 12 units with the use of the Common Vent Backflow Damper Collar Kit (#300143678A)
- Compatible with NaviLink Wi-Fi Control (#PBCM-AS-001)
- **Freeze Protection** - maintains normal operation during freezing ambient temperatures down to -5°F (standard on all models)
- **Uniform Energy Factor Ratings** for NG and LP units
  NPE-180A2/210A2/240A2 - 0.95 UEF
  NPE-180S2/210S2/240S2 - 0.96 UEF
  NPE-150S2 - 0.93 UEF
- Compatible with **Natural Gas (NG)** and **Propane (LPG)** *** (*** requires installation of included Field Conversion Kit by a qualified gas servicer)
- Approved for Installations on **Manufactured Homes**
- Optional **NaviCirc** Crossover Valve Compatible
- Certified by **CSA, NSF 5, AHRI, AB1953** CA Low Lead, **SCAQMD** *(Rule 1146.2 Type 1 - Complies with 14 ng/J or 20 ppm NOx @ 3% O2)*
- **15-Year** Heat Exchanger and **5-Year** Parts Warranty (Residential)****
  8-Year Heat Exchanger and **5-Year** Parts Warranty (Commercial)****
  (**** see Navien Limited Warranty)
- **Optional accessories** are available *(see below)*

Sleek Design
Compatible with
2" PVC and ***1/2" Gas Pipe***

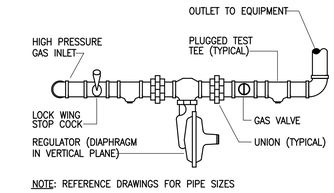
Built-In Control Panel with Diagnostics



Indoor and Outdoor Venting Options

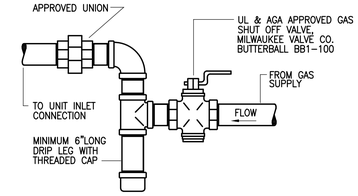
Job Name: _____
Location: _____
Engineer: _____
Wholesaler: _____
Contractor: _____
Model No.: _____
Submitted to: _____

Remote Controller (300227178)	**Plumb Easy/Ishin Set** (3/4") (30009323A - Lead Free) (300258128 - for Pipe Cover)	**CondensateNeutralizer** (GX0000013222 - Single Unit) (GX0000013241 - Up to 6 Units) (GX0000013251 - Up to 16 Units)	**Ready-Link CommunicationCable** (GX0000054A)	**Outdoor/Vent Kit** (300258014)	**External Pump Wire** (GX0000013191)	**3" Vent Termination Caps and Wall Flanges** (GX0038738)

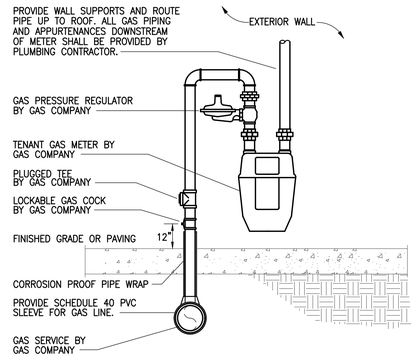


NOTE: REFERENCE DRAWINGS FOR PIPE SIZES

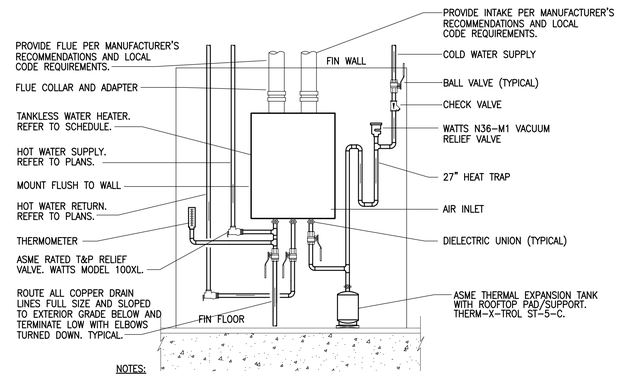
3 GAS PRESSURE REGULATOR INSTALLATION
SCALE: NONE



4 GAS CONNECTION TO EQUIPMENT
SCALE: NONE



2 TYPICAL GAS METER AND PIPING
SCALE: NONE



NOTES:

1. PROVIDE UNIT IN READILY ACCESSIBLE LOCATION, IN COMPLIANCE WITH LOCAL CODES. COORDINATE FINAL LOCATION AND INSTALLATION WITH ARCHITECT AND/OR OWNER.
2. PROVIDE 1" PIPE INSULATION HAVING A CONDUCTIVITY NOT EXCEEDING 0.28 BTU PER INCH/HR x S.F. x °F ON ALL DOMESTIC WATER PIPING. PROVIDE JACKETING FOR ALL EXPOSED PIPING.

1 WATER HEATER TYPICAL WATER PIPING
SCALE: NONE

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DRAWN BY: AL QC: KO

PLUMBING DETAILS

P-303

Bid 25-002
Construction of Justice Center Vehicle Maintenance Garage

Enclosure #2: Pricing

Total Bid

$_____

Calendar days for completion _____

Acknowledgement of Receipt of Addendum(s), if issued by Purchasing, to the Bid Document.

Addendum No 1 dated _____ Received _____

Addendum No 2 dated _____ Received _____

Addendum No 3 dated _____ Received _____

_____
Name of Respondent

_____
Signature of Authorized Representative

_____
Printed Name of Representative