



# **PROJECT MANUAL**

**FOR**

## **Mobile Civic Center- Parking Facility**

**200 South Claiborne Street  
Mobile, Alabama 36602**

**Project #CC-085-22**

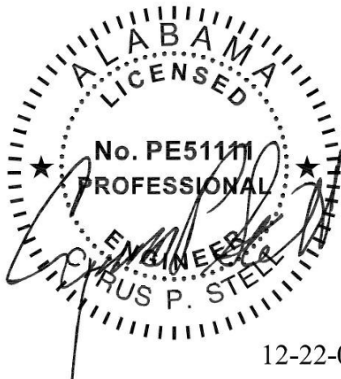
August 11, 2023



**Evan Terry Associates LLC**

**City of Mobile**  
**Architectural Engineering Department**  
205 Government Plaza  
P.O. Box 1827  
Mobile, Alabama 36633-1827

SECTION 00 01 07  
SEALS PAGE



08/05/23

12-22-0093

END OF SECTION

**SECTION 00 01 10  
TABLE OF CONTENTS**

**PROCUREMENT AND CONTRACTING REQUIREMENTS**

**1.01 DIVISION 00 -- PROCUREMENT AND CONTRACTING REQUIREMENTS**

- A. 00 01 10 - Table of Contents
- B. 00 10 00 - Invitation to Bid
- C. 00 20 00 - Instructions to Bidders
  - 1. AIA Document A701, 2018 Edition
- D. 00 22 00 - Supplementary Instructions to Bidders
- E. 00 40 00 - Bid Form
  - 1. Sales Tax Form C-3A
  - 2. Supplier Diversity Subcontracting & Major Supplier Plan
- F. 00 50 00 - Standard Form of Agreement Between Owner & Contractor
  - 1. AIA Document A101, 2017 Edition
- G. 00 60 00 - Bonds, Certificates and Affidavits
  - 1. Performance Bond (Owner's modified form)
  - 2. Labor and Material Payment Bond (Owner's modified form)
  - 3. E-Verify Documentation (Sample)
  - 4. Application and Certification for Payment
    - a. AIA Document G702, 2021 Edition
    - b. AIA Document G703, 2021 Edition with DBE Utilization Report
  - 5. Certificate of Substantial Completion
    - a. AIA Document G704, 2017 Edition
  - 6. Contractor's Affidavit of Payment of Debts & Claims
    - a. AIA Document G706, 1994 Edition
  - 7. Contractor's Affidavit of Release of Liens
    - a. AIA Document G706A, 1994 Edition
  - 8. Consent of Surety to Final Payment
    - a. AIA Document G707, 1994 Edition
  - 9. Request for Taxpayer Identification Number and Certification, W-9 Form
  - 10. Electronic Payment Authorization
  - 11. City of Mobile Vendor Information Form
- H. 00 72 00 - General Conditions
  - 1. AIA Document A201, 2017 Edition
- I. 00 73 00 - Supplementary Conditions

**1.02 DC - DESIGN CRITERIA**

- A. DC G - Sitework Criteria
  - 1. Geotechnical Report

**SPECIFICATIONS**

**2.01 DIVISION 01 -- GENERAL REQUIREMENTS**

- A. 01 10 00 - Summary
- B. 01 20 00 - Price and Payment Procedures
- C. 01 23 00 - Alternates
- D. 01 25 00 - Substitution Procedures
- E. 01 30 00 - Administrative Requirements
- F. 01 31 00 - Project Management and Coordination
- G. 01 31 19 - Project Meetings

- H. 01 32 00 - Construction Progress Documentation
- I. 01 32 16 - Construction Progress Schedule
- J. 01 32 33 - Photographic Documentation
- K. 01 33 00 - Submittal Procedures
- L. 01 35 53 - Security Procedures
- M. 01 40 00 - Quality Assurance, Control and Documentation
- N. 01 41 00 - Regulatory Requirements
- O. 01 42 16 - Definitions
- P. 01 45 30 - Special Inspections
- Q. 01 45 31 - Statement of Special Inspections
- R. 01 45 32 - Final Report of special Inspections
- S. 01 51 00 - Temporary Utilities
- T. 01 52 13 - Field Offices and Sheds
- U. 01 55 00 - Vehicular Access and Parking
- V. 01 56 00 - Cleaning Up
- W. 01 56 39 - Landscape Protection
- X. 01 57 13 - Temporary Erosion and Sediment Control
- Y. 01 58 13 - Temporary Project Signage
- Z. 01 60 00 - Materials and Equipment
- AA. 01 63 00 - Substitution Procedures
- AB. 01 70 00 - Execution and Closeout Requirements
- AC. 01 73 00 - Execution Requirements
- AD. 01 78 00 - Closeout Submittals

**2.02 DIVISION 02 -- EXISTING CONDITIONS (NOT USED)**

**2.03 DIVISION 03 -- CONCRETE**

- A. 03 30 00 - Cast-in-Place Concrete
- B. 03 38 16 - Unbonded Post Tensioned Concrete
- C. 03 45 00 - Precast Architectural Concrete

**2.04 DIVISION 04 -- MASONRY**

- A. 04 20 00 - Unit Masonry
- B. 04 26 16 - Adhered Masonry Veneer

**2.05 DIVISION 05 -- METALS**

- A. 05 12 00 - Structural Steel Framing
- B. 05 40 00 - Cold-Formed Metal Framing
- C. 05 50 00 - Metal Fabrications
- D. 05 51 00 - Metal Stairs
- E. 05 52 13 - Pipe and Tube Railings

**2.06 DIVISION 06 -- WOOD, PLASTICS, AND COMPOSITES**

- A. 06 10 00 - Rough Carpentry

**2.07 DIVISION 07 -- THERMAL AND MOISTURE PROTECTION**

- A. 07 16 16 - Crystalline Waterproofing

- B. 07 21 19 - Foamed-In-Place Insulation
- C. 07 25 00 - Weather Barriers
- D. 07 42 13.23 - Metal Composite Material Wall Panels
- E. 07 54 00 - Thermoplastic Membrane Roofing
- F. 07 62 00 - Sheet Metal Flashing and Trim
- G. 07 71 00 - Roof Specialties
- H. 07 91 00 - Preformed Joint Seals
- I. 07 92 00 - Joint Sealants

## **2.08 DIVISION 08 -- OPENINGS**

- A. 08 11 13 - Hollow Metal Doors and Frames
- B. 08 44 13 - Glazed Aluminum Curtain Walls
- C. 08 71 00 - Door Hardware
- D. 08 80 00 - Glazing

## **2.09 DIVISION 09 -- FINISHES**

- A. 09 65 00 - Resilient Flooring
- B. 09 91 13 - Exterior Painting

## **2.10 DIVISION 10 -- SPECIALTIES**

- A. 10 44 00 - Fire Protection Specialties

## **2.11 DIVISION 11 -- EQUIPMENT (NOT USED)**

## **2.12 DIVISION 12 -- FURNISHINGS (NOT USED)**

## **2.13 DIVISION 13 -- SPECIAL CONSTRUCTION (NOT USED)**

## **2.14 DIVISION 14 -- CONVEYING EQUIPMENT**

- A. 14 21 23.16 Machine Room-Less Electric Traction Passenger Elevator

## **2.15 DIVISION 21 -- FIRE SUPPRESSION**

- A. 21 04 51 - General Fire Protection Requirements
- B. 21 04 52 - Identification for Fire Protection Piping and Equipment
- C. 21 04 53 - Basic Fire Protection Materials and Methods
- D. 21 04 55 - Fire Protection System

## **2.16 DIVISION 22 -- PLUMBING**

- A. 22 04 01 - General Plumbing Requirements
- B. 22 04 03 - Basic Plumbing Materials and Methods
- C. 22 04 05 - Identification for Plumbing Piping and Equipment
- D. 22 04 07 - Plumbing Systems Insulation
- E. 22 04 10 - Plumbing Piping
- F. 22 04 40 - Plumbing Fixtures

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

- A. 23 00 10 - General HVAC Requirements
- B. 23 00 53 - Basic HVAC Materials and Methods
- C. 23 00 62 - Hangers and Supports for HVAC Piping and Equipment
- D. 23 00 77 - Identification for HVAC Piping and Equipment
- E. 23 01 81 - Hydronic Piping

- F. 23 01 83 - Refrigerant Piping
- G. 23 05 13 - Condensing Boilers
- H. 23 07 12 - HVAC Systems Insulation
- I. 23 07 38 - Mini Split System AC Units
- J. 23 07 62 - Unit Heaters
- K. 23 09 50 - Testing, Adjusting and Balancing

**2.18 DIVISION 25 -- INTEGRATED AUTOMATION**

**2.19 DIVISION 26 -- ELECTRICAL**

**2.20 DIVISION 27 -- COMMUNICATIONS**

**2.21 DIVISION 28 -- ELECTRONIC SAFETY AND SECURITY**

**2.22 DIVISION 31 -- EARTHWORK**

- A. 31 10 00 - Site Clearing
- B. 31 20 00 - Earth Moving
- C. 31 22 00 - Grading
- D. 31 31 16 - Termite Control
- E. 31 62 13 - Concrete Piles
- F. 31 63 16 - Auger Cast Grout Piles

**2.23 DIVISION 32 -- EXTERIOR IMPROVEMENTS**

- A. 32 13 13 - Concrete Paving
- B. 32 13 73 Concrete Paving Joint Sealants
- C. 32 84 00 - Landscape Irrigation

**2.24 DIVISION 33 -- UTILITIES**

- A. 33 41 00 - Storm Utility Drainage Piping

**2.25 DIVISION 46 -- WATER AND WASTEWATER EQUIPMENT**

**END OF SECTION**

**SECTION 00100**  
**INVITATION TO BID**

You are invited to submit a sealed bid for construction of the following facility:

<b>PROJECT NAME:</b>	Mobile Civic Center Parking Facility
<b>PROJECT LOCATION:</b>	200 South Claiborne Street, Mobile, Alabama 36602
<b>PROJECT NUMBER:</b>	CC-085-22

1. BID DATE:
  - A. Sealed Bids will be received and clocked in until **2:15 PM** local time, **Wednesday, the 20th day of September 2023** in the office of the City Clerk, Government Plaza, 9<sup>th</sup> Floor South Administrative Tower, 205 Government Street, Mobile, Alabama 36602.
  - B. All Bids not clocked in at the City Clerk’s Office prior to the time specified, or Bids received after the specified time, will be automatically rejected and returned immediately, unopened.
  - C. Bids will be publicly opened and read at **2:30 PM** local time, in the Atrium Lobby of Government Plaza.
  
2. SPECIFICATIONS AND DRAWINGS:
  - A. Specifications and Drawings are on file and may be examined and obtained from the following location: <https://www.cityofmobile.org/bids/>
  - B. Bidders shall use complete sets of Bid Documents in preparing their bid. Neither the Owner nor Architect/Engineer assumes responsibility for errors or misinterpretations resulting from the use of incomplete sets of Bid Documents.
  - C. All Addenda will be posted to the following location: <https://www.cityofmobile.org/bids/>
  - D. This is a tax exempt project and shall be certified by the requirements of the Alabama Department of Revenue. Bidders shall NOT include sales and use taxes with their bid amounts. Bidders shall complete the Sales Tax Form C-3A and include it as an attachment to their Bid Form (see Section 00400).
  
3. BID SURETY: Required on Bids \$10,000.00 or more
  - A. A Cashier’s Check drawn on a bank registered to do business in the State of Alabama and which is a member of the Federal Deposit Insurance Corporation, or a Bid Bond payable to Owner, City of Mobile, in the amount of 5% of the Base Bid, but in no event more than \$10,000.00 is required to accompany Bid.
  - B. Bid Bond must be issued by a Surety licensed to do business in the State of Alabama. Bidder shall require the attorney in fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.
  - C. No Bid may be modified, withdrawn, or canceled for a period of sixty (60) days after the time designated above for receipt of bids.
  - D. The City of Mobile will have sixty (60) days from the bid opening date to award contract.

4. SURETY QUALIFICATIONS:
  - A. A Surety authorized to do business in the State of Alabama must issue Bonds.
  - B. If the Base Bid is \$50,000 or more, the Surety must have a minimum rating of A/Class VI as reported by the latest issue of Best Key Rating Guide Property-Casualty published by Alfred M. Best Company, Inc.
5. IRREGULARITIES AND REJECTION:
  - A. The City of Mobile reserves the right to waive irregularities in the Bid and in Bidding, and to reject any or all Bids.
6. BIDDER QUALIFICATIONS:
  - A. Bids for Work costing \$50,000 or more must be licensed pursuant to current Alabama law and of classifications compliant with the State of Alabama Licensing Board for General Contractors. Note that if the contract amount is \$10,000 or greater, both a Performance Bond and a Labor and Material Payment Bond shall be required. **Before Bidding, Contractor shall verify their license classification of their General Contractors license with the State of Alabama Licensing Board for General Contractors to verify classification is acceptable to perform 51% of the Scope of Work.**
  - B. In case of a joint venture of two or more Contractors, the amount for the bid shall be within the maximum bid limitations as set by the State of Alabama Licensing Board for General Contractors of at least one of the partners to the joint venture.
7. NON-RESIDENT CONTRACTORS:
  - A. Except for contracts funded in whole or part with funds received from a federal agency, preference shall be given to resident Contractors on the same basis as the nonresident Contractor's state awards contracts to Alabama Contractors bidding in similar circumstances.
  - B. Nonresident Bidders shall, prior to submitting a bid, be registered with the Alabama Secretary of State and the Alabama Department of Revenue. Provide the Secretary of State Business "Entity ID Number" on the Bid Form in the space provided.
8. PRE-BID CONFERENCE:
  - A. A Pre-Bid Conference shall be held on **Thursday, September 7, 2023** at 10:00 AM local time. The conference will include a walkthrough of the site location. Conference shall commence in the City of Mobile's A/E Conference Room, 5<sup>th</sup> Floor, South Tower, 205 Government Street, Mobile, Alabama 36602.
  - B. Minutes of this conference will be made as an Addendum for the project.
9. BID SUBMITTAL:
  - A. Bids must be submitted on copies of the Bid Forms furnished in the bidding documents.
  - B. Bid, with Bid Security, Sales Tax Form C-3A and other supporting data specified, shall be contained in a sealed, opaque envelope, approximately 9x12 inches or larger and be marked on the outside with the words "**SEALED BID FOR MOBILE CIVIC CENTER – PARKING FACILITY - PROJECT NUMBER: CC-085-22**".



- C. The Bid envelope shall be clearly addressed to the Owner as indicated on the Bid Form and include the bid date, the name, address and State License number and classification of the Bidder issued by the State of Alabama Licensing Board for General Contractors.
- D. All Bids of \$50,000 or more must include the bidder's State of Alabama General Contractor's License information written on the outside of the bid envelope. Any bid submitted without such license information may be rejected and returned to the bidder unopened.
- E. In addition, in large letters on both front and back of envelope, write the following: **DO NOT OPEN UNTIL TWO-THIRTY PM, SEPTEMBER 20, 2023.**
- F. For a bid to be valid it shall be delivered at designated location prior to time and date for receipt of Bids indicated in INVITATION TO BID, or prior to any extension thereof issued to Bidders. After that time no Bid will be received or withdrawn.
- G. When sent by mail, preferably special delivery, express service, or registered mail, the sealed Bid, marked as indicated above, shall be enclosed in another envelope for mailing such that the exterior mailing container or envelope may be opened without revealing the contents of the Bid. It is the Contractors responsibility to assure delivery of the bid to the City Clerk's Office prior the time and date established.

10. EQUAL OPPORTUNITY:

- A. The City of Mobile, Alabama is an Equal Opportunity Employer and requires that all Contractors comply with the Equal Employment Opportunity laws and the provisions of the Bid Documents in this regard.
- B. The City of Mobile also encourages and supports the utilization of Minority Business Enterprises on these and all other publicly solicited Bids, and shall be in compliance with the City of Mobile's Minority Utilization Plan as adopted by the City Council.
- C. Contractor shall provide an appropriately completed copy of the "City of Mobile Subcontracting and Major Supplier Plan" in the envelope with their Bid Form. Form shall document DBE Subcontractors participating in the project and, should the total % of DBE participation not meet the 15% minimum, all efforts to obtain DBE Subcontractors shall be documented on or attached to the DBE Form when submitted. During construction, contractors are required to submit a "DBE Utilization Report" with every Pay Application.
- D. Contractors should contact the City of Mobile, Supplier Diversity Manager for assistance with DBE Subcontractor information and any questions regarding the DBE Compliance Forms. Contact Archnique Kidd at 251-208-7967.

11. ADDITIONAL BIDDING PROCEDURES:

- A. Refer to the complete information in the Bid Documents prior to submitting a bid. Additional Bidding Procedure information is contained therein, particularly in the specification Section 00 21 00 "Instructions to Bidders - AIA Document A701" and in the specification Section 00 22 00 "Supplementary Instructions to Bidders".

12. STATE OF ALABAMA IMMIGRATION ACT

"The State of Alabama, under the Beason-Hammon Alabama Taxpayer and Citizen Protection Act, Act No. 2011-535, Alabama Code Section 31-13-1, et. Seq., requires:

- A. That the Contractor shall be enrolled in the E-Verify Program, shall participate in that Program during the performance of the contract, and shall verify the immigration status of every employee who is required to be verified, according to the applicable federal rules and regulations; and
- B. That it will attach to the contract the company's documentation of enrollment in E-Verify.
- C. The subcontractor must also enroll in the E-Verify Program prior to performing any work on the contract and shall attach to its sworn affidavit documentation establishing that the subcontractor is enrolled in the E-Verify Program.

13. PUBLIC CONTRACTS WITH ENTITIES ENGAGING IN CERTAIN BOYCOTT ACTIVITIES

- A. By signing this contract, Contractor further represents and agrees that it is not currently engaged in, nor will it engage in, any boycott of a person or entity based in or doing business with a jurisdiction with which the State of Alabama can enjoy open trade.

END OF SECTION

**SECTION 00 20 00**  
**INSTRUCTIONS TO BIDDERS**

**PART 1 – GENERAL**

This section includes the INSTRUCTIONS TO BIDDERS, AIA Document A701-2018 edition, to be utilized with the Owner's most recent modifications and which shall be used in conjunction with the entire Bid Documents and Section 00 22 00 SUPPLEMENTARY INSTRUCTIONS TO BIDDERS for this project.

# DRAFT AIA® Document A701™ – 2018

## Instructions to Bidders

for the following Project:  
(Name, location, and detailed description)

«Mobile Civic Center- Parking Facility »  
«22 South Claiborne Street »  
«Mobile, Alabama 36602 »

### THE OWNER:

(Name, legal status, address, and other information)

«City of Mobile »« »  
«PO Box 1827 »  
«Mobile, Alabama 36633-1827 »  
« »

### THE ARCHITECT:

(Name, legal status, address, and other information)

« Evan Terry Associates LLC »  
« 1 Perimeter Park South  
Suite 200 S »  
«Birmingham, Alabama 35243 »  
« »

### TABLE OF ARTICLES

- 1 DEFINITIONS
- 2 BIDDER'S REPRESENTATIONS
- 3 BIDDING DOCUMENTS
- 4 BIDDING PROCEDURES
- 5 CONSIDERATION OF BIDS
- 6 POST-BID INFORMATION
- 7 PERFORMANCE BOND AND PAYMENT BOND
- 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR
- 9 NONDISCRIMINATION
- 10 USE OF DOMESTIC PRODUCTS
- 11 PREFERENCE TO RESIDENT CONTRACTORS
- 12 PRE-BID REQUIREMENTS
- 13 POST-BID REQUIREMENTS

**ADDITIONS AND DELETIONS:**  
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612™-2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.



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## ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents. A Bidder must be licensed by the State Licensing Board for General Contractors if the amount for the Contract exceeds the amount established by said Board.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work. A Sub-bidder performing Work must be licensed by the State Licensing Board for General Contractors if the Sub-bidders' contract amount exceeds that established by said Board.

- 1.10 A non-resident Bidder or Sub-bidder is one who
- a. Is neither organized nor existing under the laws of the State of Alabama
  - b. nor maintains its principal place of business in the State of Alabama.

A non-resident contractor who has maintained a permanent branch office within the State of Alabama for at least five (5) continuous years shall not thereafter be deemed to be a non-resident contractor so long as such contractor continues to maintain a branch office within Alabama.

## ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- .1 the Bidder has read and understands the Bidding Documents;
- .2 the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- .3 the Bid complies with the Bidding Documents;
- .4 the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- .5 the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- .6 the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

§ 2.2 The Bidder is licensed by the State Licensing Board for General Contractors and the amount Bid does not exceed the Bid Limit stipulated in the Bidder's License and by the City of Mobile.

§ 2.3 Each and every Contractor belonging to or comprising a part of any entity that is bidding as a joint venture or association involving two or more contractors is licensed by the State Licensing Board for General Contractors and that the amount Bid does not exceed the Bid limit stipulated in at least one of their licenses.

§ 2.4 Any non-resident Bidder is authorized by the Secretary of State of Alabama and is registered with Alabama Department of Revenue to transact business in Alabama.

§ 2.5 Joint Ventures or Associations of Contractors, whether the same are Bidders or Subcontractors of Bidders, will remain in existence until all insurance and warranty requirements for the Project have been fulfilled.

### **ARTICLE 3 BIDDING DOCUMENTS**

#### **§ 3.1 Distribution**

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

#### **§ 3.2 Modification or Interpretation of Bidding Documents**

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect at least five (5) calendar days prior to the date for receipt of Bids.

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.2.4 The Contract Drawings and Specifications are intended to cooperate and agree, but should conflicts or difference be found to exist between the requirements within either and clarification has not been obtained in accordance with the above procedure prior to Bidding, then the most costly and/or restrictive interpretation by the decision of the Architectural Engineering Department Director will be final.

#### **§ 3.3 Substitutions**

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

##### **§ 3.3.2 Substitution Process**

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least fifteen (15) calendar days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.3.6 See Division One Section "Substitution Procedures", if included in Specification.

#### § 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued no later than two (2) days prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

### ARTICLE 4 BIDDING PROCEDURES

#### § 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents. No bid will be considered unless made out and submitted on a copy of the Bid Form, Section 00410. Additional Bid Forms will be furnished to prospective Bidders upon request.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

Unit Prices: Supply requested Unit Prices where shown on the Bid Form, Such Unit Prices shall be used to adjust the Contract Amount where the quantities shown on the Drawings and/or Specifications do not reflect amounts required for completion of the work. Where Completion of the Work requires quantities in excess of those shown on the drawings and specifications, unit prices shall be used to compute an extra payment to the Contractor. Where completion of work required quantities less than those on the Drawings and/or specifications, unit prices shall be used to compute a credit to the Owner.

Contingency Allowance: As shown on the Bid Form, Contractor shall add the amount of the contingency allowance to the Base Bid to derive the Total Bid. The contingency allowance shall cover cost of material, labor, overhead, profit and other expenses for complete installation of items of additional work as required for a complete functional project. The contingency allowance shall be used to fund unforeseen conditions not covered in the construction documents and shall be subject to the provisions of change orders. Upon the completion of work any unused portion of the contingency allowance shall be credited to the Owner by change order.

**§ 4.1.6** Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

**§ 4.1.7** Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

**§ 4.1.8** A Bidder shall incur all costs associated with the preparation of its Bid.

#### **§ 4.2 Bid Security**

**§ 4.2.1** Each Bid shall be accompanied by the following bid security if so required in the Bidding Documents:  
*(Insert the form and amount of bid security.)*

«The Bidder shall provide a Bid Security in the form of a cashier's check drawn on a bank registered to do business in the State of Alabama and which is a member of the Federal Deposit Insurance Corporation, or a Bid Bond. Bid Security is required for bids exceeding \$10,000.00. Bid Security shall be in the amount of 5% of the TOTAL BID, but in no event more than \$10,000.00.»

**§ 4.2.2** The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.

**§ 4.2.3** If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

**§ 4.2.4** The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected.

**§ 4.2.5** Bonds must be issued by a Surety authorized to do business in the State of Alabama. A Performance Bond and a Labor and Material Payment Bond are required for projects exceeding \$10,000.00. If the project cost is \$50,000.00 or more, the Surety must have a minimum rating of A/Class VI as reported by the latest issue of Best's Key Rating Guide Property-Casualty published by Alfred M. Best Company, Inc.

#### **§ 4.3 Submission of Bids**

**§ 4.3.1** A Bidder shall submit its Bid as indicated below:

*(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)*

«Submission of Bid shall be as stated in Section 00100, Invitation to Bid, Paragraph 9, titled "Bid Submittal".»

**§ 4.3.3** Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted and will be returned unopened.



§ 4.3.4 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

#### § 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security, if required, shall be in an amount sufficient for the Bid as resubmitted.

### ARTICLE 5 CONSIDERATION OF BIDS

#### § 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

#### § 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

#### § 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 The Owner shall accept Alternates in the order listed on the Bid Form to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

### ARTICLE 6 POST-BID INFORMATION

#### § 6.1 Contractor's Qualification Statement

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

#### § 6.3 Submittals

§ 6.3.1 After notification of selection for the award of the Contract, the Bidder shall, within three (3) calendar days or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

- .1 a designation of the Work to be performed with the Bidder's own forces;
- .2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and
- .3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.
- .4 The name of the Project Superintendent and Project Manager together with the resume of qualifications of each;
- .5 Nonresident Contractor shall submit a letter from an attorney as required by Subparagraph 11.1.2 below and;
- .6 Engineering Firm or Testing Laboratory for testing as specified.

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

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

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

§ 6.3.5 The Contractor shall, within ten (10) calendar days of receiving Contract Forms for signature, furnish to the Owner the following items, along with the signed contract, or the Bid Security will be forfeited automatically without further delay:

- .1 A Signed Construction Contract;
- .2 Performance Bond and Labor and Material Payment Bond (originals) on all Bids over \$10,000.00;
- .3 Certificate of Insurance and copy of Builder's Risk Policy (original), as identified in the specifications;
- .4 Schedule of Values; and
- .5 Federal Immigration Law Compliance: E-Verify enrollment documentation.

§ 6.3.6 The Bid Check or Bond of the three (3) lowest Bidders will not be returned until after the Construction Contract is executed.

## **ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND**

### **§ 7.1 Bond Requirements**

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.

§ 7.1.4 A Surety authorized to do business in the State of Alabama shall issue Performance Bond and Labor and Material Payment Bond, as required by the Contract Documents. If the project cost is \$50,000.00 or more, the Surety must have a minimum rating of A/Class VI as reported by the latest issue of Best's Key Rating Guide Property-Casualty, published by Alfred M. Best Company, Inc.

### **§ 7.2 Time of Delivery and Form of Bonds**

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than ten (10) calendar days from receiving the Construction Contract forms for signature.

§ 7.2.2 The bonds shall be written on City's Performance Bond and Labor and Material Payment Bond forms.

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

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

## **ARTICLE 8 FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR**

Unless otherwise required in the Bidding Documents, the Agreement for the Work will be written on AIA Document A101, Standard Form of Agreement Between Owner and Contractor Where the Basis of Payment Is a Stipulated Sum.

§ 8.1.1 AIA Document A101, Standard Form of Agreement Between Owner and Contractor where the Basis of Payment is a stipulated sum will be edited electronically and include the standard signatures as required by the City of Mobile.

## **ARTICLE 9 NONDISCRIMINATION**

§9.1.1 Contractor shall comply with all Federal, State and local laws concerning nondiscrimination, including but not limited to City of Mobile Ordinance No. 14-034 which requires, *inter alia*, that all contractors performing work for the City of Mobile not discriminate on the basis of race, creed, color, national origin or disability, require that all subcontractors they engage do the same, and make every reasonable effort to assure that fifteen percent of the work performed under contract be awarded to socially and economically disadvantaged individuals and business entities. Contractor shall provide a completed copy of the City of Mobile Subcontracting and Major Supplier Plan with the Bid Form, for bids of \$250,000.00 or greater.

## **ARTICLE 10 USE OF DOMESTIC PRODUCTS**

§ 10.1.1 Section 39-3-1 Code of Alabama provides that the Contractor agrees, in the execution of his contract, to use material supplies and products manufactured, mined, processed or otherwise produced in the United States or its territories, if available at reasonable prices, and that breach of this agreement by the Contractor shall result in the assessment of liquidated damages in an amount not less than \$500 nor more than 20 percent of the gross amount of the contract price.

§ 10.1.2 Section 39-3-4, Code of Alabama provides that the Contractor for a municipal construction project, financed by the State of Alabama or any political subdivision thereof, is required to use steel produced within the United States. If the Contractor violates the requirement to use domestic steel, this contract will automatically be revoked and the contractor shall not be entitled to any set-off or recoupment for labor or materials used up to the time of revocation.

## **ARTICLE 11 PREFERENCE TO RESIDENT CONTRACTORS**

§ 11.1.1 Except for contracts funded in whole or in part with funds received from a federal agency, preference shall be given to Alabama resident contractors, and a nonresident bidder domiciled in a state having laws granting preference to local contractors shall be awarded the contracts only on the same basis as the nonresident bidder's state awards contracts to Alabama contractors bidding under similar circumstances. In the letting of public contracts in which any state, county or municipal funds are utilized, resident contractors in Alabama, be they corporations, individuals or partnerships, are to be granted preference over nonresidents in awarding of contracts in the same manner and to the same extent as provided by the laws of the state of domicile of the nonresident.

§ 11.1.2 A successful nonresident bidder shall include in his post bid submittals a written opinion of an attorney at law licensed to practice law in such nonresident bidders' state of domicile, as to the preferences, if any or none, granted by the law of that state to its own business entities whose principal places of business are in that state in the letting of any or all public contracts.

## **ARTICLE 12 PRE-BID REQUIREMENTS**

### **§ 12.1 STATE OF ALABAMA CONTRACTORS LICENSE**

§ 12.1.1 If the Project total bid amount is \$50,000 or more, a license issued by the State of Alabama Licensing Board for General Contractors is required prior to submitting a bid and the licensed classification and bid limits must cover the type of work in this project. See Invitation to Bid, Section 6 "Bidder Qualifications".

### **§ 12.2 A NONRESIDENT BIDDER**

§ 12.2.1 Every bidder shall be registered with the Department of Revenue and with the Alabama Secretary of the State prior to bidding. The Secretary of State's "Business Entity ID" registration number shall be included on the bid form.

## **ARTICLE 13 POST-BID REQUIREMENTS**

### **§ 13.1 CITY CONTRACTOR'S LICENSE**

13.1.1 A City of Mobile Contractors License is required and must be current before the Contractor signs the Contract. Contractor must qualify and post \$10,000.00 Surety Bond with the Land Use/Code Administration Department before a Contractors License will be issued by the Revenue Department. Information on the City Contractors License may be obtained by writing or calling:

Land Use/Code Administration  
P. O. Box 1827  
Mobile, Alabama 36633-1827  
Phone: 251.208.7421

Revenue Department  
P. O. Box 1827  
Mobile, Alabama 36633-1827  
251.208.7461

**13.2 E-VERIFY DOCUMENTATION**

**§ 13.2.1** The Contractor agrees that it shall comply with all of the requirements of the State of Alabama Immigration Law (Act. No. 2011-535 as amended by Act. No. 2012-491, Alabama Code (1975) Section 31-13-1, et. Seq., See Section 31-13-9), and the provisions of said Law, including all penalties for violation thereof, are incorporated therein.

**13.3 PUBLIC CONTRACTS WITH ENTITIES ENGAGING IN CERTAIN BOYCOTT ACTIVITIES**

**§ 13.3** The Contractor represents and agrees that it is not currently engaged in, nor will engage in, any boycott of a person or entity based in or doing business with a jurisdiction with which the State of Alabama can enjoy open trade.



**SECTION 00 22 00**  
**SUPPLEMENTARY INSTRUCTIONS TO BIDDERS**

**THE ATTENTION OF ALL BIDDERS IS CALLED TO THE FOLLOWING INSTRUCTIONS AND CONDITIONS:**

**1. BIDDING DOCUMENTS**

- A. Bidders may obtain complete sets of Bid Documents and Specifications (Project Manual) from the Department of Architectural Engineering as listed in the Invitation to Bid.
- B. Bidders shall use the complete set of documents in preparing their bid. The City of Mobile assumes no responsibility for errors or misinterpretations resulting from use of an incomplete set of documents.

**2. INTERPRETATION OF BID DOCUMENTS:**

- A. Bidders shall carefully study and compare the Bidding Documents and compare various components of the Bidding Documents with each other, shall examine the site and local conditions and shall at once report to the Project Manager any errors, inconsistencies or ambiguities discovered.
- B. Bidders requiring clarification or interpretation of the Bidding Documents shall make a written request to the Project Manager by 12:00 PM at least five (5) calendar days prior to the date for receipt of Bids. E-mail requests are required and should be addressed to **gregg.blaize@cityofmobile.org**
- C. Interpretations, corrections, and changes to the Bidding Documents will be made by a formal, written Addendum. Interpretations, corrections, and changes to the Bidding Documents made in any other manner will not be binding, and Bidders shall not rely on them.
- D. Any discrepancy not resolved prior to Bidding shall be bid by the Contractor to provide for the costliest and/or restrictive interpretation of the documents.

**3. BIDDING PROCEDURES:**

- A. No Bid will be considered unless made out and submitted on a copy of the Bid Form as set forth by the Bid Documents.
- B. All blanks on the Bid Form shall be legibly executed in a non-erasable medium.
- C. Sums shall be expressed in both words and figures. In case of discrepancy, the amount written in words shall govern.
- D. Interlineations, alterations, and erasures must be initialed by the signer of the Bid.
- E. All requested Alternates, Unit Prices and Allowances shall be bid as indicated on the Bid Form and the Bid Documents.

- F. Addenda shall be considered as a part of the Bid Documents and those issued prior to the opening of Bids shall be acknowledged on the Bid Form and any adjustment in cost shall be included in the Contract Sum.

**4. BID SECURITY:**

- A. A Cashier's Check drawn on a bank registered to do business in the State of Alabama and which is a member of the Federal Deposit Insurance Corporation, or Bid Bond payable to Owner, City of Mobile, in the amount of 5% of the Base Bid, but in no event more than \$10,000.00, must accompany bid. By submitting a Bid Security, the Bidder pledges to enter into a Contract with the City of Mobile on the terms stated in the Bid, and will, if required, furnish bonds covering faithful performance of the Contract and required insurance certificate. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds or insurance or any other required document, the amount of the Bid security shall be forfeited to the Owner as liquidated damages, not as a penalty.
- B. Bid Bond shall be valid for a minimum of sixty (60) days from the date of the Bid. The Owner reserves the right to retain the security of all Bidders until the successful Bidder enters into the Contract or until (60) days after Bid opening, whichever is sooner.
- C. Bonds must be issued by a Surety licensed to do business in the State of Alabama. If the project cost is more than \$50,000.00 the Surety must have a minimum rating of A/Class VI as reported by the latest issue of Best's Key Rating Guide Property-Casualty published by Alfred M. Best Company, Inc.
- D. Power of Attorney is required for all Bonds.
- E. The Surety company shall be required to execute AIA Document G-707, "Consent of Surety to Final Payment" prior to Final Payment of retainage being made to the Contractor.

**5. EXAMINATION OF DOCUMENTS AND SITE WORK:**

- A. Before submitting a Bid, Bidders should carefully examine the Bid Documents, visit the site of the Work, including attendance at the Pre-Bid conference, fully inform themselves as to existing conditions and limitations, and include in the Bid a sum to cover the cost of all items included in the Contract and necessary to perform the Work. The submission of a Bid will be considered as conclusive evidence that the Bidder has made such examination.

**6. SUBMISSION OF BIDS:**

- A. Bid, with Bid Security, Sales Tax Form C-3A, and other supporting data specified, shall be contained in a sealed, opaque envelope, approximately 9x12 inches or larger and be marked on the outside with the words "**SEALED BID FOR MOBILE CIVIC CENTER – PARKING FACILITY, PROJECT NUMBER: CC-085-22**", the Bid Date, and Contractor's

name, address, and City of Mobile Business License number. And, if bidding in an amount \$50,000 or greater, the State of Alabama General Contractor's License number and classification of the Bidder issued by the State of Alabama Licensing Board for General Contractors shall be written on the envelope.

- B. Bids shall be deposited at the designated location prior to the time and date for receipt of Bids. Bids received after the time and date specified in the Invitation to Bid, or as modified by Addendum, will not be considered. Late Bids will be returned to the Bidder unopened.
- C. The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.
- D. Oral, telephonic, facsimile, or other electronically transmitted bids will not be considered.

**7. MODIFICATION OR WITHDRAWAL OF BIDS:**

- A. A Bid may not be modified, withdrawn, or canceled by the Bidder for a period of sixty (60) days following the time and date designated for receipt of bids, and each Bidder so agrees in submitting a Bid.

**8. CONSIDERATION AND AWARD OF BIDS:**

- A. At the discretion of the City, the properly identified Bids received on time will be publicly opened and will be read aloud.
- B. The City shall have the right to reject all Bids. A Bid not accompanied by a required Bid security or a Bid which is in any way incomplete, or irregular is subject to rejection.
- C. It is the intent of the City to award a Contract to the lowest qualified Bidder provided the Bid has been submitted in accordance with the requirements of the Bidding Documents and does not exceed the funds available. The City shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the City's judgment, is in the City's best interest.
- D. The award shall be based on the lowest Total Bid for the Base Bid and any allowances, plus any alternates and/or options that may be accepted, as listed on the Bid Form.

**9. PROOF OF COMPETENCY OF BIDDER:**

- A. Bidders may be required to furnish evidence satisfactory to the City of Mobile that they have sufficient means and experience in the types of work called for to assure the completion of the Contract in a satisfactory manner.

**10. SIGNING OF CONTRACT:**

- A. The Standard Agreement between the City of Mobile and the Contractor, included herein, shall serve as the Agreement between the City and the Contractor.

- B. The Bidder to whom the Contract is awarded shall, within ten (10) calendar days of receiving the Contract Forms, properly execute and deliver to the Owner, the following items with the signed Agreement:
  - (1). Performance Bond and Labor and Material Payment Bond (originals);
  - (2). Certificate of Insurance (original) with endorsements to City of Mobile;
  - (3). Evidence of enrollment in the E-Verify program.
  - (4). Other documentation as required by the Contract Documents.
- C. Failure or refusal to sign the Agreement or to provide Certificates of Insurance in a form satisfactory to the City of Mobile, E-Verify verification, or other required documentation, shall subject the Bidder to immediate forfeiture of Bid Security.
- D. On all documents: City of Mobile Business License, the Alabama Secretary of State Business Identity, the Alabama Secretary of State Certificate of Authority (out of state contractors), E-verify documentation, and ACORD Insurance Form, the Contractor's name shall be EXACTLY the same.

**11. NONDISCRIMINATION:**

- A. Contractor shall comply with all Federal, State and local laws concerning nondiscrimination, including but not limited to City of Mobile Ordinance No. 14-034 which requires, inter alia, that all contractors performing work for the City of Mobile not discriminate on the basis of race, creed, color, national origin or disability, require that all subcontractors they engage do the same, and make every reasonable effort to assure that fifteen percent of the work performed under contract be awarded to socially and economically disadvantaged individuals and business entities.

**12. AMERICANS WITH DISABILITIES ACT (ADA):**

- A. Bidders shall comply with the provisions of the Americans with Disabilities Act (ADA) of 1990 which prohibits discrimination against individuals with disabilities.

**13. USE OF DOMESTIC PRODUCTS:**

- A. Section 39-3-1, Alabama Code, 1975, provides that the Contractor agree, in the execution of this Contract, to use materials, supplies and products manufactured, mined, processed or otherwise produced in the United States or its territories, if available at reasonable prices, and that breach of this Agreement by the Contractor shall result in the assessment of liquidated damages in an amount not less than \$500.00 nor more than twenty (20) percent of gross amount of the Contract Price.

**14. NON-RESIDENT (OUT OF STATE) CONTRACTORS:**

- A. Preference to Resident Contractors: Section 39-3-5, Code of Alabama, 1975, provides that a non-resident (out of State) bidder domiciled in a state which grants a preference to local Contractors is to be awarded a public contract on the same basis as the non-resident bidder's state awards contracts to Alabama bidders. Alabama bidders are given a preference to the same extent that a non-resident bidder receives a



preference in his home state. A non-resident bidder must include with any written bid documents a written opinion of an attorney licensed to practice in the non-resident bidder's state declaring what preferences, if any, exists in the non-resident's state.

- B. Certificate of Authority: All non-resident (out of State) bidders shall be registered with the Alabama Secretary of State and the Alabama Department of Revenue prior to submitting a Bid. Provide the Secretary of State Business "Entity ID Number" on the Bid Form in the space provided.

**15. ALABAMA IMMIGRATION ACT:**

- A. The State of Alabama Immigration Law (Act No. 2011-535 as amended by Act No. 2012-491), requires that Contractors not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama. In addition, Contractors are required to enroll in the federal E-Verify program and submit verification of enrollment to the City of Mobile within ten (10) days of receiving the contract forms (see Section 00 60 00).

**16. CITY OF MOBILE BUSINESS LICENSE:**

- A. A City of Mobile Business License is required and must be current at time of contract award and throughout contract period.

**17. CITY OF MOBILE CONTRACTOR'S BUSINESS LICENSE:**

- A. A City of Mobile Contractor's Business License is required and must be current when contractor signs the contract and throughout contract period.
- B. Contractor must qualify and post a \$10,000 surety bond with the Land Use/Code Administration Department before a Contractor's Business License will be issued by the Revenue Department. Information on the City Contractor's License may be obtained by writing or calling:

Land Use/Code Administration  
P.O. Box 1827  
Mobile, Alabama 36633-1827  
Phone: 251-208-7421

Revenue Department  
P.O. Box 1827  
Mobile, Alabama 36633-1827  
Phone: 251-208-7461

**18. CITY OF MOBILE BUILDING PERMIT:**

- A. A City of Mobile Building Permit, City of Mobile Development Permit AND Certificate of Appropriateness is required and shall be obtained from the Land Use/Code Administration Department, but at no cost to the Contractor.
- B. Contractor is responsible for ensuring that all inspections are successfully performed in accordance with City of Mobile regulations.

**19. CONSTRUCTION SCHEDULE AND ACCESS:**

- A. **The project shall be completed within Four Hundred Thirty-Five (435) calendar days from the date indicated by the Notice to Proceed.**
- B. There shall be no interruption of service to the building during any scheduled event. Within five (5) days of the bid opening, the Apparent Low Bidder Contractor shall meet with the Owner to discuss Owner scheduling and priorities. Apparent Low Bidder shall then provide a proposed schedule within 5 calendar days of the initial meeting for Owner review and approval.
- C. Contractor shall have access to the site as approved by the Owner, but typically **seven days a week, 24 Hours per day**. Contractor is directed to coordinate all areas of work and scheduling with the Owner. After hours work will require prior approval of the Project Manager and may require hiring of a guard at the contractor's expense.
- D. The Contractor may be allowed additional construction days due to inclement conditions ("rain days") only as such are appropriately documented and are in excess of the NOAA/ National Weather Service average (previous 5 years) for the given month. A "rain day" is defined as more than a "trace" (0.10") of rain falling within a given 24 hour period. The Contractor shall provide documentation and formally request any "rain days" they feel are legitimately due. Documentation shall be submitted to the Project Manager, in writing, within ten (10) calendar days of the rain event. Claim shall include documentation of trades adversely impacted and the impacted activities of each trade.

**20. SITE CONSIDERATIONS:**

- A. It is the Contractor's responsibility to carefully remove and store any items not permanently installed within the work areas. It is recommended that the Contractor photograph, videotape or in some manner document any features to be removed and their condition, prior to removal.
- B. Noise and strong smells shall be isolated or kept to a minimum when adjacent portions of the site are occupied.
- C. Contractor shall be responsible to leave the work area and adjacent site clear of equipment and debris, etc. at the end of each workday. All final cleaning is the responsibility of the Contractor and shall be executed prior to acceptance for reuse of any portion of the site.
- D. A dumpster and lay down area for Contractor materials and staging may be located at the site and located per the direction of the Owner. The Contractor is responsible for the removal of the dumpster, any storage containers and any security fencing, temporary erosion control (BMPs), etc. as soon as practical after their use by the Contractor or the work is complete.

**21. SALES AND USE TAX EXEMPTION:**

- A. As per the State of Alabama ACT 2013-205, the Alabama Department of Revenue (ADOR) has been granted the authority to issue a “Certificate of Exemption from Sales and Use Tax for Governmental Entities” on construction projects. Therefore, this project shall qualify for State of Alabama Sales and Use Tax Exemptions under this ACT. It is the responsibility of the Bidder to confirm the potential tax-exempt status of their bid with the ADOR and include any such savings in their bid, as well as accounting for same on their bid form attachment Sales Tax Form C-3A.
  
- B. The full text of ACT 2013-205 is available on the State of Alabama Building Commission website at [www.bc.alabama.gov](http://www.bc.alabama.gov).

**22. SUBMISSION OF LIEN WAIVERS:**

- A. At each monthly Application for Payment submitted to the owner, the Contractor shall provide completed lien waivers, including those from Subcontractors and material suppliers.

**23. NOTICE OF COMPLETION:**

- A. For Contracts \$50,000 or greater:  
Contractor shall provide proof of publication of Advertisement of Completion for four consecutive weeks in a local newspaper, as required in the Title 39, Section 39-1-1, Subsection (f), of the Code of Alabama. This Advertisement shall not begin until the Project has been accepted by the City of Mobile.
  
- B. Notice of Completion advertisement shall read as follows:  
  
STATE OF ALABAMA  
  
COUNTY OF MOBILE  
  
NOTICE OF COMPLETION  
In accordance with Chapter 1, Title 39, Code of Alabama, 1975, NOTICE IS HEREBY given that (COMPANY NAME) has completed the contract for Mobile Civic Center– Parking Facility- CC-085-22, Mobile, Alabama 36602. All persons having any claims for labor, material or otherwise in connection with this project should immediately notify the Architectural Engineering Department, City of Mobile, P.O. Box 1827, Mobile, Alabama 36633-1827.
  
- C. Advertisement shall not begin until the Project has been accepted by the City of Mobile as Substantially Complete.

**24. CONTRACTOR WARRANTY AND CERTIFICATION:**

- A. Upon completion of the contract, the Contractor shall certify under oath that all bills have been paid in full.

- B. Contractor shall provide a one-year Labor and Materials Warranty on company letterhead in addition to other warranties required by the Bid Documents.

**25. LIQUIDATED DAMAGES**

- A. A time charge equal to Two Hundred Fifty Dollars (\$250.00) per calendar day will be made against the Contractor for the entire period that any part of the Work remains uncompleted, or any required closeout documents are not acceptably submitted, for more than thirty (30) calendar days after the time specified for the Substantial Completion for the Work, the amount of which shall be deducted by the owner, and shall be retained by the Owner out of monies otherwise due the Contractor in the final payment, not as a penalty, but as liquidated damages sustained.

**END OF SECTION**

**SECTION 00 40 00**  
**BID FORM**

Copies of the following Bid Forms shall be used. Bids submitted on alternate forms may be rejected. Fill in all blank spaces with an appropriate entry. Bid Form must be signed by an officer of the company and notarized.

**TO: City of Mobile, 205 Government St., P.O. Box 1827, Mobile, AL, 36633**

**REF: PROJECT NO.: CC-085-22**  
**PROJECT NAME: Mobile Civic Center- Parking Facility**  
**PROJECT LOCATION: 200 South Claiborne Street**  
**Mobile, Alabama, 36602**

In compliance with the Bid Documents and having carefully and thoroughly examined said documents for the subject Work prepared by the City of Mobile, Architectural Engineering Department dated August 4, 2023; and all Addendum (a) Number(s)

\_\_\_\_\_, dated \_\_\_\_\_,  
2023 (CAUTION: before submitting any bid it is the Bidder's responsibility to check with the Architectural Engineering Department for all Addenda or special instructions that may impact the Bid) thereto, receipt of which is hereby acknowledged, the premises and all conditions affecting the Work prior to making this Proposal, the Undersigned Bidder, hereby

**COMPANY NAME:** \_\_\_\_\_

**ADDRESS:** \_\_\_\_\_ **PHONE:** \_\_\_\_\_

**ALABAMA GENERAL CONTRACTOR LICENSE NO.** \_\_\_\_\_

**CITY OF MOBILE BUSINESS LICENSE NO.** \_\_\_\_\_

**SECRETARY OF STATE OF ALABAMA BUSINESS IDENTITY NO.** \_\_\_\_\_

**SECRETARY OF STATE OF ALABAMA ACCOUNT NO.** \_\_\_\_\_

(Note: Secretary of State Account Number shall be filled in only by non-resident bidders)

(Check one) [ ] A Corporation [ ] A Partnership [ ] An Individual Doing Business

hereby proposes to furnish all labor, materials, tools, equipment, and supplies and to sustain all the expenses incurred in performing the Work on the above captioned Project in accordance with the terms of the Contract Documents, and all applicable laws and regulations for the sum listed below. The initial term of the Contract shall extend for Sixty (60) calendar days from the date of the Notice to Proceed.

**BASE BID:** \$ \_\_\_\_\_

**CONTINGENCY ALLOWANCE:** + \$ \_\_\_\_\_ 300,000.00

**TOTAL BASE BID:** \$ \_\_\_\_\_  
(Fill in here and in Total Bid below)

**TOTAL BASE BID:** \_\_\_\_\_ Dollars (\$ \_\_\_\_\_ .00)  
(Amount in Words) (Amount in Figures)

Additive Alternate #1:

\_\_\_\_\_ Dollars & No Cents \$ \_\_\_\_\_ .00  
Amount in Words Amount in #'s

Additive Alternate #2:

\_\_\_\_\_ Dollars & No Cents \$ \_\_\_\_\_ .00  
Amount in Words Amount in #'s

(Note: Show amount in both words and figures. In case of discrepancy, the amount in words shall govern). **Bids shall be provided in whole dollar amount with no cents.**

**REQUIRED LISTING OF SUBCONTRACTORS/SUPPLIERS:** List the subcontractors/suppliers for the trades listed below which you intend to use for the base bid. If no trades are designated, the listing is not required. List yourself for work you intend to self-perform. Any envelope adjustments to this section must be initialed by the bidder. Failure to complete this section may render your bid non-responsive. See Supplemental Instructions to Bidders for additional information.

(List requested trades here, if any)

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**CONTINGENCY ALLOWANCE:** \$300,000.00 lump sum Contingency Allowance shall be included in the Total Bid for work related to unforeseen conditions as approved by the Owner.

**BID SECURITY:** The undersigned Bidder agrees that the attached Bid Security, as a Cashier's Check drawn on a bank registered to do business in the State of Alabama and which is a member of the Federal Deposit Insurance Corporation, or a Bid Bond, made payable to the City of Mobile, in the amount of 5% of the bid amount, but in no event more than \$10,000, as the proper measure of liquidated damages which the City will sustain by the failure of the undersigned to execute the Contract. Said Bid Security shall become the property of the City of Mobile as liquidated damages as specified in the Contract Documents.

**AMERICANS WITH DISABILITIES ACT (ADA):** The undersigned Bidder agrees to fully comply with all requirements of the Americans with Disabilities Act of 1990 and the Amendment Act.

**NONDISCRIMINATION:** Contractor shall comply with all Federal, State and local laws concerning nondiscrimination, including but not limited to City of Mobile Ordinance No. 14-034 which requires, inter alia, that all contractors performing work for the City of Mobile not discriminate on the basis of race, creed, color, national origin or disability, require that all subcontractors they engage do the same, and make every reasonable effort to assure that fifteen percent of the work performed under contract be awarded to socially and economically disadvantaged individuals and business entities.

**SIGNATURE:** If the undersigned Bidder is incorporated, the entire legal title of the company followed by "a corporation" should be used. If Bidder is an individual, then that individual's full legal name followed by doing business as (d/b/a) and name of firm, if any, should be used. If Bidder is a partnership, then full name of each partner should be listed followed by "d/b/a" and name of firm, if any.

Ensure that name and exact arrangement thereof is the same on all forms submitted with this Bid. If a word is abbreviated in the official company name, such as "Co.", then use that abbreviation. If not abbreviated in the official name, spell out.

Bidder agrees not to revoke or withdraw this Bid until sixty (60) calendar days following the time and date for receipt of bids. If notified in writing of the acceptance of this Bid within this time period, Bidder agrees to execute a Contract based on this Bid on the proscribed form within ten (10) calendar days of said notification and to furnish Performance Bond and Materials and Payment Bond as specified.

**COMPANY NAME:** \_\_\_\_\_  
(Printed or Typed)

**BY:** \_\_\_\_\_  
(Signature of Company Officer)

**COMPANY OFFICER:** \_\_\_\_\_  
(Printed or Typed)

**TITLE:** \_\_\_\_\_ **DATE:** \_\_\_\_\_, 2023  
(Printed or Typed)

Sworn to and subscribed before me this \_\_\_\_\_ day of \_\_\_\_\_,  
2023

\_\_\_\_\_  
Notary Public

**Attachments:**

1. Bid Security, with Power of Attorney
2. Secretary of State Authorization (Out of state bidders only)
3. Sales Tax Form C-3A

**END OF BID FORM**



## ACCOUNTING OF SALES TAX A Form C-3A: Proposal Form

To: \_\_\_\_\_ City of Mobile, Alabama \_\_\_\_\_ Date: \_\_\_\_\_  
(Awarding Authority)

**NAME OF PROJECT** Mobile Civic Center - Parking Facility

Project Number: CC-085-22

### SALES TAX ACCOUNTING

Pursuant to Act 2013-205, Section 1(g) the Contractor accounts for the sales tax NOT included in the bid proposal form as follows:

#### ESTIMATED SALES TAX AMOUNT

**BASE BID:** \$ \_\_\_\_\_

**Alternate No. 1** (.....)  (add)  (deduct) \$ \_\_\_\_\_  
(Insert key word for Alternate)

**Alternate No. 2** (.....)  (add)  (deduct) \$ \_\_\_\_\_

**Alternate No. 3** (.....)  (add)  (deduct) \$ \_\_\_\_\_

**Alternate No. 4** (.....)  (add)  (deduct) \$ \_\_\_\_\_

**Alternate No. 5** (.....)  (add)  (deduct) \$ \_\_\_\_\_

**Alternate No. 6** (.....)  (add)  (deduct) \$ \_\_\_\_\_

**Failure to provide an accounting of sales tax shall render the bid non-responsive. Other than determining responsiveness, sales tax accounting shall not affect the bid pricing nor be considered in the determination of the lowest responsible and responsive bidder.**

**Legal Name of Bidder** \_\_\_\_\_

Mailing Address \_\_\_\_\_

**\*By (Legal Signature)** \_\_\_\_\_

\*Name (type or print) \_\_\_\_\_

*(Seal)*

\*Title \_\_\_\_\_

Telephone Number: \_\_\_\_\_ Email Address: \_\_\_\_\_

\_\_\_\_\_



OFFICE OF SUPPLIER DIVERSITY  
**CITY OF MOBILE**  
Subcontracting and Major Supplier Plan

Contact Office of Supplier Diversity for  
questions on completing this form.  
Via email: [Archnique.kidd@cityofmobile.org](mailto:Archnique.kidd@cityofmobile.org)  
251.208.7967  
205 Government Street, 4<sup>th</sup> Floor

**Bidders and Proposers – Please complete and submit these forms as required by your City of Mobile Bid or Proposal Specification.**

This document provides information to the City of Mobile about the subcontractors and major suppliers you intend to use to complete this contract. Failure to submit this form, when so required by the bid or proposal specification, will render your bid non-responsible. Not all specifications require this form to be completed, or may require its completion under varying circumstances. Refer to the specification for direction.

The City of Mobile will use this form to:

- Understand your intended use of subcontractors and major suppliers as part of your bid/proposal submission.
- Evaluate your capability to complete the performance of this contract.
- Determine your use of Disadvantaged Business Enterprises (DBEs) as subcontractors and suppliers.
- For certain contracts, assess whether you exercised “good faith efforts” to use DBE subcontractors and suppliers for at least 15% of the value of your bid/proposal amount. (See City of Mobile City Code Sec. 14-2.)

Include this form with your bid/proposal submission. Should your bid be considered the lowest responsible bid, you will have the opportunity to update this form at contract signature. You also will be required to re-verify your information at contract conclusion.

The bid specification may require you to attempt in “good faith” to use DBE subcontractors and suppliers for at least 15% of the value of your bid in the performance of this contract. If you don’t have that level of DBE subcontractor / supplier usage (as documented on **Form 1**), you are required to complete the “good faith effort” documentation on **Form 2**. When so required, failure to adequately address the good faith effort factors on Form 2 will render your bid or proposal as non-responsive. The determination whether the bid or proposal adequately demonstrates and documents a DBE subcontractor/supplier plan, or good faith efforts to complete such a plan, will be at the sole discretion of the City of Mobile. You are encouraged to work with the City of Mobile Supplier Diversity Manager when preparing this form.

About “**DBEs**”: The City of Mobile considers businesses owned by minorities, women, or disabled veterans to be DBEs. Please consult with the City Supplier Diversity Manager for clarification or lists of certified DBEs.

About “**Good Faith**” Effort: The City of Mobile expects contractors holding large contracts to recruit and engage DBEs to be a part of their team. If the specification sets, and you cannot meet, the 15% target, you must show us how you attempted to recruit and engage DBEs to meet this target. This helps the City identify DBE market weaknesses for development, and ensures all bidders are equally considering this obligation in preparing a bid. The “good faith effort” factors on **Form 2** are not intended to be a mandatory, exhaustive, or exclusive. They are a tool to help you, and to help the City consistently and fairly consider your effort.



OFFICE OF SUPPLIER DIVERSITY  
**CITY OF MOBILE**  
 Subcontracting and Major Supplier Plan

Contact Office of Supplier Diversity for questions on completing this form.  
 Via email: Archnique.kidd@cityofmobile.org  
 251.208.7967  
 205 Government Street, 4<sup>th</sup> Floor

**FORM 1: Background and Plan**

**Section I. Information about your company**

Company	
Address	
Telephone	
E-Mail	

RFP/RFQ Solicitation Number	
Project Description	
Is your company a DBE company?	Yes <input type="checkbox"/> No <input type="checkbox"/>
Work force demographics	Male _____ Female _____ Minority _____ Non-minority _____ Vets _____ Total #of Employees _____

**Subcontractor/Major Supplier Plan submitted by:**

Printed Name: \_\_\_\_\_

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Title: \_\_\_\_\_

The following employee will be designated as the **DBE Liaison** for all communication regarding DBE participation including documentation for DBE participation and maintenance of records of Good Faith Efforts for this contract award:

Name: \_\_\_\_\_ Title: \_\_\_\_\_

E-mail: \_\_\_\_\_ Phone: \_\_\_\_\_



OFFICE OF SUPPLIER DIVERSITY  
**CITY OF MOBILE**  
 Subcontracting and Major Supplier Plan

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 Via email: Archnique.kidd@cityofmobile.org  
 251.208.7967  
 205 Government Street, 4<sup>th</sup> Floor

**FORM 1: Background and Plan**

**Section II. Plan for Subcontractors and Major Vendors**

This form asks for your intentions to utilize subcontractors and suppliers as a potential contractor for the city of Mobile. For purposes of this form, disadvantaged individuals or enterprises include persons or small-business-enterprise owners who are women, members of a racial minority, or disabled military veterans.

RFP/RFQ/Bid # \_\_\_\_\_ Your Bid/Proposal Amount \$ \_\_\_\_\_ Date: \_\_\_\_/\_\_\_\_/\_\_\_\_

Description \_\_\_\_\_

Name of Bidder/Proposer: \_\_\_\_\_

**I intend to use the following subcontractors: (Attach additional pages if necessary)**

Subcontractor or Major Supplier	Phone	Scope of Work to be performed	\$\$ Value to be Performed	% Of Your Bid Amount	DBE?	Official Verification Only



OFFICE OF SUPPLIER DIVERSITY  
**CITY OF MOBILE**  
 Subcontracting and Major Supplier Plan

**Form 2: Good Faith Effort Documentation**

Name of Bidder: \_\_\_\_\_

Contact Person: \_\_\_\_\_ Phone \_\_\_\_\_ Email \_\_\_\_\_

Please complete this form if you are unable to identify DBE subcontractors or suppliers to reach 15% of the value of your bid.

YES ( · )	NO ( · )	<b>Did you do these suggested areas for DBE recruitment and engagement</b>
		<b>PRE-BID MEETING(S):</b> The bidder attended all pre-bid meetings scheduled by the City to inform DBEs of contracting and subcontracting opportunities.
		<b>CMDBE/ALDOT DBE LIST(S):</b> The bidder utilized the Office of Supplier Diversity's list or lists of certified ALDOT DBE 's
		<b>SMALL CONTRACT(S):</b> The bidder selected specific portions of the work to be performed by DBEs in order to increase the likelihood of meeting the DBE goals (including breaking down contracts into smaller units to facilitate DBE participation). Consider support services, including insurance, accounting, temporary labor, and transportation, landscaping, and janitorial as potential areas for DBE use.
		<b>FOLLOW-UP:</b> The bidder followed-up initial indications of interest by DBEs by contacting those DBEs to determine with certainty if they remained interested in bidding.
		<b>ADVERTISEMENT:</b> The bidder advertised in general circulation and/or trade association publications concerning subcontracting opportunities, and allowed DBEs reasonable time to respond.
		<b>INTERNET ADVERTISING:</b> The bidder advertised DBE and/or subcontracting opportunities on the <i>City of Mobile</i> Facebook page or other internet portals that are accessible to DBEs and/or potential subcontractors.
		<b>GOOD FAITH NEGOTIATIONS:</b> The bidder negotiated in good faith with interested DBEs and did not reject DBEs as unqualified without sound business reasons based on a thorough investigation of their capabilities.



OFFICE OF SUPPLIER DIVERSITY  
**CITY OF MOBILE**  
Subcontracting and Major Supplier Plan

	<b>INFORMATION:</b> The bidder provided interested DBEs with adequate information about the plans, specifications and requirements of the subcontract.
	<b>WRITTEN NOTICE(S):</b> The bidder/proposer took the necessary steps to provide written notice in a manner reasonably calculated to inform DBEs of subcontracting opportunities and allowed sufficient time for them to participate effectively.
	<b>COMMUNITY RESOURCES:</b> The bidder/proposer used the services of available community organizations, small and/or disadvantaged business assistance offices and other organizations that provided assistance in the recruitment and placement of DBE firms.
	<b>CONTRACT RECORDS:</b> The bidder/proposer has maintained the following records for each DBE that has bid on the subcontracting opportunity:  1. Name, address, and telephone number; 2. A description of information provided by the bidder/proposer or subcontractor; and 3. A statement of whether an agreement was reached, and if not, why not, including any reasons for concluding that the DBE was unqualified to perform the job.

Please indicate if any of the following applied:

\_\_\_\_\_ There are not ways to break out 15% of the value of this contract for subcontractors / suppliers.

\_\_\_\_\_ Could not find sufficient DBEs to provide subcontracting or supplier services.

\_\_\_\_\_ DBEs were available but did not have sufficient qualifications or experience to meet the needs of this contract.

Please indicate additional efforts you have taken to recruit and engage DBEs. \_\_\_\_\_

Suggestions or comments to improve this program. \_\_\_\_\_

**SECTION 00 50 00**

**STANDARD FORM OF AGREEMENT BETWEEN OWNER AND CONTRACTOR**

**PART 1 - GENERAL**

This section includes the STANDARD FORM OF AGREEMENT BETWEEN OWNER and CONTRACTOR, AIA Document A101, wherein the basis of payment is a Stipulated Sum; the document has been electronically modified to meet the Owner's requirements and shall be used for the Project.

# DRAFT AIA® Document A101™ – 2017

## Standard Form of Agreement Between Owner and Contractor where the basis of payment is a Stipulated Sum

AGREEMENT made as of the « » day of « » in the year « »

(In words, indicate day, month and year.)

BETWEEN the Owner:

(Name, legal status, address and other information)

«City of Mobile »« »  
«P. O. Box 1827 »  
«Mobile, Alabama 36633-1827 »  
« »

and the Contractor:

(Name, legal status, address and other information)

« »« »

« »

« »

« »

«City of Mobile Business License Number: »  
«Secretary of State Registration Number: »

for the following Project:

(Name, location and detailed description)

«Mobile Civic Center- Parking Facility  
200 South Claiborne Street  
Mobile, Alabama 36602  
CC-085-22  
Parking Deck Construction

The Engineer:

(Name, legal status, address and other information)

«Evan Terry Associates, LLC  
1 Perimeter Park South, #200S  
Birmingham, Alabama 35243»

The Owner and Contractor agree as follows.

**ADDITIONS AND DELETIONS:**  
The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

The parties should complete A101™-2017, Exhibit A, Insurance and Bonds, contemporaneously with this Agreement. AIA Document A201™-2017, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

**ELECTRONIC COPYING** of any portion of this AIA® Document to another electronic file is prohibited and constitutes a violation of copyright laws as set forth in the footer of this document.



## TABLE OF ARTICLES

1	THE CONTRACT DOCUMENTS
2	THE WORK OF THIS CONTRACT
3	DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION
4	CONTRACT SUM
5	PAYMENTS
6	DISPUTE RESOLUTION
7	TERMINATION OR SUSPENSION
8	MISCELLANEOUS PROVISIONS
9	ENUMERATION OF CONTRACT DOCUMENTS, INSURANCE AND BONDS

### ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary, and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement, and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

### ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others (See attachment Exhibit A).

### ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be:

*(Check one of the following boxes.)*

[  ] A date set forth in a notice to proceed issued by the Owner.

§ 3.2 The Contract Time shall be measured from the date of commencement of the Work.

#### § 3.3 Substantial Completion

§ 3.3.1 Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Substantial Completion of the entire Work:

*(Check one of the following boxes and complete the necessary information.)*

[  ] Not later than  (  ) calendar days from the date of the Notice to Proceed for commencement of the Work.

§ 3.3.3 If the Contractor fails to achieve Substantial Completion as provided in this Section 3.3, liquidated damages, if any, shall be assessed as set forth in Section 4.5.

**ARTICLE 4 CONTRACT SUM**

§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor’s performance of the Contract. The Contract Sum shall be «\_\_\_\_\_ and 00/100 Dollars» (\$ «\_\_.00»), subject to additions and deductions as provided in the Contract Documents.

Base Bid: \$  
Contingency Allowance: \$ 300,000.00  
Total Contract Sum: \$

**§ 4.2 Alternates**

§ 4.2.1 Alternates, if any, included in the Contract Sum:

Item	Price
N/A	

§ 4.3 Allowances, if any, included in the Contract Sum:  
(Identify each allowance.)

Contingency Allowance: Three Hundred thousand dollars and 00/100 Dollars (\$300,000.00)

- A. Contingency Allowance shall cover cost of material, labor, overhead, profit and other expenses for complete installation of items of additional work as required for a complete, functional project.
- B. Contingency Allowance shall be used for unforeseen conditions not covered in the construction documents.
- C. All extra work under this section must be authorized by the Owner, in writing, prior to materials or undertaking work.
- D. Upon completion of the Work, the unused portion of the Allowance shall be credited back to the Owner in the form of a Change Order.
- E. Allowances are subject to the same provision of AIA 201 Article 7.3.7.

§ 4.4 Unit prices, if any:  
(Identify the item and state the unit price and quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price per Unit (\$0.00)
1. N/A		

§ 4.5 Liquidated damages:  
(Insert terms and conditions for liquidated damages, if any.)

«A time charge equal to two hundred fifty dollars and no cents (\$250.00) per calendar day will be made against the Contractor for the entire period that any part of the Work remains uncompleted or any required closeouts documents are not acceptably submitted for more than thirty (30) days after the date specified for the substantial Completion of the Work, the amount of which shall be deducted by the owner, and shall be retained by the Owner out of monies otherwise due the Contractor in the final payment, not as a penalty, but as liquidated damages sustained. »

**ARTICLE 5 PAYMENTS**

**§ 5.1 Progress Payments**

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the 25th of the month.

**§ 5.1.3** Provided that an Application for Payment in acceptable format is received by the Architect not later than the first «1st » day of a month, the Owner shall make payment of the amount certified to the Contractor not later than the tenth «10th » day of the «following » month. If an Application for Payment in acceptable format is received by the Architect after the application date fixed above, payment of the amount certified shall be made by the Owner not later than «forty » ( «40 » ) days after the Architect receives the Application for Payment.  
*(Federal, state or local laws may require payment within a certain period of time.)*

**§ 5.1.4** Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form, and supported by such data to substantiate its accuracy, as the Architect may require. This accepted schedule of values shall be used as a basis for reviewing the Contractor's Applications for Payment.

**§ 5.1.5** Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

**§ 5.1.6** In accordance with AIA Document A201, General Conditions of the Contract for Construction (including Owner's then-current modifications), and subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

**§ 5.1.6.1** The amount of each progress payment shall first include:

- .1 That portion of the Contract Sum properly allocable to completed Work;
- .2 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 in advance by the Owner, suitably stored off the site at a location agreed upon in writing and insured as specified;
- .3 Completed work shall be determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values.

**§ 5.1.6.2** The amount of each progress payment shall then be reduced by:

- .1 The aggregate of any amounts previously paid by the Owner;
- .2 The amount, if any, for Work that remains uncorrected and for which the Architect has previously withheld a Certificate for Payment as provided in Article 9 of AIA Document A201-2017;
- .3 Any amount for which the Contractor does not intend to pay a Subcontractor or material supplier, unless the Work has been performed by others the Contractor intends to pay;
- .4 For Work performed or defects discovered since the last payment application, any amount for which the Architect may withhold payment, or nullify a Certificate of Payment in whole or in part, as provided in Article 9 of AIA Document A201-2017; and
- .5 Retainage withheld pursuant to Section 5.1.7.

**§ 5.1.6.3** Any Progress Payment shall include partial release of liens for material and labor for previous application for payment amount approved and paid. For projects over \$250,000.00, the DBE Utilization Report shall be included with the pay application.

### **§ 5.1.7 Retainage**

**§ 5.1.7.1** For each progress payment made prior to Substantial Completion of the Work, the Owner may withhold the following amount, as retainage, from the payment otherwise due:

*(Insert a percentage or amount to be withheld as retainage from each Application for Payment. The amount of retainage may be limited by governing law.)*

«Five percent (5%) of the first fifty percent (50%) of the completed work and after fifty percent (50%) completion has been accomplished, no further retainage shall be held from the original Contract Sum. Increases in the contract sum by Change Order shall also be subject to retainage.»

**§ 5.1.7.1.1** The following items are not subject to retainage:

*(Insert any items not subject to the withholding of retainage, such as general conditions, insurance, etc.)*

«N/A »

« »

**§ 5.1.7.3** Except as set forth in this Section 5.1.7.3, upon Substantial Completion of the Work, the Contractor may submit an Application for Payment that includes the retainage withheld from prior Applications for Payment pursuant to this Section 5.1.7. The Application for Payment submitted at Substantial Completion shall not include retainage as follows:

*(Insert any other conditions for release of retainage upon Substantial Completion.)*

«The net amount of the Retainage shall be equal to two and one half percent (2.5%) of total Contract Sum, as increased or decreased by Change Order. »

**§ 5.1.8** If final completion of the Work is materially delayed through no fault of the Contractor, the Owner shall pay the Contractor any additional amounts in accordance with Article 9 of AIA Document A201.

**§ 5.1.9** Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

## **§ 5.2 Final Payment**

**§ 5.2.1** Final monthly progress payment, constituting the entire unpaid balance of the Contract Sum, less retainage, shall be made by the Owner to the Contractor when

- .1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Article 12 of AIA Document A201 (including Owner's then-current modifications which may be obtained from the Owner or, alternatively, a copy of which is incorporated in the Project Manual and incorporated by reference herein as a part thereof), and to satisfy other requirements, if any, which extend beyond final payment; and
- .2 a Certificate of Substantial Completion has been issued by the Architect/Owner and the project accepted.

**§ 5.2.2** The Owner's final payment to the Contractor of retainage shall be made as follows:

« The final two and one half percent (2.5%) of the total Contract Sum retained will not be paid until proof of publication is submitted and all written claims paid in full. Contractor to submit the following:

- Contractor's Affidavit of Payment of Debts and Claims (AIA form G706, included in contract documents) with
  - a.) Contractor's Release or Waiver of Liens
  - b.) Releases or Waivers of Liens from Subcontractors and Material and Equipment Suppliers;
- Contractor's Affidavit of Release of Liens (AIA form G706A, included in contract documents);
- Consent of Surety, if any, to final payment (AIA form G707, included in contract documents);
- Any additional close out requirements per the contract documents; and
- Notarized Affidavit of Notice of Completion advertisement from publisher.

Contractor shall provide proof of publication of Notice of Completion in a local newspaper once per week for four (4) consecutive weeks, as required in the Title 39, Section 39-1-1, Subsection (f), of the Code of Alabama quoted below. "The Contractor shall, immediately after the completion of the contract, give notice of Completion by an advertisement in a newspaper of general circulation published within the city or county in which the work has been done, for a period of four (4) consecutive weeks. A final settlement shall not be made upon the contract until the expiration of thirty (30) days after the completion of the notice. Proof of publication of the notice shall be made by the contractor to the authority by whom the contract was made by affidavit of the publisher and a printed copy of the notice published. If no newspaper is published in the county in which the work is done, the notice may be given by the contract." (Acts 1927, No. 39, 9.37; Acts 1935, No. 39, 9. 70; Code 1940, T. 50, Section 16; Acts 1983, No. 83-737, 9.1203; Acts 1989, No. 89-650m 9. 1284, Section 1; Acts 1994, No. 94-207, p. 270, Section 1; Acts 1997, No. 97-225, p. 348, Section 1.)

The Notice of Completion shall read as follows:

STATE OF ALABAMA  
COUNTY OF MOBILE  
NOTICE OF COMPLETION

In accordance with Chapter I, Title 39, Code of Alabama, 1975, NOTICE IS HEREBY given that ( ) has completed the contract for Mobile Civic Center – Parking Facility (CC-085-22), 200 South Claiborne Street, Mobile, Alabama, 36602. All persons having any claims for labor, material or otherwise in connection with this project should immediately notify the Architectural Engineering Department, City of Mobile, P. O. Box 1827, Mobile, Alabama 36633-1827.

Publication of the Notice of Completion shall not begin until the Project has been accepted as Substantially Complete by the City of Mobile. »

**ARTICLE 6 DISPUTE RESOLUTION**

**§ 6.1 Initial Decision Maker**

The Engineer will serve as the Initial Decision Maker pursuant to Article 15 of AIA Document A201, unless the parties appoint below another individual, not a party to this Agreement, to serve as the Initial Decision Maker. *(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)*

«N/A »

**§ 6.2 Binding Dispute Resolution**

For any Claim, the method of binding dispute resolution shall be as follows:  
*(Check the appropriate box.)*

[  ] Litigation in a court of competent jurisdiction

**ARTICLE 7 TERMINATION OR SUSPENSION**

**§ 7.1** The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201, General Conditions of the Contract for Construction, including Owner's then-current modifications, a copy of which is incorporated in the contract documents and incorporated by reference herein as a part thereof.

**§ 7.2** The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201, General Conditions of the Contract for Construction, including Owner's then-current modifications, a copy of which is incorporated in the contract documents and incorporated by reference herein as a part thereof.

**ARTICLE 8 MISCELLANEOUS PROVISIONS**

**§ 8.1** Where reference is made in this Agreement to a provision of AIA Document A201 or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents. A copy of such amended, revised or supplemental provision is incorporated in the contract documents and hereby incorporated by reference herein as a part thereof.

**§ 8.2** The Owner's representative:  
*(Name, address, email address, and other information)*

«Director, Real Estate & Asset Management »  
«P. O. Box 1827 »  
«Mobile, Alabama 36633-1827 »

**§ 8.3** The Contractor's representative:  
*(Name, address, email address, and other information)*

« »  
« »

« »§ 8.4 Neither the Owner's nor the Contractor's representative shall be changed without ten days' prior notice to the other party.

### § 8.5 Insurance and Bonds

§ 8.5.1 The Owner and the Contractor shall purchase and maintain insurance as set forth below:

The Contractor shall purchase and maintain from a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- .1 Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- .2 Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- .3 Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- .4 Claims for damages insured by usual personal injury liability coverage;
- .5 Claims for damages, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- .6 Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- .7 Claims for bodily injury or property damage arising out of completed operations; and
- .8 Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18 of the General Conditions of the Contract for Construction.

The Contractor shall take out and maintain during the life of the Contract no less than the following amounts of insurance with the City of Mobile named as an additional insured. Contractor shall submit a Certificate of Insurance. Insurance companies listed as the "Companies Affording Coverage" shall be authorized by the Secretary of the State of Alabama. Insurance produced out of the State of Alabama must be signed or counter signed by a licensed Agent of Alabama, with the Agent's name, address and telephone number typed or printed on the face of the Certificate of Insurance.

- .1 Workmen's Compensation Insurance: - Statutory-amount and coverage as required by all applicable laws, rules or regulations of the State of Alabama.
- .2 Employee's Liability Insurance shall be provided for limits of liability not less than:
  - A. Bodily Injury by Accident \$1,000,000 each accident
  - B. Bodily Injury by Disease \$1,000,000 each employee
  - C. Bodily Injury by Disease \$1,000,000 each policy
- .3 The Contractor shall provide Broad Form (commonly termed Comprehensive) General Liability Insurance (including premises-product-completed operations, independent contractors, and blanket contractual liability), specifically covering the obligations assumed by the Contractor for limits of liability not less than:
  - A. Bodily Injury \$1,000,000 each person  
\$1,000,000 each occurrence
  - B. Property Damage \$1,000,000 each occurrence; or
  - C. Bodily Injury & Property Damage \$1,000,000 combined single limit
4. Such comprehensive policy shall include the following:
  - A. All liability of the Contractor, for the Contractor's Direct Operations.

- B. Subcontractor's Operations.
  - C. Completed Operations Cover, thereby meaning any loss which shall occur after the contract has been completed, but which can be traced back to the Contract.
  - D. General Aggregate Limit shall apply on a "Per Project" Basis.
  - E. Contractual Liability, meaning thereby; any risk assumed by the Contractor under Hold Harmless Agreements or any other assumption of liability, but specifically items 11.1.1.8.3G herein below
  - F. Broad Form Property damage Coverage, including Completed Operations.
  - G. Personal Injury Liability, with employee's exclusions removed.
  - H. Explosion and Collapse Hazard:
    - Included or  Not Applicable.
  - I. Underground Hazard:
    - Included or  Not Applicable.
5. The Contractor shall carry for himself and shall require that all Subcontractors and all Owners of Automobiles or trucks rented or hired on the contract carry, until the Contract is completed, Comprehensive Automobile Liability Coverage for Bodily Injury and property. Damage for any auto in amounts not less than the minimum amounts as indicated. The Contractor and Subcontractor shall also carry for themselves insurance for all non-owned and hired automobile at the limits of liability as indicated below:
- |    |                                    |  |
|----|------------------------------------|--|
| A. | Bodily Injury                      | \$1,000,000 each person<br>\$1,000,000 each occurrence |
| B. | Property damage                    | \$1,000,000 each occurrence; or,                       |
| C. | Bodily Injury &<br>Property damage | \$1,000,000 combined single limit                      |
6. Umbrella/Excess Liability: \$2,000,000 combined single limit each occurrence for bodily injury and/or property damage
7. Builder's Risk Coverage: The Contractor shall carry for the Owner, himself, and all Subcontractors a Builder's Risk Policy to cover the full amount of the Contract during construction, fabrication or erection of any equipment.
8. A Surety authorized to do business in the State of Alabama shall furnish the required Insurance.
9. The standard ACORD™ format shall be provided. The ACORD™ Certificate must be signed or countersigned by a Licensed Resident Agent of the State of Alabama and the agent's name, address and telephone number must appear on the face of the certificate.
10. The Surety must have a minimum rating of A/Class VI as reported in the latest issue of Best's Key Rating Guide Property-Casualty, published by Alfred M. Best Company, Inc. if the bid price exceeds \$50,000.00.
11. "In Rem" endorsement.
12. Borrowed Servant/Alternate Employer endorsement in favor of the City of Mobile.

The insurance shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

Certificates of insurance acceptable to the Owner shall be filed with the Owner within ten (10) calendar days from date of issuance of contract forms for execution. Contractor shall deliver to the City of Mobile, certificates of

insurance certifying the existence and limits of the insurance coverages along with separate policy endorsements. Contractor shall also be responsible for delivering policy renewal certificates to the City of Mobile, and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies shall contain a provision that coverages afforded under the policies will not be cancelled subject to non-renewal nor material change, or allowed to expire without at least 30 days' (except 10 days from non-payment) prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment and thereafter upon renewal or replacement of such coverage until the expiration of the time. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

All policies of insurance, except worker's compensation, shall be endorsed to provide that all such insurances are primary and non-contributing with any other insurance maintained by the City of Mobile and endorsed to waive rights of subrogation in favor of the City of Mobile.

The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

**§ 8.5.2** The Contractor shall provide bonds as set forth below:

Contractor shall furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder.

Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

The Labor and Material Payment Bond and the Performance Bond shall each be for one hundred percent (100%) of the Contract Sum.

1. Bond shall be submitted with the executed agreement on provided form(s).
2. Power of Attorney is required for both bonds.
3. A Surety authorized to do business in the State of Alabama shall furnish both bonds.
4. A Surety licensed to do business in the State of Alabama must execute the bonds.
5. The Surety must have a minimum rating of A/Class VI as reported in the latest issue of Best's Key Rating Guide Property-Casualty, published by Alfred M. Best Company, Inc., if the bid price exceeds \$50,000.00.
6. The Surety company shall be required to execute AIA Document G-707, "Consent of Surety to Final Payment" prior to Final Payment being made to the Contractor.

**§ 8.6** Contractor agrees to indemnify and hold the City, its elected officials, officers, agents, and employees whole and harmless from all costs, liabilities and claims for damages of any kind (including interest and attorneys' fees) arising in any way out of the performance of this Agreement and/or the activities of Contractor, its principals, directors, agents and employees in the performance of this Agreement, for which the City is alleged to be liable. In the event that the City, through no fault of its own, is made a party to any lawsuit or legal proceeding arising in any way from this contract or any activities conducted pursuant thereto, Contractor hereby agrees to pay all of City's costs of defense, including but not limited to all attorneys' fees, court costs, expert witness fees and other expenses, through trial and, if necessary, appeal. This section is not as to third parties or to anyone a waiver of any defense or immunity or statutory damages cap otherwise available to Contractor or City, and these defenses and matters may be raised in the City's behalf in any action or proceeding arising under this Agreement.



§ 8.7 Other provisions:

«Contractor shall provide a minimum one (1) year warranty from the date of substantial completion of all Labor and Materials for the Work covered by this contract, unless otherwise specified. Labor and Material warranties required by other sections of the construction document shall not conflict with this provision. The most stringent warranty provision shall apply. »

**ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS**

§ 9.1 This Agreement is comprised of the following documents:

- .1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor
- .2 AIA Document A201, General Conditions of the Contract for Construction, including Owner’s then-current modifications, a copy of which is incorporated in the contract documents and incorporated by reference herein as a part thereof.

.3 Drawings

Number	Title	Date

.4 Specifications

Section	Title	Date

.5 Addenda, if any:

Number	Date

Portions of Addenda relating to bidding or proposal requirements are not part of the Contract Documents unless the bidding or proposal requirements are also enumerated in this Article 9.

.6 Other Exhibits:

*(Check all boxes that apply and include appropriate information identifying the exhibit where required.)*

§ 9.2  Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
N/A			

§ 9.2.1 Other documents, if any, listed below:

*(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201™–2017 provides that the advertisement or invitation to bid, Instructions to Bidders, sample forms, the Contractor’s bid or proposal, portions of Addenda relating to bidding or proposal requirements, and other information furnished by the Owner in anticipation of receiving bids or proposals, are not part of the Contract Documents unless enumerated in this Agreement. Any such documents should be listed here only if intended to be part of the Contract Documents.)*

»

§ 9.2.2 Best Management Practices (BMPs):

The Contractor shall be responsible for providing, implementing and maintaining BMPs for sediment and erosion control in full compliance with all applicable Local, State and Federal Codes and Ordinances throughout the contract period. All Work shall be in accordance with the Clean Water Act; the Alabama Water Pollution Control Act; the current version of the Alabama Handbook for Erosion Control, Sediment

Control Stormwater Management on Construction sites and Urban Areas; and the current version of the Mobile, Alabama City Code Chapter 17 Stormwater Management and Flood Control. All Waste water with oils, grease, paint, mortar, etc., shall be properly contained and disposed of.

§ 9.2.3 Contractor shall comply with all Federal, State and local laws concerning nondiscrimination, including but not limited to City of Mobile Ordinance No. 14-034 which requires, *inter alia*, that all contractors performing work for the City of Mobile not discriminate on the basis of race, creed, color, national origin or disability, require that all subcontractors they engage do the same, and make every reasonable effort to assure that fifteen percent of the work performed under contract be awarded to socially and economically disadvantaged individuals and business entities.

§ 9.2.4 By signing this contract, the contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom.

§ 9.2.5 Public Contracts with Entities Engaging in certain Boycott Activities:

By signing this contract, the Contractor further represents and agrees that it is not currently engaged in, nor will it engage in, any boycott of a person or entity based in or doing business with a jurisdiction with which the State of Alabama can enjoy open trade.

REMAINDER OF PAGE INTENTIONALLY LEFT BLANK

This Agreement entered into as of the day and year first written above.

City of Mobile

Legal Name of Party to Contract:  
Contractor:

\_\_\_\_\_  
**OWNER** *(Signature)*

«William S. Stimpson, Mayor »« »  
*(Printed name and title)*

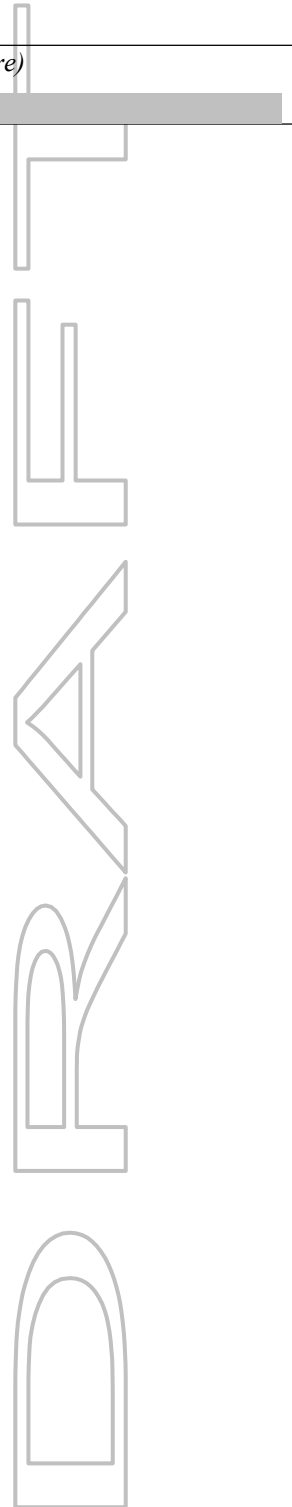
\_\_\_\_\_  
**CONTRACTOR** *(By Signature)*

« »« »  
*(Printed name and title)*

ATTEST:

\_\_\_\_\_  
City Clerk

\_\_\_\_\_  
Director, Real Estate & Asset Management



# PERFORMANCE BOND

Any singular reference to Contractor, Surety, Owner or other Party shall be considered plural where applicable.

**KNOW ALL MEN BY THESE PRESENTS:** That the Contractor, \_\_\_\_\_, hereinafter called the Principal, and \_\_\_\_\_, hereinafter called the Surety, are held and firmly bound unto the **City of Mobile, P. O. Box 1827, Mobile, AL 36633**, hereinafter called the Owner, in the penal sum of \_\_\_\_\_ Dollars (\$ \_\_\_\_\_ .00) for payment of which we bind ourselves, our heirs, executors, administrators, successors, and assigns for the faithful performance of a certain written Contract dated the \_\_\_\_\_ day of \_\_\_\_\_, 2023 entered into between the Principal and the City of Mobile for furnishing all labor, material, equipment and insurance and performing all Work required to properly complete Mobile Civic Center Parking Facility (CC-085-22), 200 South Claiborne Street, Mobile, Alabama, 36602, a copy of which said Contract is incorporated herein by reference and is made a part hereof as if fully copied herein.

**NOW, THEREFORE**, the condition of this obligation is such that if the Principal shall faithfully perform the terms and conditions of the Contract in all respects on its part and shall fully pay all obligations incurred in connection with the performance of such Contract on account of labor and materials used in connection therewith, and all such other obligations of every form, nature and character, and shall save harmless the Owner from all and any liability of every nature, kind and character which may be incurred in connection with the performance or fulfillment of such Contract or other such and liability resulting from negligence or otherwise on the part of such Principal and further save harmless the Owner from all cost and damage which may be suffered by reason of the failure to fully and completely perform said contract and shall fully reimburse and repay the Owner for all expenditures of every kind, character, and description which may be incurred by the Owner in making good any and every default which may exist on the part of the Principal in connection with the performance of said Contract; and further that the Principal shall pay all lawful claims of all persons, firms, partnerships, or corporations for all labor performed and material furnished in connection with the performance of the Contract, and that the failure to do so with such persons, firms, partnerships or corporations shall give them a direct obligation; and provided, however, that no suit, action, or proceedings by reason of any default whatever shall be brought on this bond after two years from the date on which the final payment on the Contract falls due, and provided, further, that if any alterations or additions which may be made under the Contract, or in the work to be done under it, or the giving by the Owner of any extensions of time for the performance of the Contract or any other forbearance being expressly waived. This obligation shall remain in full force and effect until the performance of all covenants, terms and conditions herein stipulated and after such performance, it shall become null and void.

In addition to any other legal mode of service, service of summons, and other process in civil actions brought in Mobile County may be had on the Contractor or the Surety on the bond by leaving a copy of the summons and complaint or other pleading or process with the Mayor of the City of Mobile which shall bind the principal Contractor and Surety to the mode of service above described and that the service shall be the same as personal service on the contractor or surety. This Bond is given pursuant to the terms of Alabama Code, Title 39-1-1, et. al., As Amended.

## EXECUTED IN FOUR (4) COUNTERPARTS.

SIGNED, SEALED AND DELIVERED this \_\_\_\_\_ day of \_\_\_\_\_, 2023.

**CONTRACTOR AS PRINCIPAL**  
Company: \_\_\_\_\_  
(Corporate Seal)

**SURETY**  
Company: \_\_\_\_\_  
(Corporate Seal)

By: \_\_\_\_\_  
(Signature)

Name and Title: \_\_\_\_\_

By: \_\_\_\_\_  
(Signature)

Name and Title: \_\_\_\_\_

Resident Agent: \_\_\_\_\_  
(Signature)

Name and Title: \_\_\_\_\_

Company Name: \_\_\_\_\_

Address: \_\_\_\_\_

Phone and Fax: \_\_\_\_\_

Owner's Representative: Cassie Boatwright  
Director  
REAM Department  
PO Box 1827  
Mobile, AL 36633  
251-208-7454

# LABOR AND MATERIAL PAYMENT BOND

Any singular reference to Contractor, Surety, Owner or other Party shall be considered plural where applicable.

**KNOW ALL MEN BY THESE PRESENTS:** That the Contractor, \_\_\_\_\_, \_\_\_\_\_, as Principal, and \_\_\_\_\_, as Surety, are held and firmly bound unto the **City of Mobile, P. O. Box 1827, Mobile, AL 36633** (hereinafter called the "Obligee") in the penal sum of \_\_\_\_\_ Dollars and no/cents (\$\_\_\_\_\_.00) lawful money of the United States, for the payment of which sum well and truly to be made we bind ourselves, our heirs, personal representatives, successors, and assigns, jointly and severally, firmly by these presents.

**WHEREAS,** said Principal has entered into a certain Contract with said Obligee, dated the \_\_\_\_\_ day of \_\_\_\_\_, 2022, (hereinafter called the "Contract") for furnishing all labor, material, equipment and insurance and perform all work required to properly complete Mobile Civic Center Parking Facility (CC-085-22), 200 South Claiborne Street, Mobile, Alabama, 36602, which, **THEREFORE, THE CONDITION OF THIS OBLIGATION IS SUCH** that if said Principal and all subcontractors to whom any portion of work provided for in said Contract is sublet and all assignees of said Principal and of such subcontractors shall promptly make payments to all persons supplying him or them with labor, materials or supplies for or in the prosecution of the work provided for in such Contract, or in any amendment or extension of or additions to said Contract, and for the payment of reasonable attorney's fees, incurred by the claimant or claimants in suits on each bond, then the above obligations shall be void; otherwise to remain in full force and effect. **PROVIDED,** however, that this bond is subject to the following conditions and limitations.

- (a) Any person, firm or corporation that has furnished labor, materials or supplies for or in the prosecution of the work provided for in said contract shall have a direct right of action against the Principal and Surety on this bond, which right of action shall be asserted in a proceeding instituted in the County in which the work provided for in said Contract is to be performed or in any county in which said Principal and Surety does business. Such right of action shall be asserted in a proceeding instituted in the name of the claimant or claimants for his or their use and benefit against said Principal and Surety or either of them (but not later than one year after the final settlement of said Contract) in which action such claim or claims shall be adjudicated and judgment rendered thereon.
- (b) The Principal and Surety hereby designate and appoint \_\_\_\_\_ **Attorney-In-Fact,** as the agent of each of them to receive and accept service of process or other pleading issued or filed in any proceeding instituted on this bond and hereby consent that such service shall be the same as personal service on the Principal and/or Surety. In addition to any other legal mode of service, service of summons, and other process in civil actions brought in Mobile County may be had on the Contractor or the Surety on the bond by leaving a copy of the summons and complaint or other pleading or process with the Mayor of the City of Mobile which shall bind the principal Contractor and Surety to the mode of service above described and that the service shall be the same as personal service on the contractor or surety.
- (c) The Surety shall not be liable hereunder for damage or compensation recoverable under any Workmen's Compensation or Employer's Liability Statute.
- (d) In no event shall the Surety be liable for a greater sum than the penalty of this bond, or subject to any suit, action or proceeding thereon that is instituted later than two years after the final settlement of said Contract.
- (e) This bond is given pursuant to the terms of Alabama Code, Title 39-1-1, et. al., As Amended.

**EXECUTED IN FOUR (4) COUNTERPARTS.**

SIGNED, SEALED AND DELIVERED this \_\_\_\_\_ day of \_\_\_\_\_, 2023

**CONTRACTOR AS PRINCIPAL**  
Company. \_\_\_\_\_ (Corporate Seal)

**SURETY**  
Company: \_\_\_\_\_ (Corporate Seal)

By: \_\_\_\_\_ (Signature)  
Name and Title: Brian Harris, President

By: \_\_\_\_\_ (Signature)  
Name and Title: \_\_\_\_\_

Resident Agent: \_\_\_\_\_ (Signature)  
Name and Title: \_\_\_\_\_  
Company Name: \_\_\_\_\_  
Address: \_\_\_\_\_  
Phone and Fax: \_\_\_\_\_

Owner's Representative: Cassie Boatwright  
Director  
REAM Department  
PO Box 1827  
Mobile, AL 36633  
251-208-7454

Company ID Number:

Approved by:

<b>Employer</b>	
Name (Please Type or Print)	Title
Signature	Date
<b>Department of Homeland Security – Verification Division</b>	
Name (Please Type or Print)	Title
Signature	Date

Company ID Number:

<b>Information Required for the E-Verify Program</b>	
<b>Information relating to your Company:</b>	
Company Name	
Company Facility Address	
Company Alternate Address	
County or Parish	
Employer Identification Number	
North American Industry Classification Systems Code	
Parent Company	
Number of Employees	
Number of Sites Verified for	

TO OWNER City of Mobile  
 P. O. Box 1827  
 Mobile, AL 36633-1827

PROJECT:

APPLICATION NO:

Distribution to:

<input type="checkbox"/>	OWNER
<input type="checkbox"/>	ARCHITECT
<input type="checkbox"/>	CONTRACTOR
<input type="checkbox"/>	
<input type="checkbox"/>	

PERIOD TO:

FROM CONTRACTOR:

VIA ARCHITECT:

PROJECT NO:

CONTRACT FOR:

CONTRACT DATE:

**CONTRACTOR'S APPLICATION FOR PAYMENT**

Application is made for payment, as shown below, in connection with the Contract. Continuation Sheet, AIA Document G703, is attached.

- 1. ORIGINAL CONTRACT SUM \$ \_\_\_\_\_
- 2. Net change by Change Orders \$ \_\_\_\_\_
- 3. CONTRACT SUM TO DATE (Line 1 + 2) \$ \_\_\_\_\_
- 4. TOTAL COMPLETED & STORED TO DATE (Column G on G703) \$ \_\_\_\_\_
- 5. RETAINAGE:
  - a. \_\_\_\_\_ % of Completed Work (Column D + E on G703) \$ \_\_\_\_\_
  - b. \_\_\_\_\_ % of Stored Material (Column F on G703) \$ \_\_\_\_\_
  - Total Retainage (Lines 5a + 5b or Total in Column I of G703) \$ \_\_\_\_\_
- 6. TOTAL EARNED LESS RETAINAGE (Line 4 Less Line 5 Total) \$ \_\_\_\_\_
- 7. LESS PREVIOUS CERTIFICATES FOR PAYMENT (Line 6 from prior Certificate) \$ \_\_\_\_\_
- 8. CURRENT PAYMENT DUE \$ \_\_\_\_\_
- 9. BALANCE TO FINISH, INCLUDING RETAINAGE (Line 3 less Line 6) \$ \_\_\_\_\_

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: \_\_\_\_\_ Date: \_\_\_\_\_

State of: \_\_\_\_\_ County of: \_\_\_\_\_  
 Subscribed and sworn to before me this \_\_\_\_\_ day of \_\_\_\_\_  
 Notary Public:  
 My Commission expires: \_\_\_\_\_

**ARCHITECT'S CERTIFICATE FOR PAYMENT**

In accordance with the Contract Documents, based on on-site observations and the data comprising the application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED . . . . . \$ \_\_\_\_\_

*(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)*

ARCHITECT:

By: \_\_\_\_\_ Date: \_\_\_\_\_

This Certificate is not negotiable. The AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner		
Total approved this Month		
<b>TOTALS</b>		
NET CHANGES by Change Order		



# CONTINUATION SHEET

AIA DOCUMENT G703

PAGE OF PAGES

AIA Document G702, APPLICATION AND CERTIFICATION FOR PAYMENT, containing Contractor's signed certification is attached.

APPLICATION NO:  
APPLICATION DATE:

In tabulations below, amounts are stated to the nearest dollar.

PERIOD TO:

Use Column I on Contracts where variable retainage for line items may apply.

ARCHITECT'S PROJECT NO:

A ITEM NO.	B DESCRIPTION OF WORK	C SCHEDULED VALUE	D WORK COMPLETED		F MATERIALS PRESENTLY STORED (NOT IN D OR E)	G		H BALANCE TO FINISH (C - G)	I RETAINAGE (IF VARIABLE RATE)
			FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD		TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)		
<b>GRAND TOTALS</b>									

Users may obtain validation of this document by requesting of the license a completed AIA Document D401 - Certification of Document's Authenticity

OFFICE OF SUPPLIER DIVERSITY

**CITY OF MOBILE**

**DBE Compliance  
DBE UTILIZATION REPORT**

**Return to Office of Supplier Diversity**  
Via email: [archnique.kidd@cityofmobile.org](mailto:archnique.kidd@cityofmobile.org)  
or  
P.O. Box 1948  
Mobile, AL 36633

<b>CONTRACTOR:</b>	<b>Certified DBE:</b>	<b>YES</b>	<b>NO</b>	<b>Contract Start Date:</b>
--------------------	-----------------------	------------	-----------	-----------------------------

<b>DESCRIPTION:</b>	<b>Estimated Completion Date:</b>
---------------------	-----------------------------------

<b>This report is for the month of:</b>	<b>JAN</b>	<b>APR</b>	<b>JULY</b>	<b>OCT</b>	
<b>(CHECK ONE):</b>	<b>FEB</b>	<b>MAY</b>	<b>AUG</b>	<b>NOV</b>	<b>FINAL _____</b>
	<b>MARCH</b>	<b>JUNE</b>	<b>SEPT</b>	<b>DEC</b>	

Original Contract Amount	Total Amount of Contract Changes (change orders or amendments)	Final Contract Amount (include contract changes)	Payments to Date from City of Mobile	<b>OFFICE USE ONLY (Verification)</b>
\$	\$	\$	\$	

**Instructions:** List all DBEs utilized on the contract, whether or not the firms were originally listed for DBE goal credit. List actual amount paid to each DBE firm. If the established Percentage is not being met, please include a narrative description of the progress being made in DBE participation.

DBE SUBCONTRACTOR	DBE DESCRIPTION OF WORK	DBE SUBCONTRACT AMOUNT	DBE PAYMENTS THIS REPORT	PAYMENTS TO DATE	<b>OFFICE USE ONLY (Verification)</b>
		\$	\$	\$	
		\$	\$	\$	
		\$	\$	\$	
		\$	\$	\$	
<b>TOTALS</b>		\$	\$	\$	

**I HEREBY CERTIFY THAT THE INFORMATION CONTAINED HEREIN IS TRUE AND CORRECT. SUPPORTING DOCUMENTATION IS ON FILE AND IS AVAILABLE FOR INSPECTION BY CITY OF MOBILE OFFICE OF SUPPLIER DIVERSITY PERSONNEL AT ANY TIME.**

PRINT NAME: \_\_\_\_\_

SIGNATURE: \_\_\_\_\_ /\_\_\_\_\_/\_\_\_\_\_  
(Title) (Date)

DBE Utilization Report



**AIA**<sup>®</sup>

# Document G704™ – 2000

## *Certificate of Substantial Completion*

PROJECT: *(Name and address)*

PROJECT NUMBER:

CONTRACT FOR:

CONTRACT DATE:

TO OWNER: *(Name and address)*

TO CONTRACTOR: *(Name and address)*

OWNER

ARCHITECT

CONTRACTOR

FIELD

OTHER

PROJECT OR PORTION OF THE PROJECT DESIGNATED FOR PARTIAL OCCUPANCY OR USE SHALL INCLUDE:

The Work performed under this Contract has been reviewed and found, to the Architect's best knowledge, information and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated above is the date of issuance established by this Certificate, which is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

\_\_\_\_\_  
ARCHITECT

BY

\_\_\_\_\_  
DATE OF ISSUANCE

A list of items to be completed or corrected is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment.

Cost estimate of Work that is incomplete or defective: \$ \_\_\_\_\_

The Contractor will complete or correct the Work on the list of items attached hereto within ( ) days from the above date of Substantial Completion.

\_\_\_\_\_  
CONTRACTOR

BY

\_\_\_\_\_  
DATE

The Owner accepts the Work or designated portion as substantially complete and will assume full possession at (time) on (date).

\_\_\_\_\_  
OWNER

BY

\_\_\_\_\_  
DATE

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance shall be as follows: *(Note: Owner's and Contractor's legal and insurance counsel should determine and review insurance requirements and coverage.)*



# AIA<sup>®</sup> Document G706<sup>™</sup> – 1994

## Contractor's Affidavit of Payment of Debts and Claims

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

OWNER:

ARCHITECT:

TO OWNER: *(Name and address)*

CONTRACT FOR: General Construction

CONTRACTOR:

CONTRACT DATED:

SURETY:

OTHER:

STATE OF:

COUNTY OF:

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor, and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

### EXCEPTIONS:

#### SUPPORTING DOCUMENTS ATTACHED HERETO:

1. Consent of Surety to Final Payment. Whenever Surety is involved, Consent of Surety is required. AIA Document G707, Consent of Surety, may be used for this purpose

Indicate Attachment  Yes  No

CONTRACTOR: *(Name and address)*

*The following supporting documents should be attached hereto if required by the Owner:*

1. Contractor's Release or Waiver of Liens, conditional upon receipt of final payment.
2. Separate Releases or Waivers of Liens from Subcontractors and material and equipment suppliers, to the extent required by the Owner, accompanied by a list thereof.
3. Contractor's Affidavit of Release of Liens (AIA Document G706A).

BY: \_\_\_\_\_

*(Signature of authorized representative)*

\_\_\_\_\_  
*(Printed name and title)*

Subscribed and sworn to before me on this date:

Notary Public:

My Commission Expires:



# AIA<sup>®</sup> Document G707<sup>™</sup> – 1994

## Consent Of Surety to Final Payment

PROJECT: *(Name and address)*

ARCHITECT'S PROJECT NUMBER:

OWNER:

CONTRACT FOR: General Construction

ARCHITECT:

TO OWNER: *(Name and address)*

CONTRACT DATED:

CONTRACTOR:

SURETY:

OTHER:

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the  
*(Insert name and address of Surety)*

on bond of  
*(Insert name and address of Contractor)*

, SURETY,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the  
Surety of any of its obligations to  
*(Insert name and address of Owner)*

, CONTRACTOR,

as set forth in said Surety's bond.

, OWNER,

IN WITNESS WHEREOF, the Surety has hereunto set its hand on this date:  
*(Insert in writing the month followed by the numeric date and year.)*

\_\_\_\_\_  
*(Surety)*

\_\_\_\_\_  
*(Signature of authorized representative)*

\_\_\_\_\_  
*(Printed name and title)*

Attest:  
*(Seal):*

## Request for Taxpayer Identification Number and Certification

Give Form to the  
requester. Do not  
send to the IRS.

Print or type See Specific Instructions on page 2.	1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank.	
	2 Business name/disregarded entity name, if different from above	
	3 Check appropriate box for federal tax classification; check only <b>one</b> of the following seven boxes: <input type="checkbox"/> Individual/sole proprietor or single-member LLC <input type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=partnership) ▶ _____ <b>Note.</b> For a single-member LLC that is disregarded, do not check LLC; check the appropriate box in the line above for the tax classification of the single-member owner. <input type="checkbox"/> Other (see instructions) ▶ _____	
	4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3): Exempt payee code (if any) _____ Exemption from FATCA reporting code (if any) _____ <i>(Applies to accounts maintained outside the U.S.)</i>	
	5 Address (number, street, and apt. or suite no.)	Requester's name and address (optional)
	6 City, state, and ZIP code	
	7 List account number(s) here (optional)	

### Part I Taxpayer Identification Number (TIN)

Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the Part I instructions on page 3. For other entities, it is your employer identification number (EIN). If you do not have a number, see *How to get a TIN* on page 3.

<b>Social security number</b>																
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				-						-						
or																
<b>Employer identification number</b>																
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**Note.** If the account is in more than one name, see the instructions for line 1 and the chart on page 4 for guidelines on whose number to enter.

### Part II Certification

- Under penalties of perjury, I certify that:
- The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and
  - I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and
  - I am a U.S. citizen or other U.S. person (defined below); and
  - The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct.

**Certification instructions.** You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions on page 3.

<b>Sign Here</b>	Signature of U.S. person ▶ _____	Date ▶ <b>09/20/2022</b>
------------------	----------------------------------	--------------------------

### General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.  
**Future developments.** Information about developments affecting Form W-9 (such as legislation enacted after we release it) is at [www.irs.gov/fw9](http://www.irs.gov/fw9).

#### Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following:

- Form 1099-INT (interest earned or paid)
- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)

- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
  - Form 1099-C (canceled debt)
  - Form 1099-A (acquisition or abandonment of secured property)
- Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.
- If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding? on page 2.*
- By signing the filled-out form, you:
- Certify that the TIN you are giving is correct (or you are waiting for a number to be issued),
  - Certify that you are not subject to backup withholding, or
  - Claim exemption from backup withholding if you are a U.S. exempt payee. If applicable, you are also certifying that as a U.S. person, your allocable share of any partnership income from a U.S. trade or business is not subject to the withholding tax on foreign partners' share of effectively connected income, and
  - Certify that FATCA code(s) entered on this form (if any) indicating that you are exempt from the FATCA reporting, is correct. See *What is FATCA reporting?* on page 2 for further information.

## ELECTRONIC PAYMENT AUTHORIZATION

I authorize the City of Mobile to pay amounts owed to my company by EFT (electronic funds transfer). In the event of any discrepancy, the City has the authority to reverse the payment and debit my account for the incorrect payment amount.

*All fields are required to be completed.*

Company Name \_\_\_\_\_

City Vendor No. \_\_\_\_\_ Tax Identification No. \_\_\_\_\_  
*(if available)*

Billing Address \_\_\_\_\_

City State Zip \_\_\_\_\_

EFT Contact Person \_\_\_\_\_

EFT Contact Phone \_\_\_\_\_

EFT Contact Email \_\_\_\_\_  
*(required for EFT payment notification emails)*

Bank Name \_\_\_\_\_

Routing Number \_\_\_\_\_ Account Number \_\_\_\_\_

Account Type  Checking or  Savings

Authorized Official (print) \_\_\_\_\_

Authorized Official (signature) \_\_\_\_\_ Date 09/20/2022

For City Use Only:

Vendor No. \_\_\_\_\_

Entered Date \_\_\_\_\_

**CITY OF MOBILE, AL  
VENDOR INFORMATION FORM**

***Company Information:***

1. City Vendor Number:

2. Name of Company:

3. Company D.B.A. Name, if any:

4. Mailing Address:

5. Remittance Address:

6. Telephone:

7. Fax

8. Main Email:

***Primary Contact:***

9. Contact Name and Title:

10. Contact Phone:

11. Contact Fax:

12. Contact Email:

***Alternate Contact (if applicable):***

13. Alt. Contact Name and Title:

14. Alt. Contact Phone:

15. Alt. Contact Fax:

16. Alt. Contact Email:

***City of Mobile Business License Information:***

17. City of Mobile Business License No. (if required):

*Please attach additional sheets if necessary.*



**SECTION 00 72 00  
GENERAL CONDITIONS**

**FORM OF GENERAL CONDITIONS**

**1.01 THE GENERAL CONDITIONS APPLICABLE TO THIS CONTRACT IS ATTACHED FOLLOWING THIS PAGE.**

**RELATED REQUIREMENTS**

**2.01 SECTION 00 22 00 SUPPLEMENTARY INSTRUCTIONS TO BIDDERS**

**2.02 SECTION 01 42 16 - DEFINITIONS.**

**END OF SECTION**



# AIA® Document A201® – 2017

## General Conditions of the Contract for Construction

**for the following PROJECT:**

*(Name and location or address)*

Mobile Civic Center - Parking Facility  
22 South Claiborne Street  
Mobile, ALabama 36602

**THE OWNER:**

*(Name, legal status and address)*

City Of Mobile  
PO Box 1827  
Mobile Alabama 36633-1827

**THE ARCHITECT:**

*(Name, legal status and address)*

Evan Terry Associates, LLC, Limited Liability Company  
One Perimeter Park South Suite 200S  
Birmingham, Alabama 35243

**TABLE OF ARTICLES**

- 1      **GENERAL PROVISIONS**
- 2      **OWNER**
- 3      **CONTRACTOR**
- 4      **ARCHITECT**
- 5      **SUBCONTRACTORS**
- 6      **CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**
- 7      **CHANGES IN THE WORK**
- 8      **TIME**
- 9      **PAYMENTS AND COMPLETION**
- 10     **PROTECTION OF PERSONS AND PROPERTY**
- 11     **INSURANCE AND BONDS**
- 12     **UNCOVERING AND CORRECTION OF WORK**
- 13     **MISCELLANEOUS PROVISIONS**

**ADDITIONS AND DELETIONS:**

The author of this document has added information needed for its completion. The author may also have revised the text of the original AIA standard form. An *Additions and Deletions Report* that notes added information as well as revisions to the standard form text is available from the author and should be reviewed. A vertical line in the left margin of this document indicates where the author has added necessary information and where the author has added to or deleted from the original AIA text.

This document has important legal consequences. Consultation with an attorney is encouraged with respect to its completion or modification.

For guidance in modifying this document to include supplementary conditions, see AIA Document A503™, Guide for Supplementary Conditions.

Init.

User Notes:

14      **TERMINATION OR SUSPENSION OF THE CONTRACT**

15      **CLAIMS AND DISPUTES**

## INDEX

(Topics and numbers in bold are Section headings.)

### **Acceptance of Nonconforming Work**

9.6.6, 9.9.3, **12.3**

Acceptance of Work

9.6.6, 9.8.2, 9.9.3, 9.10.1, 9.10.3, **12.3**

### **Access to Work**

**3.16**, 6.2.1, **12.1**

Accident Prevention

10

Acts and Omissions

3.2, 3.3.2, 3.12.8, 3.18, 4.2.3, 8.3.1, 9.5.1, 10.2.5,

10.2.8, 13.3.2, 14.1, 15.1.2, 15.2

Addenda

1.1.1

Additional Costs, Claims for

3.7.4, 3.7.5, 10.3.2, 15.1.5

### **Additional Inspections and Testing**

9.4.2, 9.8.3, 12.2.1, **13.4**

### **Additional Time, Claims for**

3.2.4, 3.7.4, 3.7.5, 3.10.2, 8.3.2, **15.1.6**

### **Administration of the Contract**

3.1.3, **4.2**, 9.4, 9.5

Advertisement or Invitation to Bid

1.1.1

Aesthetic Effect

4.2.13

### **Allowances**

**3.8**

### **Applications for Payment**

4.2.5, 7.3.9, 9.2, **9.3**, 9.4, 9.5.1, 9.5.4, 9.6.3, 9.7, 9.10

Approvals

2.1.1, 2.3.1, 2.5, 3.1.3, 3.10.2, 3.12.8, 3.12.9,

3.12.10.1, 4.2.7, 9.3.2, 13.4.1

### **Arbitration**

8.3.1, 15.3.2, **15.4**

## **ARCHITECT**

**4**

Architect, Definition of

**4.1.1**

Architect, Extent of Authority

2.5, 3.12.7, 4.1.2, 4.2, 5.2, 6.3, 7.1.2, 7.3.4, 7.4, 9.2,  
9.3.1, 9.4, 9.5, 9.6.3, 9.8, 9.10.1, 9.10.3, 12.1, 12.2.1,  
13.4.1, 13.4.2, 14.2.2, 14.2.4, 15.1.4, 15.2.1

Architect, Limitations of Authority and Responsibility

2.1.1, 3.12.4, 3.12.8, 3.12.10, 4.1.2, 4.2.1, 4.2.2, 4.2.3,  
4.2.6, 4.2.7, 4.2.10, 4.2.12, 4.2.13, 5.2.1, 7.4, 9.4.2,  
9.5.4, 9.6.4, 15.1.4, 15.2

Architect's Additional Services and Expenses

2.5, 12.2.1, 13.4.2, 13.4.3, 14.2.4

Architect's Administration of the Contract

3.1.3, 3.7.4, 15.2, 9.4.1, 9.5

Architect's Approvals

2.5, 3.1.3, 3.5, 3.10.2, 4.2.7

Architect's Authority to Reject Work

3.5, 4.2.6, 12.1.2, 12.2.1

Architect's Copyright

1.1.7, 1.5

Architect's Decisions

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 4.2.14, 6.3,  
7.3.4, 7.3.9, 8.1.3, 8.3.1, 9.2, 9.4.1, 9.5, 9.8.4, 9.9.1,  
13.4.2, 15.2

Architect's Inspections

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 13.4

Architect's Instructions

3.2.4, 3.3.1, 4.2.6, 4.2.7, 13.4.2

Architect's Interpretations

4.2.11, 4.2.12

Architect's Project Representative

4.2.10

Architect's Relationship with Contractor

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2,  
3.5, 3.7.4, 3.7.5, 3.9.2, 3.9.3, 3.10, 3.11, 3.12, 3.16,  
3.18, 4.1.2, 4.2, 5.2, 6.2.2, 7, 8.3.1, 9.2, 9.3, 9.4, 9.5,  
9.7, 9.8, 9.9, 10.2.6, 10.3, 11.3, 12, 13.3.2, 13.4, 15.2

Architect's Relationship with Subcontractors

1.1.2, 4.2.3, 4.2.4, 4.2.6, 9.6.3, 9.6.4, 11.3

Architect's Representations

9.4.2, 9.5.1, 9.10.1

Architect's Site Visits

3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4

Asbestos

10.3.1

Attorneys' Fees

3.18.1, 9.6.8, 9.10.2, 10.3.3

Award of Separate Contracts

6.1.1, 6.1.2

**Award of Subcontracts and Other Contracts for Portions of the Work**

**5.2**

### **Basic Definitions**

**1.1**

Bidding Requirements

1.1.1

Binding Dispute Resolution

8.3.1, 9.7, 11.5, 13.1, 15.1.2, 15.1.3, 15.2.1, 15.2.5,  
15.2.6.1, 15.3.1, 15.3.2, 15.3.3, 15.4.1

Bonds, Lien

7.3.4.4, 9.6.8, 9.10.2, 9.10.3

**Bonds, Performance, and Payment**

7.3.4.4, 9.6.7, 9.10.3, **11.1.2**, 11.1.3, **11.5**

**Building Information Models Use and Reliance**

**1.8**

Building Permit

3.7.1

### **Capitalization**

**1.3**

Certificate of Substantial Completion

9.8.3, 9.8.4, 9.8.5

## **Certificates for Payment**

4.2.1, 4.2.5, 4.2.9, 9.3.3, **9.4**, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4, 15.1.4

**Certificates of Inspection, Testing or Approval**  
13.4.4

**Certificates of Insurance**  
9.10.2

## **Change Orders**

1.1.1, 3.4.2, 3.7.4, 3.8.2.3, 3.11, 3.12.8, 4.2.8, 5.2.3, 7.1.2, 7.1.3, **7.2**, 7.3.2, 7.3.7, 7.3.9, 7.3.10, 8.3.1, 9.3.1.1, 9.10.3, 10.3.2, 11.2, 11.5, 12.1.2

**Change Orders, Definition of**  
**7.2.1**

## **CHANGES IN THE WORK**

2.2.2, 3.11, 4.2.8, **7**, 7.2.1, 7.3.1, 7.4, 8.3.1, 9.3.1.1, 11.5

**Claims, Definition of**  
**15.1.1**

**Claims, Notice of**  
1.6.2, 15.1.3

## **CLAIMS AND DISPUTES**

3.2.4, 6.1.1, 6.3, 7.3.9, 9.3.3, 9.10.4, 10.3.3, **15**, 15.4  
**Claims and Timely Assertion of Claims**  
15.4.1

## **Claims for Additional Cost**

3.2.4, 3.3.1, 3.7.4, 7.3.9, 9.5.2, 10.2.5, 10.3.2, **15.1.5**

## **Claims for Additional Time**

3.2.4, 3.3.1, 3.7.4, 6.1.1, 8.3.2, 9.5.2, 10.3.2, **15.1.6**

## **Concealed or Unknown Conditions, Claims for** **3.7.4**

## **Claims for Damages**

3.2.4, 3.18, 8.3.3, 9.5.1, 9.6.7, 10.2.5, 10.3.3, 11.3, 11.3.2, 14.2.4, 15.1.7

**Claims Subject to Arbitration**  
15.4.1

## **Cleaning Up**

**3.15**, 6.3

**Commencement of the Work, Conditions Relating to**  
2.2.1, 3.2.2, 3.4.1, 3.7.1, 3.10.1, 3.12.6, 5.2.1, 5.2.3, 6.2.2, 8.1.2, 8.2.2, 8.3.1, 11.1, 11.2, **15.1.5**

**Commencement of the Work, Definition of**  
**8.1.2**

## **Communications**

3.9.1, **4.2.4**

## **Completion, Conditions Relating to**

3.4.1, 3.11, 3.15, 4.2.2, 4.2.9, 8.2, 9.4.2, 9.8, 9.9.1, 9.10, 12.2, 14.1.2, 15.1.2

## **COMPLETION, PAYMENTS AND**

**9**

## **Completion, Substantial**

3.10.1, 4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2, 15.1.2

## **Compliance with Laws**

2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14.1.1, 14.2.1.3, 15.2.8, 15.4.2, 15.4.3

## **Concealed or Unknown Conditions**

3.7.4, 4.2.8, 8.3.1, 10.3

## **Conditions of the Contract**

1.1.1, 6.1.1, 6.1.4

## **Consent, Written**

3.4.2, 3.14.2, 4.1.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3, 13.2, 15.4.4.2

## **Consolidation or Joinder**

**15.4.4**

## **CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

1.1.4, **6**

**Construction Change Directive, Definition of**  
**7.3.1**

## **Construction Change Directives**

1.1.1, 3.4.2, 3.11, 3.12.8, 4.2.8, 7.1.1, 7.1.2, 7.1.3, **7.3**, 9.3.1.1

## **Construction Schedules, Contractor's**

3.10, 3.11, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2

## **Contingent Assignment of Subcontracts**

**5.4**, 14.2.2.2

## **Continuing Contract Performance**

**15.1.4**

**Contract, Definition of**

**1.1.2**

## **CONTRACT, TERMINATION OR SUSPENSION OF THE**

**5.4.1.1**, 5.4.2, 11.5, **14**

## **Contract Administration**

3.1.3, 4, 9.4, 9.5

**Contract Award and Execution, Conditions Relating to**

3.7.1, 3.10, 5.2, 6.1

**Contract Documents, Copies Furnished and Use of**  
1.5.2, 2.3.6, 5.3

## **Contract Documents, Definition of**

**1.1.1**

## **Contract Sum**

2.2.2, 2.2.4, 3.7.4, 3.7.5, 3.8, 3.10.2, 5.2.3, 7.3, 7.4, **9.1**, 9.2, 9.4.2, 9.5.1.4, 9.6.7, 9.7, 10.3.2, 11.5, 12.1.2, 12.3, 14.2.4, 14.3.2, 15.1.4.2, **15.1.5**, **15.2.5**

**Contract Sum, Definition of**

**9.1**

## **Contract Time**

1.1.4, 2.2.1, 2.2.2, 3.7.4, 3.7.5, 3.10.2, 5.2.3, 6.1.5, 7.2.1.3, 7.3.1, 7.3.5, 7.3.6, 7, 7, 7.3.10, 7.4, 8.1.1, 8.2.1, 8.2.3, 8.3.1, 9.5.1, 9.7, 10.3.2, 12.1.1, 12.1.2, 14.3.2, 15.1.4.2, 15.1.6.1, 15.2.5

**Contract Time, Definition of**

**8.1.1**

## **CONTRACTOR**

**3**

**Contractor, Definition of**

**3.1**, **6.1.2**

## **Contractor's Construction and Submittal Schedules**

**3.10**, 3.12.1, 3.12.2, 4.2.3, 6.1.3, 15.1.6.2

Contractor's Employees  
2.2.4, 3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2,  
10.3, 11.3, 14.1, 14.2.1.1

## **Contractor's Liability Insurance**

### **11.1**

Contractor's Relationship with Separate Contractors  
and Owner's Forces

3.12.5, 3.14.2, 4.2.4, 6, 11.3, 12.2.4

Contractor's Relationship with Subcontractors

1.2.2, 2.2.4, 3.3.2, 3.18.1, 3.18.2, 4.2.4, 5, 9.6.2, 9.6.7,  
9.10.2, 11.2, 11.3, 11.4

Contractor's Relationship with the Architect

1.1.2, 1.5, 2.3.3, 3.1.3, 3.2.2, 3.2.3, 3.2.4, 3.3.1, 3.4.2,  
3.5.1, 3.7.4, 3.10, 3.11, 3.12, 3.16, 3.18, 4.2, 5.2, 6.2.2,  
7, 8.3.1, 9.2, 9.3, 9.4, 9.5, 9.7, 9.8, 9.9, 10.2.6, 10.3,  
11.3, 12, 13.4, 15.1.3, 15.2.1

Contractor's Representations

3.2.1, 3.2.2, 3.5, 3.12.6, 6.2.2, 8.2.1, 9.3.3, 9.8.2

Contractor's Responsibility for Those Performing the  
Work

3.3.2, 3.18, 5.3, 6.1.3, 6.2, 9.5.1, 10.2.8

Contractor's Review of Contract Documents

3.2

Contractor's Right to Stop the Work

2.2.2, 9.7

Contractor's Right to Terminate the Contract

14.1

Contractor's Submittals

3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 9.2, 9.3, 9.8.2,  
9.8.3, 9.9.1, 9.10.2, 9.10.3

Contractor's Superintendent

3.9, 10.2.6

Contractor's Supervision and Construction

Procedures

1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3,  
7.3.4, 7.3.6, 8.2, 10, 12, 14, 15.1.4

Coordination and Correlation

1.2, 3.2.1, 3.3.1, 3.10, 3.12.6, 6.1.3, 6.2.1

Copies Furnished of Drawings and Specifications

1.5, 2.3.6, 3.11

Copyrights

1.5, 3.17

Correction of Work

2.5, 3.7.3, 9.4.2, 9.8.2, 9.8.3, 9.9.1, 12.1.2, 12.2, 12.3,  
15.1.3.1, 15.1.3.2, 15.2.1

**Correlation and Intent of the Contract Documents**

### **1.2**

Cost, Definition of

#### **7.3.4**

Costs

2.5, 3.2.4, 3.7.3, 3.8.2, 3.15.2, 5.4.2, 6.1.1, 6.2.3,  
7.3.3.3, 7.3.4, 7.3.8, 7.3.9, 9.10.2, 10.3.2, 10.3.6, 11.2,  
12.1.2, 12.2.1, 12.2.4, 13.4, 14

**Cutting and Patching**

3.14, 6.2.5

Damage to Construction of Owner or Separate  
Contractors

3.14.2, 6.2.4, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damage to the Work

3.14.2, 9.9.1, 10.2.1.2, 10.2.5, 10.4, 12.2.4

Damages, Claims for

3.2.4, 3.18, 6.1.1, 8.3.3, 9.5.1, 9.6.7, 10.3.3, 11.3.2,  
11.3, 14.2.4, 15.1.7

Damages for Delay

6.2.3, 8.3.3, 9.5.1.6, 9.7, 10.3.2, 14.3.2

**Date of Commencement of the Work, Definition of**  
**8.1.2**

**Date of Substantial Completion, Definition of**  
**8.1.3**

**Day, Definition of**

#### **8.1.4**

Decisions of the Architect

3.7.4, 4.2.6, 4.2.7, 4.2.11, 4.2.12, 4.2.13, 6.3, 7.3.4,  
7.3.9, 8.1.3, 8.3.1, 9.2, 9.4, 9.5.1, 9.8.4, 9.9.1, 13.4.2,  
14.2.2, 14.2.4, 15.1, 15.2

**Decisions to Withhold Certification**

9.4.1, 9.5, 9.7, 14.1.1.3

Defective or Nonconforming Work, Acceptance,  
Rejection and Correction of

2.5, 3.5, 4.2.6, 6.2.3, 9.5.1, 9.5.3, 9.6.6, 9.8.2, 9.9.3,  
9.10.4, 12.2.1

Definitions

1.1, 2.1.1, 3.1.1, 3.5, 3.12.1, 3.12.2, 3.12.3, 4.1.1, 5.1,  
6.1.2, 7.2.1, 7.3.1, 8.1, 9.1, 9.8.1, 15.1.1

**Delays and Extensions of Time**

3.2, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, 8.3, 9.5.1, 9.7,  
10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5

**Digital Data Use and Transmission**

1.7

Disputes

6.3, 7.3.9, 15.1, 15.2

**Documents and Samples at the Site**

### **3.11**

**Drawings, Definition of**

#### **1.1.5**

Drawings and Specifications, Use and Ownership of  
3.11

Effective Date of Insurance

8.2.2

**Emergencies**

10.4, 14.1.1.2, 15.1.5

Employees, Contractor's

3.3.2, 3.4.3, 3.8.1, 3.9, 3.18.2, 4.2.3, 4.2.6, 10.2,  
10.3.3, 11.3, 14.1, 14.2.1.1

Equipment, Labor, or Materials

1.1.3, 1.1.6, 3.4, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1,  
4.2.6, 4.2.7, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3,  
9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2

Execution and Progress of the Work

1.1.3, 1.2.1, 1.2.2, 2.3.4, 2.3.6, 3.1, 3.3.1, 3.4.1, 3.7.1,  
3.10.1, 3.12, 3.14, 4.2, 6.2.2, 7.1.3, 7.3.6, 8.2, 9.5.1,  
9.9.1, 10.2, 10.3, 12.1, 12.2, 14.2, 14.3.1, 15.1.4

Extensions of Time  
3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3, 7.4, 9.5.1, 9.7, 10.3.2, 10.4, 14.3, 15.1.6, **15.2.5**

**Failure of Payment**  
9.5.1.3, **9.7**, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

Faulty Work  
(See Defective or Nonconforming Work)

**Final Completion and Final Payment**  
4.2.1, 4.2.9, 9.8.2, **9.10**, 12.3, 14.2.4, 14.4.3

Financial Arrangements, Owner's  
2.2.1, 13.2.2, 14.1.1.4

**GENERAL PROVISIONS**

**1**

**Governing Law**

**13.1**  
Guarantees (See Warranty)

**Hazardous Materials and Substances**  
10.2.4, **10.3**

Identification of Subcontractors and Suppliers  
5.2.1

**Indemnification**  
3.17, **3.18**, 9.6.8, 9.10.2, 10.3.3, 11.3

**Information and Services Required of the Owner**  
2.1.2, **2.2**, 2.3, 3.2.2, 3.12.10.1, 6.1.3, 6.1.4, 6.2.5, 9.6.1, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4

**Initial Decision**

**15.2**

**Initial Decision Maker, Definition of**  
1.1.8

Initial Decision Maker, Decisions  
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

Initial Decision Maker, Extent of Authority  
14.2.4, 15.1.4.2, 15.2.1, 15.2.2, 15.2.3, 15.2.4, 15.2.5

**Injury or Damage to Person or Property**  
**10.2.8**, 10.4

Inspections  
3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 12.2.1, 13.4

Instructions to Bidders  
1.1.1

Instructions to the Contractor  
3.2.4, 3.3.1, 3.8.1, 5.2.1, 7, 8.2.2, 12, 13.4.2

**Instruments of Service, Definition of**  
**1.1.7**

Insurance  
6.1.1, 7.3.4, 8.2.2, 9.3.2, 9.8.4, 9.9.1, 9.10.2, 10.2.5, **11**

Insurance, Notice of Cancellation or Expiration  
11.1.4, 11.2.3

**Insurance, Contractor's Liability**

**11.1**  
Insurance, Effective Date of  
8.2.2, 14.4.2

**Insurance, Owner's Liability**  
**11.2**

**Insurance, Property**  
**10.2.5**, 11.2, 11.4, 11.5

Insurance, Stored Materials  
9.3.2

**INSURANCE AND BONDS**

**11**  
Insurance Companies, Consent to Partial Occupancy  
9.9.1

Insured loss, Adjustment and Settlement of  
11.5

Intent of the Contract Documents  
1.2.1, 4.2.7, 4.2.12, 4.2.13

**Interest**  
**13.5**

**Interpretation**  
1.1.8, 1.2.3, **1.4**, 4.1.1, 5.1, 6.1.2, 15.1.1

Interpretations, Written  
4.2.11, 4.2.12

Judgment on Final Award  
15.4.2

**Labor and Materials, Equipment**  
1.1.3, 1.1.6, **3.4**, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1, 10.2.4, 14.2.1.1, 14.2.1.2

Labor Disputes  
8.3.1

Laws and Regulations  
1.5, 2.3.2, 3.2.3, 3.2.4, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1, 10.2.2, 13.1, 13.3.1, 13.4.2, 13.5, 14, 15.2.8, 15.4

Liens  
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

Limitations, Statutes of  
12.2.5, 15.1.2, 15.4.1.1

Limitations of Liability  
3.2.2, 3.5, 3.12.10, 3.12.10.1, 3.17, 3.18.1, 4.2.6, 4.2.7, 6.2.2, 9.4.2, 9.6.4, 9.6.7, 9.6.8, 10.2.5, 10.3.3, 11.3, 12.2.5, 13.3.1

Limitations of Time  
2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2.7, 5.2, 5.3, 5.4.1, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15, 15.1.2, 15.1.3, 15.1.5

**Materials, Hazardous**  
**10.2.4**, **10.3**

Materials, Labor, Equipment and  
1.1.3, 1.1.6, 3.4.1, 3.5, 3.8.2, 3.8.3, 3.12, 3.13, 3.15.1, 5.2.1, 6.2.1, 7.3.4, 9.3.2, 9.3.3, 9.5.1.3, 9.10.2, 10.2.1.2, 10.2.4, 14.2.1.1, 14.2.1.2

Means, Methods, Techniques, Sequences and Procedures of Construction  
3.3.1, 3.12.10, 4.2.2, 4.2.7, 9.4.2

Mechanic's Lien  
2.1.2, 9.3.1, 9.3.3, 9.6.8, 9.10.2, 9.10.4, 15.2.8

**Mediation**  
8.3.1, 15.1.3.2, 15.2.1, 15.2.5, 15.2.6, **15.3**, 15.4.1, 15.4.1.1

**Minor Changes in the Work**  
1.1.1, 3.4.2, 3.12.8, 4.2.8, 7.1, **7.4**

## MISCELLANEOUS PROVISIONS

### 13

#### Modifications, Definition of

##### 1.1.1

#### Modifications to the Contract

1.1.1, 1.1.2, 2.5, 3.11, 4.1.2, 4.2.1, 5.2.3, 7, 8.3.1, 9.7, 10.3.2

#### Mutual Responsibility

##### 6.2

#### Nonconforming Work, Acceptance of

9.6.6, 9.9.3, 12.3

#### Nonconforming Work, Rejection and Correction of

2.4, 2.5, 3.5, 4.2.6, 6.2.4, 9.5.1, 9.8.2, 9.9.3, 9.10.4, 12.2

#### Notice

1.6, 1.6.1, 1.6.2, 2.1.2, 2.2.2., 2.2.3, 2.2.4, 2.5, 3.2.4, 3.3.1, 3.7.4, 3.7.5, 3.9.2, 3.12.9, 3.12.10, 5.2.1, 7.4, 8.2.2, 9.6.8, 9.7, 9.10.1, 10.2.8, 10.3.2, 11.5, 12.2.2.1, 13.4.1, 13.4.2, 14.1, 14.2.2, 14.4.2, 15.1.3, 15.1.5, 15.1.6, 15.4.1

#### Notice of Cancellation or Expiration of Insurance

11.1.4, 11.2.3

#### Notice of Claims

1.6.2, 2.1.2, 3.7.4, 9.6.8, 10.2.8, 15.1.3, 15.1.5, 15.1.6, 15.2.8, 15.3.2, 15.4.1

#### Notice of Testing and Inspections

13.4.1, 13.4.2

#### Observations, Contractor's

3.2, 3.7.4

#### Occupancy

2.3.1, 9.6.6, 9.8

#### Orders, Written

1.1.1, 2.4, 3.9.2, 7, 8.2.2, 11.5, 12.1, 12.2.2.1, 13.4.2, 14.3.1

## OWNER

### 2

#### Owner, Definition of

##### 2.1.1

#### Owner, Evidence of Financial Arrangements

2.2, 13.2.2, 14.1.1.4

#### Owner, Information and Services Required of the

2.1.2, 2.2, 2.3, 3.2.2, 3.12.10, 6.1.3, 6.1.4, 6.2.5, 9.3.2, 9.6.1, 9.6.4, 9.9.2, 9.10.3, 10.3.3, 11.2, 13.4.1, 13.4.2, 14.1.1.4, 14.1.4, 15.1.4

#### Owner's Authority

1.5, 2.1.1, 2.3.32.4, 2.5, 3.4.2, 3.8.1, 3.12.10, 3.14.2, 4.1.2, 4.2.4, 4.2.9, 5.2.1, 5.2.4, 5.4.1, 6.1, 6.3, 7.2.1, 7.3.1, 8.2.2, 8.3.1, 9.3.2, 9.5.1, 9.6.4, 9.9.1, 9.10.2, 10.3.2, 11.4, 11.5, 12.2.2, 12.3, 13.2.2, 14.3, 14.4, 15.2.7

#### Owner's Insurance

##### 11.2

#### Owner's Relationship with Subcontractors

1.1.2, 5.2, 5.3, 5.4, 9.6.4, 9.10.2, 14.2.2

#### Owner's Right to Carry Out the Work

2.5, 14.2.2

#### Owner's Right to Clean Up

##### 6.3

#### Owner's Right to Perform Construction and to Award Separate Contracts

##### 6.1

#### Owner's Right to Stop the Work

##### 2.4

#### Owner's Right to Suspend the Work

14.3

#### Owner's Right to Terminate the Contract

14.2, 14.4

#### Ownership and Use of Drawings, Specifications and Other Instruments of Service

1.1.1, 1.1.6, 1.1.7, 1.5, 2.3.6, 3.2.2, 3.11, 3.17, 4.2.12, 5.3

#### Partial Occupancy or Use

9.6.6, 9.9

#### Patching, Cutting and

3.14, 6.2.5

#### Patents

3.17

#### Payment, Applications for

4.2.5, 7.3.9, 9.2, 9.3, 9.4, 9.5, 9.6.3, 9.7, 9.8.5, 9.10.1, 14.2.3, 14.2.4, 14.4.3

#### Payment, Certificates for

4.2.5, 4.2.9, 9.3.3, 9.4, 9.5, 9.6.1, 9.6.6, 9.7, 9.10.1, 9.10.3, 14.1.1.3, 14.2.4

#### Payment, Failure of

9.5.1.3, 9.7, 9.10.2, 13.5, 14.1.1.3, 14.2.1.2

#### Payment, Final

4.2.1, 4.2.9, 9.10, 12.3, 14.2.4, 14.4.3

#### Payment Bond, Performance Bond and

7.3.4.4, 9.6.7, 9.10.3, 11.1.2

#### Payments, Progress

9.3, 9.6, 9.8.5, 9.10.3, 14.2.3, 15.1.4

## PAYMENTS AND COMPLETION

### 9

#### Payments to Subcontractors

5.4.2, 9.5.1.3, 9.6.2, 9.6.3, 9.6.4, 9.6.7, 14.2.1.2

#### PCB

10.3.1

#### Performance Bond and Payment Bond

7.3.4.4, 9.6.7, 9.10.3, 11.1.2

#### Permits, Fees, Notices and Compliance with Laws

2.3.1, 3.7, 3.13, 7.3.4.4, 10.2.2

## PERSONS AND PROPERTY, PROTECTION OF

### 10

#### Polychlorinated Biphenyl

10.3.1

#### Product Data, Definition of

##### 3.12.2

#### Product Data and Samples, Shop Drawings

3.11, 3.12, 4.2.7

#### Progress and Completion

4.2.2, 8.2, 9.8, 9.9.1, 14.1.4, 15.1.4

#### Progress Payments

9.3, 9.6, 9.8.5, 9.10.3, 14.2.3, 15.1.4



**Project, Definition of**  
**1.1.4**  
Project Representatives  
4.2.10  
**Property Insurance**  
10.2.5, 11.2  
**Proposal Requirements**  
1.1.1  
**PROTECTION OF PERSONS AND PROPERTY**  
**10**  
Regulations and Laws  
1.5, 2.3.2, 3.2.3, 3.6, 3.7, 3.12.10, 3.13, 9.6.4, 9.9.1,  
10.2.2, 13.1, 13.3, 13.4.1, 13.4.2, 13.5, 14, 15.2.8, 15.4  
Rejection of Work  
4.2.6, 12.2.1  
Releases and Waivers of Liens  
9.3.1, 9.10.2  
Representations  
3.2.1, 3.5, 3.12.6, 8.2.1, 9.3.3, 9.4.2, 9.5.1, 9.10.1  
Representatives  
2.1.1, 3.1.1, 3.9, 4.1.1, 4.2.10, 13.2.1  
Responsibility for Those Performing the Work  
3.3.2, 3.18, 4.2.2, 4.2.3, 5.3, 6.1.3, 6.2, 6.3, 9.5.1, 10  
Retainage  
9.3.1, 9.6.2, 9.8.5, 9.9.1, 9.10.2, 9.10.3  
**Review of Contract Documents and Field**  
**Conditions by Contractor**  
3.2, 3.12.7, 6.1.3  
Review of Contractor's Submittals by Owner and  
Architect  
3.10.1, 3.10.2, 3.11, 3.12, 4.2, 5.2, 6.1.3, 9.2, 9.8.2  
Review of Shop Drawings, Product Data and Samples  
by Contractor  
3.12  
**Rights and Remedies**  
1.1.2, 2.4, 2.5, 3.5, 3.7.4, 3.15.2, 4.2.6, 5.3, 5.4, 6.1,  
6.3, 7.3.1, 8.3, 9.5.1, 9.7, 10.2.5, 10.3, 12.2.1, 12.2.2,  
12.2.4, 13.3, 14, 15.4  
**Royalties, Patents and Copyrights**  
**3.17**  
Rules and Notices for Arbitration  
15.4.1  
**Safety of Persons and Property**  
**10.2, 10.4**  
**Safety Precautions and Programs**  
3.3.1, 4.2.2, 4.2.7, 5.3, 10.1, 10.2, 10.4  
**Samples, Definition of**  
**3.12.3**  
**Samples, Shop Drawings, Product Data and**  
**3.11, 3.12, 4.2.7**  
**Samples at the Site, Documents and**  
**3.11**  
**Schedule of Values**  
**9.2, 9.3.1**  
Schedules, Construction  
3.10, 3.12.1, 3.12.2, 6.1.3, 15.1.6.2

Separate Contracts and Contractors  
1.1.4, 3.12.5, 3.14.2, 4.2.4, 4.2.7, 6, 8.3.1, 12.1.2  
**Separate Contractors, Definition of**  
**6.1.1**  
**Shop Drawings, Definition of**  
**3.12.1**  
**Shop Drawings, Product Data and Samples**  
3.11, 3.12, 4.2.7  
**Site, Use of**  
**3.13, 6.1.1, 6.2.1**  
Site Inspections  
3.2.2, 3.3.3, 3.7.1, 3.7.4, 4.2, 9.9.2, 9.4.2, 9.10.1, 13.4  
Site Visits, Architect's  
3.7.4, 4.2.2, 4.2.9, 9.4.2, 9.5.1, 9.9.2, 9.10.1, 13.4  
Special Inspections and Testing  
4.2.6, 12.2.1, 13.4  
**Specifications, Definition of**  
**1.1.6**  
**Specifications**  
1.1.1, 1.1.6, 1.2.2, 1.5, 3.12.10, 3.17, 4.2.14  
Statute of Limitations  
15.1.2, 15.4.1.1  
Stopping the Work  
2.2.2, 2.4, 9.7, 10.3, 14.1  
Stored Materials  
6.2.1, 9.3.2, 10.2.1.2, 10.2.4  
**Subcontractor, Definition of**  
**5.1.1**  
**SUBCONTRACTORS**  
**5**  
Subcontractors, Work by  
1.2.2, 3.3.2, 3.12.1, 3.18, 4.2.3, 5.2.3, 5.3, 5.4, 9.3.1.2,  
9.6.7  
**Subcontractual Relations**  
**5.3, 5.4, 9.3.1.2, 9.6, 9.10, 10.2.1, 14.1, 14.2.1**  
Submittals  
3.10, 3.11, 3.12, 4.2.7, 5.2.1, 5.2.3, 7.3.4, 9.2, 9.3, 9.8,  
9.9.1, 9.10.2, 9.10.3  
Submittal Schedule  
3.10.2, 3.12.5, 4.2.7  
**Subrogation, Waivers of**  
**6.1.1, 11.3**  
**Substances, Hazardous**  
**10.3**  
**Substantial Completion**  
4.2.9, 8.1.1, 8.1.3, 8.2.3, 9.4.2, 9.8, 9.9.1, 9.10.3, 12.2,  
15.1.2  
**Substantial Completion, Definition of**  
**9.8.1**  
Substitution of Subcontractors  
5.2.3, 5.2.4  
Substitution of Architect  
2.3.3  
Substitutions of Materials  
3.4.2, 3.5, 7.3.8  
**Sub-subcontractor, Definition of**  
**5.1.2**

Subsurface Conditions  
3.7.4

**Successors and Assigns**  
**13.2**

**Superintendent**  
3.9, 10.2.6

**Supervision and Construction Procedures**  
1.2.2, 3.3, 3.4, 3.12.10, 4.2.2, 4.2.7, 6.1.3, 6.2.4, 7.1.3, 7.3.4, 8.2, 8.3.1, 9.4.2, 10, 12, 14, 15.1.4

Suppliers  
1.5, 3.12.1, 4.2.4, 4.2.6, 5.2.1, 9.3, 9.4.2, 9.5.4, 9.6, 9.10.5, 14.2.1

Surety  
5.4.1.2, 9.6.8, 9.8.5, 9.10.2, 9.10.3, 11.1.2, 14.2.2, 15.2.7

Surety, Consent of  
9.8.5, 9.10.2, 9.10.3

Surveys  
1.1.7, 2.3.4

**Suspension by the Owner for Convenience**  
**14.3**

Suspension of the Work  
3.7.5, 5.4.2, 14.3

Suspension or Termination of the Contract  
5.4.1.1, 14

**Taxes**  
3.6, 3.8.2.1, 7.3.4.4

**Termination by the Contractor**  
14.1, 15.1.7

**Termination by the Owner for Cause**  
5.4.1.1, 14.2, 15.1.7

**Termination by the Owner for Convenience**  
**14.4**

Termination of the Architect  
2.3.3

Termination of the Contractor Employment  
14.2.2

**TERMINATION OR SUSPENSION OF THE CONTRACT**

**14**

**Tests and Inspections**

3.1.3, 3.3.3, 3.7.1, 4.2.2, 4.2.6, 4.2.9, 9.4.2, 9.8.3, 9.9.2, 9.10.1, 10.3.2, 12.2.1, 13.4

**TIME**

**8**

**Time, Delays and Extensions of**

3.2.4, 3.7.4, 5.2.3, 7.2.1, 7.3.1, 7.4, 8.3, 9.5.1, 9.7, 10.3.2, 10.4, 14.3.2, 15.1.6, 15.2.5

**Time Limits**

2.1.2, 2.2, 2.5, 3.2.2, 3.10, 3.11, 3.12.5, 3.15.1, 4.2, 5.2, 5.3, 5.4, 6.2.4, 7.3, 7.4, 8.2, 9.2, 9.3.1, 9.3.3, 9.4.1, 9.5, 9.6, 9.7, 9.8, 9.9, 9.10, 12.2, 13.4, 14, 15.1.2, 15.1.3, 15.4

**Time Limits on Claims**

3.7.4, 10.2.8, 15.1.2, 15.1.3

**Title to Work**

9.3.2, 9.3.3

**UNCOVERING AND CORRECTION OF WORK**

**12**

**Uncovering of Work**

**12.1**

**Unforeseen Conditions, Concealed or Unknown**

3.7.4, 8.3.1, 10.3

**Unit Prices**

7.3.3.2, 9.1.2

**Use of Documents**

1.1.1, 1.5, 2.3.6, 3.12.6, 5.3

**Use of Site**

3.13, 6.1.1, 6.2.1

**Values, Schedule of**

9.2, 9.3.1

**Waiver of Claims by the Architect**

13.3.2

**Waiver of Claims by the Contractor**

9.10.5, 13.3.2, 15.1.7

**Waiver of Claims by the Owner**

9.9.3, 9.10.3, 9.10.4, 12.2.2.1, 13.3.2, 14.2.4, 15.1.7

**Waiver of Consequential Damages**

14.2.4, 15.1.7

**Waiver of Liens**

9.3, 9.10.2, 9.10.4

**Waivers of Subrogation**

6.1.1, 11.3

**Warranty**

3.5, 4.2.9, 9.3.3, 9.8.4, 9.9.1, 9.10.2, 9.10.4, 12.2.2, 15.1.2

**Weather Delays**

8.3, 15.1.6.2

**Work, Definition of**

**1.1.3**

**Written Consent**

1.5.2, 3.4.2, 3.7.4, 3.12.8, 3.14.2, 4.1.2, 9.3.2, 9.10.3, 13.2, 13.3.2, 15.4.4.2

**Written Interpretations**

4.2.11, 4.2.12

**Written Orders**

1.1.1, 2.4, 3.9, 7, 8.2.2, 12.1, 12.2, 13.4.2, 14.3.1

## **ARTICLE 1 GENERAL PROVISIONS**

### **§ 1.1 Basic Definitions**

#### **§ 1.1.1 The Contract Documents**

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement, and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive, or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding or proposal requirements.

#### **§ 1.1.2 The Contract**

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations, or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants, or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

#### **§ 1.1.3 The Work**

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment, and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

#### **§ 1.1.4 The Project**

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by Separate Contractors.

#### **§ 1.1.5 The Drawings**

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules, and diagrams.

#### **§ 1.1.6 The Specifications**

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

#### **§ 1.1.7 Instruments of Service**

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

#### **§ 1.1.8 Initial Decision Maker**

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2. The Initial Decision Maker shall not show partiality to the Owner or Contractor and shall not be liable for results of interpretations or decisions rendered in good faith.

### **§ 1.2 Correlation and Intent of the Contract Documents**

**§ 1.2.1** The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

§ 1.2.1.1 The invalidity of any provision of the Contract Documents shall not invalidate the Contract or its remaining provisions. If it is determined that any provision of the Contract Documents violates any law, or is otherwise invalid or unenforceable, then that provision shall be revised to the extent necessary to make that provision legal and enforceable. In such case the Contract Documents shall be construed, to the fullest extent permitted by law, to give effect to the parties' intentions and purposes in executing the Contract.

§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

### § 1.3 Capitalization

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles, or (3) the titles of other documents published by the American Institute of Architects.

### § 1.4 Interpretation

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

### § 1.5 Ownership and Use of Drawings, Specifications, and Other Instruments of Service

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and retain all common law, statutory, and other reserved rights in their Instruments of Service, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with the Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors, and suppliers are authorized to use and reproduce the Instruments of Service provided to them, subject to any protocols established pursuant to Sections 1.7 and 1.8, solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and suppliers may not use the Instruments of Service on other projects or for additions to the Project outside the scope of the Work without the specific written consent of the Owner, Architect, and the Architect's consultants.

### § 1.6 Notice

§ 1.6.1 Except as otherwise provided in Section 1.6.2, where the Contract Documents require one party to notify or give notice to the other party, such notice shall be provided in writing to the designated representative of the party to whom the notice is addressed and shall be deemed to have been duly served if delivered in person, by mail, by courier, or by electronic transmission if a method for electronic transmission is set forth in the Agreement.

§ 1.6.2 Notice of Claims as provided in Section 15.1.3 shall be provided in writing and shall be deemed to have been duly served only if delivered to the designated representative of the party to whom the notice is addressed by certified or registered mail, or by courier providing proof of delivery.

### § 1.7 Digital Data Use and Transmission

The parties shall agree upon protocols governing the transmission and use of Instruments of Service or any other information or documentation in digital form. The parties will use AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, to establish the protocols for the development, use, transmission, and exchange of digital data.

### § 1.8 Building Information Models Use and Reliance

Any use of, or reliance on, all or a portion of a building information model without agreement to protocols governing the use of, and reliance on, the information contained in the model and without having those protocols set forth in AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, and the requisite AIA Document

G202™–2013, Project Building Information Modeling Protocol Form, shall be at the using or relying party's sole risk and without liability to the other party and its contractors or consultants, the authors of, or contributors to, the building information model, and each of their agents and employees.

## **ARTICLE 2 OWNER**

### **§ 2.1 General**

**§ 2.1.1** The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

**§ 2.1.2** The Owner shall furnish to the Contractor, within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of, or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

### **§ 2.2 Evidence of the Owner's Financial Arrangements**

**§ 2.2.1** Prior to commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. The Contractor shall have no obligation to commence the Work until the Owner provides such evidence. If commencement of the Work is delayed under this Section 2.2.1, the Contract Time shall be extended appropriately.

**§ 2.2.2** Following commencement of the Work and upon written request by the Contractor, the Owner shall furnish to the Contractor reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract only if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due; or (3) a change in the Work materially changes the Contract Sum. If the Owner fails to provide such evidence, as required, within fourteen days of the Contractor's request, the Contractor may immediately stop the Work and, in that event, shall notify the Owner that the Work has stopped. However, if the request is made because a change in the Work materially changes the Contract Sum under (3) above, the Contractor may immediately stop only that portion of the Work affected by the change until reasonable evidence is provided. If the Work is stopped under this Section 2.2.2, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided in the Contract Documents.

**§ 2.2.3** After the Owner furnishes evidence of financial arrangements under this Section 2.2, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

**§ 2.2.4** Where the Owner has designated information furnished under this Section 2.2 as "confidential," the Contractor shall keep the information confidential and shall not disclose it to any other person. However, the Contractor may disclose "confidential" information, after seven (7) days' notice to the Owner, where disclosure is required by law, including a subpoena or other form of compulsory legal process issued by a court or governmental entity, or by court or arbitrator(s) order. The Contractor may also disclose "confidential" information to its employees, consultants, sureties, Subcontractors and their employees, Sub-subcontractors, and others who need to know the content of such information solely and exclusively for the Project and who agree to maintain the confidentiality of such information.

### **§ 2.3 Information and Services Required of the Owner**

**§ 2.3.1** Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

**§ 2.3.2** The Owner shall retain an architect lawfully licensed to practice architecture, or an entity lawfully practicing architecture, in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 2.3.3 If the employment of the Architect terminates, the Owner shall employ a successor to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 2.3.4 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.3.5 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.3.6 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

#### § 2.4 Owner's Right to Stop the Work

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

#### § 2.5 Owner's Right to Carry Out the Work

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such default or neglect. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect and the Architect may, pursuant to Section 9.5.1, withhold or nullify a Certificate for Payment in whole or in part, to the extent reasonably necessary to reimburse the Owner for the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect, or failure. If current and future payments are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner. If the Contractor disagrees with the actions of the Owner or the Architect, or the amounts claimed as costs to the Owner, the Contractor may file a Claim pursuant to Article 15.

### ARTICLE 3 CONTRACTOR

#### § 3.1 General

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of its obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

#### § 3.2 Review of Contract Documents and Field Conditions by Contractor

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed, and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.3.4, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall submit Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner, subject to Section 15.1.7, as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

### § 3.3 Supervision and Construction Procedures

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences, and procedures, and for coordinating all portions of the Work under the Contract. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences, or procedures, the Contractor shall evaluate the jobsite safety thereof and shall be solely responsible for the jobsite safety of such means, methods, techniques, sequences, or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely notice to the Owner and Architect, and shall propose alternative means, methods, techniques, sequences, or procedures. The Architect shall evaluate the proposed alternative solely for conformance with the design intent for the completed construction. Unless the Architect objects to the Contractor's proposed alternative, the Contractor shall perform the Work using its alternative means, methods, techniques, sequences, or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

### § 3.4 Labor and Materials

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

§ 3.4.2 Except in the case of minor changes in the Work approved by the Architect in accordance with Section 3.12.8 or ordered by the Architect in accordance with Section 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ 3.4.3 The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

### § 3.5 Warranty

§ 3.5.1 The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.5.2 All material, equipment, or other special warranties required by the Contract Documents shall be issued in the name of the Owner, or shall be transferable to the Owner, and shall commence in accordance with Section 9.8.4.

### § 3.6 Taxes

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

### § 3.7 Permits, Fees, Notices and Compliance with Laws

§ 3.7.1 Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ 3.7.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ 3.7.3 If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

### § 3.7.4 Concealed or Unknown Conditions

If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 14 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they 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, will recommend that an equitable adjustment be made in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may submit a Claim as provided in Article 15.

§ 3.7.5 If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.



### **§ 3.8 Allowances**

**§ 3.8.1** The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

**§ 3.8.2** Unless otherwise provided in the Contract Documents,

- .1 allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- .2 Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit, and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- .3 whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

**§ 3.8.3** Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

### **§ 3.9 Superintendent**

**§ 3.9.1** The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

**§ 3.9.2** The Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the name and qualifications of a proposed superintendent. Within 14 days of receipt of the information, the Architect may notify the Contractor, stating whether the Owner or the Architect (1) has reasonable objection to the proposed superintendent or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

**§ 3.9.3** The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

### **§ 3.10 Contractor's Construction and Submittal Schedules**

**§ 3.10.1** The Contractor, promptly after being awarded the Contract, shall submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall contain detail appropriate for the Project, including (1) the date of commencement of the Work, interim schedule milestone dates, and the date of Substantial Completion; (2) an apportionment of the Work by construction activity; and (3) the time required for completion of each portion of the Work. The schedule shall provide for the orderly progression of the Work to completion and shall not exceed time limits current under the Contract Documents. The schedule shall be revised at appropriate intervals as required by the conditions of the Work and Project.

**§ 3.10.2** The Contractor, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, shall submit a submittal schedule for the Architect's approval. The Architect's approval shall not be unreasonably delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, or fails to provide submittals in accordance with the approved submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

**§ 3.10.3** The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

### **§ 3.11 Documents and Samples at the Site**

The Contractor shall make available, at the Project site, the Contract Documents, including Change Orders, Construction Change Directives, and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and the approved Shop Drawings, Product Data, Samples, and similar required submittals. These shall be in electronic form or paper copy, available to the Architect and Owner, and

delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

**§ 3.12 Shop Drawings, Product Data and Samples**

**§ 3.12.1** Shop Drawings are drawings, diagrams, schedules, and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier, or distributor to illustrate some portion of the Work.

**§ 3.12.2** Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams, and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

**§ 3.12.3** Samples are physical examples that illustrate materials, equipment, or workmanship, and establish standards by which the Work will be judged.

**§ 3.12.4** Shop Drawings, Product Data, Samples, and similar submittals are not Contract Documents. Their purpose is to demonstrate how the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

**§ 3.12.5** The Contractor shall review for compliance with the Contract Documents, approve, and submit to the Architect, Shop Drawings, Product Data, Samples, and similar submittals required by the Contract Documents, in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of Separate Contractors.

**§ 3.12.6** By submitting Shop Drawings, Product Data, Samples, and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so, and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

**§ 3.12.7** The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples, or similar submittals, until the respective submittal has been approved by the Architect.

**§ 3.12.8** The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from the requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples, or similar submittals, unless the Contractor has specifically notified the Architect of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples, or similar submittals, by the Architect's approval thereof.

**§ 3.12.9** The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples, or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such notice, the Architect's approval of a resubmission shall not apply to such revisions.

**§ 3.12.10** The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences, and procedures. The Contractor shall not be required to provide professional services in violation of applicable law.

**§ 3.12.10.1** If professional design services or certifications by a design professional related to systems, materials, or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will

specify all performance and design criteria that such services must satisfy. The Contractor shall be entitled to rely upon the adequacy and accuracy of the performance and design criteria provided in the Contract Documents. The Contractor shall cause such services or certifications to be provided by an appropriately licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Shop Drawings, and other submittals related to the Work, designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy and accuracy of the services, certifications, and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor the performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review and approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents.

**§ 3.12.10.2** If the Contract Documents require the Contractor's design professional to certify that the Work has been performed in accordance with the design criteria, the Contractor shall furnish such certifications to the Architect at the time and in the form specified by the Architect.

### **§ 3.13 Use of Site**

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, lawful orders of public authorities, and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

### **§ 3.14 Cutting and Patching**

**§ 3.14.1** The Contractor shall be responsible for cutting, fitting, or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting, or patching shall be restored to the condition existing prior to the cutting, fitting, or patching, unless otherwise required by the Contract Documents.

**§ 3.14.2** The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or Separate Contractors by cutting, patching, or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter construction by the Owner or a Separate Contractor except with written consent of the Owner and of the Separate Contractor. Consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold, from the Owner or a Separate Contractor, its consent to cutting or otherwise altering the Work.

### **§ 3.15 Cleaning Up**

**§ 3.15.1** The Contractor shall keep the premises and surrounding area free from accumulation of waste materials and rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery, and surplus materials from and about the Project.

**§ 3.15.2** If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and the Owner shall be entitled to reimbursement from the Contractor.

### **§ 3.16 Access to Work**

The Contractor shall provide the Owner and Architect with access to the Work in preparation and progress wherever located.

### **§ 3.17 Royalties, Patents and Copyrights**

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for defense or loss when a particular design, process, or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications, or other documents prepared by the Owner or Architect. However, if an infringement of a copyright or patent is discovered by, or made known to, the Contractor, the Contractor shall be responsible for the loss unless the information is promptly furnished to the Architect.

### **§ 3.18 Indemnification**

**§ 3.18.1** To the fullest extent permitted by law, the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss, or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity that would otherwise exist as to a party or person described in this Section 3.18.

**§ 3.18.2** In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation, or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts, or other employee benefit acts.

## **ARTICLE 4 ARCHITECT**

### **§ 4.1 General**

**§ 4.1.1** The Architect is the person or entity retained by the Owner pursuant to Section 2.3.2 and identified as such in the Agreement.

**§ 4.1.2** Duties, responsibilities, and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified, or extended without written consent of the Owner, Contractor, and Architect. Consent shall not be unreasonably withheld.

### **§ 4.2 Administration of the Contract**

**§ 4.2.1** The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate for Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

**§ 4.2.2** The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents.

**§ 4.2.3** On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and promptly report to the Owner (1) known deviations from the Contract Documents, (2) known deviations from the most recent construction schedule submitted by the Contractor, and (3) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of, and will not be responsible for acts or omissions of, the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

### **§ 4.2.4 Communications**

The Owner and Contractor shall include the Architect in all communications that relate to or affect the Architect's services or professional responsibilities. The Owner shall promptly notify the Architect of the substance of any direct communications between the Owner and the Contractor otherwise relating to the Project. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and suppliers shall be through the Contractor. Communications by and with Separate Contractors shall be through the Owner. The Contract Documents may specify other communication protocols.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.4.2 and 13.4.3, whether or not the Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, suppliers, their agents or employees, or other persons or entities performing portions of the Work.

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data, and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5, and 3.12. The Architect's review shall not constitute approval of safety precautions or of any construction means, methods, techniques, sequences, or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may order minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more Project representatives to assist in carrying out the Architect's responsibilities at the site. The Owner shall notify the Contractor of any change in the duties, responsibilities and limitations of authority of the Project representatives.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either, and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

## ARTICLE 5 SUBCONTRACTORS

### § 5.1 Definitions

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a Separate Contractor or the subcontractors of a Separate Contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

### § 5.2 Award of Subcontracts and Other Contracts for Portions of the Work

§ 5.2.1 Unless otherwise stated in the Contract Documents, the Contractor, as soon as practicable after award of the Contract, shall notify the Owner and Architect of the persons or entities proposed for each principal portion of the Work, including those who are to furnish materials or equipment fabricated to a special design. Within 14 days of receipt of the information, the Architect may notify the Contractor whether the Owner or the Architect (1) has reasonable objection to any such proposed person or entity or (2) requires additional time for review. Failure of the Architect to provide notice within the 14-day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person, or entity for one previously selected if the Owner or Architect makes reasonable objection to such substitution.

### § 5.3 Subcontractual Relations

By appropriate written agreement, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work that the Contractor, by these Contract Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies, and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

### § 5.4 Contingent Assignment of Subcontracts

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- .1 assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor; and
- .2 assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

## **ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS**

### **§ 6.1 Owner's Right to Perform Construction and to Award Separate Contracts**

§ 6.1.1 The term "Separate Contractor(s)" shall mean other contractors retained by the Owner under separate agreements. The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and with Separate Contractors retained under Conditions of the Contract substantially similar to those of this Contract, including those provisions of the Conditions of the Contract related to insurance and waiver of subrogation.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each Separate Contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with any Separate Contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to its construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, Separate Contractors, and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces or with Separate Contractors, the Owner or its Separate Contractors shall have the same obligations and rights that the Contractor has under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6, and Articles 10, 11, and 12.

### **§ 6.2 Mutual Responsibility**

§ 6.2.1 The Contractor shall afford the Owner and Separate Contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a Separate Contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly notify the Architect of apparent discrepancies or defects in the construction or operations by the Owner or Separate Contractor that would render it unsuitable for proper execution and results of the Contractor's Work. Failure of the Contractor to notify the Architect of apparent discrepancies or defects prior to proceeding with the Work shall constitute an acknowledgment that the Owner's or Separate Contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work. The Contractor shall not be responsible for discrepancies or defects in the construction or operations by the Owner or Separate Contractor that are not apparent.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a Separate Contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a Separate Contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage that the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner or Separate Contractor as provided in Section 10.2.5.

§ 6.2.5 The Owner and each Separate Contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

### § 6.3 Owner's Right to Clean Up

If a dispute arises among the Contractor, Separate Contractors, and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

## ARTICLE 7 CHANGES IN THE WORK

### § 7.1 General

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor, and Architect. A Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor. An order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents. The Contractor shall proceed promptly with changes in the Work, unless otherwise provided in the Change Order, Construction Change Directive, or order for a minor change in the Work.

### § 7.2 Change Orders

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor, and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

### § 7.3 Construction Change Directives

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions, or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.4.

§ 7.3.4 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.4 shall be limited to the following:



- .1 Costs of labor, including applicable payroll taxes, fringe benefits required by agreement or custom, workers' compensation insurance, and other employee costs approved by the Architect;
- .2 Costs of materials, supplies, and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use, or similar taxes, directly related to the change; and
- .5 Costs of supervision and field office personnel directly attributable to the change.

§ 7.3.5 If the Contractor disagrees with the adjustment in the Contract Time, the Contractor may make a Claim in accordance with applicable provisions of Article 15.

§ 7.3.6 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.7 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

#### § 7.4 Minor Changes in the Work

The Architect may order minor changes in the Work that are consistent with the intent of the Contract Documents and do not involve an adjustment in the Contract Sum or an extension of the Contract Time. The Architect's order for minor changes shall be in writing. If the Contractor believes that the proposed minor change in the Work will affect the Contract Sum or Contract Time, the Contractor shall notify the Architect and shall not proceed to implement the change in the Work. If the Contractor performs the Work set forth in the Architect's order for a minor change without prior notice to the Architect that such change will affect the Contract Sum or Contract Time, the Contractor waives any adjustment to the Contract Sum or extension of the Contract Time.

### ARTICLE 8 TIME

#### § 8.1 Definitions

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

## § 8.2 Progress and Completion

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement, the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, commence the Work prior to the effective date of insurance required to be furnished by the Contractor and Owner.

§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

## § 8.3 Delays and Extensions of Time

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by (1) an act or neglect of the Owner or Architect, of an employee of either, or of a Separate Contractor; (2) by changes ordered in the Work; (3) by labor disputes, fire, unusual delay in deliveries, unavoidable casualties, adverse weather conditions documented in accordance with Section 15.1.6.2, or other causes beyond the Contractor's control; (4) by delay authorized by the Owner pending mediation and binding dispute resolution; or (5) by other causes that the Contractor asserts, and the Architect determines, justify delay, then the Contract Time shall be extended for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

## ARTICLE 9 PAYMENTS AND COMPLETION

### § 9.1 Contract Sum

§ 9.1.1 The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.1.2 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed so that application of such unit prices to the actual quantities causes substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

### § 9.2 Schedule of Values

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit a schedule of values to the Architect before the first Application for Payment, allocating the entire Contract Sum to the various portions of the Work. The schedule of values shall be prepared in the form, and supported by the data to substantiate its accuracy, required by the Architect. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment. Any changes to the schedule of values shall be submitted to the Architect and supported by such data to substantiate its accuracy as the Architect may require, and unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's subsequent Applications for Payment.

### § 9.3 Applications for Payment

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2, for completed portions of the Work. The application shall be notarized, if required, and supported by all data substantiating the Contractor's right to payment that the Owner or Architect require, such as copies of requisitions, and releases and waivers of liens from Subcontractors and suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage, and transportation to the site, for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information, and belief, be free and clear of liens, claims, security interests, or encumbrances, in favor of the Contractor, Subcontractors, suppliers, or other persons or entities that provided labor, materials, and equipment relating to the Work.

#### § 9.4 Certificates for Payment

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either (1) issue to the Owner a Certificate for Payment in the full amount of the Application for Payment, with a copy to the Contractor; or (2) issue to the Owner a Certificate for Payment for such amount as the Architect determines is properly due, and notify the Contractor and Owner of the Architect's reasons for withholding certification in part as provided in Section 9.5.1; or (3) withhold certification of the entire Application for Payment, and notify the Contractor and Owner of the Architect's reason for withholding certification in whole as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data in the Application for Payment, that, to the best of the Architect's knowledge, information, and belief, the Work has progressed to the point indicated, the quality of the Work is in accordance with the Contract Documents, and that the Contractor is entitled to payment in the amount certified. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion, and to specific qualifications expressed by the Architect. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work; (2) reviewed construction means, methods, techniques, sequences, or procedures; (3) reviewed copies of requisitions received from Subcontractors and suppliers and other data requested by the Owner to substantiate the Contractor's right to payment; or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

#### § 9.5 Decisions to Withhold Certification

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- .1 defective Work not remedied;
- .2 third party claims filed or reasonable evidence indicating probable filing of such claims, unless security acceptable to the Owner is provided by the Contractor;
- .3 failure of the Contractor to make payments properly to Subcontractors or suppliers for labor, materials or equipment;

- .4 reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- .5 damage to the Owner or a Separate Contractor;
- .6 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; or
- .7 repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When either party disputes the Architect's decision regarding a Certificate for Payment under Section 9.5.1, in whole or in part, that party may submit a Claim in accordance with Article 15.

§ 9.5.3 When the reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.4 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or supplier to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Contractor shall reflect such payment on its next Application for Payment.

### § 9.6 Progress Payments

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

§ 9.6.2 The Contractor shall pay each Subcontractor, no later than seven days after receipt of payment from the Owner, the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors and suppliers to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay, or to see to the payment of money to, a Subcontractor or supplier, except as may otherwise be required by law.

§ 9.6.5 The Contractor's payments to suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors or provided by suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, create any fiduciary liability or tort liability on the part of the Contractor for breach of trust, or entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.6.8 Provided the Owner has fulfilled its payment obligations under the Contract Documents, the Contractor shall defend and indemnify the Owner from all loss, liability, damage or expense, including reasonable attorney's fees and litigation expenses, arising out of any lien claim or other claim for payment by any Subcontractor or supplier of any tier. Upon receipt of notice of a lien claim or other claim for payment, the Owner shall notify the Contractor. If approved by the applicable court, when required, the Contractor may substitute a surety bond for the property against which the lien or other claim for payment has been asserted.

### § 9.7 Failure of Payment

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents, the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shutdown, delay and start-up, plus interest as provided for in the Contract Documents.

### § 9.8 Substantial Completion

§ 9.8.1 Substantial Completion is 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 Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion; establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance; and fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in the Certificate. Upon such acceptance, and consent of surety if any, the Owner shall make payment of retainage applying to the Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

### § 9.9 Partial Occupancy or Use

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor, and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

### § 9.10 Final Completion and Final Payment

§ 9.10.1 Upon receipt of the Contractor's notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection. When the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect, (3) a written statement that the Contractor knows of no reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5) documentation of any special warranties, such as manufacturers' warranties or specific Subcontractor warranties, and (6) if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts and releases and waivers of liens, claims, security interests, or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien, claim, security interest, or encumbrance. If a lien, claim, security interest, or encumbrance remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging the lien, claim, security interest, or encumbrance, including all costs and reasonable attorneys' fees.

§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed, corrected, and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of the surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- .1 liens, Claims, security interests, or encumbrances arising out of the Contract and unsettled;
- .2 failure of the Work to comply with the requirements of the Contract Documents;
- .3 terms of special warranties required by the Contract Documents; or
- .4 audits performed by the Owner, if permitted by the Contract Documents, after final payment.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor, or a supplier, shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

## ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

### § 10.1 Safety Precautions and Programs

The Contractor shall be responsible for initiating, maintaining, and supervising all safety precautions and programs in connection with the performance of the Contract.

### § 10.2 Safety of Persons and Property

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury, or loss to

- .1 employees on the Work and other persons who may be affected thereby;
- .2 the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody, or control of the Contractor, a Subcontractor, or a Sub-subcontractor; and
- .3 other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures, and utilities not designated for removal, relocation, or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with, and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities, bearing on safety of persons or property or their protection from damage, injury, or loss.

§ 10.2.3 The Contractor shall implement, erect, and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards; promulgating safety regulations; and notifying the owners and users of adjacent sites and utilities of the safeguards.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment, or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3. The Contractor may make a Claim for the cost to remedy the damage or loss to the extent such damage or loss is attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

#### § 10.2.8 Injury or Damage to Person or Property

If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, notice of the injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

#### § 10.3 Hazardous Materials and Substances

§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials or substances. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and notify the Owner and Architect of the condition.

§ 10.3.2 Upon receipt of the Contractor's notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of the material or substance or who are to perform the task of removal or safe containment of the material or substance. The Contractor and the Architect will

promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable additional costs of shutdown, delay, and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses, and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss, or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss, or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for hazardous materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for hazardous materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall reimburse the Owner for the cost and expense the Owner incurs (1) for remediation of hazardous materials or substances the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall reimburse the Contractor for all cost and expense thereby incurred.

#### § 10.4 Emergencies

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury, or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

### ARTICLE 11 INSURANCE AND BONDS

#### § 11.1 Contractor's Insurance and Bonds

§ 11.1.1 The Contractor shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Contractor shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located. The Owner, Architect, and Architect's consultants shall be named as additional insureds under the Contractor's commercial general liability policy or as otherwise described in the Contract Documents.

§ 11.1.2 The Contractor shall provide surety bonds of the types, for such penal sums, and subject to such terms and conditions as required by the Contract Documents. The Contractor shall purchase and maintain the required bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 11.1.3 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

§ 11.1.4 **Notice of Cancellation or Expiration of Contractor's Required Insurance.** Within three (3) business days of the date the Contractor becomes aware of an impending or actual cancellation or expiration of any insurance required by the Contract Documents, the Contractor shall provide notice to the Owner of such impending or actual cancellation or expiration. Upon receipt of notice from the Contractor, the Owner shall, unless the lapse in coverage arises from an act



or omission of the Owner, have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by the Contractor. The furnishing of notice by the Contractor shall not relieve the Contractor of any contractual obligation to provide any required coverage.

## **§ 11.2 Owner's Insurance**

**§ 11.2.1** The Owner shall purchase and maintain insurance of the types and limits of liability, containing the endorsements, and subject to the terms and conditions, as described in the Agreement or elsewhere in the Contract Documents. The Owner shall purchase and maintain the required insurance from an insurance company or insurance companies lawfully authorized to issue insurance in the jurisdiction where the Project is located.

**§ 11.2.2 Failure to Purchase Required Property Insurance.** If the Owner fails to purchase and maintain the required property insurance, with all of the coverages and in the amounts described in the Agreement or elsewhere in the Contract Documents, the Owner shall inform the Contractor in writing prior to commencement of the Work. Upon receipt of notice from the Owner, the Contractor may delay commencement of the Work and may obtain insurance that will protect the interests of the Contractor, Subcontractors, and Sub-Subcontractors in the Work. When the failure to provide coverage has been cured or resolved, the Contract Sum and Contract Time shall be equitably adjusted. In the event the Owner fails to procure coverage, the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent the loss to the Owner would have been covered by the insurance to have been procured by the Owner. The cost of the insurance shall be charged to the Owner by a Change Order. If the Owner does not provide written notice, and the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain the required insurance, the Owner shall reimburse the Contractor for all reasonable costs and damages attributable thereto.

**§ 11.2.3 Notice of Cancellation or Expiration of Owner's Required Property Insurance.** Within three (3) business days of the date the Owner becomes aware of an impending or actual cancellation or expiration of any property insurance required by the Contract Documents, the Owner shall provide notice to the Contractor of such impending or actual cancellation or expiration. Unless the lapse in coverage arises from an act or omission of the Contractor: (1) the Contractor, upon receipt of notice from the Owner, shall have the right to stop the Work until the lapse in coverage has been cured by the procurement of replacement coverage by either the Owner or the Contractor; (2) the Contract Time and Contract Sum shall be equitably adjusted; and (3) the Owner waives all rights against the Contractor, Subcontractors, and Sub-subcontractors to the extent any loss to the Owner would have been covered by the insurance had it not expired or been cancelled. If the Contractor purchases replacement coverage, the cost of the insurance shall be charged to the Owner by an appropriate Change Order. The furnishing of notice by the Owner shall not relieve the Owner of any contractual obligation to provide required insurance.

## **§ 11.3 Waivers of Subrogation**

**§ 11.3.1** The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents, and employees, each of the other; (2) the Architect and Architect's consultants; and (3) Separate Contractors, if any, and any of their subcontractors, sub-subcontractors, agents, and employees, for damages caused by fire, or other causes of loss, to the extent those losses are covered by property insurance required by the Agreement or other property insurance applicable to the Project, except such rights as they have to proceeds of such insurance. The Owner or Contractor, as appropriate, shall require similar written waivers in favor of the individuals and entities identified above from the Architect, Architect's consultants, Separate Contractors, subcontractors, and sub-subcontractors. The policies of insurance purchased and maintained by each person or entity agreeing to waive claims pursuant to this section 11.3.1 shall not prohibit this waiver of subrogation. This waiver of subrogation shall be effective as to a person or entity (1) even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, (2) even though that person or entity did not pay the insurance premium directly or indirectly, or (3) whether or not the person or entity had an insurable interest in the damaged property.

**§ 11.3.2** If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, to the extent permissible by such policies, the Owner waives all rights in accordance with the terms of Section 11.3.1 for damages caused by fire or other causes of loss covered by this separate property insurance.

## **§ 11.4 Loss of Use, Business Interruption, and Delay in Completion Insurance**

The Owner, at the Owner's option, may purchase and maintain insurance that will protect the Owner against loss of use of the Owner's property, or the inability to conduct normal operations, due to fire or other causes of loss. The Owner waives all rights of action against the Contractor and Architect for loss of use of the Owner's property, due to fire or other hazards however caused.

#### **§11.5 Adjustment and Settlement of Insured Loss**

**§ 11.5.1** A loss insured under the property insurance required by the Agreement shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.5.2. The Owner shall pay the Architect and Contractor their just shares of insurance proceeds received by the Owner, and by appropriate agreements the Architect and Contractor shall make payments to their consultants and Subcontractors in similar manner.

**§ 11.5.2** Prior to settlement of an insured loss, the Owner shall notify the Contractor of the terms of the proposed settlement as well as the proposed allocation of the insurance proceeds. The Contractor shall have 14 days from receipt of notice to object to the proposed settlement or allocation of the proceeds. If the Contractor does not object, the Owner shall settle the loss and the Contractor shall be bound by the settlement and allocation. Upon receipt, the Owner shall deposit the insurance proceeds in a separate account and make the appropriate distributions. Thereafter, if no other agreement is made or the Owner does not terminate the Contract for convenience, the Owner and Contractor shall execute a Change Order for reconstruction of the damaged or destroyed Work in the amount allocated for that purpose. If the Contractor timely objects to either the terms of the proposed settlement or the allocation of the proceeds, the Owner may proceed to settle the insured loss, and any dispute between the Owner and Contractor arising out of the settlement or allocation of the proceeds shall be resolved pursuant to Article 15. Pending resolution of any dispute, the Owner may issue a Construction Change Directive for the reconstruction of the damaged or destroyed Work.

### **ARTICLE 12 UNCOVERING AND CORRECTION OF WORK**

#### **§ 12.1 Uncovering of Work**

**§ 12.1.1** If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

**§ 12.1.2** If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, the Contractor shall be entitled to an equitable adjustment to the Contract Sum and Contract Time as may be appropriate. If such Work is not in accordance with the Contract Documents, the costs of uncovering the Work, and the cost of correction, shall be at the Contractor's expense.

#### **§ 12.2 Correction of Work**

##### **§ 12.2.1 Before Substantial Completion**

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, discovered before Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

##### **§ 12.2.2 After Substantial Completion**

**§ 12.2.2.1** In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of any applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of notice from the Owner to do so, unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.5.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction of the Owner or Separate Contractors, whether completed or partially completed, caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

### § 12.3 Acceptance of Nonconforming Work

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

## ARTICLE 13 MISCELLANEOUS PROVISIONS

### § 13.1 Governing Law

The Contract shall be governed by the law of the place where the Project is located, excluding that jurisdiction's choice of law rules. If the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

### § 13.2 Successors and Assigns

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns, and legal representatives to covenants, agreements, and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate the assignment.

### § 13.3 Rights and Remedies

§ 13.3.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights, and remedies otherwise imposed or available by law.

§ 13.3.2 No action or failure to act by the Owner, Architect, or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach thereunder, except as may be specifically agreed upon in writing.

### § 13.4 Tests and Inspections

§ 13.4.1 Tests, inspections, and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules, and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections, and

approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections, and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of tests, inspections, or approvals that do not become requirements until after bids are received or negotiations concluded. The Owner shall directly arrange and pay for tests, inspections, or approvals where building codes or applicable laws or regulations so require.

§ 13.4.2 If the Architect, Owner, or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection, or approval not included under Section 13.4.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection, or approval, by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.4.3, shall be at the Owner's expense.

§ 13.4.3 If procedures for testing, inspection, or approval under Sections 13.4.1 and 13.4.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure, including those of repeated procedures and compensation for the Architect's services and expenses, shall be at the Contractor's expense.

§ 13.4.4 Required certificates of testing, inspection, or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.4.5 If the Architect is to observe tests, inspections, or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.4.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

### § 13.5 Interest

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at the rate the parties agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

## ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

### § 14.1 Termination by the Contractor

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency, that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor reasonable evidence as required by Section 2.2.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, their agents or employees, or any other persons or entities performing portions of the Work, repeated suspensions, delays, or interruptions of the entire Work by the Owner as described in Section 14.3, constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, as well as reasonable overhead and profit on Work not executed, and costs incurred by reason of such termination.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor, a Subcontractor, a Sub-subcontractor, or their agents or employees or any other persons or entities performing portions of the Work because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

#### § 14.2 Termination by the Owner for Cause

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors or suppliers in accordance with the respective agreements between the Contractor and the Subcontractors or suppliers;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the reasons described in Section 14.2.1 exist, and upon certification by the Architect that sufficient cause exists to justify such action, the Owner may, without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

#### § 14.3 Suspension by the Owner for Convenience

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work, in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay, or interruption under Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was, or would have been, so suspended, delayed, or interrupted, by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

#### § 14.4 Termination by the Owner for Convenience

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Owner shall pay the Contractor for Work properly executed; costs incurred by reason of the termination, including costs attributable to termination of Subcontracts; and the termination fee, if any, set forth in the Agreement.

## **ARTICLE 15 CLAIMS AND DISPUTES**

### **§ 15.1 Claims**

#### **§ 15.1.1 Definition**

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, a change in the Contract Time, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim. This Section 15.1.1 does not require the Owner to file a Claim in order to impose liquidated damages in accordance with the Contract Documents.

#### **§ 15.1.2 Time Limits on Claims**

The Owner and Contractor shall commence all Claims and causes of action against the other and arising out of or related to the Contract, whether in contract, tort, breach of warranty or otherwise, in accordance with the requirements of the binding dispute resolution method selected in the Agreement and within the period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all Claims and causes of action not commenced in accordance with this Section 15.1.2.

#### **§ 15.1.3 Notice of Claims**

§ 15.1.3.1 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered prior to expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party under this Section 15.1.3.1 shall be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3.2 Claims by either the Owner or Contractor, where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2, shall be initiated by notice to the other party. In such event, no decision by the Initial Decision Maker is required.

#### **§ 15.1.4 Continuing Contract Performance**

§ 15.1.4.1 Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents.

§ 15.1.4.2 The Contract Sum and Contract Time shall be adjusted in accordance with the Initial Decision Maker's decision, subject to the right of either party to proceed in accordance with this Article 15. The Architect will issue Certificates for Payment in accordance with the decision of the Initial Decision Maker.

#### **§ 15.1.5 Claims for Additional Cost**

If the Contractor wishes to make a Claim for an increase in the Contract Sum, notice as provided in Section 15.1.3 shall be given before proceeding to execute the portion of the Work that is the subject of the Claim. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

#### **§ 15.1.6 Claims for Additional Time**

§ 15.1.6.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, notice as provided in Section 15.1.3 shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.6.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated, and had an adverse effect on the scheduled construction.

### § 15.1.7 Waiver of Claims for Consequential Damages

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit, except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.7 shall be deemed to preclude assessment of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

### § 15.2 Initial Decision

§ 15.2.1 Claims, excluding those where the condition giving rise to the Claim is first discovered after expiration of the period for correction of the Work set forth in Section 12.2.2 or arising under Sections 10.3, 10.4, and 11.5, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim. If an initial decision has not been rendered within 30 days after the Claim has been referred to the Initial Decision Maker, the party asserting the Claim may demand mediation and binding dispute resolution without a decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of the request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished, or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of receipt of an initial decision, demand in writing that the other party file for mediation. If such a demand is made and the party receiving the demand fails to file for mediation within 30 days after receipt thereof, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

### § 15.3 Mediation

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract, except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.7, shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

§ 15.3.3 Either party may, within 30 days from the date that mediation has been concluded without resolution of the dispute or 60 days after mediation has been demanded without resolution of the dispute, demand in writing that the other party file for binding dispute resolution. If such a demand is made and the party receiving the demand fails to file for binding dispute resolution within 60 days after receipt thereof, then both parties waive their rights to binding dispute resolution proceedings with respect to the initial decision.

§ 15.3.4 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

### § 15.4 Arbitration

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. The Arbitration shall be conducted in the place where the Project is located, unless another location is mutually agreed upon. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement, shall be specifically enforceable under applicable law in any court having jurisdiction thereof.



**§ 15.4.4 Consolidation or Joinder**

**§ 15.4.4.1** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

**§ 15.4.4.2** Subject to the rules of the American Arbitration Association or other applicable arbitration rules, either party may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

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4/30/08

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CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE  
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# Geotechnical Engineering-Testing, Inc.

PROFESSIONAL ENGINEERS

Geotechnical Evaluations - Geosciences - Construction Materials - Pavement Management

July 7, 2023

Gregg Blaize  
Capital Improvement Project Manager  
City of Mobile  
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P.O. Box 1827  
Mobile, AL 36633

Email: [gregg.blaize@cityofmobile.org](mailto:gregg.blaize@cityofmobile.org)

Re: Proposed Scope of Services and Fees for Design Phase Geotechnical Engineering Services for the Proposed City of Mobile – Civic Center Parking Deck in Mobile, Alabama

Mr. Blaize:

Geotechnical Engineering-Testing, Inc. (GET) is pleased to submit this report of our soils explorations and geotechnical engineering evaluations for the proposed design and construction of the City of Mobile – Civic Center Parking Deck in Mobile, Alabama. This report includes the results of the soils explorations program and our recommendations for site preparations, design and construction of building foundations for the currently planned structure, and the design and construction of roadway pavements.

The recommendations provided in the attached report are based in part on the project information provided to GET and only apply to the specific project and site discussed in the report.

Please call Curt Doyle, P.E. if you have any questions regarding this report.

Sincerely,

GEOTECHNICAL ENGINEERING-TESTING, INC.


  
Curt Doyle, P.E.  
Principal Engineer  
Alabama License No. 25733  
Date: 7/07/2023



TABLE OF CONTENTS

	page
INTRODUCTION.....	1
OBJECTIVES/SCOPE OF WORK.....	1
PROJECT DESCRIPTION.....	2
SITE DESCRIPTION.....	3
General Site Description.....	3
Site Topography.....	3
SOILS EXPLORATIONS PROGRAM.....	3
Boring Locations.....	3
Field Explorations.....	3
Laboratory Testing.....	4
GENERAL SUBSURFACE CONDITIONS.....	5
Site Geology.....	5
Subsurface Soil Conditions.....	5
GEOTECHNICAL EVALUATIONS AND RECOMMENDATIONS.....	6
General Site Stratigraphy and Engineering Properties.....	7
Seismic Site Class.....	7
Settlement Evaluations.....	7
Building Foundation Recommendations.....	7
Shallow Foundation Option.....	8
Deep Foundation Option.....	8
Intermediate Foundation Option.....	11
General Geotechnical Site Preparation (Building Area).....	11
Floor Slab.....	12
General Geotechnical Site Preparation (Proposed Roadways).....	12
Pavement Recommendations.....	13
Utility Trenches.....	14
Required Special Inspections.....	14
CONSTRUCTION CONSIDERATIONS.....	14
Excavation Slopes.....	14
Site Grading.....	14
Dewatering.....	15
Engineering Services During Construction.....	15
CONCLUSION.....	15
LIMITATIONS.....	16

**FIGURES**

**HIGHWAY LOCATION MAP**

**Figure 1**

**GEOLOGIC MAP**

**Figure 2**

**APPENDICES**

**BORING LOCATION PLAN**

**A**

**LOGS OF BORING**

**B**

**LABORATORY TEST RESULTS**

**C**

**SUBSURFACE DIAGRAMS**

**D**

**PHOTOS OF CORE SAMPLES**

**E**

## **INTRODUCTION**

Geotechnical Engineering-Testing, Inc. (GET) has completed the authorized soils explorations and geotechnical engineering studies for the design phase of the Civic Center Parking Garage for the City of Mobile. The geotechnical studies included planning and performing the soils exploration and laboratory testing program, evaluation of the soils explorations results, providing general site earthwork recommendations, providing soil parameters for foundation designs, making foundation recommendation for the parking garage structure, providing pavement recommendations for a new access road, and preparation of this report of findings and recommendations. Our professional services for this project have been performed, findings obtained, and recommendations prepared in accordance with generally accepted local geotechnical engineering principles and practices. This warranty is in lieu of all other warranties, either expressed or implied.

This report presents the results of the geotechnical field exploration and laboratory testing programs, provides relevant soil parameters for use by the designers and contractors, and provides recommendations for geotechnical site preparation, building foundation design/construction, and pavement design.

Details of our findings and recommendations are set forth in the following sections of this report.

## **OBJECTIVES/SCOPE OF WORK**

The geotechnical design services for this project have been performed in general accordance with the proposed scope of work dated February 27, 2023, that was developed by GET engineers based upon the information requested by Mr. Gregg Blaize of the City of Mobile and the project design team. Authorization for these services was received on April 19, 2023.

The scope of geotechnical services deemed appropriate for this study, based upon the project requirements, our understanding of the project as summarized herein, and with reliance on our knowledge of the local geology and with similar project parameters, included the following:

- Perform ten (10) soil test borings to depths of 80 to 100 ft below the existing ground surface within the footprint of the proposed parking garage.
- Core the existing asphalt pavements and perform seven (7) shallow auger borings within the area of proposed drives.
- Visual classifications of recovered soil specimens.
- Laboratory soil testing program.
- Assessment of groundwater conditions.
- Development of soil parameters for design.
- Engineering evaluations and recommendations.
- Preparation of this report of findings and recommendations.

## **PROJECT DESCRIPTION**

The new parking garage is to be located on the east side of the existing civic center parking lot. The existing parking lot is located on the south side of the civic center building. The parking garage will be constructed with the long dimension in the north-south direction adjacent to Claiborne Street and approximately 400 ft north of Canal Street.

The general project location is identified on a Highway Location Map in Figure 1 of this report.

This project generally consists of the construction of 6 level parking structure, encompassing an approximate 70,000 square ft footprint and will have approximate dimensions of 190 ft by 360 ft. The structure will be constructed of cast-in-place concrete. Based upon information received from the structural engineer on July 5, 2023, column loads for the structure will range between 390 kips and 1710 kips with the majority of the column loads at approximately 900 kips. No information regarding the proposed elevations of the ground level slab has been provided at this time. For the purposes of this study, it is assumed that this elevation will not be above elevation +14 ft. This study also includes the evaluations of portions of the parking lot for a future extension of Eslava Street from St. Lawrence Street to Claiborne Street.

## **SITE DESCRIPTION**

### General Site Description

The parking garage will be constructed in the area of an existing asphalt paved parking lot. The asphalt surface was typically 3 to 4 inches thick. Within the parking lot there are raised islands with concrete curbing and small trees. Next to the southwest corner of the building footprint, there is an enclosed monopole cell tower and the accompanying equipment building. The existing site plan, provided by Mr. Gregg Blaize with the City of Mobile, indicates that a sanitary sewer and a water line pass through the proposed parking garage footprint.

### Site Topography

Based upon the topographic data from the site plan, the existing topography at the site varies between about elevation +12.75 ft and +13.25 ft within the area of the building footprint. Elevations of the soil borings were estimated based upon this plan.

## **SOILS EXPLORATIONS PROGRAM**

The procedures for the field exploration and laboratory testing programs utilized on this project are summarized in the following sections of this report.

### Boring Locations

The locations of the borings performed for this project were selected by GET personnel based upon the project site plans provided by Mr. Blaize on May 11, 2023. The site plan was overlaid on a Google Earth image and GPS coordinates of the boring locations were selected. In the field, boring locations were established using a network rover submeter GPS surveying instrument. Approximate soil boring locations are shown on the Boring Location Plan included in Appendix A of this report.

### Field Explorations

The soils explorations for this project included performing ten deep soil test borings within the planned parking garage footprint. These borings generally extended to depths of about 80 ft to 100 ft below ground surface. The borings were performed with Mobile B-37 and CME-45 core-boring rigs. The boreholes were advanced using the mud rotary method of drilling. When



performing the mud rotary method of drilling, a bentonite drilling fluid was circulated through the drilling rods and boreholes to return the soil cuttings to the ground surface and to provide a positive head on the walls and bottom of the boreholes.

The soil test borings were conducted in general accordance with standard drilling and sampling procedures. Standard penetration tests were performed and split spoon soil samples were collected continuously to a depth of 7.5 ft, at 2.5 ft center-to-center intervals from 7.5 ft to 20 ft, and then at 5 ft center-to-center intervals to the boring termination depths. This closer than standard sampling interval was performed to better delineate the stratification for evaluating the near surface foundation soils. Where cohesive soils were encountered, undisturbed tube samples were collected or attempted with 3-inch diameter thin-walled tube samplers in lieu of or between the SPT sample intervals.

Split spoon soil samples collected during the boring operations were visually described, logged, placed in moisture tight plastic bags and, along with the sealed tube samples, transported to the laboratory. At the laboratory, the samples were visually examined to confirm or adjust field classifications. Selected samples were laboratory tested to determine some engineering properties to aid in analyses.

Within the planned roadways, seven shallow auger borings were performed. At each boring location the existing asphalt was cored and the borings were advanced with an approximate 3-inch diameter, bucket-type hand auger. Soil borings were advanced to a depth of about 5 ft below ground surface except where auger refusal was met.

Logs of Boring for the soil test borings have been prepared using visual classifications of the soils and/or laboratory test results. These Logs of Boring are included in Appendix B of this report.

#### Laboratory Testing

The laboratory testing program included performing physical laboratory soil mechanics tests on selected soil samples that were recovered from the borings. Tests included moisture content, percent passing the #200 sieve, grain size distribution analysis, Atterberg limits, unit weight, and

one-point triaxial shear with the sample confined near the overburden pressure. Tests were performed in general accordance with applicable laboratory soil testing standards. Some test results are shown on the Logs of Boring opposite the respective samples tested. A summary of classification test results and other test reports are included in Appendix C of this report.

## GENERAL SUBSURFACE CONDITIONS

### Site Geology

Based upon a review of the Quaternary Geologic Map of the Mobile Quadrangle dated 1988, the project site lies within the alluvial, coastal, delta and low-terrace deposits of the quaternary system. The delta deposit is light-gray, yellowish-gray, and brownish-gray clay, silt and sand, intermixed and interbedded. The deposit is poorly sorted to well-sorted, weakly bedded; locally includes thin stringers of well-rounded quartz granule gravel, discontinuous lenses of peat and scattered shell debris. Mapped areas include small, younger alluvial, colluvial, and swamp deposits of the Holocene age. The geologic map of the region is included in Figure 2 of this report.

### Subsurface Soil Conditions

The subsurface soils at the parking garage site varied somewhat from the surface to a depth of about 27 ft. Below a depth of about 27 ft the subsurface soil conditions were relatively uniform. Generally, the upper soils consisted of firm sands from the surface to a depth of 5 ft, very loose sands from 5 ft to 18 ft, and then soft clay from 18 ft to 27 ft. Below a depth of 27 ft the soils generally consisted of firm sands and silty sands to boring termination depths of 80 to 100 ft. There were exceptions to these generalizations, particularly within the upper soils. For instance, all the soil borings did not encounter the stratum of soft clay near the 18-ft depth and the soils transitioned from very loose sands to firm sands.

Within the roadways, approximately 2 to 5 inches of asphalt was encountered in the borings. Photos of the core samples collected are included in Appendix E of this report. Generally, a mix of red, brown and light gray silty sands were encountered below the asphalt surface. There were also some minor organics and gravel encountered.

Details of the soils encountered are presented by the Logs of Boring. The soil boring logs provided with this report are representative of subsurface conditions at their respective locations and for their respective vertical reaches. However, local variations characteristic of the subsurface materials of the region may be encountered during construction. The boring logs and related information are based on the driller's logs and visual examination of soil samples in the laboratory. The delineation between soil types shown on the logs is approximate and the description represents the interpretation of subsurface conditions at the designated boring location on the date drilled.

The generalized subsurface soil conditions are also shown by the Subsurface Diagrams included in Appendix D of this report.

Groundwater was not encountered in the 5 ft deep shallow auger borings. Groundwater was not measured in the deep borings within the building at the time of drilling due to the use of drilling mud. Groundwater was measured at depths of about 3 to 5 ft below ground surface in the deeper borings several days after completion. For other nearby investigations performed by GET, groundwater was historically measured at about 8 ft below ground surface.

Groundwater elevations shown on the boring logs represent the highest groundwater surface measured. Fluctuations in water table levels should be anticipated throughout the year. Absence of groundwater data on certain borings implies that no data is available but does not necessarily mean that groundwater will not be encountered at these locations or within the vertical reaches of these borings in the future.

## **GEOTECHNICAL EVALUATIONS AND RECOMMENDATIONS**

The recommendations provided below are based upon the project information described herein, the available subsurface data collected, our engineering evaluations regarding the geotechnical matters, and our experience on projects in close proximity to this site and the typical climate conditions of the area. If project information or design concepts change, we should be advised of these changes, and should be provided the opportunity to review our recommendations as presented in this geotechnical report taking into consideration the new design information.

Generalized Site Stratigraphy and Engineering Properties

Based on the results of the soils explorations and our engineering experience, we recommend that, where appropriate, the design parameters shown below be assigned to the respective subsurface soils.

RECOMMENDED DESIGN SOIL PARAMETERS							
Soil Type	Depth	Total Unit Weight (pcf)	Internal Angle of Friction	Cohesive Shear Strength	Lateral Pressure Coefficients		
					Active (K <sub>a</sub> )	Passive (K <sub>p</sub> )	At-Rest (K <sub>o</sub> )
Firm Sand	0' - 5'	120	33°	-	0.295	3.39	0.46
Very Loose Sand	5' - 18'	100	28°	-	0.36	2.77	0.53
Soft Clay	18' - 27'	95	-	800 psf	-	-	0.61
Firm Sand	27' - 90'	125	35°	-	0.27	3.69	0.43
Firm Silty Sand (Backfill)		122 pcf	34°	-	0.28	3.53	0.44

Seismic Site Class

Seismic site classification according to the International Building Code (2015) is based on the average soil profile to a depth of 100 ft. In accordance with IBC Section 1613.3.2 and ASCE 7-10, this site is characterized as Site Class D.

Settlement Evaluations

No formal consolidation testing of the soft clay soils encountered in the borings was performed. However, based upon the index testing performed, results of other nearby consolidation testing, and the loads that would be implied from shallow foundations, settlement of the clay soils would be on the order of 6 to 10 inches under the column loads provided to us.

Building Foundation Recommendations

Several options have been evaluated with regards to supporting the building loads on this project. Information regarding the various options and reasons for selection is presented below.

*Shallow Foundation Option*

Based upon the large column loads and the excessive settlement that would occur from the underlying compressible soils, shallow foundations were not deemed a feasible alternative for the column loads and/or other heavily loaded foundations on this project. Even if soft soils were not present or if the soft soils could be preconsolidated by a preload and surcharge of the site, extensive undercutting and backfilling of the loose sands between 5 and 15 ft below ground surface would have to be accomplished to provide adequate bearing capacity for shallow foundations. This type of undercut/backfill operation would require extensive dewatering.

Smaller, lightly loaded walls may be supported on shallow foundations. Shallow continuous strip foundations with a minimum 2 ft width and minimum 2 ft depth below the lowest adjacent final grade will have an allowable bearing capacity of 1000 pounds per square ft, psf. This allowable bearing capacity is based upon a factor of safety of 3.0. Since bearing capacity of sands is a function of foundation width and depth, slightly higher bearing capacities may be available if required.

*Deep Foundation Option*

Due to the excessive settlement and insufficient bearing capacity of shallow foundations, we recommend supporting the columns, and other heavy loads, on deep foundations. Specifically, we recommend that the parking garage structure be supported on driven displacement (precast concrete) piles. These type piles are commonly used for projects such as the one at hand. These piles are installed by driving with an impact hammer and the record of driving resistance provides assurance of the capacity of each pile installed.

We have performed analyses to estimate ultimate capacities of 18-inch square and 24-inch square concrete piles using the computer program APILE, Version 2018.8.1 and subsurface soil parameters indicated by the results of the recent soils explorations program. Our analyses included methodologies recommended by the Federal Highway Administration, the U.S Army Corps of Engineers, and the American Petroleum Institute. The results of these three analysis methods were averaged and the calculated ultimate pile capacities for selected installation depths are shown in the table below.

It should be noted that the ultimate pile capacities provided in the table below are based upon driving the pile from near the ground surface. Jetting is not recommended and will reduce the pile capacities presented below, however, predrilling within the upper 15 ft will be allowed.

<b>RECOMMENDED ULTIMATE PILE CAPACITIES, KIPS</b>				
<b>Tip Depth*</b>	<b>18" Precast Concrete Pile</b>		<b>24" Precast Concrete Pile</b>	
	<b>Compression</b>	<b>Tension</b>	<b>Compression</b>	<b>Tension</b>
50'	370	150	620	220
55'	430	185	710	270
60'	490	220	800	325
65'	555	260	900	380
70'	625	305	1000	440
*Below finished grade of about elevation +13.0 ft				

The pile capacities presented above are ultimate capacities. Should no load testing be performed for this project, we recommend a factor of safety of 3.0 be applied to the ultimate capacities presented above. The factor of safety may be reduced to 2.0 if load tests are performed.

If load testing is performed, we recommend that test piles be installed and that pile load tests be performed prior to final pile design. Driven piles should be installed using a properly sized impact hammer, i.e. the hammer energy should be great enough to drive the piles to the design tip depth but should not overstress and damage the piles during driving operations. Prior to pile installation, the pile contractor should submit the selected pile hammer/driving system to the geotechnical engineer of record for evaluation of drivability using wave equation analyses. The wave equation analyses will provide assurance that the hammer can drive the pile to the design depth without meeting driving refusal and without overstressing the pile materials. However, final approval of the driving system cannot be made until field performance is evaluated. Test piles should be installed with the same hammer as anticipated for use when installing production piles.

It is recommended that one static load test be performed for each 200 piles installed. Static pile load tests should be conducted in general accord with procedures in ASTM D1143 and monitored by representatives of the geotechnical engineer. As long as one static load test is performed for

the project, two dynamic tests may be substituted for each additional static load test required. The dynamic load shall be evaluated with a pile dynamic analyzer (PDA) and a CAPWAP® (Case Pile Wave Analysis Program) analysis performed. Static load test results should be evaluated by the geotechnical engineer. The geotechnical engineer should also review reports provided by the dynamic load test provider.

We recommend that the driving of test piles and production piles be monitored by the geotechnical engineer or his representative. Driving records should be kept for the installation of each pile. The driving records should be reviewed to help ensure that production piles are installed as anticipated by the foundation designers.

Our evaluations of the axial capacities of the piles only consider pile-soil interaction and not the structural characteristics of the pile material or the weight of the pile. *We recommend that the project structural engineer review and/or design the pile layout and lateral bracing for the piles.* Recommended design soil parameters for use by the project structural engineer in determining the lateral load capacity of the piles have been provided in the table of Design Soil Parameters above.

The tension capacities provided are based upon the pile-soil interaction and do not include the weight of the pile. These capacities are considered short-term as these would resist temporary uplift loads that may occur during storm events.

Based upon the laboratory testing performed and experience in the vicinity of the project, auger cast-in-place (ACIP) piles were not considered a viable deep foundation alternative for this site. The firm sand layer from which the piles will obtain most of the friction and end bearing capacity of the pile consists of relatively “clean” sands. These type materials when below the water table have a high probability for “mining” during ACIP pile installation. This “mining” will significantly reduce the pile capacity and possibly the structural integrity of adjacent piles.

We have also not considered drilled displacement piles at this site. These type piles often cannot be installed to the “design” tip depth, which reduces overburden pressures on the piles and, thus, results in a lower capacity than anticipated. This often requires the need for additional piles and

foundation redesign during construction. These type piles are proprietary and thus the ability to properly install the pile is highly dependent on the abilities of the operator and quality control is limited.

#### *Intermediate Foundation Option*

A third option evaluated, in lieu of deep or shallow foundations, is an intermediate (rammed aggregate pier) foundation system. Typically, these foundations are designed and installed by specialty contractors such as Geopier or Hayward Baker. A rammed aggregate pier system at this site would generally be installed to a depth of 30 ft below ground surface and would provide an allowable bearing capacity of about 3000 to 4000 psf. The actual design of the system would be provided by the contractor as each uses proprietary methods for designing and installing piers. While this methodology can greatly increase the bearing capacity of upper loose soils to provide support for shallow foundation systems, this type foundation can usually only reduce the settlement of soft clay materials by 50 to 75 percent. For this foundation option to be considered viable for shallow foundation support at this site without excessive settlement of foundations, the site must be preloaded prior to aggregate pier installation. It is estimated that the required preload and surcharge fill height required to adequately consolidate the soft clay soils under the loads anticipated would be on the order of 25 to 30 ft. The limits of this amount of fill material would extend approximately 75 ft from the building perimeter and impact Claiborne Street and the project to the south.

#### General Geotechnical Site Preparation (Building Area)

Below are some general guidelines and recommendations for site preparations in the building area. The means and methods of construction will be the responsibility of the contractor.

- Clear the proposed building construction area; these operations are anticipated to remove all deleterious items at and near the surface such as organics, debris, underground utilities, old foundations, asphalt, concrete, etc. The clearing activities should extend a minimum of 5 ft outside the building footprint.



- A qualified soils technician should inspect and probe the insitu soils for zones of soft or very loose soils. Additional undercutting, if deemed necessary, should be directed by the project geotechnical engineer of record.
- The top 12 inches of the insitu soils should be compacted to at least 98 percent standard Proctor density (SPD) in all areas.
- Where offsite borrow soils will be required, these materials should be granular soils that are free of organics or deleterious materials with no more than about 20 percent passing a #200 sieve and that have a plasticity index of no more than six.
- Fill soils should be placed in loose lifts no thicker than 8 inches and each lift should be compacted to at least 100 percent SPD.
- The top 8 inches of fill or insitu materials beneath the floor slab shall be compacted to 100 percent SPD.
- Representative samples of the backfill/fill soils and insitu subgrade soils should be collected for classification and laboratory Proctor density testing. The maximum dry density, optimum moisture content, gradation, and plasticity should be determined. These tests are needed for quality control of compacted soils. Field density tests should be performed on the compacted insitu subgrade and fill soils. One test should be performed for each 2500 square feet of general fill area per lift of backfill/fill soils.

#### Floor Slab

We recommend that the subgrade soils beneath the floor slab be prepared as described in the *General Geotechnical Site Preparation* section above. Following the preparation of the subgrade soils, we recommend a modulus of subgrade reaction of 200 pci be utilized for the floor slab design.

#### General Geotechnical Site Preparation (Proposed Roadways)

- We recommend the removal of the existing asphalt pavements, concrete curbing and any deleterious material in the proposed roadway areas.
- After clearing, and cutting to design subgrade elevation, if necessary, the top 8 inches of the insitu soils should be compacted to at least 98 percent SPD or to the satisfaction of the geotechnical engineer.

- Any required backfill/fill soils should be placed in maximum 8-inch thick loose layers, and each layer should be compacted and tested before placement of the succeeding lift.
- Each layer of backfill/fill soils should be compacted to at least 100 percent SPD.
- The top 8 inches of subgrade materials, whether insitu soils or fill soils, shall be compacted to at least 100 percent SPD in all areas.
- Representative samples of the backfill/fill soils and insitu subgrade soils should be collected for classification and laboratory Proctor density testing. The maximum dry density, optimum moisture content, gradation, and plasticity should be determined. One field density test should be performed for each 300 linear feet of roadway of insitu subgrade and general fill area per lift of backfill/fill soils.
- Where crushed aggregate will be required for this project, we recommend crushed aggregate base (ALDOT 825 B) be placed in lifts no thicker than 6 inches. Each lift should be compacted to at least 100 percent modified Proctor density (MPD).
- Pavement material properties should meet and construction practices should be in accord with the most current ALDOT Standard Specifications. The minimum compaction requirements outlined in this report supersede the minimum requirements in the ALDOT specifications.

#### Pavement Recommendations

Currently, we have received no design traffic data. While extensive heavy truck traffic is not expected, it is expected that there will be routine truck traffic on the proposed roadway. After the pavement subgrade soils have been prepared as described previously, we recommend the following pavement section for the proposed roadways:

#### *New Roadway Areas*

**Pay Item 424A-340:** Superpave Bituminous Concrete Wearing Surface Layer, 1/2” Maximum Aggregate Size Mix, ESAL Range A/B (165 Lb/SY)

**Pay Item 424B-635:** Superpave Bituminous Concrete Upper Binder Layer, 3/4” Maximum Aggregate Size Mix, ESAL Range A/B (225 Lb/SY)

**Pay Item 301A-012:** Crushed Aggregate Base Course, Type B, Plant Mixed, 6” Compacted Thickness

If additional loading information is provided for the roadways, the above recommendations can be modified if warranted.

#### Utility Trenches

Backfilling of storm drain and utility trenches must be performed in a controlled manner to reduce settlement of the backfill and potential cracking of overlying floor slabs and pavements. We recommend that utility trenches be backfilled with acceptable borrow or dense-graded crushed stone in 4 to 6-inch loose lifts compacted with mechanical piston tampers. We recommend that utility trenches be compacted to at least 95% SPD outside of pavement or building areas and at least 98% SPD beneath pavement or building areas. Should seepage occur in utility trenches, it may be necessary to “floor” the trench with dense-graded aggregate to provide a working surface.

#### Required Special Inspections

We recommend that the geotechnical engineer of record be allowed to review the project plans and specifications after further plan development to determine the Special Inspections and inspection frequency related to the soils and foundations.

### **CONSTRUCTION CONSIDERATIONS**

#### Excavation Slopes

Due to the potential for high groundwater and the sandy materials encountered in the upper 10 ft we recommend that excavation slopes be constructed no steeper than 3:1 horizontal:vertical (H:V) or in accordance with OSHA regulations whichever is most stringent.

#### Site Grading

The upper 5 to 10 ft of the soils at this site are typically silty sand materials. Difficult excavation is not anticipated. These materials are generally suitable for backfill, however, the insitu materials may be more silty than off site borrow and therefore slightly more moisture sensitive. Proper moisture conditioning may be required for reuse.

Upon completion of grading, care should be taken to maintain the subgrade moisture content near optimum prior to construction of pavements. Construction traffic over the completed subgrade should be avoided to the extent practical. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. If the subgrade should become frozen, desiccated, saturated, or disturbed, the affected material should be removed or these materials should be scarified, moisture conditioned and densified prior to pavement construction.

#### Dewatering

While groundwater was observed in the borings at depths of 3 to 5 ft below ground surface, it was noted in other nearby borings to be approximately 8 ft below ground surface. Depending on depths of excavations, sumps or other means of dewatering may be required.

#### Engineering Services During Construction

The engineering recommendations provided in this report are based on the information obtained from the soils explorations, laboratory testing program, and experience on similar projects. Regardless of the thoroughness of a geotechnical exploration program, there is always a possibility that conditions at locations remote from borings will be different from those at specific boring locations and that conditions will not be as anticipated by the designers or constructors. In addition, the construction process may itself alter soil conditions. Therefore, we recommend that a representative of the geotechnical engineer of record observe and document the construction procedures used and the conditions encountered. Unanticipated conditions and inadequate procedures should be reported to the design team along with timely recommendations to address such conditions.

### **CONCLUSION**

This report concludes the authorized design phase geotechnical engineering services for the Civic Center Parking Garage in Mobile, Alabama. This geotechnical report has been prepared for the exclusive use of City of Mobile and other members of the design/construction team for the specific project discussed in this document. In the event that any changes in the design or location or elevation of any of the project elements as outlined in this geotechnical report are planned, or if any structures are included or added that are not discussed in this document, the conclusions and

recommendations contained herein shall not be considered valid unless the changes are reviewed and the conclusions and recommendations modified or validated by GET.

Our evaluations for the project were based upon the project plans and data received on May 11, 2023 and subsequent drawings received through July 5, 2023 and discussions with the project structural engineer, Mr. Andrew Marlin of MBA Engineers. Additional assumptions have been outlined in the discussions contained in previous sections of this report.

This geotechnical report presents an evaluation of site conditions on the basis of conventional geotechnical procedures for site characterization.

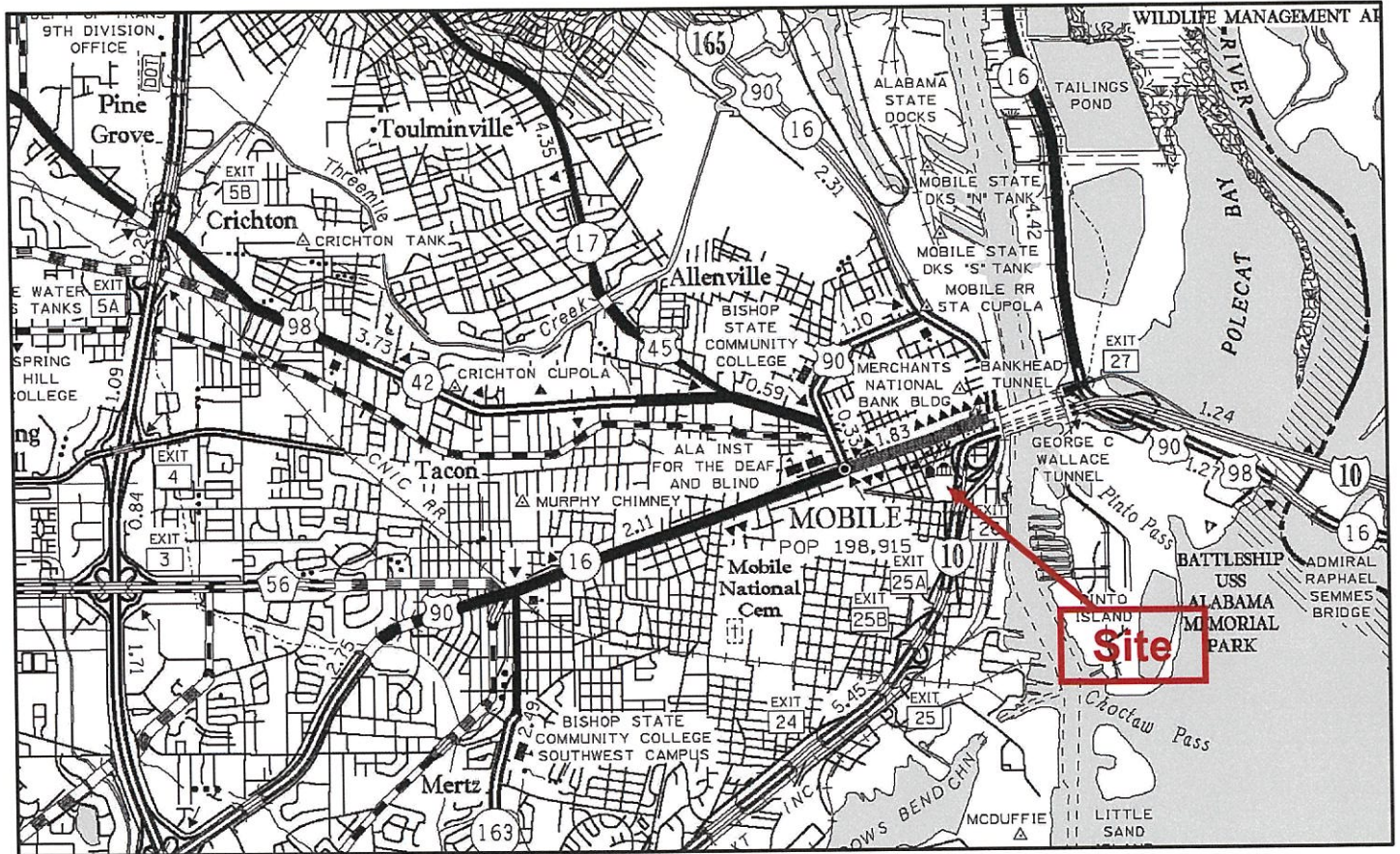
## **LIMITATIONS**

The evaluations and recommendations presented by this report are based on the data obtained from the soil borings drilled at the locations shown on the boring location plan and the laboratory testing program performed. Additional assumptions may have been outlined in the discussions contained in previous sections of this report.


We prepared this report to aid in the evaluation of this site and to assist in the design of the project. The recommendations provided are based in part on the project information provided to GET and only apply to the specific project and site discussed in this report. If the project description or stated assumptions are incorrect or if additional information is available, correct or additional information should be conveyed to GET for review. Recommendations can then be modified if warranted.

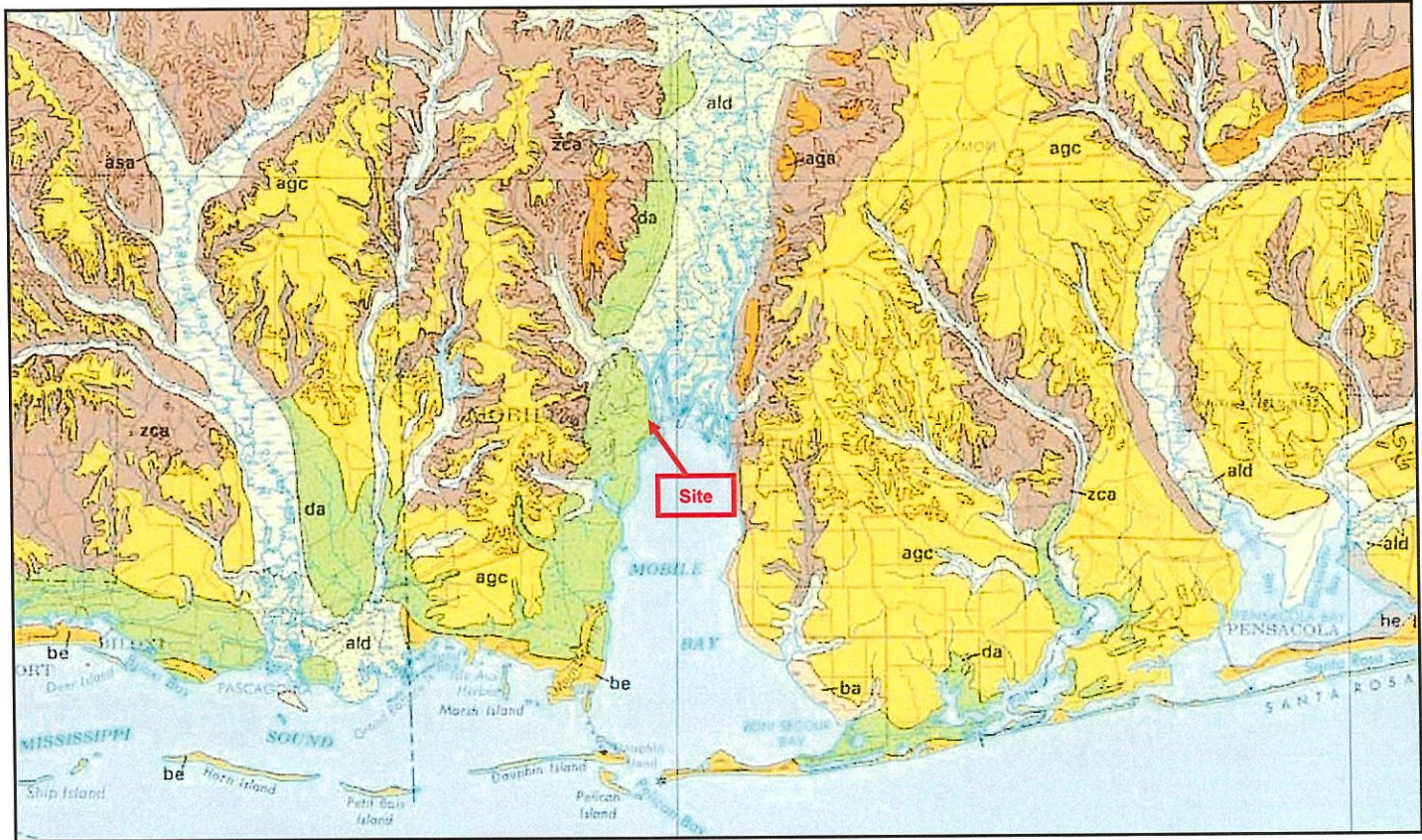
Our professional services for this project have been performed, findings obtained, and recommendations prepared in accordance with generally accepted engineering principles and practices. The services identified herein were completed in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the same locality and under similar conditions as this project. No other representation, expressed or implied, is included or intended, and no warranty or guarantee is included or intended in this report or any other instrument of service.

## FIGURES



Source – General Highway Map Mobile County, Alabama, Alabama Dept. of Transportation, 2011


 <p><b>GEOTECHNICAL ENGINEERING TESTING, INC.</b></p>	<p><b>City of Mobile Civic Center Parking Garage Mobile, AL</b></p>	<p><b>Highway Location Map Figure 1</b></p>
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Source – Quaternary Geologic Map of the Mobile 4° x 6° Quadrangle, United States, USGS, 1988

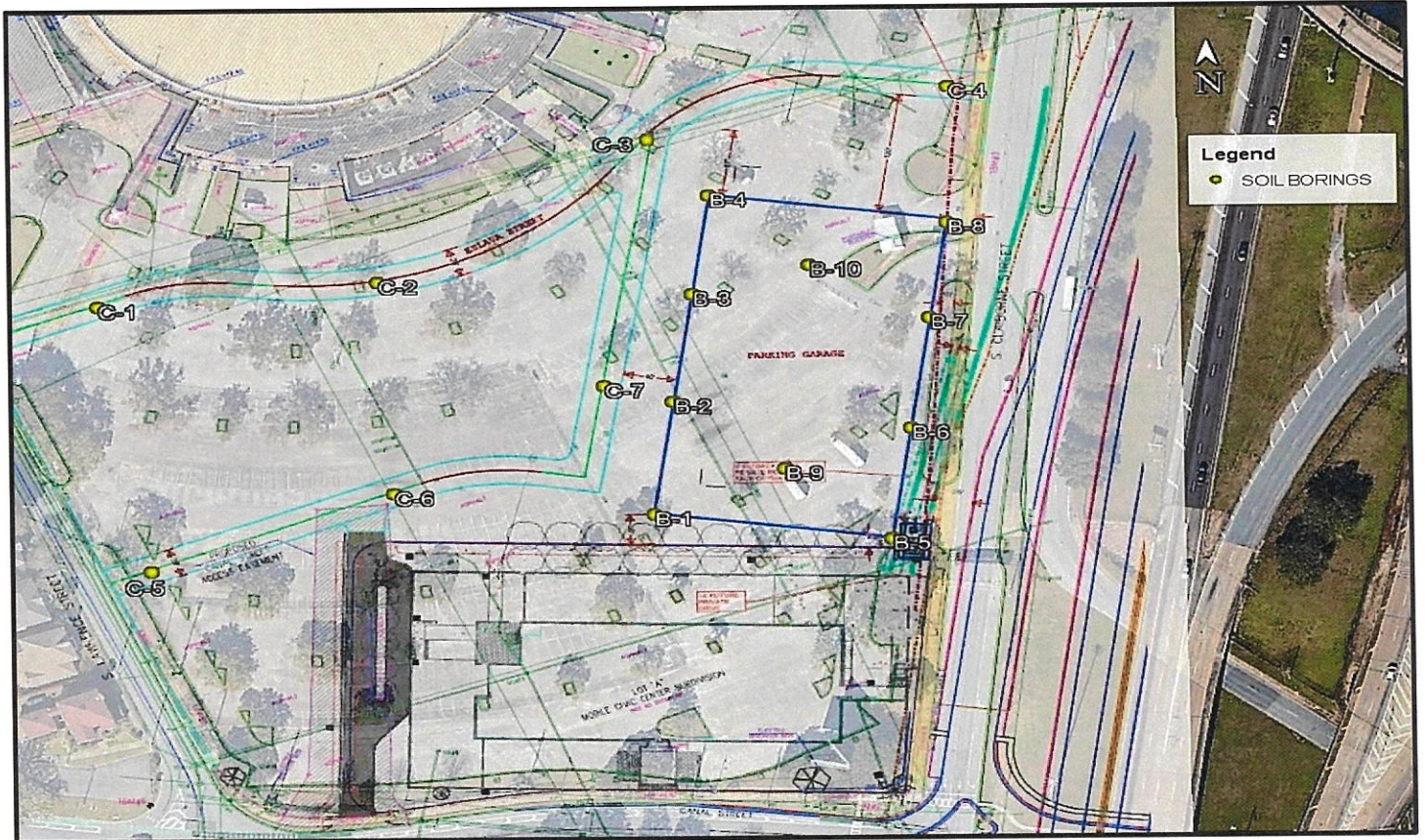


**da** DELTA DEPOSIT - Light-gray, yellowish-gray, and brownish-gray clay, silt and sand, intermixed and interbedded. Deposit is poorly sorted to well-sorted, weakly bedded; locally includes thin stringers of well-rounded quartz granule gravel, discontinuous lenses of peat and scattered shell debris. Mapped areas include small, younger alluvial, colluvial, and swamp deposits of the Holocene age.

 <p><b>GEOTECHNICAL ENGINEERING TESTING, INC.</b></p>	<p><b>City of Mobile Civic Center Parking Garage Mobile, Alabama</b></p>	<p><b>Geologic Location Map Figure 2</b></p>
--	--	--



**APPENDIX A**  
**BORING LOCATION PLAN**



Source – Google Earth

<p><b>GEOTECHNICAL ENGINEERING TESTING, INC.</b></p>	<p><b>Civic Center Parking Garage Mobile, AL</b></p>	<p><b>Boring Location Plan</b></p>
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**APPENDIX B**  
**BORING LOGS**

PROJECT NAME:

DATE DRILLED:



G.E.T. PROJ. NUMBER:

BORING DEPTH: 0 FT.

BORING ELEV.:

PROJECT LOCATION:

DATUM:

BORING NUMBER: LEGEND

DRILL RIG:

WATER DEPTH:

BORING LOCATION:

DRILL METHOD:

REMARKS:

DRILL CREW:

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>r</sub>	N <sub>c</sub>		L.L.	P.I.				
0		TOPSOIL										
5		SAND										
10		CLAY										
15		SILT										
20		GRAVEL										
25		ORGANICS										
30		PEAT										
35		SILTY SAND (EXAMPLE OF A SOIL MIXTURE)										
40		SPLIT-SPOON SAMPLE (STANDARD PENETRATION TEST)										
45		UNDISTURBED TUBE SAMPLE										
50		SAMPLE NOT RECOVERED										
55		VANE SHEAR										
		B.T. @ 0 FT										
60												
65												
70												

N<sub>r</sub> - Standard penetration test value determined in the field - ASTM D1586 (WOH indicates penetration of sampler under weight of 104 lb hammer)  
 N<sub>c</sub> - Standard penetration test value of sand corrected for overburden by Peck-Hansen-Thornburn, 1974

w.c. % - Percent water content based on dry soil weight

L.L. - Liquid Limit

P.I. - Plasticity Index

Unit Wt., pcf - Dry unit weight of soil, pounds per cubic ft

% Minus #200 - Percent by weight of soils finer than #200 sieve

c - Cohesion, tons per square ft

φ - Angle of internal friction, degrees

s - Vane shear strength, tons per square ft

c\* - Values measure with a pocket penetrometer

Classification according to the Unified Classification System

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

DATE DRILLED: 6/21/23



G.E.T. PROJ. NUMBER: 23-157

BORING DEPTH: 80 FT.

BORING ELEV.: 13.2 FT.

PROJECT LOCATION: MOBILE, AL

DATUM:

WATER DEPTH: 5.6 FT.

BORING NUMBER: B-1

DRILL RIG: CME 45

DRILL CREW: CHALLENGE,  
NB(LOGGER)

BORING LOCATION:

DRILL METHOD: MUD ROTARY

REMARKS:

N: 249332 E: 1797528

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>f</sub>	N <sub>c</sub>		L.L.	P.I.				
0		4" Asphalt	1	37								
		Dense to very dense grayish brown silty sand	2	50+								
		Firm brown silty sand	3	19								
5			4	17								
		Firm gray silty sand with clay	5	12								
10			6	3								
		Very loose gray clayey sand										
		Very loose brownish gray silty sand	7	2		27	22	2		26.9		SM
15			T-1			27	24	4	98	23.7	c=0.25	SC-SM
		Very soft gray sandy clay	9	WOH		70	58	37		58.6		CH
20			10	5		119	94	45		53.1		MH
		Medium consistency dark gray clayey silt with organics										
25			11	9		32						
		Medium consistency grayish brown sandy clay										
30			12	22								
		Firm brownish gray silty sand										
35			13	23								
40			14	26								
		Firm grayish brown and brownish gray sand with silt										
45			15	23		22	NP	NP		7.9		SP-SM
50			16	27								

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI\_AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

DATE DRILLED: 6/21/23



G.E.T. PROJ. NUMBER: 23-157

BORING DEPTH: 80 FT.

BORING ELEV.: 13.2 FT.

PROJECT LOCATION: MOBILE, AL

DATUM:

BORING NUMBER: B-1

DRILL RIG: CME 45

WATER DEPTH: 5.6 FT.

BORING LOCATION:

DRILL METHOD: MUD ROTARY

DRILL CREW: CHALLENGE,  
NB(LOGGER)

REMARKS:

N: 249332 E: 1797528

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>i</sub>	N <sub>c</sub>		LL.	P.I.				
50		Firm grayish brown and brownish gray sand with silt										
55			17	36								
60		Dense light gray sand with silt	18	32	23	NP	NP		6.3		SP-SM	
65			19	32								
70		Firm yellowish brown sand with silt	20	10	23	NP	NP		8.0		SP-SM	
75		Firm reddish brown silty sand	21	29								
80		Dense yellowish brown sand with silt and gravel	22	36	16	NP	NP		8.7		SP-SM	
		B.T. @ 80 FT										
85												
90												
95												
100												

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER GPJ GETI AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: CME 45

DRILL METHOD: MUD ROTARY

DATE DRILLED: 6/22/23

BORING DEPTH: 85 FT.

BORING ELEV.: 12.7 FT.

DATUM:

WATER DEPTH: 3.5 FT.

DRILL CREW: CHALLENGE,  
NB(LOGGER)



BORING NUMBER: B-2

BORING LOCATION:

REMARKS:

N: 249447 E: 1797544

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>t</sub>	N <sub>c</sub>		L.L.	P.I.				
0		3" Asphalt	1	23								
		Firm light brown sand with silt	2	23								
		Firm light brown silty sand	3	18								
5		Loose to very loose light brown sand	4	9								
			5	3		147	147	78				OH
		Very soft dark brown organic clay	5A									
10		Very loose gray clayey sand	T-1									
			7	WOH		29	26	8		29.5		SC
			8	WOH		29				25.7		
15		Very loose gray silty clayey sand	9	WOH		30	24	5		21.8		SC-SM
			10	1		54	64	29		50.1	c*=0.13	MH
20		Very soft gray sandy silt										
			11	2		104						
25		Very soft gray clay										
			12	26								
30		Firm brownish gray and yellowish brown silty sand										
			13	22								
35												
			14	19								
40		Firm and dense light brown and brownish gray sand										
			15	32								
45												
			16	21		22	NP	NP		5.4		SP-SM
50												

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI, AL.GDT, 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

DATE DRILLED: 6/22/23



G.E.T. PROJ. NUMBER: 23-157

BORING DEPTH: 85 FT.

BORING ELEV.: 12.7 FT.

PROJECT LOCATION: MOBILE, AL

DATUM:

WATER DEPTH: 3.5 FT.

BORING NUMBER: B-2

DRILL RIG: CME 45

DRILL CREW: CHALLENGE,  
NB(LOGGER)

BORING LOCATION:

DRILL METHOD: MUD ROTARY

REMARKS:

N: 249447 E: 1797544

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>t</sub>	N <sub>c</sub>		L.L.	P.I.				
50		Firm and dense light brown and brownish gray sand										
55			17	25								
60		Firm and dense white, light brown, and brownish gray sand	18	38								
65			19	23		23	NP	NP		5.0		SP
70			20	35								
75		Dense yellowish brown and brownish gray sand	21	38								
80			22	22		15	NP	NP		4.5		SP
85		Firm to dense brownish red sand with gravel	23	42								
		B.T. @ 85 FT										
90												
95												
100												

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:



PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: MOBILE B37

DRILL METHOD: MUD ROTARY

REMARKS:

DATE DRILLED: 5/24/23

BORING DEPTH: 100 FT.

BORING ELEV.: 13.0 FT.

DATUM:

WATER DEPTH: 3.7 FT.

DRILL CREW: ES, BT,  
RS(LOGGER)



BORING NUMBER: B-3

BORING LOCATION:

N: 249556 E: 1797559

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>r</sub>	N <sub>c</sub>		L.L.	P.I.				
0		4" Asphalt	1	16								
		Firm red silty sand	2	19								
		Firm to very loose dark brown silty sand	3	3								
5		Very loose dark brown and black silty sand with organics	4	3		13	NP	NP		12.5		SM
		Very loose to loose grayish brown silty sand	5	3								
10			6	5								
		Very loose gray clayey sand	7	2		27						
15			8	3								
			9	4		27	25	5		25.4		SC-SM
20		Very loose gray silty clayey sand	10	2		29						
25			11	29								
30		Firm to dense pale brown sand with silt	12	33								
35			13	30								
40		Firm pale brown silty sand	14	30								
45			15	28		23	NP	NP		3.6		SP
50		Firm pale brown and gray sand										

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT. 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

**PROJECT NAME:** CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

**G.E.T. PROJ. NUMBER:** 23-157

**PROJECT LOCATION:** MOBILE, AL

**DRILL RIG:** MOBILE B37

**DRILL METHOD:** MUD ROTARY

**DATE DRILLED:** 5/24/23

**BORING DEPTH:** 100 FT.

**BORING ELEV.:** 13.0 FT.

**DATUM:**

**WATER DEPTH:** 3.7 FT.

**DRILL CREW:** ES, BT,  
RS(LOGGER)



**BORING NUMBER:** B-3

**BORING LOCATION:**

**REMARKS:**

**N:** 249556 **E:** 1797559

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>f</sub>	N <sub>c</sub>		L.L.	P.I.				
50		Firm pale brown and gray sand										
55		Firm pale brown silty sand with gray clay	16	26								
60		Firm grayish brown and gray silty sand	17	24								
65			18	34	22	NP	NP		4.5			SP
70		Dense gray sand	19	36								
75			20	37								
80		Dense light brown sand	21	33	19	NP	NP		4.3			SP
85			22	44								
90		Dense brown silty sand	23	40								
95			24	38								
95		Dense pale yellowish brown silty sand	24	38								
100		B.T. @ 100 FT	25	45								

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT. 7/17/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: MOBILE B37

DRILL METHOD: MUD ROTARY

REMARKS:

DATE DRILLED: 5/25/23

BORING DEPTH: 90 FT.

BORING ELEV.: 13.2 FT.

DATUM:

WATER DEPTH: 4.1 FT.

DRILL CREW: ES, BT,  
RS(LOGGER)



BORING NUMBER: B-4

BORING LOCATION:

N: 249656 E: 1797573

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>f</sub>	N <sub>c</sub>		L.L.	P.I.				
0		3' Asphalt	1	27							c*=1.50	
		Firm red and dark brown silty sand	2	35								
		Dense yellowish brown silty sand	3	20								
		Firm grayish brown silty sand	4	16								
5		Firm brownish gray sand	5	6								
		Loose gray silty sand	6	7								
10		Loose light gray and light brown silty sand	7	2		30						
		Very loose gray clayey sand	8	WOH		28	23	8		23.7		SC
15		Very loose gray clayey sand	9	1		29						
		Very loose gray silty sand	10	2		32	21	NP		25.0		SM
20		Very loose gray silty sand	11	7								
		Loose light brown sand with silt	12	20								
25		Loose light brown sand with silt	13	23								
30		Firm light brown sand	14	23								
35		Firm light brown sand	15	24		22	NP	NP		10.1		SP-SM
40		Firm light brown sand with silt	16	26								
45		Firm light brown sand with silt										
50		Firm light brown sand										

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: MOBILE B37

DRILL METHOD: MUD ROTARY

REMARKS:

DATE DRILLED: 5/25/23

BORING DEPTH: 90 FT.

BORING ELEV.: 13.2 FT.

DATUM:

WATER DEPTH: 4.1 FT.

DRILL CREW: ES, BT,  
RS(LOGGER)



BORING NUMBER: B-4

BORING LOCATION:

N: 249656 E: 1797573

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>r</sub>	N <sub>c</sub>		L.L.	P.I.				
50		Firm light brown sand	17	24	24	NP	NP	4.0			SP	
55												
60		Dense light brown sand with silt	18	40								
65												
70		Firm light brown sand with silt	20	26	22	NP	NP	8.9			SW-SM	
75												
80		Firm to dense grayish brown silty sand	22	37								
85												
90		Firm yellowish brown sand with silt	23	25								
90			B.T. @ 90 FT	24	26							

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT. 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

DATE DRILLED: 5/30/23



G.E.T. PROJ. NUMBER: 23-157

BORING DEPTH: 90 FT.

BORING ELEV.: 12.8 FT.

PROJECT LOCATION: MOBILE, AL

DATUM:

BORING NUMBER: B-5

DRILL RIG: MOBILE B37

WATER DEPTH: NOT MEASURED

BORING LOCATION:

DRILL METHOD: MUD ROTARY

DRILL CREW: ES, BT,  
RS(LOGGER)

REMARKS:

N: 249306 E: 1797709

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>i</sub>	N <sub>c</sub>		L.L.	P.I.				
0		3" Asphalt	1	20								
		Firm dark brown silty sand	2	23								
		Firm light brown silty sand	3	15								
		Firm grayish brown silty sand with clay	4	10								
5			5	1		31						
		Very loose gray silty clayey sand	6	WOH		28	24	5		37.1		SC-SM
10			7	1		28						
		Very loose gray clayey sand with silt	8	WOH		30	35	17		21.3		SC
15			T-1			52	38	25	56	61.1	c=0.38	CL
		Soft very dark brown clay with silt	9	4		44	60	43	77	89.5	c=0.45	CH
20		Soft very dark brown clay with silt and sand										
		Dense light brown sand	10	41								
25			11	33								
		Dense grayish brown silty sand	12	42								
30			13	26		73	69	33				
		Very stiff brown and gray clayey silt with sand	14	30								
35			15	33								
		Dense light brown silty sand										
40												
		Dense reddish yellow sand with gray clay										
45												
50												

MOD DEEP BORING LOG W/O MC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: MOBILE B37

DRILL METHOD: MUD ROTARY

DATE DRILLED: 5/30/23

BORING DEPTH: 90 FT.

BORING ELEV.: 12.8 FT.

DATUM:

WATER DEPTH: NOT  
MEASURED

DRILL CREW: ES, BT,  
RS(LOGGER)



BORING NUMBER: B-5

BORING LOCATION:

REMARKS:

N: 249306 E: 1797709

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>i</sub>	N <sub>c</sub>		L.L.	P.I.				
50		Dense reddish yellow sand with gray clay										
55		Dense light brown silty sand	16	32								
60		Dense gray silty clayey sand	17	32	36	24	6		31.1		SC-SM	
65		Firm gray clayey sand	18	29	30				26.2			
70		Dense gray, brown, and light brown sand with clay lenses	19	35								
75		Dense light brown sand with silt	20	31								
80		Dense light brown sand with silt	21	35	24	NP	NP		6.5		SP-SM	
85		Dense brown and gray gravelly sand with clay pockets	22	35								
90		B.T. @ 90 FT	23	40								
95												
100												

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: CME 45

DRILL METHOD: MUD ROTARY

DATE DRILLED: 6/20/23

BORING DEPTH: 80 FT.

BORING ELEV.: 12.8 FT.

DATUM:

WATER DEPTH: 3.7 FT.

DRILL CREW: CHALLENGE,  
NB(LOGGER)



BORING NUMBER: B-6

BORING LOCATION:

REMARKS:

N: 249417 E: 1797729

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>r</sub>	N <sub>c</sub>		L.L.	P.I.				
0		4" Asphalt	1	6								
		Loose to very loose brown silty sand with organics	2	2								
			3	2		42						
5		Very loose brown silty sand	4	2		59	NP	NP		18.7		SM
			T-1			24	NP	NP		14.5		SM
			6	3		24						
10		Very loose gray and brown silty sand	7	WOH		28						
			8	2		25						
15		Very loose gray clayey sand	9	6								
		Loose light gray and brownish yellow silty sand	10	2								
20		Very loose light gray and light brown silty clayey sand	11	19								
25		Firm light brown sand	12	19		26	NP	NP		3.4		SP
30		Firm yellowish brown and light brown sand	13	24								
35		Firm to dense white and light gray sand	14	14		23	NP	NP		3.6		SP
40			15	25								
45			16	24		22	NP	NP		3.7		SP
50												

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI\_AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: CME 45

DRILL METHOD: MUD ROTARY

REMARKS:

DATE DRILLED: 6/20/23

BORING DEPTH: 80 FT.

BORING ELEV.: 12.8 FT.

DATUM:

WATER DEPTH: 3.7 FT.

DRILL CREW: CHALLENGE,  
NB(LOGGER)



BORING NUMBER: B-6

BORING LOCATION:

N: 249417 E: 1797729

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>t</sub>	N <sub>c</sub>		L.L.	P.I.				
50												
55	⊗	Firm to dense white and light gray sand	17	39								
60	⊗		18	54		24	NP	NP		4.1		SP
65		Firm gray sand with silt										
70	⊗		20	14								
75	⊗	Firm gray gravelly sand	21	29		11	NP	NP		3.2		SW
80	⊗	Firm brown silty sand B.T. @ 80 FT	22	22								
85												
90												
95												
100												

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER GPJ GETI AL GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:



PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

DATE DRILLED: 6/19/23



G.E.T. PROJ. NUMBER: 23-157

BORING DEPTH: 100 FT.

BORING ELEV.: 12.9 FT.

PROJECT LOCATION: MOBILE, AL

DATUM:

BORING NUMBER: B-7

DRILL RIG: CME 45

WATER DEPTH: CAVED AT  
2.5

BORING LOCATION:

DRILL METHOD: MUD ROTARY

DRILL CREW: CHALLENGE,  
NB(LOGGER)

REMARKS:

N: 249530 E: 1797745

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>t</sub>	N <sub>c</sub>		L.L.	P.I.				
0		4" Asphalt	1	19								
		Firm light brown, dark gray, and brown silty sand	2	21								
		Firm brown silty sand	3	22								
5		Firm brown sand with silt	4	18								
		Very loose dark gray and gray silty sand with organics	5	2		47	32	NP		12.4		SM
10		Very loose gray silty sand	6	WOH		32						
			7	-								
15		Very loose gray clayey sand	8	WOH		27	29	14		24.8		SC
			9	WOH		44					c*=0.20	
20		Gray sandy clay	T-1			55	88	65	64	65.6		CH
25		Medium consistency brown and gray sandy clay	11	6		29	42	25		61.8	c*=0.30	CL
30		Firm yellowish brown, grayish brown, and light brown sand with silt	12	12								
35		Firm reddish brown, light brown, and gray sand	13	29								
40		Firm yellowish brown and gray sand	14	21								
45		Firm gray silty sand	15	29		24	NP	NP		16.6		SM
50		Dense to firm light gray and gray sand	16	30								

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: CME 45

DRILL METHOD: MUD ROTARY

DATE DRILLED: 6/19/23

BORING DEPTH: 100 FT.

BORING ELEV.: 12.9 FT.

DATUM:

WATER DEPTH: CAVED AT  
2.5

DRILL CREW: CHALLENGE,  
NB(LOGGER)



BORING NUMBER: B-7

BORING LOCATION:

REMARKS:

N: 249530 E: 1797745

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>f</sub>	N <sub>c</sub>		L.L.	P.I.				
50												
55		Dense to firm light gray and gray sand	17	35		25	NP	NP		4.9		SP
60			18	33								
65			19	21								
70		Firm yellowish brown sand	20	30		20	NP	NP		4.6		SP
75			21	23								
80			22	19								
85		Dense to firm yellowish brown sand with silt	23	32		23	NP	NP		5.5		SP-SM
90			24	22								
95		Stiff gray clay with sand	25	9		45	82	63		92.0		CH
100		Stiff gray clay	26	11		47						
		B.T. @ 100 FT										

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI\_AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: CME 45

DRILL METHOD: MUD ROTARY

DATE DRILLED: 6/26/23

BORING DEPTH: 85 FT.

BORING ELEV.: 12.5 FT.

DATUM:

WATER DEPTH:  
BACKFILLED

DRILL CREW: CHALLENGE,  
NB(LOGGER)



BORING NUMBER: B-8

BORING LOCATION:

REMARKS:

N: 249626 E: 1797759

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>t</sub>	N <sub>c</sub>		L.L.	P.I.				
0		3" Asphalt	1	17								
		Firm light brown and dark brown silty sand	2	32								
		Dense, firm, and loose light brown silty sand	3	18								
5			4	7								
			5	3								
10		Very loose gray silty clayey sand	6	2		33	20	NP		23.7		SM
			7	WOH		30						
15		Very loose gray clayey sand	8	WOH		28				25.0	c*=0.05	
			T-1			27	NP	NP		21.4	c=0.33	SM
		Very loose gray silty sand	10	WOH		45						
20		Very soft gray silty clay with sand										
25		Medium consistency gray clay	11	4		68					c*=0.40	
30		Firm light brown and brownish yellow silty sand with clay	12	30								
35		Firm brownish yellow and gray sand	13	20								
40			14	39								
45		Dense to firm brown and light brown sand	15	25		25	NP	NP		4.3		SP
50			16	25								

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI\_AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: CME 45

DRILL METHOD: MUD ROTARY

DATE DRILLED: 6/26/23

BORING DEPTH: 85 FT.

BORING ELEV.: 12.5 FT.

DATUM:

WATER DEPTH:  
BACKFILLED

DRILL CREW: CHALLENGE,  
NB(LOGGER)



BORING NUMBER: B-8

BORING LOCATION:

REMARKS:

N: 249626 E: 1797759

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>r</sub>	N <sub>c</sub>		L.L.	P.I.				
50		Dense to firm brown and light brown sand	17	24								
55			18	22								
60		Firm brown and brownish yellow sand	19	10	25	NP	NP	4.4			SP	
65			20	33								
70		Dense and firm light brown and brown sand	21	38								
75			22	21	26	NP	NP	5.6			SP-SM	
80			23	41								
85		B.T. @ 85 FT										
90												
95												
100												

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

**PROJECT NAME:** CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

**G.E.T. PROJ. NUMBER:** 23-157

**PROJECT LOCATION:** MOBILE, AL

**DRILL RIG:** MOBILE B37

**DRILL METHOD:** MUD ROTARY

**DATE DRILLED:** 5/30/23

**BORING DEPTH:** 90 FT.

**BORING ELEV.:** 12.8 FT.

**DATUM:**

**WATER DEPTH:** 3.1 FT.

**DRILL CREW:** ES, BT,  
RS(LOGGER)



**BORING NUMBER:** B-9

**BORING LOCATION:**

**REMARKS:**

**N:** 249377 **E:** 1797630

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>t</sub>	N <sub>c</sub>		L.L.	P.I.				
0		4" Asphalt	1	13								
		Firm red and dark grayish brown silty sand	2	9								
		Loose dark grayish brown silty sand	3	7								
5		Loose grayish brown silty sand	4	6								
		Very loose gray clayey sand	5	4		34						
10		Very loose gray silty sand	6	WOH		30	25	3		31.1		SM
			7	2		30						
15		Very loose gray silty clayey sand	8	3		30	24	4		23.4		SC-SM
			9	2		30						
25		Dense to firm light brown and brown silty sand	10	31								
			11	29								
35		Dense reddish yellow silty sand	12	35								
			13	30								
40		Firm light yellowish brown silty sand	14	25								
			15	27								
50		Firm light yellowish brown and dark grayish brown silty sand										

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: MOBILE B37

DRILL METHOD: MUD ROTARY

REMARKS:

DATE DRILLED: 5/30/23

BORING DEPTH: 90 FT.

BORING ELEV.: 12.8 FT.

DATUM:

WATER DEPTH: 3.1 FT.

DRILL CREW: ES, BT,  
RS(LOGGER)



BORING NUMBER: B-9

BORING LOCATION:

N: 249377 E: 1797630

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>i</sub>	N <sub>c</sub>		L.L.	P.I.				
50		Firm light yellowish brown and dark grayish brown silty sand										
55			16	39		22	NP	NP		8.4		SP-SM
60		Dense light gray and dark grayish brown sand	17	33								
65			18	39								
70		Dense dark grayish brown sand with clay pockets	19	42								
75		Dense dark grayish brown silty sand with gravel	20	40		15	NP	NP		13.8		SM
80		Dense light yellowish brown and dark grayish brown silty sand	21	43								
85		Dense light yellowish brown sand	22	43								
90		B.T. @ 90 FT	23	41								

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: MOBILE B37

DRILL METHOD: MUD ROTARY

REMARKS:

DATE DRILLED: 5/25/23

BORING DEPTH: 90 FT.

BORING ELEV.: 13.2 FT.

DATUM:

WATER DEPTH: 2.7 FT.

DRILL CREW: ES, BT,  
RS(LOGGER)



BORING NUMBER: B-10

BORING LOCATION:

N: 249584 E: 1797652

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>f</sub>	N <sub>c</sub>		L.L.	P.I.				
0		3" Asphalt	1	23								
		Firm brown and red silty sand	2	19								
		Firm light yellowish brown silty sand	3	12								
5		Firm grayish brown silty sand	4	15								
		Loose light brown and gray silty sand with organic lense	5	5								
			6	WOH		28						
10		Very loose gray clayey sand	7	WOH		27	24	9		24.0		SC
			8	WOH		53					c*=0.25	
15		Very soft gray sandy clay	T-1			110	70	50		75.7	c=0.41	CH
		Very soft gray sandy clay	10	WOH		27	26	10		26.1		SC
20		Very loose grayish brown clayey sand										
			11	18								
25		Firm yellowish red sand										
			12	20								
30		Firm light brown sand										
			13	21							c*=0.50	
35		Stiff gray clay										
		Firm light brown sand										
40		Firm reddish yellow and grayish brown silty sand	14	23								
			15	22								
45		Firm to dense reddish yellow and light brown silty sand										
			16	31								
50												

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI\_AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG: MOBILE B37

DRILL METHOD: MUD ROTARY

REMARKS:

DATE DRILLED: 5/25/23

BORING DEPTH: 90 FT.

BORING ELEV.: 13.2 FT.

DATUM:

WATER DEPTH: 2.7 FT.

DRILL CREW: ES, BT,  
RS(LOGGER)



BORING NUMBER: B-10

BORING LOCATION:

N: 249584 E: 1797652

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	SHEAR STRENGTH tsf	UNIFIED CLASS
				N <sub>i</sub>	N <sub>c</sub>		L.L.	P.I.				
50		Firm to dense reddish yellow and light brown silty sand										
55		Dense light gray sand with silt	17	37								
60		Dense light gray sand with silt	18	32	22	NP	NP		5.4			SP-SM
65		Dense light brown sand	19	40								
70		Dense light brown sand	20	40								
75		Dense light brown sand with silt and gravel	21	35								
80		Dense light brown sand with silt and gravel	22	37	14	NP	NP		6.9			SW-SM
85		Dense light brown sand	23	43								
90		B.T. @ 90 FT	24	41								

MOD DEEP BORING LOG W/O NC VALUES & N-E 23-157 MOBILE CIVIC CENTER.GPJ GETI\_AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

Reviewed By:



**PROJECT NAME:** CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

**DATE DRILLED:** 5/17/23

**G.E.T. PROJ. NUMBER:** 23-157

**BORING DEPTH:** 5 FT.

**PROJECT LOCATION:** MOBILE, AL

**BORING ELEV.:** 12.5 FT.



**DATUM:**

**BORING NUMBER:** A-1

**WATER DEPTH:** NWTE

**DRILL RIG:**

**BORING LOCATION:**

**DRILL METHOD:** HAND AUGER

**DRILL CREW:** BT,  
WL(LOGGER)

**REMARKS:**

**N:** 249548 **E:** 1797099

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	INSITU CBR (DCP)	AASHTO CLASS
				N <sub>r</sub>	N <sub>c</sub>		L.L.	P.I.				
0		3.91" Asphalt										
1												
2												
3		Red, dark, brown, and gray silty sand with iron rock	1			9	NP	NP		24.8		A-2-4
4												
5		B.T. @ 5 FT										
6												
7												
8												
9												
10												

HAND AUGER W/ N-E (AASHTO) 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23

**NOTE:** The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

DATE DRILLED: 5/17/23

G.E.T. PROJ. NUMBER: 23-157

BORING DEPTH: 5 FT.

PROJECT LOCATION: MOBILE, AL

BORING ELEV.: 12 FT.

DRILL RIG:

DATUM:

DRILL METHOD: HAND AUGER

WATER DEPTH: NWTE

DRILL CREW: BT,  
WL(LOGGER)



BORING NUMBER: A-2

BORING LOCATION:

REMARKS:

N: 249570 E: 1797316

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	INSITU CBR (DCP)	AASHTO CLASS
				N <sub>f</sub>	N <sub>c</sub>		L.L.	P.I.				
0		5.23" Aspaht										
1												
2												
3		Red, dark brown, and light brown silty sand	1			9	NP	NP		18.0		A-2-4
4												
5		B.T. @ 5 FT										
6												
7												
8												
9												
10												

HAND AUGER W/ N.E. (AASHTO) 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

**PROJECT NAME:** CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

**G.E.T. PROJ. NUMBER:** 23-157

**PROJECT LOCATION:** MOBILE, AL

**DRILL RIG:**

**DRILL METHOD:** HAND AUGER

**DATE DRILLED:** 5/18/23

**BORING DEPTH:** 1.6 FT.

**BORING ELEV.:** 12.5 FT.

**DATUM:**

**WATER DEPTH:** NWTE

**DRILL CREW:** BT,  
WL(LOGGER)



**BORING NUMBER:** A-3

**BORING LOCATION:**

**REMARKS:** REFUSAL @ 19" DUE TO TREE ROOTS

**N:** 249716 **E:** 1797528

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	INSITU CBR (DCP)	AASHTO CLASS
				N <sub>f</sub>	N <sub>c</sub>		L.L.	P.I.				
0		4.70" Asphalt										
1		Dark brownish gray, red, and yellow silty sand with iron rocks, organics, and silt pockets	1			7	NP	NP		21.4		A-2-4
2		B.T. @ 1.6 FT										
3												
4												
5												
6												
7												
8												
9												
10												

HAND AUGER W/ N-E (AASHTO) 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23

**NOTE:** The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

DATE DRILLED: 5/18/23

G.E.T. PROJ. NUMBER: 23-157

BORING DEPTH: 5 FT.

PROJECT LOCATION: MOBILE, AL

BORING ELEV.: 12 FT.



BORING NUMBER: A-4

DRILL RIG:

DATUM:

BORING LOCATION:

DRILL METHOD: HAND AUGER

DRILL CREW: BT,  
WL(LOGGER)

REMARKS:

N: 249765 E: 1797762

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	INSITU CBR (DCP)	AASHTO CLASS
				N <sub>1</sub>	N <sub>6</sub>		L.L.	P.I.				
0		3.34" Asphalt										
1												
2												
3		Light gray, light brown, and red silty sand with silt pockets	1			12	NP	NP		18.3		A-2-4
4												
5		B.T. @ 5 FT										
6												
7												
8												
9												
10												

HAND AUGER W/ N-E (AASHTO) 23-157 MOBILE CIVIC CENTER.GPJ GETI\_AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG:

DRILL METHOD: HAND AUGER

DATE DRILLED: 5/18/23

BORING DEPTH: 2.8 FT.

BORING ELEV.: 12 FT.

DATUM:

WATER DEPTH: NWTE

DRILL CREW: BT,  
WL(LOGGER)





BORING NUMBER: A-5

BORING LOCATION:

REMARKS: REFUSAL @ 33" DUE TO BIG SOLID ROCK

N: 249279 E: 1797136

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	INSITU CBR (DCP)	AASHTO CLASS
				N <sub>i</sub>	N <sub>c</sub>		L.L.	P.I.				
0		3.55" Asphalt										
1		Dark brownish gray and red silty clayey sand with organics	1			12	17	5		23.1		A-2-4
3		B.T. @ 2.8 FT										
4												
5												
6												
7												
8												
9												
10												

HAND AUGER W/ N.E. (AASHTO) 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

**PROJECT NAME:** CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

**DATE DRILLED:** 5/18/23

**G.E.T. PROJ. NUMBER:** 23-157

**BORING DEPTH:** 0.7 FT.

**PROJECT LOCATION:** MOBILE, AL

**BORING ELEV.:** 12 FT.

**DRILL RIG:**

**DATUM:**

**DRILL METHOD:** HAND AUGER

**WATER DEPTH:** NWTE

**DRILL CREW:** BT,  
WL(LOGGER)



**BORING NUMBER:** A-6

**BORING LOCATION:**

**REMARKS:** REFUSAL @ 8" DUE TO CONCRETE-GRAVEL

**N:** 249366 **E:** 1797348

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	INSITU CBR (DCP)	AASHTO CLASS
				N <sub>f</sub>	N <sub>c</sub>		L.L.	P.I.				
0		2.29" Asphalt Light brown and gray gravel	1			0	NP	NP		1.5		A-1-a
1		B.T. @ 0.7 FT										
2												
3												
4												
5												
6												
7												
8												
9												
10												

HAND AUGER W/ N-E (AASHTO) 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23

**NOTE:** The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

PROJECT NAME: CITY OF MOBILE  
CIVIC CENTER PARKING GARAGE

G.E.T. PROJ. NUMBER: 23-157

PROJECT LOCATION: MOBILE, AL

DRILL RIG:

DRILL METHOD: HAND AUGER

DATE DRILLED: 5/18/23

BORING DEPTH: 5 FT.

BORING ELEV.: 12 FT.

DATUM:

WATER DEPTH: NWTE

DRILL CREW: BT,  
WL(LOGGER)



BORING NUMBER: A-7

BORING LOCATION:

REMARKS:

N: 249464 E: 1797491

DEPTH IN FEET	LOG	DESCRIPTION	SAMPLE NO.	S.P.T.		W.C. %	ATTERBERG LIMITS		DRY UNIT WT. pcf	% MINUS #200	INSITU CBR (DCP)	AASHTO CLASS
				N <sub>f</sub>	N <sub>c</sub>		L.L.	P.I.				
0		3.30" Asphalt										
1												
2												
3		Red, gray, light yellowish brown silty sand with silt pockets	1			12	19	3		23.5		A-2-4
4												
5		B.T. @ 5 FT										
6												
7												
8												
9												
10												

HAND AUGER W/ N-E (AASHTO) 23-157 MOBILE CIVIC CENTER.GPJ GETI\_AL.GDT 7/7/23

NOTE: The stratification lines shown represent the approximate boundary between soil types and the transition may be gradual. The groundwater level stated is for conditions at the time of boring and the level may fluctuate large amounts for other conditions or seasons.

**APPENDIX D**  
**LABORATORY TEST RESULTS**



SOIL CLASSIFICATION SUMMARY - ME 23-157 MOBILE CIVIC CENTER GPJ SETI AL.GDT 7/7/23

Boring Location	Boring No.	Sample ID	Depth (ft)	Water Content (%)	Atterberg Limits			% Gravel	% Sand	% Passing 200 (if hydrometer data available)		D <sub>50</sub> (mm)	USCS	AASHTO Class
					LL	PL	PI			% Silt	% Clay			
N: 249548 E: 1797099	A-1	1	0.3	9	NP	16	NP	0.0	75.2	24.8	0.155	SM	A-2-4 (0)	
N: 249570 E: 1797316	A-2	1	0.4	9	NP	NP	NP	0.4	81.6	18.0	0.164	SM	A-2-4 (0)	
N: 249716 E: 1797528	A-3	1	0.4	7	NP	14	NP	0.0	78.6	21.4	0.158	SM	A-2-4 (0)	
N: 249765 E: 1797762	A-4	1	0.4	12	NP	14	NP	0.0	81.7	18.3	0.188	SM	A-2-4 (0)	
N: 249279 E: 1797136	A-5	1	0.3	12	17	12	5	0.8	76.1	23.1	0.163	SC-SM	A-2-4 (0)	
N: 249366 E: 1797348	A-6	1	0.2	0	NP	NP	NP	94.6	3.9	1.5	15.585	GP	A-1-a (0)	
N: 249464 E: 1797491	A-7	1	0.3	12	19	16	3	0.0	76.5	23.5	0.187	SM	A-2-4 (0)	
N: 249332 E: 1797528	B-1	7	11.5	27	22	20	2	0.0	73.1	26.9	0.278	SM	A-2-4 (0)	
N: 249332 E: 1797528	B-1	T-1	14.0	27	24	20	4	0.0	76.3	23.7	0.145	SC-SM	A-2-4 (0)	
N: 249332 E: 1797528	B-1	9	16.5	70	58	21	37	0.0	41.4	58.6		CH	A-7-6 (19)	
N: 249332 E: 1797528	B-1	10	19.0	119	94	49	45	10.2	36.8	53.1		MH	A-7-5 (22)	
N: 249332 E: 1797528	B-1	11	24.0	32										
N: 249332 E: 1797528	B-1	15	44.0	22	NP	NP	NP	0.0	92.1	7.9	0.28	SP-SM	A-3 (0)	
N: 249332 E: 1797528	B-1	18	59.0	23	NP	NP	NP	0.0	93.7	6.3	0.289	SP-SM	A-3 (0)	
N: 249332 E: 1797528	B-1	20	69.0	23	NP	NP	NP	0.6	91.5	8.0	0.473	SP-SM	A-1-b (0)	
N: 249332 E: 1797528	B-1	22	79.0	16	NP	NP	NP	11.8	79.5	8.7	0.398	SP-SM	A-3 (0)	



**SOIL CLASSIFICATION SUMMARY**

GET PROJECT NUMBER: 23-157  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 COUNTY: MOBILE

SOIL CLASSIFICATION SUMMARY - NE 23-157 MOBILE CIVIC CENTER GAR. GETI AL.GDT 7/1/23

Boring Location	Boring No.	Sample ID	Depth (ft)	Water Content (%)	Atterberg Limits			% Gravel	% Sand	% Passing 200 (if hydrometer data available)		D <sub>50</sub> (mm)	USCS	AASHTO Class
					LL	PL	PI			% Silt	% Clay			
N: 249447 E: 1797544	B-2	5A	7.3	147	147	69	78							
N: 249447 E: 1797544	B-2	7	11.5	29	26	18	8	0.0	70.5	20.1	9.4	0.134	SC	A-2-4 (0)
N: 249447 E: 1797544	B-2	8	14.0	29				0.0	74.3		25.7	0.291		
N: 249447 E: 1797544	B-2	9	16.5	30	24	19	5	0.0	78.2		21.8	0.335	SC-SM	A-2-4 (0)
N: 249447 E: 1797544	B-2	10	19.0	54	64	35	29	0.0	49.9		50.1		MH	A-7-5 (11)
N: 249447 E: 1797544	B-2	11	24.0	104										
N: 249447 E: 1797544	B-2	16	49.0	22	NP	NP	NP				5.4	0.295	SP-SM	A-3 (0)
N: 249447 E: 1797544	B-2	19	64.0	23	NP	NP	NP	0.2	94.8		5.0	0.346	SP	A-3 (0)
N: 249447 E: 1797544	B-2	22	79.0	15	NP	NP	NP	22.1	73.5		4.5	1.008	SP	A-1-b (0)
N: 249556 E: 1797559	B-3	4	5.0	13	NP	18	NP	0.0	87.5		12.5	0.443	SM	A-1-b (0)
N: 249556 E: 1797559	B-3	7	11.5	27										
N: 249556 E: 1797559	B-3	9	19.0	27	25	20	5	0.0	74.6		25.4	0.294	SC-SM	A-2-4 (0)
N: 249556 E: 1797559	B-3	10	24.0	29										
N: 249556 E: 1797559	B-3	15	49.0	23	NP	NP	NP	0.0	96.4		3.6	0.279	SP	A-3 (0)
N: 249556 E: 1797559	B-3	18	64.0	22	NP	NP	NP	0.0	95.5		4.5	0.32	SP	A-3 (0)
N: 249556 E: 1797559	B-3	21	79.0	19	NP	NP	NP	0.0	95.7		4.3	0.461	SP	A-1-b (0)



**SOIL CLASSIFICATION SUMMARY**

GET PROJECT NUMBER: 23-157  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 COUNTY: MOBILE

SOIL CLASSIFICATION SUMMARY - NE 23-157 MOBILE CIVIC CENTER GAR. GETI AL. GOT 7/1/23

Boring Location	Boring No.	Sample ID	Depth (ft)	Water Content (%)	Atterberg Limits			% Gravel	% Sand	% Passing 200 (if hydrometer data available)		D <sub>50</sub> (mm)	USCS	AASHTO Class
					LL	PL	PI			% Silt	% Clay			
N: 249656 E: 1797573	B-4	7	11.5	30										
N: 249656 E: 1797573	B-4	8	14.0	28	23	15	8	0.0	76.3	23.7	0.314	SC	A-2-4 (0)	
N: 249656 E: 1797573	B-4	9	16.5	29										
N: 249656 E: 1797573	B-4	10	19.0	32	21	21	NP	0.0	75.0	25.0	0.299	SM	A-2-4 (0)	
N: 249656 E: 1797573	B-4	15	44.0	22	NP	NP	NP	0.0	89.9	10.1	0.321	SP-SM	A-3 (0)	
N: 249656 E: 1797573	B-4	17	54.0	24	NP	NP	NP	0.0	96.0	4.0	0.31	SP	A-3 (0)	
N: 249656 E: 1797573	B-4	20	69.0	22	NP	NP	NP	0.5	90.6	8.9	0.464	SW-SM	A-1-b (0)	
N: 249306 E: 1797709	B-5	5	6.5	31										
N: 249306 E: 1797709	B-5	6	9.0	28	24	19	5	0.0	62.9	37.1	0.176	SC-SM	A-4 (0)	
N: 249306 E: 1797709	B-5	7	11.5	28										
N: 249306 E: 1797709	B-5	8	14.0	30	35	18	17	0.0	78.7	21.3	0.341	SC	A-2-6 (0)	
N: 249306 E: 1797709	B-5	T-1	16.5	52	38	13	25	0.0	38.9	40.8 20.3	0.026	CL	A-6 (12)	
N: 249306 E: 1797709	B-5	9	19.0	44	60	17	43	0.0	10.5	89.5		CH	A-7-6 (41)	
N: 249306 E: 1797709	B-5	13	39.0	73	69	36	33							
N: 249306 E: 1797709	B-5	17	59.0	36	24	18	6	0.0	68.9	31.1	0.09	SC-SM	A-2-4 (0)	
N: 249306 E: 1797709	B-5	18	64.0	30				0.0	73.8	26.2	0.286			



**SOIL CLASSIFICATION SUMMARY**

GET PROJECT NUMBER: 23-157  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 COUNTY: MOBILE

SOIL CLASSIFICATION SUMMARY - N.E. 23-157 MOBILE CIVIC CENTER, G.P.I. GETI AL.GDT. 1/1/23

Boring Location	Boring No.	Sample ID	Depth (ft)	Water Content (%)	Atterberg Limits			% Gravel	% Sand	% Passing 200 (if hydrometer data available)		D <sub>50</sub> (mm)	USCS	AASHTO Class
					LL	PL	PI			% Silt	% Clay			
N: 249306 E: 1797709	B-5	21	79.0	24	NP	19	NP	0.0	93.5	6.5	0.175	SP-SM	A-3 (0)	
N: 249417 E: 1797729	B-6	3	3.5	42										
N: 249417 E: 1797729	B-6	4	5.0	59	NP	NP	NP	0.0	81.3	18.7	0.37	SM	A-2-4 (0)	
N: 249417 E: 1797729	B-6	T-1	6.5	24	NP	22	NP	0.0	85.5	14.5	0.163	SM	A-2-4 (0)	
N: 249417 E: 1797729	B-6	6	9.0	24										
N: 249417 E: 1797729	B-6	7	11.5	28										
N: 249417 E: 1797729	B-6	8	14.0	25										
N: 249417 E: 1797729	B-6	12	29.0	26	NP	NP	NP	0.0	96.6	3.4	0.274	SP	A-3 (0)	
N: 249417 E: 1797729	B-6	14	39.0	23	NP	NP	NP	0.0	96.4	3.6	0.336	SP	A-3 (0)	
N: 249417 E: 1797729	B-6	16	49.0	22	NP	NP	NP	0.4	95.9	3.7	0.311	SP	A-3 (0)	
N: 249417 E: 1797729	B-6	18	59.0	24	NP	18	NP	0.2	95.7	4.1	0.302	SP	A-3 (0)	
N: 249417 E: 1797729	B-6	21	74.0	11	NP	NP	NP	31.0	65.8	3.2	1.666	SW	A-1-b (0)	
N: 249530 E: 1797745	B-7	5	6.5	47	32	32	NP	0.0	87.6	12.4	0.445	SM	A-1-b (0)	
N: 249530 E: 1797745	B-7	6	9.0	32										
N: 249530 E: 1797745	B-7	8	14.0	27	29	15	14	0.0	75.2	24.8	0.301	SC	A-2-6 (0)	
N: 249530 E: 1797745	B-7	9	16.5	44										



**SOIL CLASSIFICATION SUMMARY**

GET PROJECT NUMBER: 23-157  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 COUNTY: MOBILE

SOIL CLASSIFICATION SUMMARY - I.E. 23-157 MOBILE CIVIC CENTER GAR. GETI AL.SPT. 7/17/23

Boring Location	Boring No.	Sample ID	Depth (ft)	Water Content (%)	Atterberg Limits			% Gravel	% Sand	% Passing 200 (# hydrometer data available)		D <sub>50</sub> (mm)	USCS	AASHTO Class
					LL	PL	PI			% Silt	% Clay			
N: 249530 E: 1797745	B-7	T-1	18.5	55	88	23	65	0.0	34.4	65.6		CH	A-7-6 (42)	
N: 249530 E: 1797745	B-7	11	24.0	29	42	17	25	0.0	38.2	61.8		CL	A-7-6 (13)	
N: 249530 E: 1797745	B-7	15	44.0	24	NP	NP	NP	0.2	83.2	16.6	0.26	SM	A-2-4 (0)	
N: 249530 E: 1797745	B-7	17	54.0	25	NP	NP	NP	0.0	95.1	4.9	0.232	SP	A-3 (0)	
N: 249530 E: 1797745	B-7	20	69.0	20	NP	NP	NP	0.0	95.4	4.6	0.46	SP	A-1-b (0)	
N: 249530 E: 1797745	B-7	23	84.0	23	NP	NP	NP	0.0	94.5	5.5	0.333	SP-SM	A-3 (0)	
N: 249530 E: 1797745	B-7	25	94.0	45	82	19	63	0.0	8.0	92.0		CH	A-7-6 (64)	
N: 249530 E: 1797745	B-7	26	99.0	47										
N: 249626 E: 1797759	B-8	6	9.0	33	20	21	NP	0.0	76.3	23.7	0.314	SM	A-2-4 (0)	
N: 249626 E: 1797759	B-8	7	11.5	30										
N: 249626 E: 1797759	B-8	8	14.0	28				0.0	75.0	25.0	0.299			
N: 249626 E: 1797759	B-8	T-1	16.5	27	NP	18	NP	0.0	78.6	21.4	0.339	SM	A-2-4 (0)	
N: 249626 E: 1797759	B-8	10	19.0	45										
N: 249626 E: 1797759	B-8	11	24.0	68										
N: 249626 E: 1797759	B-8	15	44.0	25	NP	NP	NP	0.0	95.7	4.3	0.256	SP	A-3 (0)	
N: 249626 E: 1797759	B-8	19	64.0	25	NP	NP	NP	1.9	93.7	4.4	0.266	SP	A-3 (0)	



**SOIL CLASSIFICATION SUMMARY**

GET PROJECT NUMBER: 23-157  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 COUNTY: MOBILE

SOIL CLASSIFICATION SUMMARY - N.E. 23-157 MOBILE CIVIC CENTER GAR. GETI AL. GDT 7/12/23

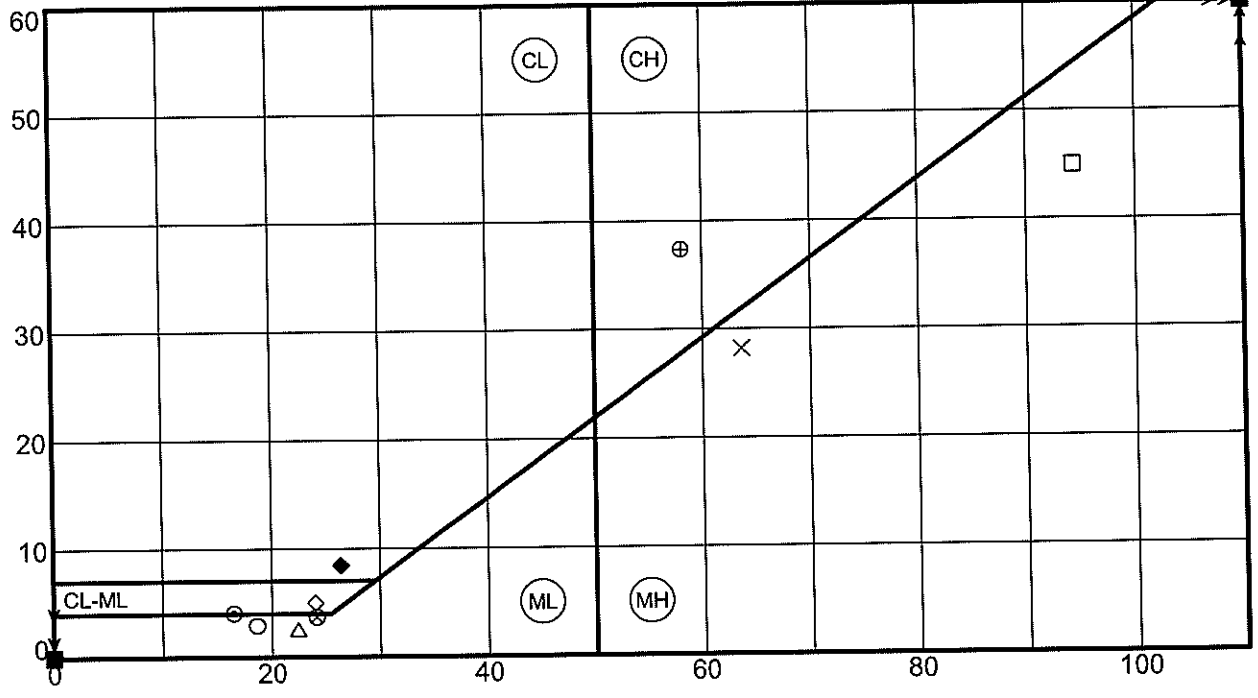
Boring Location	Boring No.	Sample ID	Depth (ft)	Water Content (%)	Atterberg Limits			% Gravel	% Sand	% Passing 200 (if hydrometer data available)		D <sub>50</sub> (mm)	USCS	AASHTO Class
					LL	PL	PI			% Silt	% Clay			
N: 249626 E: 1797759	B-8	22	79.0	26	NP	NP	NP	0.0	94.4	5.6		0.197	SP-SM	A-3 (0)
N: 249377 E: 1797630	B-9	5	6.5	34										
N: 249377 E: 1797630	B-9	6	9.0	30	25	22	3	0.0	68.9	31.1		0.234	SM	A-2-4 (0)
N: 249377 E: 1797630	B-9	7	11.5	30										
N: 249377 E: 1797630	B-9	8	14.0	30	24	20	4	0.0	76.6	23.4		0.317	SC-SM	A-2-4 (0)
N: 249377 E: 1797630	B-9	9	19.0	30										
N: 249377 E: 1797630	B-9	16	54.0	22	NP	NP	NP	0.0	91.6	8.4		0.493	SP-SM	A-1-b (0)
N: 249377 E: 1797630	B-9	20	74.0	15	NP	NP	NP	17.2	69.0	13.8		0.519	SM	A-1-b (0)
N: 249584 E: 1797652	B-10	6	9.0	28										
N: 249584 E: 1797652	B-10	7	11.5	27	24	15	9	0.0	76.0	24.0		0.31	SC	A-2-4 (0)
N: 249584 E: 1797652	B-10	8	14.0	53										
N: 249584 E: 1797652	B-10	T-1	16.5	110	70	20	50	0.0	24.3	57.5	18.2	0.026	CH	A-7-6 (39)
N: 249584 E: 1797652	B-10	10	19.0	27	26	16	10	0.0	73.9	26.1		0.286	SC	A-2-4 (0)
N: 249584 E: 1797652	B-10	18	59.0	22	NP	NP	NP	0.0	94.6	5.4		0.243	SP-SM	A-3 (0)
N: 249584 E: 1797652	B-10	22	79.0	14	NP	NP	NP	15.0	78.1	6.9		0.571	SW-SM	A-1-b (0)



**SOIL CLASSIFICATION SUMMARY**

GET PROJECT NUMBER: 23-157  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 COUNTY: MOBILE

PLASTICITY INDEX



Test Method: \_\_\_\_\_ LIQUID LIMIT

Boring ID	Depth (ft.)	LL	PL	PI	Fines	Classification
● A-1	0.3	NP	16	NP	24.8	SILTY SAND (SM)
⊠ A-2	0.4	NP	NP	NP	18.0	SILTY SAND (SM)
▲ A-3	0.4	NP	14	NP	21.4	SILTY SAND (SM)
★ A-4	0.4	NP	14	NP	18.3	SILTY SAND (SM)
⊙ A-5	0.3	17	12	5	23.1	SILTY, CLAYEY SAND (SC-SM)
⊛ A-6	0.2	NP	NP	NP	1.5	POORLY GRADED GRAVEL (GP)
○ A-7	0.3	19	16	3	23.5	SILTY SAND (SM)
△ B-1	11.5	22	20	2	26.9	SILTY SAND (SM)
⊗ B-1	14.0	24	20	4	23.7	SILTY, CLAYEY SAND (SC-SM)
⊕ B-1	16.5	58	21	37	58.6	SANDY FAT CLAY (CH)
□ B-1	19.0	94	49	45	53.1	SANDY ELASTIC SILT (MH)
⊕ B-1	44.0	NP	NP	NP	7.9	POORLY GRADED SAND with SILT (SP-SM)
⊕ B-1	59.0	NP	NP	NP	6.3	POORLY GRADED SAND with SILT (SP-SM)
★ B-1	69.0	NP	NP	NP	8.0	POORLY GRADED SAND with SILT (SP-SM)
⊗ B-1	79.0	NP	NP	NP	8.7	POORLY GRADED SAND with SILT (SP-SM)
■ B-2	7.3	147	69	78		
◆ B-2	11.5	26	18	8	29.5	CLAYEY SAND (SC)
◇ B-2	16.5	24	19	5	21.8	SILTY, CLAYEY SAND (SC-SM)
× B-2	19.0	64	35	29	50.1	SANDY ELASTIC SILT (MH)
■ B-2	49.0	NP	NP	NP	5.4	POORLY GRADED SAND with SILT (SP-SM)

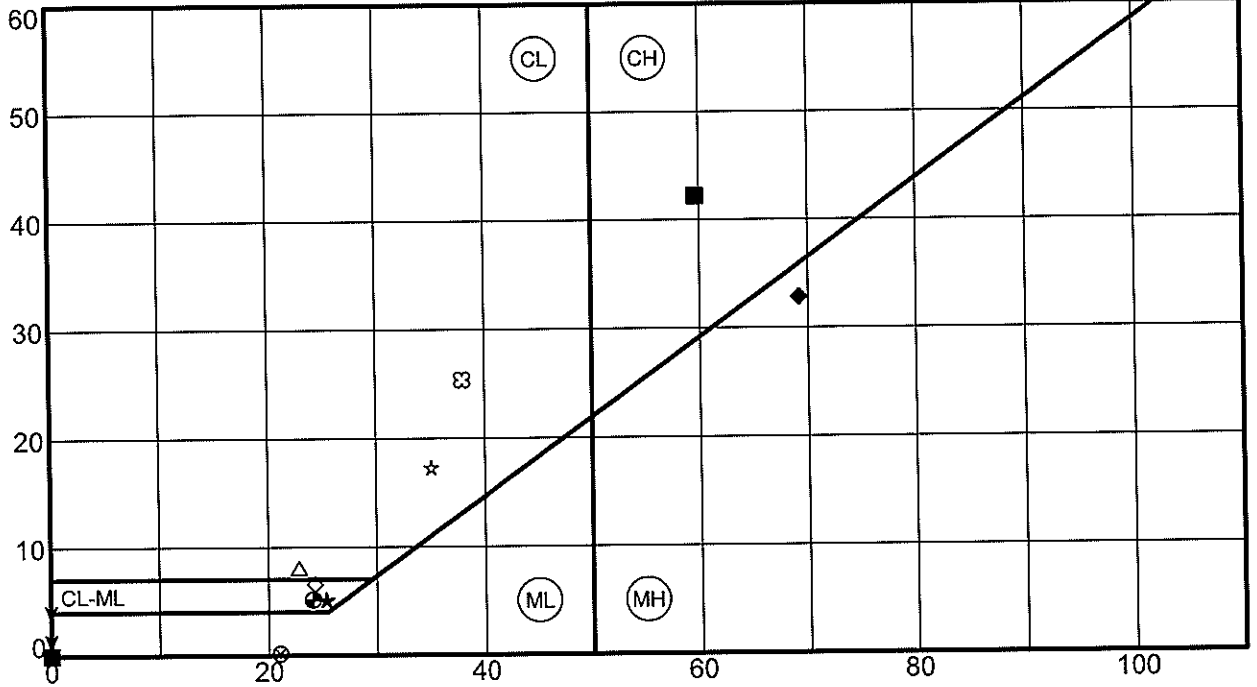
U.S. ATTERBERG LIMITS 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**ATTERBERG LIMITS RESULTS**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

PLASTICITY INDEX



Test Method: \_\_\_\_\_

LIQUID LIMIT

Boring ID	Depth (ft.)	LL	PL	PI	Fines	Classification
● B-2	64.0	NP	NP	NP	5.0	POORLY GRADED SAND (SP)
■ B-2	79.0	NP	NP	NP	4.5	POORLY GRADED SAND with GRAVEL (SP)
▲ B-3	5.0	NP	18	NP	12.5	SILTY SAND (SM)
★ B-3	19.0	25	20	5	25.4	SILTY, CLAYEY SAND (SC-SM)
⊙ B-3	49.0	NP	NP	NP	3.6	POORLY GRADED SAND (SP)
⊕ B-3	64.0	NP	NP	NP	4.5	POORLY GRADED SAND (SP)
○ B-3	79.0	NP	NP	NP	4.3	POORLY GRADED SAND (SP)
△ B-4	14.0	23	15	8	23.7	CLAYEY SAND (SC)
⊗ B-4	19.0	21	21	NP	25.0	SILTY SAND (SM)
⊕ B-4	44.0	NP	NP	NP	10.1	POORLY GRADED SAND with SILT (SP-SM)
□ B-4	54.0	NP	NP	NP	4.0	POORLY GRADED SAND (SP)
⊙ B-4	69.0	NP	NP	NP	8.9	WELL-GRADED SAND with SILT (SW-SM)
● B-5	9.0	24	19	5	37.1	SILTY, CLAYEY SAND (SC-SM)
★ B-5	14.0	35	18	17	21.3	CLAYEY SAND (SC)
⊗ B-5	16.5	38	13	25	61.1	SANDY LEAN CLAY (CL)
■ B-5	19.0	60	17	43	89.5	FAT CLAY (CH)
◆ B-5	39.0	69	36	33		
◇ B-5	59.0	24	18	6	31.1	SILTY, CLAYEY SAND (SC-SM)
⊗ B-5	79.0	NP	19	NP	6.5	POORLY GRADED SAND with SILT (SP-SM)
■ B-6	5.0	NP	NP	NP	18.7	SILTY SAND (SM)

US ATTERBERG LIMITS 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23

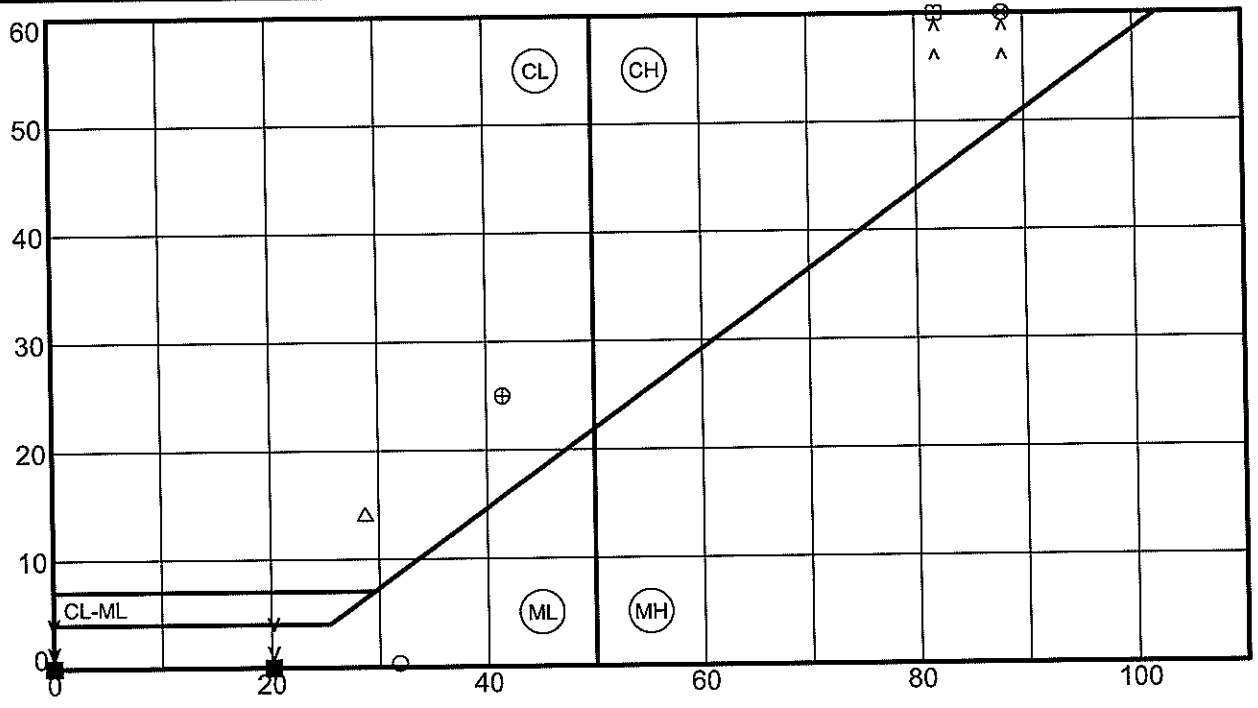


**ATTERBERG LIMITS RESULTS**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



PLASTICITY INDEX



Test Method: \_\_\_\_\_ LIQUID LIMIT

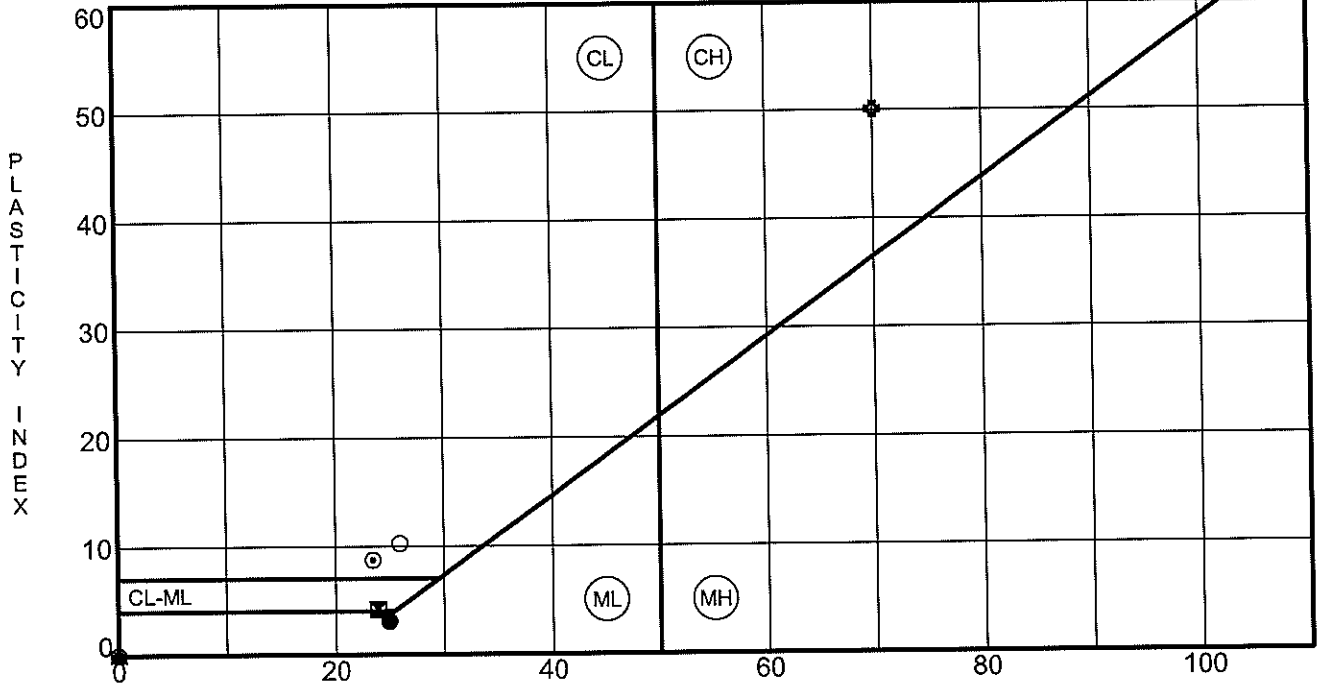
Boring ID	Depth (ft.)	LL	PL	PI	Fines	Classification
● B-6	6.5	NP	22	NP	14.5	SILTY SAND (SM)
⊠ B-6	29.0	NP	NP	NP	3.4	POORLY GRADED SAND (SP)
▲ B-6	39.0	NP	NP	NP	3.6	POORLY GRADED SAND (SP)
★ B-6	49.0	NP	NP	NP	3.7	POORLY GRADED SAND (SP)
⊙ B-6	59.0	NP	18	NP	4.1	POORLY GRADED SAND (SP)
⊕ B-6	74.0	NP	NP	NP	3.2	WELL-GRADED SAND with GRAVEL (SW)
○ B-7	6.5	32	32	NP	12.4	SILTY SAND (SM)
△ B-7	14.0	29	15	14	24.8	CLAYEY SAND (SC)
⊗ B-7	18.5	88	23	65	65.6	SANDY FAT CLAY (CH)
⊕ B-7	24.0	42	17	25	61.8	SANDY LEAN CLAY (CL)
□ B-7	44.0	NP	NP	NP	16.6	SILTY SAND (SM)
⊙ B-7	54.0	NP	NP	NP	4.9	POORLY GRADED SAND (SP)
⊕ B-7	69.0	NP	NP	NP	4.6	POORLY GRADED SAND (SP)
★ B-7	84.0	NP	NP	NP	5.5	POORLY GRADED SAND with SILT (SP-SM)
⊗ B-7	94.0	82	19	63	92.0	FAT CLAY (CH)
■ B-8	9.0	20	21	NP	23.7	SILTY SAND (SM)
◆ B-8	16.5	NP	18	NP	21.4	SILTY SAND (SM)
◇ B-8	44.0	NP	NP	NP	4.3	POORLY GRADED SAND (SP)
× B-8	64.0	NP	NP	NP	4.4	POORLY GRADED SAND (SP)
■ B-8	79.0	NP	NP	NP	5.6	POORLY GRADED SAND with SILT (SP-SM)

US ATTERBERG LIMITS 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**ATTERBERG LIMITS RESULTS**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_

LIQUID LIMIT

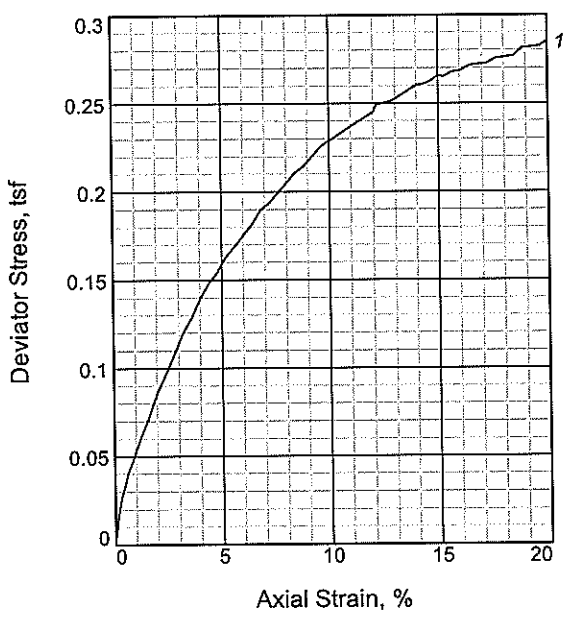
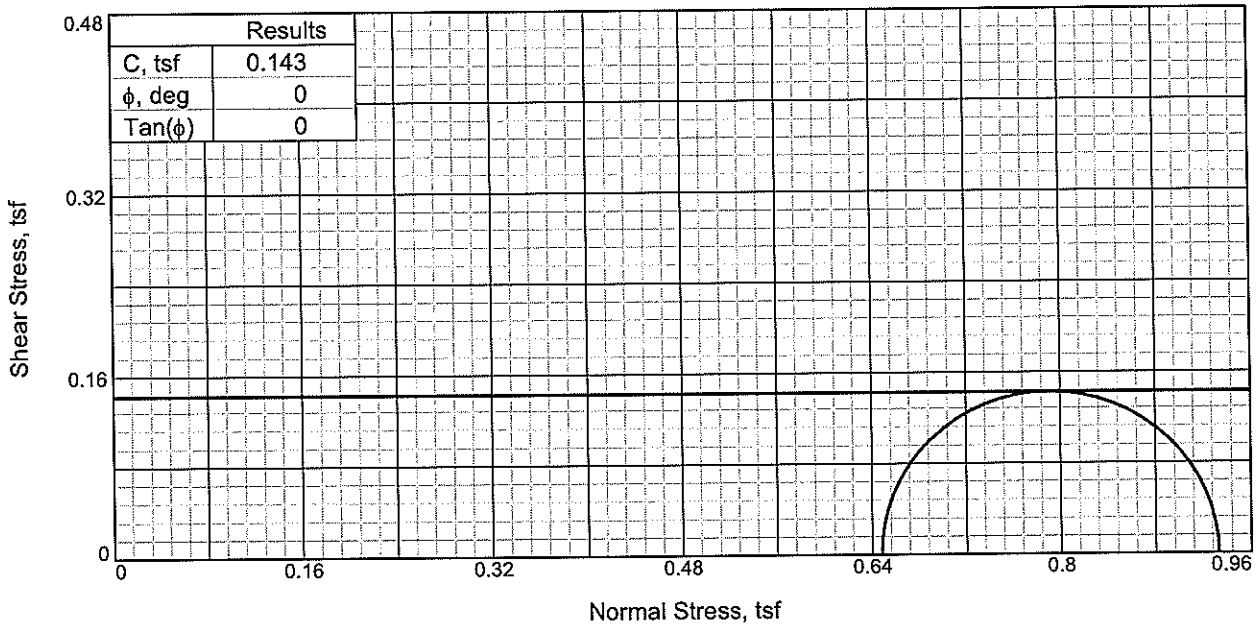
Boring ID	Depth (ft.)	LL	PL	PI	Fines	Classification
● B-9	9.0	25	22	3	31.1	SILTY SAND (SM)
⊠ B-9	14.0	24	20	4	23.4	SILTY, CLAYEY SAND (SC-SM)
▲ B-9	54.0	NP	NP	NP	8.4	POORLY GRADED SAND with SILT (SP-SM)
★ B-9	74.0	NP	NP	NP	13.8	SILTY SAND with GRAVEL (SM)
⊙ B-10	11.5	24	15	9	24.0	CLAYEY SAND (SC)
⊕ B-10	16.5	70	20	50	75.7	FAT CLAY with SAND (CH)
○ B-10	19.0	26	16	10	26.1	CLAYEY SAND (SC)
△ B-10	59.0	NP	NP	NP	5.4	POORLY GRADED SAND with SILT (SP-SM)
⊗ B-10	79.0	NP	NP	NP	6.9	WELL-GRADED SAND with SILT (SW-SM)

US ATTERBERG LIMITS 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**ATTERBERG LIMITS RESULTS**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Sample No.		1
Initial	Water Content, %	26.8
	Dry Density, pcf	59.0
	Saturation, %	39.2
	Void Ratio	1.8341
	Diameter, in.	3.41
	Height, in.	6.23
At Test	Water Content, %	68.4
	Dry Density, pcf	59.0
	Saturation, %	100.0
	Void Ratio	1.8341
	Diameter, in.	3.41
	Height, in.	6.23
Strain rate, in./min.		0.06
Back Pressure, psi		0.00
Cell Pressure, psi		9.00
Fail. Stress, tsf		0.29
Strain, %		20.0
Ult. Stress, tsf		
Strain, %		
$\sigma_1$ Failure, tsf		0.93
$\sigma_3$ Failure, tsf		0.65

**Type of Test:**  
Unconsolidated Undrained

**Sample Type:** Undisturbed

**Description:** Gray clayey sand

**Assumed Specific Gravity=** 2.68

**Remarks:** 6-27-2023  
1A Shear failure

**Client:** City of Mobile

**Project:** Civic Center Parking Deck in Mobile, Alabama

**Source of Sample:** Shelby Tube      **Depth:** 14-16

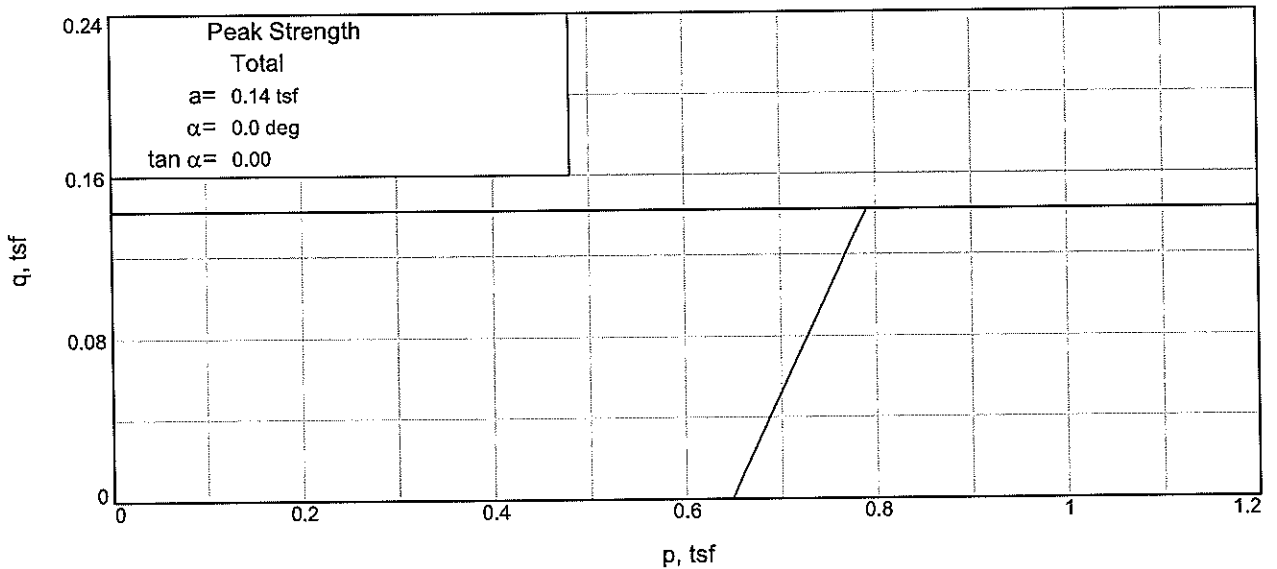
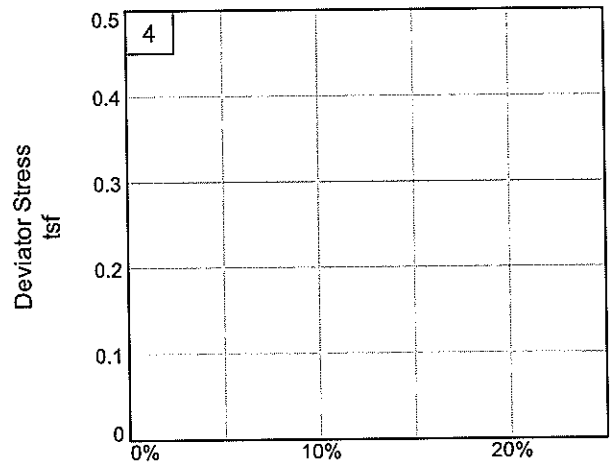
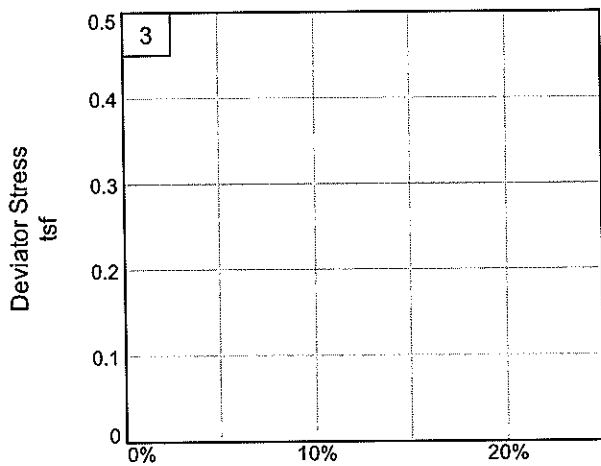
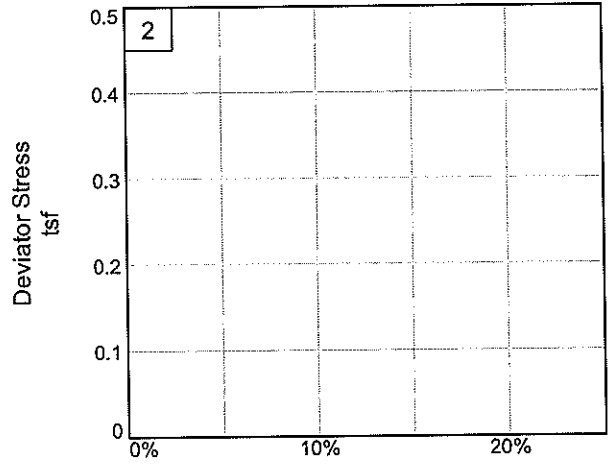
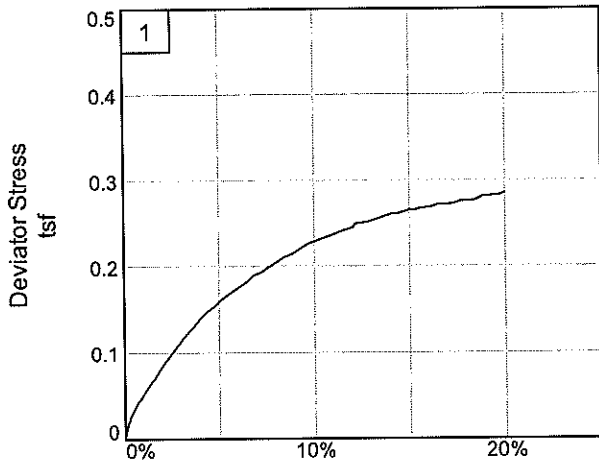
**Sample Number:** B-1, T-1

**Proj. No.:** 23-157      **Date Sampled:**

TRIAXIAL SHEAR TEST REPORT  
 Geotechnical Engineering-Testing, Inc.  
 Mobile, AL

Figure \_\_\_\_\_

Tested By: BJ



Client: City of Mobile

Project: Civic Center Parking Deck in Mobile, Alabama

Source of Sample: Shelby Tube

Depth: 14-16

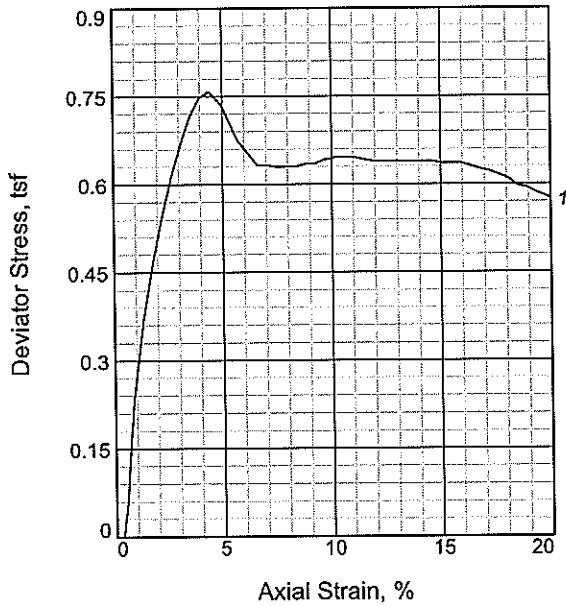
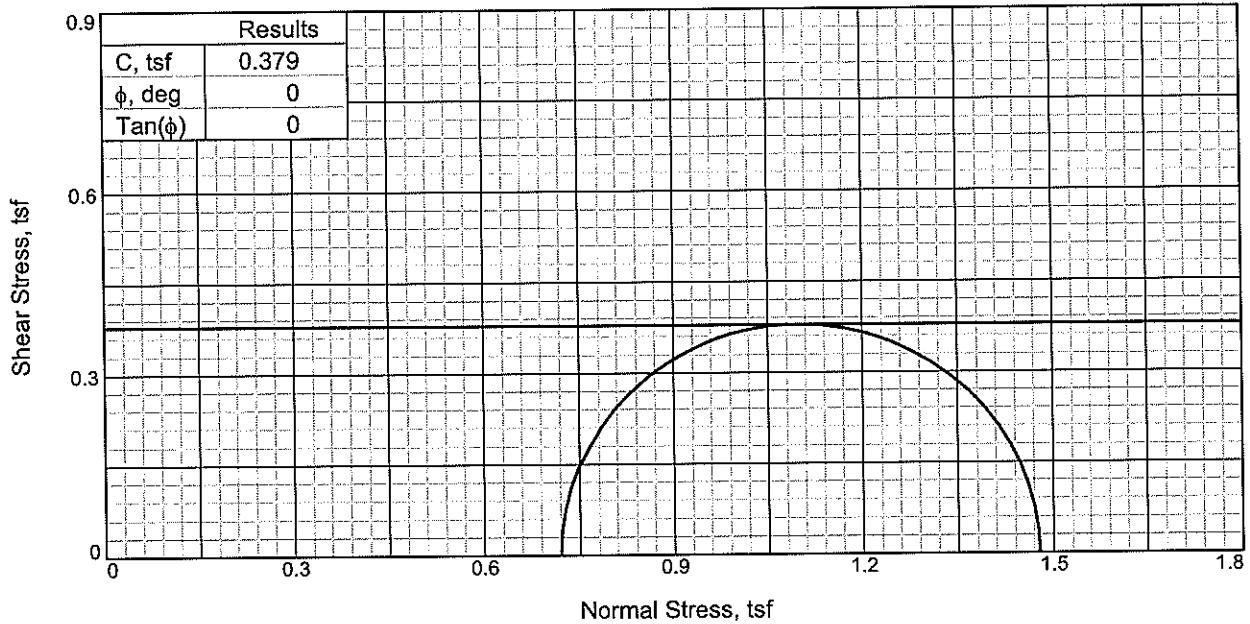
Sample Number: B-1, T-1

Project No.: 23-157

Figure \_\_\_\_\_

Geotechnical Engineering-Testing, Inc.

Tested By: BJ



Sample No.		1
Initial	Water Content, %	78.6
	Dry Density, pcf	47.3
	Saturation, %	83.0
	Void Ratio	2.5373
	Diameter, in.	2.74
	Height, in.	5.67
At Test	Water Content, %	94.7
	Dry Density, pcf	47.3
	Saturation, %	100.0
	Void Ratio	2.5373
	Diameter, in.	2.74
	Height, in.	5.67
Strain rate, in./min.		0.06
Back Pressure, psi		0.00
Cell Pressure, psi		10.00
Fail. Stress, tsf		0.76
Strain, %		4.4
Ult. Stress, tsf		
Strain, %		
$\sigma_1$ Failure, tsf		1.48
$\sigma_3$ Failure, tsf		0.72

**Type of Test:**

Unconsolidated Undrained

**Sample Type:** Undisturbed

**Description:** Gray clay with organics

**Assumed Specific Gravity=** 2.68

**Remarks:** 6-22-2023

2A Shear failure

**Client:** City of Mobile

**Project:** Civic Center Parking Deck in Mobile, Alabama

**Source of Sample:** Shelby Tube      **Depth:** 16.5-18.5

**Sample Number:** B-5, T-1

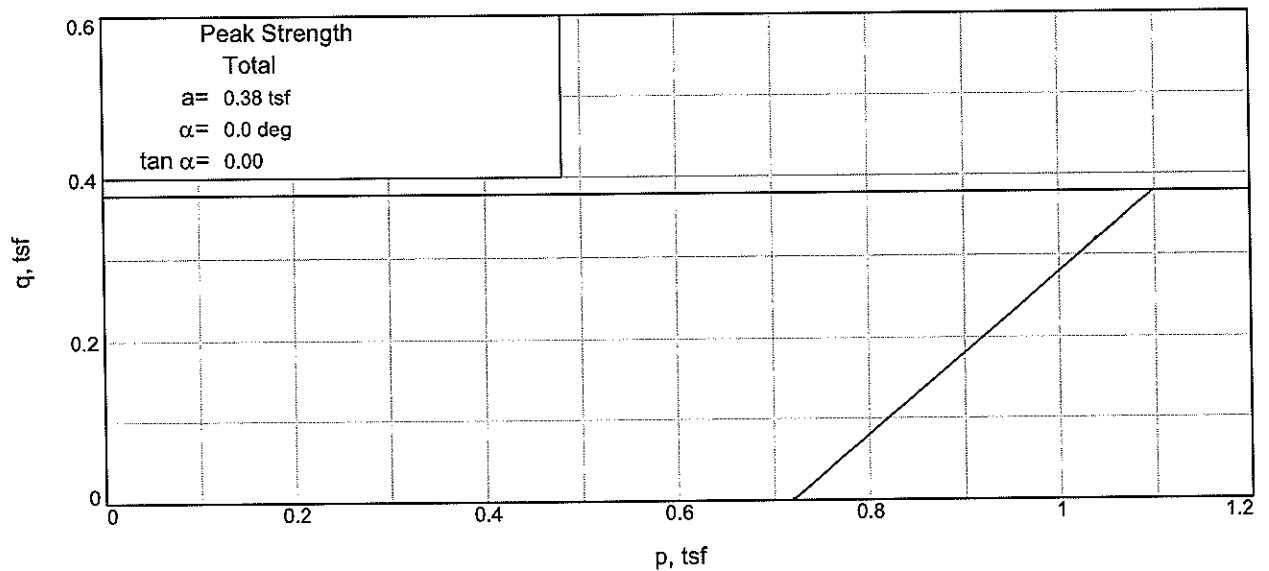
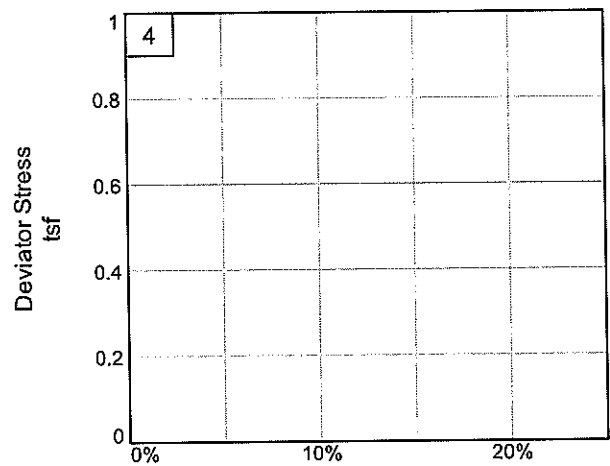
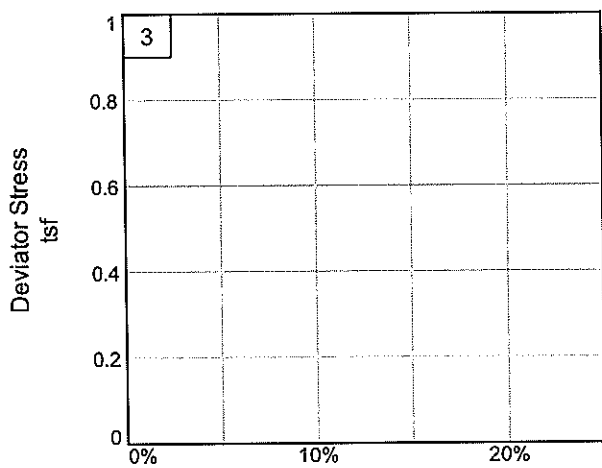
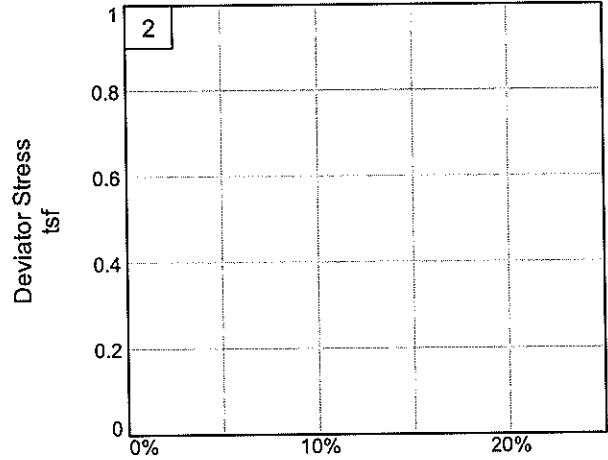
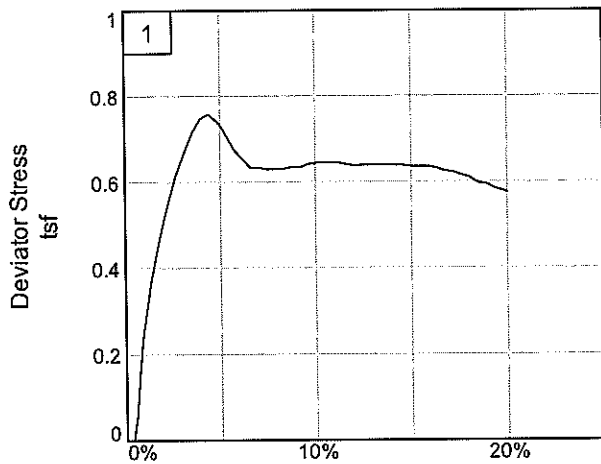
**Proj. No.:** 23-157

**Date Sampled:**

TRIAXIAL SHEAR TEST REPORT  
 Geotechnical Engineering-Testing, Inc.  
 Mobile, AL

**Figure** \_\_\_\_\_

**Tested By:** BJ \_\_\_\_\_



Client: City of Mobile

Project: Civic Center Parking Deck in Mobile, Alabama

Source of Sample: Shelby Tube

Depth: 16.5-18.5

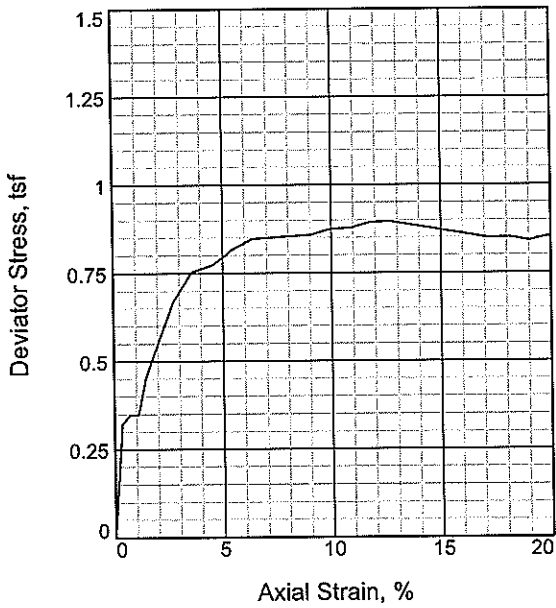
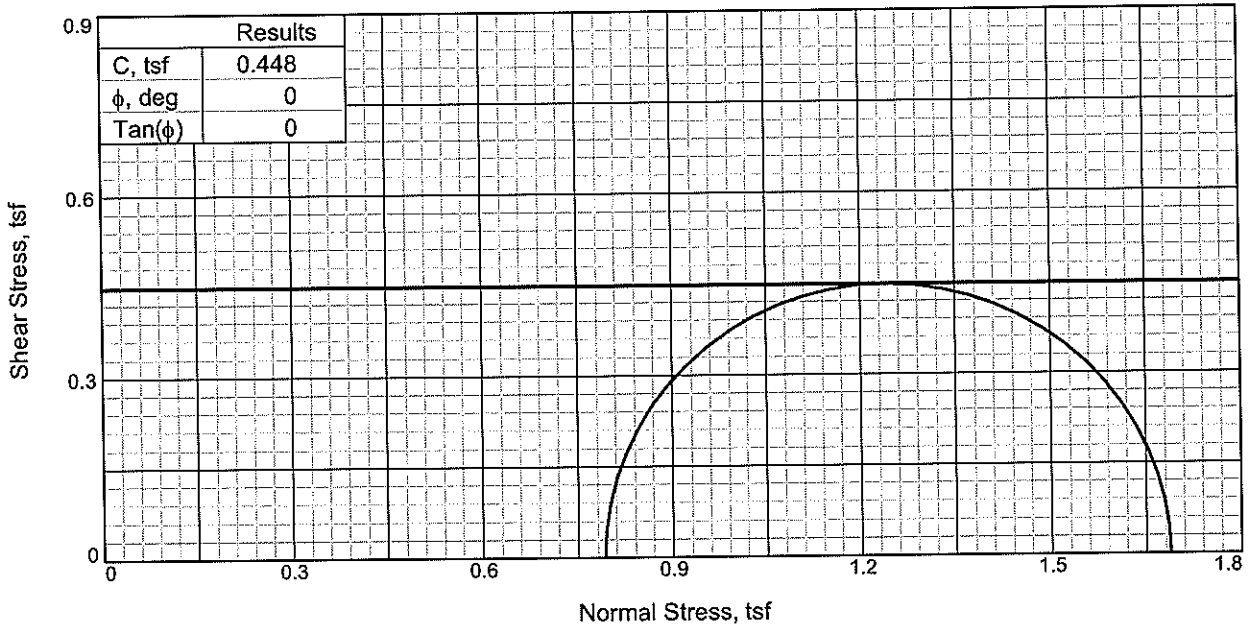
Sample Number: B-5, T-1

Project No.: 23-157

Figure \_\_\_\_\_

Geotechnical Engineering-Testing, Inc.

Tested By: BJ \_\_\_\_\_



Sample No.		1
Initial	Water Content, %	44.2
	Dry Density, pcf	77.2
	Saturation, %	99.4
	Void Ratio	1.2242
	Diameter, in.	1.44
At Test	Height, in.	2.76
	Water Content, %	44.5
	Dry Density, pcf	77.2
	Saturation, %	100.0
	Void Ratio	1.2242
Diameter, in.		1.44
Height, in.		2.76
Strain rate, in./min.		0.03
Back Pressure, psi		0.00
Cell Pressure, psi		11.00
Fail. Stress, tsf		0.90
Strain, %		12.7
Ult. Stress, tsf		
Strain, %		
$\sigma_1$ Failure, tsf		1.69
$\sigma_3$ Failure, tsf		0.79

**Type of Test:**

Unconsolidated Undrained

**Sample Type:** SPT

**Description:** Very dark brown clay with silt

**Assumed Specific Gravity=** 2.75

**Remarks:** 6-24-2023

1A Bulging failure

**Figure** \_\_\_\_\_

**Client:** City of Mobile

**Project:** Civic Center Parking Deck in Mobile, Alabama

**Source of Sample:** Split spoon      **Depth:** 18.5-20

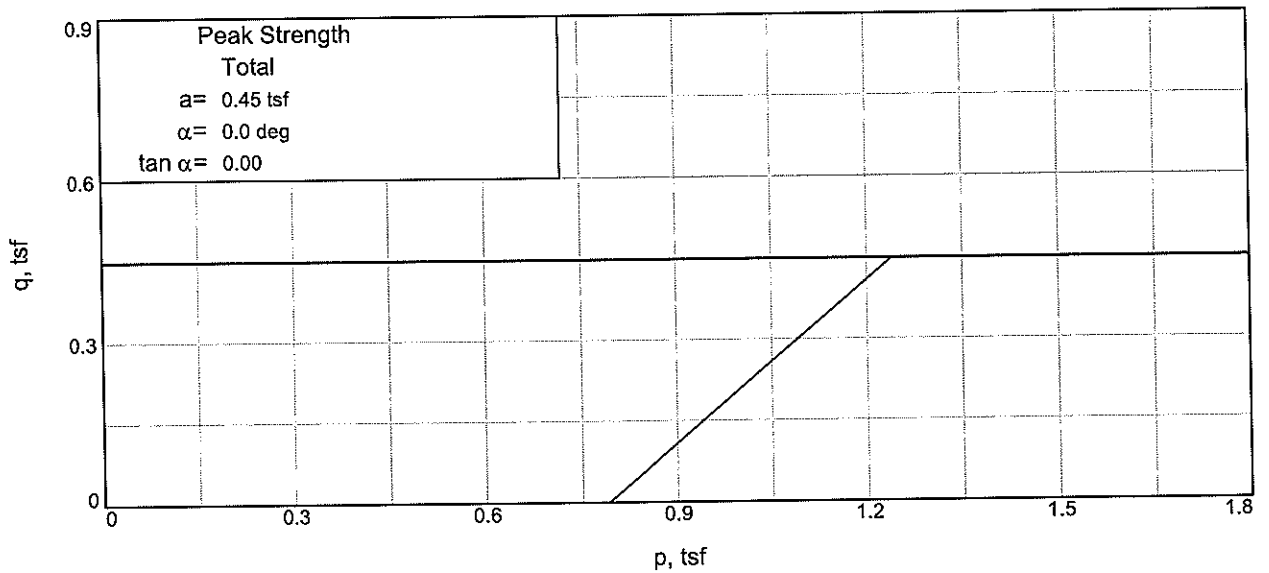
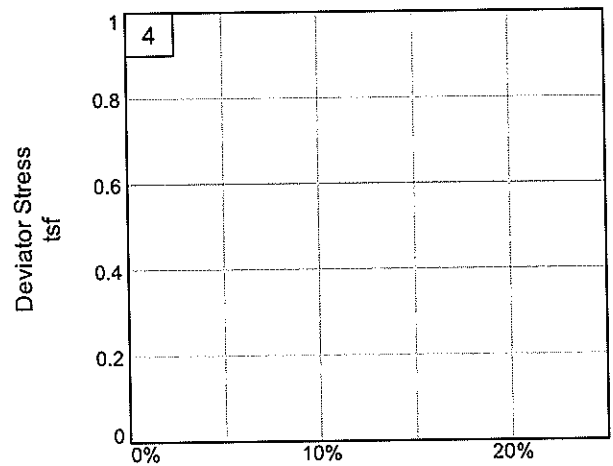
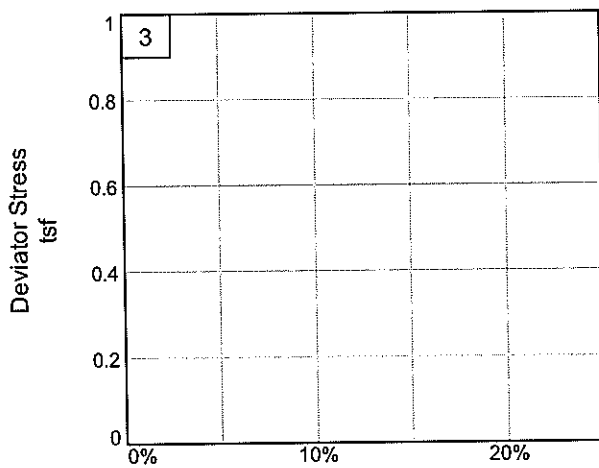
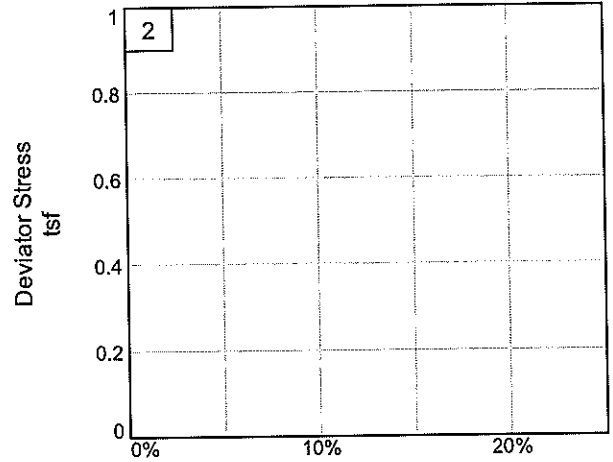
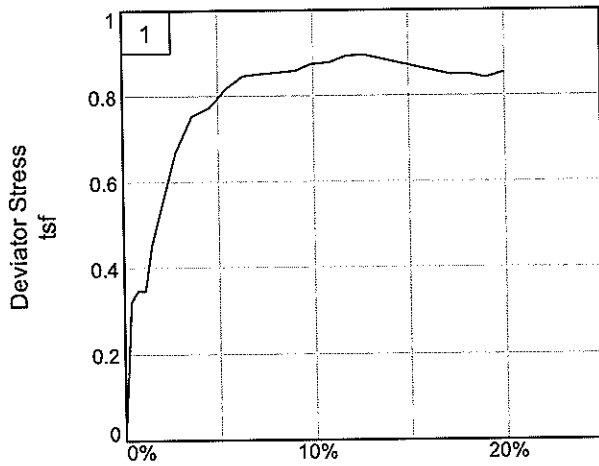
**Sample Number:** B-5. S-9

**Proj. No.:** 23-157

**Date Sampled:**

TRIAXIAL SHEAR TEST REPORT  
 Geotechnical Engineering-Testing, Inc.  
 Mobile, AL

**Tested By:** BJ \_\_\_\_\_



Client: City of Mobile

Project: Civic Center Parking Deck in Mobile, Alabama

Source of Sample: Split spoon

Depth: 18.5-20

Sample Number: B-5. S-9

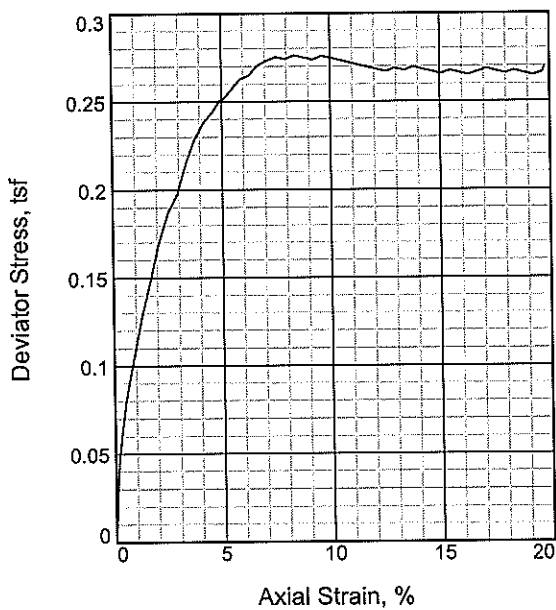
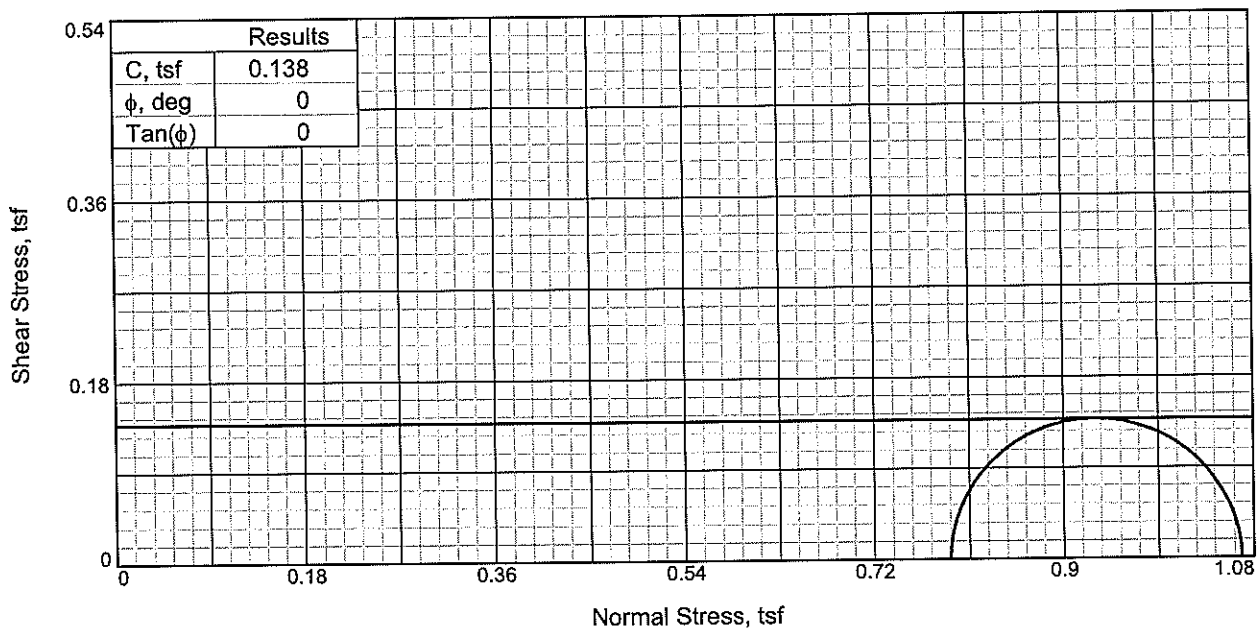
Project No.: 23-157

Figure \_\_\_\_\_

Geotechnical Engineering-Testing, Inc.

Tested By: BJ





Sample No.		1
Initial	Water Content, %	55.5
	Dry Density, pcf	28.2
	Saturation, %	30.1
	Void Ratio	4.9306
	Diameter, in.	2.73
At Test	Height, in.	5.97
	Water Content, %	184.0
	Dry Density, pcf	28.2
	Saturation, %	100.0
	Void Ratio	4.9306
Diameter, in.		2.73
	Height, in.	5.97
Strain rate, in./min.		0.06
Back Pressure, psi		0.00
Cell Pressure, psi		11.00
Fail. Stress, tsf		0.28
Strain, %		8.4
Ult. Stress, tsf		
Strain, %		
$\sigma_1$ Failure, tsf		1.07
$\sigma_3$ Failure, tsf		0.79

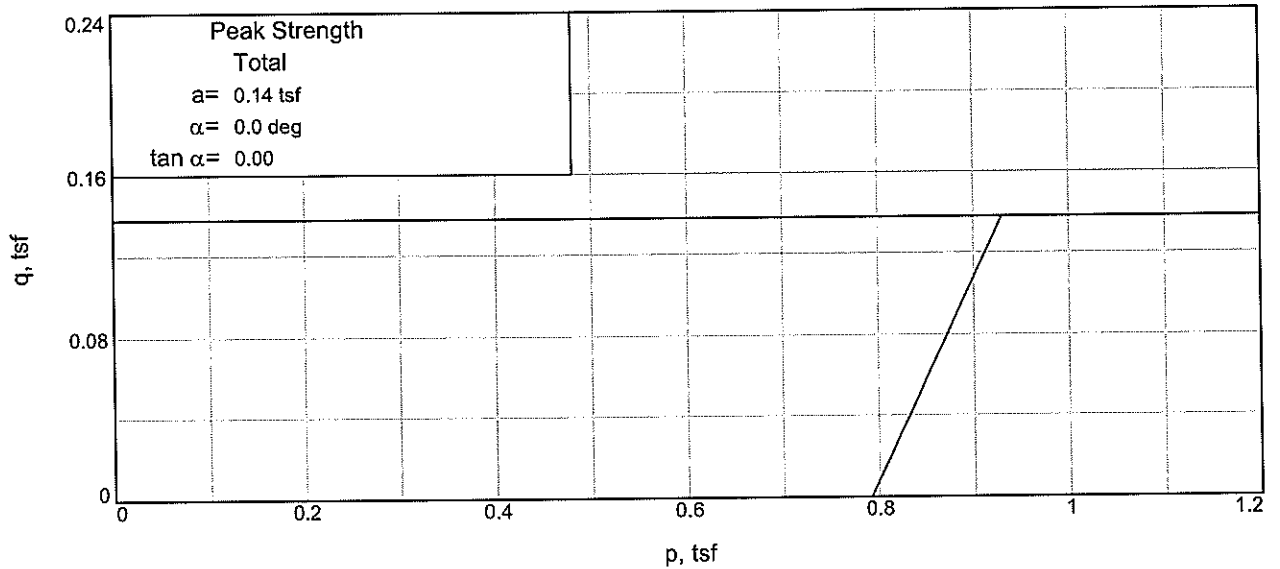
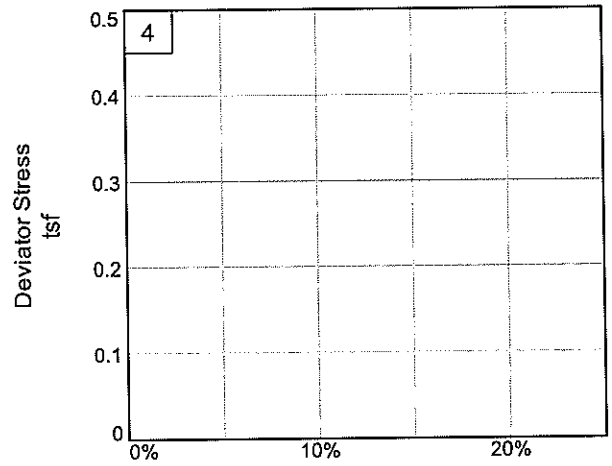
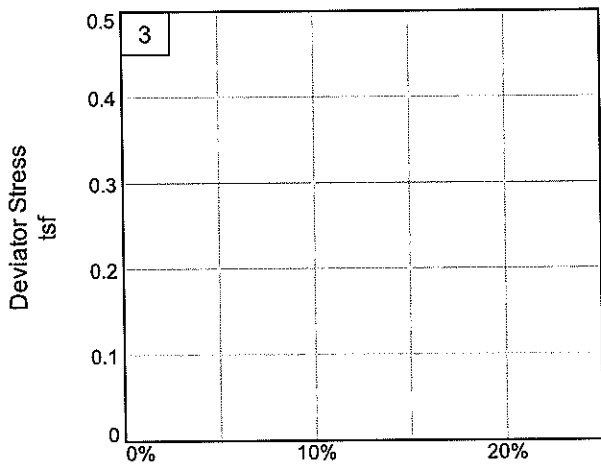
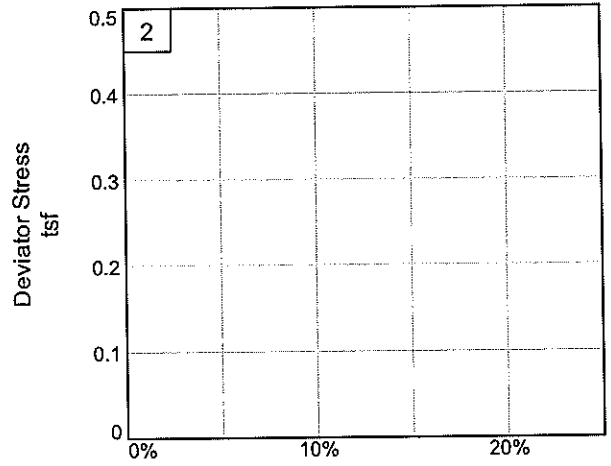
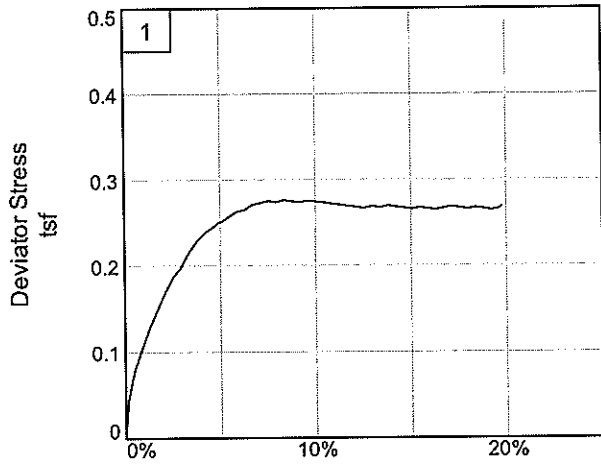
**Type of Test:**  
Unconsolidated Undrained  
**Sample Type:** Undisturbed  
**Description:** Dark gray clay

**Assumed Specific Gravity=** 2.68  
**Remarks:** 6-24-2023  
1A Shear failure

**Figure** \_\_\_\_\_

**Client:** City of Mobile  
**Project:** Civic Center Parking Deck in Mobile, Alabama  
**Source of Sample:** Shelby Tube      **Depth:** 18.5-20.5  
**Sample Number:** B-7, T-1  
**Proj. No.:** 23-157      **Date Sampled:**  
TRIAXIAL SHEAR TEST REPORT  
Geotechnical Engineering-Testing, Inc.  
Mobile, AL

**Tested By:** BJ \_\_\_\_\_



**Client:** City of Mobile

**Project:** Civic Center Parking Deck in Mobile, Alabama

**Source of Sample:** Shelby Tube

**Depth:** 18.5-20.5

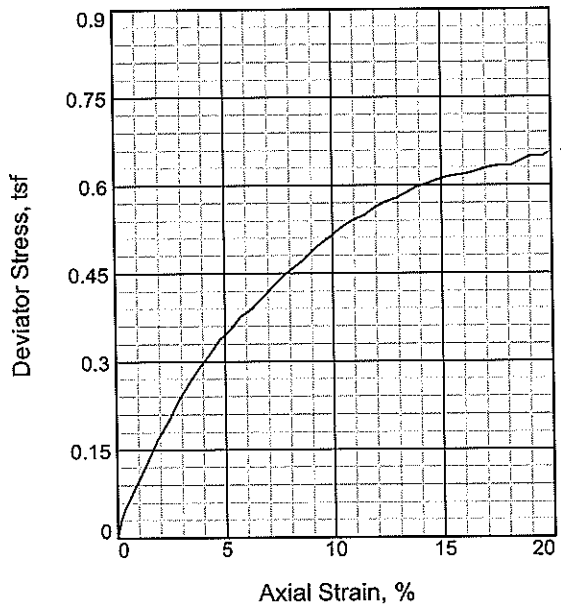
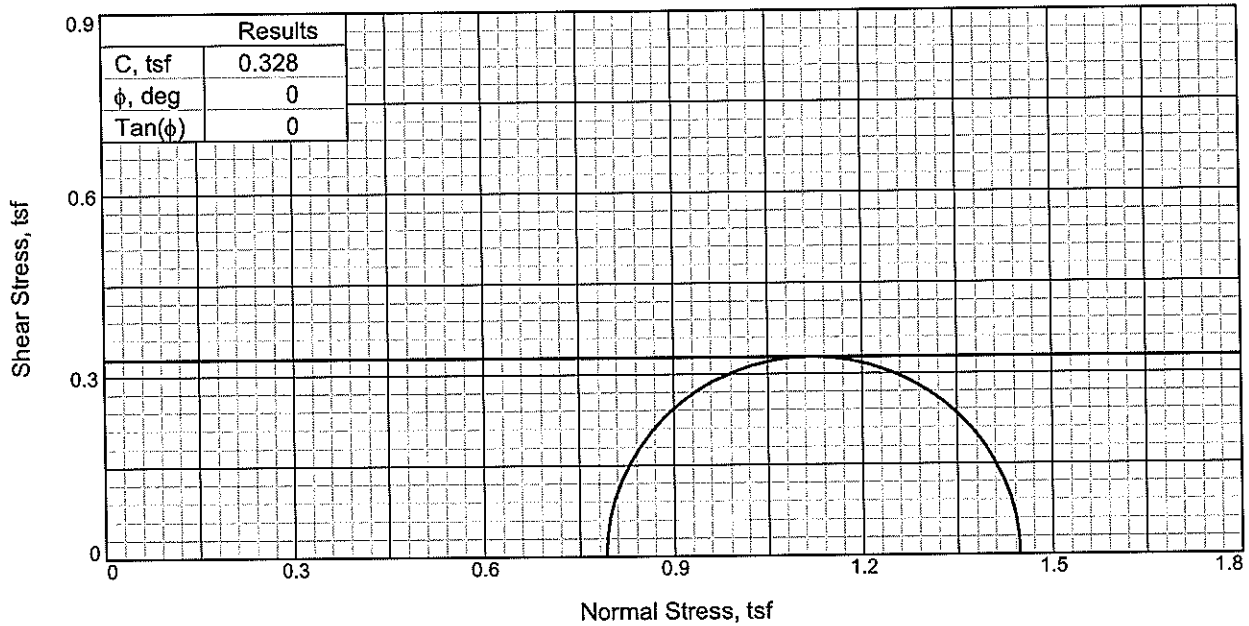
**Sample Number:** B-7, T-1

**Project No.:** 23-157

**Figure** \_\_\_\_\_

**Geotechnical Engineering-Testing, Inc.**

**Tested By:** BJ



Sample No.		1
Initial	Water Content, %	31.1
	Dry Density, pcf	93.2
	Saturation, %	99.3
	Void Ratio	0.8761
	Diameter, in.	2.77
	Height, in.	5.23
At Test	Water Content, %	31.3
	Dry Density, pcf	93.2
	Saturation, %	100.0
	Void Ratio	0.8761
	Diameter, in.	2.77
	Height, in.	5.23
Strain rate, in./min.		0.06
Back Pressure, psi		0.00
Cell Pressure, psi		11.00
Fail. Stress, tsf		0.66
Strain, %		19.9
Ult. Stress, tsf		
Strain, %		
$\sigma_1$ Failure, tsf		1.45
$\sigma_3$ Failure, tsf		0.79

**Type of Test:**  
Unconsolidated Undrained

**Sample Type:** Undisturbed

**Description:** Dark gray clayey sand

**Assumed Specific Gravity=** 2.80

**Remarks:** 6-27-2023  
1A Shear failure

**Client:** City of Mobile

**Project:** Civic Center Parking Deck in Mobile, Alabama

**Source of Sample:** Shelby Tube      **Depth:** 16.5-18.5

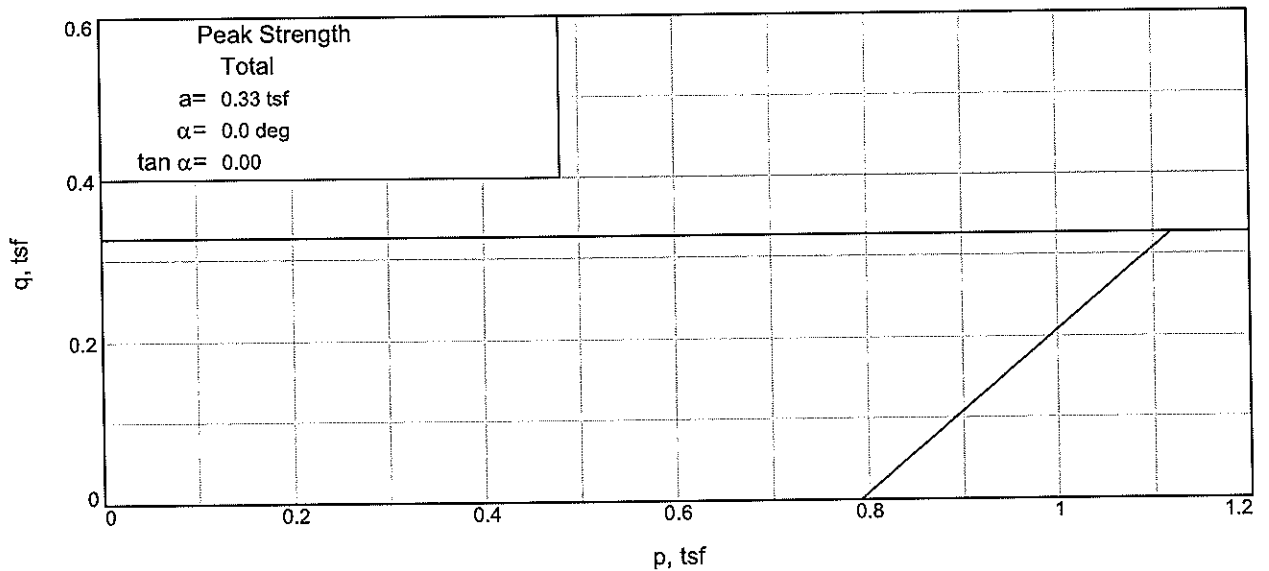
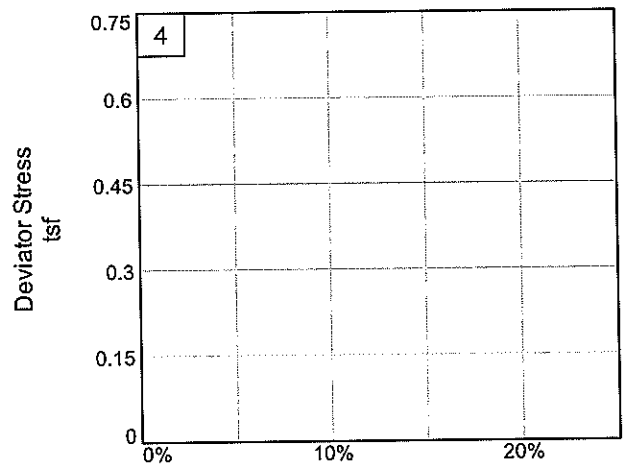
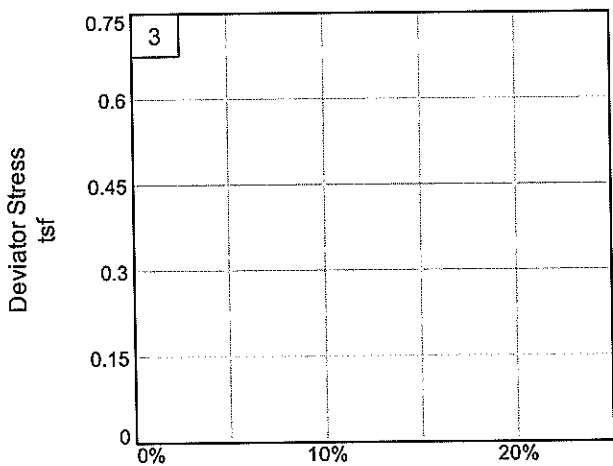
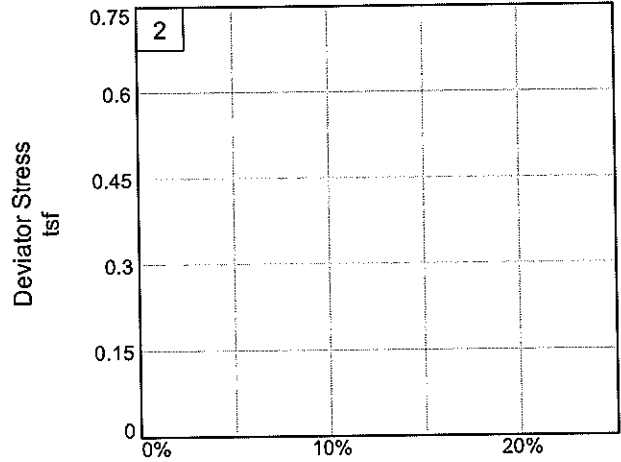
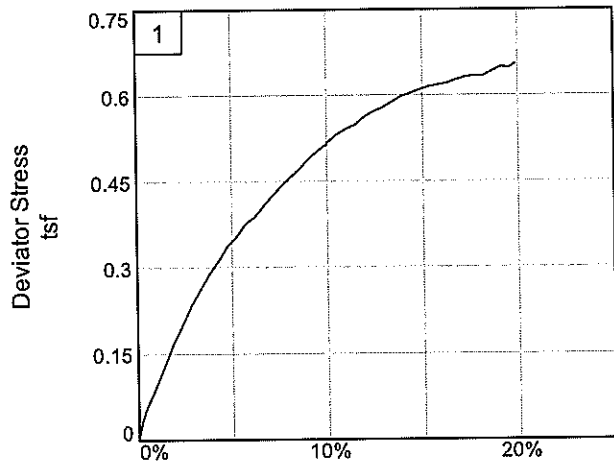
**Sample Number:** B-8, T-1

**Proj. No.:** 23-157      **Date Sampled:**

TRIAXIAL SHEAR TEST REPORT  
 Geotechnical Engineering-Testing, Inc.  
 Mobile, AL

Figure \_\_\_\_\_

Tested By: BJ



Client: City of Mobile

Project: Civic Center Parking Deck in Mobile, Alabama

Source of Sample: Shelby Tube

Depth: 16.5-18.5

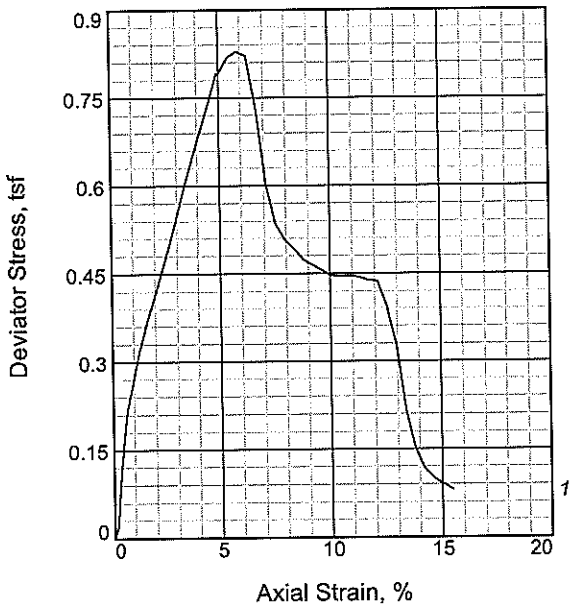
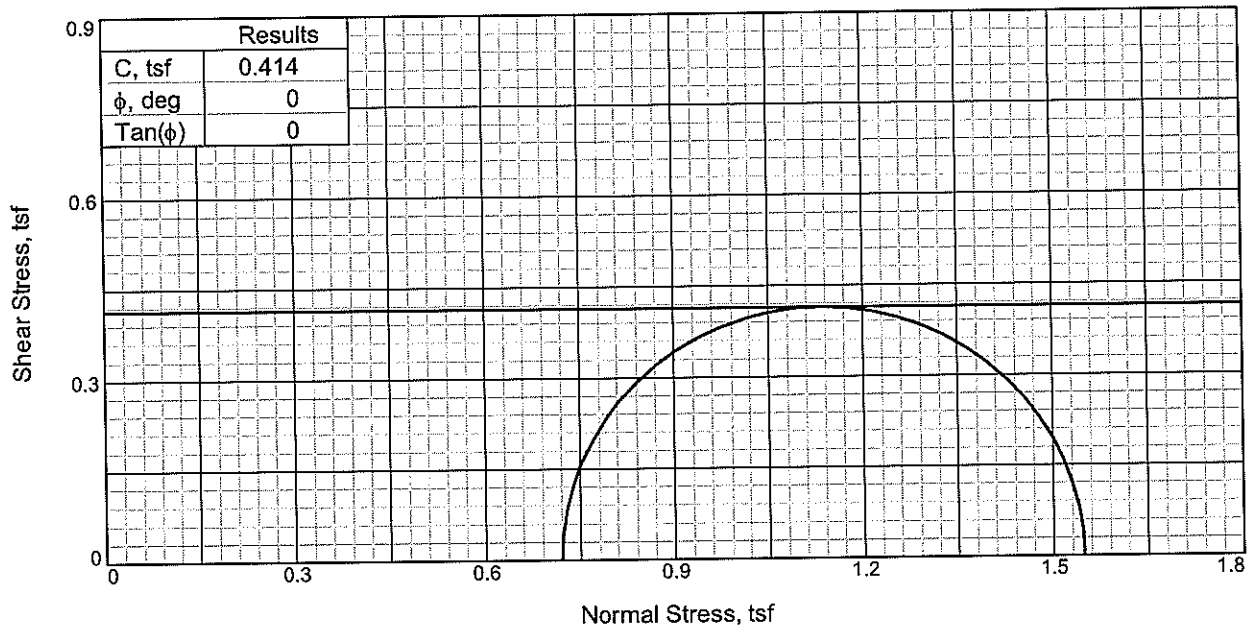
Sample Number: B-8, T-1

Project No.: 23-157

Figure \_\_\_\_\_

Geotechnical Engineering-Testing, Inc.

Tested By: BJ



Sample No.		1
Initial	Water Content, %	49.3
	Dry Density, pcf	58.7
	Saturation, %	71.4
	Void Ratio	1.8504
	Diameter, in.	2.76
	Height, in.	5.98
At Test	Water Content, %	69.0
	Dry Density, pcf	58.7
	Saturation, %	100.0
	Void Ratio	1.8504
	Diameter, in.	2.76
	Height, in.	5.98
Strain rate, in./min.	0.06	
Back Pressure, psi	0.00	
Cell Pressure, psi	10.00	
Fail. Stress, tsf	0.83	
Strain, %	5.9	
Ult. Stress, tsf		
Strain, %		
$\sigma_1$ Failure, tsf	1.55	
$\sigma_3$ Failure, tsf	0.72	

**Type of Test:**  
Unconsolidated Undrained

**Sample Type:** Undisturbed

**Description:** Gray clayey sand

**Assumed Specific Gravity=** 2.68

**Remarks:** 6-27-2023  
2A Shear failure

**Client:** City of Mobile

**Project:** Civic Center Parking Deck in Mobile, Alabama

**Source of Sample:** Shelby Tube      **Depth:** 16.5-18.5

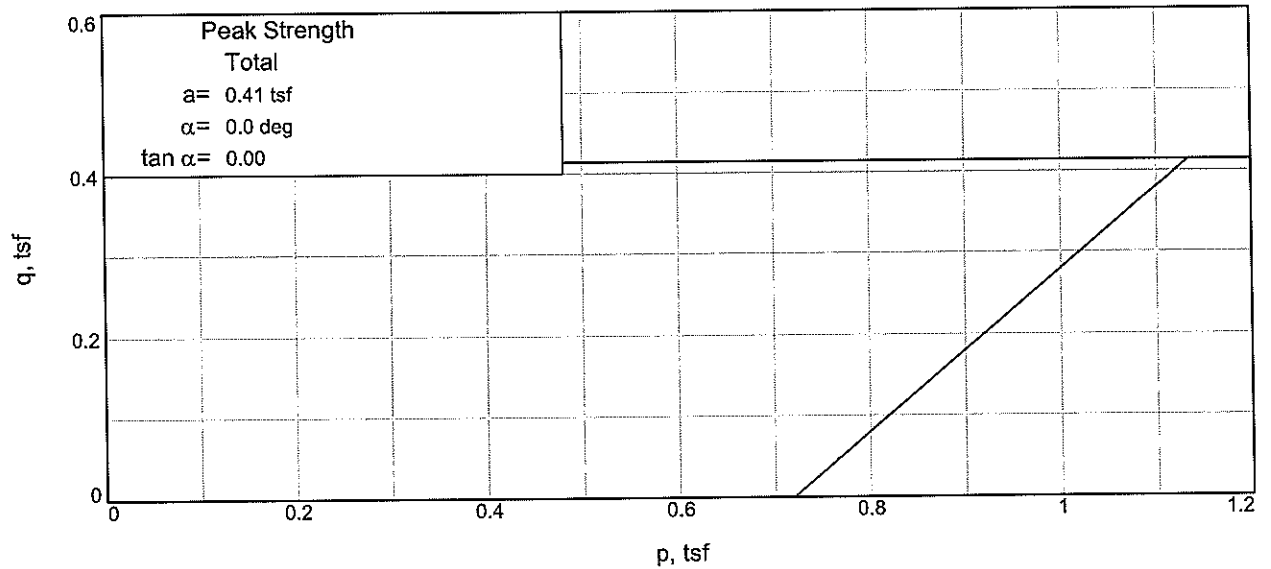
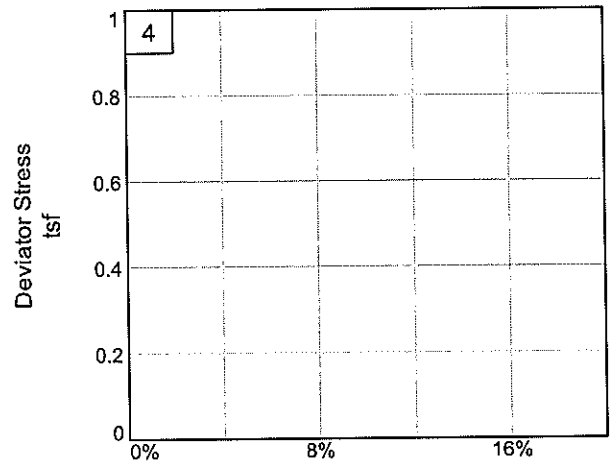
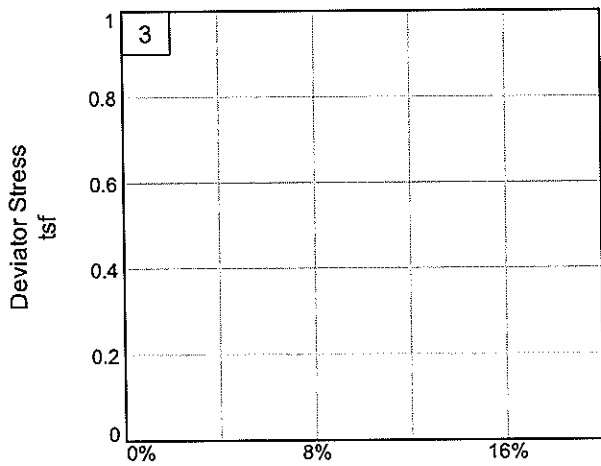
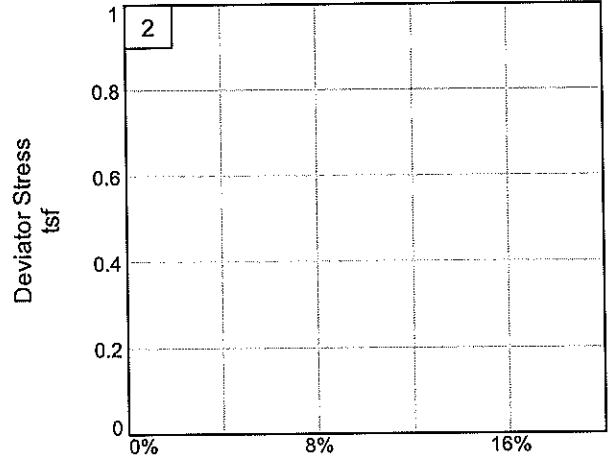
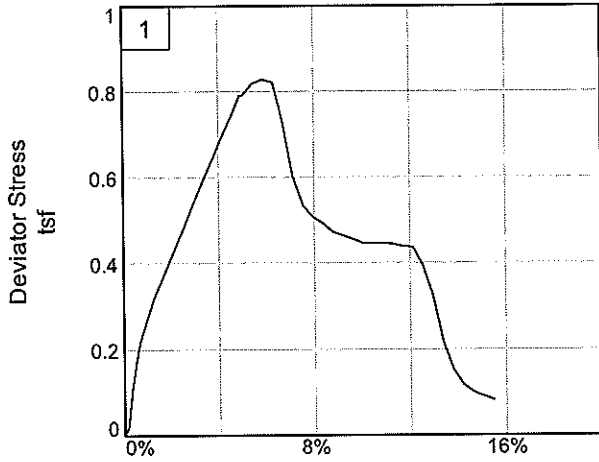
**Sample Number:** B-10. T-1

**Proj. No.:** 23-157      **Date Sampled:**

TRIAXIAL SHEAR TEST REPORT  
Geotechnical Engineering-Testing, Inc.  
Mobile, AL

Figure \_\_\_\_\_

Tested By: BJ



Client: City of Mobile

Project: Civic Center Parking Deck in Mobile, Alabama

Source of Sample: Shelby Tube

Depth: 16.5-18.5

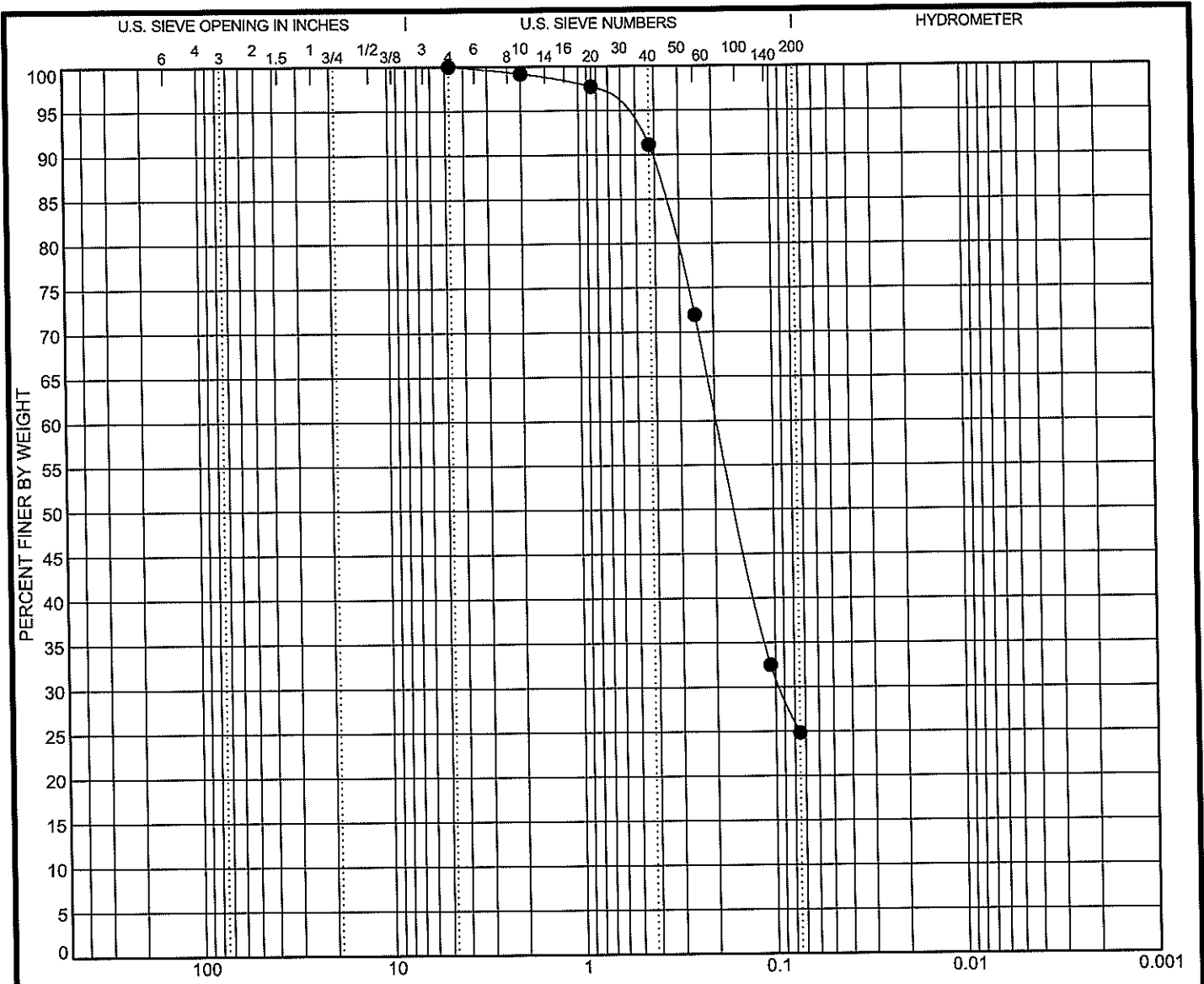
Sample Number: B-10. T-1

Project No.: 23-157

Figure \_\_\_\_\_

Geotechnical Engineering-Testing, Inc.

Tested By: BJ \_\_\_\_\_



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● A-1 1;0.3 ft.	SILTY SAND (SM)					NP	16	NP		
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
A-1 0.3 ft.	4.75	0.193	0.095		0.0	75.2	24.8			

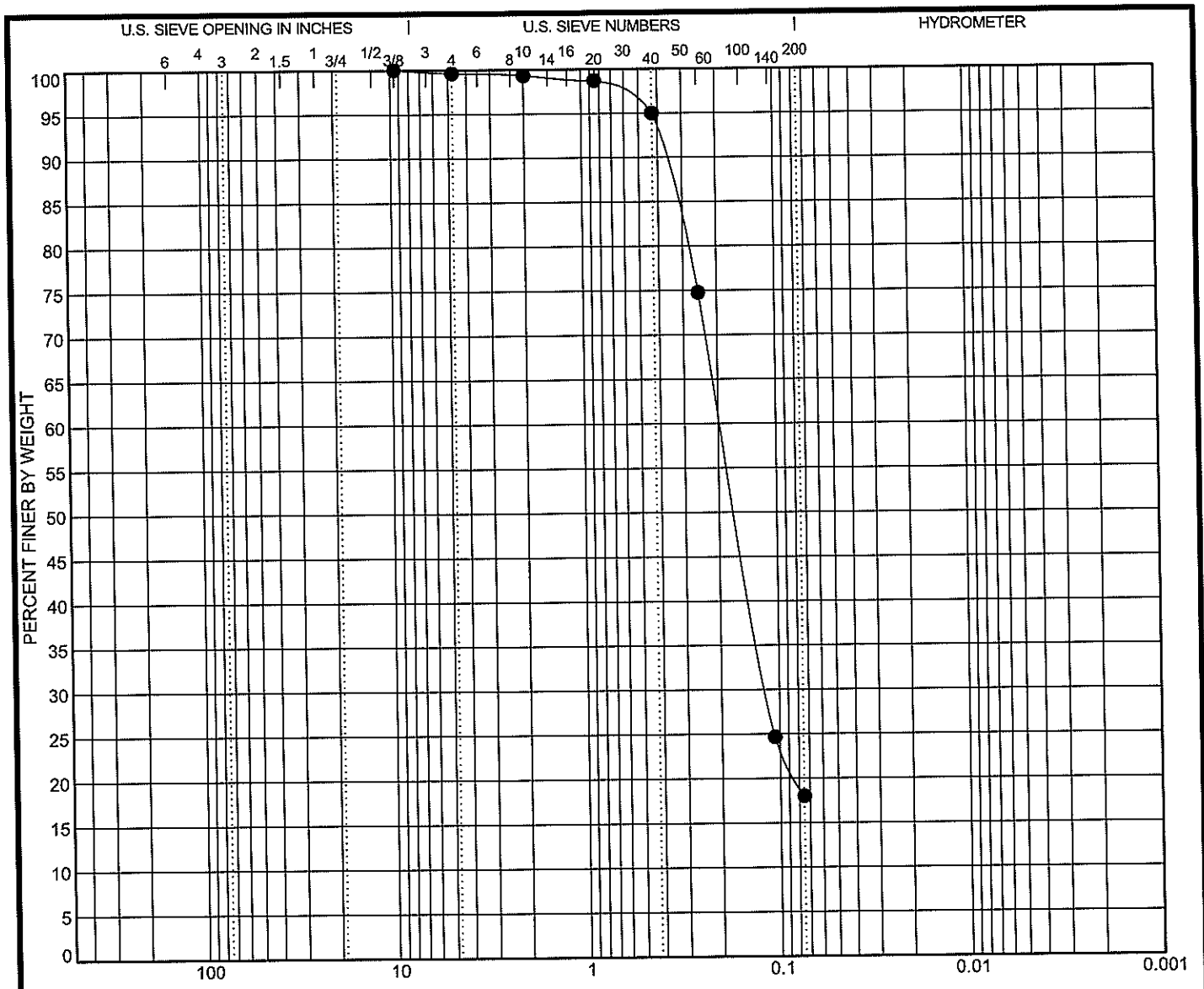
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● A-2 1; 0.4 ft.	SILTY SAND (SM)	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
A-2 0.4 ft.	9.5	0.194	0.116		0.4	81.6	18.0	

REMARKS:

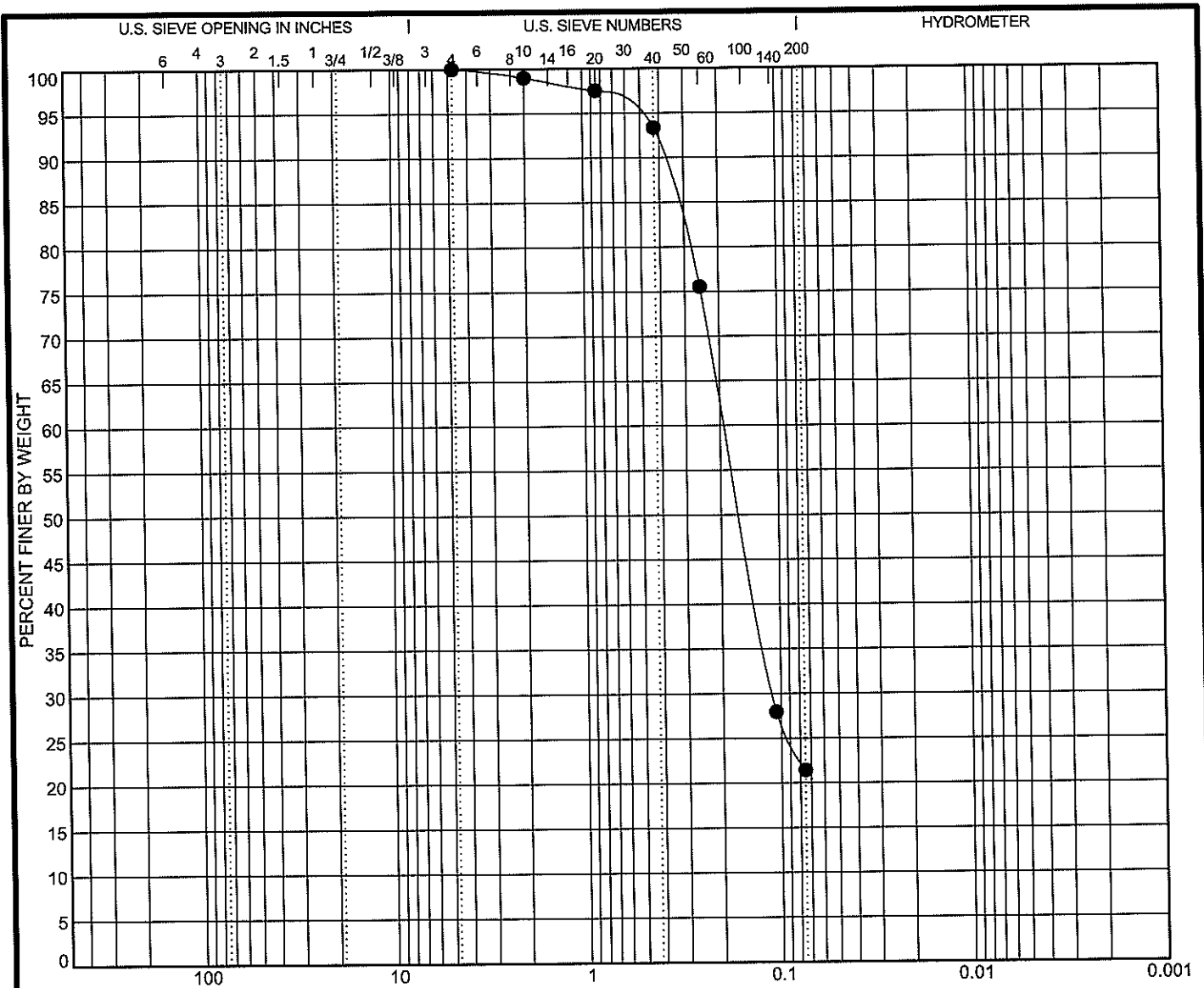
GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL





Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● A-3 1;0.4 ft.	SILTY SAND (SM)	NP	14	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
A-3 0.4 ft.	4.75	0.189	0.11		0.0	78.6	21.4	

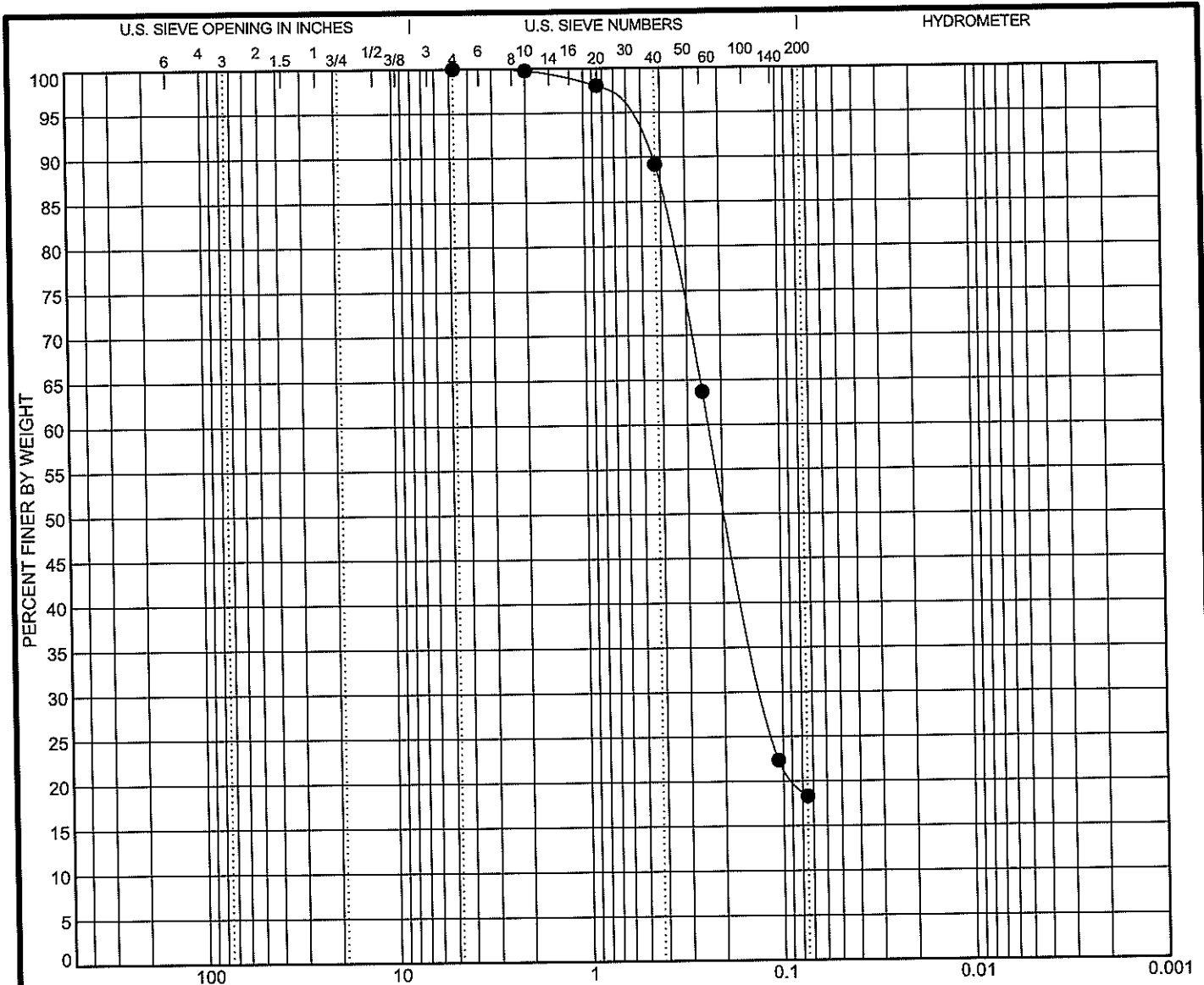
REMARKS:

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● A-4 1;0.4 ft.	SILTY SAND (SM)	NP	14	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
A-4 0.4 ft.	4.75	0.232	0.124		0.0	81.7	18.3	

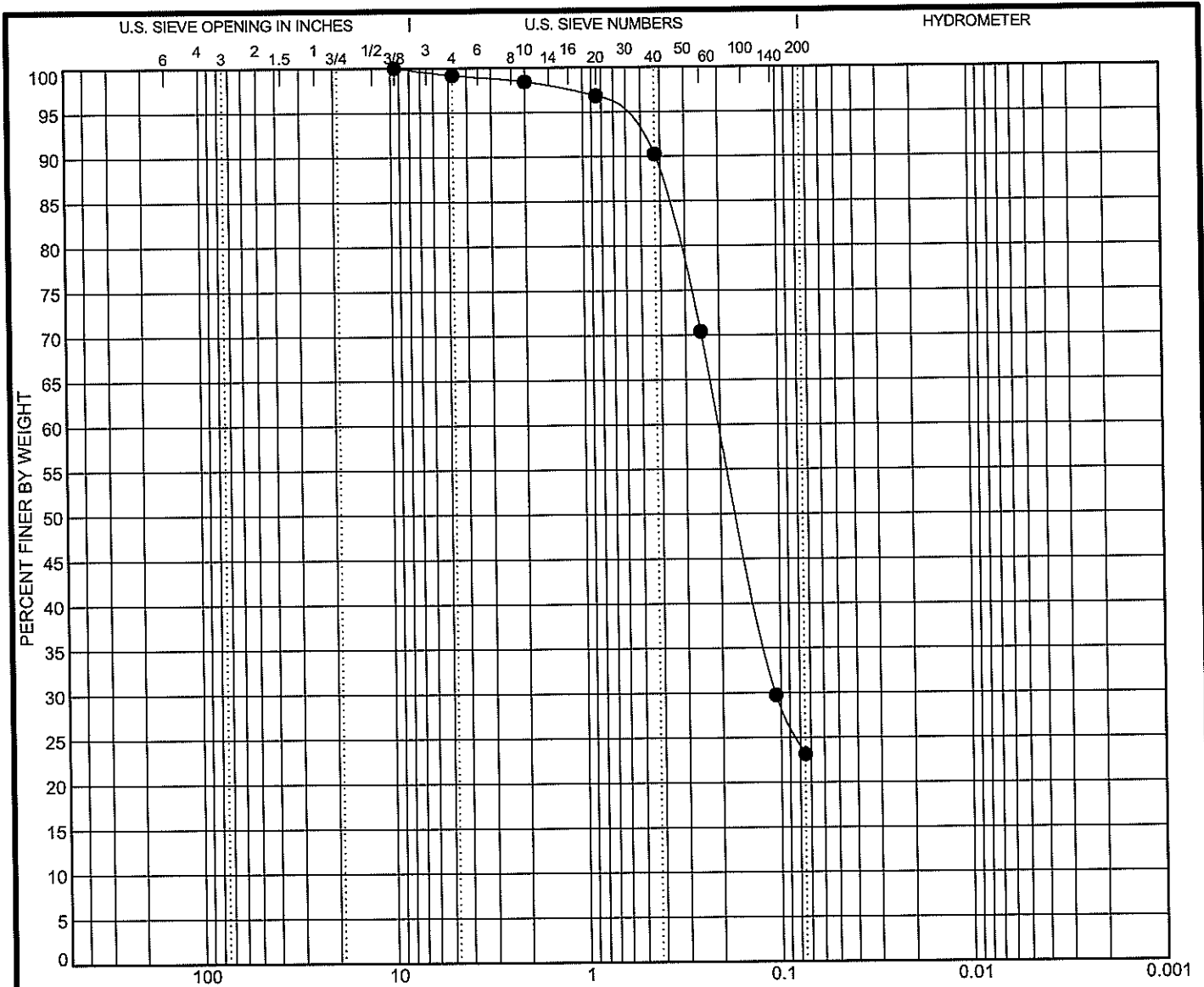
REMARKS:

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/723



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● A-5 1;0.3 ft.	SILTY, CLAYEY SAND (SC-SM)	17	12	5		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
A-5 0.3 ft.	9.5	0.201	0.107		0.8	76.1	23.1	

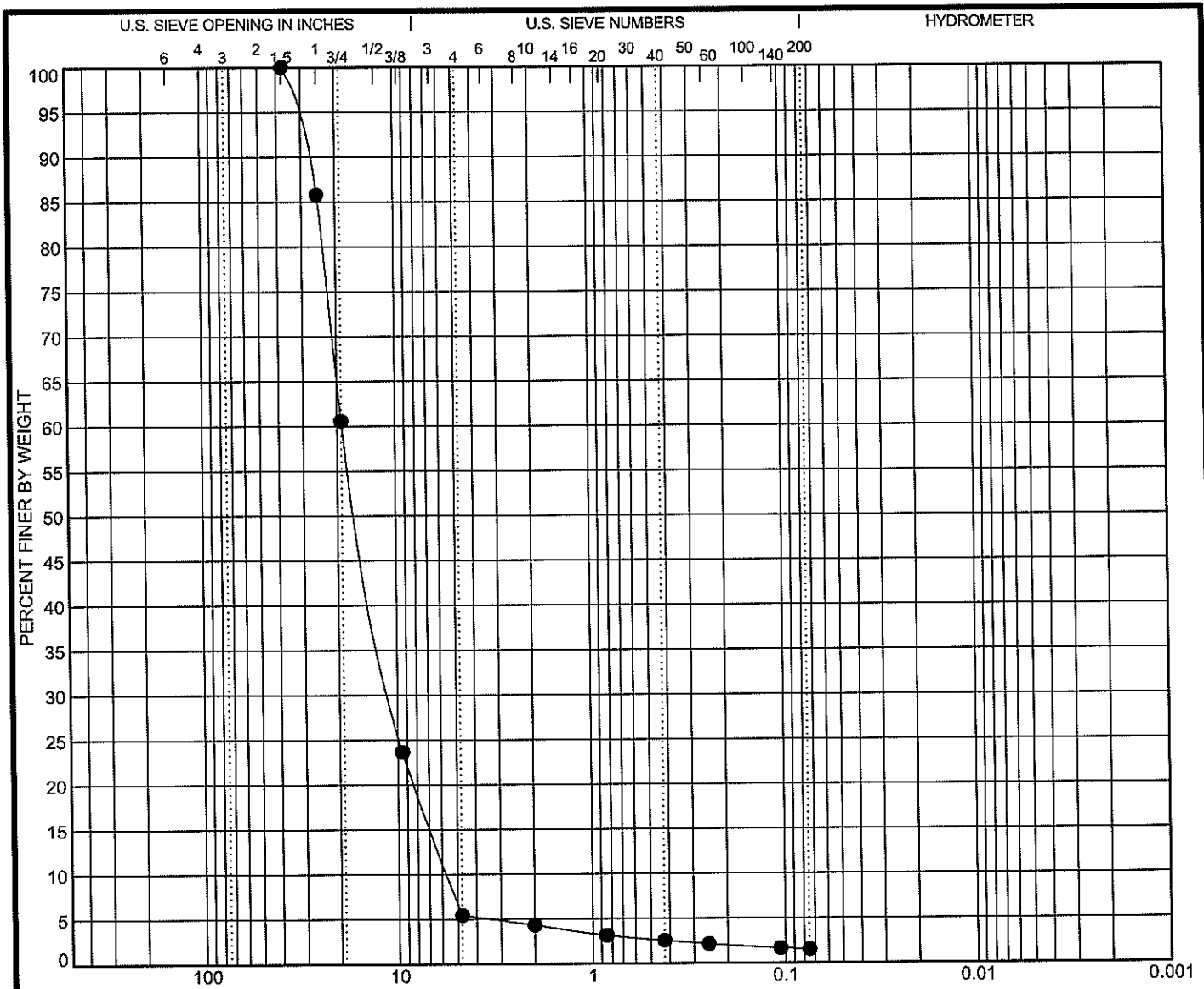
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● A-6 1;0.2 ft.	POORLY GRADED GRAVEL (GP)	NP	NP	NP	1.08	3.33

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
A-6 0.2 ft.	37.5	18.807	10.703	5.653	94.6	3.9	1.5	

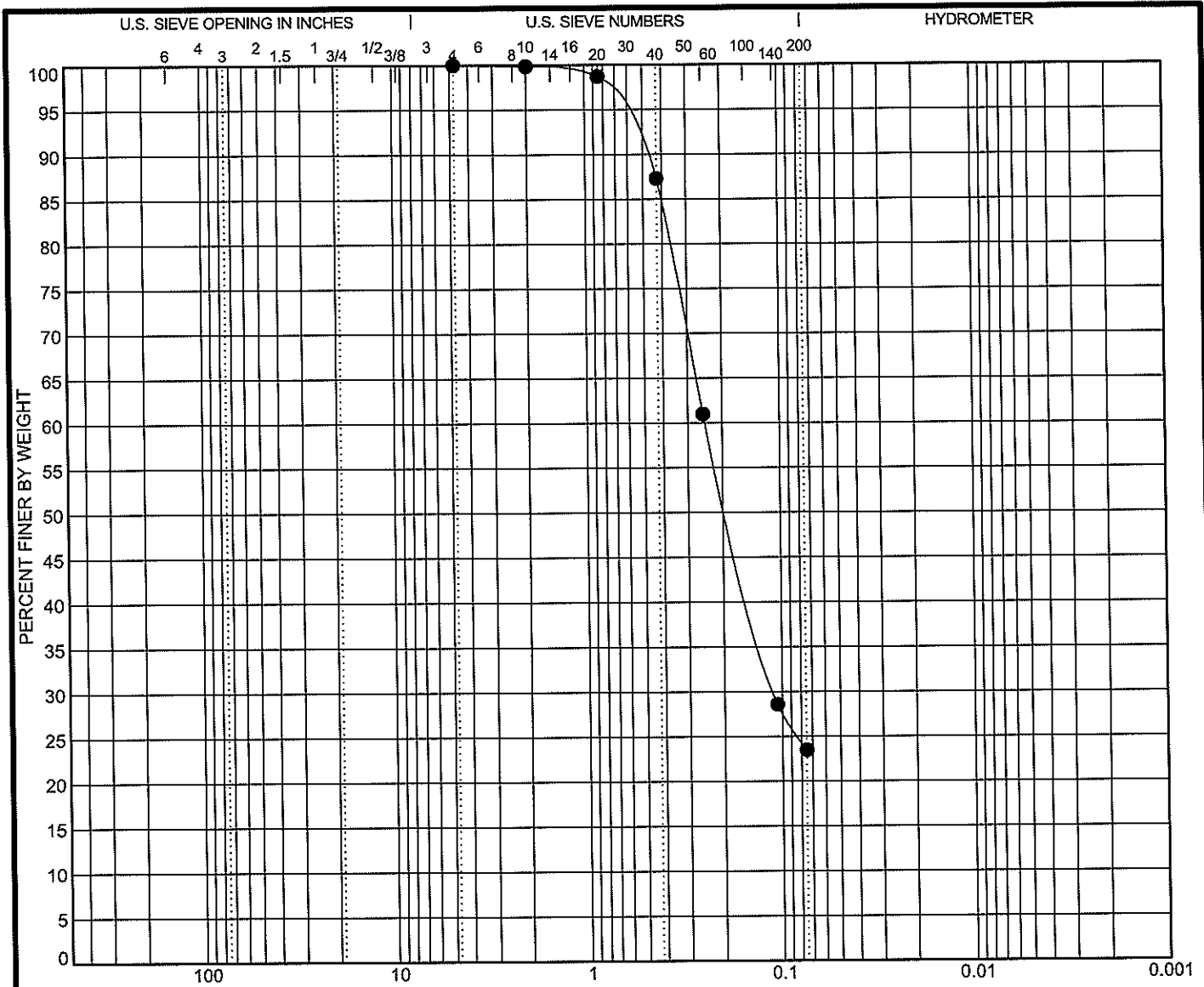
REMARKS:



### GRAIN SIZE DISTRIBUTION

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● A-7 1;0.3 ft.	SILTY SAND (SM)	19	16	3		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
A-7 0.3 ft.	4.75	0.244	0.11		0.0	76.5	23.5	

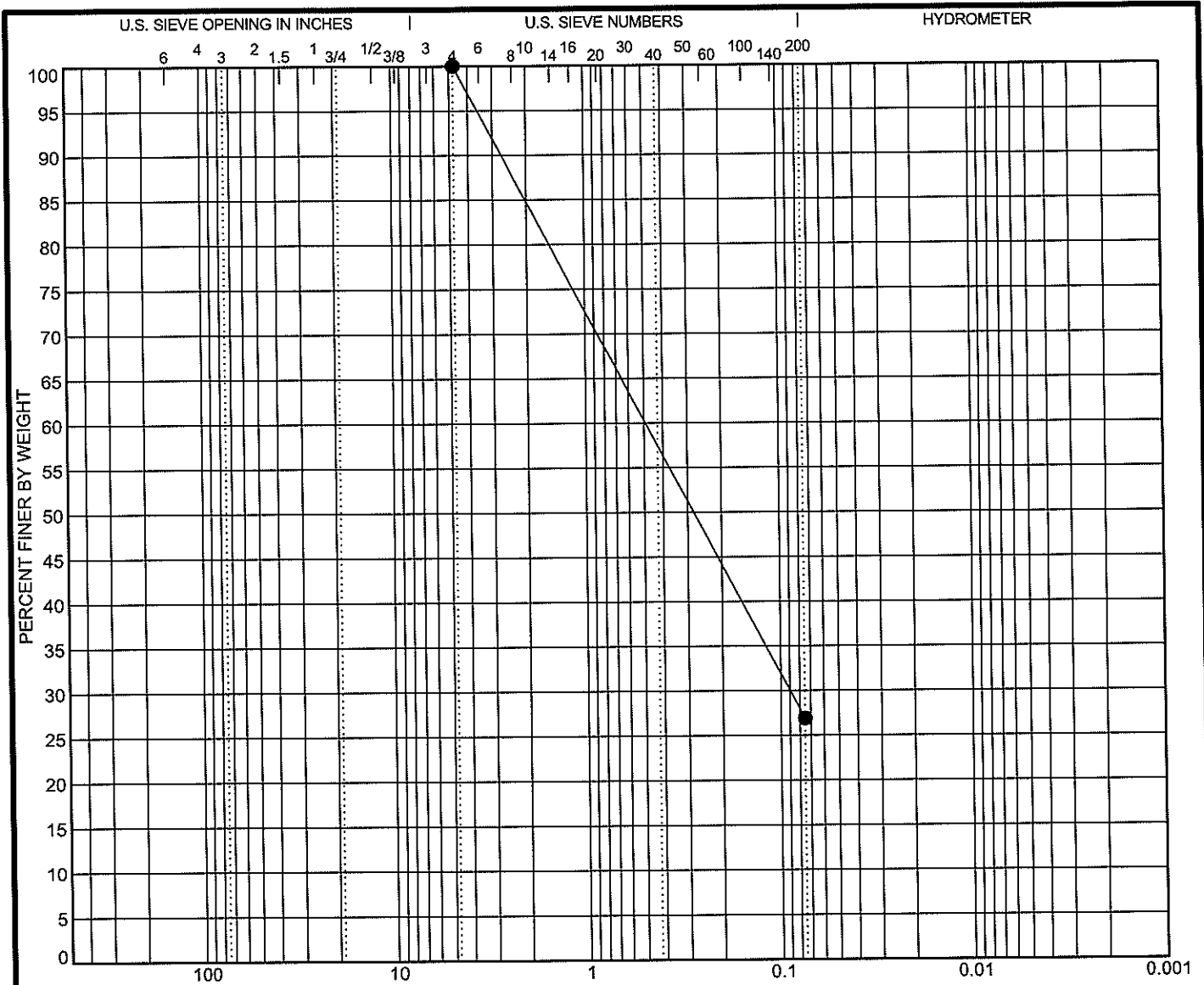
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-1 S-7;11.5 ft.	SILTY SAND (SM)	22	20	2		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-01 11.5 ft.	4.75	0.491	0.09		0.0	73.1		26.9

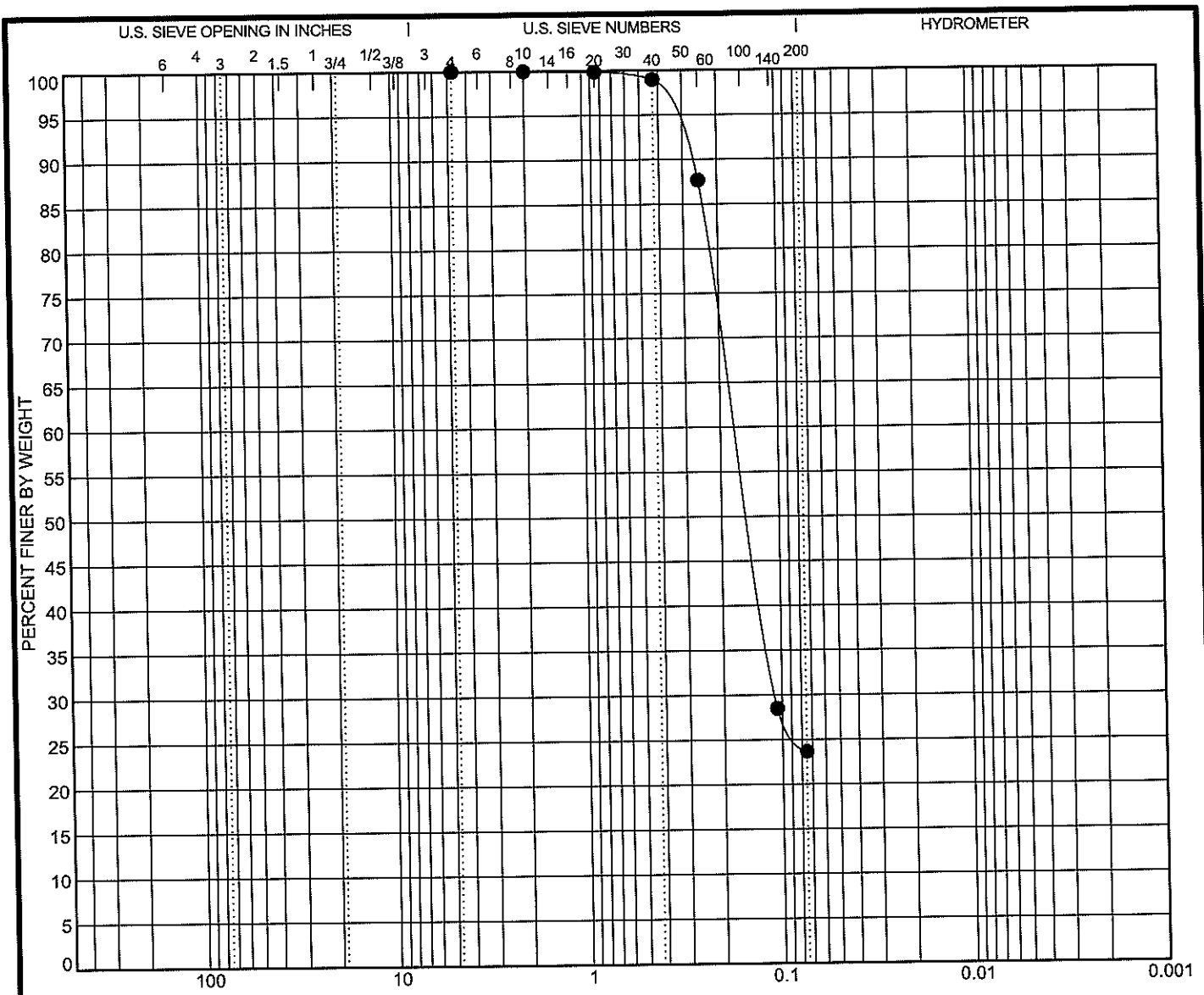
REMARKS:

GET GRAINSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-1 T-1; 14.0 ft.	SILTY, CLAYEY SAND (SC-SM)	24	20	4		

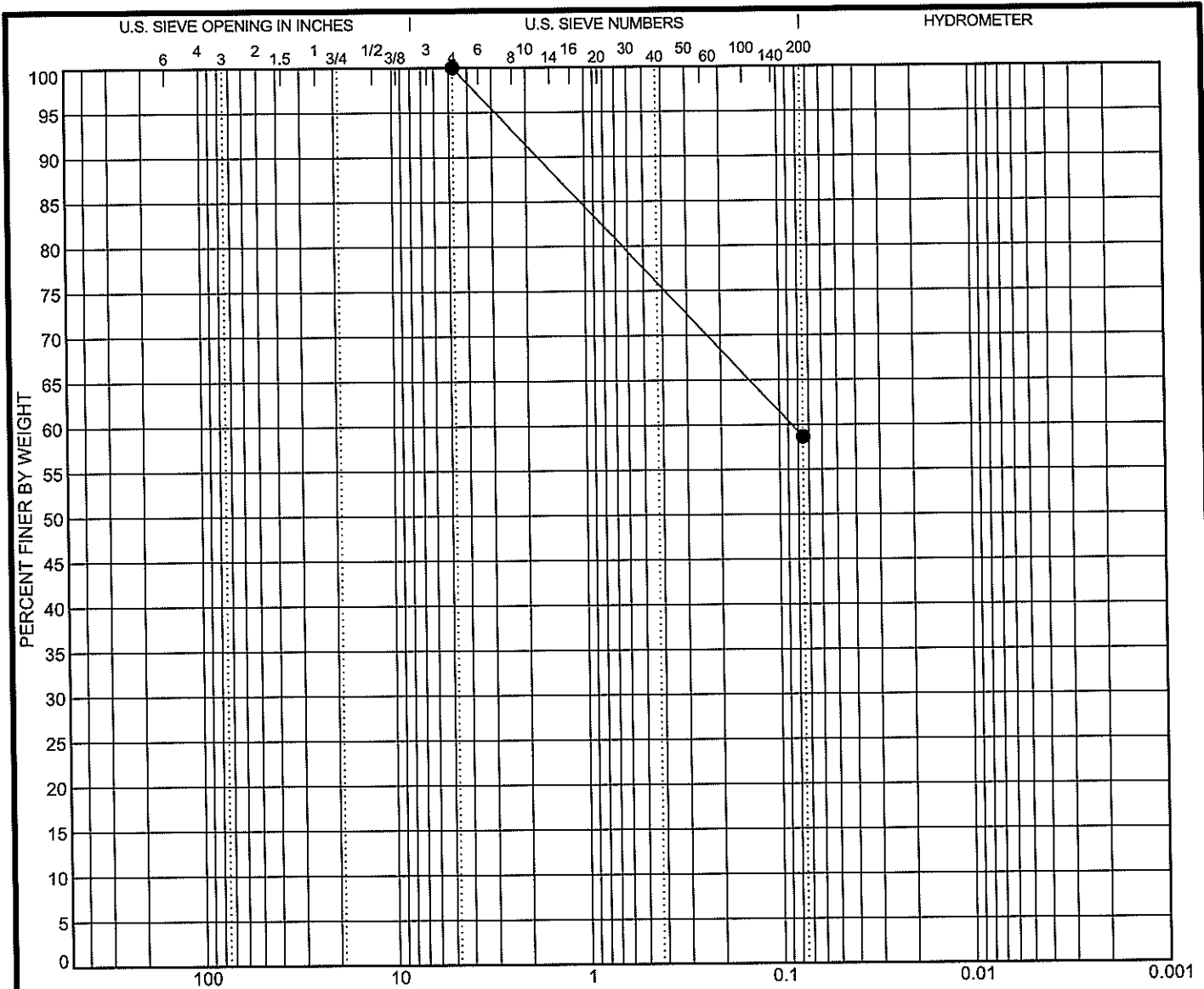
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-01 14.0 ft.	4.75	0.167	0.108		0.0	76.3	23.7	

REMARKS:



**GRAIN SIZE DISTRIBUTION**  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET, GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/1/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-1 S-9;16.5 ft.	SANDY FAT CLAY (CH)					58	21	37		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-01 16.5 ft.	4.75	0.086			0.0	41.4	58.6	

REMARKS:

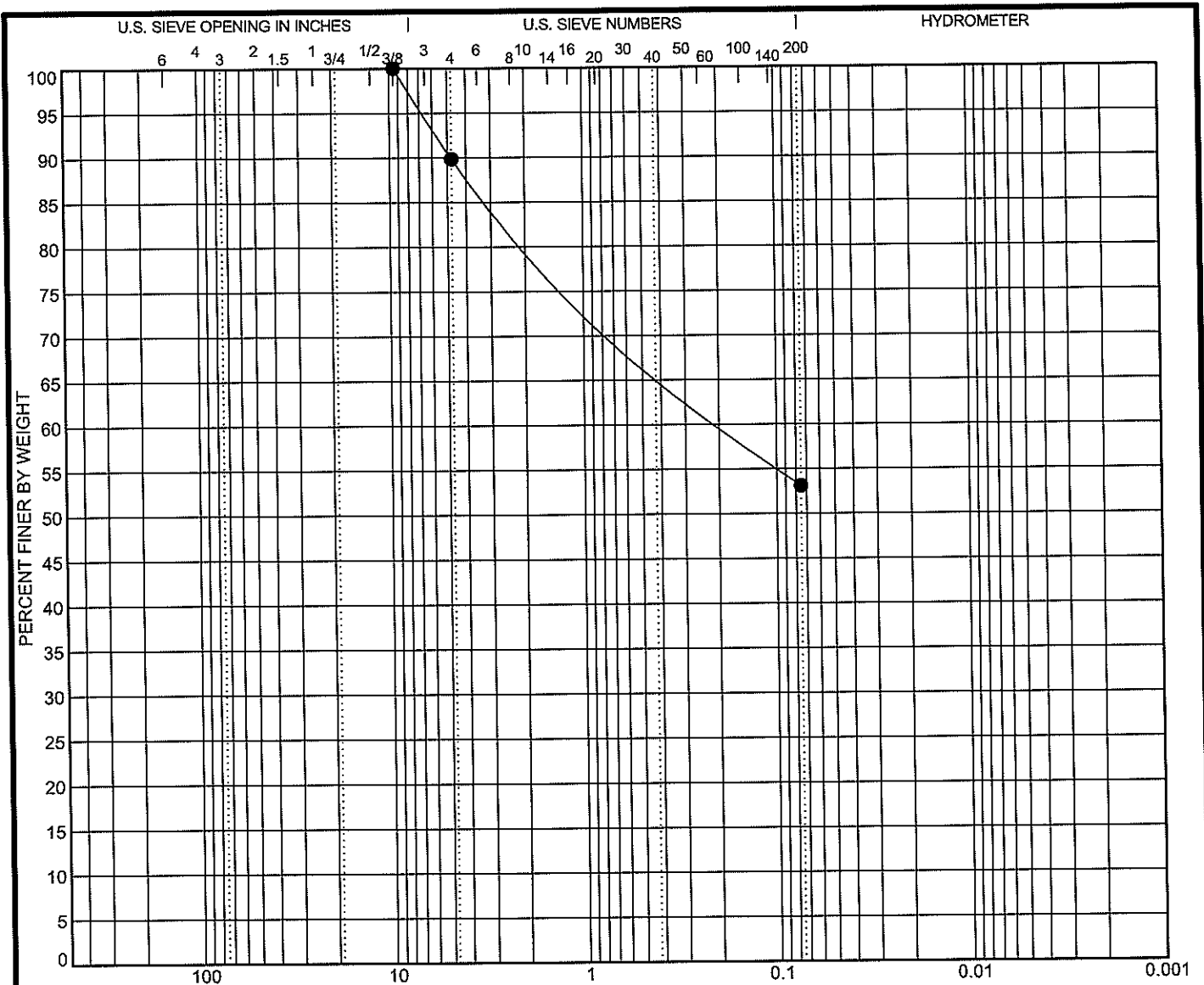


**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23





Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-1 S-10; 19.0 ft.	SANDY ELASTIC SILT (MH)	94	49	45		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-01 19.0 ft.	9.5	0.164			10.2	36.8	53.1	

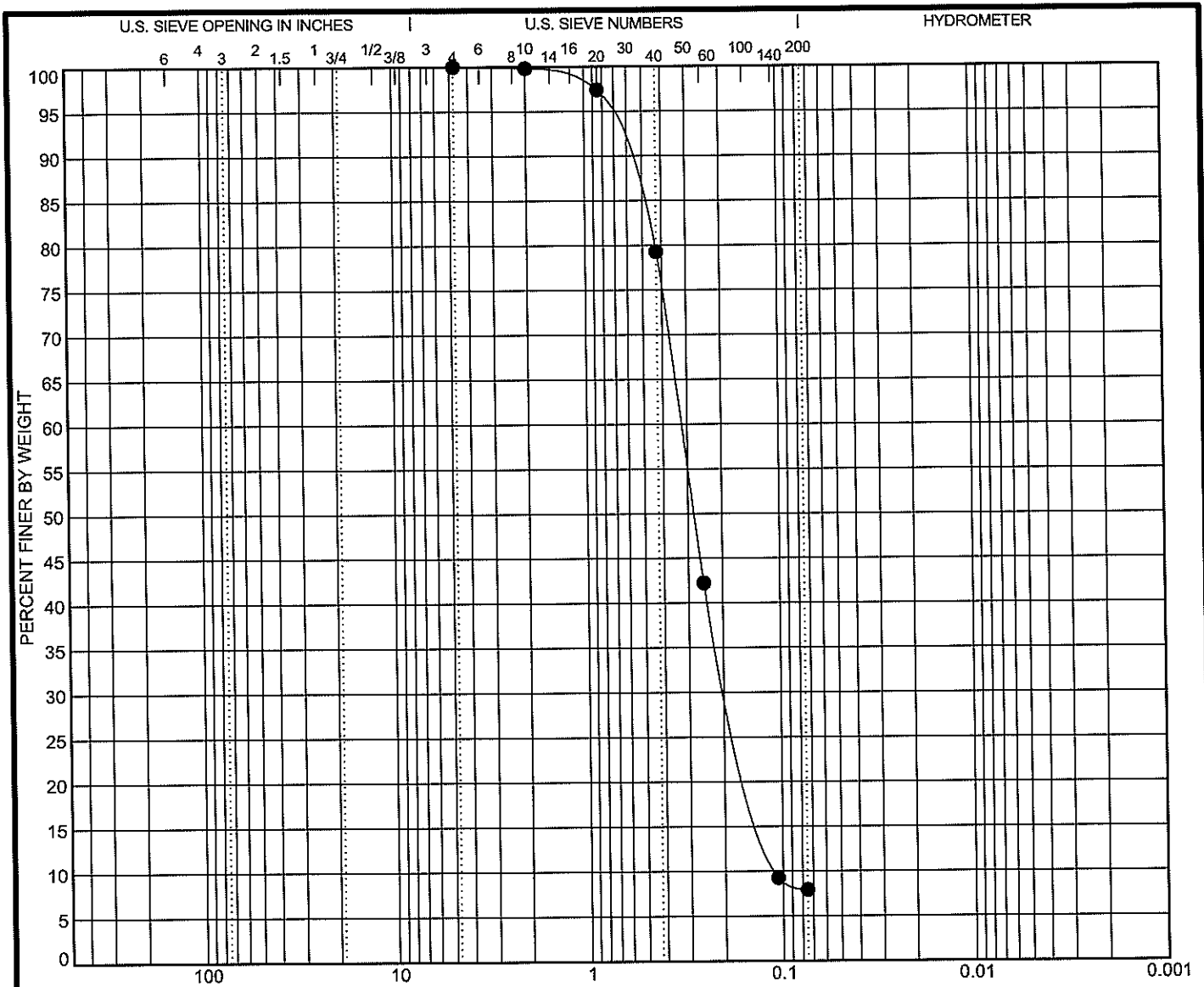
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-1 S-15;44.0 ft.	POORLY GRADED SAND with SILT (SP-SM)					NP	NP	NP	0.95	2.98
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-01 44.0 ft.	4.75	0.323	0.182	0.108	0.0	92.1	7.9			

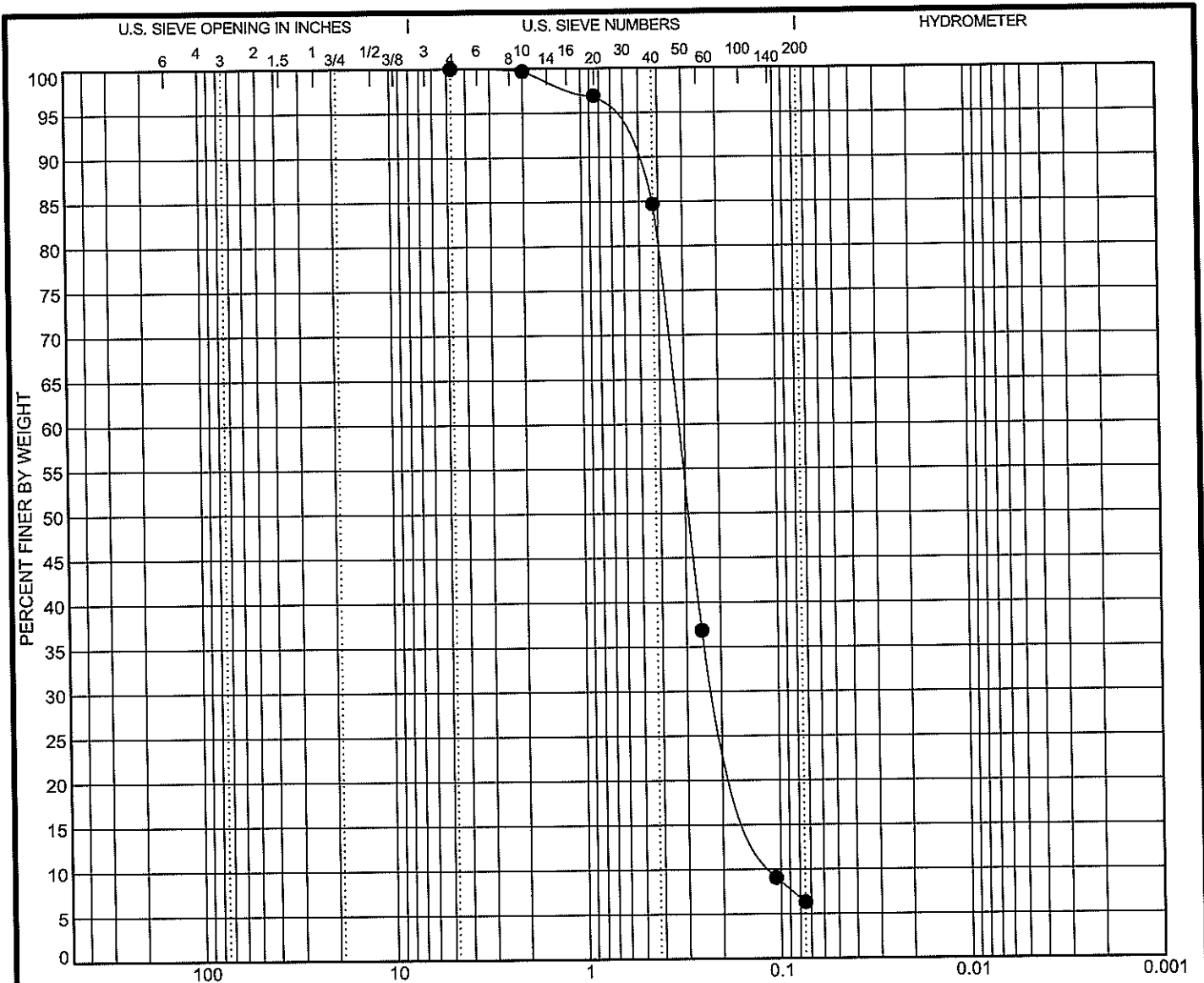
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/723



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-1 S-18;59.0 ft.	POORLY GRADED SAND with SILT (SP-SM)	NP	NP	NP	1.16	2.96

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-01 59.0 ft.	4.75	0.323	0.202	0.109	0.0	93.7	6.3	

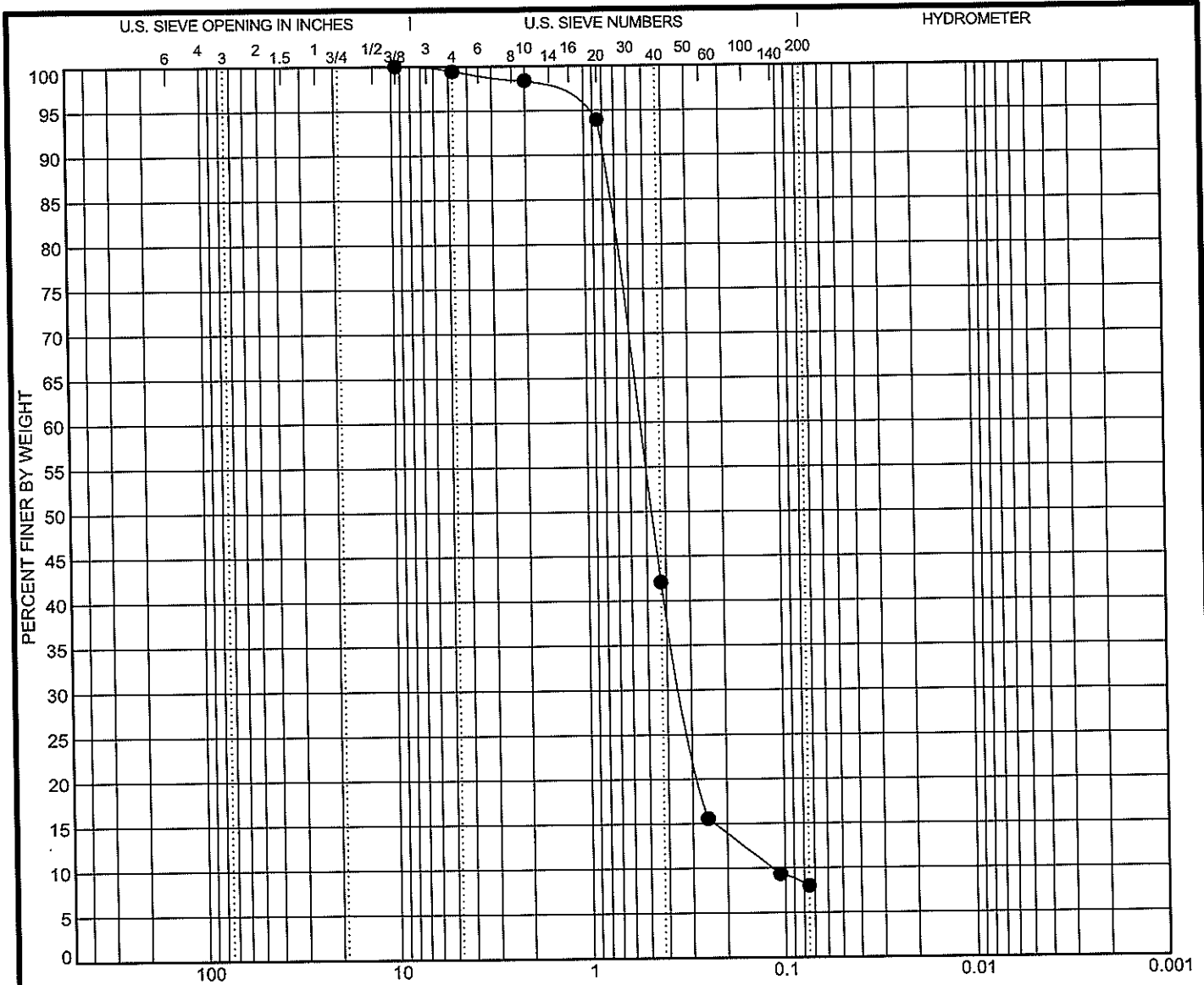
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/723



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-1 S-20;69.0 ft.	POORLY GRADED SAND with SILT (SP-SM)	NP	NP	NP	1.77	4.64

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-01 69.0 ft.	9.5	0.54	0.334	0.116	0.6	91.5	8.0	

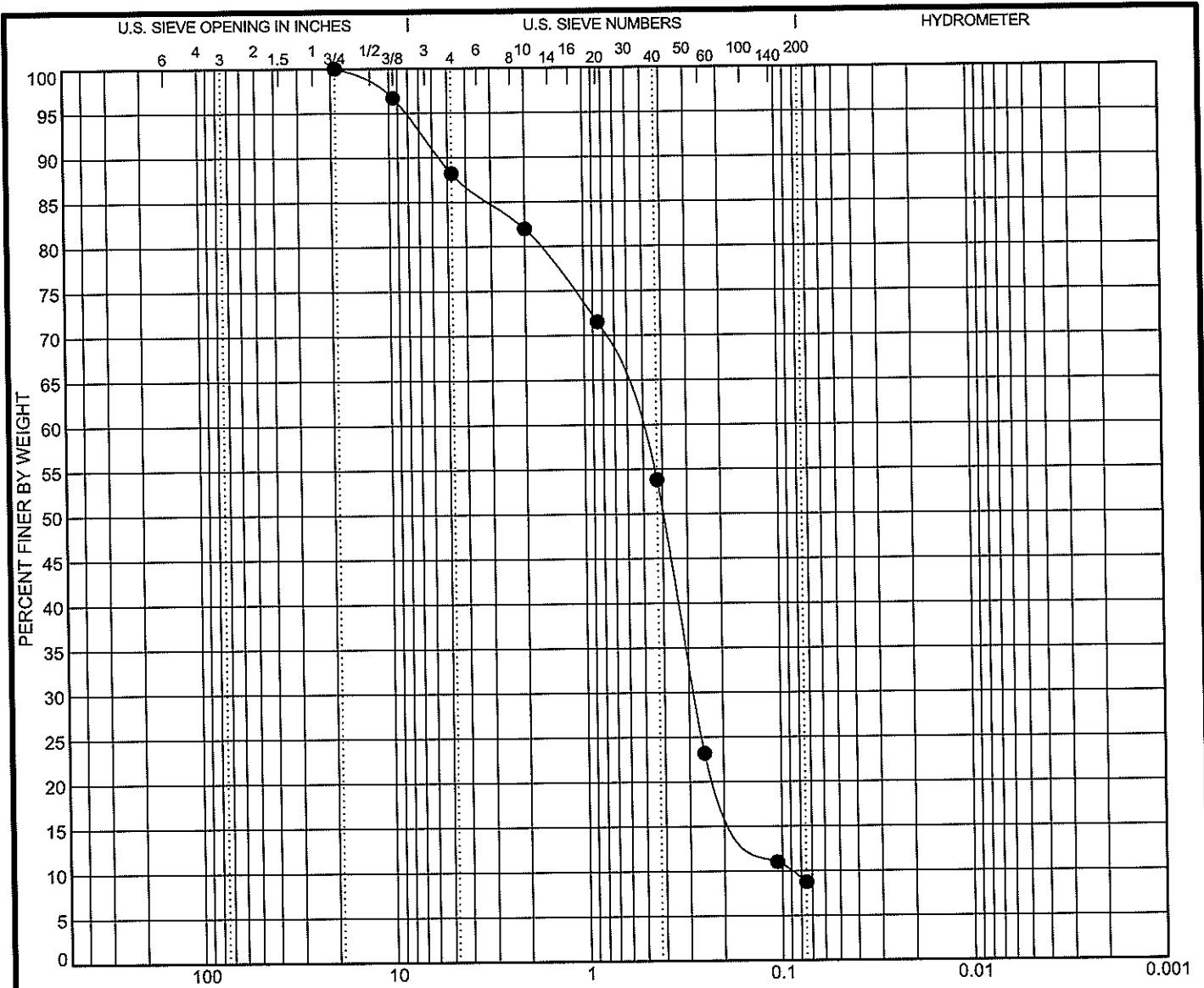
REMARKS:

GET GRAINSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-1 S-22;79.0 ft.	POORLY GRADED SAND with SILT (SP-SM)	NP	NP	NP	1.61	5.95

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-01 79.0 ft.	19	0.542	0.281	0.091	11.8	79.5	8.7	

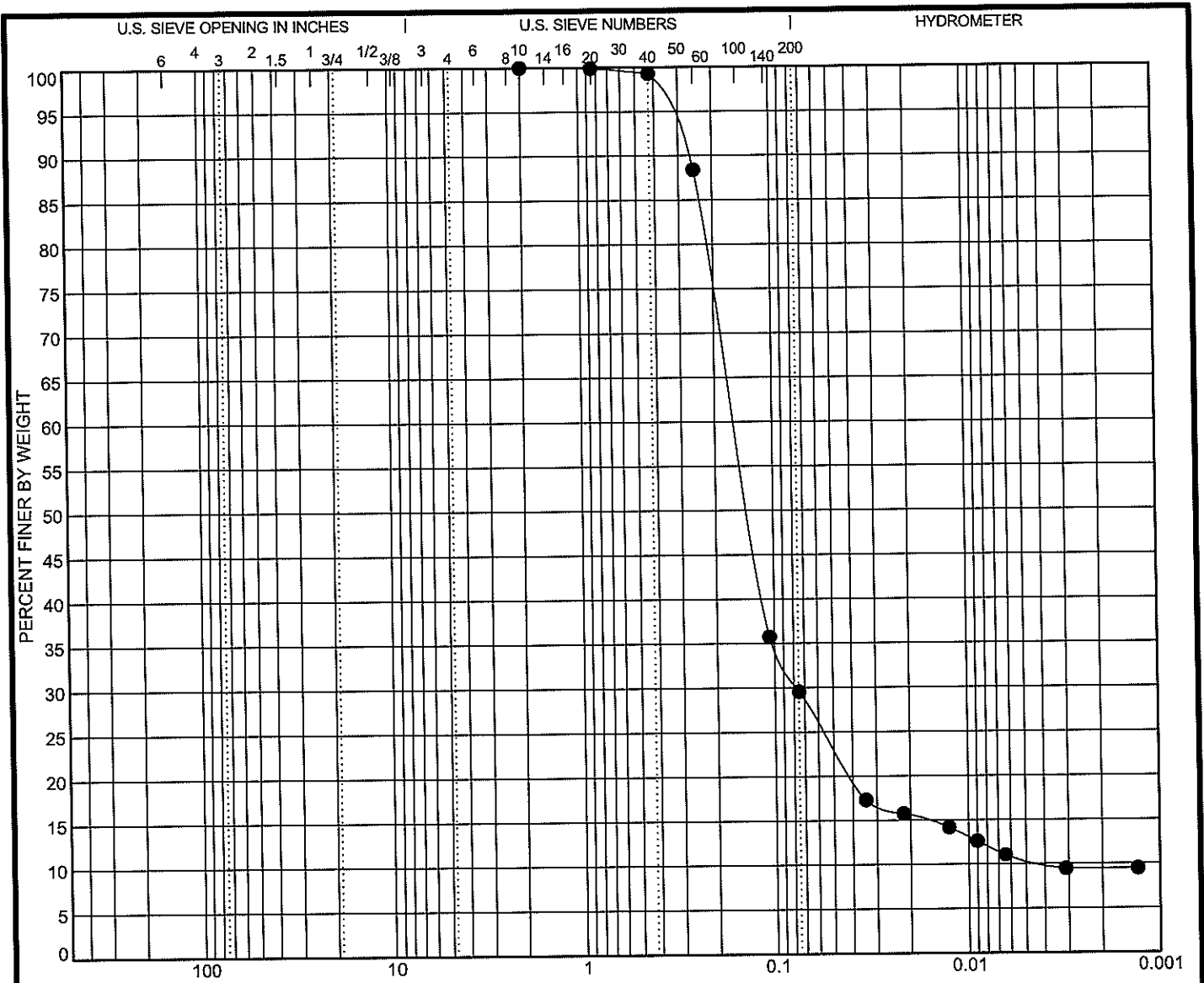
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-2 S-7;11.5 ft.	CLAYEY SAND (SC)	26	18	8	9.38	39.23

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-02 11.5 ft.	2	0.157	0.077	0.004	0.0	70.5	20.1	9.4

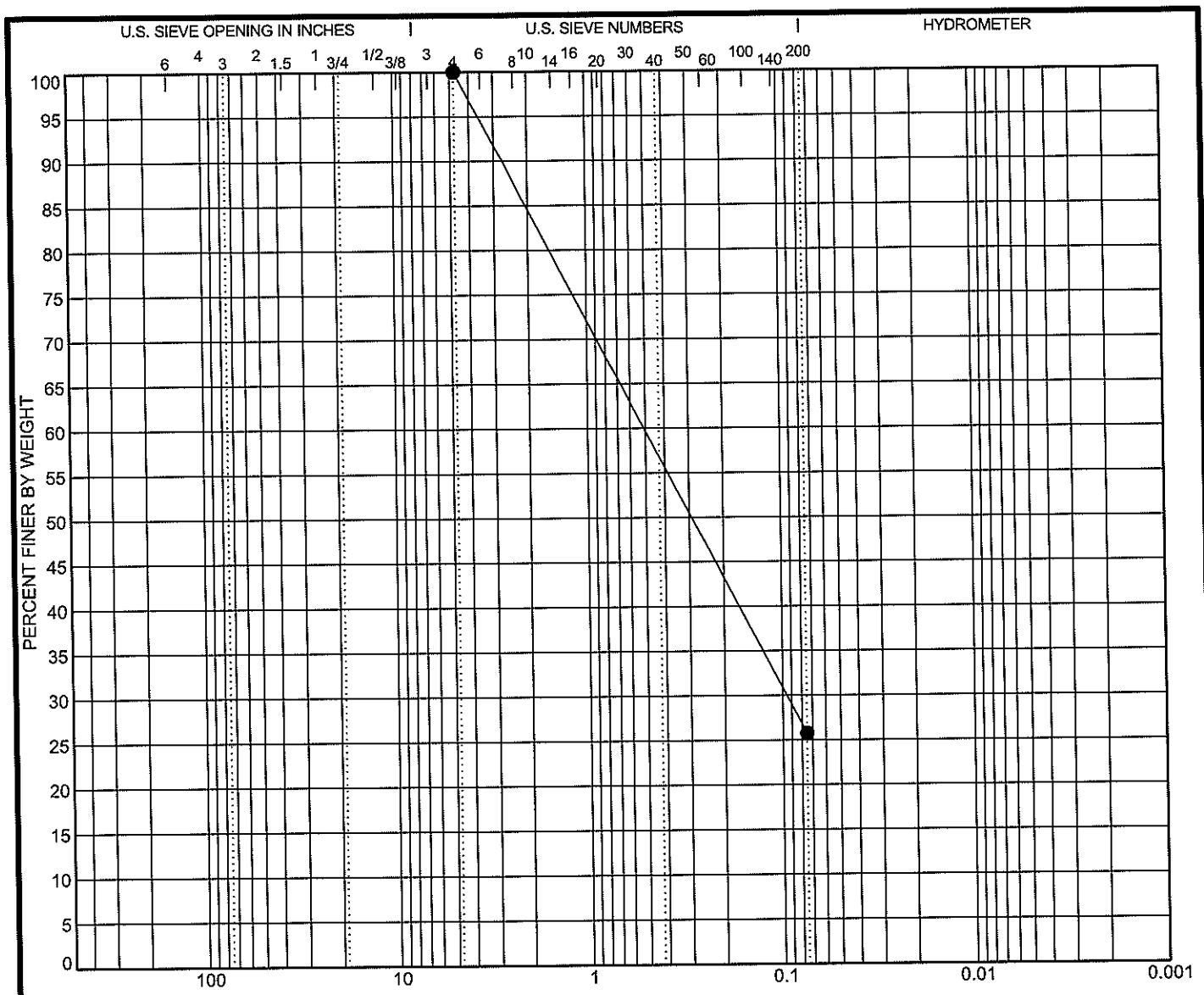
REMARKS:

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-2 S-8; 14.0 ft.						

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-02 14.0 ft.	4.75	0.509	0.095		0.0	74.3	25.7	

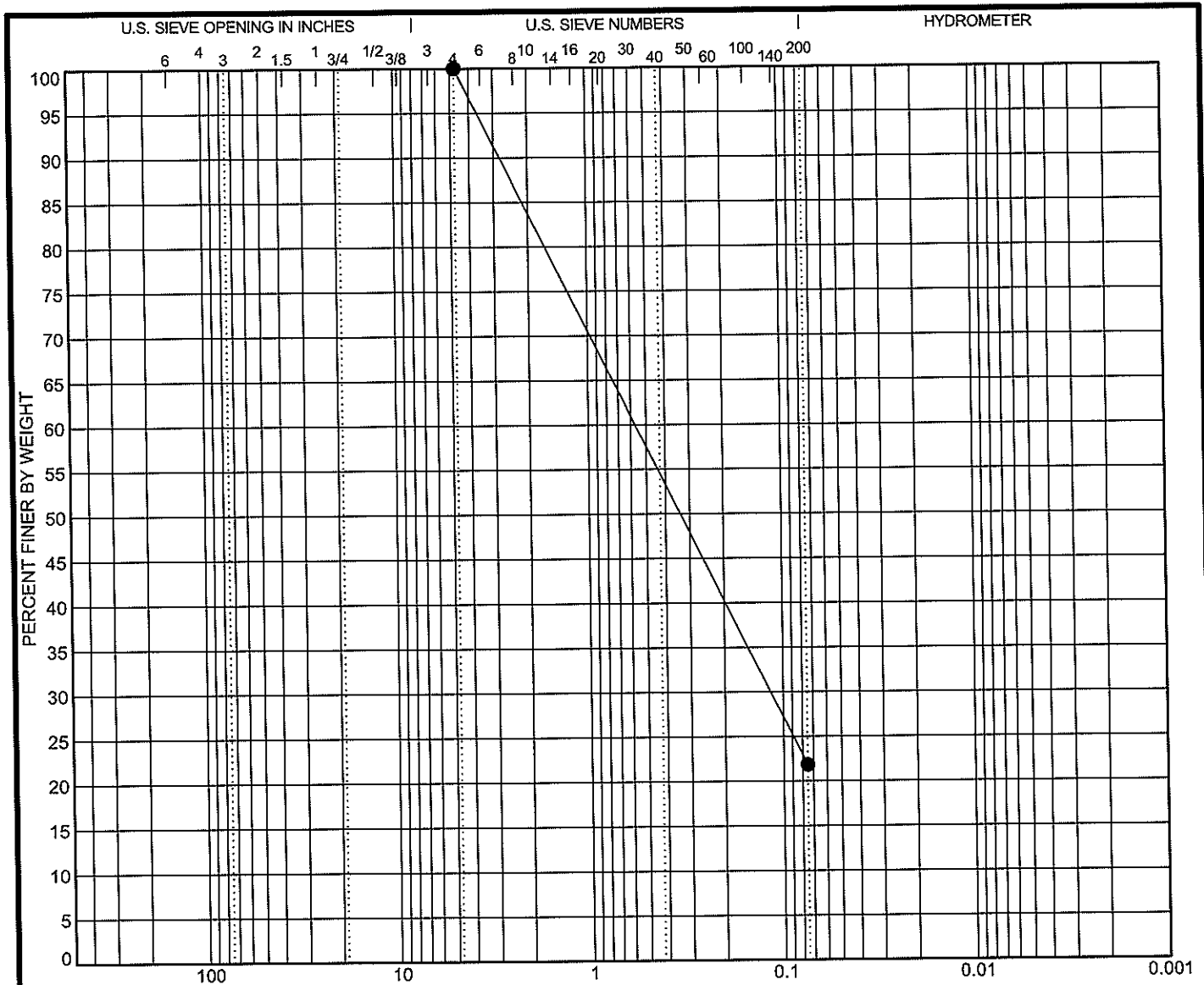
REMARKS:

GET GRAINSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-2 S-9; 16.5 ft.	SILTY, CLAYEY SAND (SC-SM)	24	19	5		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-02 16.5 ft.	4.75	0.569	0.116		0.0	78.2	21.8	

REMARKS:

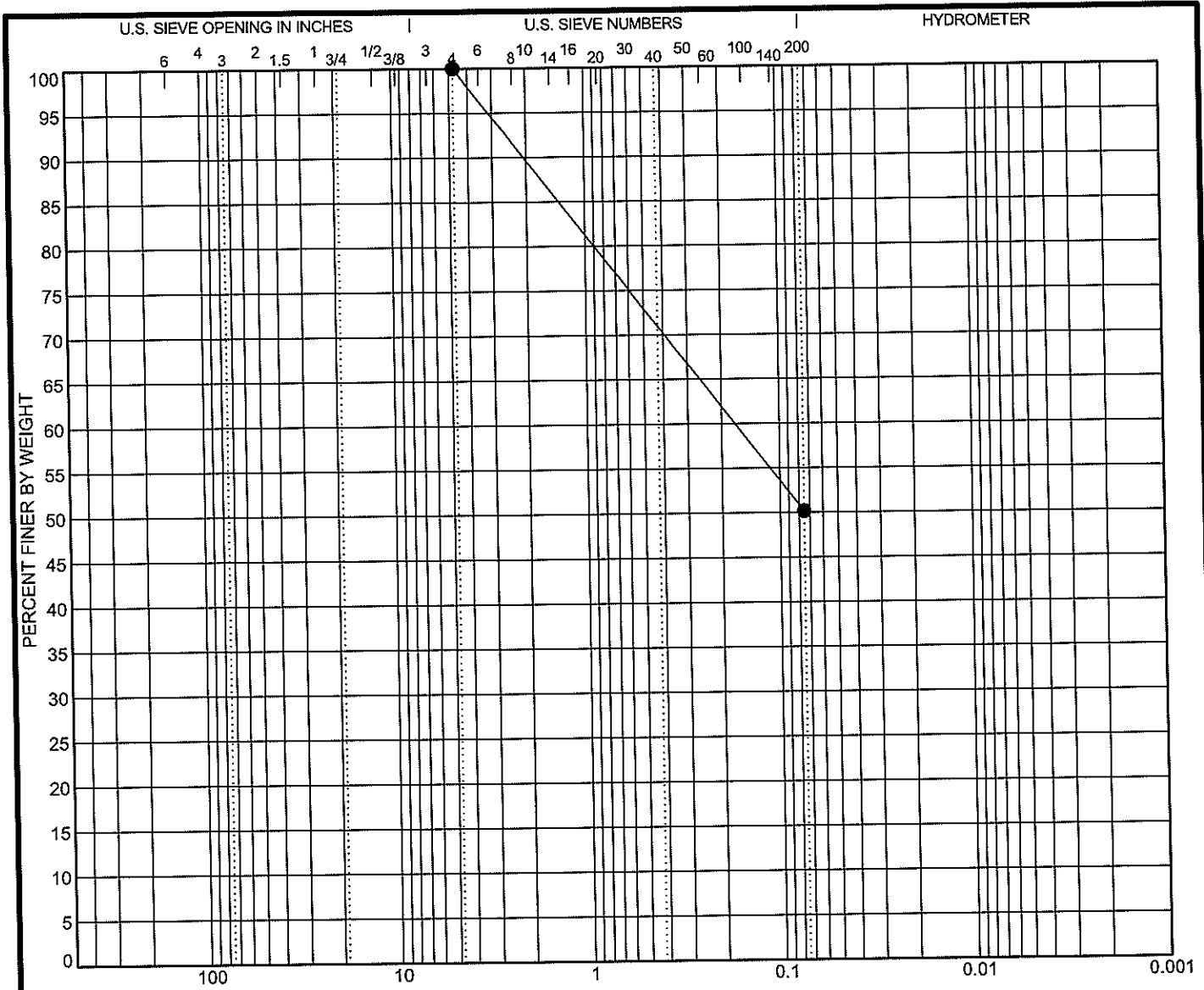
GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL





Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-2 S-10;19.0 ft.	SANDY ELASTIC SILT (MH)					64	35	29		
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-02 19.0 ft.	4.75	0.17			0.0	49.9		50.1		

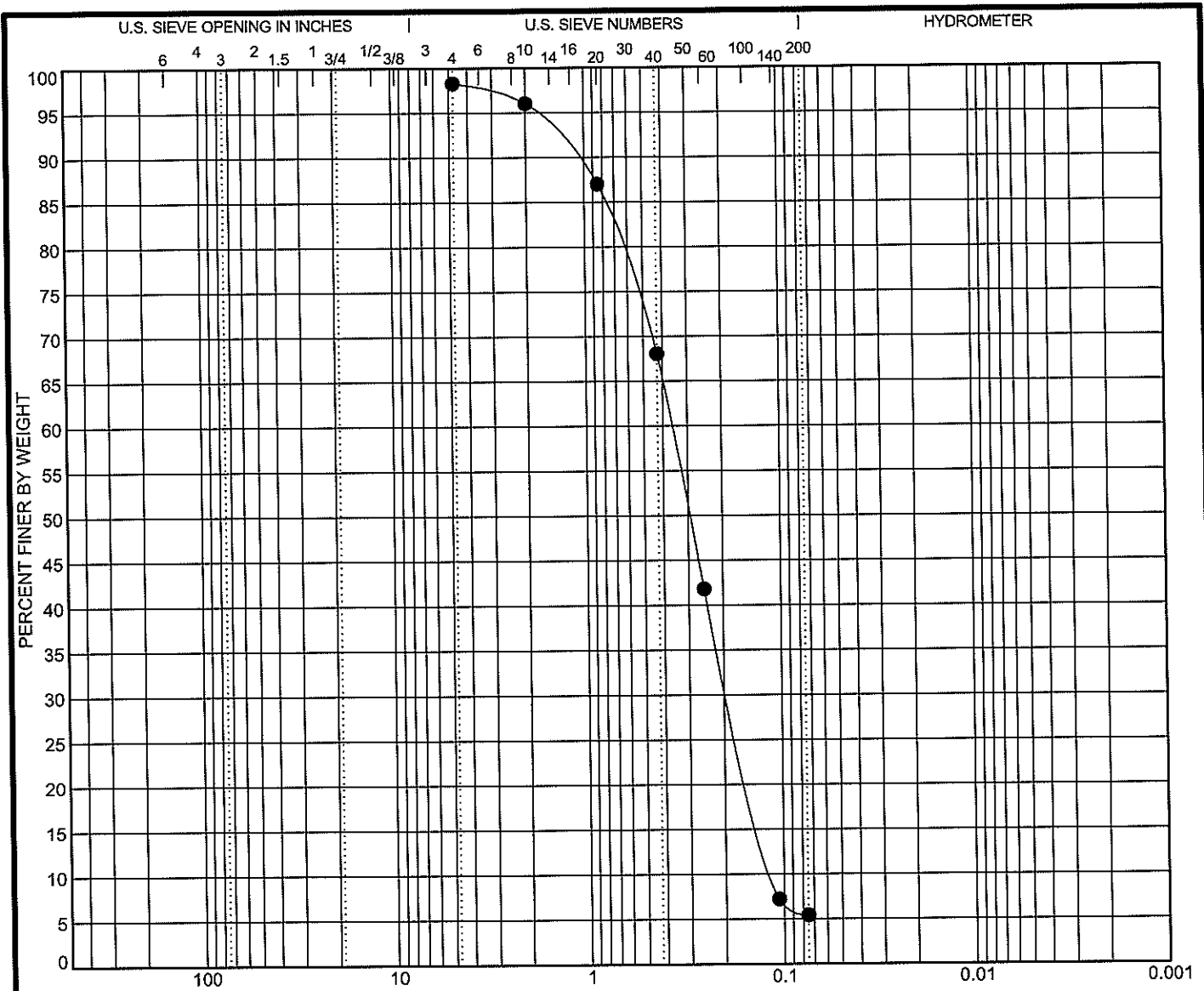
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-2 S-16;49.0 ft.	POORLY GRADED SAND with SILT (SP-SM)	NP	NP	NP	0.85	3.18

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-02 49.0 ft.	4.75	0.361	0.187	0.114	0.0	92.9	5.4	

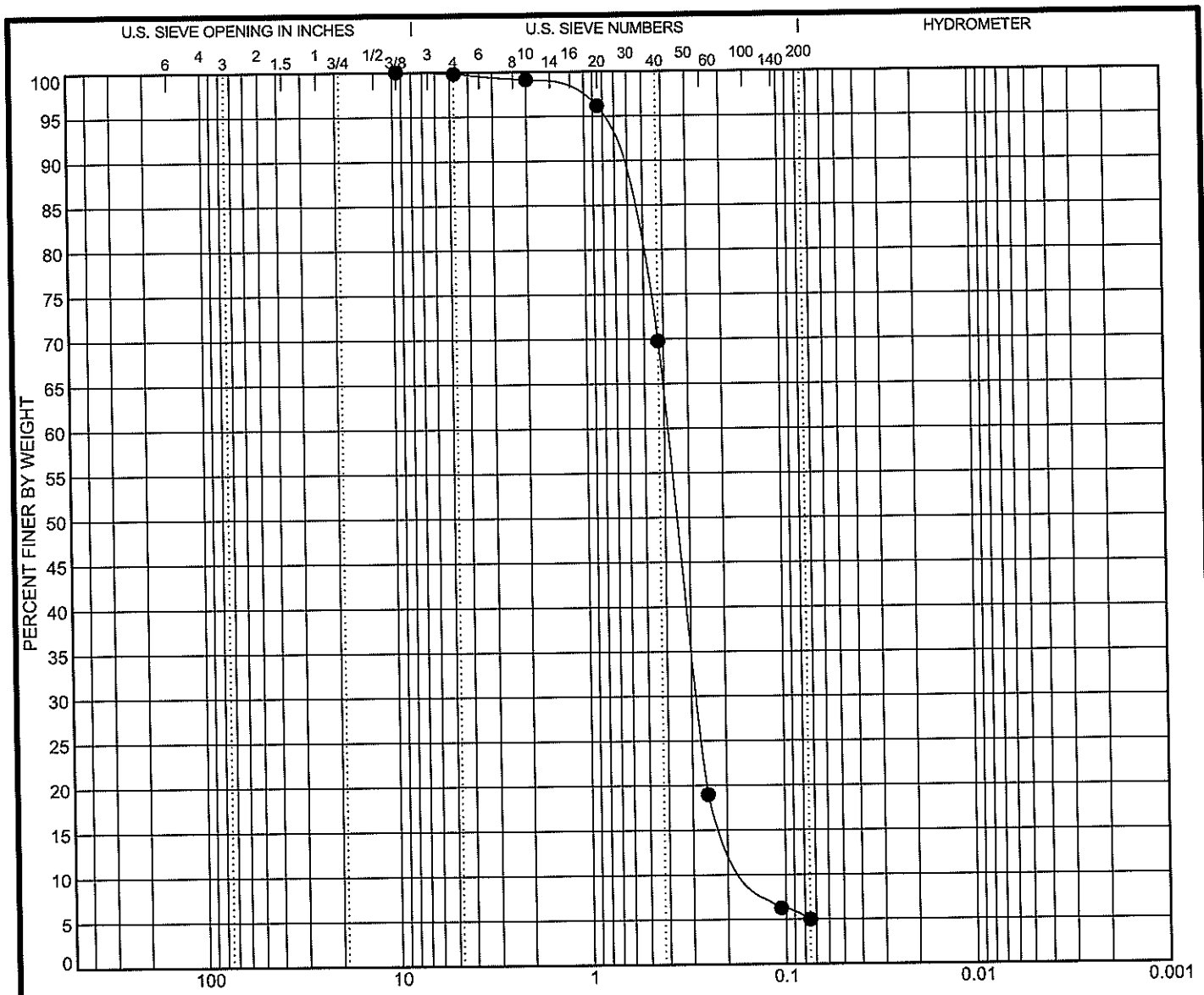
REMARKS:

GET GRAINSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



### GRAIN SIZE DISTRIBUTION

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-2 S-19;64.0 ft.	POORLY GRADED SAND (SP)					NP	NP	NP	1.50	2.81
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-02 64.0 ft.	9.5	0.384	0.281	0.137	0.2	94.8	5.0			

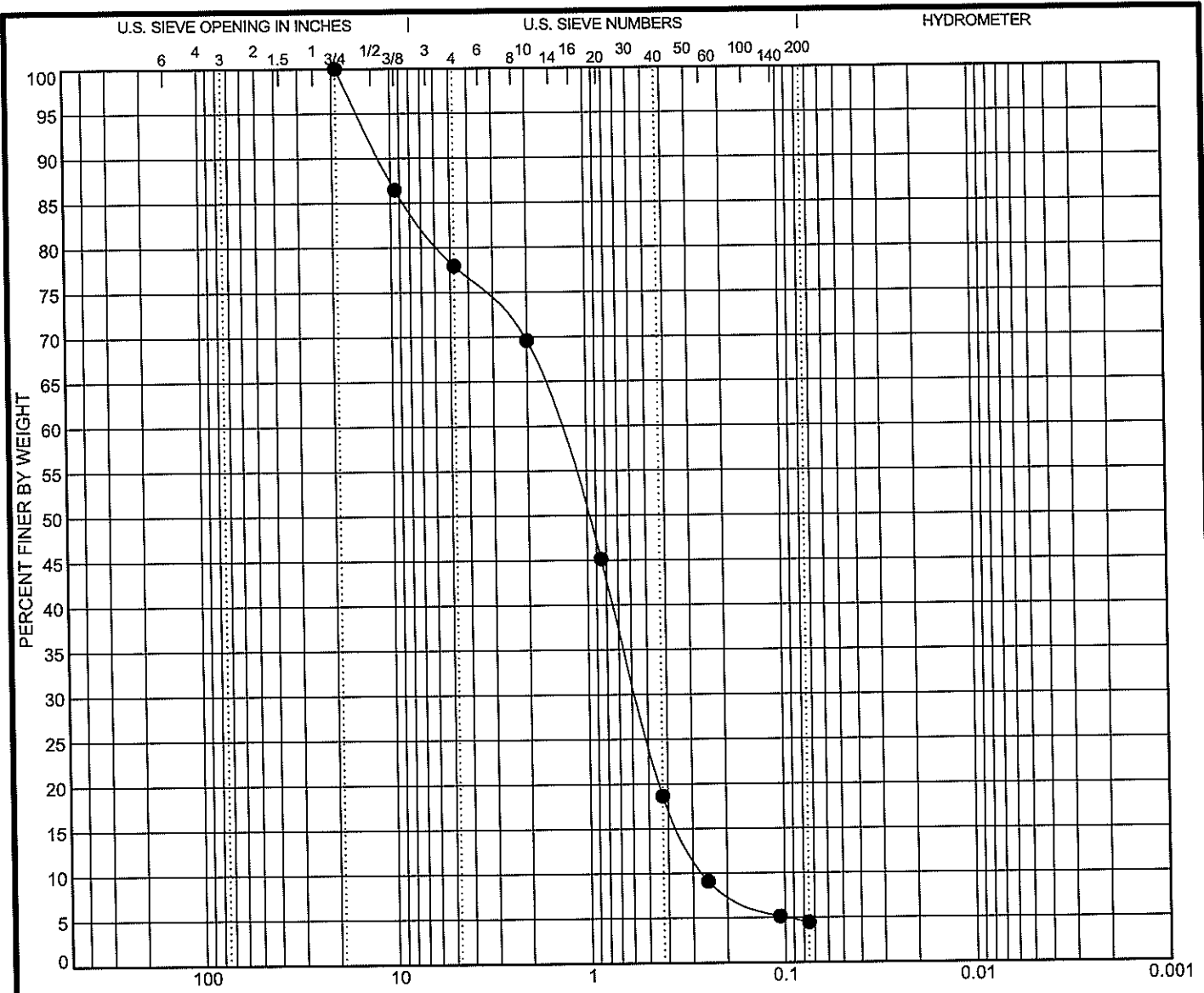
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAINSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-2 S-22;79.0 ft.	POORLY GRADED SAND with GRAVEL (SP)					NP	NP	NP	0.87	5.44
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-02 79.0 ft.	19	1.431	0.572	0.263	22.1	73.5	4.5			

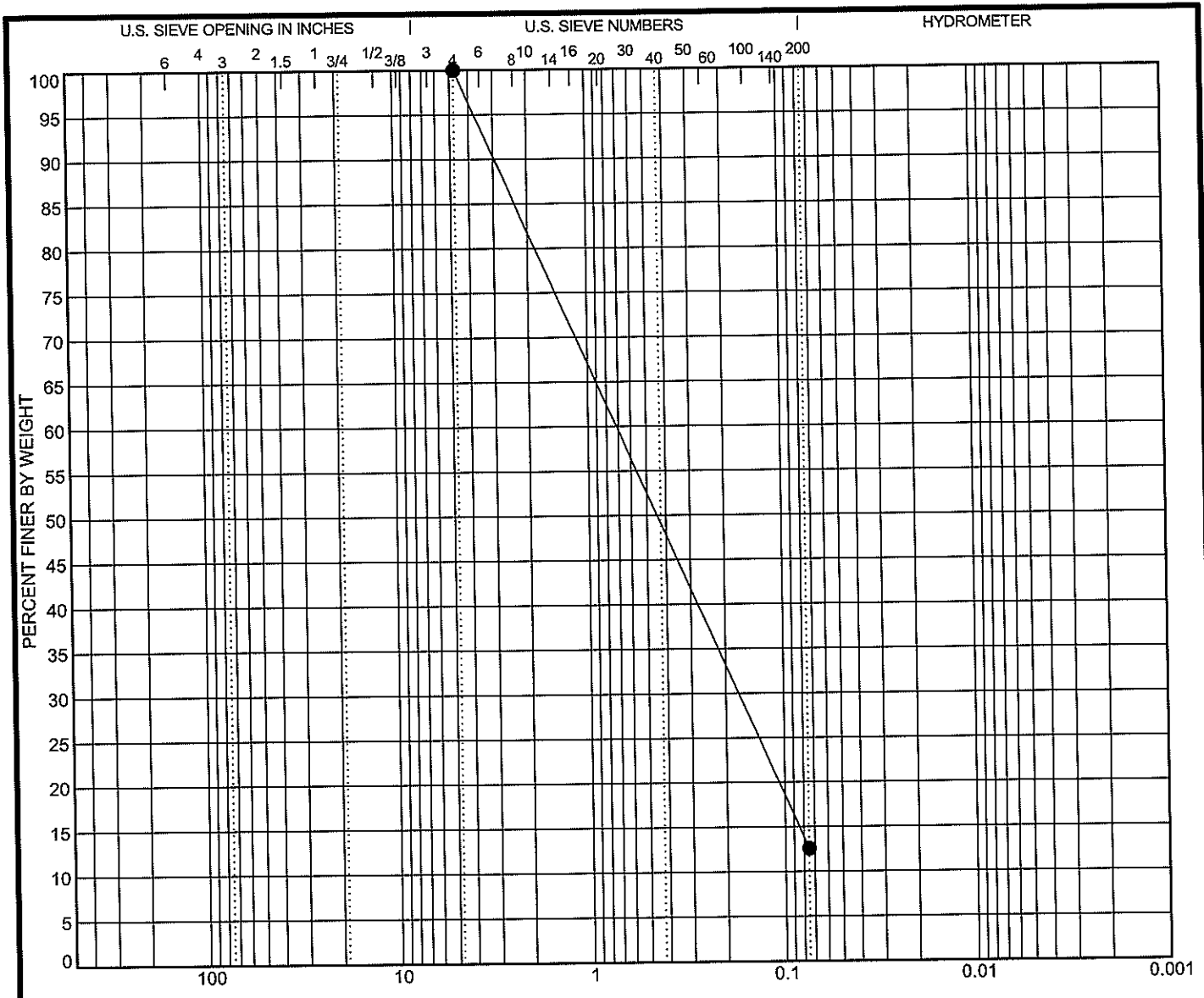
REMARKS:

GET GRAINSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

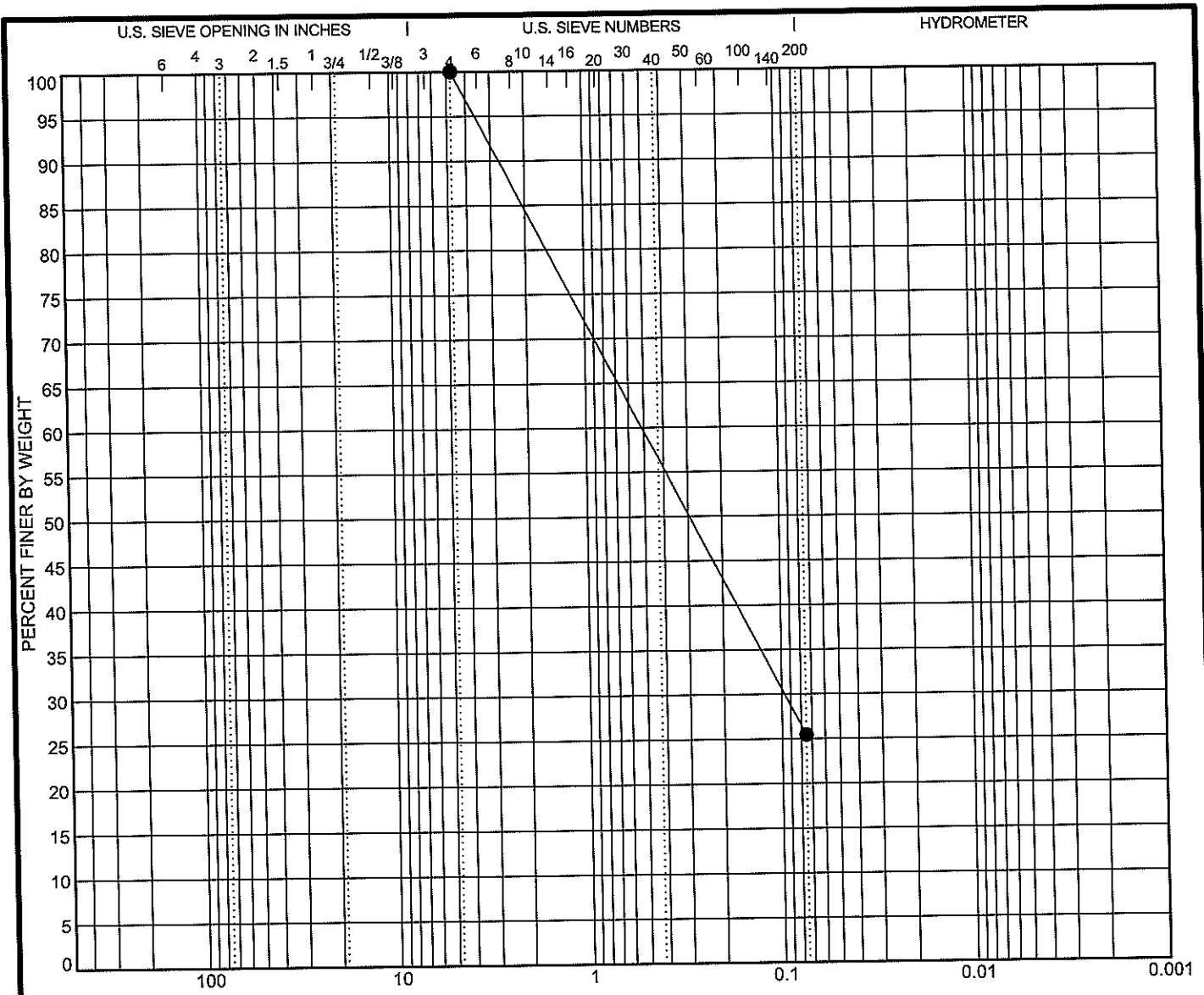
Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-3 S-4;5.0 ft.	SILTY SAND (SM)					NP	18	NP		
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-03 5.0 ft.	4.75	0.712	0.172		0.0	87.5	12.5			

REMARKS:



**GRAIN SIZE DISTRIBUTION**  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-3 S-9;19.0 ft.	SILTY, CLAYEY SAND (SC-SM)	25	20	5		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-03 19.0 ft.	4.75	0.513	0.097		0.0	74.6	25.4	

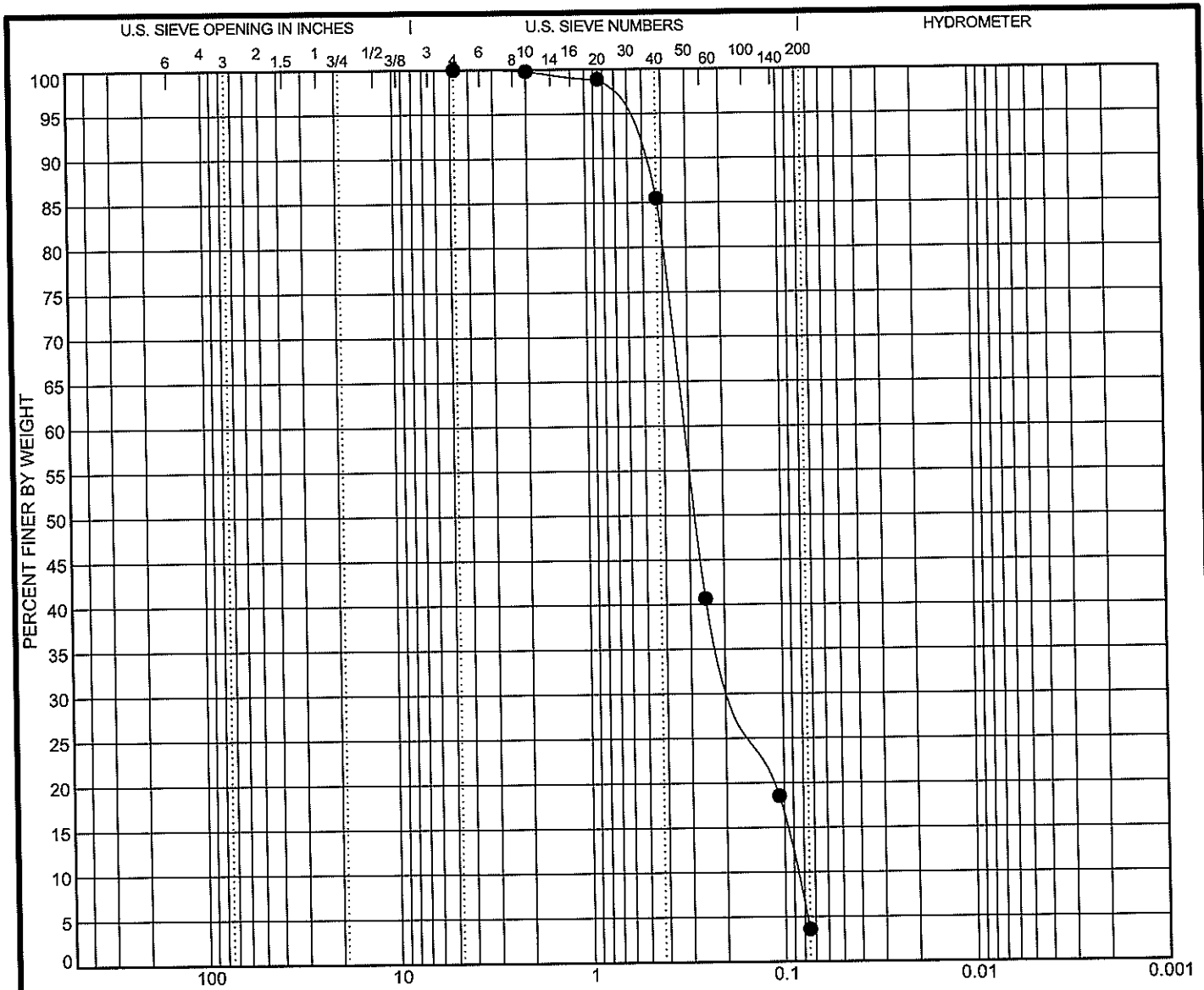
REMARKS:

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-3 S-15;49.0 ft.	POORLY GRADED SAND (SP)					NP	NP	NP	1.00	3.61
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-03 49.0 ft.	4.75	0.314	0.165	0.087	0.0	96.4	3.6			

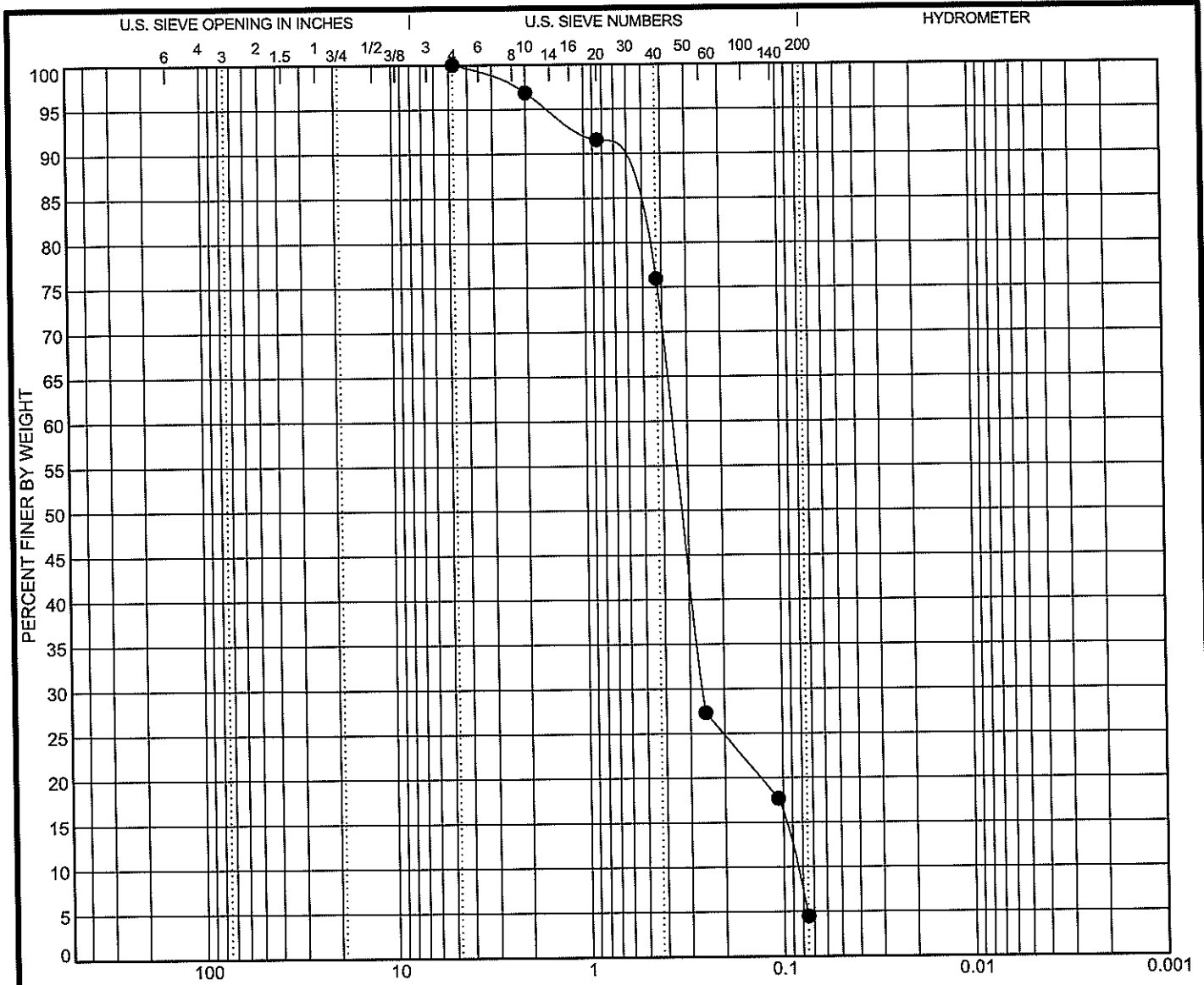
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-3 S-18;64.0 ft.	POORLY GRADED SAND (SP)	NP	NP	NP	2.14	4.12

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-03 64.0 ft.	4.75	0.357	0.257	0.087	0.0	95.5	4.5	

REMARKS:

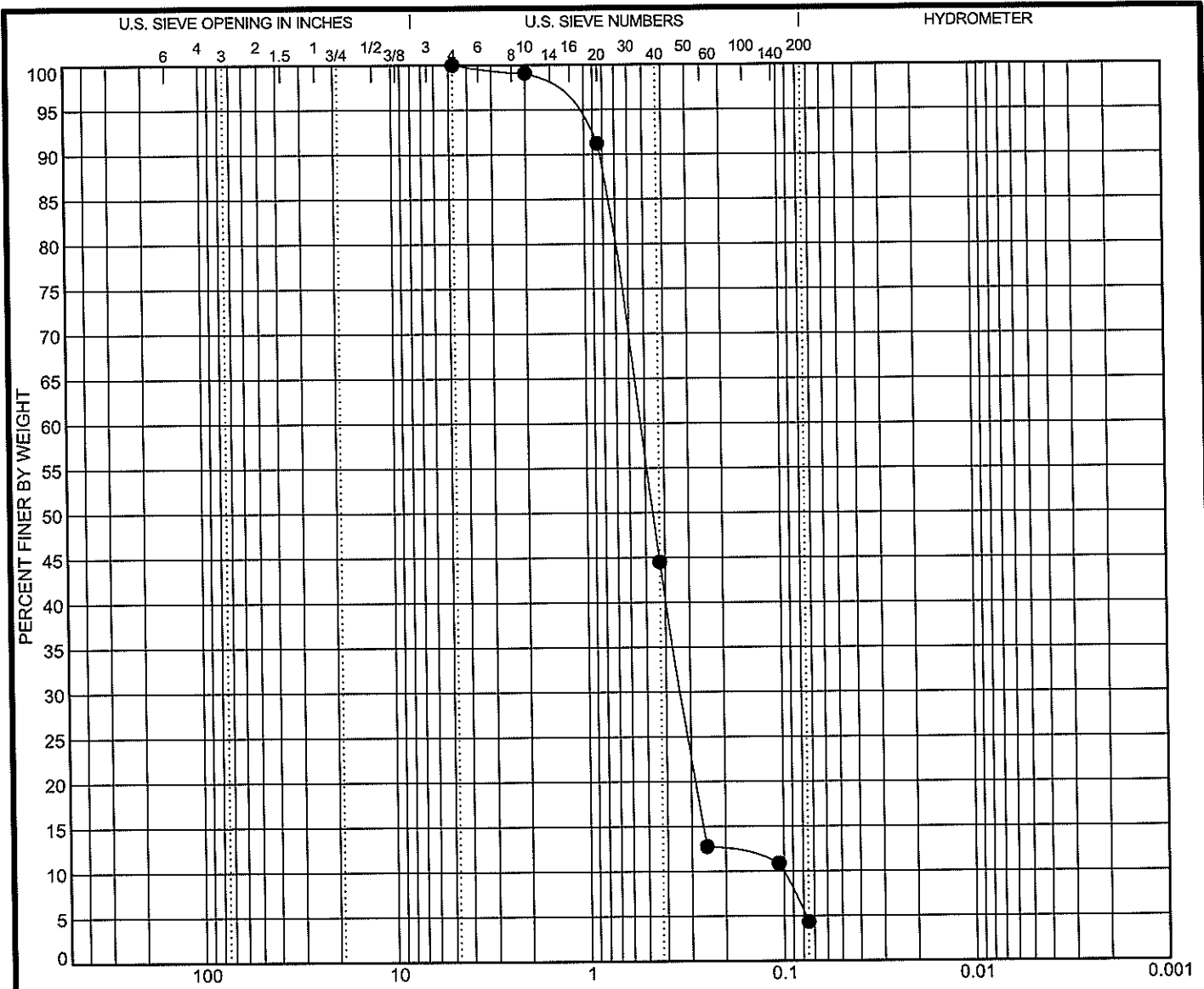
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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL





Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-3 S-21;79.0 ft.	POORLY GRADED SAND (SP)	NP	NP	NP	2.05	5.28

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-03 79.0 ft.	4.75	0.535	0.334	0.101	0.0	95.7		4.3

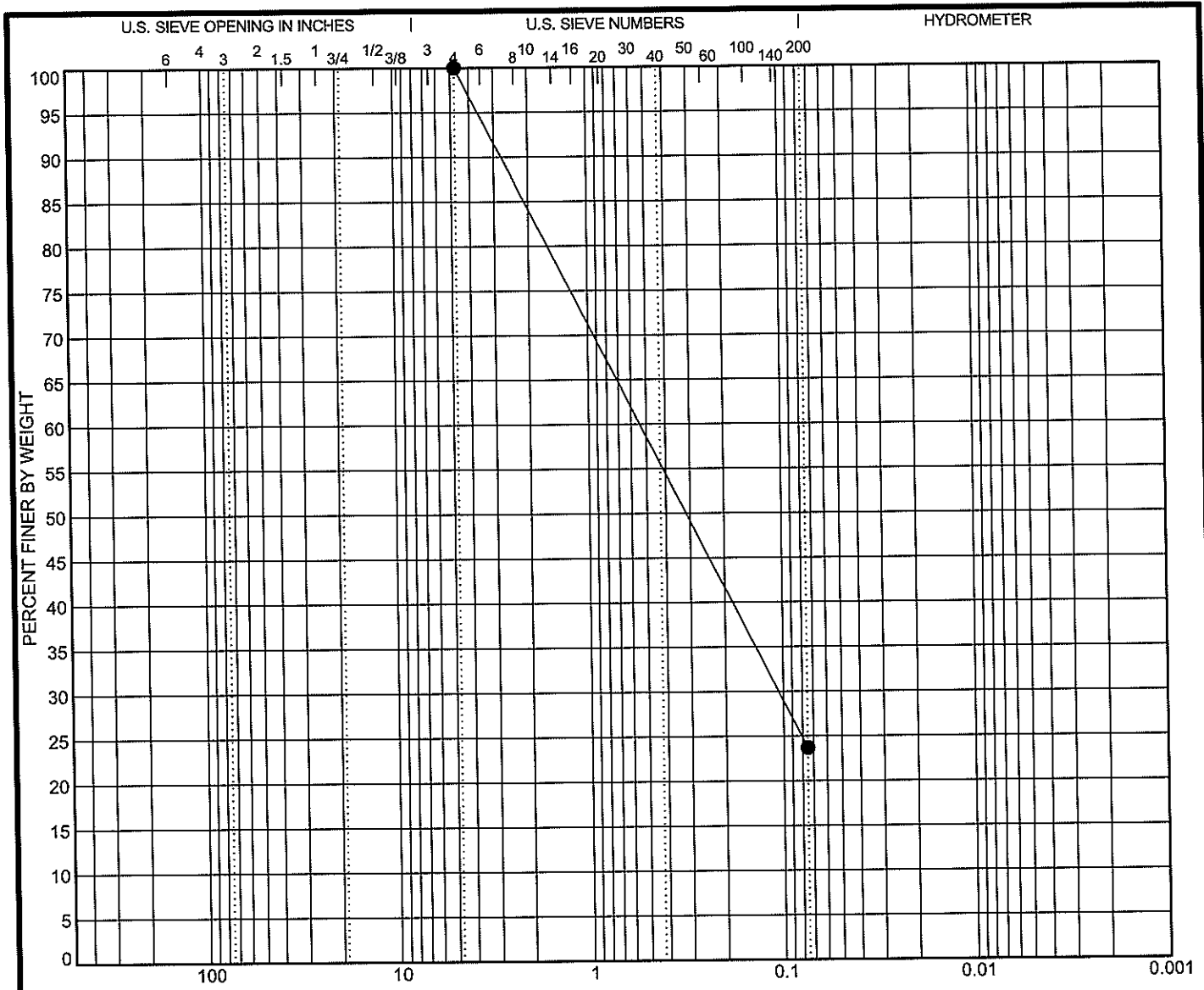
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-4 S-8;14.0 ft.	CLAYEY SAND (SC)	23	15	8		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-04 14.0 ft.	4.75	0.54	0.106		0.0	76.3	23.7	

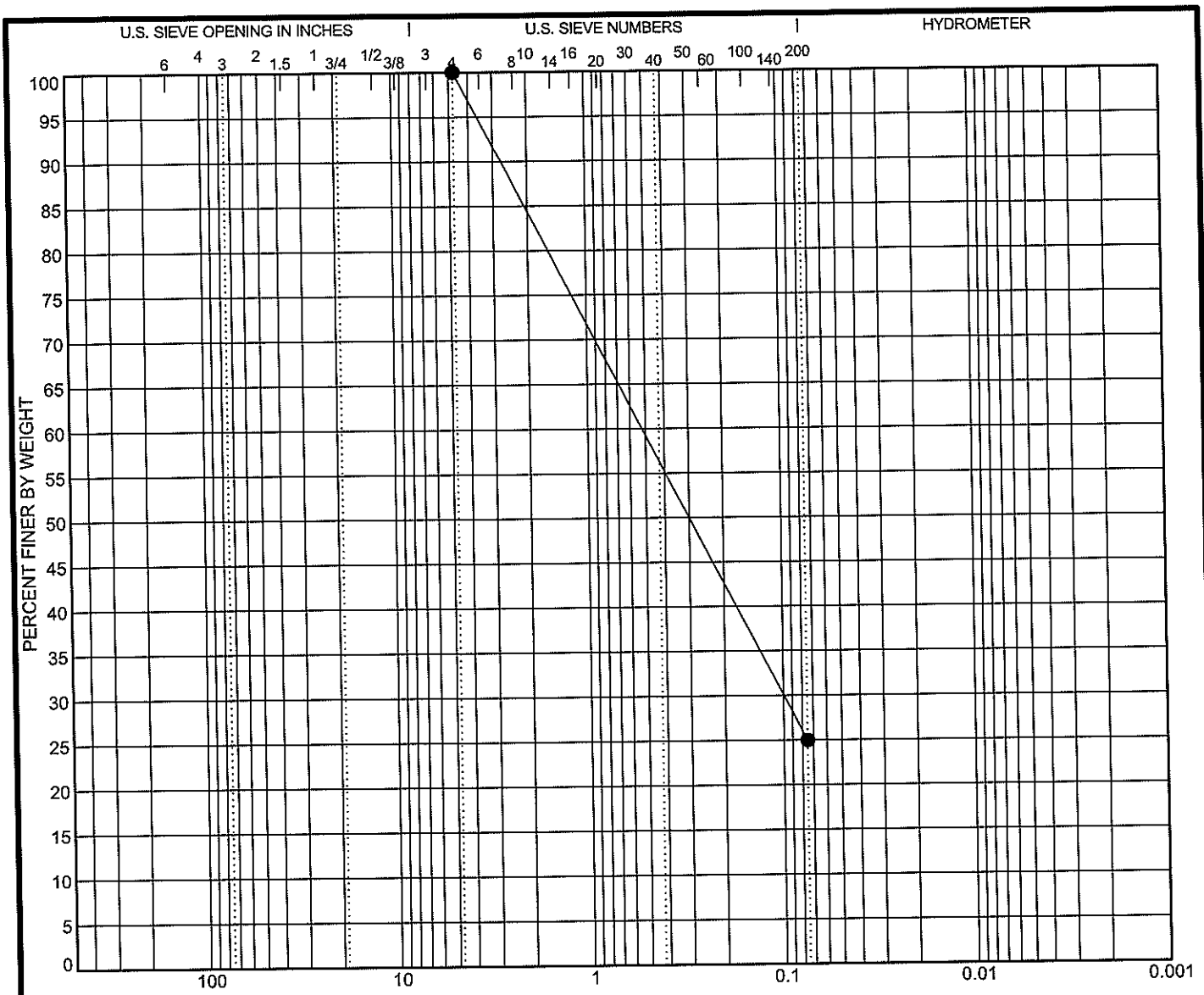
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
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 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-4 S-10;19.0 ft.	SILTY SAND (SM)	21	21	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-04 19.0 ft.	4.75	0.52	0.099		0.0	75.0	25.0	

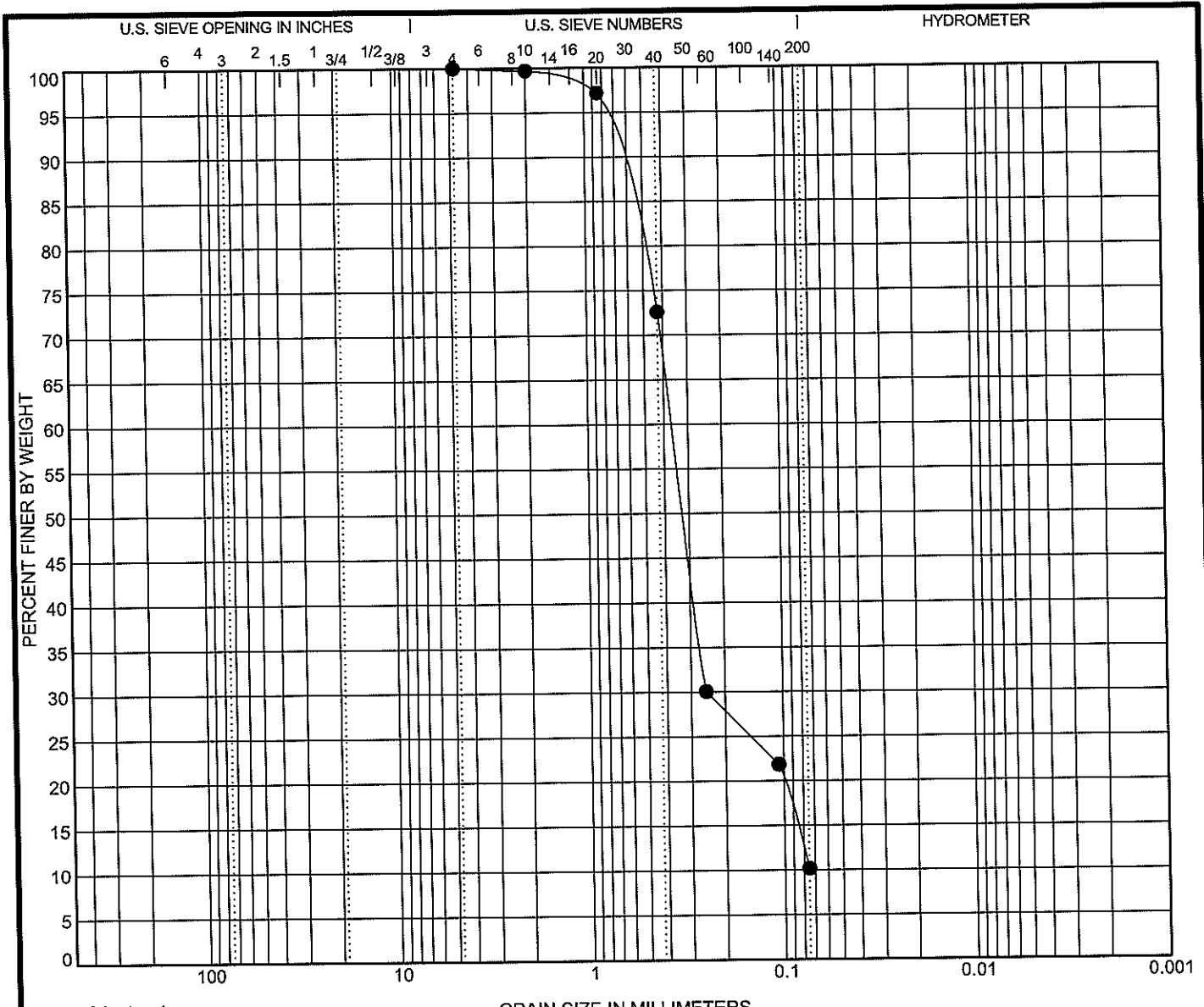
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

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 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-4 S-15;44.0 ft.	POORLY GRADED SAND with SILT (SP-SM)					NP	NP	NP	2.29	4.86
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-04 44.0 ft.	4.75	0.363	0.249		0.0	89.9	10.1			

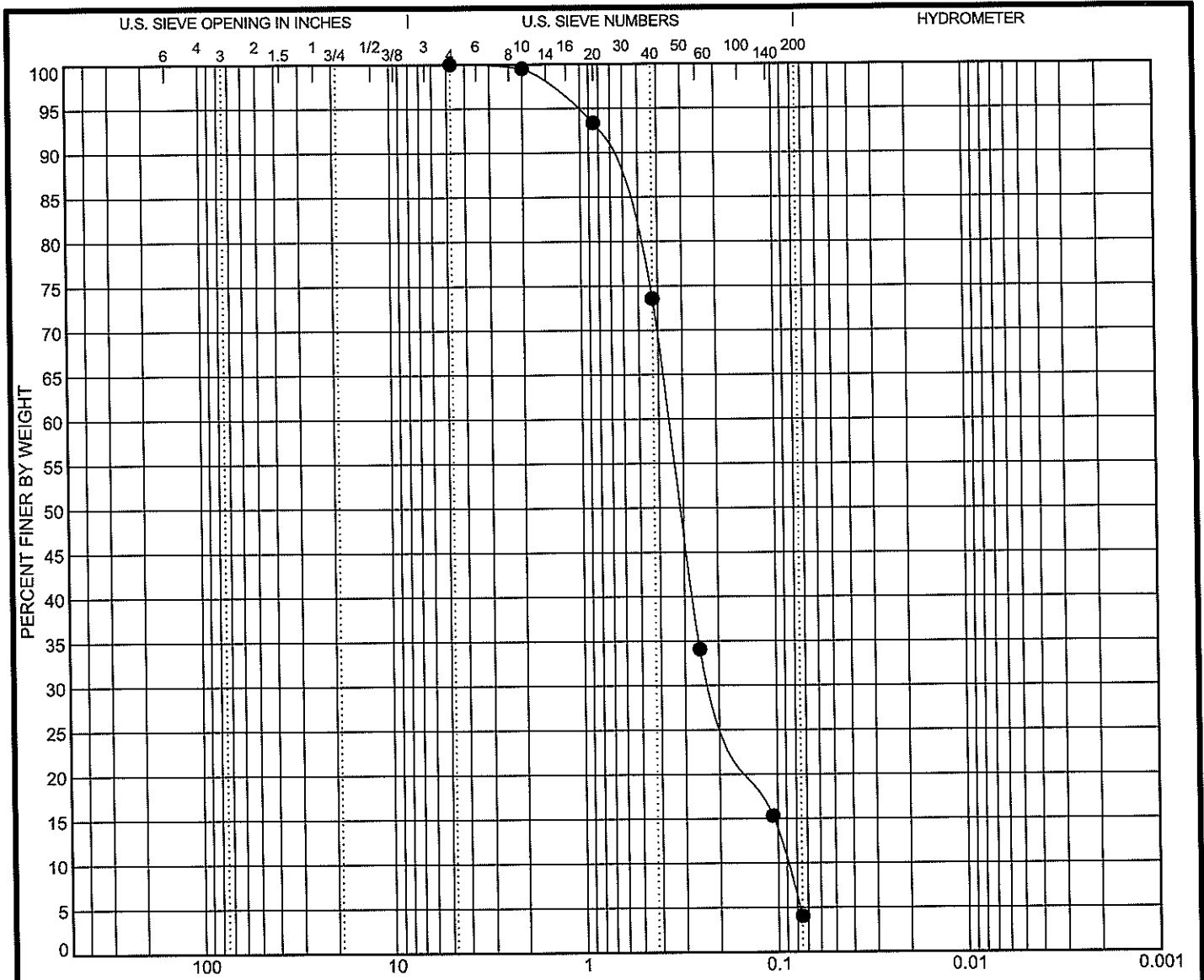
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-4 S-17;54.0 ft.	POORLY GRADED SAND (SP)					NP	NP	NP	1.35	3.93

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-04 54.0 ft.	4.75	0.354	0.207	0.09	0.0	96.0	4.0	

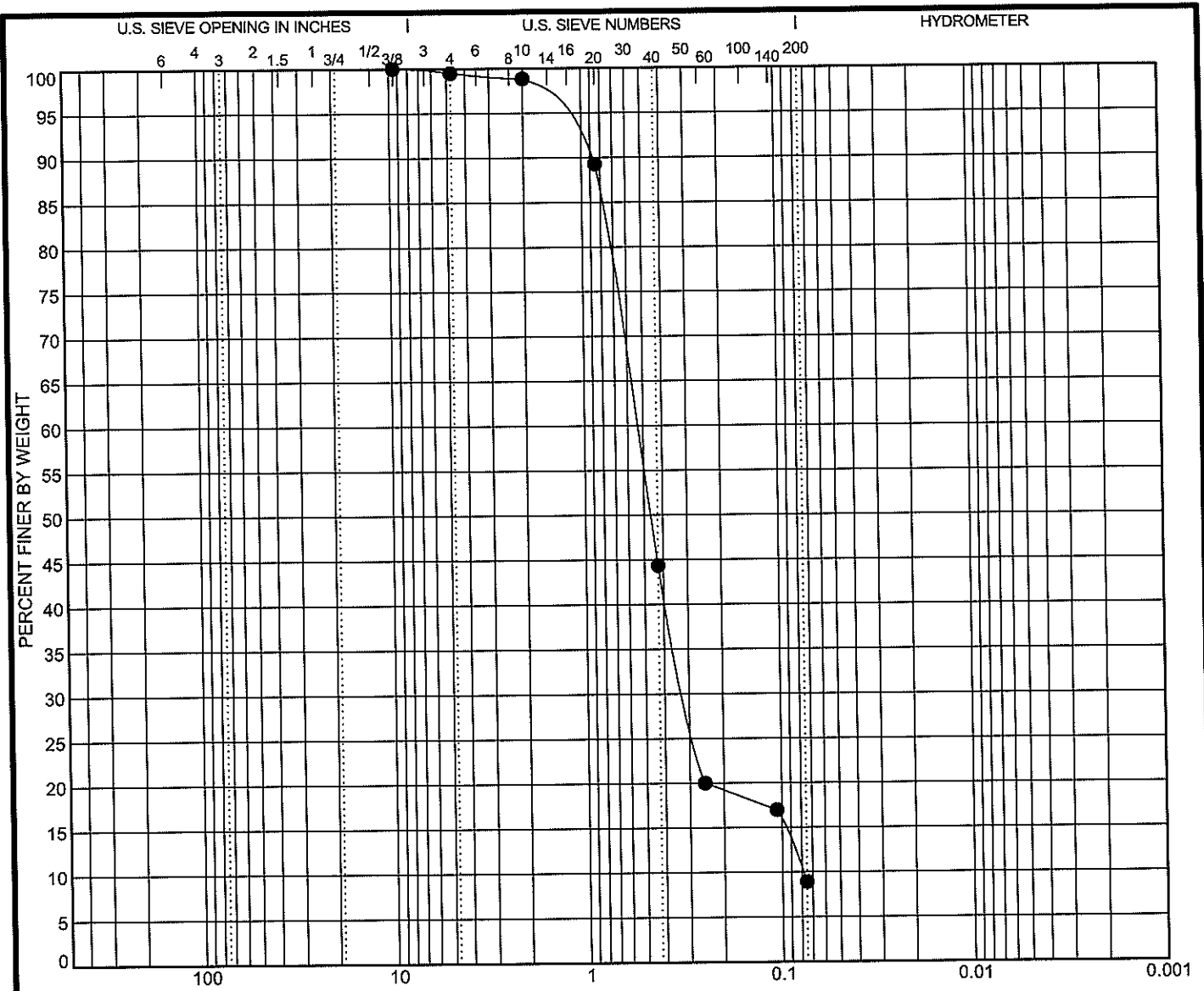
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-4 S-20;69.0 ft.	WELL-GRADED SAND with SILT (SW-SM)					NP	NP	NP	2.27	6.88
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-04 69.0 ft.	9.5	0.541	0.311	0.079	0.5	90.6	8.9			

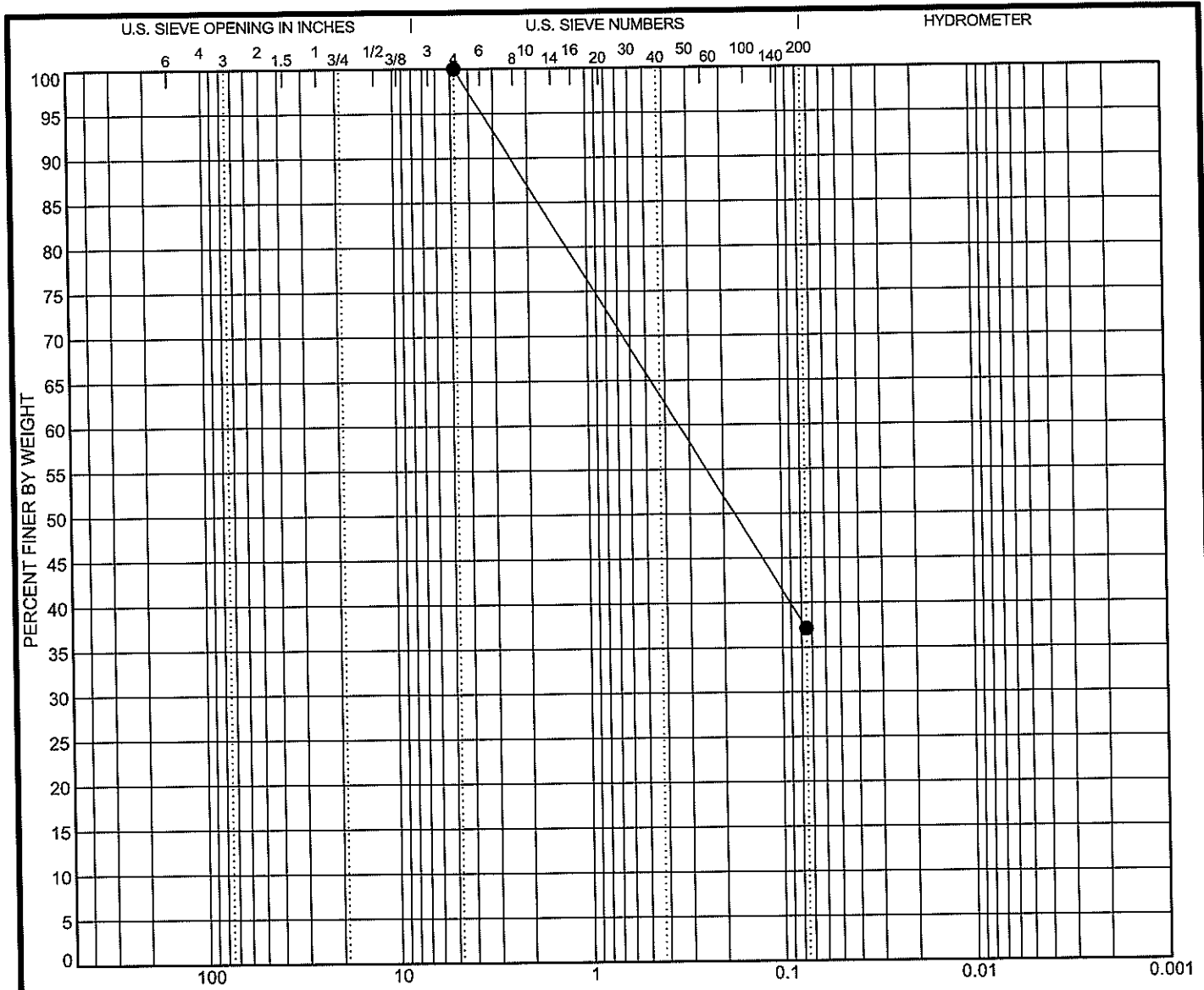
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-5 S-6;9.0 ft.	SILTY, CLAYEY SAND (SC-SM)					24	19	5		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-05 9.0 ft.	4.75	0.34			0.0	62.9	37.1	

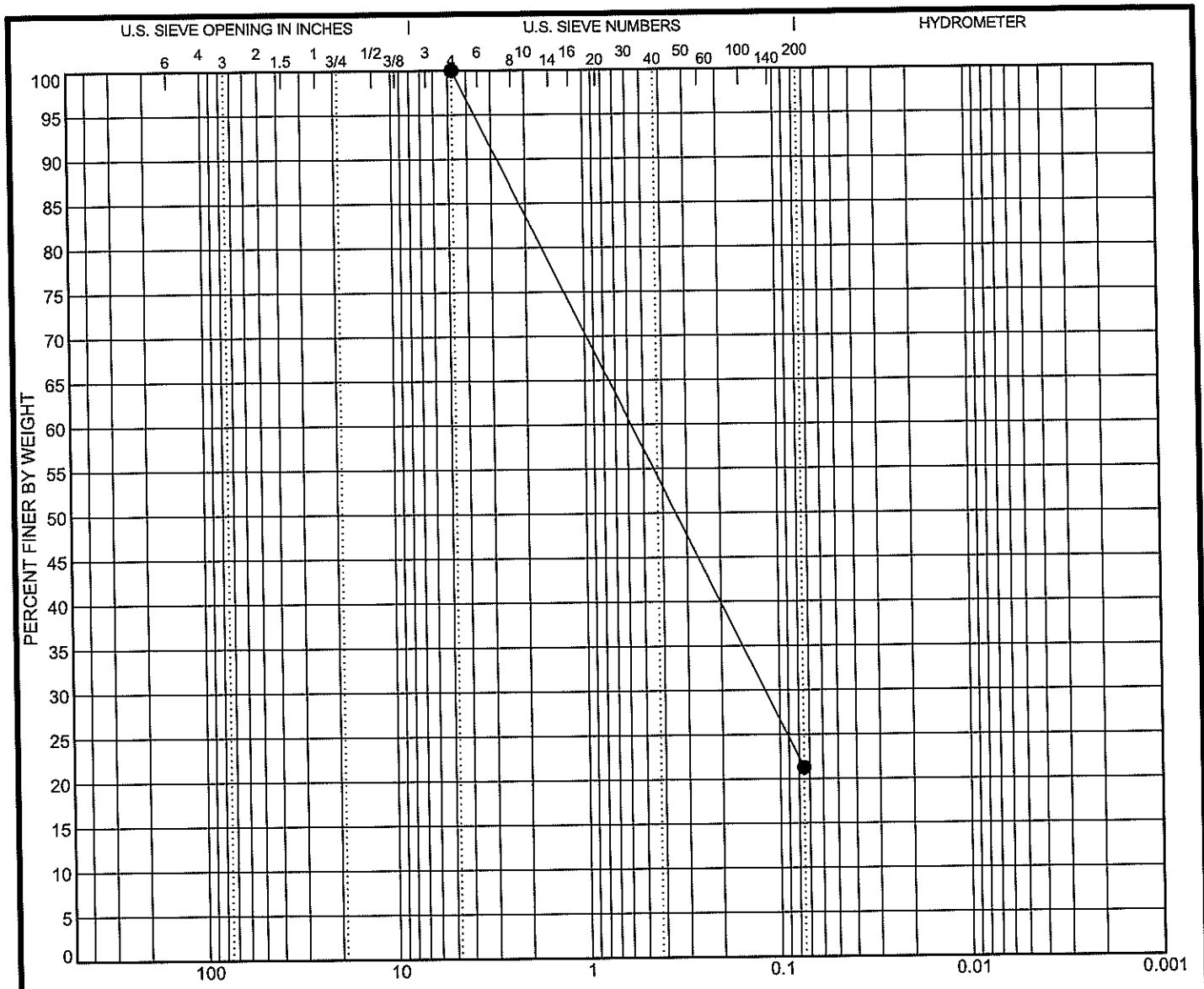
REMARKS:

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification				LL	PL	PI	Cc	Cu
● B-5 S-8; 14.0 ft.	CLAYEY SAND (SC)				35	18	17		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-05 14.0 ft.	4.75	0.577	0.119		0.0	78.7	21.3	

REMARKS:

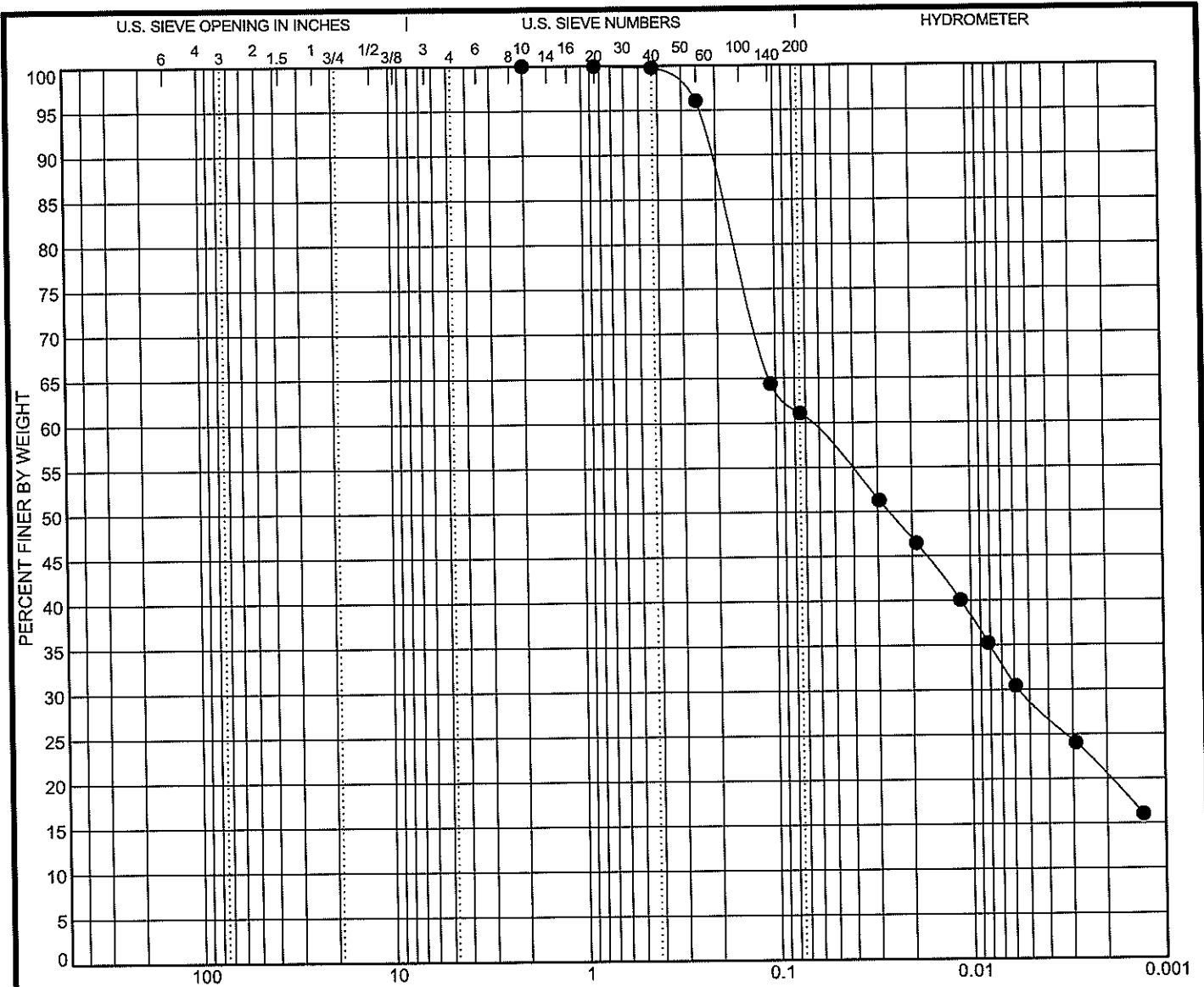
GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL





Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-5 T-1;16.5 ft.	SANDY LEAN CLAY (CL)	38	13	25		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-05 16.5 ft.	2	0.068	0.006		0.0	38.9	40.8	20.3

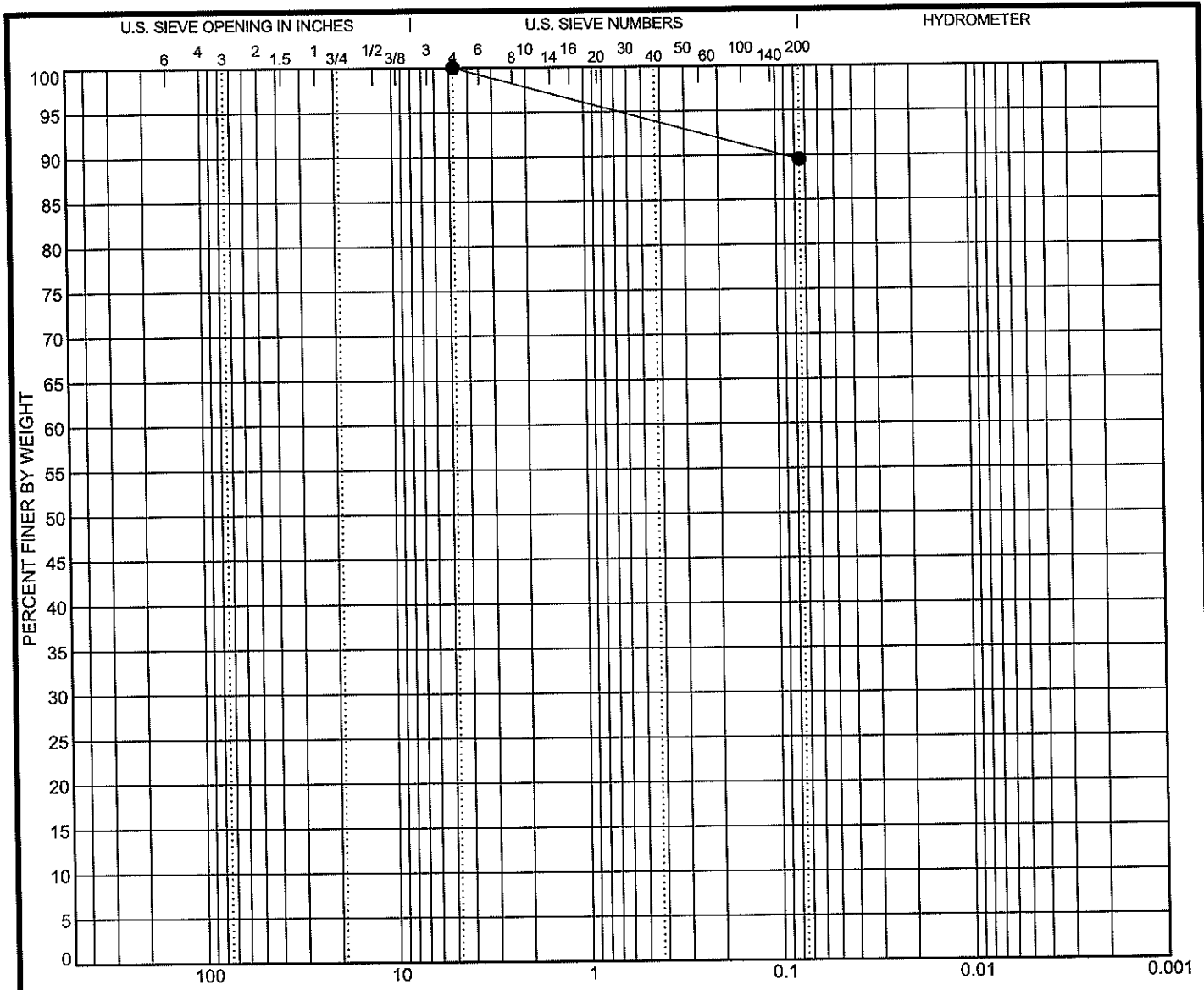
REMARKS:

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### GRAIN SIZE DISTRIBUTION

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-5 S-9; 19.0 ft.	FAT CLAY (CH)	60	17	43		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-05 19.0 ft.	4.75				0.0	10.5	89.5	

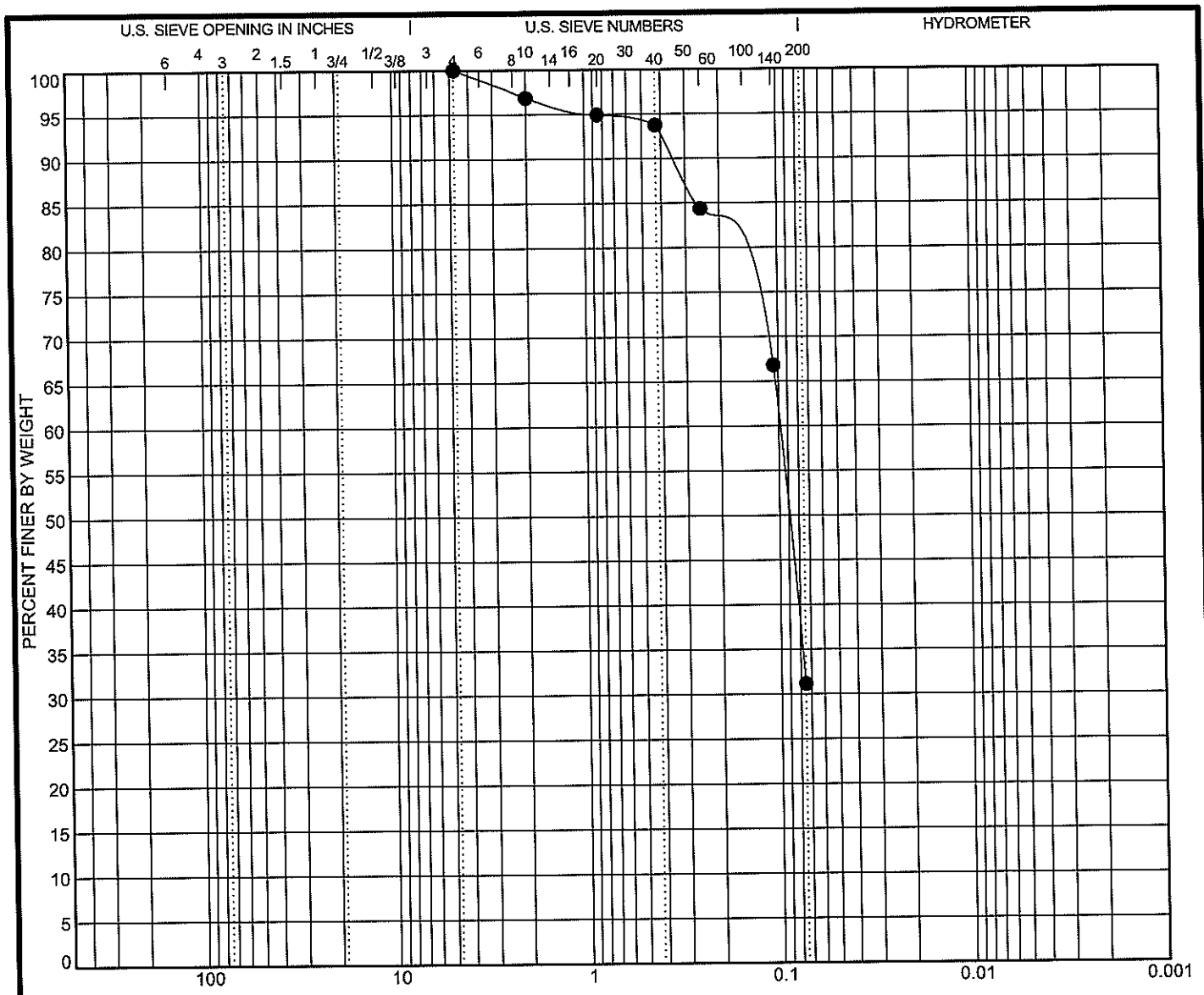
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRANSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-5 S-17;59.0 ft.	SILTY, CLAYEY SAND (SC-SM)	24	18	6		

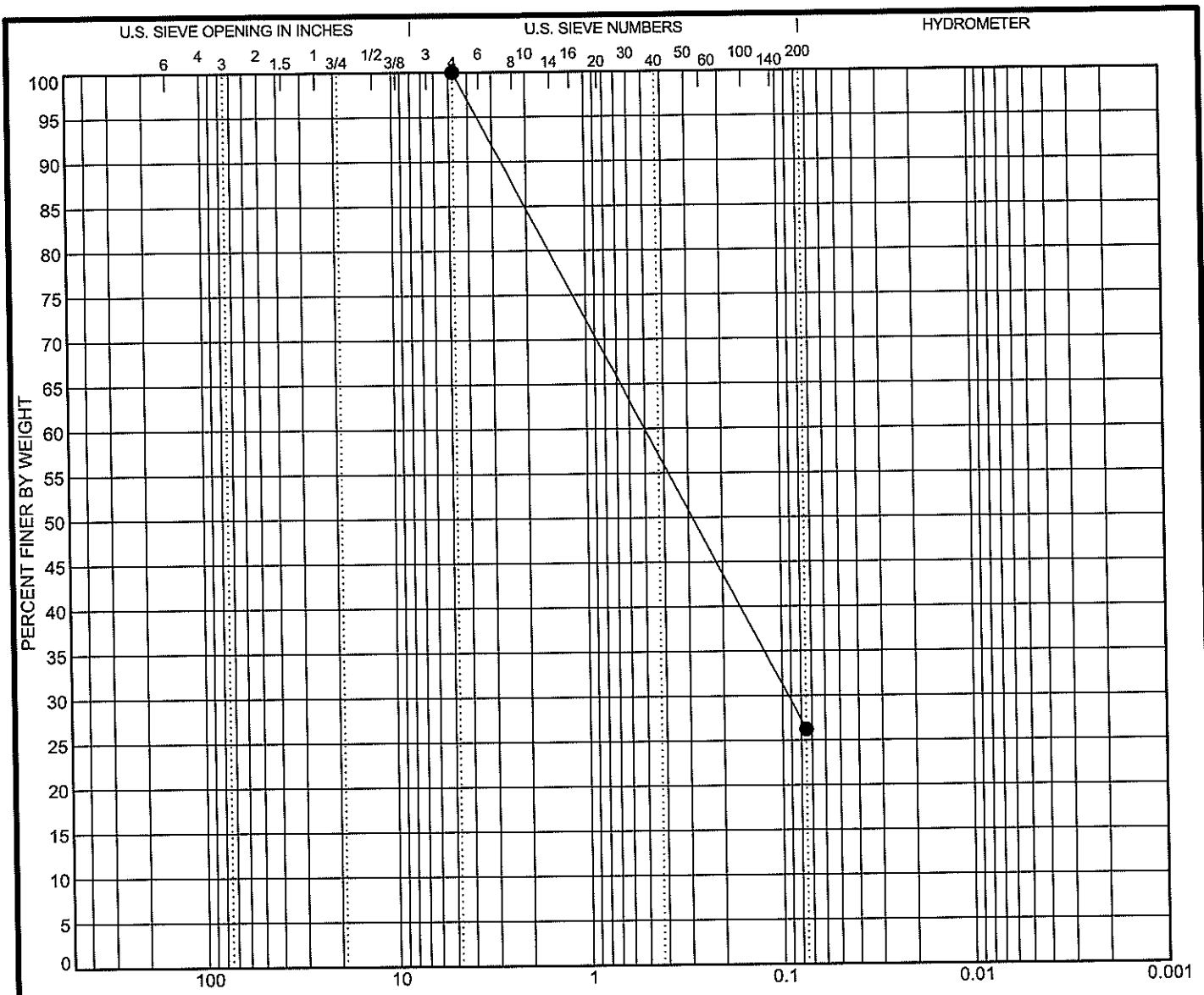
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-05 59.0 ft.	4.75	0.099			0.0	68.9	31.1	

REMARKS:



**GRAIN SIZE DISTRIBUTION**  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-5 S-18;64.0 ft.										
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-05 64.0 ft.	4.75	0.501	0.093		0.0	73.8	26.2			

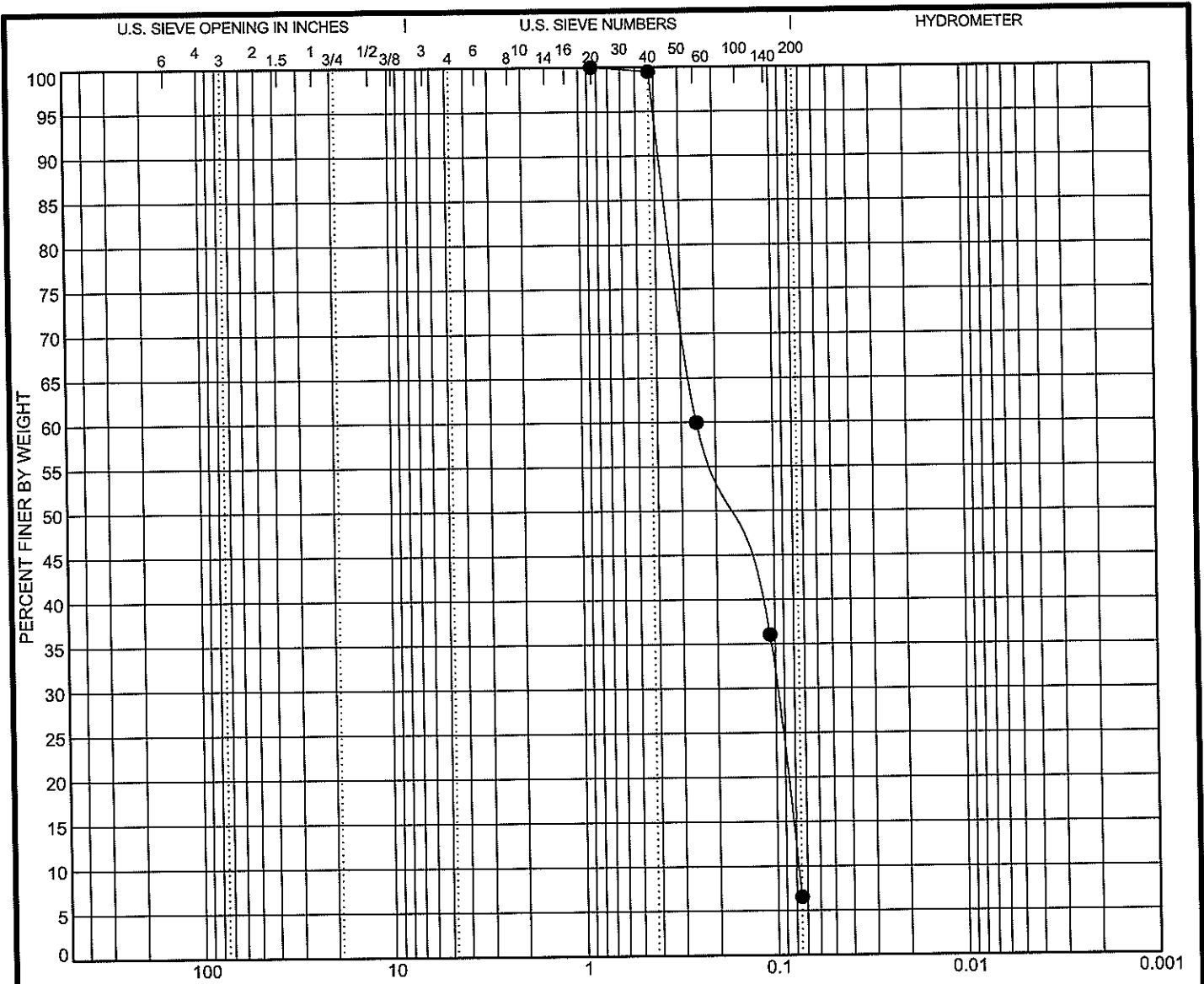
REMARKS:

GET GRAINSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

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Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-5 S-21;79.0 ft.	POORLY GRADED SAND with SILT (SP-SM)					NP	19	NP	0.50	3.20
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-05 79.0 ft.	0.85	0.25	0.099	0.078	0.0	93.5	6.5			

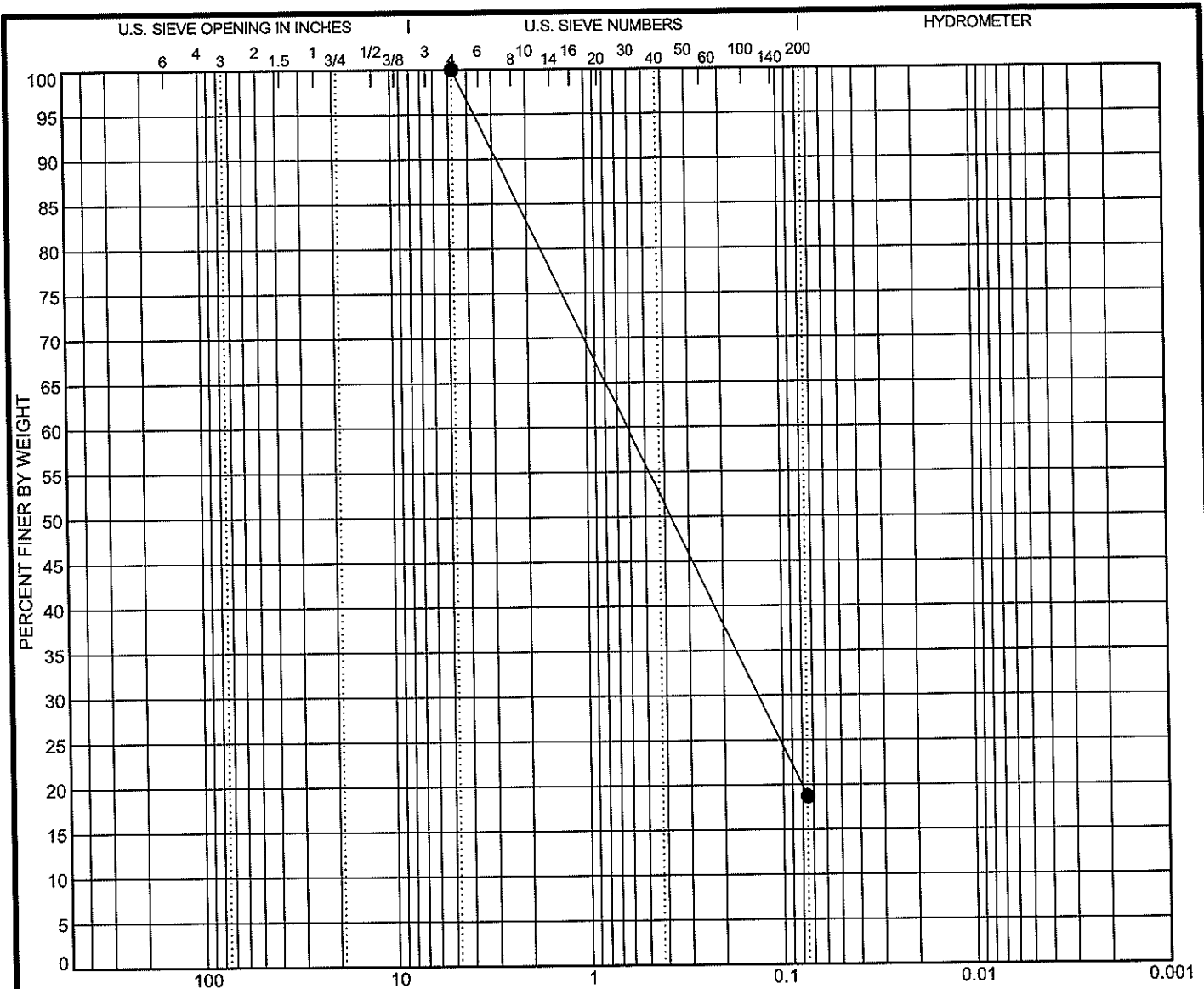
REMARKS:



**GRAIN SIZE DISTRIBUTION**

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 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET, GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-6 S-4;5.0 ft.	SILTY SAND (SM)	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-06 5.0 ft.	4.75	0.617	0.134		0.0	81.3	18.7	

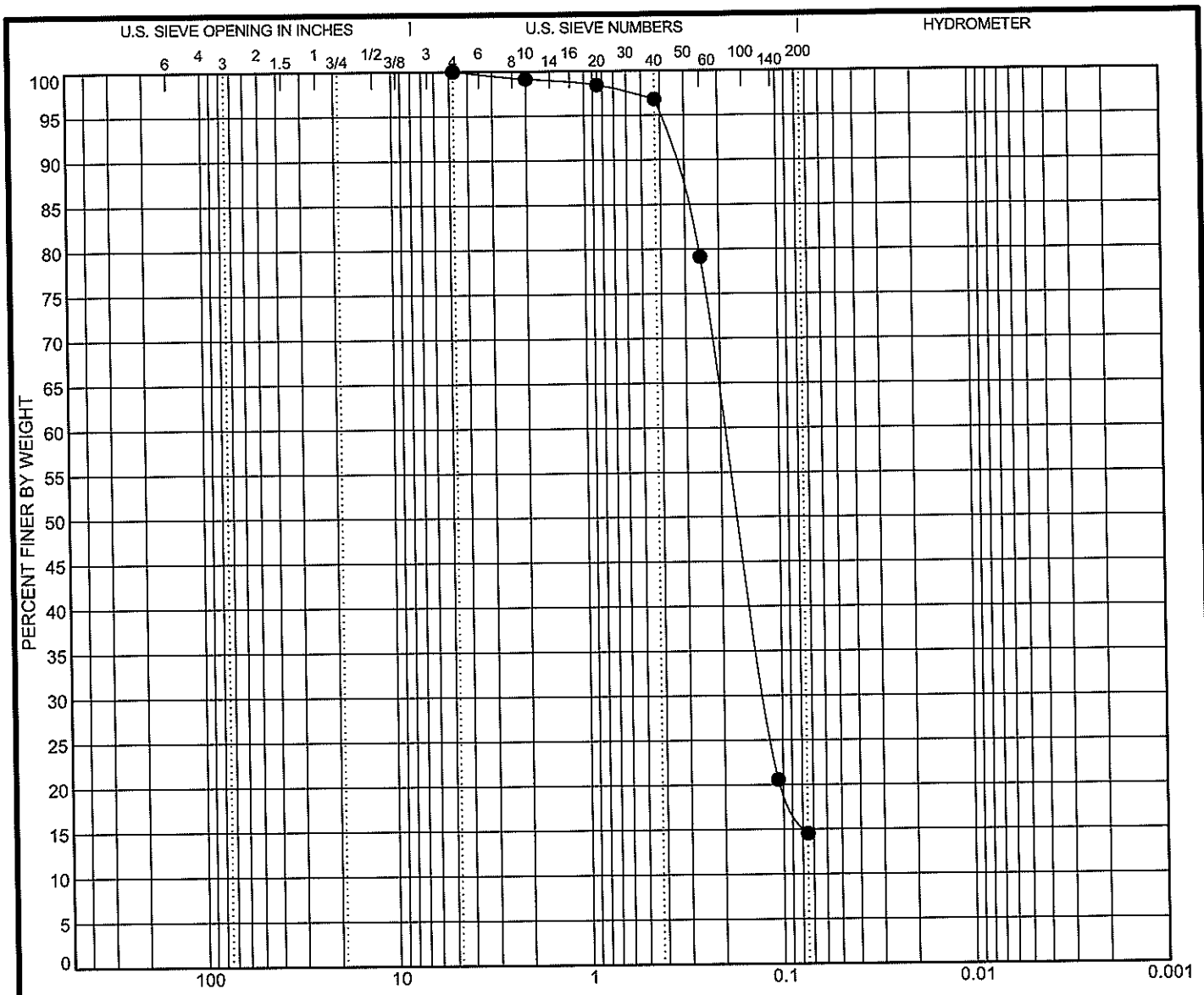
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

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 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-6 T-1;6.5 ft.	SILTY SAND (SM)	NP	22	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-06 6.5 ft.	4.75	0.189	0.122		0.0	85.5	14.5	

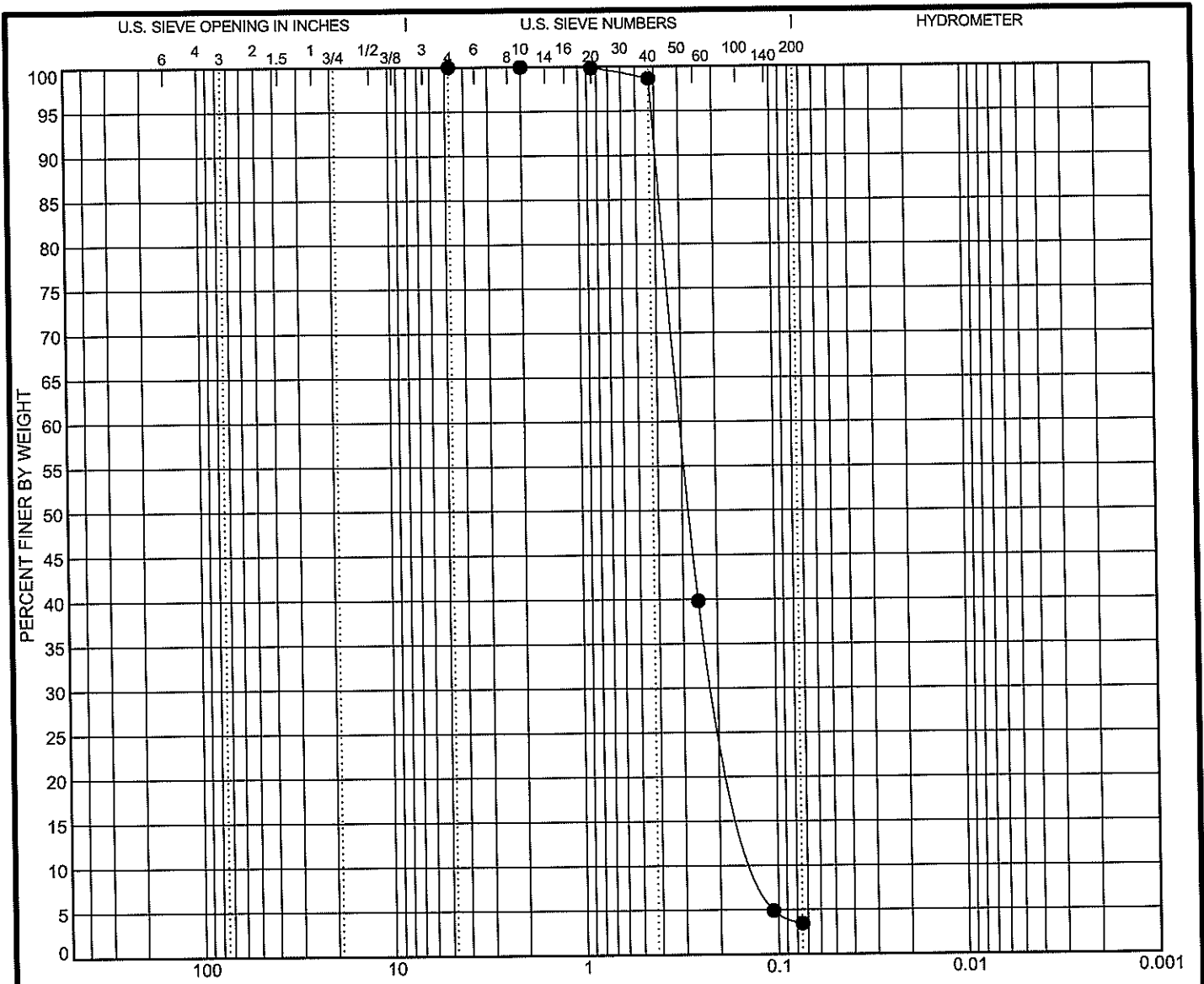
REMARKS:

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-6 S-12;29.0 ft.	POORLY GRADED SAND (SP)					NP	NP	NP	1.07	2.50
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-06 29.0 ft.	4.75	0.3	0.196	0.12	0.0	96.6	3.4			

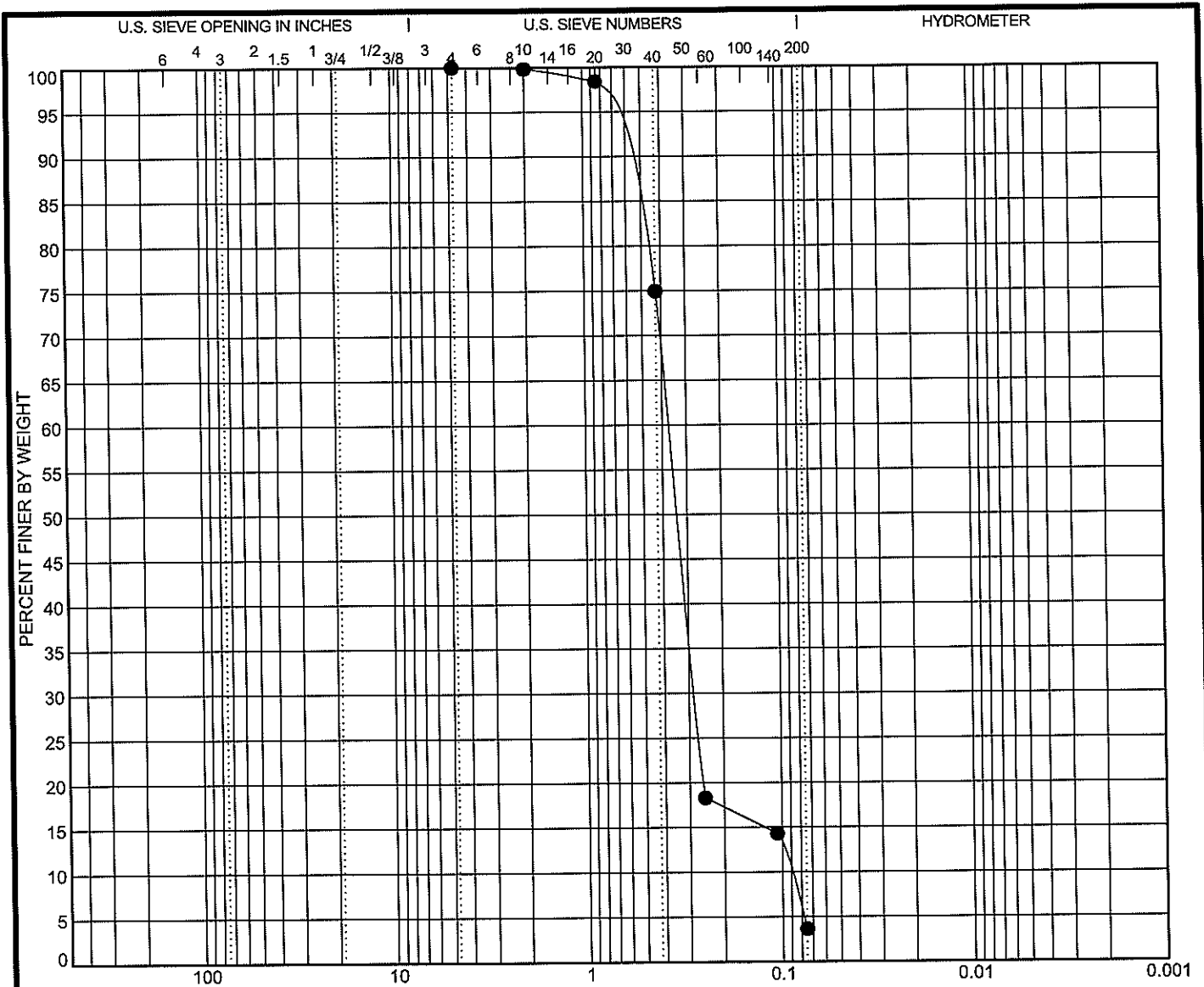
REMARKS:



**GRAIN SIZE DISTRIBUTION**  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23





Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-6 S-14;39.0 ft.	POORLY GRADED SAND (SP)	NP	NP	NP	2.28	4.01

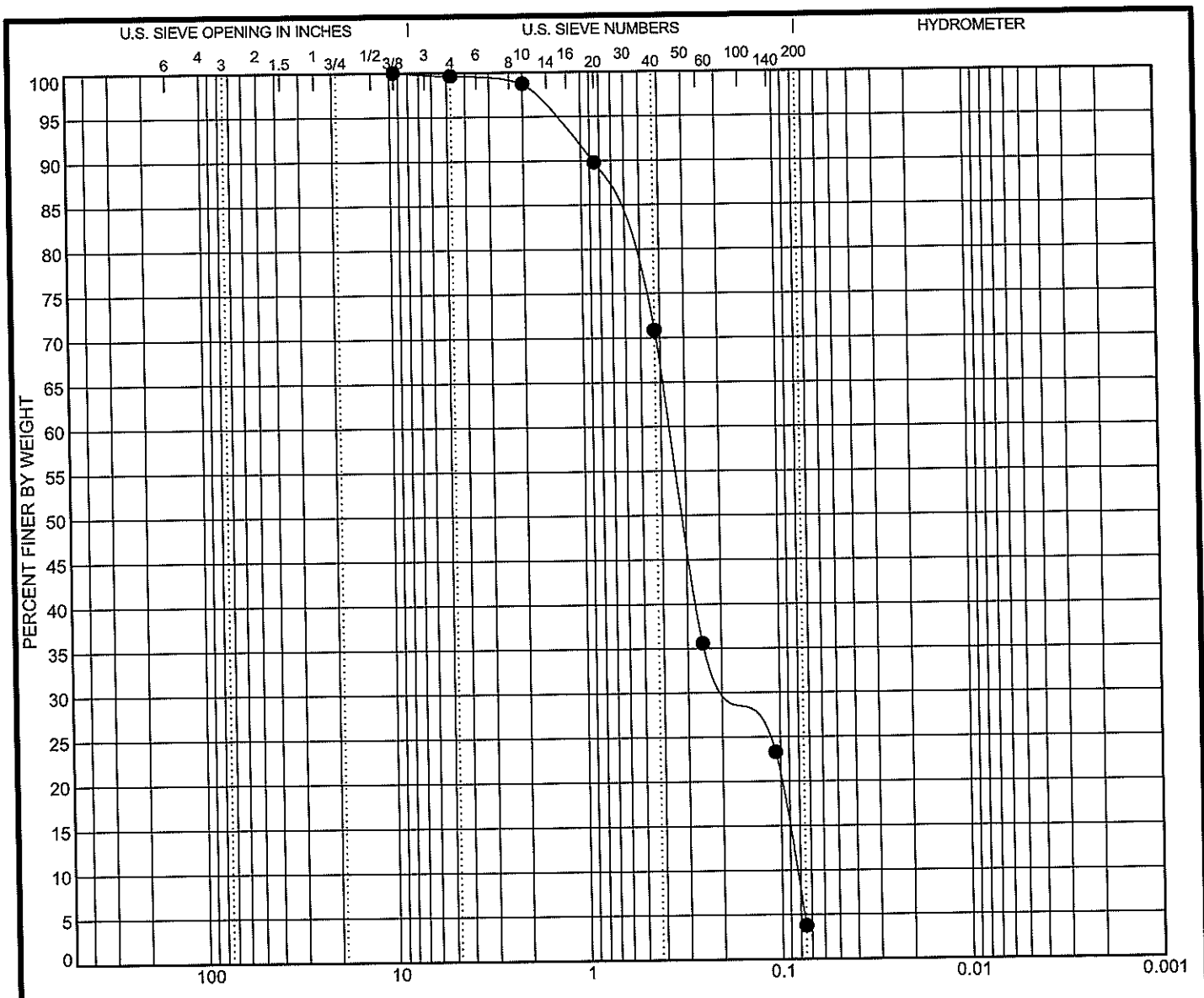
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-06 39.0 ft.	4.75	0.37	0.279	0.092	0.0	96.4	3.6	

REMARKS:



### GRAIN SIZE DISTRIBUTION

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-6 S-16;49.0 ft.	POORLY GRADED SAND (SP)	NP	NP	NP	0.95	4.31

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-06 49.0 ft.	9.5	0.361	0.17	0.084	0.4	95.9	3.7	

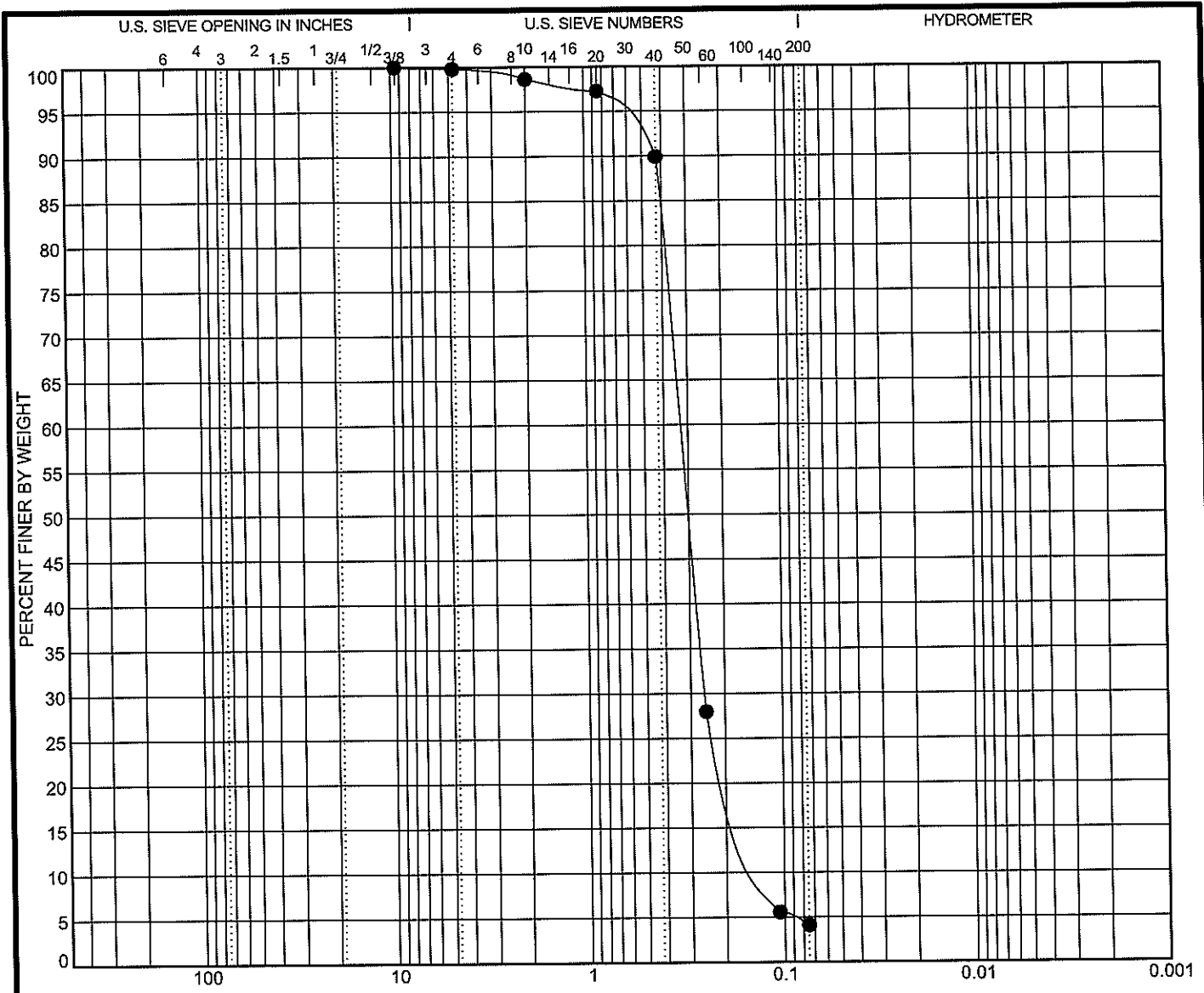
REMARKS:

GET\_GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GET AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-6 S-18;59.0 ft.	POORLY GRADED SAND (SP)	NP	18	NP	1.57	2.62

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-06 59.0 ft.	9.5	0.329	0.254	0.126	0.2	95.7	4.1	

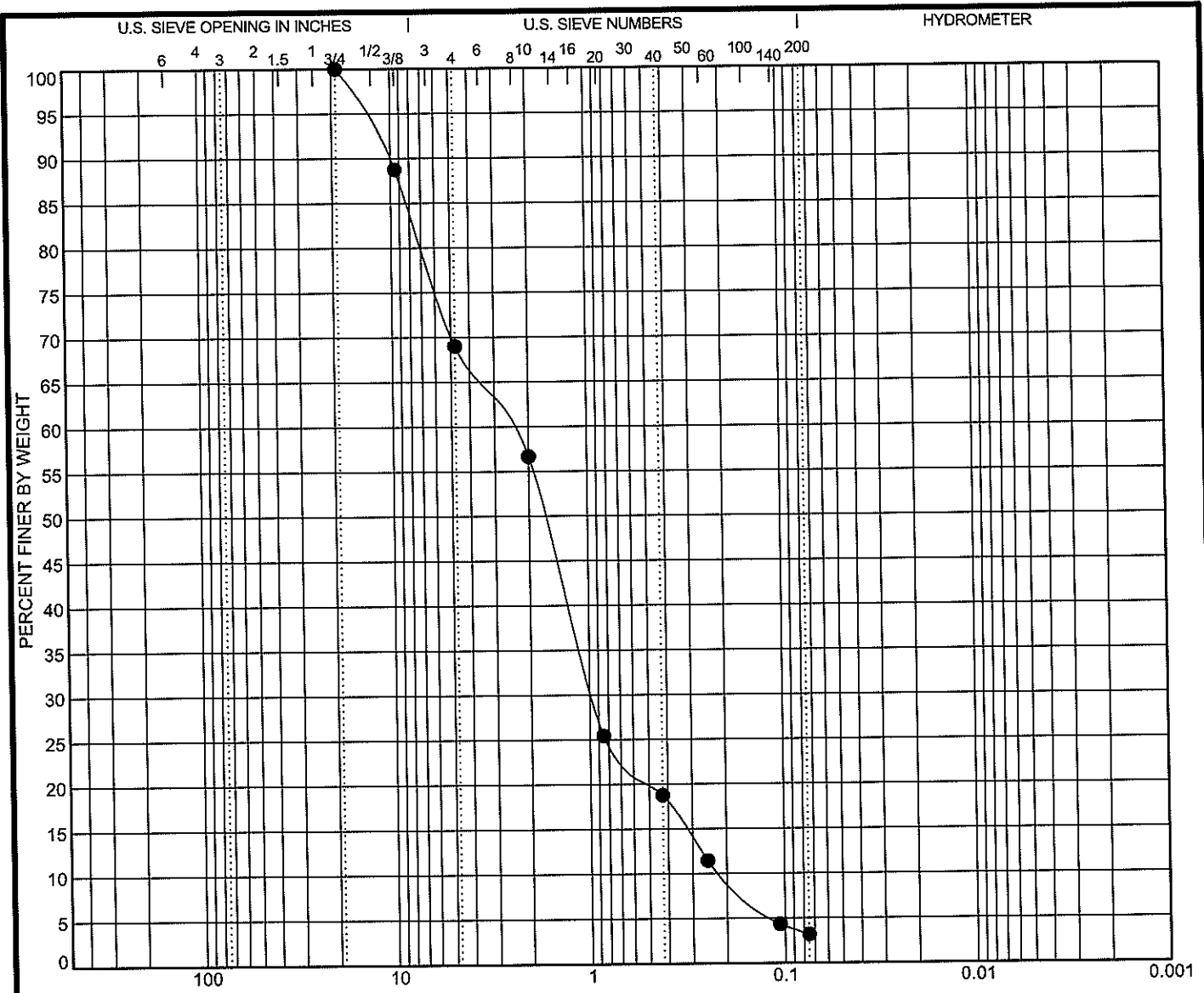
REMARKS:

GET GRAINSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-6 S-21;74.0 ft.	WELL-GRADED SAND with GRAVEL (SW)	NP	NP	NP	1.75	12.02

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-06 74.0 ft.	19	2.528	0.964	0.21	31.0	65.8	3.2	

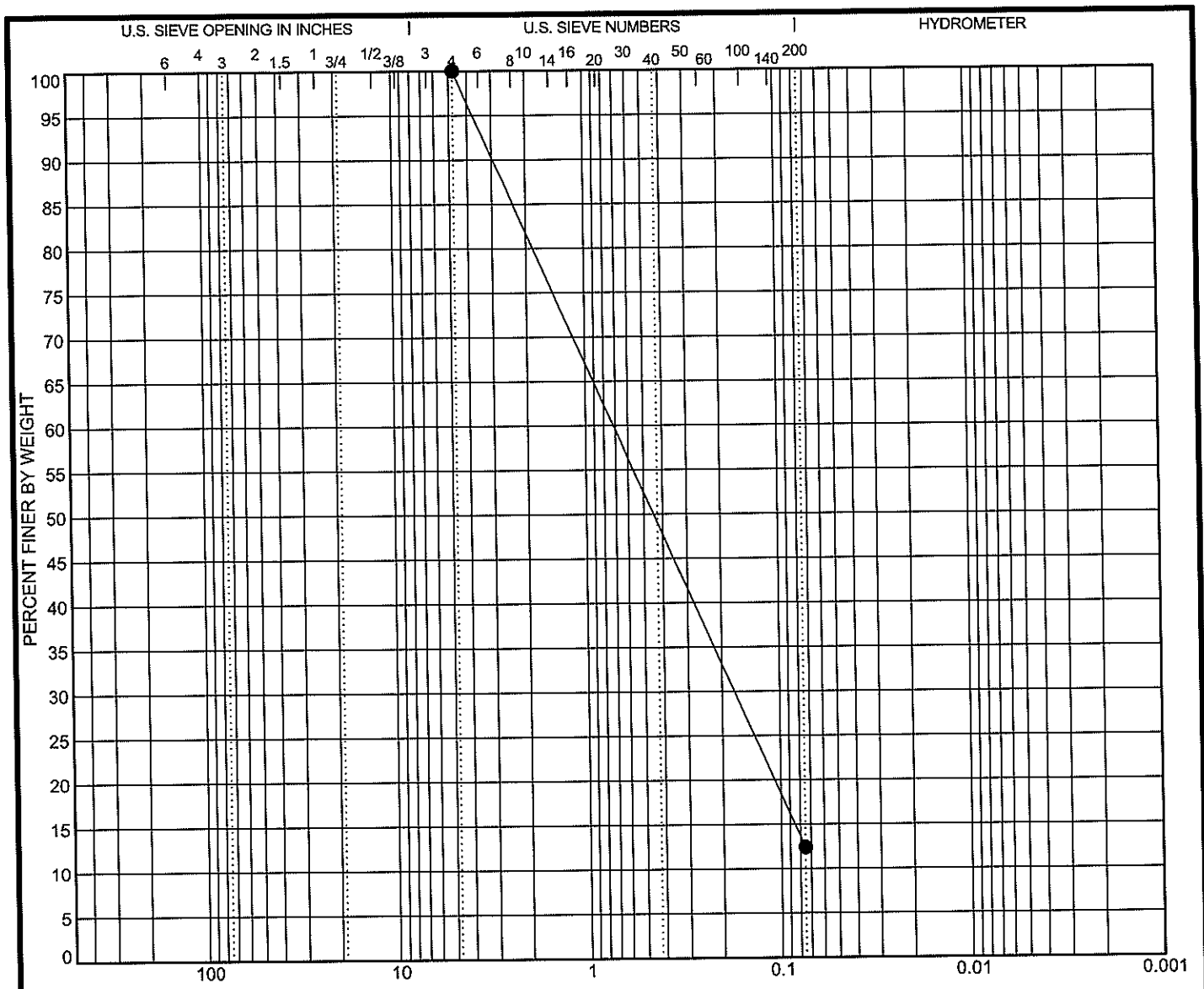
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-7 S-5;6.5 ft.	SILTY SAND (SM)	32	32	NP	0.62	10.67

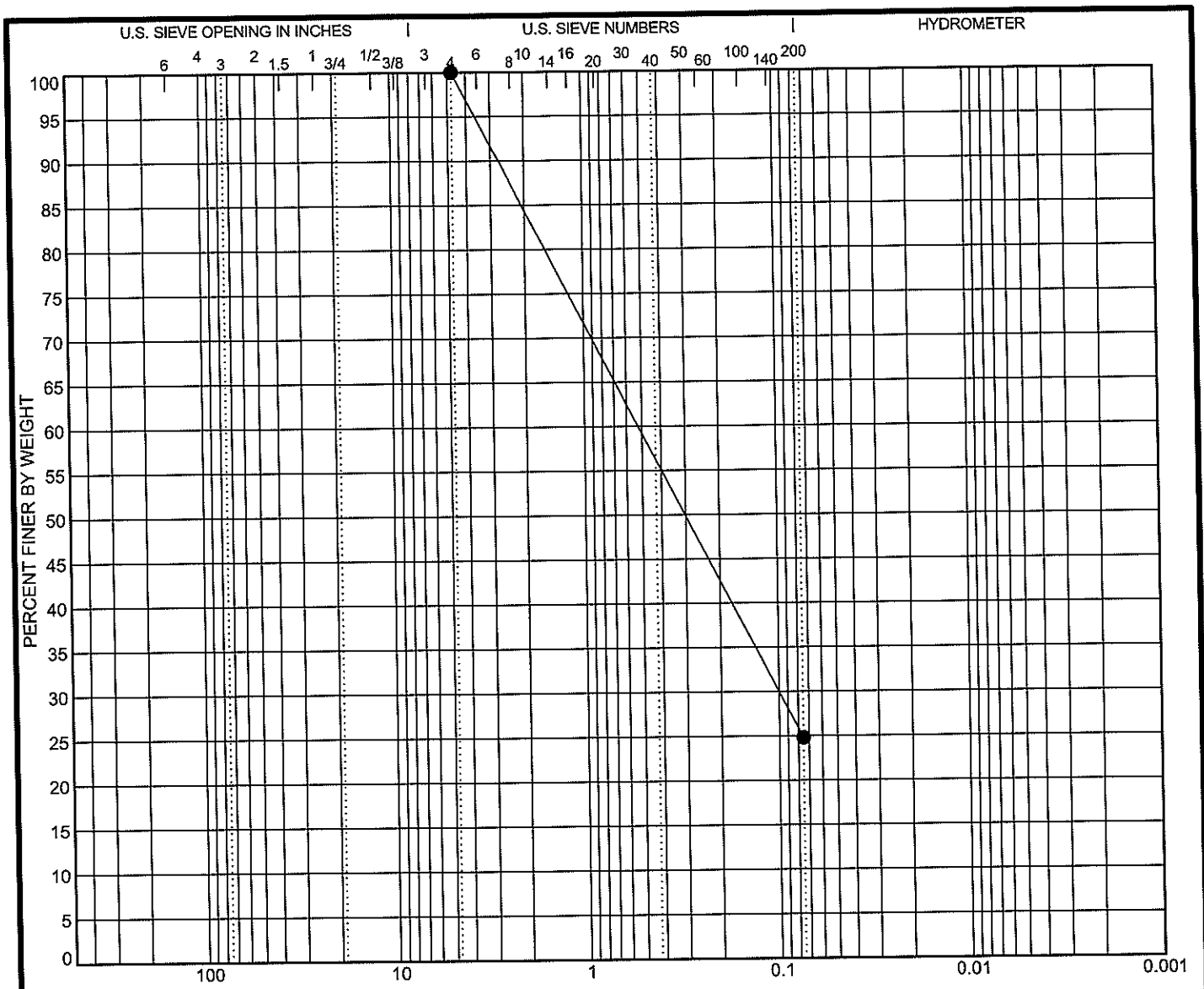
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-07 6.5 ft.	4.75	0.715	0.173		0.0	87.6	12.4	

REMARKS:



**GRAIN SIZE DISTRIBUTION**  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-7 S-8;14.0 ft.	CLAYEY SAND (SC)					29	15	14		
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-07 14.0 ft.	4.75	0.523	0.1		0.0	75.2	24.8			

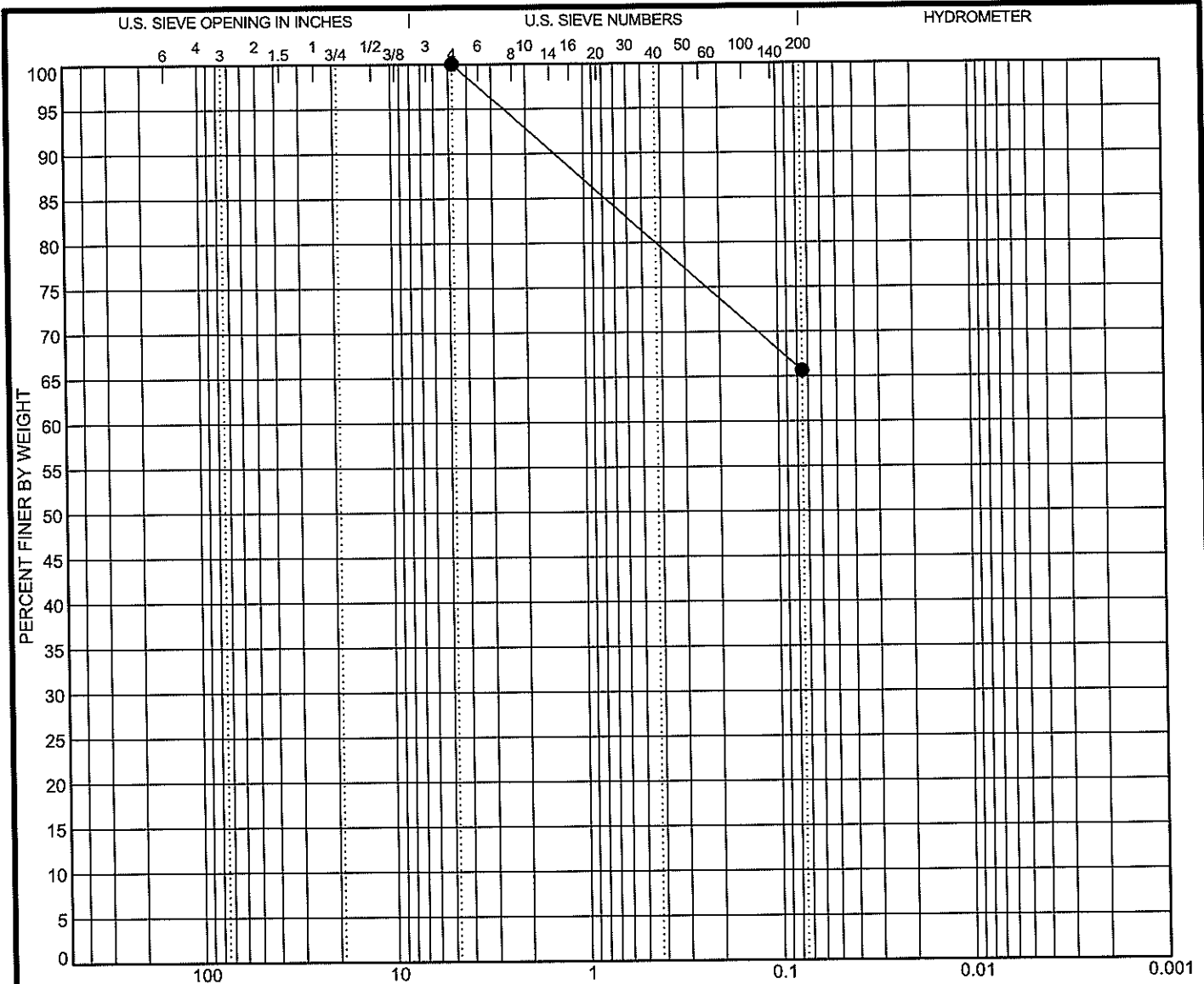
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-7 T-1; 18.5 ft.	SANDY FAT CLAY (CH)	88	23	65		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-07 18.5 ft.	4.75				0.0	34.4	65.6	

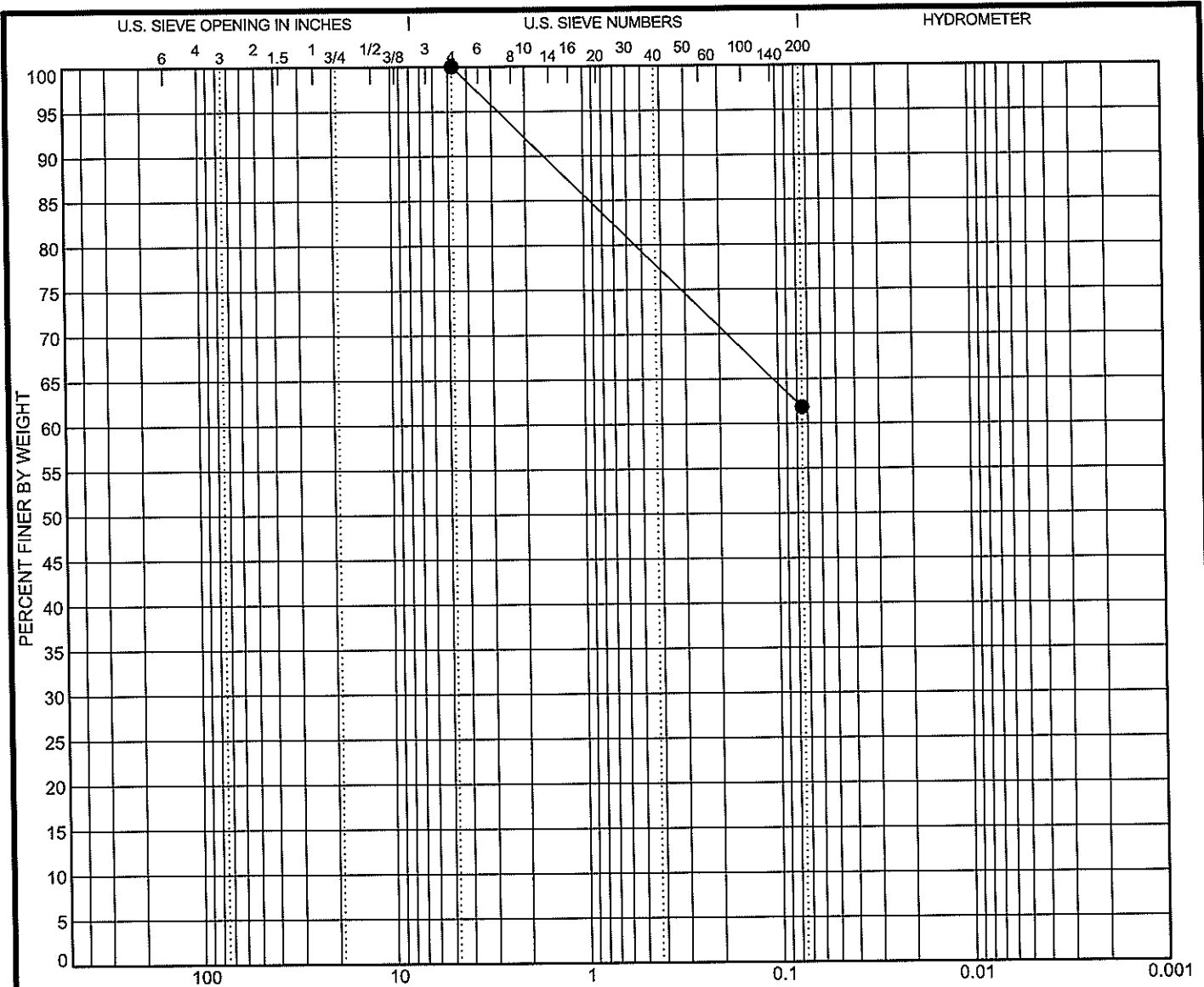
REMARKS:

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### GRAIN SIZE DISTRIBUTION

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-7 S-11;24.0 ft.	SANDY LEAN CLAY (CL)	42	17	25		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-07 24.0 ft.	4.75				0.0	38.2	61.8	

REMARKS:

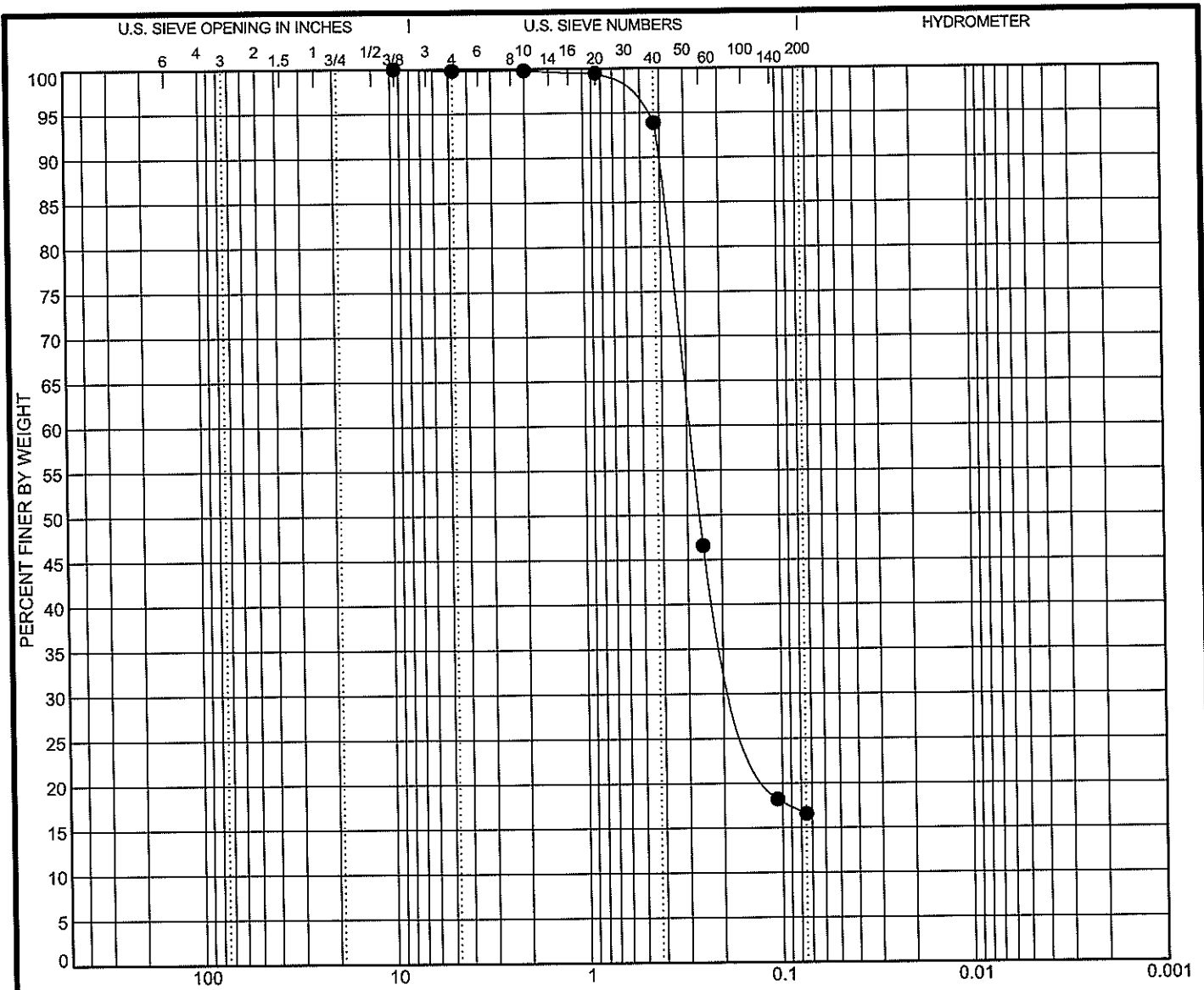
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### GRAIN SIZE DISTRIBUTION

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL





Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-7 S-15;44.0 ft.	SILTY SAND (SM)	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-07 44.0 ft.	9.5	0.291	0.151		0.2	83.2	16.6	

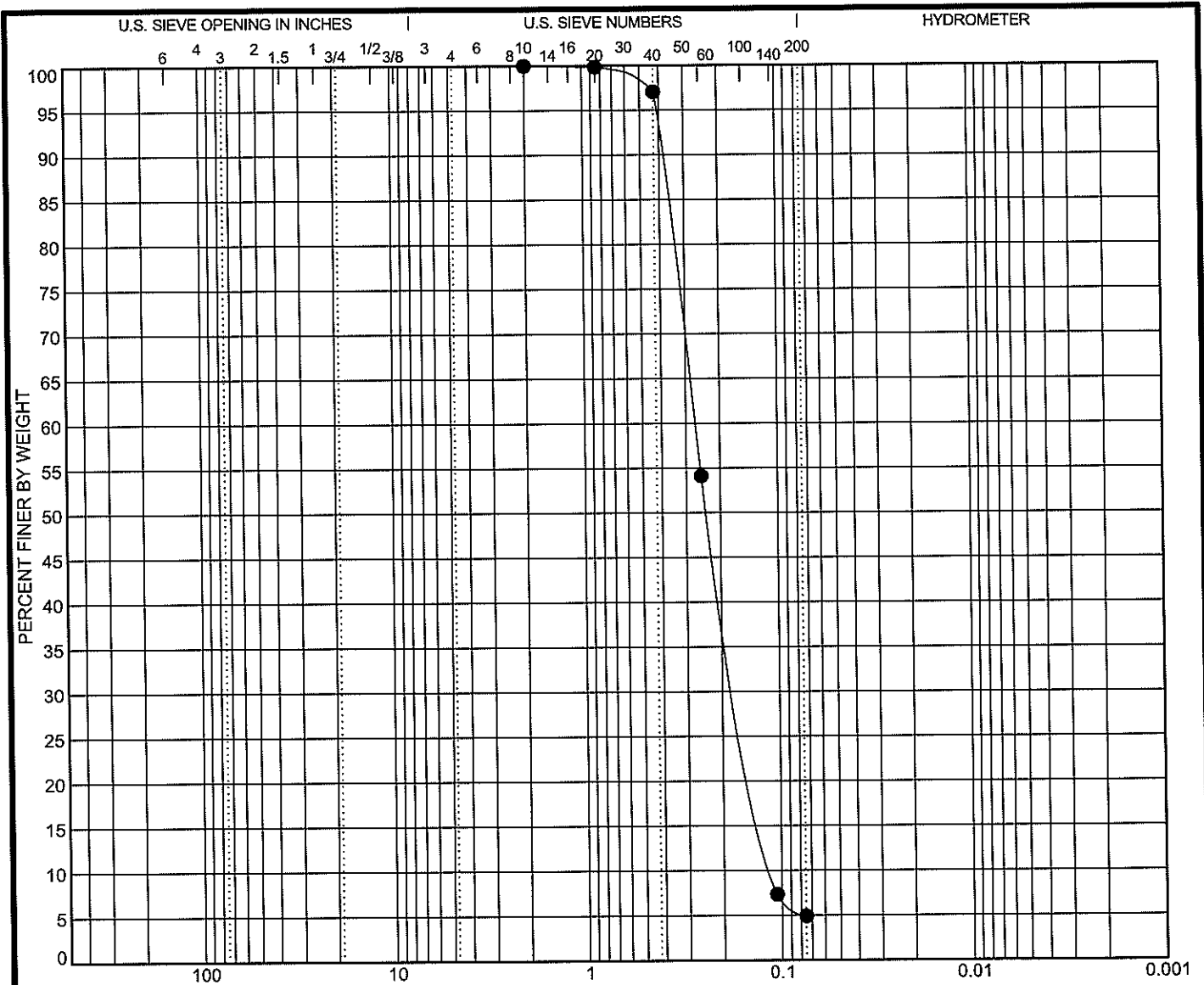
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### GRAIN SIZE DISTRIBUTION

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-7 S-17;54.0 ft.	POORLY GRADED SAND (SP)	NP	NP	NP	0.86	2.42

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-07 54.0 ft.	2	0.269	0.161	0.111	0.0	95.1	4.9	

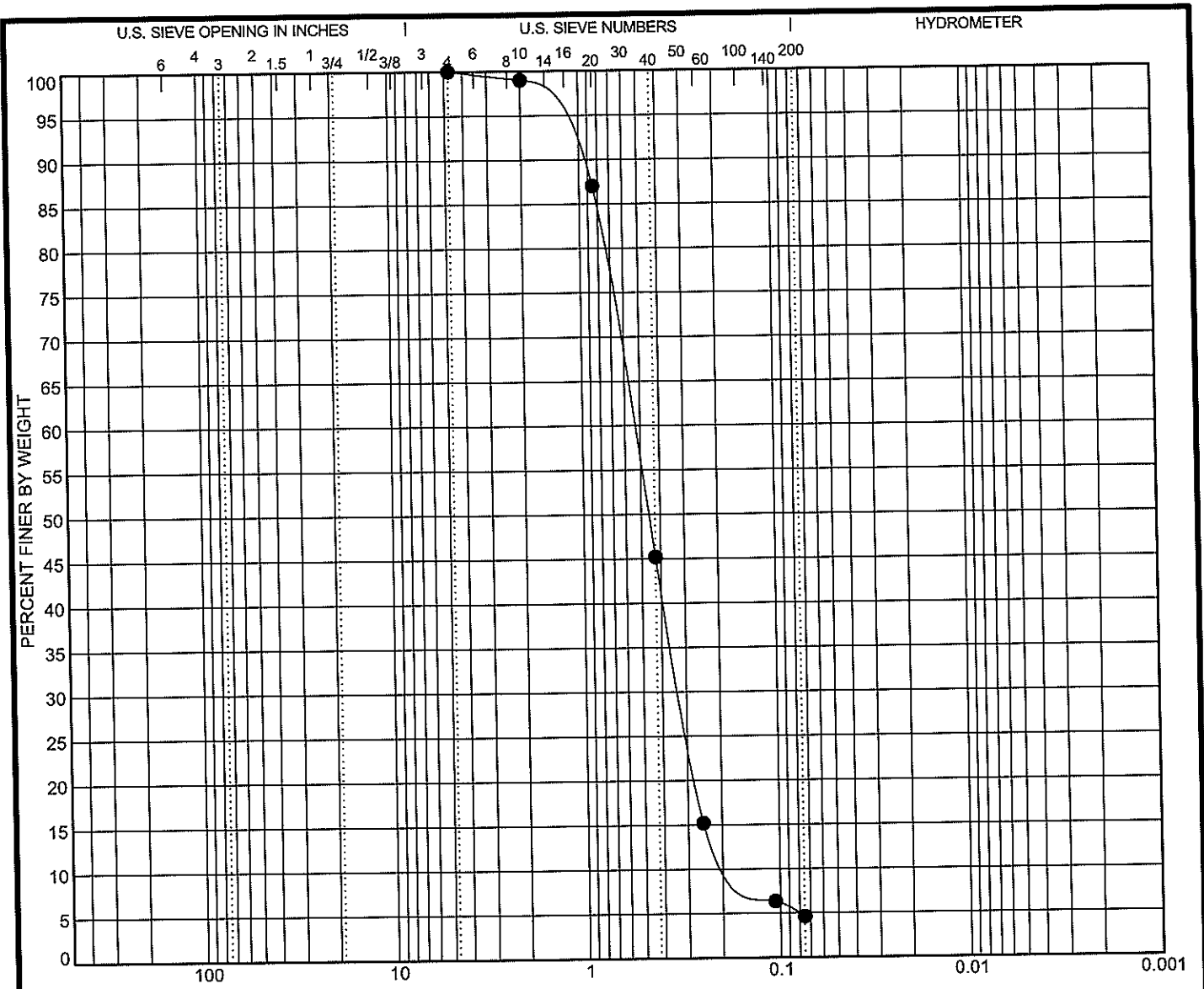
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER GPJ GETI-AL GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-7 S-20;69.0 ft.	POORLY GRADED SAND (SP)	NP	NP	NP	1.28	3.59

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-07 69.0 ft.	4.75	0.543	0.325	0.151	0.0	95.4	4.6	

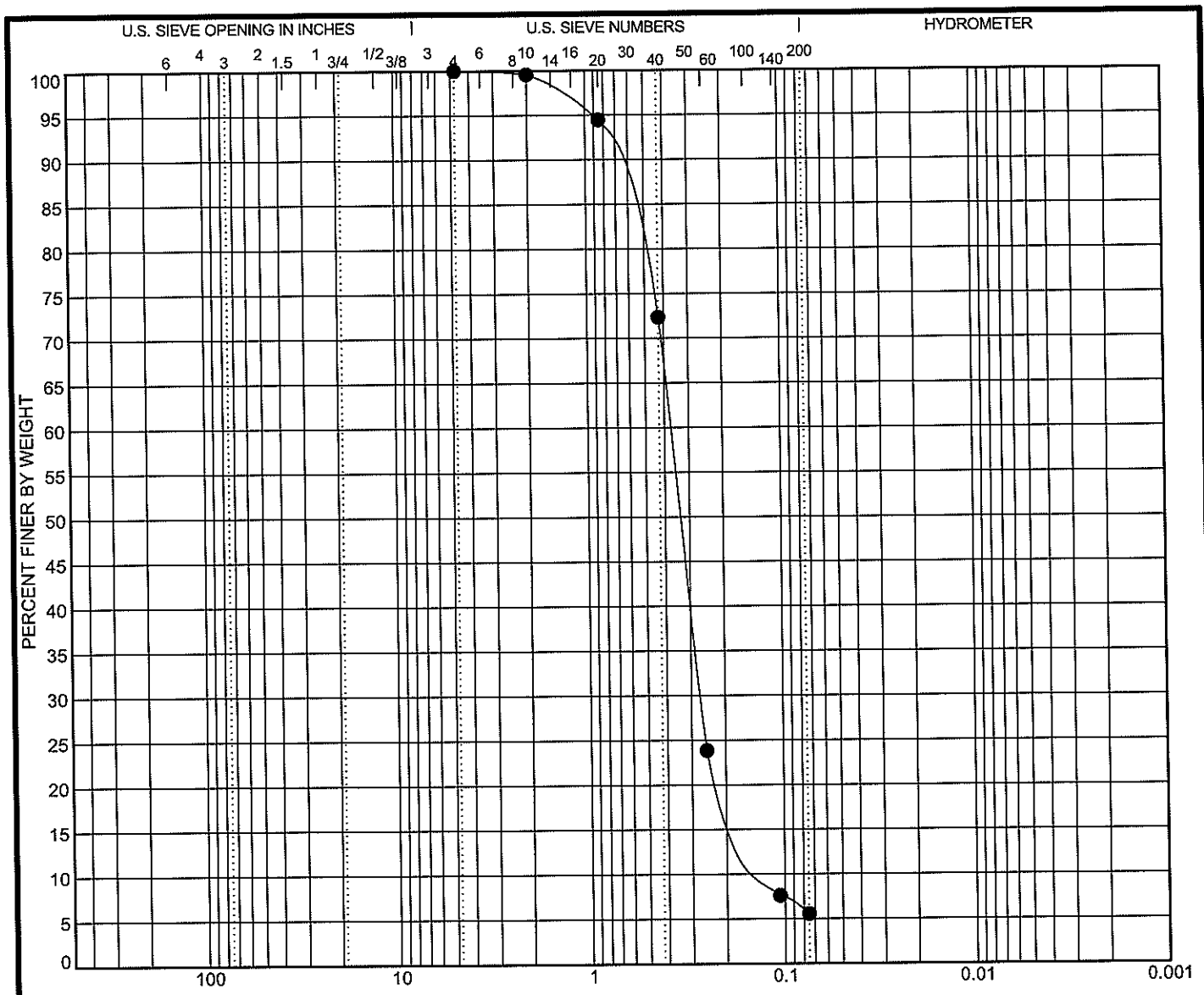
REMARKS:

GET GRAINSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

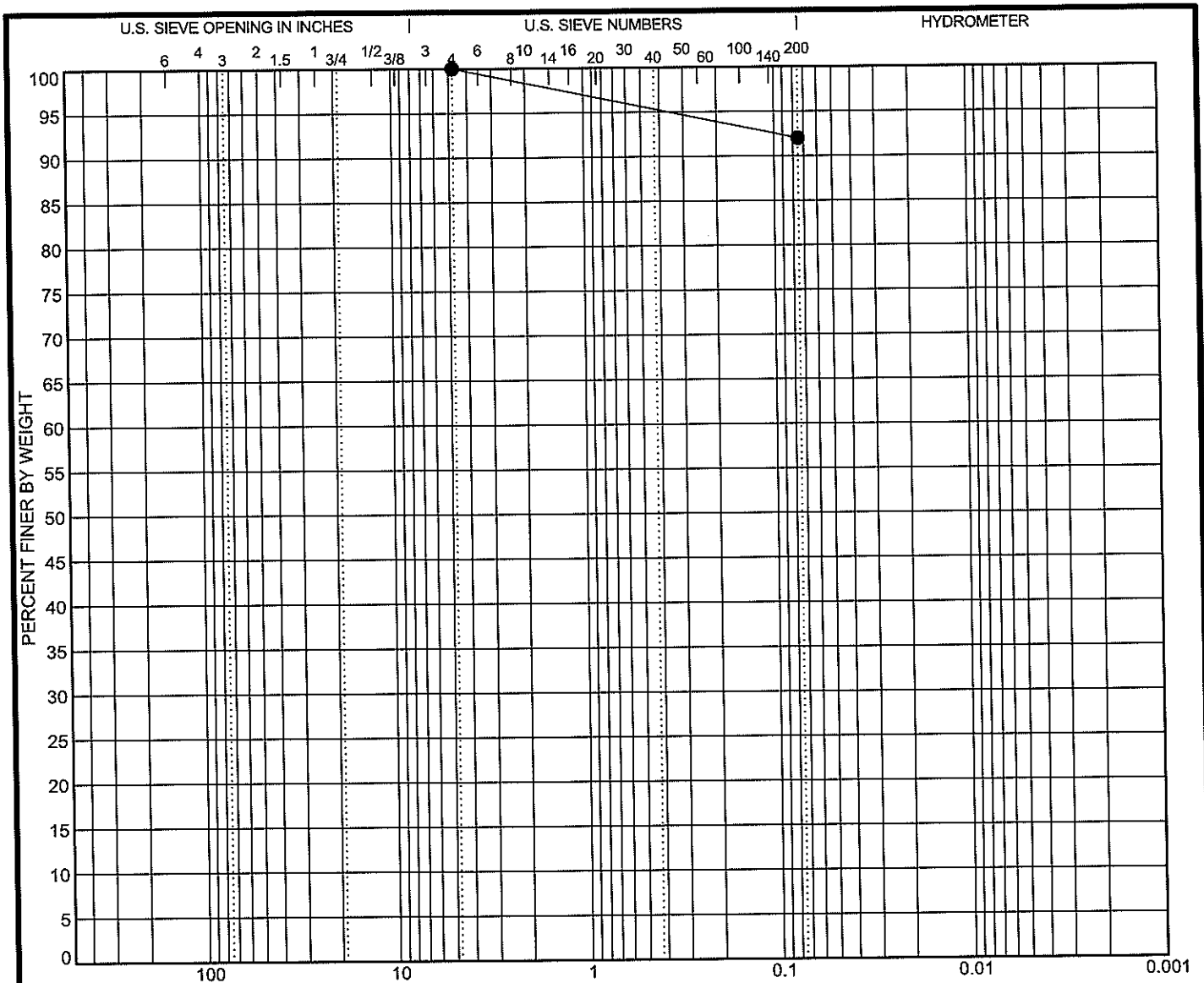
Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-7 S-23;84.0 ft.	POORLY GRADED SAND with SILT (SP-SM)					NP	NP	NP	1.60	3.08
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-07 84.0 ft.	4.75	0.371	0.267	0.12	0.0	94.5	5.5			

REMARKS:



**GRAIN SIZE DISTRIBUTION**  
 PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification				LL	PL	PI	Cc	Cu
● B-7	S-25;94.0 ft.	FAT CLAY (CH)				82	19	63		
Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay	
B-07	94.0 ft.	4.75				0.0	8.0	92.0		

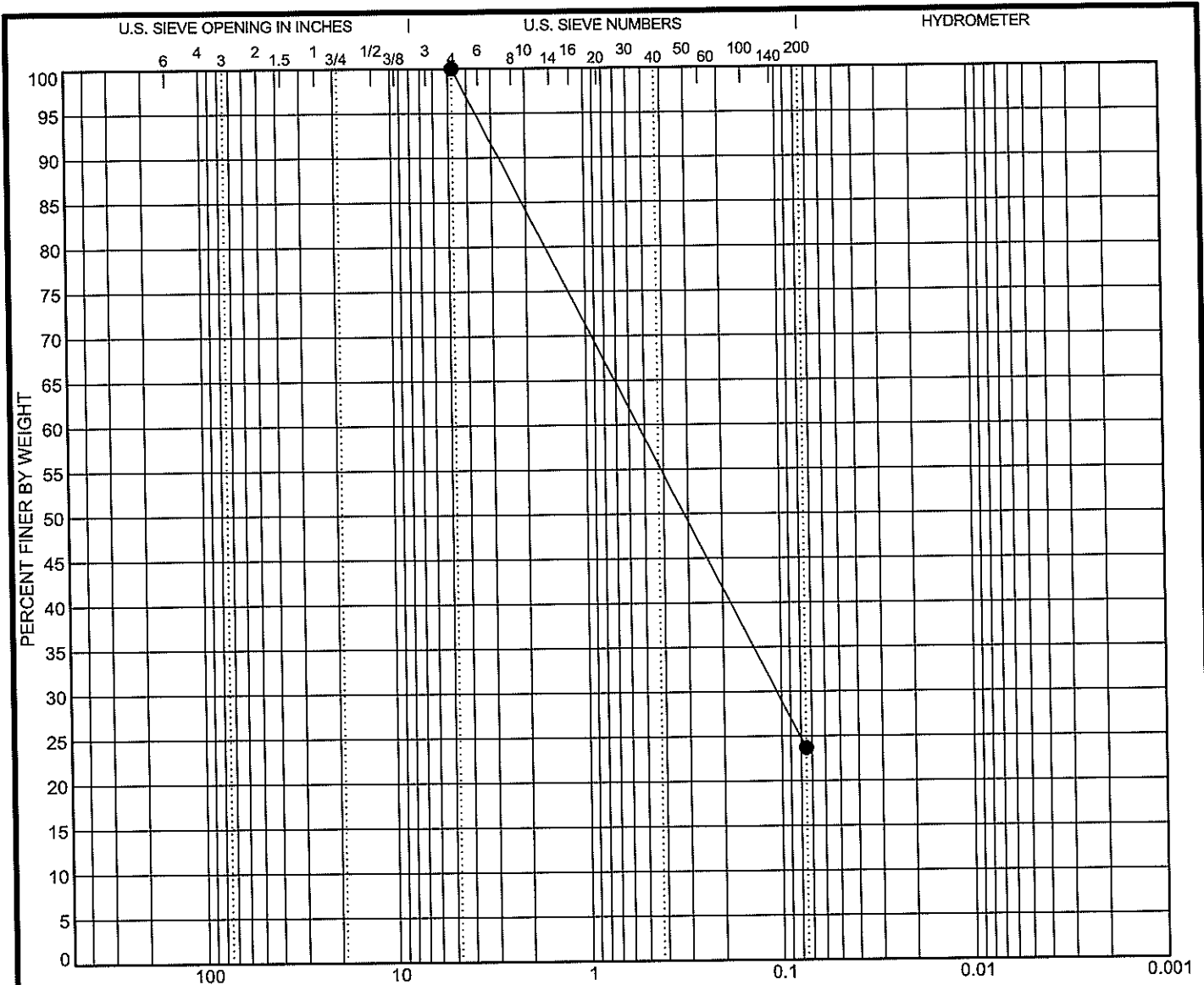
REMARKS:



### GRAIN SIZE DISTRIBUTION

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-8 S-6; 9.0 ft.	SILTY SAND (SM)	20	21	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-08 9.0 ft.	4.75	0.54	0.106		0.0	76.3	23.7	

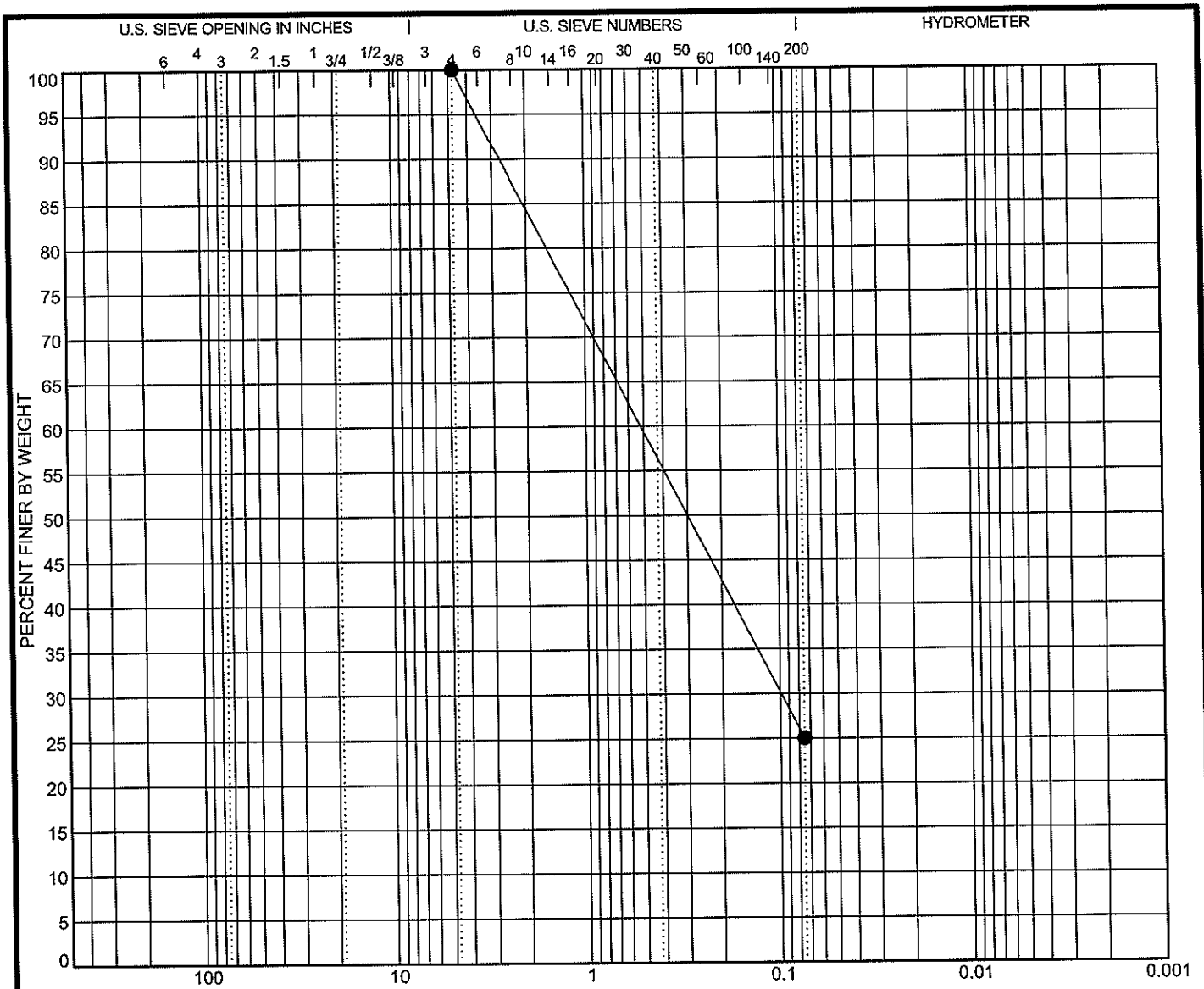
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER GPJ GETI AL GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-8 S-8; 14.0 ft.						

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-08 14.0 ft.	4.75	0.519	0.099		0.0	75.0		25.0

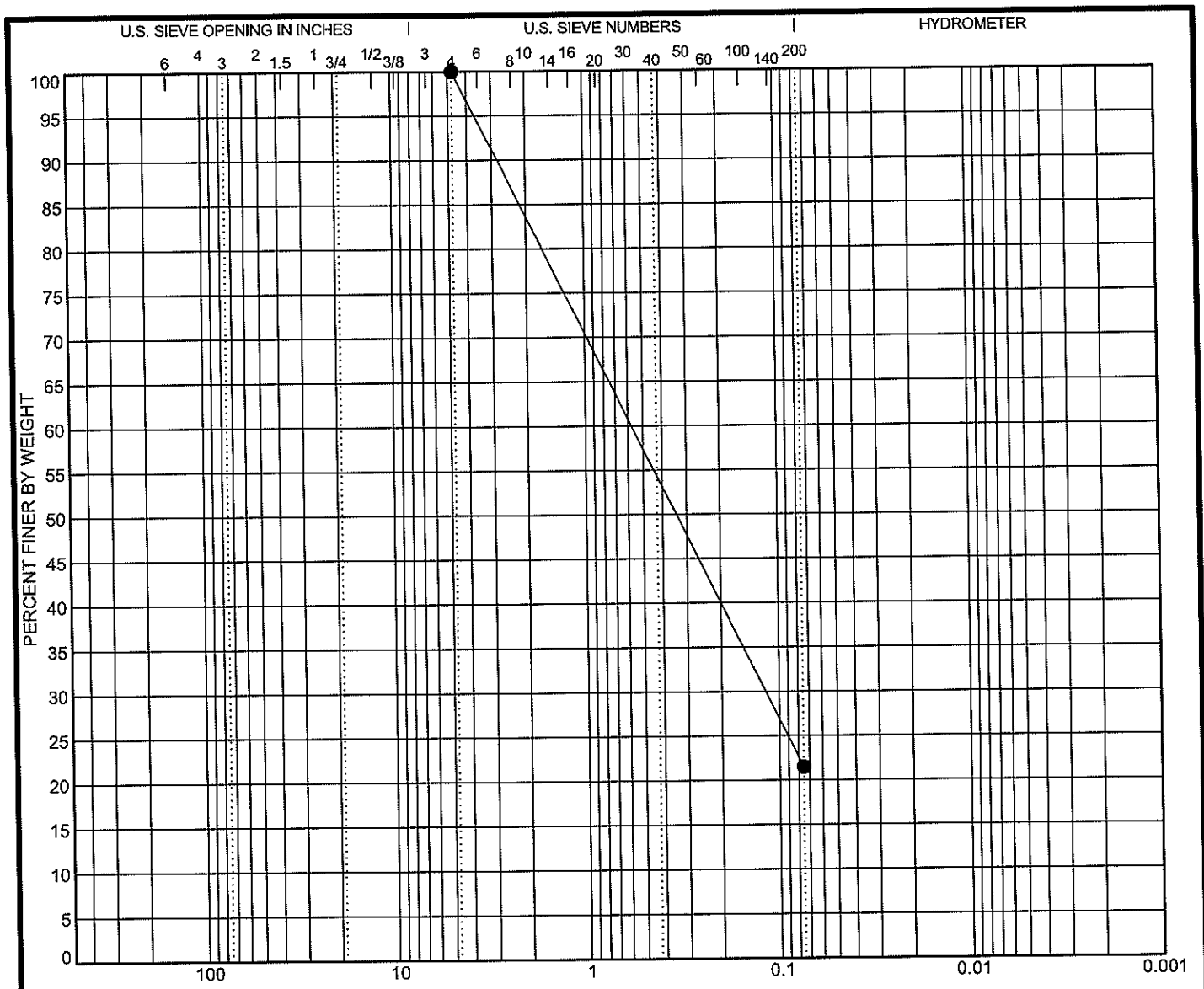
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
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 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-8 T-1;16.5 ft.	SILTY SAND (SM)	NP	18	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-08 16.5 ft.	4.75	0.575	0.118		0.0	78.6	21.4	

REMARKS:

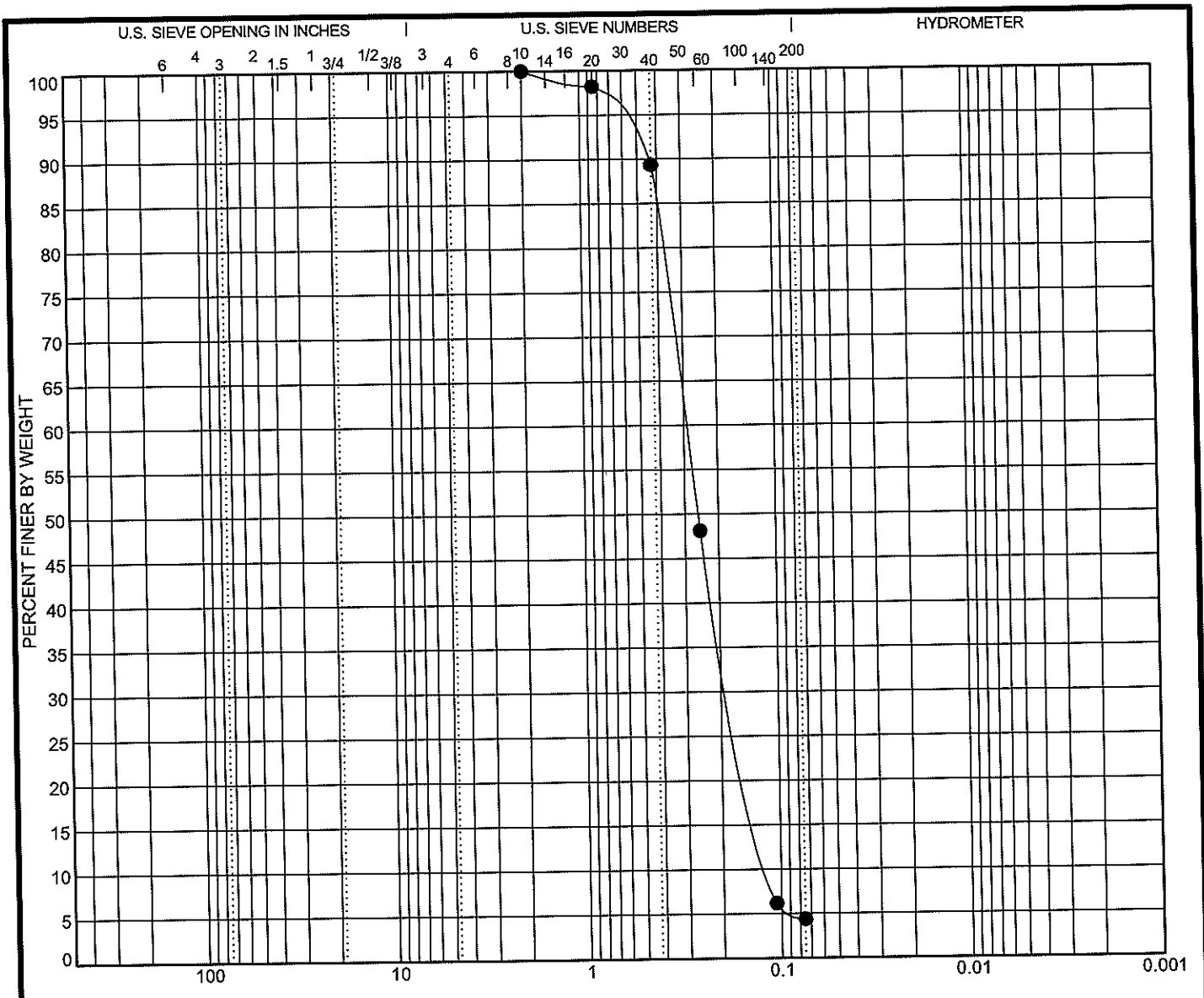
GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL





Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-8 S-15;44.0 ft.	POORLY GRADED SAND (SP)					NP	NP	NP	0.89	2.54
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-08 44.0 ft.	2	0.291	0.173	0.115	0.0	95.7	4.3			

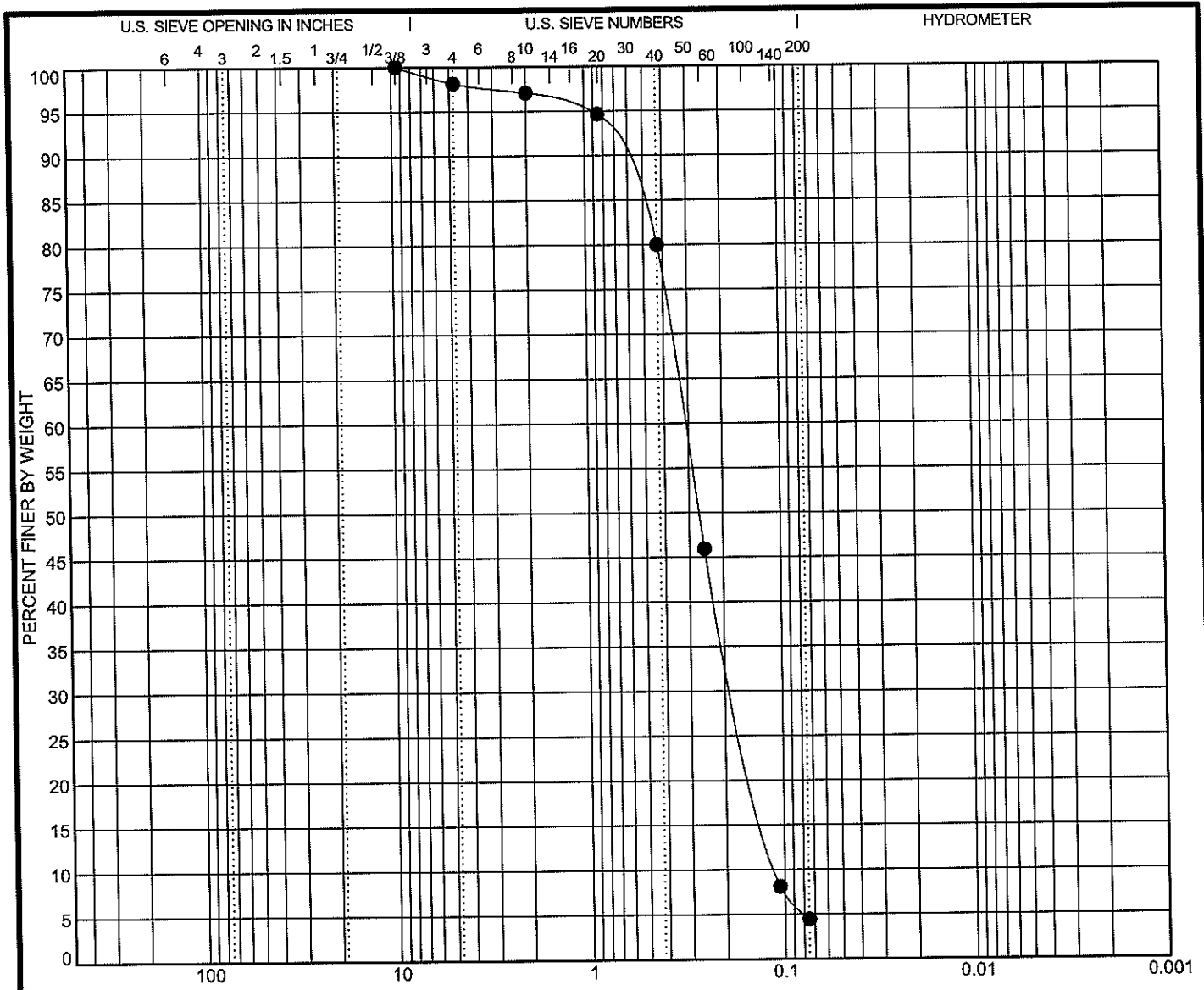
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-8 S-19;64.0 ft.	POORLY GRADED SAND (SP)					NP	NP	NP	0.88	2.81
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-08 64.0 ft.	9.5	0.311	0.174	0.111	1.9	93.7	4.4			

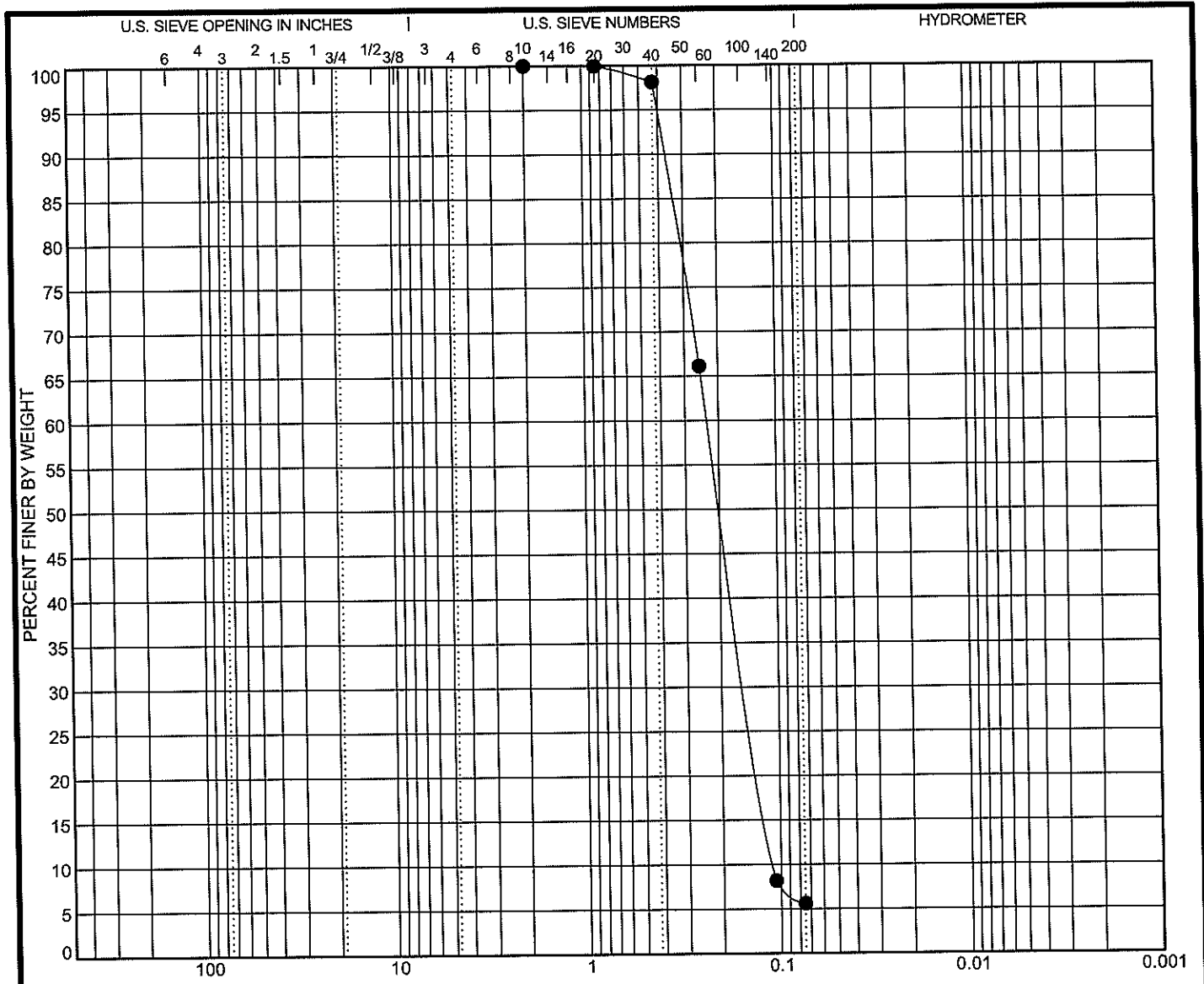
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-8 S-22;79.0 ft.	POORLY GRADED SAND with SILT (SP-SM)					NP	NP	NP	0.86	2.10

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-08 79.0 ft.	2	0.228	0.146	0.109	0.0	94.4	5.6	

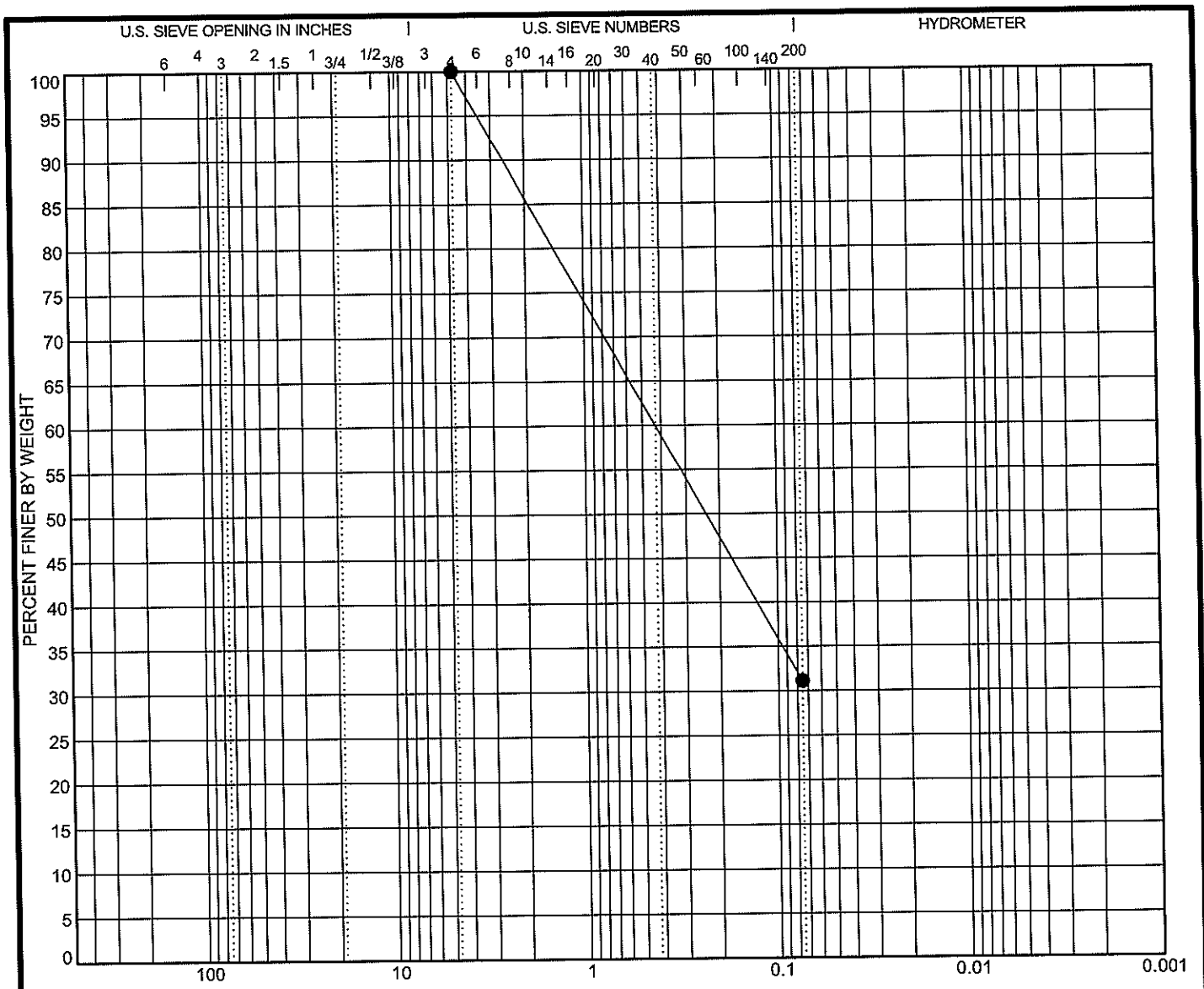
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
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 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-9 S-6;9.0 ft.	SILTY SAND (SM)	25	22	3		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-09 9.0 ft.	4.75	0.427			0.0	68.9	31.1	

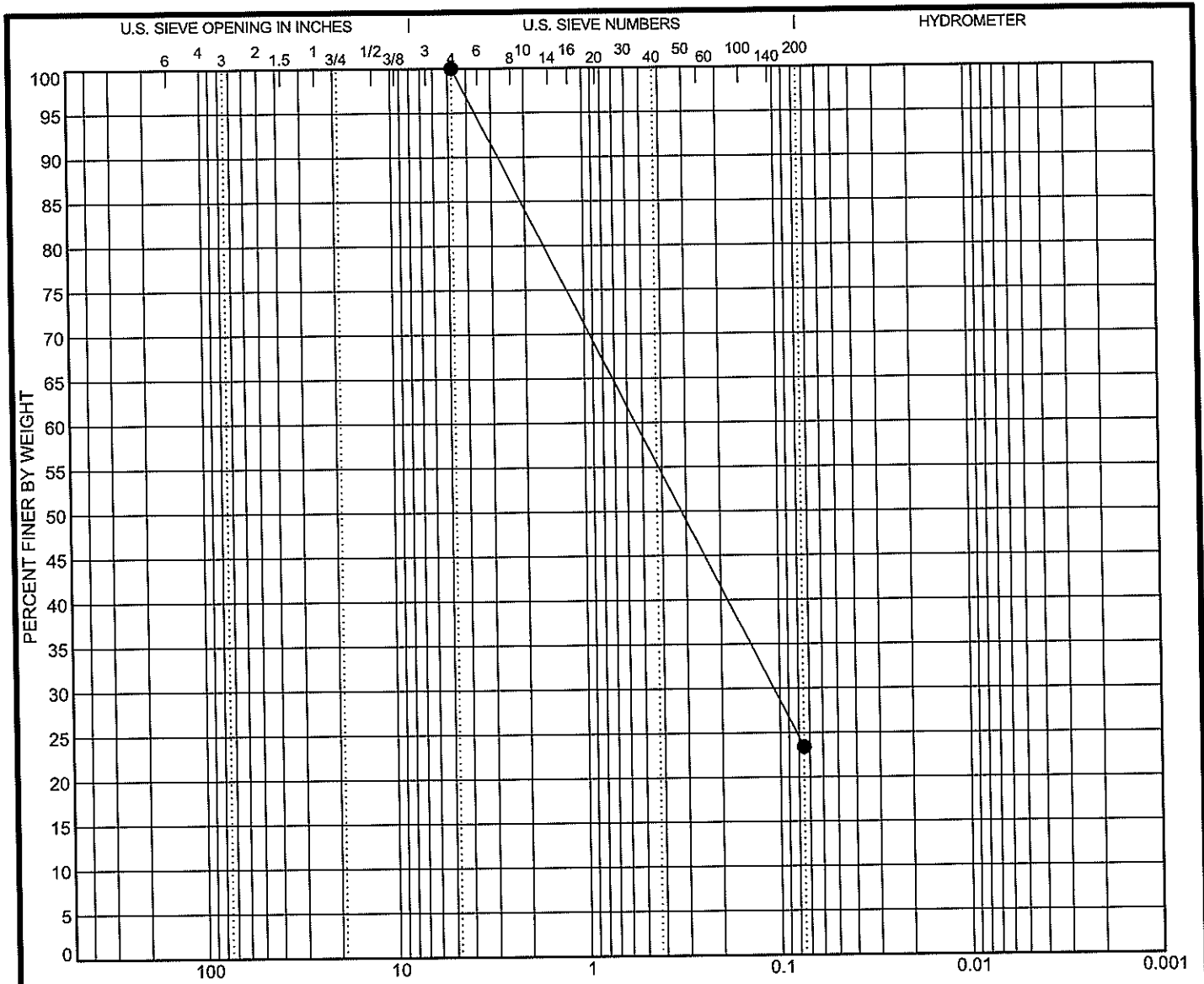
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification					LL	PL	PI	Cc	Cu
● B-9 S-8;14.0 ft.	SILTY, CLAYEY SAND (SC-SM)					24	20	4		
Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay		
B-09 14.0 ft.	4.75	0.545	0.107		0.0	76.6	23.4			

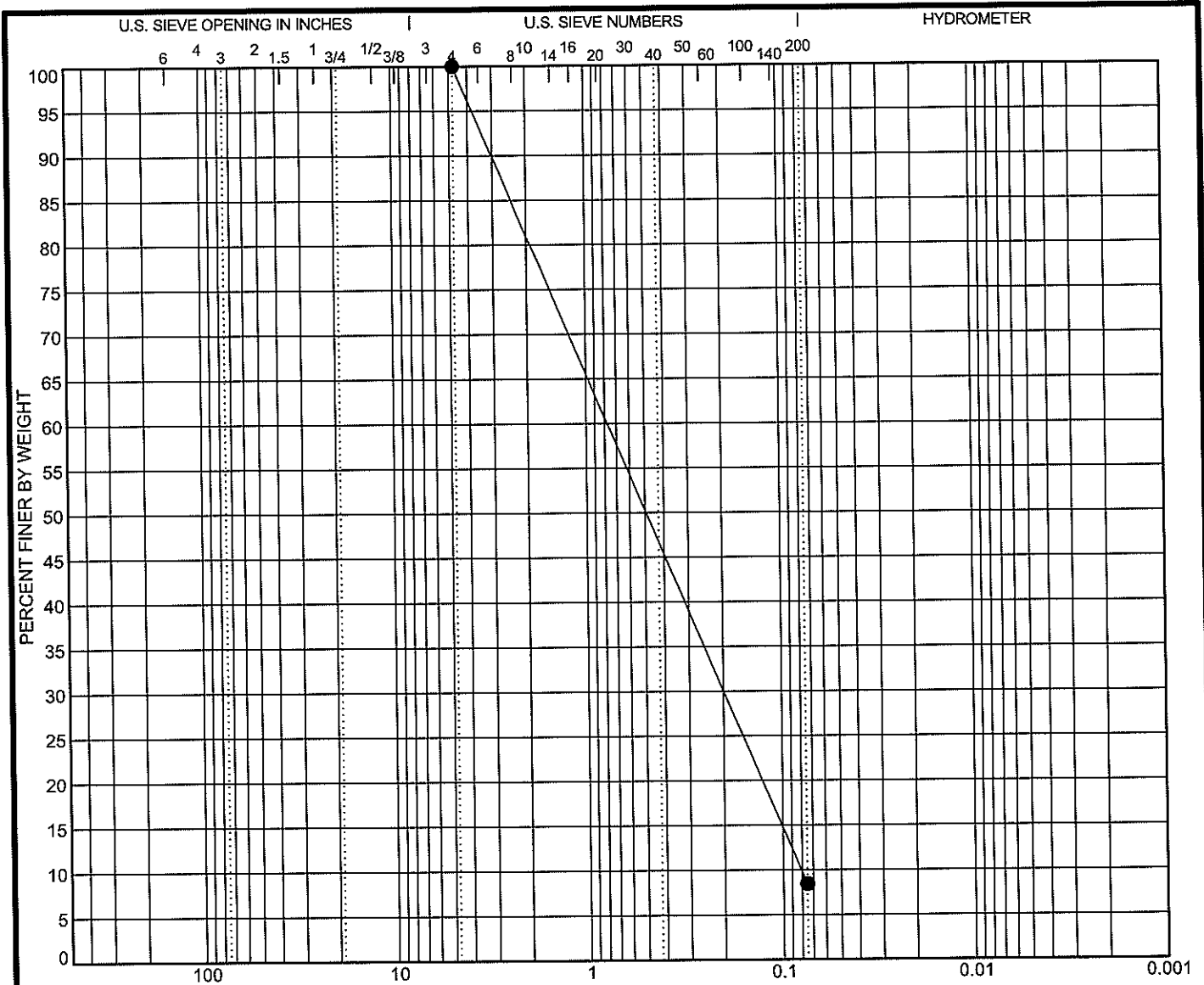
REMARKS:

GET\_GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-9 S-16;54.0 ft.	POORLY GRADED SAND with SILT (SP-SM)	NP	NP	NP	0.64	9.63

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-09 54.0 ft.	4.75	0.776	0.199	0.081	0.0	91.6	8.4	

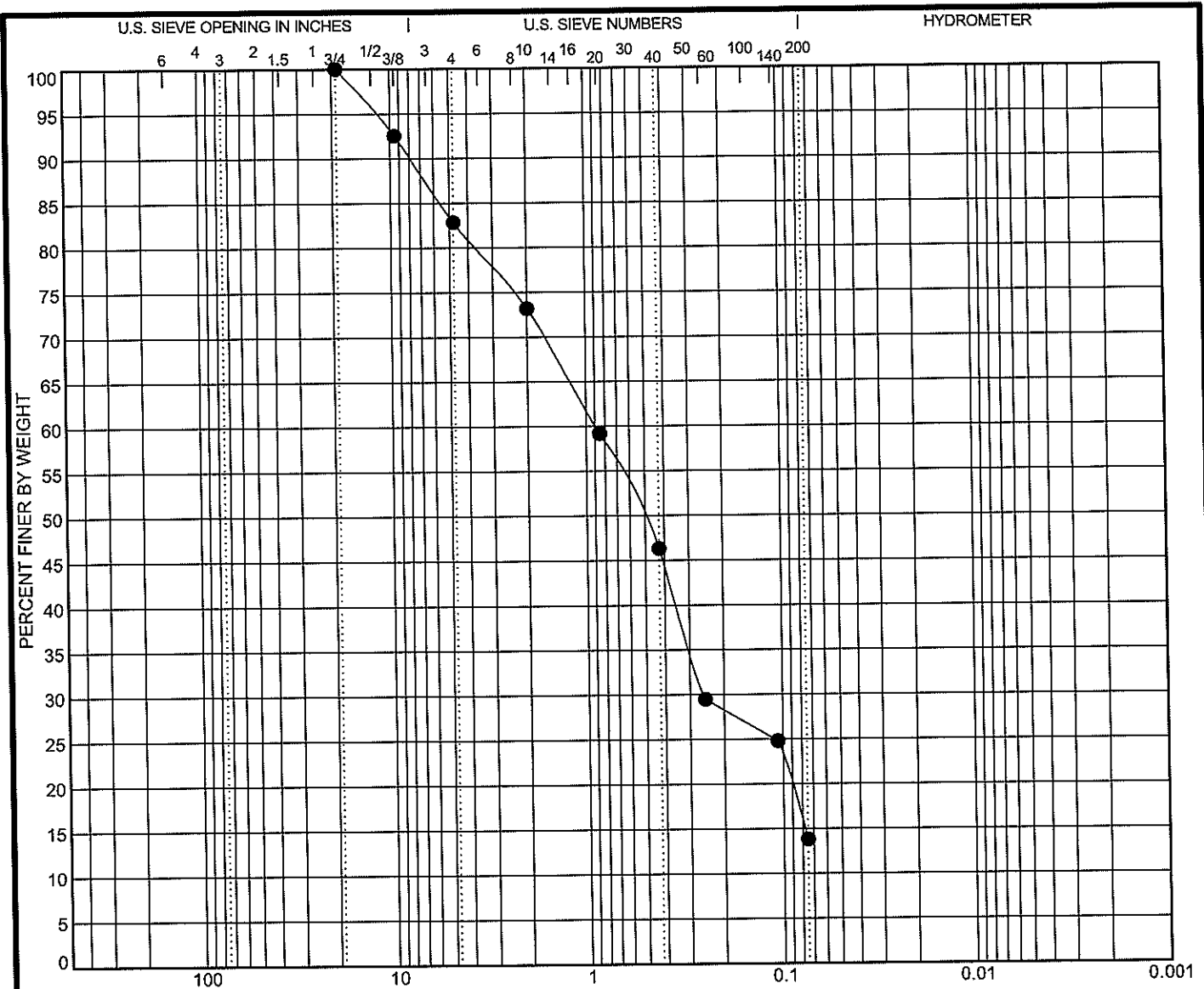
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-9 S-20;74.0 ft.	SILTY SAND with GRAVEL (SM)	NP	NP	NP		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-09 74.0 ft.	19	0.895	0.254		17.2	69.0	13.8	

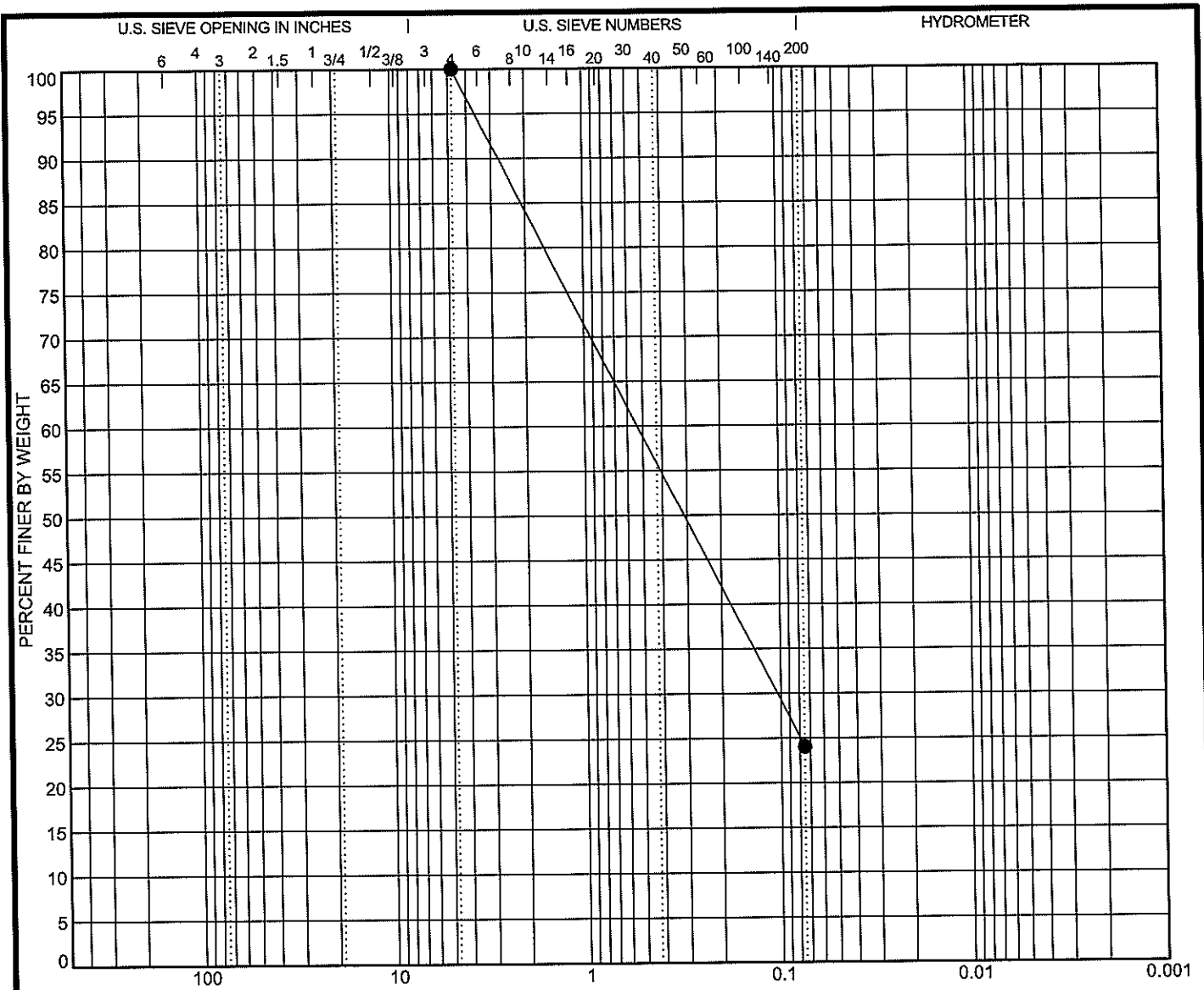
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-10 S-7;11.5 ft.	CLAYEY SAND (SC)	24	15	9		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-10 11.5 ft.	4.75	0.535	0.104		0.0	76.0		24.0

REMARKS:

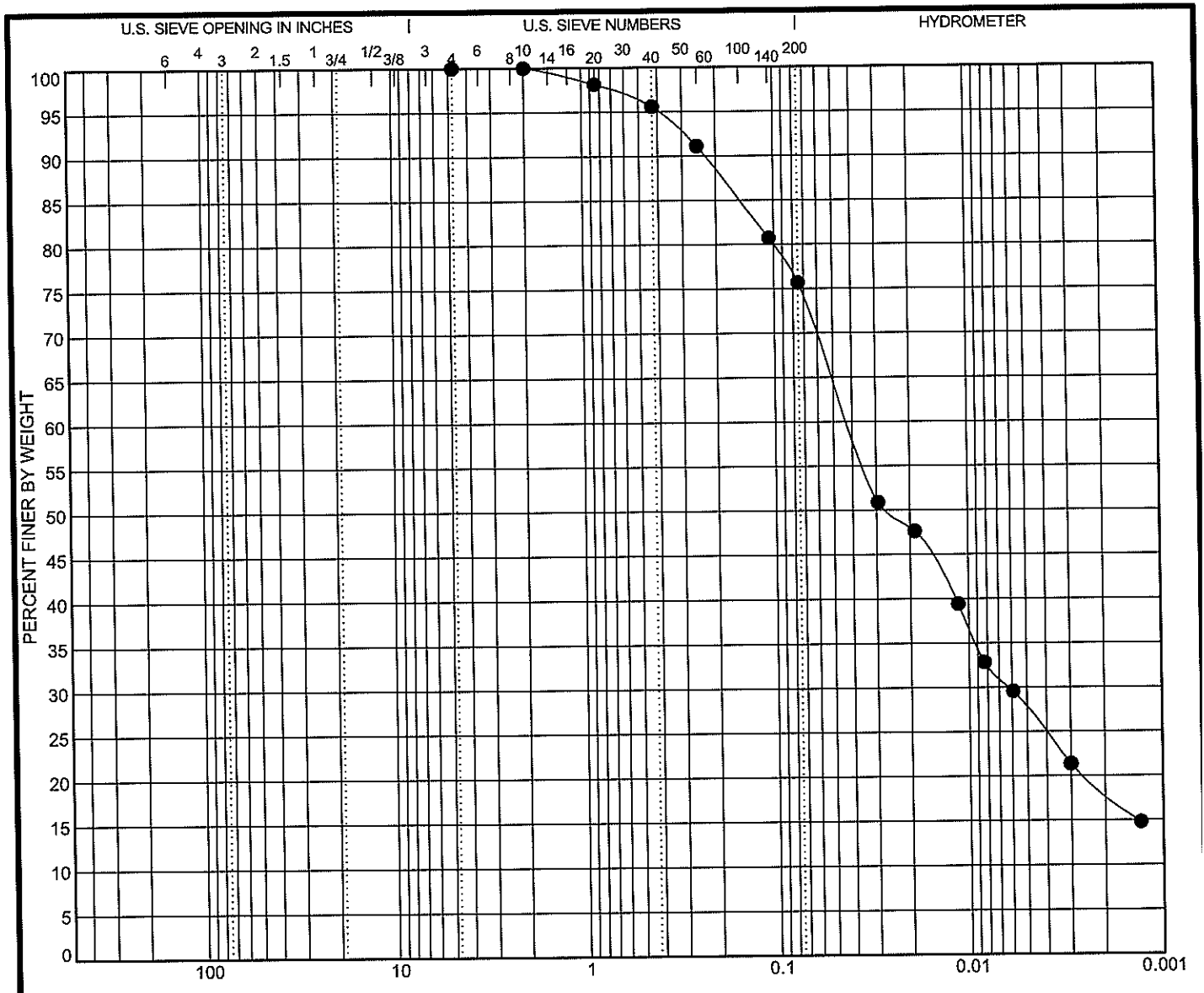
GET GRAINSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



### GRAIN SIZE DISTRIBUTION

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL





Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-10 T-1; 16.5 ft.	FAT CLAY with SAND (CH)	70	20	50		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-10 16.5 ft.	4.75	0.041	0.006		0.0	24.3	57.5	18.2

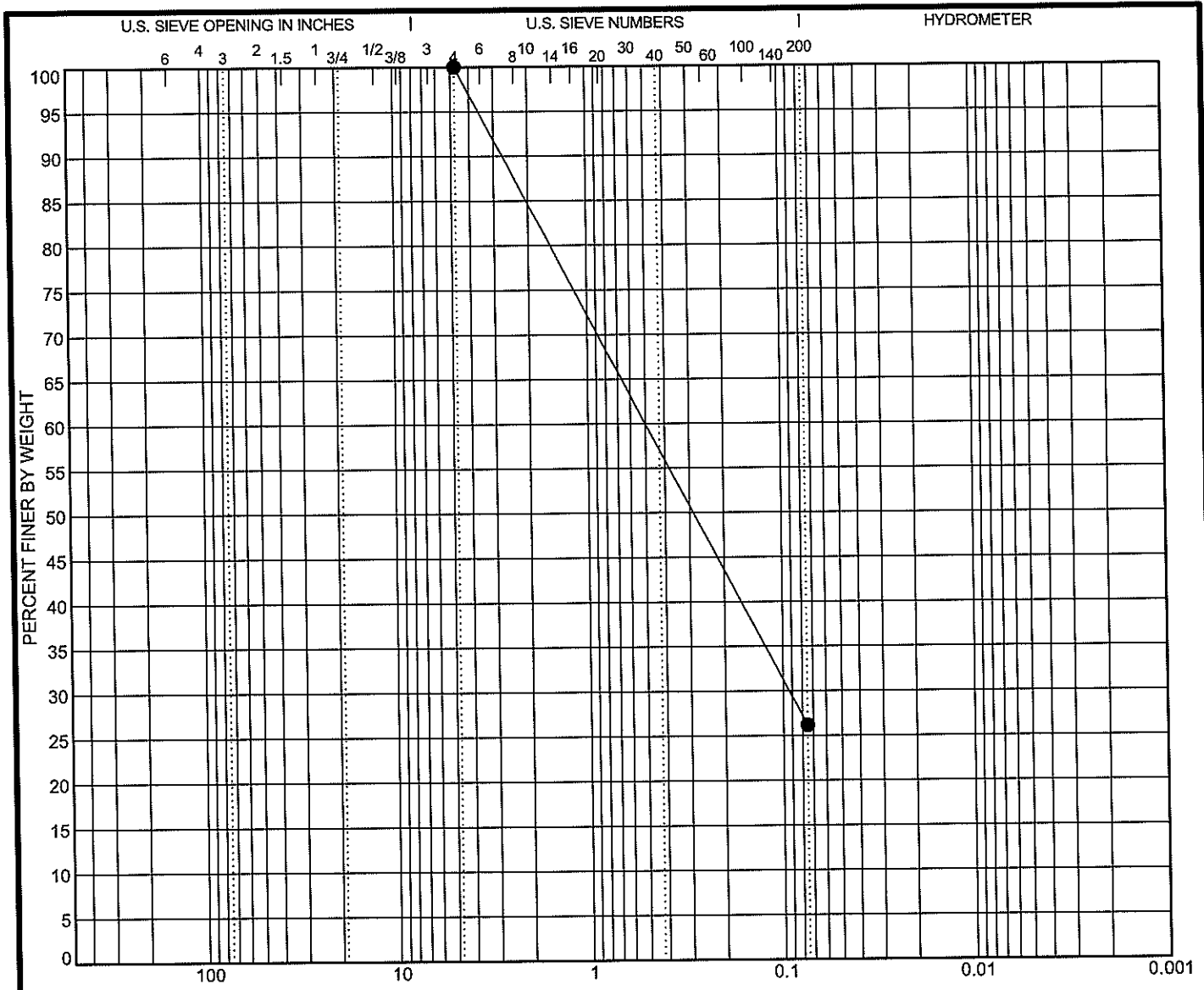
REMARKS:

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**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-10 S-10; 19.0 ft.	CLAYEY SAND (SC)	26	16	10		

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-10 19.0 ft.	4.75	0.502	0.093		0.0	73.9		26.1

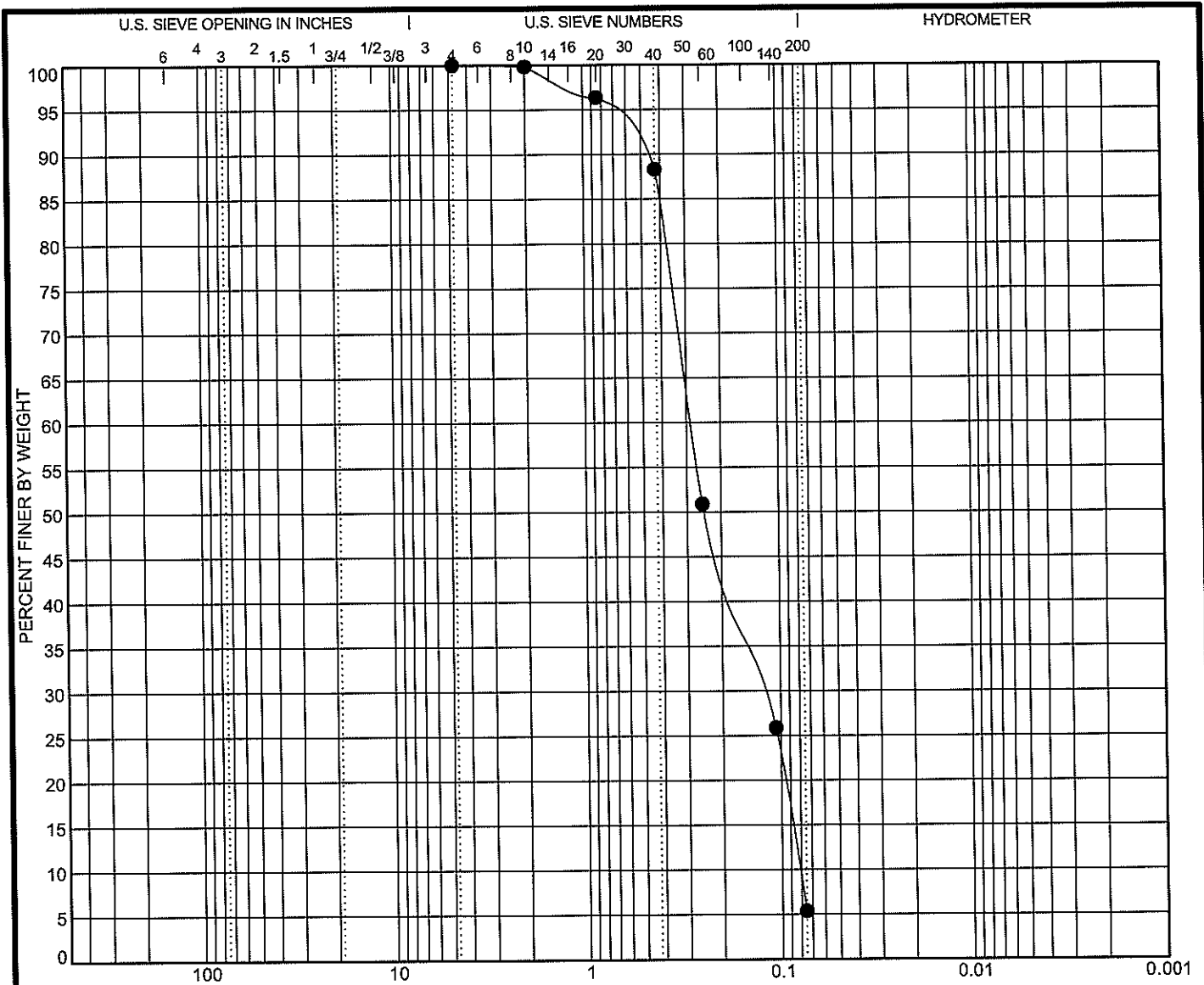
REMARKS:

GET GRAINSIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-10 S-18;59.0 ft.	POORLY GRADED SAND with SILT (SP-SM)	NP	NP	NP	0.65	3.51

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-10 59.0 ft.	4.75	0.285	0.122	0.081	0.0	94.6	5.4	

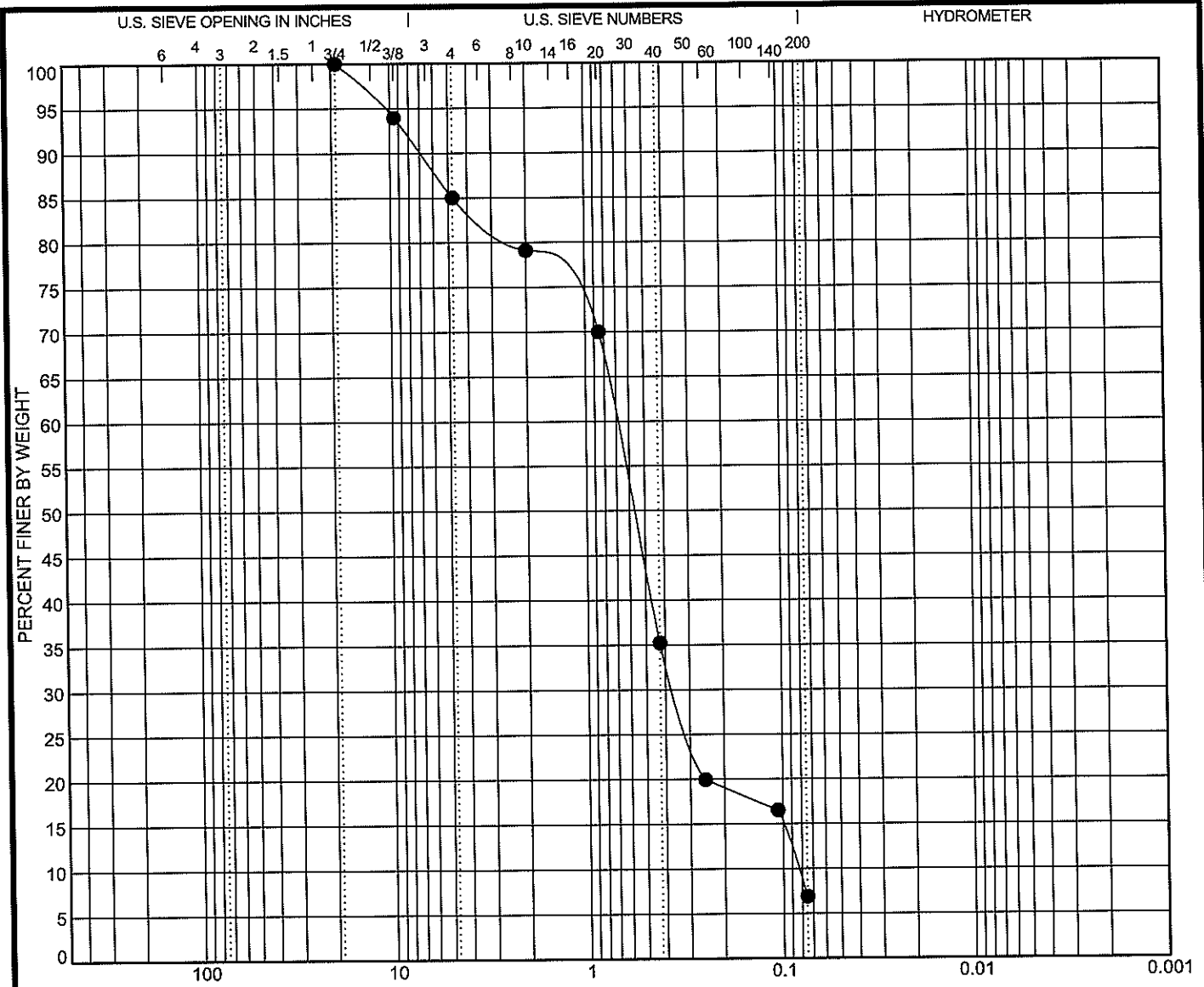
REMARKS:



**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI.AL.GDT 7/7/23



Test Method: \_\_\_\_\_ GRAIN SIZE IN MILLIMETERS

COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification	Classification	LL	PL	PI	Cc	Cu
● B-10 S-22;79.0 ft.	WELL-GRADED SAND with SILT (SW-SM)	NP	NP	NP	2.15	8.30

Specimen Identification	D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
B-10 79.0 ft.	19	0.697	0.355	0.084	15.0	78.1	6.9	

REMARKS:

GET GRAIN SIZE 23-157 MOBILE CIVIC CENTER.GPJ GETI AL.GDT 7/7/23

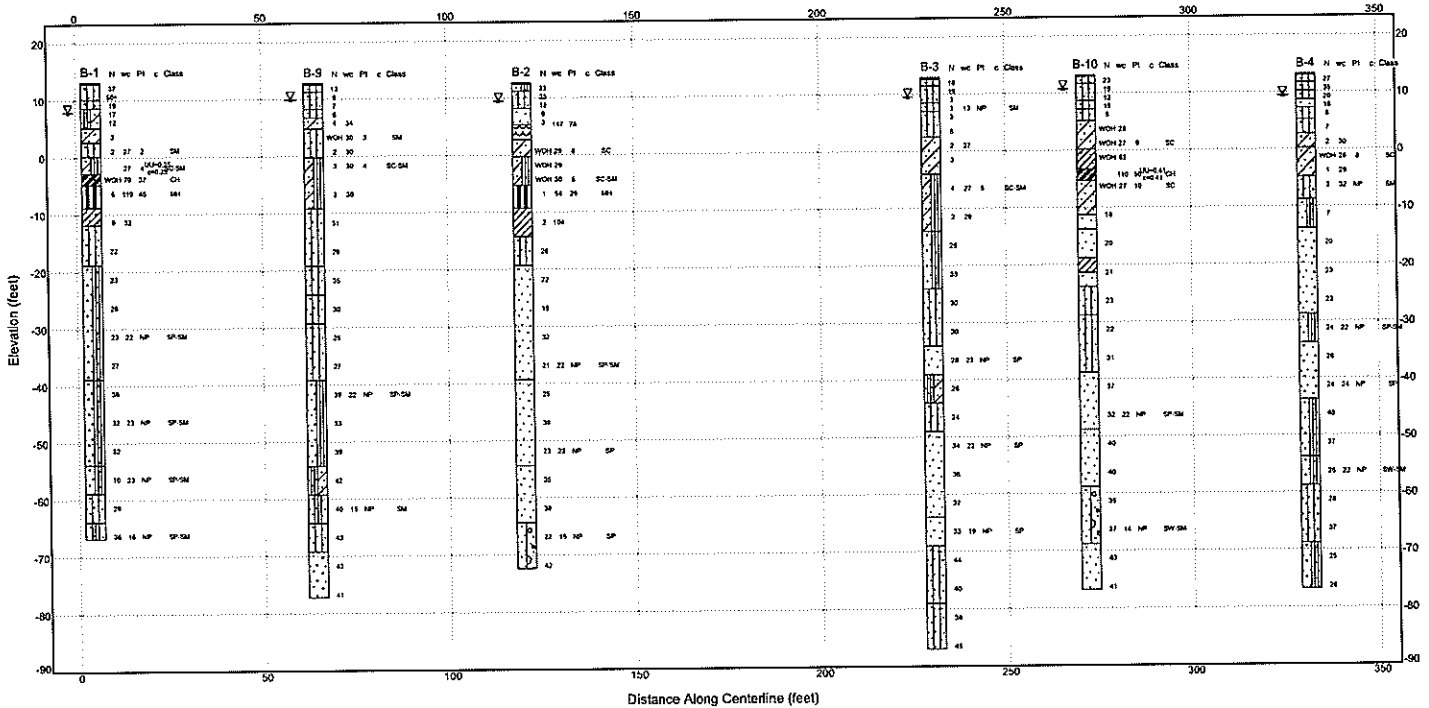


**GRAIN SIZE DISTRIBUTION**

PROJECT NAME: CITY OF MOBILE  
 CIVIC CENTER PARKING GARAGE  
 G.E.T. PROJ. NUMBER: 23-157  
 PROJECT LOCATION: MOBILE, AL

**APPENDIX D**  
**SUBSURFACE DIAGRAMS**

11 X ELEVATION (FEET) CLASS: 23-157 MOBILE CIVIC CENTER GAR. GET. ALDOT 7/1/93



WEST SIDE PROFILE

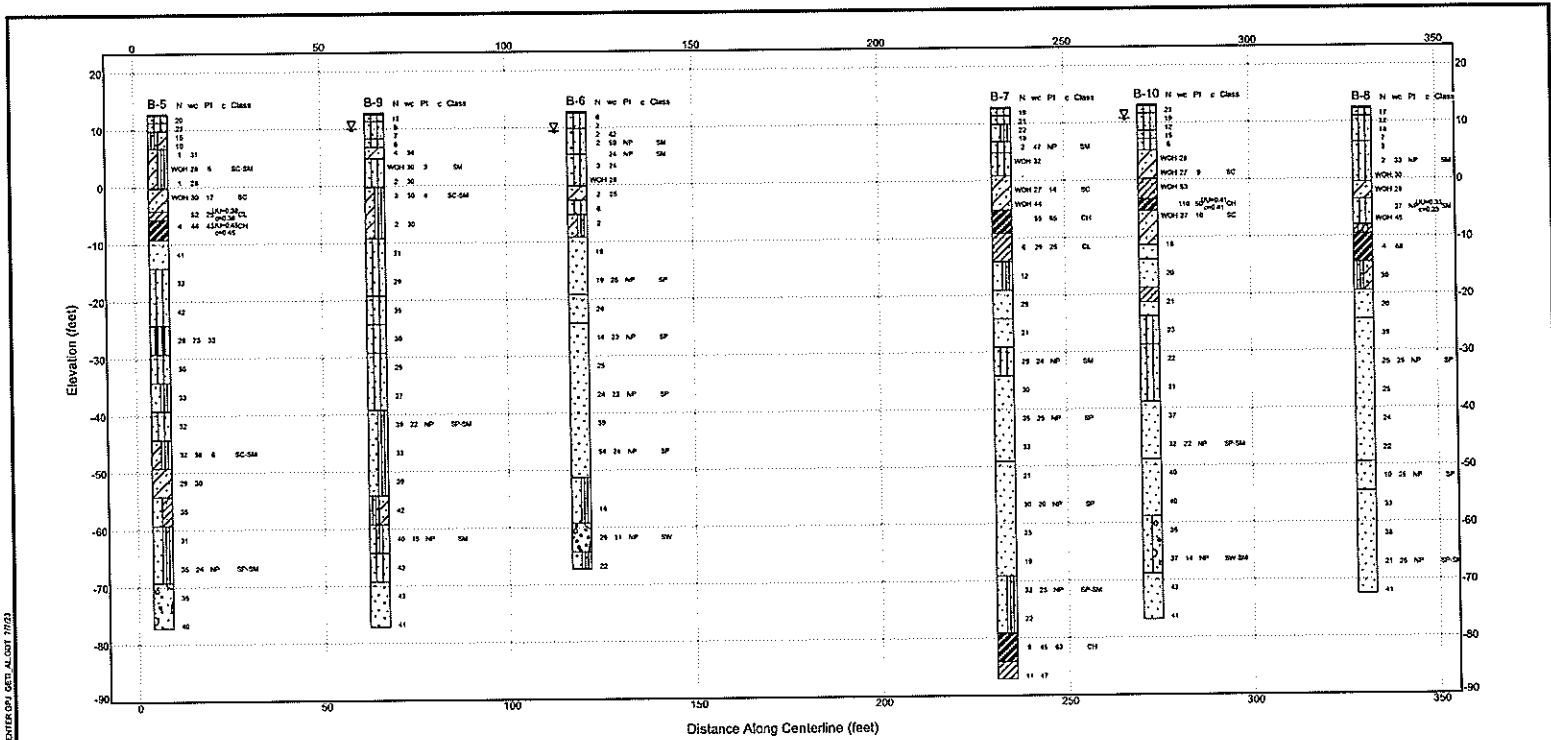


**LEGEND**

Topsoil	Sandy Clay	Sand with Clay	N - SPT value determined in field ASTM D1586
Poorly-graded Sand	Lean Clay	Sand with Silt	%w - Percent Water
Silty Sand	Fat Clay	Water	c - Cohesive Shear Strength, tsf
Clayey Sand	Silt	High Plasticity Organic silt or clay	Nv - Vane Shear Strength, tsf
			Class - USCS Classification

**SUBSURFACE DIAGRAM**

PROJECT NAME:	CITY OF MOBILE
CIVIC CENTER PARKING GARAGE	
G.E.T. PROJ. NUMBER:	23-157
PROJECT LOCATION:	MOBILE, AL



EAST SIDE PROFILE

**LEGEND**

			N - SPT value determined in field ASTM D1586
			w - Percent Water
			c - Cohesive Shear Strength, tsf (at Hard Penetration)
			q <sub>v</sub> - Vane Shear Strength, tsf
			Class - UCCS Classification



**SUBSURFACE DIAGRAM**

PROJECT NAME:	CITY OF MOBILE
CIVIC CENTER PARKING GARAGE	
G.E.T. PROJ. NUMBER:	23-157
PROJECT LOCATION:	MOBILE, AL

11 X 17 ELEV PER C CLASS 23-157 MOBILE CIVIC CENTER (S) GET AL COM 7/23

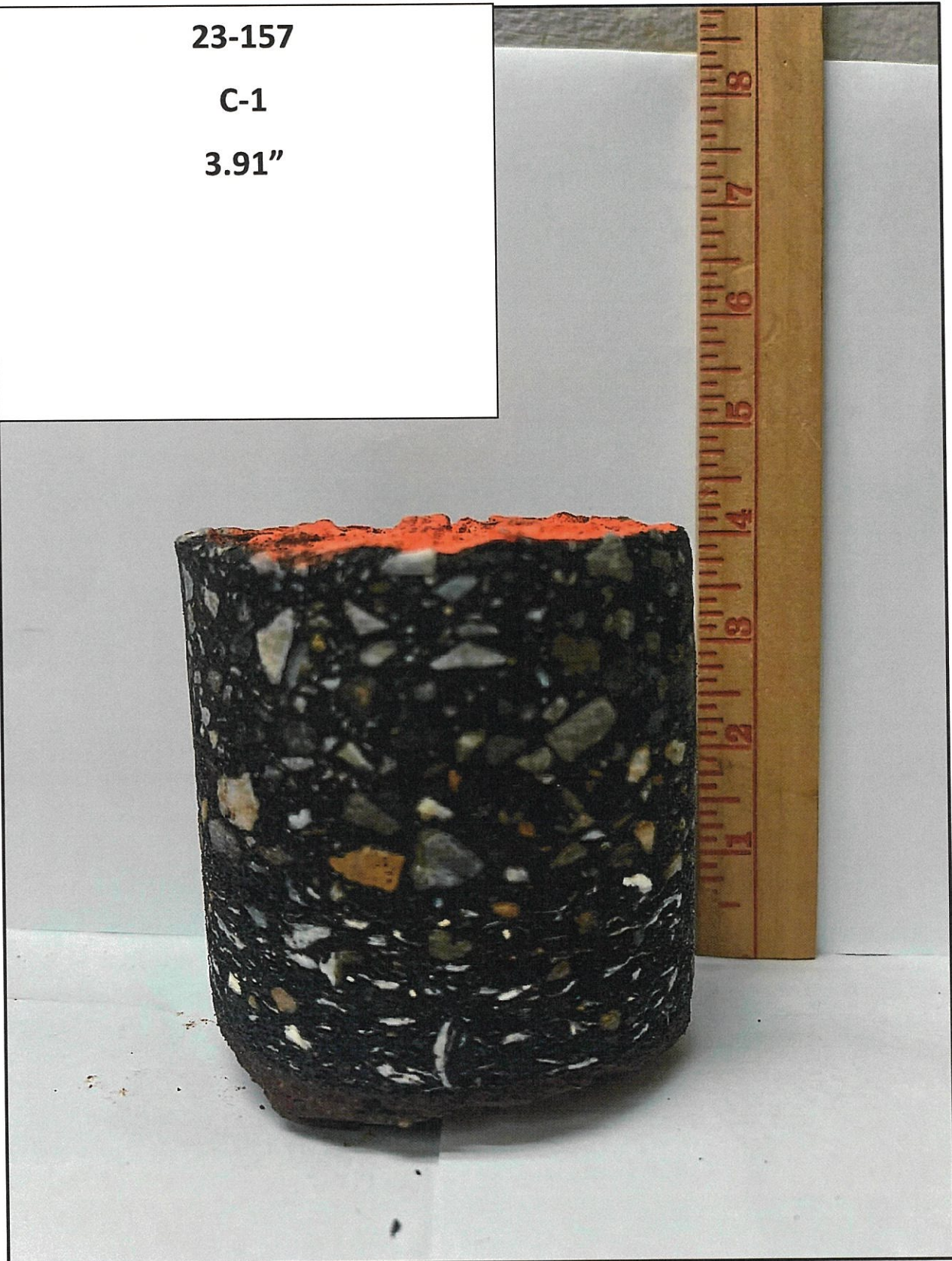
**APPENDIX E**  
**ASPHALT CORE SAMPLES**



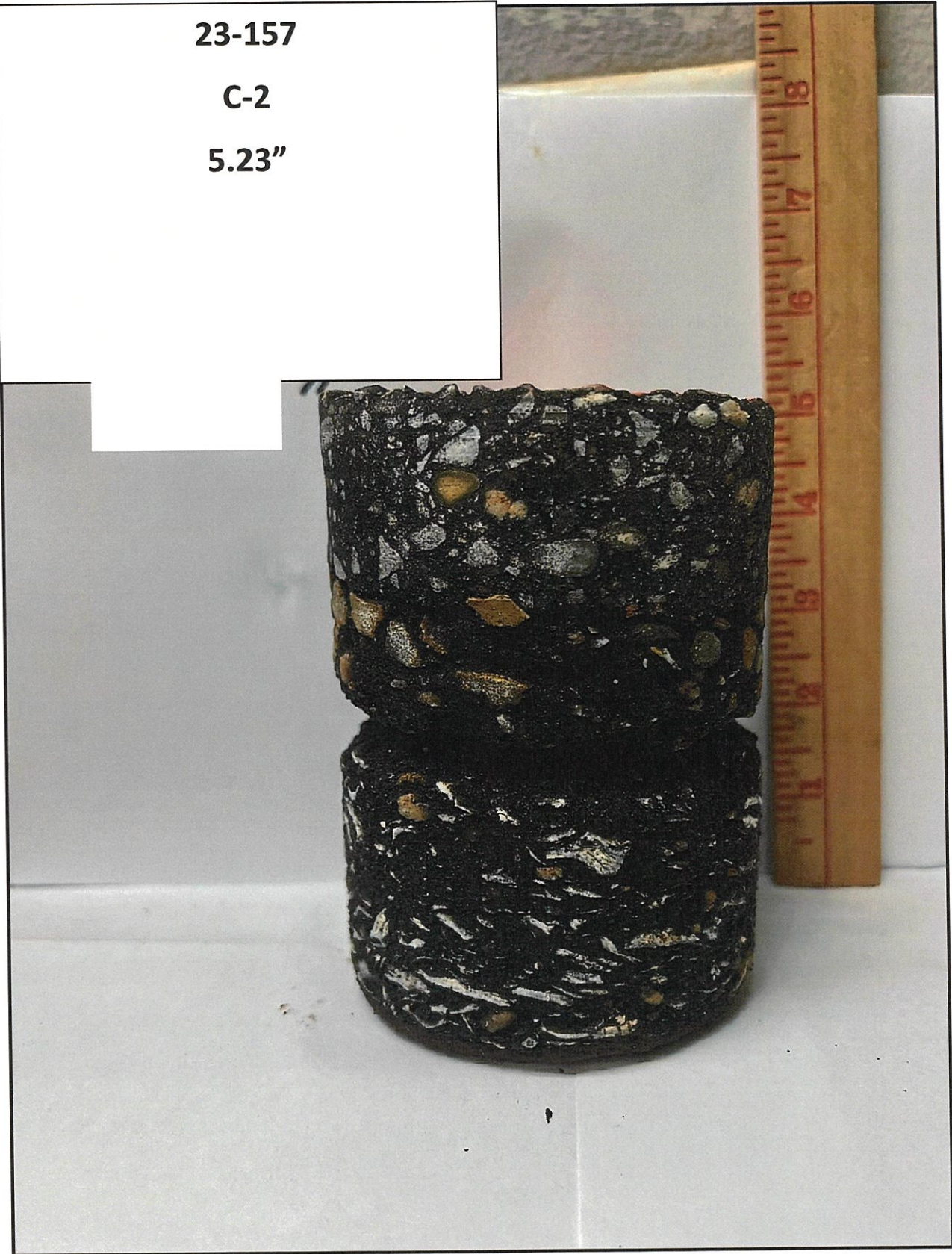
**23-157**

**C-1**

**3.91"**



**23-157**  
**C-2**  
**5.23"**

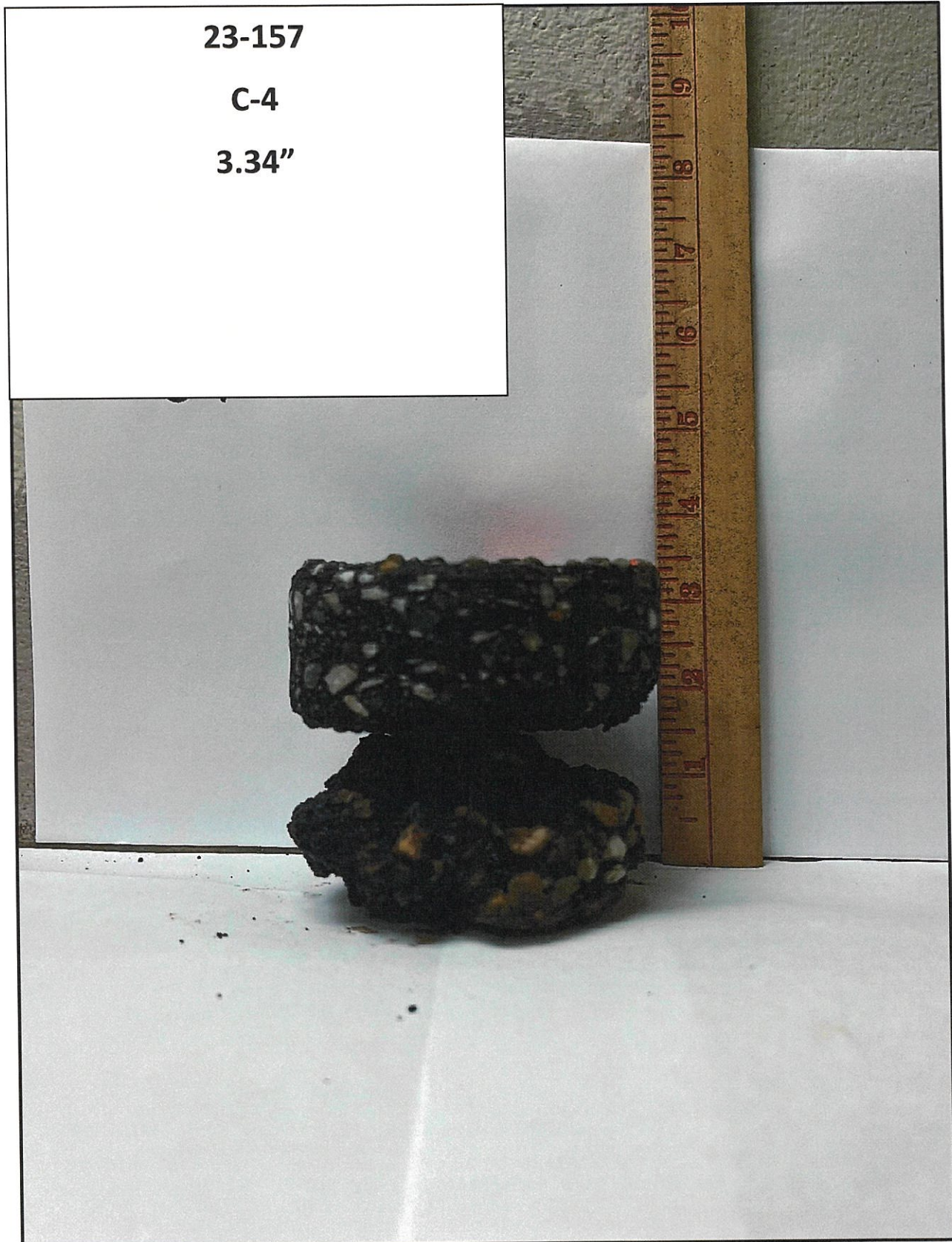


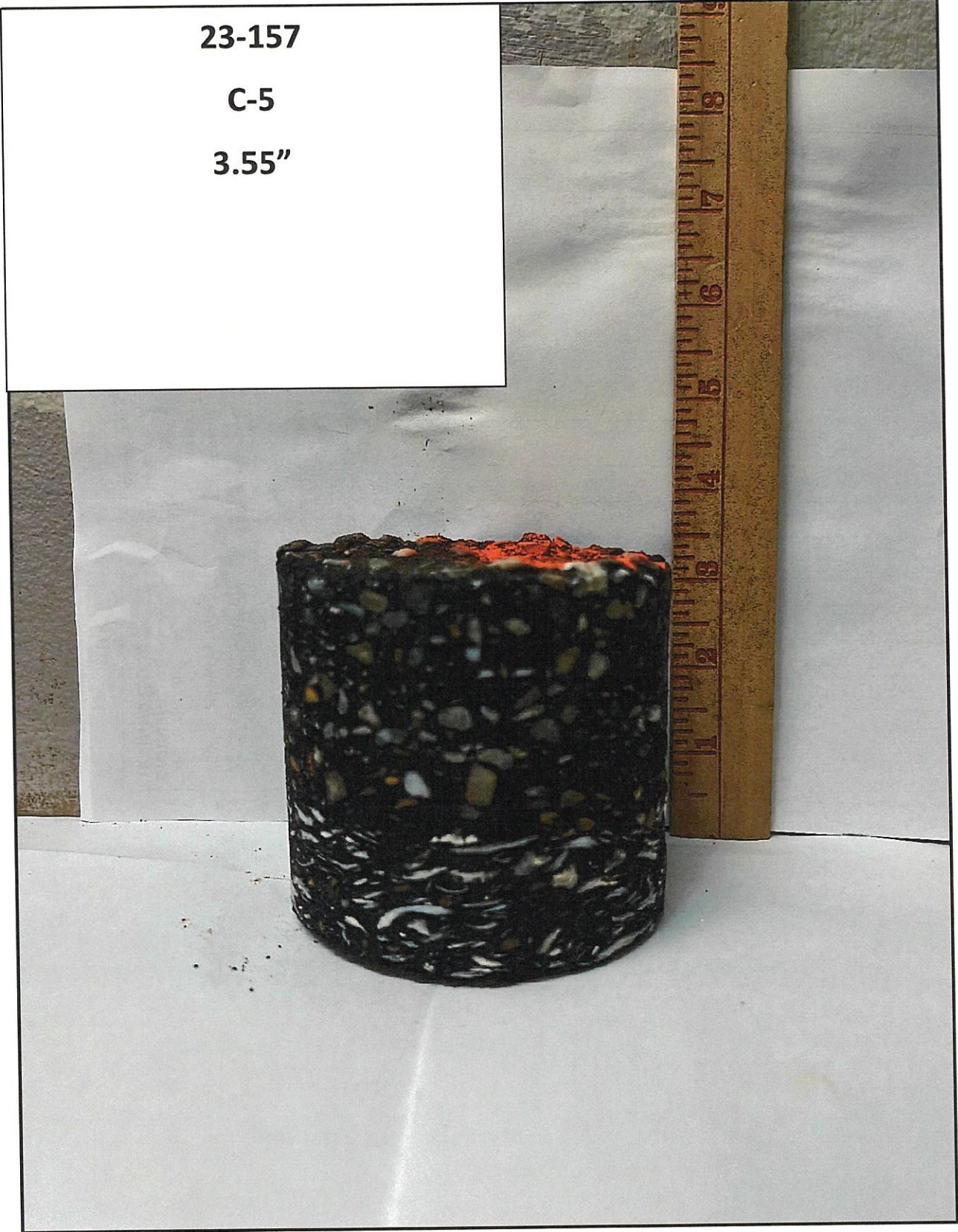
**23-157**

**C-3**

**4.70"**



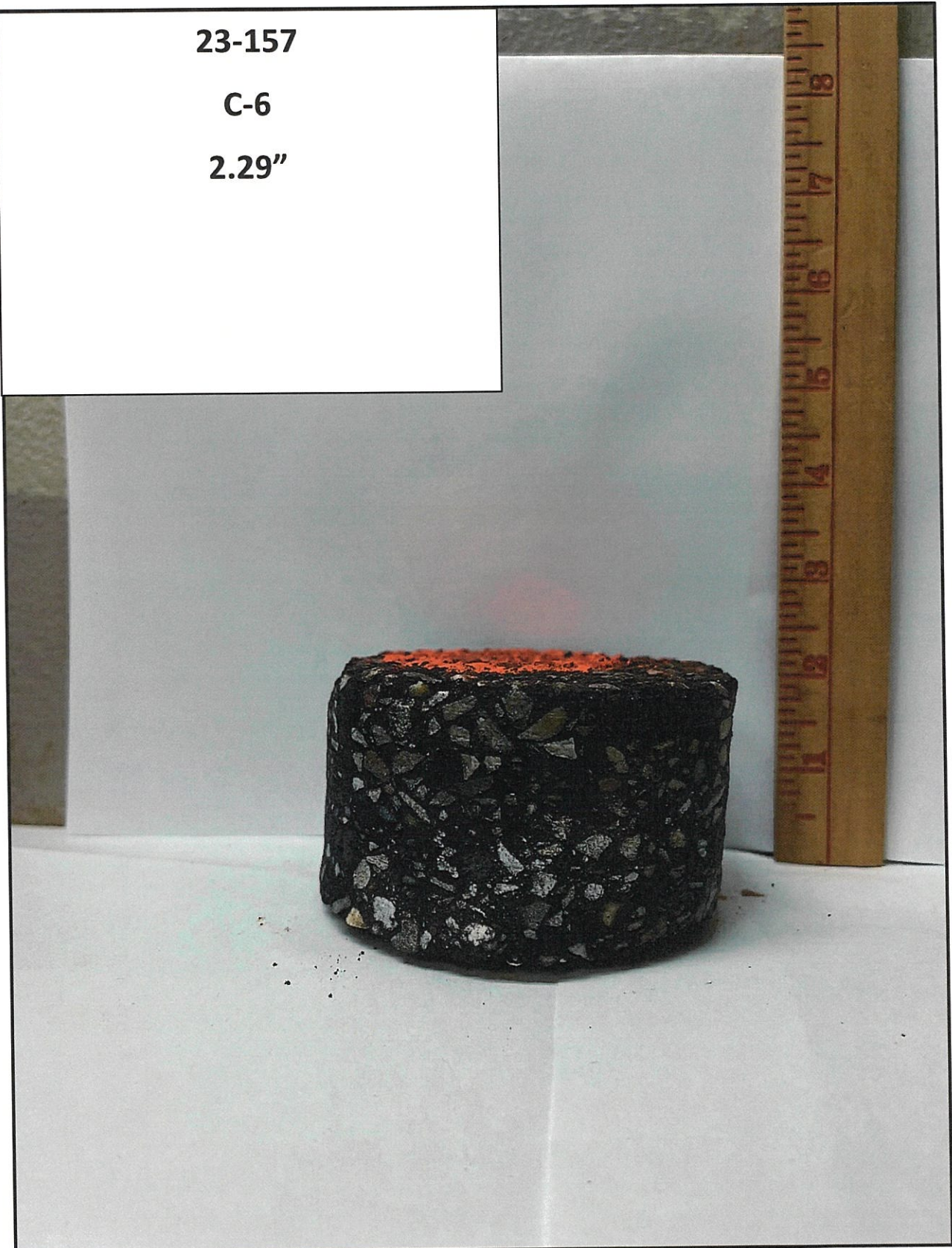


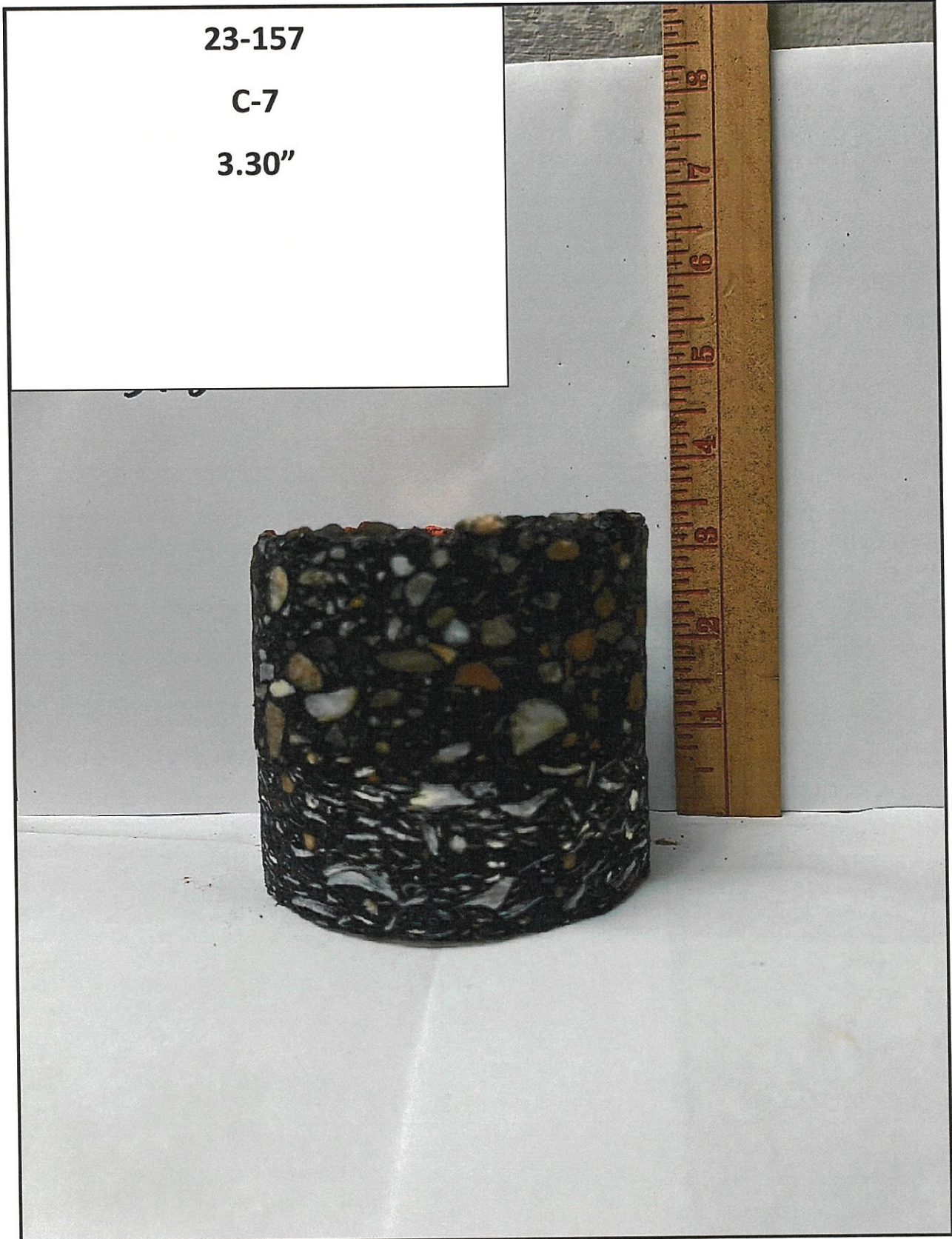


**23-157**

**C-6**

**2.29"**





**SECTION 01 10 00**  
**SUMMARY**

**PART 1 GENERAL**

**1.01 PROJECT**

- A. Project Name: A New parking Deck for the City of Mobile.
- B. Owner's Name: City of Mobile, Alabama.
- C. Architect's Name: Evan Terry Associates LLC.
- D. The Project consists of the construction of a new parking deck for the City of Mobile.

**1.02 CONTRACT DESCRIPTION**

- A. Contract Type: A single prime contract based on a Stipulated Price as described in Document 00 52 00 - Agreement Form.

**1.03 OWNER OCCUPANCY**

- A. Owner intends to occupy the Project upon Substantial Completion.
- B. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.
- C. Schedule the Work to accommodate Owner occupancy.

**1.04 CONTRACTOR USE OF SITE AND PREMISES**

- A. Construction Operations: Limited to areas noted on Drawings.
- B. Provide access to and from site as required by law and by Owner:
  - 1. Do not obstruct roadways, sidewalks, or other public ways without permit.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**



**SECTION 01 20 00**  
**PRICE AND PAYMENT PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedures for preparation and submittal of applications for progress payments.
- B. Documentation of changes in Contract Sum and Contract Time.
- C. Change procedures.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 72 00 - General Conditions: Additional requirements for progress payments, final payment, changes in the Work.
- B. Section 01 78 00 - Closeout Submittals: Project record documents.

**1.03 SCHEDULE OF VALUES**

- A. Use Schedule of Values Form: AIA G703, edition stipulated in the Agreement.
- B. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit draft to Architect for approval.
- C. Forms filled out by hand will not be accepted.
- D. Submit Schedule of Values in duplicate within 15 days after date of Owner-Contractor Agreement.
- E. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the specification section. Identify site mobilization.

**1.04 APPLICATIONS FOR PROGRESS PAYMENTS**

- A. Payment Period: Submit at intervals stipulated in the Agreement.
- B. Use Form AIA G702 and Form AIA G703, edition stipulated in the Agreement.
- C. Electronic media printout including equivalent information will be considered in lieu of standard form specified; submit sample to Architect for approval.
- D. Forms filled out by hand will not be accepted.
- E. For each item, provide a column for listing each of the following:
  - 1. Item Number.
  - 2. Description of work.
  - 3. Scheduled Values.
  - 4. Previous Applications.
  - 5. Work in Place and Stored Materials under this Application.
  - 6. Authorized Change Orders.
  - 7. Total Completed and Stored to Date of Application.
  - 8. Balance to Finish.
  - 9. Retainage.
- F. Execute certification by signature of authorized officer.
- G. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed and for stored products.
- H. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.
- I. Submit one electronic and three hard-copies of each Application for Payment.
- J. Include the following with the application:
  - 1. Transmittal letter as specified for submittals in Section 01 30 00.
  - 2. Construction progress schedule, revised and current as specified in Section 01 30 00.
  - 3. Affidavits attesting to off-site stored products.

- K. When Architect requires substantiating information, submit data justifying dollar amounts in question. Provide one copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

#### **1.05 MODIFICATION PROCEDURES**

- A. For minor changes not involving an adjustment to the Contract Sum or Contract Time, Architect will issue instructions directly to Contractor.
- B. For other required changes, Architect will issue a document signed by Owner instructing Contractor to proceed with the change, for subsequent inclusion in a Change Order.
  - 1. The document will describe the required changes and will designate method of determining any change in Contract Sum or Contract Time.
  - 2. Promptly execute the change.
- C. For changes for which advance pricing is desired, Architect will issue a document that includes a detailed description of a proposed change with supplementary or revised drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required and the period of time during which the requested price will be considered valid. Contractor shall prepare and submit a fixed price quotation within 14 days.
- D. Contractor may propose a change by submitting a request for change to Architect, describing the proposed change and its full effect on the work, with a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation. Document any requested substitutions in accordance with Section 01 60 00.
- E. Computation of Change in Contract Amount: As specified in the Agreement and Conditions of the Contract.
  - 1. For change requested by Architect for work falling under a fixed price contract, the amount will be based on Contractor's price quotation.
  - 2. For change requested by Contractor, the amount will be based on the Contractor's request for a Change Order as approved by Architect.
  - 3. For pre-determined unit prices and quantities, the amount will be based on the fixed unit prices.
  - 4. For change ordered by Architect without a quotation from Contractor, the amount will be determined by Architect based on the Contractor's substantiation of costs as specified for Time and Material work.
- F. Substantiation of Costs: Provide full information required for evaluation.
  - 1. On request, provide the following data:
    - a. Quantities of products, labor, and equipment.
    - b. Taxes, insurance, and bonds.
    - c. Overhead and profit.
    - d. Justification for any change in Contract Time.
    - e. Credit for deletions from Contract, similarly documented.
  - 2. Support each claim for additional costs with additional information:
    - a. Origin and date of claim.
    - b. Dates and times work was performed, and by whom.
    - c. Time records and wage rates paid.
    - d. Invoices and receipts for products, equipment, and subcontracts, similarly documented.
  - 3. For Time and Material work, submit itemized account and supporting data after completion of change, within time limits indicated in the Conditions of the Contract.
- G. Execution of Change Orders: Architect will issue Change Orders for signatures of parties as provided in the Conditions of the Contract.
- H. After execution of Change Order, promptly revise Schedule of Values and Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum.

- I. Promptly revise progress schedules to reflect any change in Contract Time, revise sub-schedules to adjust times for other items of work affected by the change, and resubmit.
- J. Promptly enter changes in Project Record Documents.

**1.06 APPLICATION FOR FINAL PAYMENT**

- A. Prepare Application for Final Payment as specified for progress payments, identifying total adjusted Contract Sum, previous payments, and sum remaining due.
- B. Application for Final Payment will not be considered until the following have been accomplished:
  - 1. All closeout procedures specified in Section 01 70 00.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 23 00**  
**ALTERNATES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Description of Alternates.
- B. Procedures for pricing Alternates.
- C. Documentation of changes to Contract Sum and Contract Time.

**1.02 ACCEPTANCE OF ALTERNATES**

- A. Alternates quoted on Bid Forms will be reviewed and accepted or rejected at Owner's option. Accepted Alternates will be identified in the Owner-Contractor Agreement.
- B. Coordinate related work and modify surrounding work to integrate the Work of each Alternate.

**1.03 SCHEDULE OF ALTERNATES**

- A. Alternate One - Add Precast and Coatings
  - 1. Refer to the drawings and add Precast and Coatings as shown on North and West Elevations and Identified as Alternate One.
- B. Alternate Two - Add Elevators 5 and 6.
  - 1. Base bid shall include elevators 1, 2, 3 and 4. This alternate adds Elevators 5 and 6 and all associated utilities and services.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 25 00**  
**SUBSTITUTION PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Procedural requirements for proposed substitutions.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: Fundamental product requirements, product options, delivery, storage, and handling.

**1.03 DEFINITIONS**

- A. Substitutions: Changes from Contract Documents requirements proposed by Contractor to materials, products, assemblies, and equipment.
  - 1. Substitutions for Cause: Proposed due to changed Project circumstances beyond Contractor's control.
    - a. Unavailability.
    - b. Regulatory changes.
  - 2. Substitutions for Convenience: Proposed due to possibility of offering substantial advantage to the Project.
    - a. Substitution requests offering advantages solely to the Contractor will not be considered.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 GENERAL REQUIREMENTS**

- A. A Substitution Request for products, assemblies, materials, and equipment constitutes a representation that the submitter:
  - 1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product, equipment, assembly, or system.
  - 2. Agrees to provide the same warranty for the substitution as for the specified product.
  - 3. Agrees to provide same or equivalent maintenance service and source of replacement parts, as applicable.
  - 4. Agrees to coordinate installation and make changes to other work that may be required for the work to be complete, with no additional cost to Owner.
  - 5. Waives claims for additional costs or time extension that may subsequently become apparent.
- B. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents. Burden of proof is on proposer.
- C. Content: Include information necessary for tracking the status of each Substitution Request, and information necessary to provide an actionable response.
  - 1. No specific form is required. Contractor's Substitution Request documentation must include the following:
    - a. Project Information:
      - 1) Official project name and number, and any additional required identifiers established in Contract Documents.
      - 2) Owner's, Architect's, and Contractor's names.
    - b. Substitution Request Information:
      - 1) Discrete and consecutive Substitution Request number, and descriptive subject/title.
      - 2) Indication of whether the substitution is for cause or convenience.
      - 3) Issue date.
      - 4) Reference to particular Contract Document(s) specification section number, title, and article/paragraph(s).

- 5) Description of Substitution.
- 6) Reason why the specified item cannot be provided.
- 7) Differences between proposed substitution and specified item.
- 8) Description of how proposed substitution affects other parts of work.
- c. Attached Comparative Data: Provide point-by-point, side-by-side comparison addressing essential attributes specified, as appropriate and relevant for the item:
  - 1) Physical characteristics.
  - 2) In-service performance.
  - 3) Expected durability.
  - 4) Visual effect.
  - 5) Warranties.
  - 6) Other salient features and requirements.
  - 7) Include, as appropriate or requested, the following types of documentation:
    - (a) Product Data:
    - (b) Samples.
    - (c) Certificates, test, reports or similar qualification data.
    - (d) Drawings, when required to show impact on adjacent construction elements.
- d. Impact of Substitution:
  - 1) Savings to Owner for accepting substitution.
  - 2) Change to Contract Time due to accepting substitution.
- D. Limit each request to a single proposed substitution item.
  - 1. Submit an electronic document, combining the request form with supporting data into single document.

### **3.02 SUBSTITUTION PROCEDURES DURING PROCUREMENT**

- A. Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period, and the documents required.

### **3.03 SUBSTITUTION PROCEDURES DURING CONSTRUCTION**

- A. Architect will consider requests for substitutions only within 15 days after date of Agreement.
- B. Submit request for Substitution for Cause within 14 days of discovery of need for substitution, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
- C. Submit request for Substitution for Convenience immediately upon discovery of its potential advantage to the project, but not later than 14 days prior to time required for review and approval by Architect, in order to stay on approved project schedule.
  - 1. In addition to meeting general documentation requirements, document how the requested substitution benefits the Owner through cost savings, time savings, greater energy conservation, or in other specific ways.
  - 2. Document means of coordinating of substitution item with other portions of the work, including work by affected subcontractors.
  - 3. Bear the costs engendered by proposed substitution of:
    - a. Owner's compensation to the Architect for any required redesign, time spent processing and evaluating the request.
- D. Substitutions will not be considered under one or more of the following circumstances:
  - 1. When they are indicated or implied on shop drawing or product data submittals, without having received prior approval.
  - 2. Without a separate written request.

### **3.04 RESOLUTION**

- A. Architect may request additional information and documentation prior to rendering a decision. Provide this data in an expeditious manner.
- B. Architect will notify Contractor in writing of decision to accept or reject request.

1. Architect's decision following review of proposed substitution will be noted on the submitted form.

### **3.05 ACCEPTANCE**

- A. Accepted substitutions change the work of the Project. They will be documented and incorporated into work of the project by Change Order, Construction Change Directive, Architectural Supplementary Instructions, or similar instruments provided for in the Conditions of the Contract.

### **3.06 CLOSEOUT ACTIVITIES**

- A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
- B. Include completed Substitution Request Forms as part of the Project record. Include both approved and rejected Requests.

**END OF SECTION**

**SECTION 01 30 00**  
**ADMINISTRATIVE REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. General administrative requirements.
- B. Preconstruction meeting.
- C. Site mobilization meeting.
- D. Progress meetings.
- E. Construction progress schedule.
- F. Coordination drawings.
- G. Submittals for review, information, and project closeout.
- H. Number of copies of submittals.
- I. Requests for Interpretation (RFI) procedures.
- J. Submittal procedures.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 60 00 - Product Requirements: General product requirements.
- B. Section 01 70 00 - Execution and Closeout Requirements: Additional coordination requirements.
- C. Section 01 78 00 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

**1.03 REFERENCE STANDARDS**

- A. AIA G716 - Request for Information; 2004.
- B. AIA G810 - Transmittal Letter; 2001.

**1.04 GENERAL ADMINISTRATIVE REQUIREMENTS**

- A. Comply with requirements of Section 01 70 00 - Execution and Closeout Requirements for coordination of execution of administrative tasks with timing of construction activities.
- B. Make the following types of submittals to Architect:
  - 1. Requests for Interpretation (RFI).
  - 2. Requests for substitution.
  - 3. Shop drawings, product data, and samples.
  - 4. Test and inspection reports.
  - 5. Design data.
  - 6. Manufacturer's instructions and field reports.
  - 7. Applications for payment and change order requests.
  - 8. Progress schedules.
  - 9. Coordination drawings.
  - 10. Correction Punch List and Final Correction Punch List for Substantial Completion.
  - 11. Closeout submittals.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRECONSTRUCTION MEETING**

- A. Schedule meeting after Notice of Award.
- B. Attendance Required:
  - 1. Owner.
  - 2. Architect.
  - 3. Contractor.



- C. Agenda:
  - 1. Execution of Owner-Contractor Agreement.
  - 2. Submission of executed bonds and insurance certificates.
  - 3. Distribution of Contract Documents.
  - 4. Submission of list of subcontractors, list of products, schedule of values, and progress schedule.
  - 5. Designation of personnel representing the parties to Contract, Owner and Architect.
  - 6. Procedures and processing of field decisions, submittals, substitutions, applications for payments, proposal request, Change Orders, and Contract closeout procedures.
  - 7. Scheduling.
- D. 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.

### **3.02 SITE MOBILIZATION MEETING**

- A. Schedule meeting at the Project site prior to Contractor occupancy.
- B. Attendance Required:
  - 1. Contractor.
  - 2. Owner.
  - 3. Architect.
  - 4. Contractor's superintendent.
  - 5. Major subcontractors.
- C. Agenda:
  - 1. Use of premises by Owner and Contractor.
  - 2. Owner's requirements.
  - 3. Construction facilities and controls provided by Owner.
  - 4. Temporary utilities provided by Owner.
  - 5. Survey and building layout.
  - 6. Security and housekeeping procedures.
  - 7. Schedules.
  - 8. Application for payment procedures.
  - 9. Procedures for testing.
  - 10. Procedures for maintaining record documents.
  - 11. Requirements for start-up of equipment.
  - 12. Inspection and acceptance of equipment put into service during construction period.
- D. 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.

### **3.03 PROGRESS MEETINGS**

- A. Schedule and administer meetings throughout progress of the work at maximum bi-monthly intervals.
- B. Attendance Required:
  - 1. Contractor.
  - 2. Owner.
  - 3. Architect.
  - 4. Contractor's superintendent.
  - 5. Major subcontractors.
- C. Agenda:
  - 1. Review minutes of previous meetings.
  - 2. Review of work progress.
  - 3. Field observations, problems, and decisions.
  - 4. Identification of problems that impede, or will impede, planned progress.
  - 5. Review of submittals schedule and status of submittals.
  - 6. Maintenance of progress schedule.

7. Corrective measures to regain projected schedules.
  8. Planned progress during succeeding work period.
  9. Maintenance of quality and work standards.
  10. Effect of proposed changes on progress schedule and coordination.
  11. Other business relating to work.
- D. 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.

#### **3.04 CONSTRUCTION PROGRESS SCHEDULE**

- A. Within 10 days after date of the Agreement, submit preliminary schedule defining planned operations for the first 60 days of work, with a general outline for remainder of work.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
  1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.

#### **3.05 COORDINATION DRAWINGS**

- A. Provide information required by Project Coordinator for preparation of coordination drawings.
- B. Review drawings prior to submission to Architect.

#### **3.06 REQUESTS FOR INTERPRETATION (RFI)**

- A. Definition: A request seeking one of the following:
  1. An interpretation, amplification, or clarification of some requirement of Contract Documents arising from inability to determine from them the exact material, process, or system to be installed; or when the elements of construction are required to occupy the same space (interference); or when an item of work is described differently at more than one place in Contract Documents.
  2. A resolution to an issue which has arisen due to field conditions and affects design intent.
- B. Preparation: Prepare an RFI immediately upon discovery of a need for interpretation of Contract Documents. Failure to submit a RFI in a timely manner is not a legitimate cause for claiming additional costs or delays in execution of the work.
  1. Prepare a separate RFI for each specific item.
    - a. Review, coordinate, and comment on requests originating with subcontractors and/or materials suppliers.
    - b. Do not forward requests which solely require internal coordination between subcontractors.
  2. Prepare in a format and with content acceptable to Owner.
    - a. Use AIA G716 - Request for Information .
  3. Combine RFI and its attachments into a single electronic file. PDF format is preferred.
- C. Reason for the RFI: Prior to initiation of an RFI, carefully study all Contract Documents to confirm that information sufficient for their interpretation is definitely not included.
  1. Include in each request Contractor's signature attesting to good faith effort to determine from Contract Documents information requiring interpretation.
  2. Improper RFIs: Requests not prepared in compliance with requirements of this section, and/or missing key information required to render an actionable response. They will be returned without a response, with an explanatory notation.
- D. Content: Include identifiers necessary for tracking the status of each RFI, and information necessary to provide an actionable response.
  1. Official Project name and number, and any additional required identifiers established in Contract Documents.

2. Owner's, Architect's, and Contractor's names.
  3. Discrete and consecutive RFI number, and descriptive subject/title.
  4. Issue date, and requested reply date.
  5. Reference to particular Contract Document(s) requiring additional information/interpretation. Identify pertinent drawing and detail number and/or specification section number, title, and paragraph(s).
  6. Annotations: Field dimensions and/or description of conditions which have engendered the request.
  7. Contractor's suggested resolution: A written and/or a graphic solution, to scale, is required in cases where clarification of coordination issues is involved, for example; routing, clearances, and/or specific locations of work shown diagrammatically in Contract Documents. If applicable, state the likely impact of the suggested resolution on Contract Time or the Contract Sum.
- E. Attachments: Include sketches, coordination drawings, descriptions, photos, submittals, and other information necessary to substantiate the reason for the request.
- F. RFI Log: Prepare and maintain a tabular log of RFIs for the duration of the project.
1. Indicate current status of every RFI. Update log promptly and on a regular basis.
  2. Note dates of when each request is made, and when a response is received.
  3. Highlight items requiring priority or expedited response.
  4. Highlight items for which a timely response has not been received to date.
- G. Review Time: Architect will respond and return RFIs to Contractor within seven calendar days of receipt. For the purpose of establishing the start of the mandated response period, RFIs received after 12:00 noon will be considered as having been received on the following regular working day.
1. Response period may be shortened or lengthened for specific items, subject to mutual agreement, and recorded in a timely manner in progress meeting minutes.
- H. Responses: Content of answered RFIs will not constitute in any manner a directive or authorization to perform extra work or delay the project. If in Contractor's belief it is likely to lead to a change to Contract Sum or Contract Time, promptly issue a notice to this effect, and follow up with an appropriate Change Order request to Owner.
1. Response may include a request for additional information, in which case the original RFI will be deemed as having been answered, and an amended one is to be issued forthwith. Identify the amended RFI with an R suffix to the original number.
  2. Do not extend applicability of a response to specific item to encompass other similar conditions, unless specifically so noted in the response.
  3. Upon receipt of a response, promptly review and distribute it to all affected parties, and update the RFI Log.
  4. Notify Architect within seven calendar days if an additional or corrected response is required by submitting an amended version of the original RFI, identified as specified above.

### **3.07 SUBMITTALS FOR REVIEW**

- A. When the following are specified in individual sections, submit them for review:
1. Product data.
  2. Shop drawings.
  3. Samples for selection.
  4. Samples for verification.
- B. Submit to Architect for review for the limited purpose of checking for compliance with information given and the design concept expressed in Contract Documents.
- C. Samples will be reviewed for aesthetic, color, or finish selection.
- D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 78 00 - Closeout Submittals.

**3.08 SUBMITTALS FOR INFORMATION**

- A. When the following are specified in individual sections, submit them for information:
  - 1. Design data.
  - 2. Certificates.
  - 3. Test reports.
  - 4. Inspection reports.
  - 5. Manufacturer's instructions.
  - 6. Manufacturer's field reports.
  - 7. Other types indicated.
- B. Submit for Architect's knowledge as contract administrator or for Owner.

**3.09 SUBMITTALS FOR PROJECT CLOSEOUT**

- A. Submit Correction Punch List for Substantial Completion.
- B. Submit Final Correction Punch List for Substantial Completion.
- C. When the following are specified in individual sections, submit them at project closeout in compliance with requirements of Section 01 78 00 - Closeout Submittals:
  - 1. Project record documents.
  - 2. Operation and maintenance data.
  - 3. Warranties.
  - 4. Bonds.
  - 5. Other types as indicated.
- D. Submit for Owner's benefit during and after project completion.

**3.10 NUMBER OF COPIES OF SUBMITTALS**

- A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected.
- B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
  - 1. After review, produce duplicates.
  - 2. Retained samples will not be returned to Contractor unless specifically so stated.

**3.11 SUBMITTAL PROCEDURES**

- A. General Requirements:
  - 1. Use a separate transmittal for each item.
  - 2. Submit separate packages of submittals for review and submittals for information, when included in the same specification section.
  - 3. Transmit using approved form.
    - a. Use Form AIA G810.
  - 4. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of products required, field dimensions, adjacent construction work, and coordination of information is in accordance with the requirements of the work and Contract Documents.
  - 5. Schedule submittals to expedite the Project, and coordinate submission of related items.
    - a. For each submittal for review, allow 15 days excluding delivery time to and from the Contractor.
    - b. For sequential reviews involving Architect's consultants, Owner, or another affected party, allow an additional 7 days.
    - c. For sequential reviews involving approval from authorities having jurisdiction (AHJ), in addition to Architect's approval, allow an additional 30 days.
  - 6. Identify variations from Contract Documents and product or system limitations that may be detrimental to successful performance of the completed work.
  - 7. Provide space for Contractor and Architect review stamps.
  - 8. When revised for resubmission, identify all changes made since previous submission.
- B. Product Data Procedures:

1. Submit only information required by individual specification sections.
  2. Collect required information into a single submittal.
  3. Submit concurrently with related shop drawing submittal.
  4. Do not submit (Material) Safety Data Sheets for materials or products.
- C. Shop Drawing Procedures:
1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting Contract Documents and coordinating related work.
  2. Do not reproduce Contract Documents to create shop drawings.
  3. Generic, non-project-specific information submitted as shop drawings do not meet the requirements for shop drawings.
- D. Samples Procedures:
1. Transmit related items together as single package.
  2. Identify each item to allow review for applicability in relation to shop drawings showing installation locations.
  3. Include with transmittal high-resolution image files of samples to facilitate electronic review and approval. Provide separate submittal page for each item image.

### **3.12 SUBMITTAL REVIEW**

- A. Submittals for Review: Architect will review each submittal, and approve, or take other appropriate action.
- B. Submittals for Information: Architect will acknowledge receipt and review. See below for actions to be taken.
- C. Architect's actions will be reflected by marking each returned submittal using virtual stamp on electronic submittals.
- D. Architect's and consultants' actions on items submitted for review:
1. Authorizing purchasing, fabrication, delivery, and installation:
    - a. "Approved", or language with same legal meaning.
    - b. "Approved as Noted, Resubmission not required", or language with same legal meaning.
      - 1) At Contractor's option, submit corrected item, with review notations acknowledged and incorporated.
    - c. "Approved as Noted, Resubmit for Record", or language with same legal meaning.
  2. Not Authorizing fabrication, delivery, and installation:
- E. Architect's and consultants' actions on items submitted for information:
1. Items for which no action was taken:
    - a. "Received" - to notify the Contractor that the submittal has been received for record only.
  2. Items for which action was taken:
    - a. "Reviewed" - no further action is required from Contractor.

**END OF SECTION**

## SECTION 01 31 00

### 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. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
  - 1. General project coordination procedures.
  - 2. Administrative and supervisory personnel.
  - 3. Coordination drawings.
  - 4. Requests for Information (RFIs).
  - 5. Project meetings.
- B. Each contractor shall participate in coordination requirements. Certain areas of responsibility are assigned to a specific contractor.
- C. Related Sections:
  - 1. Division 1 Section "Execution Requirements"
  - 2. Division 1 Section "Closeout Procedures" for coordinating closeout of the Contract.

##### 1.3 DEFINITIONS

- A. RFI: Request from Owner, Architect, or Contractor seeking information from each other during construction.

##### 1.4 COORDINATION

- A. Contractor shall be responsible for coordinating all trades of his contract, Owners Contractors, coordinating construction sequences and schedules, and coordinating actual installed location and interface of work.
- B. Contractor shall supervise and direct the development of coordination drawings showing comprehensive coordination and integration of all Work of this project including, but not limited to, structural, architectural mechanical, plumbing, fire protection, electrical disciplines, and Owners Contractors.

- C. Coordination drawings are intended to assist Contractor and all trades during construction and may be used to supplement shop drawings, record drawings, and other required submittals.
- D. Coordination: Each contractor shall supervise and direct construction operations with those of subcontractors and entities to ensure efficient and orderly installation of each part of the Work. Each contractor shall coordinate its operations with operations, included in different Sections that depend on each other for proper installation, connection, and operation.
  - 1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
  - 2. Coordinate installation of different components with other contractors to ensure maximum performance and accessibility for required maintenance, service, and repair.
  - 3. Make adequate provisions to accommodate items scheduled for later installation.
- E. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
  - 1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- F. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
  - 1. Preparation of Contractor's construction schedule.
  - 2. Preparation of the schedule of values.
  - 3. Installation and removal of temporary facilities and controls.
  - 4. Delivery and processing of submittals.
  - 5. Progress meetings.
  - 6. Pre-installation conferences.
  - 7. Project closeout activities.
  - 8. Startup and adjustment of systems.
  - 9. Project closeout activities.

## 1.5 KEY PERSONNEL

- A. Key Personnel Names: Within 5 days of Notice to Proceed, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and email addresses. Provide names, addresses, and telephone numbers of individuals assigned as standbys in the absence of individuals assigned to Project.
  - 1. Post copies of list at site. Keep list current at all times.

1.6 REQUESTS FOR INFORMATION (RFIs)

- A. General: Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.
  - 1. Engineer/Architect will return RFIs submitted to Engineer/Architect by other entities controlled by Contractor with no response.
  - 2. Coordinate and submit RFIs in a prompt manner so as to avoid delays in Contractor's work or work of subcontractors.

1.7 PROJECT MEETINGS

- A. General: Attendance of subcontractors and superintendent at a weekly progress meeting is required.

**PART 2 - PRODUCTS** (Not Used)

**PART 3 - EXECUTION** (Not Used)

END OF SECTION



## SECTION 01 31 19

### PROJECT MEETINGS

#### PART 1 – GENERAL

##### 1.01 RELATED DOCUMENTS:

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

##### 1.02 DESCRIPTION:

- A. This section specifies administrative and procedural requirements for project meetings including, but not limited to:
  - 1. Pre-Construction Meetings
  - 2. Pre-Installation Meetings
  - 3. Progress/Schedule Update/Coordination Meetings
- B. The General Contractor will conduct the meetings listed above, in addition to those enumerated in other sections this specification, to ensure safe and quality execution of the project, and proper coordination of the work with building users and Owner's requirements.

##### 1.03 PRE-CONSTRUCTION MEETING:

- A. The Engineer and Owner will schedule a pre-construction and organizational meeting prior to commencement of construction activities. The Engineer will conduct the meeting to review with the Contractor the Contractor's responsibilities and personnel assignments.
- B. Attendees: The Owner, the Engineer, the Contractor and his superintendent, major subcontractors, manufacturers, suppliers, and other concerned parties shall each be represented at the meeting. All participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
- C. Agenda: Discuss items of significance which could affect progress, including such topics as:
  - 1. Tentative overall construction schedule including critical sequencing or phasing.
  - 2. Critical path or critical sequence items.
  - 3. Tentative weekly work schedule and working hours.
  - 4. Work restrictions.
  - 5. Designation of responsible personnel, their duties, and accurate contact information.
  - 6. Procedures for processing field decisions and Change Orders.
  - 7. Procedures for RFIs.
  - 8. Procedures for testing and inspecting.
  - 9. Procedures for processing Applications for Payment.

10. Distribution of Contract Documents and project correspondence.
  11. Use of the premises including office, work and storage areas.
  12. Owner's occupancy requirements.
  13. Parking availability.
  14. Equipment and material deliveries.
  15. Temporary interruption of electrical power, HVAC, water, etc. (if any).
  16. Temporary occupation of interior spaces.
  17. Safety and security procedures.
  18. Housekeeping.
  19. Construction waste management and recycling.
  20. Preparation of record documents.
  21. Review of bid allowances and unit prices and how they would apply to the contract.
- C. Reporting: The Engineer will distribute meeting minutes to the Owner and to attendees designated by the Owner.
- 1.04 PRE-INSTALLATION CONFERENCES: Unless permitted otherwise, the following shall apply to the preinstallation conferences.
- A. The Contractor shall conduct a pre-installation conference at the site before each construction activity that requires coordination with other construction, or as required by various Sections of this Project Manual or by Construction Drawings. Shop drawings shall be approved prior to the meeting and reviewed during the meeting. Contractor is to advise the Designer and Owner of scheduled meeting dates with at least a one-week notice.
  - B. Attendees: The installer and technical representatives of manufacturers and fabricators involved in or affected by the installation, and its coordination or integration with other materials and installations that have preceded or will follow, SHALL attend the meeting. Contractor and all subcontractor supervisory personnel are also required to attend. The designer shall also attend.
  - C. Reporting: The Designer will distribute meeting minutes to the Owner, all affected parties, and all meeting attendees. Significant discussions and agreements and disagreements of each conference, along with the approved schedule, will be recorded.
  - D. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the work and reconvene the conference at the earliest feasible date.
- 1.05 PROGRESS / SCHEDULE UPDATE / COORDINATION MEETINGS: Unless permitted otherwise, the following shall apply to the progress (OAC) meetings.
- A. The Contractor will conduct progress/scheduling update/coordination meetings every two weeks. The Owner may require these meetings to be conducted on a weekly schedule. The Contractor will notify the Owner and Engineer of scheduled meeting dates and locations. Dates of meetings will be coordinated with preparation of the monthly application for payment. Construction on in use facilities will likely require more frequent progress and schedule meetings.

- B. Attendees: In addition to representatives of the Owner, Engineer, and Contractor, each subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings by persons familiar with the project and authorized to conclude matters relating to progress.
- C. Agenda: Contractor shall prepare the meeting agenda. Distribute the agenda to all invited attendees. The following agenda items shall be included in the meeting agenda, and discussed in the meeting.
  - 1. Review and correction or approve minutes of the previous progress meeting.
  - 2. Construction Schedule: The Contractor shall review progress since the last meeting. Determine where each activity is in relation to the Contractor's Construction Schedule, whether on time or ahead or behind schedule. If behind schedule, submit a recover schedule and secure commitments from parties involved to do so.
  - 3. Review the following topics for present and future issues:
    - a. Safety
    - b. Shoring needs and problems
    - c. Construction incidence reports
    - d. Coordination of construction activities with Owner's use of the facility
  - 4. Review the present and future needs of each entity present, including such items as:
    - a. Coordination or Interface requirements with Owner's use of facility.
    - b. Time
    - c. Submittals
    - d. Sequences of operations
    - e. Deliveries
    - f. Off-site fabrication problems
    - g. Access
    - h. Site utilization
    - i. Temporary facilities and services
    - j. Hours of work
    - k. Hazards and risks
    - l. Housekeeping
    - m. Quality and work standards
    - n. Change orders
    - o. Documentation of information for payment requests
    - p. RFI's

- q. Field Observations
  - r. Pending claims and disputes
  - s. Deficiencies Log
- D. Reporting: After each meeting date, the Designer will distribute copies of minutes of the meeting to attendees. Significant discussions and agreements achieved will be recorded.

**PART 2 – PRODUCTS** (Not Used)

**PART 3 – EXECUTION** (Not Used)

END OF SECTION

## SECTION 01 32 00

### 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. Submittals Schedule.
2. Contractor's Construction Schedule.
3. Daily construction reports.
4. Field condition reports.
5. Construction Photographs.

- B. Related Sections include the following:

1. Division 01 Section "Schedule of Values".
2. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
3. Division 01 Section "Submittal Procedures" for submitting schedules and reports.
4. Division 01 Section "Quality Assurance, Control, and Documentation" for submitting a schedule of tests and inspections.
5. Division 01 Section "Closeout Procedures" for submitting "As-Built Schedule" as Project Record Documents at Project closeout.

##### 1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that is linked to, and precedes another activity in the network.
3. Successor Activity: An activity that is linked to, and follows another activity in the network.

- B. Schedule – A list of all distinct construction activities logically linked together to show the contractor's planned sequence of work.

1. Preliminary Schedule – Schedule showing the contractor’s planned sequence of work for the first 90 days of the project. This schedule is to include mobilization activities and procurement activities.
  2. Initial Schedule – The first schedule showing the contractor’s planned sequence of all project activities. This schedule will serve as the baseline to measure progress of the work.
  3. Schedule Update – An update of the initial schedule showing current progress of the project.
- C. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. These relationships, and the activity durations, are used to calculate when activities can be performed, the duration of the project, and the critical path of the project.
- D. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- E. Float: The measure of leeway in starting and completing an activity.

#### 1.4 SUBMITTALS

- A. Qualification Data: For firms and persons specified in "Quality Assurance" Section to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and Owner/Commissioning Authorities, and other information specified.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
1. Submit to Architect and Awarding Authority 3 printed copies and 1 working electronic copy of schedule, using software indicated, and labeled to comply with requirements for submittals. Include type of schedule (preliminary, initial (baseline) or updated) and date on label.
- C. 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. Submittal category (action or informational).
  4. Name of subcontractor.
  5. Description of the Work covered.
  6. Scheduled date for Architect's final release or approval.
- D. Daily Construction Reports: To be completed daily by contractor’s project staff. Submit to Architect and Awarding Authority at bi-weekly intervals.
- E. Field Condition Reports: Submit 2 copies of report to architect and 1 copy of report to City of Mobile PM at time of discovery of differing conditions.
- F. Construction Photographs: To be reviewed at each project meeting and to be submitted in a binder and on an electronic disk with close-out documents.

**1.5 QUALITY ASSURANCE**

- A. Scheduling Consultant Qualifications: An experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Architect's request. Reference Paragraph 3.1,A.
- B. Pre-scheduling Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to the preliminary construction schedule and Contractor's construction schedule, including, but not limited to, the following:
  - 1. Review software limitations and content and format for reports.
  - 2. Verify availability of qualified personnel needed to develop and update schedule.
  - 3. Discuss constraints, including phasing, work stages, area separations, interim milestones, and partial Owner occupancy.
  - 4. Review delivery dates for Owner-furnished products.
  - 5. Review Allowances and time required for procurement and installation.
  - 6. Review schedule for work of Owner's separate contracts.
  - 7. Review time required for review of submittals and resubmittals.
  - 8. Review requirements for tests and inspections by independent testing and inspecting agencies.
  - 9. Review time required for completion and startup procedures.
  - 10. Review and finalize list of construction activities to be included in schedule.
  - 11. Review submittal requirements and procedures.
  - 12. Review procedures for updating schedule.

**1.6 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.
  - 1. Secure time commitments for performing critical elements of the Work from parties involved.
  - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

**PART 2 - PRODUCTS****2.1 SUBMITTALS SCHEDULE**

- A. Preparation: Submit to the Architect and Awarding Authority a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, resubmittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
  - 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.

2. Final Submittal: Submit concurrently with the first complete submittal of Contractor's Construction Schedule.
  - a. Submittal schedule to be incorporated directly into Contractor's Construction Schedule.

## 2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling" 2<sup>nd</sup> Edition. Use as a reference for additional definitions not included herein.
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion to date of Final Completion.
  1. Contract completion date can be changed, at the Awarding Authority's discretion, by submission of a schedule that shows an early completion date, as allowed by the General Conditions to the Contract.
- C. Activities: Activities should be broken down and organized by floor, by elevation, and by work area. Comply with the following:
  1. Activity Duration: Define activities so no activity is longer than fifteen days, unless specifically allowed by Architect and Owner. An exception will be granted for procurement activities.
  2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
    - a. Examples include, but are not limited to, structural components, limestone or pre-cast components, architectural trim, plumbing, heating/cooling/ventilation equipment, window systems, conveying equipment, specialty items, etc.
  3. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
  4. Startup and Testing Time: Include not less than seven days for startup and testing.
  5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
  1. Phasing: Arrange list of activities on schedule by phase. Allowances: Include a separate activity for each allowance item detailing when information is required from Architect, and when the Work for the allowance must begin so as not to affect the completion date.
  2. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
  3. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
  4. Owner-Furnished Products: Include a separate activity for each product.



5. Work Restrictions: Show the effect of the following items on the schedule:
  - a. Coordination with existing construction.
  - b. Limitations of continued occupancies.
  - c. Uninterruptible services.
  - d. Partial occupancy before Substantial Completion.
  - e. Use of premises restrictions.
  - f. Provisions for future construction.
  - g. Seasonal variations.
  - h. Environmental control.
- E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, review inspections by review agencies, Pre-Install Conferences, Building Dry-in, temp-perm power, conditioned air, Certificate of Occupancy, Substantial Completion, and Final Completion.
- F. Resource / staffing: Should the contractor's progress fall materially behind the accepted initial schedule (30 days or more), the awarding authority can require the contractor to incorporate resource loading into the recovery schedule to indicate required staffing levels for each activity. This resource loading will show aggregate manpower requirements on a daily or weekly basis.
- G. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
  1. Refer to Division 1 Section "Schedule of Values" for cost reporting and payment procedures.
- H. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the effect of the proposed change on the overall project schedule.
- I. Computer Software: Prepare schedules using a program that has been developed specifically to manage construction schedules. See Article 9 of the General Conditions of the contract for further information.

### 2.3 CONTRACTORS CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, cost and resource loaded, time-scaled CPM network analysis program.
  1. Submit schedule to the Architect and Awarding Authority in the time frame stipulated in the timeframe listed below.
    - a. For projects with an initial contract value of less than \$5,000,000.00 – Initial schedule within 10 days of Issuance of Letter of intent or Notice to Proceed.
    - b. For projects with an initial contract value of \$5,000,000.00 to \$20,000,000.00 – Preliminary schedule within 10 days of Issuance of Letter of intent or Notice to Proceed, and Initial schedule within 30 days of Issuance of Letter of intent or Notice to Proceed.

- c. For projects with an initial contract value greater than \$20,000,000.00 – Preliminary schedule within 15 days of Issuance of Letter of intent or Notice to Proceed, and Initial schedule within 45 days of Issuance of Letter of intent or Notice to Proceed.
  2. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meetings and payment request dates.
  3. Use “one workday” as the unit of time. Include a list of non-working days and holidays incorporated into the schedule.
  4. Failure to include any work item required for the performance of this schedule shall not excuse the Contractor from completing all work within the applicable completion dates, regardless of Architect or Owner approval of the schedule.
- B. CPM Schedule Preparation: Prepare a list of all activities required to complete the work. Determine the relationship of each activity to the other activities, and link the activities together to indicate the logical sequence of work.
  1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities.
    - a. Preparation and processing of submittals.
    - b. Mobilization and demobilization.
    - c. Purchase of materials.
    - d. Delivery.
    - e. Fabrication.
    - f. Utility Interruptions.
    - g. Power outages or any utility shut downs must be given advance notice of 30 days and must be included in the CPM schedule.
    - h. Installation.
    - i. Architect and Owner Inspections.
    - j. Work by Owner that may affect or be affected by Contractor’s activities.
    - k. Testing and commissioning.
  2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Schedule start and completion dates shall be consistent with Contract milestone dates.
  3. Processing: Process data to produce output data on a computer-drawn, time-scaled network. Revise data, reorganize activity sequences and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time
  4. Format: Mark the critical path: Locate the critical path near center of Network; locate paths with most float near the edges.
- C. Initial Issue of Schedule: Sort the initial submission of the network diagram “early start” date. Identify clearly all critical activities. Identify critical activities. Prepare Tabulated reports showing the following:
  1. Contractor or subcontractor and the Work or activity.
  2. Description of activity.

3. Principal events of activity.
  4. Immediate preceding and succeeding activities.
  5. Early and late start dates.
  6. Early and late finish dates.
  7. Activity duration in workdays.
  8. Total float or slack time.
  9. Average size of workforce.
- D. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
  2. Changes in early and late start dates.
  3. Changes in early and late finish dates.
  4. Changes in activity durations in workdays.
  5. Changes in the critical path.
  6. Changes in total float or slack time.
  7. Changes in cost-loading or resource-loading.
  8. Changes in the Contract Time.

## 2.3 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
1. List of subcontractors at Project site.
  2. List of separate contractors at Project site.
  3. Approximate count of personnel at Project site.
    - a. Personnel count is to be broken down by subcontractor
  4. Equipment at project site.
  5. High and low temperatures and general weather conditions.
  6. Accidents involving injury or damage to equipment or work in place
  7. Meetings and significant decisions.
  8. Unusual events.
  9. Inspections of the work
  10. Stoppages, delays, shortages, and losses.
  11. Meter readings and similar recordings.
  12. Emergency procedures enacted
  13. Orders and requests of authorities having jurisdiction.
  14. Change Orders received and implemented.

15. Construction Change Directives received.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
  - a. The City of Mobile intends to require the General Contractor's Daily Reporting to be done using a Call-in service administered by a third party provider. The daily reporting will be required by all Superintendents listed in the project's minimum general contractor staffing requirements.
- B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare a detailed report. Submit with a request for information. Include a detailed description of the differing conditions and photographs illustrating the existing conditions, together with recommendations for changing the Contract Documents.
- C. Construction Photographs: Photographs to document pre-existing conditions and to regularly document construction progress.

### **PART 3 - EXECUTION**

#### **3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE**

- A. Scheduling Consultant: Engage a 3<sup>rd</sup> party scheduling consultant to provide planning, evaluation, and reporting using CPM scheduling.
  1. In-House Option: Awarding Authority may waive the requirement to retain a consultant if Contractor employs skilled personnel with experience in CPM scheduling and reporting techniques. Submit qualifications.
  2. Meetings: Scheduling consultant shall attend all meetings related to Project progress, alleged delays, and time impact.
- B. Float: Float is a shared resource, available to both parties as needed. The Contractor shall not sequester shared float through such strategies as (a) extending activity duration estimates to consume available float, (b) using preferential logic, or (c) using extensive crew / resource sequencing, constraints, unnecessary milestones, leads or lags on logic ties, and hammock type activities. Since Float within the Construction Schedule is jointly owned, no time extensions will be granted nor delay damages paid until a delay occurs which extends the work beyond the contract completion date. Since float within the Construction Schedule is jointly owned, it is acknowledged that Trustees-caused delays on the project may be offset by Trustees-caused time savings (i.e., critical path submittals returned in less time than allowed by the contract, approval of substitution requests and credit changes which result in a savings of time to the Contractor, etc.). In such an event, the Contractor shall not be entitled to receive a time extension or delay damages until all Trustee-caused time savings are exceeded and the contract completion date is also exceeded.
- C. Weather Delays: Weather delays will be calculated as days lost for events in excess of the NOAA 30 year average for Mobile, AL (1971 – 2000). Weather delays will not be granted for rain events less than 0.1 inches. Weather delays will not be granted for activities that are not shown to be on the critical path of the schedule at the time of the event.

- D. Contractor's Construction Schedule Updating: At two-week intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
1. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
  2. As the Work progresses, indicate Actual Completion percentage for each activity.
  3. At the end of the project, submit the As-Built schedule with actual start and finish dates to the owner as a close-out requirement.
- E. Distribution: Distribute copies of approved schedule to Architect, Awarding Authority, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post copies in Project meeting rooms and temporary field offices.
  2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Awarding Authority to receive both paper and working electronic copy of each update.
  3. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.
- F. Construction Schedule Software: The following CPM software shall be used.
1. For projects with a contract value of less than \$5,000,000, use Microsoft Project, Primavera P6, or other comparable software products.
  2. For projects with a contract value greater than \$5,000,000, use Primavera P6 or other comparable software product.

### 3.2 CONSTRUCTION PHOTOGRAPHS

- A. Photographic Process: Digital Imaging.
- B. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
- C. Preconstruction Digital Photographs and Digital Video Recording: Before starting construction, take color photographs and digital video recording of Project site and affected City right-of-ways and surrounding properties and interior existing photos of affected areas from different vantage points. Show existing conditions adjacent to property.
- D. Periodic Construction Photographs: Periodic digital color photographs and digital file to be submitted in duplicate on disc and in print form at each pay request with the following views:
1. Exterior views of all distinct elevations on a weekly basis. Photographs of each elevation are to be taken from the same location throughout the project.
  2. Interior views of all levels of major spaces on a monthly basis. Of particular interest is the process of structure, mechanical (ductwork, equipment, plumbing, and sprinkler systems), electrical, partitions and interior finishes.

3. Roof: Views of all roof areas on a weekly basis during periods when work is occurring on or adjacent to the roof.
4. Field Office Prints: Retain one set of prints of periodic photographs in field office at Project site, available at all times for reference. Identify photographs the same as for those submitted to Architect.

END OF SECTION

**SECTION 01 32 16**  
**CONSTRUCTION PROGRESS SCHEDULE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Preliminary schedule.
- B. Construction progress schedule, bar chart type.

**1.02 REFERENCE STANDARDS**

- A. AGC (CPSM) - Construction Planning and Scheduling Manual; 2004.

**1.03 SUBMITTALS**

- A. Within 10 days after date of Agreement, submit preliminary schedule.
- B. If preliminary schedule requires revision after review, submit revised schedule within 10 days.
- C. Within 20 days after review of preliminary schedule, submit draft of proposed complete schedule for review.
  - 1. Include written certification that major contractors have reviewed and accepted proposed schedule.
- D. Within 10 days after joint review, submit complete schedule.
- E. Submit updated schedule with each Application for Payment.
- F. Submit in PDF format.
- G. Submit under transmittal letter form specified in Section 01 30 00 - Administrative Requirements.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PRELIMINARY SCHEDULE**

- A. Prepare preliminary schedule in the form of a horizontal bar chart.

**3.02 CONTENT**

- A. Show complete sequence of construction by activity, with dates for beginning and completion of each element of construction.
- B. Identify each item by specification section number.
- C. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
- D. Provide legend for symbols and abbreviations used.

**3.03 BAR CHARTS**

- A. Include a separate bar for each major portion of Work or operation.
- B. Identify the first work day of each week.

**3.04 REVIEW AND EVALUATION OF SCHEDULE**

- A. Participate in joint review and evaluation of schedule with Architect at each submittal.
- B. Evaluate project status to determine work behind schedule and work ahead of schedule.
- C. After review, revise as necessary as result of review, and resubmit within 10 days.

**3.05 UPDATING SCHEDULE**

- A. Maintain schedules to record actual start and finish dates of completed activities.
- B. Indicate progress of each activity to date of revision, with projected completion date of each activity.
- C. Annotate diagrams to graphically depict current status of Work.

- D. Identify activities modified since previous submittal, major changes in Work, and other identifiable changes.
- E. Indicate changes required to maintain Date of Substantial Completion.
- F. Submit reports required to support recommended changes.
- G. Provide narrative report to define problem areas, anticipated delays, and impact on the schedule. Report corrective action taken or proposed and its effect.

**3.06 DISTRIBUTION OF SCHEDULE**

- A. Distribute copies of updated schedules to Contractor's project site file, to subcontractors, suppliers, Architect, Owner, and other concerned parties.
- B. Instruct recipients to promptly report, in writing, problems anticipated by projections indicated in schedules.

**END OF SECTION**



**SECTION 01 32 33****PHOTOGRAPHIC DOCUMENTATION****PART 1 - GENERAL****1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section includes administrative and procedural requirements for the following:
  - 1. Site Camera and video recordings.
- B. Related Requirements:
  - 1. Section 013300 "Submittal Procedures" for submitting photographic documentation.
  - 2. Section 017700 "Closeout Procedures" for submitting photographic documentation as project record documents at Project closeout.
  - 3. Section 017900 "Demonstration and Training" for submitting video recordings of demonstration of equipment and training of Owner's personnel.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For site camera.
- B. Key Plan: Submit key plan of Project site and building with notation of fixed mounted camera marked for location. Indicate elevation or story of construction.
- C.
- D.
- E. Digital Photographs: Submit image files within three days of taking photographs.
  - 1. Digital Camera: Minimum sensor resolution of 8 megapixels.
  - 2. Format: Minimum 3200 by 2400 pixels, in unaltered original files, with same aspect ratio as the sensor, uncropped, date and time stamped, in folder named by date of photograph, accompanied by key plan file.
  - 3. Identification: Provide the following information with each image description in file metadata tag:
    - a. Name of Project.
    - b. Name and contact information for photographer.
    - c. Name of Contractor.
    - d. Date photograph was taken.
    - e. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
    - f. Unique sequential identifier keyed to accompanying key plan.
- F. Video Recordings: Submit video recordings within seven days of recording
  - 1. Submit video recordings in digital video disc format acceptable to Architect by posting to Project Web site.
  - 2. Identification: With each submittal, provide the following information:
    - a. Name of Project.
    - b. Name of Contractor.
    - c. Date video recording was recorded.
    - d. Description of vantage point, indicating location, direction (by compass

- e. point), and elevation or story of construction.  
Weather conditions at time of recording.

## **1.02 QUALITY ASSURANCE**

- A. Photographer Qualifications: An company who has been regularly engaged as a professional photographer of construction projects for not less than three years.

## **1.03 USAGE RIGHTS**

- A. Obtain and transfer copyright usage rights from photographer to Owner for unlimited reproduction of photographic documentation.

## **PART 2 - PRODUCTS**

### **2.1 PHOTOGRAPHIC MEDIA**

- A. Digital Video Recordings: Provide high-resolution, digital video disc in format acceptable to Architect.

## **PART 3 - EXECUTION**

### **3.1 CONSTRUCTION PHOTOGRAPHS**

- A. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
  - 1. Date and Time: Include date and time in file name for each image.
  - 2. Field Office Images: Maintain one set of images accessible in the field office at Project site, available at all times for reference. Identify images in the same manner as those submitted to Architect.

### **3.2 CONSTRUCTION VIDEO RECORDINGS**

- A. Video Recording Photographer: Engage a qualified videographer to record construction video recordings.
- B. Recording: Fixed mount camera at location approved by Owner. Provide periodic recordings bi-weekly.

**END OF SECTION**

## SECTION 01 33 00

### SUBMITTAL PROCEDURES

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Section, apply to this Section.

##### 1.2 SUMMARY

- A. Section Includes:
  - 1. Submittal Procedure
  - 2. Submittal Schedule
  - 3. Shop Drawings
  - 4. Product Data
  - 5. Samples

##### 1.3 SUBMITTAL PROCEDURES

- A. Number each submittal with Project Manual specification Section number and sequential number within each section. Number resubmittals with original number and an alphabetic suffix.
- B. Identify Project, Contractor, Subcontractor or supplier, pertinent Drawing sheet and detail numbers, and specification Section number, as appropriate.
- C. Submit all submittals simultaneously for each Produce or Specification Section. Where multiple Products function as an assembly, group submittals for all related Products into single submittal.
- D. Project Manager will not review incomplete submittals.
- E. Apply Contractor's stamp, signed or initialed certifying that:
  - 1. Submittal was reviewed.
  - 2. Products, field dimensions, and adjacent construction have been verified.
  - 3. Information has been coordinated with requirements for Work and Contract Documents.
- F. Schedule submittals to expedite the Project, and deliver to Engineer and Project Manager. Coordinate submittal of related items.
- G. For each submittal, allow 14 days for Engineer's review, excluding delivery time to and from Contractor. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of completed Work.

- H. Revise and resubmit submittals when required; identify all changes made since previous submittals.
- I. Distribute copies of reviewed submittals to concerned parties and to Project Record Documents file. Instruct parties to promptly report any inability to comply with provisions.

#### 1.4 SUBMITTAL SCHEDULE

- A. Submit a submittal schedule showing all submittals proposed for project, including:
  - 1. Submittals for Review
  - 2. Closeout Submittals.
- B. Include for each submittal:
  - 1. Specification section number.
  - 2. Description of submittal.
  - 3. Type of submittal.
  - 4. Anticipated submittal date.
- C. Submit three (3) hard copies and one (1) PDF copy, concurrently.

#### 1.5 SHOP DRAWINGS

- A. Present information in clear and thorough manner.
- B. Identify details by reference to sheet and detail numbers or areas shown on Drawings.
- C. Reproductions of details contained in Contract Documents are not acceptable.
- D. Submit four (4) hard copies and one (1) PDF copy (concurrently). One hard copy and a PDF copy will be returned to Contractor for printing and distribution.

#### 1.6 PRODUCT DATA

- A. Mark each copy to identify applicable products, models, options, and other data.
- B. Supplement manufacturers' standard data to provide information unique to this Project.
- C. Submit 3 copies. Project Manager will return one copy to Contractor for printing and distribution.

#### 1.7 SAMPLES

- A. Submit samples to illustrate functional and aesthetic characteristics of Products, with integral parts and attachment of devices. Coordinate sample submittals for interfacing work.
- B. Where so indicated, submit samples of finishes from the full range of manufacturers'

standard colors, textures, and patterns for Project Manager’s selection.

- C. Include identification for each sample, with full Project information.
- D. Project Manager will notify Contractor of approval or rejection of samples, or of selection of color, texture or pattern if full range is submitted.

END OF SECTION

**SECTION 01 35 53**  
**SECURITY PROCEDURES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Security measures including formal security program and entry control.

**1.02 SECURITY PROGRAM**

- A. Protect Work, existing premises and Owner's operations from theft, vandalism, and unauthorized entry.
- B. Initiate program in coordination with Owner's existing security system at project mobilization.
- C. Maintain program throughout construction period until Owner occupancy.

**1.03 ENTRY CONTROL**

- A. Restrict entrance of persons and vehicles into Project site .
- B. Allow entrance only to authorized persons with proper identification.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 40 00**  
**QUALITY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Submittals.
- B. Quality assurance.
- C. References and standards.
- D. Testing and inspection agencies and services.
- E. Control of installation.
- F. Mock-ups.
- G. Manufacturers' field services.
- H. Defect Assessment.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 21 00 - Allowances: Allowance for payment of testing services.
- B. Section 01 42 16 - Definitions.
- C. Section 01 60 00 - Product Requirements: Requirements for material and product quality.

**1.03 REFERENCE STANDARDS**

- A. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2017.
- B. IAS AC89 - Accreditation Criteria for Testing Laboratories; 2018.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Test Reports: After each test/inspection, promptly submit two copies of report to Architect and to Contractor.
  - 1. Include:
    - a. Date issued.
    - b. Project title and number.
    - c. Name of inspector.
    - d. Date and time of sampling or inspection.
    - e. Identification of product and specifications section.
    - f. Location in the Project.
    - g. Type of test/inspection.
    - h. Date of test/inspection.
    - i. Results of test/inspection.
    - j. Compliance with Contract Documents.
    - k. When requested by Architect, provide interpretation of results.
  - 2. Test report submittals are for Architect's knowledge as contract administrator for the limited purpose of assessing compliance with information given and the design concept expressed in the Contract Documents, or for Owner's information.

**1.05 QUALITY ASSURANCE**

- A. Testing Agency Qualifications:
  - 1. Prior to start of work, submit agency name, address, and telephone number, and names of full time registered Engineer and responsible officer.
  - 2. Submit copy of report of laboratory facilities inspection made by NIST Construction Materials Reference Laboratory during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

- B. Quality-Control Personnel Qualifications. Engage a person with requisite training and experience to implement and manage quality assurance (QA) and quality control (QC) for the project.

#### **1.06 REFERENCES AND STANDARDS**

- A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.
- B. Comply with reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.
- C. Obtain copies of standards where required by product specification sections.
- D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.
- E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.
- F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from Contract Documents by mention or inference otherwise in any reference document.

#### **1.07 TESTING AND INSPECTION AGENCIES AND SERVICES**

- A. Owner will employ services of an independent testing agency to perform certain specified testing; payment for cost of services will be derived from allowance specified in Section 01 21 00; see Section 01 21 00 and applicable sections for description of services included in allowance.
- B. Employment of agency in no way relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

### **PART 2 PRODUCTS - NOT USED**

### **PART 3 EXECUTION**

#### **3.01 CONTROL OF INSTALLATION**

- A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Have work performed by persons qualified to produce required and specified quality.
- F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.
- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

#### **3.02 MOCK-UPS**

- A. Tests shall be performed under provisions identified in this section and identified in the respective product specification sections.
- B. Assemble and erect specified items with specified attachment and anchorage devices, flashings, seals, and finishes.
- C. Architect will use accepted mock-ups as a comparison standard for the remaining Work.



- D. Where mock-up has been accepted by Architect and is specified in product specification sections to be removed, protect mock-up throughout construction, remove mock-up and clear area when directed to do so by Architect.

### **3.03 TESTING AND INSPECTION**

- A. Testing Agency Duties:
  - 1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
  - 2. Perform specified sampling and testing of products in accordance with specified standards.
  - 3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
  - 4. Promptly notify Architect and Contractor of observed irregularities or non-compliance of Work or products.
  - 5. Perform additional tests and inspections required by Architect.
  - 6. Submit reports of all tests/inspections specified.
- B. Limits on Testing/Inspection Agency Authority:
  - 1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
  - 2. Agency may not approve or accept any portion of the Work.
  - 3. Agency may not assume any duties of Contractor.
  - 4. Agency has no authority to stop the Work.
- C. Contractor Responsibilities:
  - 1. Deliver to agency at designated location, adequate samples of materials proposed to be used that require testing, along with proposed mix designs.
  - 2. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
  - 3. Provide incidental labor and facilities:
    - a. To provide access to Work to be tested/inspected.
    - b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
    - c. To facilitate tests/inspections.
    - d. To provide storage and curing of test samples.
  - 4. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
  - 5. Employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
  - 6. Arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
- D. Re-testing required because of non-compliance with specified requirements shall be performed by the same agency on instructions by Architect.
- E. Re-testing required because of non-compliance with specified requirements shall be paid for by Contractor.

### **3.04 MANUFACTURERS' FIELD SERVICES**

- A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust, and balance equipment as applicable, and to initiate instructions when necessary.
- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

### **3.05 DEFECT ASSESSMENT**

- A. Replace Work or portions of the Work not complying with specified requirements.

- B. If, in the opinion of Owner, it is not practical to remove and replace the work, Owner will direct an appropriate remedy or adjust payment.

**END OF SECTION**

## SECTION 01 40 00

### QUALITY ASSURANCE, CONTROL, & DOCUMENTATION

#### PART 1 – GENERAL

##### 1.01 SUMMARY

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

##### 1.02 GENERAL

- A. Control System: The Contractor shall establish and maintain a system for documenting, monitoring, inspecting, verifying, and testing of the work and that of his subcontractors to ensure that all applicable requirements of the contract documents are met. The Contractor shall be diligent to ensure that the quality of workmanship is satisfactory, that the installation meets all manufacturer requirements, that dimensional requirements are met, that defective materials are not used, and that all required protection and control and laboratory testing procedures are effected. Where specific testing procedures are not stipulated, the Contractor shall establish and conduct a test procedure to ensure adherence to specified quality.
- B. Chain of Control: The Contractor shall plan, coordinate, execute, and examine the work to ensure the complete, workmanlike, and warrantable installation of all materials in a system or element of the construction.
  - 1. The Contractor shall plan, coordinate, execute, and examine the work to ensure that all underlying, substrate, or contiguous work is installed as required to meet the tolerances and requirements for the correct installation of subsequent work.
  - 2. It is the responsibility of the Contractor to advise the Architect no later than the submittal phase of any discrepancies in the requirements or tolerances of materials or components in a system or element of the construction.

#### PART 2 – PRODUCTS

##### 2.01 QA / QC PROGRAM

- A. The Contractor shall submit for Owner's Approval their program format 10 (ten) days from Notice to Proceed.
- B. Once work has begun, the QA / QC manual must be kept up-to-date and approved by Owner's Field Coordinator and Project Manager prior to the current Pay Application being approved.

##### 2.02 MOCK UPS

- A. Mock-ups shall be used to judge workmanship, execution of details, and colors for all exterior material elements. No work shall be started on any of the exterior material elements until such time the mock-up is completed by the Contractor, and accepted / approved by the City of Mobile.

##### 2.03 DOCUMENTATION

- A. Documentation shall be by specification section or by system or element of the construction. The documentation shall be formatted in a comprehensive and collated manner to ensure ease of use and reference. A Table of Contents shall be provided. The Contractor's system shall include, but is not limited to the following:

- B. Pre-Installation Conference
- C. Agenda shall include Review of items 1 through 13 below
  - 1. Inspection and Testing requirements
  - 2. Correct environmental conditions for execution of the work and protection of the completed installation.
  - 3. Schedule including required inspections.
  - 4. Requirements and tolerances of underlying, substrate, or contiguous work.
  - 5. Manufacturer's Recommendations, Requirements, and Instructions.
  - 6. Review of requirements to ensure an enforceable warranty
  - 7. \*Manufacturers' Technical Representative shall be present whenever possible and when required by Specification Section\*
  - 8. Specifications
  - 9. Disposition of Submittals, Product Data, Shop Drawings and Mock ups (when required).
  - 10. Test Results
  - 11. Packaging labels from Materials where possible
  - 12. Periodic, Dated Photos of the work being performed and any other documentation that pertains to the warranty of the material or structure
  - 13. Samples of the material when reasonable, or specified.

### **PART 3 – EXECUTION**

#### **3.01 PRE-CONSTRUCTION QUALITY CONTROL MEETING**

- A. The Contractor shall schedule a meeting with the Awarding Authority, Architect, Project Superintendent, and all major trade Superintendents to review the contractor's proposed QA/QC system and requirements for compliance.

#### **3.02 INSPECTIONS**

- A. The Contractor shall make an initial inspection of each phase of work as soon as a representative portion has been completed, and the Contractor shall make follow-up inspections as required, to ensure that an acceptable quality of work is established and maintained.
- B. The Contractor shall perform a pre-final inspection, prepare a punch list, and work off all items prior to A/E inspection. Contractor shall provide copy of completed report, certifying it's completion to the Architect prior to the Architect beginning his inspections.
- C. The Contractor shall coordinate and plan inspections by the Architect and Awarding Authority in a timely manner to ensure that all parties can be scheduled so as not to impede the flow of the work.

3.03 CLOSEOUT:

- A. The documents generated through this process are to be submitted as part of the closeout documents.
- B. Provide a list of following for all equipment including but not limited to the following:
  - 1. Model Number
  - 2. Serial Number
  - 3. Description
  - 4. Contract Document Reference
- C. Filter and Belt list for each air handler

END OF SECTION

**SECTION 01 41 00**  
**REGULATORY REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SUMMARY OF REFERENCE STANDARDS**

- A. Regulatory requirements applicable to this project are the following:
- B. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- C. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.
- D. ICC (IFC) - International Fire Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. NFPA 1 - Fire Code; 2018.
- F. NFPA 101 - Life Safety Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- G. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- H. ICC (IPC) - International Plumbing Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- I. ICC (IFGC) - International Fuel Gas Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- J. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- K. ICC (IECC) - International Energy Conservation Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 40 00 - Quality Requirements.

**1.03 QUALITY ASSURANCE**

- A. Contractor's Designer Qualifications: Refer to Section - 01 40 00 - Quality Requirements.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 42 16**  
**DEFINITIONS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Other definitions are included in individual specification sections.

**1.02 DEFINITIONS**

- A. Furnish: To supply, deliver, unload, and inspect for damage.
- B. Install: To unpack, assemble, erect, apply, place, finish, cure, protect, clean, start up, and make ready for use.
- C. Product: Material, machinery, components, equipment, fixtures, and systems forming the work result. Not materials or equipment used for preparation, fabrication, conveying, or erection and not incorporated into the work result. Products may be new, never before used, or re-used materials or equipment.
- D. Provide: To furnish and install.
- E. Supply: Same as Furnish.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01-45-30**  
**STRUCTURAL TESTS AND SPECIAL INSPECTIONS**

**PART 1 - GENERAL**

**1.01 SUMMARY**

- A. This Section includes administrative and procedural requirements required for compliance with the International Building Code, Chapter 17, Structural Tests and Special Inspections.
- B. Structural testing and special inspection services are required to verify compliance with requirements specified or indicated. These services do not relieve contractor of responsibility for compliance with other construction 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 construction document requirements.
  - 3. Requirements for contractor to provide quality-assurance and -control services required by architect, owner, or authorities having jurisdiction are not limited by provisions of this section.
- C. The Owner will engage one or more qualified special inspectors and / or testing agencies to conduct structural tests and special inspections specified in this section and related sections and as maybe specified in other divisions of these specifications.
- D. Related Sections:
  - 1. Section 03 30 00 – Cast In Place Concrete.
  - 2. Section 03 38 16 – Unbonded Post-Tensioned Concrete
  - 3. Section 05 12 00 – Structural Steel
  - 4.

**Section 1.02**

**DEFINITIONS**

- A. **Approved Agency:** An established and recognized agency regularly engaged in conducting tests or furnishing inspection services, when such agency has been approved by the building official.
- B. **Construction Documents:** Written, graphic and pictorial documents prepared or assembled for describing the design, location and physical characteristics of the elements of a project necessary for obtaining a building permit. Construction Documents include all supplemental instructions, sketches, addenda, and revisions to the drawings and specifications issued by the registered design professional beyond those issued for a building permit.
- C. **Shop Drawings / Submittal Data:** Written, graphic and pictorial documents prepared and / or assembled by the contractor based on the Construction Documents.
- D. **Structural Observation:** Visual observation of the structural system by a representative of the registered design professional's office for general conformance to the approved construction documents. Structural observations are not considered part of the structural tests and special inspections and do not replace inspections and testing by the testing agency or special inspector.
- E. **Special Inspector:** A qualified person who shall demonstrate competence, to the satisfaction of the code enforcement official, for the inspection of the particular type of construction or operation requiring special inspection. The registered design professional in responsible charge and engineers of record involved in the design of the project are permitted to act as the approved agency and their personnel are permitted to act as the special inspector for the work designed by them, provided those personnel meet the qualification requirements of this section to the satisfaction of the code enforcement official. The special inspector shall provide written documentation to the code enforcement official, the registered design professional in responsible charge and the engineers of record involved in the design of the project.
- F. **Special Inspection, Continuous:** The full-time observation of work requiring special inspection by an approved special inspector who is present in the area where the work is being performed.



- G. Special Inspection, Periodic: The part-time or intermittent observation of work requiring special inspection by an approved special inspector who is present in the area where the work has been or is being performed and at the completion of the work.
- H. Testing Agency: A qualified materials testing laboratory under the responsible charge of a licensed professional engineer, approved by the code enforcement official and the registered design professional in responsible charge, to measure, examine, test, calibrate, or otherwise determine the characteristics or performance of construction materials and verify confirmation with construction documents.

### **1.03 QUALITY ASSURANCE**

- A. Testing Agency Qualifications:
  - 1. Minimum qualifications of inspection and testing agencies and their personnel shall comply with ASTM E329-03 Standard Specification for Agencies in the Testing and / or Inspection of Materials Used in Construction.
    - a. Inspectors and individuals performing tests shall be certified for the work being performed as outlined in the appendix of the ASTM E329. Certification by organizations other than those listed must be submitted to the building official for consideration before proceeding with work.
  - 2. In addition to these requirements, local jurisdiction may have additional requirements. It is the responsibility of the testing and inspection agencies to meet local requirements and comply with local procedures.

### **1.04 CONFLICTING REQUIREMENTS, REPORTS, AND TEST RESULTS**

- A. General: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the registered design professional in responsible charge for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to the registered design profession in responsible charge for a decision before proceeding.
- C. The special inspector's reports and testing agencies results shall have precedence over reports and test results provided by the contractor.
- D. Where a conflict exists between the construction documents and approved shop drawings / submittal data, the construction documents shall govern unless the shop drawings / submittal data are more restrictive. All conflicts shall be brought to the attention of the registered design professional in responsible charge.

### **1.05 SUBMITTALS BY SPECIAL INSPECTOR AND / OR TESTING AGENCY**

- A. Special inspectors shall keep and distribute records of inspections. The special inspector shall furnish inspection reports to the building official, and to the registered design professional in responsible charge, contractor, architect, and owner. Reports shall indicate that work inspected was done in conformance to approved construction documents. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the building official and to the registered design professional in responsible charge prior to the completion of that phase of the work. A final report documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted at a point in time agreed upon by the permit applicant and the building official prior to the start of work.
  - 1. Special inspection reports and test results shall include, but not be limited to, the following:
    - a. Date of inspection.
    - b. Description of inspections or tests performed including location (reference grid lines, floors, elevations, etc.).
    - c. Statement noting that the work, material, and / or product conforms or does not conform to the construction document requirements.
      - 1) Name and signature of contractor's representative who was notified of work, material, and / or products that do not meet the construction document requirements.
    - d. Name and signature of special inspector and / or testing agency representative performing the work.

- B. Schedule of Non-Compliant Work: Each agent shall maintain a log of work that does not meet the requirements of the construction documents. Include reference to original inspection / test report and subsequent dates of re-inspection / retesting.
- C. Reports and tests shall be submitted within 1 week of inspection or test. Schedule of Non-Compliant Work shall be updated daily and submitted at monthly intervals.
- D. Final Report of Special Inspections. Submitted by each agent listed in the schedule of Structural Testing and Special Inspections.

**PART 2 - PRODUCTS** (not used)

**PART 3 - EXECUTION**

**3.01 CONTRACTOR'S RESPONSIBILITY**

- A. The contractor shall coordinate the inspection and testing services with the progress of the work. The contractor shall provide sufficient notice to allow proper scheduling of all personnel. The contractor shall provide safe access for performing inspection and on site testing.
- B. The contractor shall submit schedules to the owner, registered design professionals and testing and inspecting agencies. Schedules will note milestones and durations of time for materials requiring structural tests and special inspections.
- C. The contractor shall repair and / or replace work that does not meet the requirements of the construction documents.
  - 1. Contractor shall engage an engineer / architect to prepare repair and / or replacement procedures.
  - 2. Engineer / architect shall be registered in the state in which the project is located. Engineer shall be acceptable to the registered design professional in responsible charge, code enforcement official, and owner.
  - 3. Procedures shall be submitted for review and acceptance by the registered design professional in responsible charge, code enforcement official, and owner before proceeding with corrective action.
- D. The contractor shall be responsible for costs of:
  - 1. Re-testing and re-inspection of materials, work, and / or products that do not meet the requirements of the construction documents and shop drawings / submittal data.
  - 2. Review of proposed repair and / or replacement procedures by the registered design professional in responsible charge and the inspectors and testing agencies.
  - 3. Repair or replacement of work that does not meet the requirements of the construction documents.

**3.02 STRUCTURAL OBSERVATIONS**

- A. Structural observations may be made periodically as determined by the registered design professional in responsible charge.

**3.03 TESTING AND INSPECTION**

- A. Testing and inspection shall be in accordance with the attached Schedule of Special Inspections.
- B. Reference related specifications for the minimum level of inspections and testing. Provide additional inspections and testing as necessary to determine compliance with the construction drawings.

**3.04 SCHEDULES AND FORMS**

- A. Statement of Special Inspections.
- B. Schedule of Special Inspections.
- C. Final Report of Special Inspections.

**END OF SECTION**

# STATEMENT OF SPECIAL INSPECTIONS

Project: Mobile Civic Center Parking Facility

Project Address:

Permit Applicant: TBA

Applicant Address: TBA

Owner: The City of Mobile

Owner Address:

**Registered Design Professionals (RDP):**

Architect: Evan Terry Associates

Geotechnical Engineer: GET

Structural Engineer: MBA Engineers, Inc.

Mechanical Engineer: Bernard TME

Electrical Engineer: Hyde Engineering

This statement of special inspections is submitted as a condition for permit issuance in accordance with Chapter 17 of the International Building Code. It includes a *Schedule of Special Inspections* applicable to the above referenced project as well as the identity of the individuals, agencies, or firms intended to be retained for conducting these inspections.

The Special Inspector(s) shall keep records of all inspections and shall furnish interim inspection reports to the building official and to the registered design professional in responsible charge at a frequency agreed upon by the permit applicant and building official prior to the start of work. Discrepancies shall be brought to the immediate attention of the contractor for correction. If the discrepancies are not corrected, the discrepancies shall be brought to the attention of the building official and the registered design professional in responsible charge prior to completion of that phase of work. A *Final Report of Special Inspections* documenting required special inspections and correction of any discrepancies noted in the inspections shall be submitted by each agent at the completion of that phase of work.

Maximum frequency of interim report submittals shall not be less than 7 days.

The Special Inspection program does not relieve the contractor of the responsibility to comply with the Contract Documents. Jobsite safety and means and methods of construction are solely the responsibility of the Contractor.

Owner's Acknowledgement:

Signature \_\_\_\_\_

Date \_\_\_\_\_

Building Official's Acceptance:

Signature \_\_\_\_\_

Date \_\_\_\_\_

Permit No. \_\_\_\_\_

Frequency of interim report submittals to building official:

Monthly

Bi-Monthly

Upon Completion

Per Attached Schedule

RDP in Responsible Charge



# FINAL REPORT OF SPECIAL INSPECTIONS

Project: Mobile Civic Center Parking Facility

Project Address:

Testing / Inspection Agent:

Testing / Inspection Agent Address:

Scope of Testing / Inspections: Cast in Place Concrete,

To the best of my information, knowledge, and belief, the special inspections or testing required for this project, and designated for this Agent in the *Schedule of Special Inspections* submitted for permit, have been completed in accordance with the contract documents.

Interim reports submitted prior to this final report and numbered RS-01 to RS-xx, form a basis for, and are to be considered an integral part of this final report.

[Large empty rectangular area for additional notes or details]

Special Inspector's Seal

(Licensed Professional Engineer)

Prepared By:

\_\_\_\_\_  
Type or print name

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

**SECTION 01 51 00**  
**TEMPORARY UTILITIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary Utilities: Provision of electricity, lighting, and water.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 50 00 - Temporary Facilities and Controls:
  - 1. Temporary telecommunications services for administrative purposes.
  - 2. Temporary sanitary facilities required by law.

**1.03 REFERENCE STANDARDS**

- A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

**1.04 TEMPORARY ELECTRICITY**

- A. Cost: By Contractor.
- B. Provide power service required from utility source.
- C. Power Service Characteristics: 480 volt, 200 ampere, three phase, four wire.
- D. Provide power outlets for construction operations, with branch wiring and distribution boxes located at each floor. Provide flexible power cords as required.
- E. Provide main service disconnect and over-current protection at convenient location and meter.
- F. Permanent convenience receptacles may be utilized during construction.
- G. Provide adequate distribution equipment, wiring, and outlets to provide single phase branch circuits for power and lighting.

**1.05 TEMPORARY LIGHTING FOR CONSTRUCTION PURPOSES**

- A. Provide and maintain LED, compact fluorescent, or high-intensity discharge lighting as suitable for the application for construction operations in accordance with requirements of 29 CFR 1926 and authorities having jurisdiction.
- B. Provide branch wiring from power source to distribution boxes with lighting conductors, pigtails, and lamps as required.
- C. Maintain lighting and provide routine repairs.

**1.06 TEMPORARY WATER SERVICE**

- A. Cost of Water Used: By Contractor.
- B. Provide and maintain suitable quality water service for construction operations at time of project mobilization.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 52 13**  
**FIELD OFFICES AND SHEDS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Temporary field offices for use of Contractor.
- B. Maintenance and removal.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 10 00 - Summary: use of premises and responsibility for providing field offices.
- B. Section 01 50 00 - Temporary Facilities and Controls:
  - 1. Temporary telecommunications services for administrative purposes.
  - 2. Temporary sanitary facilities required by law.
- C. Section 01 55 00: Parking and access to field offices.

**PART 2 PRODUCTS**

**2.01 MATERIALS, EQUIPMENT, FURNISHINGS**

- A. Materials, Equipment, Furnishings: Serviceable, new or used, adequate for required purpose.

**2.02 CONSTRUCTION**

- A. Portable or mobile buildings, or buildings constructed with floors raised above ground, securely fixed to foundations, with steps and landings at entrance doors.
- B. Construction: Structurally sound, secure, weather tight enclosures for office. Maintain during progress of Work; remove when no longer needed.
- C. Temperature Transmission Resistance of Floors, Walls, and Ceilings: Compatible with occupancy requirements.
- D. Exterior Materials: Weather resistant, finished in one color.
- E. Interior Materials in Offices: Sheet type materials for walls and ceilings, prefinished or painted; resilient floors and bases.
- F. Lighting for Offices: 50 fc at desk top height, exterior lighting at entrance doors.
- G. Fire Extinguishers: Appropriate type fire extinguisher at each office.

**2.03 ENVIRONMENTAL CONTROL**

- A. Heating, Cooling, and Ventilating: Automatic equipment to maintain comfort conditions.

**2.04 CONTRACTOR OFFICE AND FACILITIES**

- A. Size: For Contractor's needs and to provide space for project meetings.
- B. Furnishings in Meeting Area: Conference table and chairs to seat at least eight persons; racks and files for Contract Documents, submittals, and project record documents.
- C. Other Furnishings: Contractor's option.
- D. Equipment: Six adjustable band protective helmets for visitors, one 10 inch outdoor weather thermometer .

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Fill and grade sites for temporary structures to provide drainage away from buildings.

**3.02 INSTALLATION**

- A. Install office spaces ready for occupancy 15 days after date fixed in Notice to Proceed.
- B. Parking: Two hard surfaced parking spaces for use by Owner and Architect, connected to office by hard surfaced walk.

**3.03 MAINTENANCE AND CLEANING**

- A. Weekly janitorial services for offices; periodic cleaning and maintenance for offices.
- B. Maintain approach walks free of mud, water, and snow.

**3.04 REMOVAL**

- A. At completion of Work remove buildings, foundations, utility services, and debris. Restore areas.

**END OF SECTION**

**SECTION 01 55 00**  
**VEHICULAR ACCESS AND PARKING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Access roads.
- B. Parking.
- C. Existing pavements and parking areas.
- D. Permanent pavements and parking facilities.
- E. Construction parking controls.
- F. Flag persons.
- G. Haul routes.
- H. Traffic signs and signals.
- I. Maintenance.
- J. Removal, repair.
- K. Mud from site vehicles.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Temporary Construction: Contractor's option.

**2.02 SIGNS, SIGNALS, AND DEVICES**

- A. Stock Post Mounted and Wall Mounted Traffic Control and Informational Signs:
- B. Traffic Cones and Drums, Flares and Lights: As approved by local jurisdictions.
- C. Flag Person Equipment: As required by local jurisdictions.

**PART 3 EXECUTION**

**3.01 PREPARATION**

- A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

**3.02 ACCESS ROADS**

- A. Use of existing on-site streets and driveways for construction traffic is permitted.
- B. Tracked vehicles not allowed on paved areas.
- C. Construct new temporary all-weather access roads from public thoroughfares to serve construction area, of a width and load bearing capacity to provide unimpeded traffic for construction purposes.
- D. Provide unimpeded access for emergency vehicles. Maintain 20 foot width driveways with turning space between and around combustible materials.
- E. Provide and maintain access to fire hydrants free of obstructions.

**3.03 PARKING**

- A. Use of designated areas of existing parking facilities by construction personnel is permitted.
- B. Arrange for temporary parking areas to accommodate use of construction personnel.
- C. When site space is not adequate, provide additional off-site parking.

**3.04 PERMANENT PAVEMENTS AND PARKING FACILITIES**

- A. Prior to Substantial Completion the base for permanent roads and parking areas may be used for construction traffic.
- B. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.



**3.05 CONSTRUCTION PARKING CONTROL**

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner's operations.
- B. Monitor parking of construction personnel's vehicles in existing facilities. Maintain vehicular access to and through parking areas.
- C. Prevent parking on or adjacent to access roads or in non-designated areas.

**3.06 FLAG PERSONS**

- A. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

**3.07 HAUL ROUTES**

- A. Confine construction traffic to designated haul routes.
- B. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

**3.08 TRAFFIC SIGNS AND SIGNALS**

- A. At approaches to site and on site, install at crossroads, detours, parking areas, and elsewhere as needed to direct construction and affected public traffic.

**3.09 MAINTENANCE**

- A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.
- B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

**3.10 REMOVAL, REPAIR**

- A. Remove temporary roads when permanent paving is usable.
- B. Remove underground work and compacted materials to a depth of 2 feet; fill and grade site as specified.
- C. Remove equipment and devices when no longer required.
- D. Repair damage caused by installation.
- E. Remove post settings to a depth of 2 feet.

**3.11 MUD FROM SITE VEHICLES**

- A. Provide means of removing mud from vehicle wheels before entering streets.

**END OF SECTION**

**SECTION 01 56 00**

**CLEANING UP**

**PART 1 - GENERAL**

**1.01 REMOVAL OF DEBRIS:**

- A. All debris and waste materials shall become the property of the Contractor and the Contractor shall be responsible for removal of the debris from the project site on a daily basis.
- B. Demolition debris shall be removed in covered trucks or other method that prevents debris, litter, dust, etc. from falling onto streets, sidewalks or soil. Streets, sidewalks and other public and private spaces shall be kept clean and free from demolition debris at all times.
- C. The Contractor shall be responsible for the cleanup of streets, driveways, sidewalks, and landscaping. Failure to clean promptly (within one day's notice) will result in the Owner having areas cleaned and deducting costs for same from the Contractor's contract.
- D. No storage of debris or trash will be allowed on the exterior of the building unless in an approved container.
- E. The Contractor shall be responsible for cleanup of existing windows, roofs, etc.
- F. All debris shall be documented (dump tickets acceptable). During project close-out, a debris report will be required. Debris Report must include weight of debris.

**1.02 DUST AND DEBRIS:**

- A. The Contractor shall not allow debris and dust to accumulate for more than one day before removing such from adjacent public streets and driveways as a result of the work of this project. At no time shall any accumulation be allowed which will create a hazard to safety or which will create bad public relations. No construction debris is allowed to run into existing storm water drains.
- B. The measures to be used to prevent littering the pavement shall include (but does not constitute the only measure to be used, if necessary) the following:
  - 1. Maintain dust control.
  - 2. Wash and/or sweep paved areas.
  - 3. Pick up droppings as they occur.
  - 4. Clean existing windows, roofs and landscaped areas.
- C. Preventative measures shall be taken to prevent debris from falling onto vehicles from work performed at upper elevations of the deck.
- D. In facilities under use during the project, Contractor shall take necessary measures to limit dust intrusion into areas of the facility in use. Owner shall have sole discretion for judging if dust in areas under use by occupants is too severe.

CC-085-22

Mobile Civic Center – Parking Facility

1.03 **CLEANING UP:** Before final inspection and acceptance of the project, clean work under the contract, including adjacent pavements and parking deck concrete surfaces.

**PART 2 – PRODUCTS** (Not Used)

**PART 3 – EXECUTION** (Not Used)

END OF SECTION

**SECTION 01 56 39**

**LANDSCAPE PROTECTION**

**PART 1 • GENERAL**

1.01 SECTION INCLUDES:

- A. Protection of existing trees, shrubs, and landscaping is summarized herein. The policies regarding removal of landscaping are also included.

1.02 TREE AND SHRUB REMOVAL AND TRIMMING:

- A. The removal of any tree on City property must be approved by the Owner.
- B. Unless otherwise specified on Construction Documents, submit a plan for removal and trimming of trees and shrubs to Owner for approval.

1.03 SUBMITTALS:

The following shall be submitted:

- A. See Section 013000 • Submittal Procedures, for submittal procedures.
- B. Proposed Protection Measures: Submit plan showing fencing, gate, signage and landscape protection fencing at all locations.

**PART 2 • PRODUCTS - Not Used**

**PART 3 • EXECUTION**

Contractor shall repair or replace any Greenery or grounds to be equal to or better than the pre-project condition. It is the contractor's responsibility to document any questionable areas prior to mobilizing for the work.

3.01 SCOPE FOR TREE PROTECTION

Tree protection shall be installed on all trees prior to initiating other construction activity and shall remain in place until completion of construction activity. City of Mobile may request the tree protection to remain in place after the project is complete and this shall be executed at no additional cost to owner.

- A. Permanent tree protection shall entail installing permanent fencing and accessories as stated below.
- B. When work around trees does not exceed 14 working days, temporary tree protection or permanent tree protection shall be used.

3.02 PERMANENT TREE PROTECTION

Variations to these requirements will only be allowed with prior written permission.

1. Topsoil used in all landscape work shall be equivalent to Barna sandy loam, and processing characteristics of representative soils in the project vicinity that produce heavy growths of crops, grass, or other vegetation. Topsoil shall have permeability .6-6 inches per hour, low shrink-swell potential, pH 5.0-7.0, minimum 2% organic matter. Topsoil shall not be handled in a frozen or muddy condition. Soil shall be free subsoil, brush, organic litter, or objectionable weeds, clay, clots, stumps, stones, roots and debris 1" or larger, or any other material harmful to plant growth or hindrance to planting or maintenance operations. Soils to be free of noxious weed seed or vegetation propagules. Should regenerative materials be present in the soil, Contractor shall eradicate and remove such growth, both surface and root, which may appear in the imported materials within 1 year following acceptance of work.
2. Topsoil shall be tested for physical properties, organic content, pH and nutrient content by a recognized soils lab selected by the Manager of Landscape and Grounds Maintenance. The soils lab shall provide instructions on the proper method of taking soil samples. Contact the Owner before taking soils samples so that the process may be observed for accuracy of sampling technique. The mechanical analysis of the soil shall be as follows:

**Sieve Size Percent Passing**

- i. 1" Mesh 99 - 100 percent
- ii. ¼" Mesh 97 - 99 percent
- iii. No. 100 Mesh 40- 60 percent
- iv. No. 200 Mesh 20 - 40 percent

Soil Test shall be submitted to and approved by City landscape Architect prior to any topsoil being transported or placed in The City of Mobile.

- A. Contractors work shall limit construction traffic on grasses and landscaping
- B. Unless otherwise permitted, temporary protection of grasses, grade and landscaping from wheeled vehicles shall be executed with plywood laid on grade. All grasses, grades and other landscaping to be replaced during the project shall be labeled on the site plan and is not required to be protected.
- C. Temporary shrub protection shall be provided by fencing installed to prevent damage from traffic and, if required by owner, draping protective fabric over shrubs.
- D. Any landscape plants damaged by the contractor shall be replaced by the contractor **if the City Landscape Architect deems that replacement is necessary**. Unless agreed to by the Landscape Architect, the damaged plants shall be replaced with identical types, including size. The size of the replacement plant shall be comparable to the original plant. If, in the opinion of the landscape architect, the replacement plants are insufficient, the replacement plants may be rejected. Shrubs adjacent to buildings shall not exceed the height of the window sills. The method of replacement shall be consistent with applicable divisions from the project manual and all guidelines published by the American Society of Landscape Architects.
- E. Grasses
  1. Where lawns are to be established in areas that have not been altered or distributed by excavation, grading, or stripping operations, prepare soil as follows:
    - i. Till to a depth of not less than 6 inches to a homogeneous mixture of fine texture, free of lumps, clods, or stones in excess of one inch in greatest dimension.
    - ii. Remove foreign materials (non-soil) in excess of 1 inch.

- A. Install a 4 foot tall minimum chain link fence with a top rail around the root protection zone. Root protection zone to include a radius equal to 1.5' from face of trunk for every 1" of trunk diameter as measured from 4.5' above grade. Thus, a tree with a 10" trunk will have a 15' radius root protection zone as measured from the face of the tree. Fence posts shall be 2" diameter driven 2' into ground. Fence shall have a 3' maintenance gate with padlock keyed per Owner requirements. Fence shall have an 8.5" x 11" polymer sign which reads, "Root Protection Zone, Do Not Disturb."
- B. Install 4" of pine bark mulch over the enclosed root protection zone.
- C. No storage of material or dumping of waste is allowed in the root protection zone.
- D. No elements shall be anchored or tied to trees in root protection zones.
- E. Any root or branches extending beyond the root protection zone that require pruning shall be pruned by persons approved by the Owner's Landscape Architect.
- F. Unscheduled inspections shall be conducted by Owner's Landscape Architect. Any deficiencies shall be corrected immediately.
- G. Contractor shall contact Owner immediately if any root protected zone is compromised.
- H. Final tree inspection by the Owner's project manager, the Owner's Landscape Architect and the Contractor is required prior to issuance of the Certificate of Substantial Completion.
- I. Damages to protected trees will result in fines levied up to 100% of the value listed below. Owner's Landscape Architect will make all assessments of damage.
  - a. 1" - 3" caliper: \$200/inch
  - b. 3" -6" DBH: \$300/inch
  - c. 6" -9" DBH: \$400/inch
  - d. 9" -12" DBH: \$500/inch
  - e. 12" -15" DBH: \$600/inch
  - f. 15" OBH or more: \$700/inch

### 3.03 TEMPORARY TREE PROTECTION

When work around trees does not exceed 14 working days, permanent tree protection is not required. Unless otherwise noted on drawings, follow the follow minimum procedures.

- A. Install temporary polymer fencing around all trees. Movable wooden poles are acceptable. Fencing shall be installed at the drip line.
- B. Fencing may be moved closer to the trunk for temporary access of personnel and equipment. Fencing shall not remain closer to the trunk than the drip line overnight.
- C. Do not store materials, park equipment or damage ground surface inside of tree protection fencing.
- D. Mats shall be used below all vehicular traffic inside the root protection zone. The root protection zone is a radius equal to 1.5' from face of trunk for every 1" of trunk diameter as measured from 4.5' above grade.
- E. No part of the tree may be damaged by the work. Incidental contact of equipment to tree branches is permitted. Do not break or damage any portion of the tree for the work without prior written permission from Owner. Only the Owner shall be permitted to prune any tree. Provide owner one week lead time for pruning any greenery.

### 3.04 PROTECTION OF SHRUBS, GRASSES AND GROUND

- A. Replacement soils.

- iii. Eliminate uneven areas and low spots. Make changes in grade gradual and provide positive drainage.
  2. Prepare sub-grade for lawn in other areas as follows:
    - i. Scarify soil to a depth of not less than 4 inches.
    - ii. Remove foreign materials
    - iii. Spread 4 inches minimum topsoil at seeded areas
    - iv. Place topsoil during dry weather
    - v. Remove foreign materials while spreading
    - vi. Near plants and buildings, spread topsoil manually to prevent damage.
    - vii. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of sub-grade.
    - viii. Roll placed topsoil
    - ix. Apply fertilizer at rate required by topsoil analysis. Apply lime at rate required to achieve pH range between 6.0 and 6.5. Mix thoroughly into upper 2 inches of topsoil.
  3. Unless directed otherwise in writing, sod with Empire Zoysia sod.
    - i. Secure with wood pegs on slopes greater than 4 inch per foot.
    - ii. After completion of sodding, turf grass sod shall have a smooth surface free of depressions or bumps.
    - iii. **Sod must be installed within ten (10) days after the removal of scaffolding and equipment.**

F. Ground

1. No rutting is permitted to remain after the completion of the project. Contractor shall regrade and hand rake all ground. This shall be executed prior to replacing greenery, or if no greenery is replaced. See "Replacement of Soils" above for approved fill material.
2. Grounds shall be graded to drain.

**END OF SECTION**

**SECTION 01 57 13**  
**TEMPORARY EROSION AND SEDIMENT CONTROL**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Prevention of erosion due to construction activities.
- B. Prevention of sedimentation of waterways, open drainage ways, and storm and sanitary sewers due to construction activities.
- C. Restoration of areas eroded due to insufficient preventive measures.
- D. Performance bond.
- E. Compensation of Owner for fines levied by authorities having jurisdiction due to non-compliance by Contractor.

**1.02 REFERENCE STANDARDS**

- A. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc-Type Apparatus; 2014 (Reapproved 2018).
- B. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 2020.
- C. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2015.
- D. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a.
- E. ASTM D4751 - Standard Test Methods for Determining Apparent Opening Size of a Geotextile; 2020.
- F. ASTM D4873/D4873M - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2017.
- G. FHWA FLP-94-005 - Best Management Practices for Erosion and Sediment Control; 1995.

**1.03 PERFORMANCE REQUIREMENTS**

- A. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.
- B. Do not begin clearing, grading, or other work involving disturbance of ground surface cover until applicable permits have been obtained; furnish all documentation required to obtain applicable permits.
  - 1. Owner will obtain permits and pay for securities required by authority having jurisdiction.
- C. Provide to Owner a Performance Bond covering erosion and sedimentation preventive measures only, in an amount equal to 100 percent of the cost of erosion and sedimentation control work.
- D. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.
- E. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
  - 1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
  - 2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 25 years.
- F. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
  - 1. Control movement of sediment and soil from temporary stockpiles of soil.
  - 2. Prevent development of ruts due to equipment and vehicular traffic.



3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- G. Erosion Off Site: Prevent erosion of soil and deposition of sediment on other properties caused by water leaving the project site due to construction activities for this project.
  1. Prevent windblown soil from leaving the project site.
  2. Prevent tracking of mud onto public roads outside site.
  3. Prevent mud and sediment from flowing onto sidewalks and pavements.
  4. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.
- H. Sedimentation of Waterways On Site: Prevent sedimentation of waterways on the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
  1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
  2. If sediment basins are used as temporary preventive measures, pump dry and remove deposited sediment after each storm.
- I. Sedimentation of Waterways Off Site: Prevent sedimentation of waterways off the project site, including rivers, streams, lakes, ponds, open drainage ways, storm sewers, and sanitary sewers.
  1. If sedimentation occurs, install or correct preventive measures immediately at no cost to Owner; remove deposited sediments; comply with requirements of authorities having jurisdiction.
- J. Open Water: Prevent standing water that could become stagnant.
- K. Maintenance: Maintain temporary preventive measures until permanent measures have been established.

#### 1.04 SUBMITTALS

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Erosion and Sedimentation Control Plan:
  1. Include:
    - a. Site plan identifying soils and vegetation, existing erosion problems, and areas vulnerable to erosion due to topography, soils, vegetation, or drainage.
    - b. Site plan showing grading; new improvements; temporary roads, traffic accesses, and other temporary construction; and proposed preventive measures.
    - c. Where extensive areas of soil will be disturbed, include storm water flow and volume calculations, soil loss predictions, and proposed preventive measures.
    - d. Schedule of temporary preventive measures, in relation to ground disturbing activities.
    - e. Other information required by law.
    - f. Format required by law is acceptable, provided any additional information specified is also included.
  2. Obtain the approval of the Plan by authorities having jurisdiction.
  3. Obtain the approval of the Plan by Owner.
- C. Certificate: Mill certificate for silt fence fabric attesting that fabric and factory seams comply with specified requirements, signed by legally authorized official of manufacturer; indicate actual minimum average roll values; identify fabric by roll identification numbers.
- D. Inspection Reports: Submit report of each inspection; identify each preventive measure, indicate condition, and specify maintenance or repair required and accomplished.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use species known to be excessively competitive or prone to volunteer in subsequent seasons.
- B. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
  - 1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
  - 2. Permittivity:  $0.05 \text{ sec}^{-1}$ , minimum, when tested in accordance with ASTM D4491/D4491M.
  - 3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
  - 4. Tensile Strength: 100 pounds-force, minimum, in cross-machine direction; 124 pounds-force, minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
  - 5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
  - 6. Tear Strength: 55 pounds-force, minimum, when tested in accordance with ASTM D4533/D4533M.
  - 7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.
- C. Silt Fence Posts: One of the following, minimum 5 feet long:
  - 1. Steel U- or T-section, with minimum mass of 1.33 pound per linear foot.
  - 2. Hardwood, 2 by 2 inches in cross section.
- D. Gravel: See Section 32 11 23 for aggregate.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine site and identify existing features that contribute to erosion resistance; maintain such existing features to greatest extent possible.

### **3.02 PREPARATION**

- A. Schedule work so that soil surfaces are left exposed for the minimum amount of time.

### **3.03 SCOPE OF PREVENTIVE MEASURES**

- A. In all cases, if permanent erosion resistant measures have been installed temporary preventive measures are not required.
- B. Construction Entrances: Traffic-bearing aggregate surface.
  - 1. Width: As required; 20 feet, minimum.
  - 2. Length: 50 feet, minimum.
  - 3. Provide at each construction entrance from public right-of-way.
  - 4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.
- C. Linear Sediment Barriers: Made of silt fences.
  - 1. Provide linear sediment barriers:
    - a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
  - 2. Space sediment barriers with the following maximum slope length upslope from barrier:
    - a. Slope of Less Than 2 Percent: 100 feet..
    - b. Slope Between 2 and 5 Percent: 75 feet.
    - c. Slope Between 5 and 10 Percent: 50 feet.
    - d. Slope Between 10 and 20 Percent: 25 feet.
    - e. Slope Over 20 Percent: 15 feet.

- D. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:
  - 1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.
  - 2. Straw bale row blocking entire inlet face area; anchor into pavement.
- E. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.
- F. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.
- G. Soil Stockpiles: Protect using one of the following measures:
  - 1. Cover with polyethylene film, secured by placing soil on outer edges.
  - 2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.
- H. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
- I. Temporary Seeding: Use where temporary vegetated cover is required.

### 3.04 INSTALLATION

- A. Traffic-Bearing Aggregate Surface:
  - 1. Excavate minimum of 6 inches.
  - 2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.
  - 3. Place and compact at least 6 inches of 1 1/2 to 3 1/2 inch diameter stone.
- B. Silt Fences:
  - 1. Store and handle fabric in accordance with ASTM D4873/D4873M.
  - 2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.
  - 3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.
  - 4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
  - 5. Install with top of fabric at nominal height and embedment as specified.
  - 6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
  - 7. Fasten fabric to wood posts using one of the following:
    - a. Four nails per post with 3/4 inch diameter flat or button head, 1 inch long, and 14 gauge, 0.083 inch shank diameter.
    - b. Five staples per post with at least 17 gauge, 0.0453 inch wire, 3/4 inch crown width and 1/2 inch long legs.
  - 8. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.
  - 9. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.
- C. Temporary Seeding:
  - 1. When hydraulic seeder is used, seedbed preparation is not required.
  - 2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
  - 3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.
  - 4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.

5. Incorporate fertilizer into soil before seeding.
6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.
7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
8. Repeat irrigation as required until grass is established.

### **3.05 MAINTENANCE**

- A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.
- B. Repair deficiencies immediately.
- C. Silt Fences:
  1. Promptly replace fabric that deteriorates unless need for fence has passed.
  2. Remove silt deposits that exceed one-third of the height of the fence.
  3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.
- D. Clean out temporary sediment control structures weekly and relocate soil on site.
- E. Place sediment in appropriate locations on site; do not remove from site.

### **3.06 CLEAN UP**

- A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by Architect.
- B. Clean out temporary sediment control structures that are to remain as permanent measures.
- C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

**END OF SECTION**

**SECTION 01 58 13**  
**TEMPORARY PROJECT SIGNAGE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project identification sign.

**1.02 REFERENCE STANDARDS**

- A. FHWA (SHS) - Standard Highway Signs and Markings; 2004, with Supplement (2012).

**1.03 QUALITY ASSURANCE**

- A. Design sign and structure to withstand 50 miles/hr wind velocity.
- B. Sign Painter: Experienced as a professional sign painter for minimum three years.
- C. Finishes, Painting: Adequate to withstand weathering, fading, and chipping for duration of construction.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawing: Show content, layout, lettering, color, foundation, structure, sizes and grades of members.

**PART 2 PRODUCTS**

**2.01 SIGN MATERIALS**

- A. Structure and Framing: New, wood, structurally adequate.
- B. Sign Surfaces: Exterior grade plywood with medium density overlay, minimum 3/4 inch thick, standard large sizes to minimize joints.
- C. Rough Hardware: Galvanized.
- D. Lettering: Exterior quality paint, contrasting colors.

**2.02 PROJECT IDENTIFICATION SIGN**

- A. One painted sign of construction, design, and content indicated on drawings, location designated.
- B. Content:
  - 1. Project number, title, logo and name of Owner as indicated on Contract Documents.
  - 2. Names and titles of authorities.
  - 3. Names and titles of Architect and Consultants.
  - 4. Name of Prime Contractor.
- C. Graphic Design, Colors, Style of Lettering: Designated by Architect.
- D. Lettering: Standard Alphabet Series C, as specified in FHWA (SHS).

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install project identification sign within 30 days after date fixed by Notice to Proceed.
- B. Erect at designated location.
- C. Erect supports and framing on secure foundation, rigidly braced and framed to resist wind loadings.
- D. Install sign surface plumb and level, with butt joints. Anchor securely.
- E. Paint exposed surfaces of sign, supports, and framing.

**3.02 MAINTENANCE**

- A. Maintain signs and supports clean, repair deterioration and damage.

**3.03 REMOVAL**

- A. Remove signs, framing, supports, and foundations at completion of Project and restore the area.

**END OF SECTION**

## SECTION 01 60 00

### MATERIALS AND EQUIPMENT

#### PART 1 - GENERAL

##### 1.01 General:

- A. Material shall be new and without any indication of damage or overage. If usually packaged bring to job in original unbroken labeled containers. Materials not specified but required, shall be of a grade equal or superior to related parts of work.
- B. Products include materials, equipment and systems.
- C. Comply with Contract Documents and referenced standards as minimum requirements.
- D. Do not use or remove from site any materials and equipment removed from the existing structure, except as specifically required or allowed by Contract Documents.
- E. All construction procedures and materials used in the work for this project shall comply with the following:
  - 1. Contract Documents
  - 2. Applicable Manufacturer's Specifications
  - 3. Accepted standards/practices
  - 4. Applicable building codes, both national and local
- F. Color Selections: The Designer'/Owner's color schedule will be prepared for color only; it will not justify deviations from Contract requirements (such as changing of finish material, type of paint, etc.) which must be made by Change Order. Where color numbers and names conflict, secure instructions before proceeding.
- G. Foreign Materials: In accordance with State Law, provide only materials manufactured, mined or processed in the United States or its territories, provided same are available at reasonable prices.

##### 1.02 WORKMANSHIP:

- A. Work shall be performed by persons qualified to produce workmanship and quality specified.
- B. The Construction Manager's designated Superintendent shall provide full-time on-site supervision.

- B. Product Selection: Provide products according to the following.
1. Products specified only by referenced standards: Any product meeting that standard.
  2. Products specified by naming several manufacturers: Products of any named manufacturer meeting Specifications unless specific approval of other brand is obtained in writing. Comparison of substitute brands will be with the first name of those listed.
    - a. By requesting approval of or by making a substitution, the Contractor shall certify that the product substituted is in all respects equal to, and will function equally well in the project, as the product specified. The Architect/Engineer, at his discretion may require the certification in writing.
  3. Whenever any material or piece of equipment is identified on the plans or in the Specifications by reference to a single manufacturer's name, model numbers, etc., without the phrase "or approved equal", this material or equipment shall be supplied as specified without consideration to any other manufacturer. Any deviation from this requirement must be approved in writing by the Designer prior to the receipt of bids.
  4. When the Specifications and/or Drawings indicate two or more manufacturer's names or brands for materials or equipment to be used, it shall be assumed that the phrase "or approved equal" is inserted following the naming of manufacturers, whether such phrase occurs in the Specifications or not. However, if the Contractor desires to use a substitute, it must secure written approval by the Designer. If a request to substitute an "approved equal" is made by the Contractor, and not approved by the Designer, then it will be expressly understood that all such material and equipment so named or described by any one of the manufacturers listed in the Specifications and/or Drawings will be furnished in full accordance with the Contract Documents.
  5. Brand Names: Mentioned herein to establish a standard of design and quality. Except when indicated in subsequent sections in regard to each particular item. Qualified pre-bid approval may be given to various vendors at their request on products for which pre-bid approval is not required; such approvals will be communicated only to the vendor.

Where three or more manufacturers are listed, the product must be furnished by one of the manufacturers so listed unless specific approval of other brand is obtained in writing. Comparison of substitute brands will be with the first name of those listed.

## 1.07 SUBSTITUTIONS:



1.03 MANUFACTURER'S INSTRUCTIONS:

- A. Work shall be performed in accordance with the Material Manufacturer's specifications as modified by the Contract Documents.
- B. Conflicts between the Contract Documents and the Material Manufacturer's specifications shall be brought to the attention of the Project Manager prior to beginning construction. Work in this area shall not proceed until conflicts are satisfactorily resolved by Project Manager.
- C. Provide Material Safety Data Sheets (MSDS) for all materials brought on the site.

1.04 TRANSPORTATION AND HANDLING:

- A. Transport products by methods to avoid product damage; deliver all materials with Manufacturer's labels intact and legible.
- B. Provide equipment and personnel to handle products by methods to prevent damage.

1.05 STORAGE AND PROTECTION:

- A. The following are considered minimum requirements. Additional storage and protection requirements are specified in individual sections of the specifications.
- B. Store all materials so as to maintain clean, dry, weather tight conditions and to protect against loss, damage, and wetting. Materials indicating moisture contents above the specified level shall be marked, rejected for installation, and removed from the site.
- C. Materials temporarily stored on the scaffold or floor shall be located in approved areas and shall be distributed in such a manner as to stay within the allowable load limits.
- D. Materials subject to moisture intrusion and damage shall be stored on clean, dry, and raised platforms so as to prevent wetting or moisture absorption and yet provide sufficient ventilation to prevent condensation. These materials shall be covered so as to be completely weather tight. Factory-applied wrapping shall be unacceptable as the sole means of protection.
- E. Any materials which when subject to moisture intrusion may have a detrimental effect on the installation or performance of other components of the roofing system, shall be stored as indicated in Items 1.05, B. and D.

1.06 PRODUCT OPTIONS:

- A. The Contractor shall submit list of materials proposed in accordance with Section 01 33 00

Prior to commencing work, the Project Manager will consider requests from the Contractor for substitutions. Substitutions will then be considered according to the procedures as presented in Section 01 63 00 of this Project Manual.

**1.08 INSTALLATION**

Install, apply, connect, clean and operate all materials and equipment per manufacturer's directions and recommendations. In the event of conflict between specifications and manufacturer's directions, obtain instructions from Engineer.

**1.09 REFERENCE TO APPLICABLE STANDARDS:**

- A. Whenever reference is made to codes, standard specifications, or other data published by regulating agencies or accepted organizations, it shall be understood that such reference is made to the latest edition (including addenda) published prior to the date of the Contract Documents, except as noted specifically otherwise by date in the Contract Documents. By reference, this data becomes a legal part of this specification and shall provide the standard for the work unless otherwise noted in this project manual.

**PART 2 – PRODUCTS (Not Used)**

**PART 3 – EXECUTION (Not Used)**

END OF SECTION

## SECTION 01 63 00

### SUBSTITUTION 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. Section includes administrative and procedural requirements for substitutions.
- B. Related Sections:
  - 1. Divisions 2 through 16 Sections for specific requirements and limitations for substitutions and pre-bid approvals.

##### 1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
  - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
  - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

##### 1.4 SUBMITTALS

- A. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced.
  - 1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
    - a. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
    - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.

- c. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
  - d. 6"x12" Samples of each finish material in proposed pattern and color.
  - e. Certificates and qualification data.
  - f. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
  - g. Cost information, including a proposal of change, if any, in the Contract Sum (not applicable for pre-bid Submittals).
  - h. Impact of substitution on construction schedule.
  - i. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
  - j. 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.
2. Project Manager's Action: If necessary, Project Manager will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Project Manager will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Project Manager Supplemental Instructions for minor changes in the Work.
  - b. Use product specified if Project Manager does not issue a decision on use of a proposed substitution within time allocated.

#### 1.5 QUALITY ASSURANCE

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

#### 1.6 PROCEDURES

- A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

### **PART 2 - PRODUCTS (Not Used)**

### **PART 3 - EXECUTION (Not Used)**

END OF SECTION

**SECTION 01 60 00**  
**PRODUCT REQUIREMENTS**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. General product requirements.
- B. Transportation, handling, storage and protection.
- C. Product option requirements.
- D. Substitution limitations.
- E. Maintenance materials, including extra materials, spare parts, tools, and software.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 25 00 - Substitution Procedures: Substitutions made during procurement and/or construction phases.

**1.03 REFERENCE STANDARDS**

- A. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.04 SUBMITTALS**

- A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.
- B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.
- C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
  - 1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

**PART 2 PRODUCTS****2.01 NEW PRODUCTS**

- A. Provide new products unless specifically required or permitted by Contract Documents.
- B. Use of products having any of the following characteristics is not permitted:
  - 1. Made using or containing CFC's or HCFC's.
  - 2. Made of wood from newly cut old growth timber.
  - 3. Containing lead, cadmium, or asbestos.
- C. Where other criteria are met, Contractor shall give preference to products that:
  - 1. If used on interior, have lower emissions, as defined in Section 01 61 16.
  - 2. If wet-applied, have lower VOC content, as defined in Section 01 61 16.

**2.02 PRODUCT OPTIONS**

- A. Products Specified by Reference Standards or by Description Only: Use any product meeting those standards or description.
- B. Products Specified by Naming One or More Manufacturers: Use a product of one of the manufacturers named and meeting specifications, no options or substitutions allowed.
- C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

**2.03 MAINTENANCE MATERIALS**

- A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

- B. Deliver to Project site; obtain receipt prior to final payment.

### **PART 3 EXECUTION**

#### **3.01 SUBSTITUTION LIMITATIONS**

- A. See Section 01 25 00 - Substitution Procedures.

#### **3.02 TRANSPORTATION AND HANDLING**

- A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.
- B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.
- C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.
- D. Transport and handle products in accordance with manufacturer's instructions.
- E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.
- F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.
- G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.
- H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

#### **3.03 STORAGE AND PROTECTION**

- A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication. See Section 01 74 19.
- B. Store and protect products in accordance with manufacturers' instructions.
- C. Store with seals and labels intact and legible.
- D. Store sensitive products in weathertight, climate-controlled enclosures in an environment favorable to product.
- E. For exterior storage of fabricated products, place on sloped supports above ground.
- F. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.
- G. Comply with manufacturer's warranty conditions, if any.
- H. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.
- I. Prevent contact with material that may cause corrosion, discoloration, or staining.
- J. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.
- K. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

**END OF SECTION**

**SECTION 01 70 00**  
**EXECUTION AND CLOSEOUT REQUIREMENTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Examination, preparation, and general installation procedures.
- B. Cutting and patching.
- C. Surveying for laying out the work.
- D. Cleaning and protection.
- E. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.
- F. General requirements for maintenance service.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 30 00 - Administrative Requirements: Submittals procedures.
- B. Section 01 40 00 - Quality Requirements: Testing and inspection procedures.
- C. Section 01 57 13 - Temporary Erosion and Sediment Control: Additional erosion and sedimentation control requirements.
- D. Section 01 78 00 - Closeout Submittals: Project record documents, operation and maintenance data, warranties, and bonds.

**1.03 REFERENCE STANDARDS**

- A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2019.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Survey work: Submit name, address, and telephone number of Surveyor before starting survey work.
  - 1. On request, submit documentation verifying accuracy of survey work.
  - 2. Submit a copy of site drawing signed by the Land Surveyor, that the elevations and locations of the work are in compliance with Contract Documents.
  - 3. Submit surveys and survey logs for the project record.
- C. Cutting and Patching: Submit written request in advance of cutting or alteration that affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather exposed or moisture resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
  - 4. Visual qualities of sight exposed elements.
  - 5. Work of Owner or separate Contractor.
- D. Project Record Documents: Accurately record actual locations of capped and active utilities.

**1.05 QUALIFICATIONS**

- A. For surveying work, employ a land surveyor registered in the State in which the Project is located and acceptable to Architect. Submit evidence of surveyor's Errors and Omissions insurance coverage in the form of an Insurance Certificate. Employ only individual(s) trained and experienced in collecting and recording accurate data relevant to ongoing construction activities,
- B. For field engineering, employ a professional engineer of the discipline required for specific service on Project, licensed in the State in which the Project is located. Employ only individual(s) trained and experienced in establishing and maintaining horizontal and vertical control points necessary for laying out construction work on project of similar size, scope and/or complexity.

- C. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

#### **1.06 PROJECT CONDITIONS**

- A. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.
- B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.
- C. Erosion and Sediment Control: Plan and execute work by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

#### **1.07 COORDINATION**

- A. Coordinate scheduling, submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
- B. Notify affected utility companies and comply with their requirements.
- C. Verify that utility requirements and characteristics of new operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- D. Coordinate space requirements, supports, and installation of mechanical and electrical work that are indicated diagrammatically on drawings. Follow routing indicated for pipes, ducts, and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance, and for repairs.
- E. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
- F. Coordinate completion and clean-up of work of separate sections.
- G. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.

### **PART 2 PRODUCTS**

#### **2.01 PATCHING MATERIALS**

- A. New Materials: As specified in product sections; match existing products and work for patching and extending work.
- B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.
- C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 60 00 - Product Requirements.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
- C. Examine and verify specific conditions described in individual specification sections.
- D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.
- E. Verify that utility services are available, of the correct characteristics, and in the correct locations.



- F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

### **3.02 PREPARATION**

- A. Clean substrate surfaces prior to applying next material or substance.
- B. Seal cracks or openings of substrate prior to applying next material or substance.
- C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

### **3.03 LAYING OUT THE WORK**

- A. Verify locations of survey control points prior to starting work.
- B. Promptly notify Architect of any discrepancies discovered.
- C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.
- D. Promptly report to Architect the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.
- E. Replace dislocated survey control points based on original survey control. Make no changes without prior written notice to Architect.
- F. Utilize recognized engineering survey practices.
- G. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:
  - 1. Site improvements including pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations.
  - 2. Grid or axis for structures.
  - 3. Building foundation, column locations, ground floor elevations.
- H. Periodically verify layouts by same means.
- I. Maintain a complete and accurate log of control and survey work as it progresses.

### **3.04 GENERAL INSTALLATION REQUIREMENTS**

- A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.
- B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.
- C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.
- D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.
- E. Make neat transitions between different surfaces, maintaining texture and appearance.

### **3.05 CUTTING AND PATCHING**

- A. Whenever possible, execute the work by methods that avoid cutting or patching.
- B. Perform whatever cutting and patching is necessary to:
  - 1. Complete the work.
  - 2. Fit products together to integrate with other work.
  - 3. Provide openings for penetration of mechanical, electrical, and other services.
  - 4. Match work that has been cut to adjacent work.
  - 5. Repair areas adjacent to cuts to required condition.
  - 6. Repair new work damaged by subsequent work.
  - 7. Remove samples of installed work for testing when requested.
  - 8. Remove and replace defective and non-complying work.

- C. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.
- D. Employ original installer to perform cutting for weather exposed and moisture resistant elements, and sight exposed surfaces.
- E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.
- F. Restore work with new products in accordance with requirements of Contract Documents.
- G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 00, to full thickness of the penetrated element.
- I. Patching:
  - 1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
  - 2. Match color, texture, and appearance.
  - 3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

### **3.06 PROGRESS CLEANING**

- A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.
- B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
- C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
- D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

### **3.07 PROTECTION OF INSTALLED WORK**

- A. Protect installed work from damage by construction operations.
- B. Provide special protection where specified in individual specification sections.
- C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.
- D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.
- E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.
- F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.
- G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

### **3.08 ADJUSTING**

- A. Adjust operating products and equipment to ensure smooth and unhindered operation.

### **3.09 FINAL CLEANING**

- A. Execute final cleaning prior to final project assessment.
  - 1. Clean areas to be occupied by Owner prior to final completion before Owner occupancy.
- B. Use cleaning materials that are nonhazardous.

- C. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.
- D. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.
- E. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.
- F. Clean filters of operating equipment.
- G. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, and drainage systems.
- H. Clean site; sweep paved areas, rake clean landscaped surfaces.
- I. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

### **3.10 CLOSEOUT PROCEDURES**

- A. Make submittals that are required by governing or other authorities.
  - 1. Provide copies to Architect and Owner.
- B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.
- C. Notify Architect when work is considered ready for Architect's Substantial Completion inspection.
- D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.
- E. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.
- F. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.
- G. Notify Architect when work is considered finally complete and ready for Architect's Substantial Completion final inspection.
- H. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

### **3.11 MAINTENANCE**

- A. Provide service and maintenance of components indicated in specification sections.
- B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.
- C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.
- D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.
- E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

**END OF SECTION**

## SECTION 01 73 00

### 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. Section includes general administrative and procedural requirements governing execution of the Work including, but not limited to, the following:
  - 1. Environmental concerns.
  - 2. Installation of the Work.
  - 3. Cutting and patching.
  - 4. Progress cleaning.
  - 5. Starting and adjusting.
  - 6. Protection of installed construction.
  - 7. Correction of the Work.
- B. Related Sections:
  - 1. Division 1 Sections “Summary of the Work” and “Project Record Documents” for submitting closeout documents and final cleaning.

##### 1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.

##### 1.4 INFORMATIONAL SUBMITTALS

- A. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
  - 1. Extent: Describe reason for and extent of each occurrence of cutting and patching.
  - 2. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.

3. Products: List products to be used for patching and firms or entities that will perform patching work.
4. Dates: Indicate when cutting and patching will be performed.
5. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate how long services and systems will be disrupted.

## 1.5 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching 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 provide a match acceptable to the Architect for the visual and functional performance of in-place materials.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of underground utilities, mechanical and electrical systems, and other construction affecting the Work.
  1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; underground electrical services, and other utilities.
  2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where

indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
  - a. Description of the Work.
  - b. List of detrimental conditions, including substrates.
  - c. List of unacceptable installation tolerances.
  - d. Recommended corrections.
2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

### 3.2 PREPARATION

- A. 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.
- B. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- C. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of the Contractor, submit a request for information to Architect according to requirements in Division 1 Section "Project Management and Coordination."
- D. Surface and Substrate Preparation: Comply with manufacturer's recommendations for preparation of substrates to receive subsequent work.

### 3.3 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
  1. Make vertical work plumb and make horizontal work level.
  2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
  4. Maintain minimum headroom clearance of 96 inches, but in no case shall the new piping be lower than the existing piping.
- 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. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions.
    1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect / Engineer.
    2. Allow for building movement, including thermal expansion and contraction.
    3. Coordinate installation of anchorages. 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.
  - H. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
  - I. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous, and meet environmental requirements.

### 3.4 CUTTING AND PATCHING

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
  1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

- B. Temporary Support: Provide temporary support of work to be cut.
- C. 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.
- D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements of Division 1 Section "Summary of Work"
- E. 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.
- F. 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.
  - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
  - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
  - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
  - 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
  - 5. Proceed with patching after construction operations requiring cutting are complete.
- G. 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 practicable. Provide materials and comply with installation requirements specified in other Sections, where applicable.
  - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
  - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.
    - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    - b. Restore damaged pipe covering to its original condition.
  - 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and



wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

- a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch. Provide additional coats until patch blends with adjacent surfaces.
  4. Exterior Enclosure: Patch components in a manner that restores enclosure to a weathertight condition.
- H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

### 3.5 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.
1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
  2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above 80 deg F (27 deg C).
  3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
    - a. Utilize containers intended for holding waste materials of type to be stored.
  4. Coordinate progress cleaning for joint-use areas where more than one installer has worked.
- 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.
1. Remove liquid spills promptly.
  2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- 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. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

- F. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials or painting products down sewers or into waterways.
- G. 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.
- H. Clean completed construction as frequently as necessary through the remainder of the construction period.

### 3.6 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in other Division 2 -16 Sections."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in other Division 2-16 Sections.

### 3.7 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.

### 3.8 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
  - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass, lenses or reflective surfaces.

### 3.9 ENVIRONMENTAL CONCERNS

- 1. Provide protection and conduct construction in ways that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

### 3.10 STORMWATER CONTROL AND DISCHARGE

- 1. Comply with City of Mobile and Alabama Department of Environmental Management requirements. Pay particular attention to Water Regulations and Allowable Discharges.
- 2. See City of Mobile Code, Chapter 17, Storm Water Management and Flood Control.
- 3. Obtain any necessary permits that may be required due to discharges.

END OF SECTION 01 73 00

**SECTION 01 78 00**  
**CLOSEOUT SUBMITTALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Project Record Documents.
- B. Operation and Maintenance Data.
- C. Warranties and bonds.

**1.02 RELATED REQUIREMENTS**

- A. Section 00 72 00 - General Conditions and 00 73 00 - Supplementary Conditions: Performance bond and labor and material payment bonds, warranty, and correction of work.
- B. Section 01 30 00 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.
- C. Section 01 70 00 - Execution and Closeout Requirements: Contract closeout procedures.
- D. Individual Product Sections: Specific requirements for operation and maintenance data.
- E. Individual Product Sections: Warranties required for specific products or Work.

**1.03 SUBMITTALS**

- A. Project Record Documents: Submit documents to Architect with claim for final Application for Payment.
- B. Operation and Maintenance Data:
  - 1. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
  - 2. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
  - 3. Submit two sets of revised final documents in final form within 10 days after final inspection.
- C. Warranties and Bonds:
  - 1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
  - 2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
  - 3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 PROJECT RECORD DOCUMENTS**

- A. Maintain on site one set of the following record documents; record actual revisions to the Work:
  - 1. Drawings.
  - 2. Specifications.
  - 3. Addenda.
  - 4. Change Orders and other modifications to the Contract.
- B. Ensure entries are complete and accurate, enabling future reference by Owner.
- C. Store record documents separate from documents used for construction.
- D. Record information concurrent with construction progress.
- E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:

1. Changes made by Addenda and modifications.
- F. Record Drawings: Legibly mark each item to record actual construction including:
1. Measured depths of foundations in relation to finish first floor datum.
  2. Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
  3. Measured locations of internal utilities and appurtenances concealed in construction, referenced to visible and accessible features of the Work.
  4. Field changes of dimension and detail.
  5. Details not on original Contract drawings.

### **3.02 OPERATION AND MAINTENANCE DATA**

- A. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.
- B. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.
- C. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

### **3.03 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

- A. For Each Item of Equipment and Each System:
1. Description of unit or system, and component parts.
  2. Identify function, normal operating characteristics, and limiting conditions.
  3. Include performance curves, with engineering data and tests.
  4. Complete nomenclature and model number of replaceable parts.
- B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.
- C. Panelboard Circuit Directories: Provide electrical service characteristics, controls, and communications; typed.
- D. Include manufacturer's printed operation and maintenance instructions.

### **3.04 WARRANTIES AND BONDS**

- A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.
- B. Verify that documents are in proper form, contain full information, and are notarized.
- C. Co-execute submittals when required.
- D. Retain warranties and bonds until time specified for submittal.
- E. Manual: Bind in commercial quality 8-1/2 by 11 inch three D side ring binders with durable plastic covers.
- F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.
- G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.
- H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

**END OF SECTION**

**SECTION 03-30-00**  
**CAST-IN-PLACE CONCRETE**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section includes cast-in-place concrete, including formwork, reinforcement, concrete materials, mixture design, placement procedures, and finishes, for the following:
  - 1. Grade Beams.
  - 2. Foundation walls.
  - 3. Slabs-on-grade.
  - 4. Suspended slabs.
  - 5. Building frame members.
- B. Related Sections:
  - 1. Section 033816 "Unbonded Post-Tensioned Concrete"
  - 2. Section 312000 "Earth Moving" for drainage fill under slabs-on-grade.

**1.03 DEFINITIONS**

- A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume; subject to compliance with requirements.

**1.04 ACTION 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. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
  - 1. Location of construction joints is subject to approval of the Architect.

**1.05 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer & manufacturer.
- B. Welding certificates.
- C. Material Certificates: For each of the following, signed by manufacturers:
  - 1. Cementitious materials.
  - 2. Admixtures.
  - 3. Form materials and form-release agents.
  - 4. Steel reinforcement and accessories.
  - 5. Fiber reinforcement.
  - 6. Waterstops.
  - 7. Curing compounds.
  - 8. Floor and slab treatments.

9. Bonding agents.
  10. Adhesives.
  11. Vapor retarders.
  12. Semirigid joint filler.
  13. Joint-filler strips.
  14. Repair materials.
- D. 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.
- E. Floor surface flatness and levelness measurements indicating compliance with specified tolerances.
- F. Field quality-control reports.
- G. Minutes of preinstallation conference.

## **1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: A qualified installer who employs on Project personnel qualified as ACI-certified Flatwork Technician and Finisher and a supervisor who is an ACI-certified Concrete Flatwork Technician.
- B. 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.
1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
  2. Personnel performing laboratory tests shall be ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician - Grade I. Testing Agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician - Grade II.
- D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, obtain aggregate from single source, and obtain admixtures from single source from single manufacturer.
- E. ACI Publications: Comply with the following unless modified by requirements in the Contract Documents:
1. ACI 301, "Specifications for Structural Concrete," Sections 1 through 5.
  2. ACI 117, "Specifications for Tolerances for Concrete Construction and Materials."
- F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixtures.
- G. Preinstallation Conference: Conduct conference at Project site.
1. Before submitting design mixtures, review concrete design mixture and examine procedures for ensuring quality of concrete materials. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:
    - a. Contractor's superintendent.
    - b. Independent testing agency responsible for concrete design mixtures.
    - c. Ready-mix concrete manufacturer.
    - d. Concrete subcontractor.
    - e. Special concrete finish subcontractor.
  2. Review special inspection and testing and inspecting agency procedures for field quality control, concrete finishes and finishing, cold- and hot-weather concreting procedures, curing procedures, construction contraction and isolation joints, and joint-filler strips, semirigid joint fillers, forms and form removal limitations,

shoring and reshoring procedures, vapor-retarder installation, anchor rod and anchorage device installation tolerances, steel reinforcement installation, floor and slab flatness and levelness measurement, concrete repair procedures, and concrete protection.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.
- B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

### **PART 2 - PRODUCTS**

#### **2.01 FORM-FACING MATERIALS**

- A. Smooth-Formed Finished Concrete (Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster or painting) : Form-facing panels that will provide continuous, true, and smooth concrete surfaces. Furnish in largest practicable sizes to minimize number of joints.
  - 1. Plywood, metal, or other approved panel materials.
  - 2. 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. Medium-density overlay, Class 1 or better; mill-release agent treated and edge sealed.
    - c. Structural 1, B-B or better; mill oiled and edge sealed.
    - d. B-B (Concrete Form), Class 1 or better; mill oiled and edge sealed.
- B. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- E. Form-Release Agent: Commercially formulated form-release agent that 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-facing materials.
- F. 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 spalling of concrete on removal.
  - 1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
  - 2. Furnish ties that, when removed, will leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
  - 3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

#### **2.02 STEEL REINFORCEMENT**

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Steel Bar Mats: ASTM A 184/A 184M, fabricated from ASTM A 615/A 615M, Grade 60 deformed bars, assembled with clips.
- C. Plain-Steel Wire: ASTM A 82/A 82M, as drawn.
- D. Deformed-Steel Wire: ASTM A 496/A 496M.
- E. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain, fabricated from as-drawn steel wire into flat sheets.
- F. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.

#### **2.03 REINFORCEMENT ACCESSORIES**

- A. Joint Dowel Bars: ASTM A 615/A 615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.



- B. 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 or CRSI Class 2 stainless-steel bar supports.
  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.

#### 2.04 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 or Type I/II, gray. Supplement with the following:]
    - a. Fly Ash: ASTM C 618, Class F or C.
  - B. Silica Fume: ASTM C 1240, amorphous silica.
  - C. Normal-Weight Aggregates: ASTM C 33, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source with documented service record data of at least 10 years' satisfactory service in similar applications and service conditions using similar aggregates and cementitious materials.
    1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
    2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
  - D. Water: ASTM C 94/C 94M and potable.

#### 2.05 ADMIXTURES

- A. Air-Entraining Admixture: ASTM C 260.
- 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. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  5. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  6. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

#### 2.06 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. Manufacturers: Subject to compliance with requirements, provide one of the following:
    - a. Greenstreak.
    - b. Williams Products, Inc.
  2. Profile: Ribbed with center bulb.
  3. Dimensions: 6 inches by 3/8 inch thick (150 mm by 10 mm thick nontapered).
- B. Chemically Resistant Flexible Waterstops: Thermoplastic elastomer rubber waterstops with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints; resistant to oils, solvents, and chemicals. Factory fabricate corners, intersections, and directional changes.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. JP Specialties, Inc.; Earth Shield TPE-Rubber.
    - b. Vinylex Corp.; PetroStop.

- c. WESTEC Barrier Technologies, Inc.; 600 Series TPE-R.
- 2. Profile: Ribbed with center bulb.
- 3. Dimensions: 6 inches by 3/8 inch thick (150 mm by 10 mm thick nontapered).
- C. Flexible PVC Waterstops: CE CRD-C 572, with factory-installed metal eyelets for embedding in concrete to prevent passage of fluids through joints. Factory fabricate corners, intersections, and directional changes.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. BoMetals, Inc.
    - b. Greenstreak.
    - c. Paul Murphy Plastics Company.
    - d. Vinylex Corp.
  - 2. Profile: Ribbed with center bulb.
  - 3. Dimensions: 6 inches by 3/8 inch thick (150 mm by 10 mm thick nontapered)
- D. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch (19 by 25 mm).
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Carlisle Coatings & Waterproofing, Inc.; MiraSTOP.
    - b. CETCO; Volclay Waterstop-RX.
    - c. Concrete Sealants Inc.; Conseal CS-231.
    - d. Greenstreak; Swellstop.
    - e. Henry Company, Sealants Division; Hydro-Flex.
    - f. JP Specialties, Inc.; Earth Shield Type 20.
    - g. <Insert manufacturer's name; product name or designation>.
- E. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch (10 by 19 mm).
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Adeka Ultra Seal/OCM, Inc.; Adeka Ultra Seal.
    - b. Greenstreak; Hydrotite.
    - c. Vinylex Corp.; Swellseal.

## 2.07 FLOOR AND SLAB TREATMENTS

- A. Slip-Resistive Emery Aggregate Finish: Factory-graded, packaged, rustproof, nonglazing, abrasive, crushed emery aggregate containing not less than 50 percent aluminum oxide and not less than 20 percent ferric oxide; unaffected by freezing, moisture, and cleaning materials with 100 percent passing No. 8 sieve. **This is to be applied at all stair landings and treads.**
  - 1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Anti-Hydro International, Inc.; Emery.
    - b. Dayton Superior Corporation; Emery Tuff Non-Slip.
    - c. Lambert Corporation; EMAG-20.
    - d. L&M Construction Chemicals, Inc.; Grip It.
    - e. Metalcrete Industries; Metco Anti-Skid Aggregate.

## 2.08 CURING MATERIALS

- A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

- C. Water: Potable.

## 2.9 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, epoxy resin with a Type A shore durometer hardness of 80 per ASTM D 2240.
- C. Bonding Agent: ASTM C 1059/C 1059M, 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 IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.
- E. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- F. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

## 2.10 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) 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 (3.2 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
  - 4. Compressive Strength: Not less than [4100 psi (29 MPa)] <Insert strength> 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 1/4 inch (6.4 mm) and that can be filled in over a scarified surface 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 (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.
  - 4. Compressive Strength: Not less than [5000 psi (34.5 MPa)] <Insert strength> at 28 days when tested according to ASTM C 109/C 109M.

## 2.11 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.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed mixture designs based on laboratory trial mixtures.
- B. Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
  - 1. Fly Ash: 25 percent.
  - 2. Combined Fly Ash and Pozzolan: 25 percent.
  - 3. Silica Fume: 10 percent.
  - 4. Combined Fly Ash, Pozzolans, and Silica Fume: 35 percent with fly ash or pozzolans not exceeding 25 percent and silica fume not exceeding 10 percent.
- C. Limit water-soluble, chloride-ion content in hardened concrete to 0.06 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.

## 2.12 CONCRETE MIXTURES FOR BUILDING ELEMENTS

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. For the trial batch method, use an independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.
  1. Do not use the same testing agency for field quality control testing.
  2. Limit use of fly ash to not exceed 25 percent of cement content by weight.
- B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of Work. Do not begin concrete production until proposed mix designs have been reviewed by Architect.
- C. Design mixes to provide normal weight concrete as indicated on drawings and schedules.
- D. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
  - 1.. Ramps, slabs, and sloping surfaces: Not more than 3 inches (75 mm).
  2. Reinforced foundation systems: Not less than 1 inch (25 mm) and not more than 3 inches.
  3. Concrete containing high-range water-reducing admixture (superplasticizer): Not more than 8 inches (200 mm) after adding admixture to site-verified 2 - 3 inch (50 -75 mm) slump concrete.
  4. Other concrete: Not more than 4 inches (100 mm).

## 2.13 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

## 2.14 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 (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

## 2.15 VAPOR RETARDERS

- B. Sheet Vapor Retarder: ASTM E 1745, Class A, Include manufacturer's recommended adhesive or pressure-sensitive tape.
  1. Products:
    - a. Fortifiber Building Systems Group; Moistop Ultra 15.
    - b. Raven Industries Inc.; Vapor Block 15.
    - c. Reef Industries, Inc.; Griffolyn Type-105 Type-65G 15 mil Green.
    - d. Stego Industries, LLC; Stego Wrap 15 mil Class A 10 mil Class A.
- C. Granular Fill: Clean mixture of crushed stone or crushed or uncrushed gravel; ASTM D 448, Size 57, with 100 percent passing a 1-1/2-inch (37.5-mm) sieve and 0 to 5 percent passing a No. 8 (2.36-mm) sieve.
- C. Fine-Graded Granular Material: Clean mixture of crushed stone, crushed gravel, and manufactured or natural sand; ASTM D 448, Size 10, with 100 percent passing a 3/8-inch (9.5-mm) sieve, 10 to 30 percent passing a No. 100 (0.15-mm) sieve, and at least 5 percent passing No. 200 (0.075-mm) sieve; complying with deleterious substance limits of ASTM C 33 for fine aggregates.

**PART 3 - EXECUTION****3.01 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 347 as abrupt or gradual, as follows:
  - 1. Class A, 1/8 inch for smooth-formed finished surfaces (Apply to concrete surfaces exposed to public view).
  - 2. Class C, 1/2 inch for rough-formed finished 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.
  - 1. Install keyways, reglets, recesses, and the like, for easy removal.
  - 2. Do not use rust-stained steel form-facing material.
- 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.
- 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.

**3.02 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.
  - 1. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC's "Code of Standard Practice for Steel Buildings and Bridges."
  - 2. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
  - 3. Install dovetail anchor slots in concrete structures as indicated.

**3.03 REMOVING AND REUSING FORMS**

- A. General: Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations and curing and protection operations need to be maintained.
  - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that supports weight of concrete in place until concrete has achieved its 28-day design compressive strength.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
- B. 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.
- C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

### 3.04 SHORES AND RESHORES

- A. Comply with ACI 318 (ACI 318M) and ACI 301 for design, installation, and removal of shoring and reshoring.
  1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.
- B. Comply with ACI 347 for shoring and reshoring in multistory construction, and as specified. Extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.
- C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.
- D. Keep reshores in place at least 15 days after placing upper tier, longer if required, until concrete has attained its required 28-day strength and heavy loads have been removed.

### 3.05 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.
- 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.

### 3.06 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 or as approved by Architect.
  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 (38 mm) 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.
  7. Use epoxy-bonding adhesive 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-third of concrete thickness as follows:

1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
  2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) 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. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Section 079200 "Joint Sealants," are 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.

### 3.07 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.
- B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated, according to manufacturer's written instructions, adhesive bonding, mechanically fastening, and firmly pressing into place. Install in longest lengths practicable.

### 3.08 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.
- B. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect. Mix tickets must show the amount of water withheld at the plant in order for water to be added at the site.
- C. 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.
  1. Deposit concrete in horizontal layers of depth to not exceed formwork design pressures and in a manner to avoid inclined construction joints.
  2. Consolidate placed concrete with mechanical vibrating equipment according to ACI 301.
  3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- D. 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.
  3. Screed slab surfaces with a straightedge and strike off to correct elevations.
  4. Slope surfaces uniformly to drains where required.
  5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

- E. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
  - 1. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
  - 2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.
- F. Hot-Weather Placement: Comply with ACI 301 and as follows:
  - 1. Maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

### 3.9 FINISHING FORMED SURFACES

- A. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defects repaired and patched. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces not exposed to public view.
- B. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defects. Remove fins and other projections that exceed specified limits on formed-surface irregularities.
  - 1. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster or painting.
- C. Rubbed Finish: Apply the following to smooth-formed finished concrete where required to achieve class A finish:
  - 1. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
  - 2. Grout-Cleaned Finish: Wet concrete surfaces and apply grout of a consistency of thick paint to coat surfaces and fill small holes. Mix one part Portland cement to one and a half parts fine sand with a 1:1 mixture of bonding admixture and water. Add white Portland cement in amounts determined by trial patches so color of dry grout will match adjacent surfaces. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap and keep surface damp by fog spray for at least 36 hours.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

### 3.10 FINISHING FLOORS AND SLABS

- A. General: Comply with ACI 302.1R recommendations for screeding, restraighening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Scratch Finish: While still plastic, texture concrete surface that has been screeded and bull-floated or darbied. Use stiff brushes, brooms, or rakes to produce a profile amplitude of 1/4 inch (6 mm) in one direction.
  - 1. Apply scratch finish to surfaces indicated and to receive concrete floor toppings or to receive mortar setting beds for bonded cementitious floor finishes.
- C. 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 restraighening until surface is left with a uniform, smooth, granular texture.
  - 1. Apply float finish to surfaces indicated to receive trowel finish and] to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.



- D. 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 indicated, exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.
  - 2. Finish surfaces to the following tolerances, according to ASTM E 1155 (ASTM E 1155M), for a randomly trafficked floor surface:
- E. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated where ceramic or quarry tile is to be installed by either thickset or thin-set method. While concrete is still plastic, slightly scarify surface with a fine broom.
  - 1. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.
- F. Broom Finish: Apply a **heavy broom finish** to parking areas, exterior concrete platforms, steps, ramps, and elsewhere as indicated.
  - 1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application. Provide 10ft. by 10 ft. mock-up for Owner/Architect approval prior to first production pour. Retain first paragraph below if applicable. This finish is generally used on interior and exterior concrete treads, platforms, and ramps subject to moderate foot traffic.

### 3.11 MISCELLANEOUS CONCRETE ITEMS

- A. Filling In: Fill in holes and openings left in concrete structures after work of other trades is in place unless otherwise indicated. 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.

### 3.12 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. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces.
- C. Cure concrete according to ACI 308.1, by one or a combination of the following methods:
  - 1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
    - a. Water.
    - b. Continuous water-fog spray.
    - c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
  - 2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
    - a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.
    - b. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive penetrating liquid floor treatments.

- c. Cure concrete surfaces to receive floor coverings with either a moisture-retaining cover or a curing compound that the manufacturer certifies will not interfere with bonding of floor covering used on Project.

### 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] [six] month(s). Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) 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 (1.18-mm) sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
  1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete. Limit cut depth to 3/4 inch (19 mm). Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
  2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
  3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.
- 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. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
  2. After concrete has cured at least 14 days, correct high areas by grinding.
  3. 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.
  4. Correct other 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.
  5. Correct other low areas scheduled to remain exposed with a repair topping. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations. Prepare, mix, and apply repair topping and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
  6. Repair defective areas, except random cracks and single holes 1 inch (25 mm) 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 (19-mm) 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.

7. Repair random cracks and single holes 1 inch (25 mm) 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 special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Inspections:
  1. Steel reinforcement placement.
  2. Steel reinforcement welding.
  3. Headed bolts and studs.
  4. Verification of use of required design mixture.
  5. Concrete placement, including conveying and depositing.
  6. Curing procedures and maintenance of curing temperature.
  7. Verification of concrete strength before removal of shores and forms from beams and slabs.
- C. Concrete Tests: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. (76 cu. m) or fraction thereof of each concrete mixture placed each day, but not less than once for each 5000 square feet of surface area for slabs or walls.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
  2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
  5. Compression Test Specimens: ASTM C 31/C 31M.
    - a. Cast and laboratory cure two sets of two standard cylinder specimens for each composite sample.
    - b. Cast and field cure two sets of two standard cylinder specimens for each composite sample.
  6. Compressive-Strength Tests: ASTM C 39/C 39M; test one set of two laboratory-cured specimens at 7 days and one set of two specimens at 28 days.
    - a. Test one set of two field-cured specimens at 7 days and one set of two specimens at 28 days.
    - b. A compressive-strength test shall be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
  7. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

8. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).
9. 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.
10. 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.
11. 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. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42/C 42M or by other methods as directed by Architect.
12. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
13. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

### **3.16 VAPOR RETARDERS**

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder according to ASTM E 1643 and manufacturer's written instructions.
  1. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

**END OF SECTION**

**SECTION 03 05 16**  
**UNDERSLAB VAPOR BARRIER - STEGO**

**PART 1 GENERAL**

**1.01 REFERENCE STANDARDS**

- A. ASTM E1643 - Standard Practice for Selection, Design, Installation and Inspection of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs; 2018a.
- B. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs; 2017.

**PART 2 PRODUCTS**

**2.01 MATERIALS**

- A. Underslab Vapor Barrier:
  - 1. Water Vapor Permeance: Not more than 0.010 perms, maximum.
  - 2. Thickness: 15 mils.
  - 3. Basis of Design:
    - a. Stego Industries LLC; Stego Wrap Vapor Barrier (15-mil):  
[www.stegoindustries.com/#sle](http://www.stegoindustries.com/#sle).
- B. Accessory Products: Vapor barrier manufacturer's recommended tape, adhesive, mastic, etc., for sealing seams and penetrations in vapor barrier.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install vapor barrier in accordance with manufacturer's instructions and ASTM E1643.
- B. Install vapor barrier under interior slabs on grade; lap sheet over footings and seal to foundation walls.
- C. Lap joints minimum 6 inches.
- D. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions.
- E. No penetration of vapor barrier is allowed except for reinforcing steel and permanent utilities.
- F. Repair damaged vapor retarder before covering with other materials.

**END OF SECTION**

**SECTION 03-38-16**  
**UNBONDED POST-TENSIONED CONCRETE**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section Includes:
  - 1. Post-tensioning reinforcement and accessories including prestressing tendons, pocket formers, support bars, bar chairs, and slab bolsters.
  - 2. Post-tensioning operations including stressing, recording tendon elongations and gage pressures, and finishing tendons.
- B. Related Sections:
  - 1. Section 033000 "Cast-in-place Concrete"

**1.03 DEFINITIONS**

- A. Strand Tail: Excess strand length extending past the anchorage device.
- B. Stressing Pocket: Void formed by pocket former at stressing-end anchorage to provide required cover over wedges and strand tail.
- C. Wedge Cavity: Cone-shaped hole in anchorage device designed to hold the wedges that anchor the strand.

**1.04 COORDINATION**

- A. Attachments and Penetrations:
  - 1. Attach permanent construction such as curtain-wall systems, handrails, fire-protection equipment, lights, and security devices to the post-tensioned slab using embedded anchors.
  - 2. Drilled anchors, power-driven fasteners, and core drilling for sleeves or other penetrations are not allowed unless authorized in writing by Architect.
  - 3. Form penetrations within 18 inches of an anchorage with ASTM A 53/A 53M, Schedule 40 steel pipe.

**1.05 PREINSTALLATION MEETINGS**

- A. Preinstallation Conference: Conduct conference at a location in the project vicinity.
  - 1. Review methods and procedures related to installation and stressing of post-tensioning tendons including, but not limited to, the following:
    - a. Construction schedule and availability of materials, personnel, and equipment needed to make progress and avoid delays.
    - b. Storage of post-tensioning materials on-site.
    - c. Structural load limitations.
    - d. Coordination of post-tensioning installation drawings and nonprestressed reinforcing steel placing drawings.
    - e. Horizontal and vertical tolerances on tendons and nonprestressed reinforcement placement.
    - f. Marking and measuring of elongations.
    - g. Submittal of stressing records and requirements for tendon finishing.
    - h. Removal of formwork.

**1.06 ACTION SUBMITTALS**

- A. Product Data: For the following:
  - 1. Post-tensioning coating.

2. Tendon sheathing.
  3. Anchorage devices.
  4. Tendon couplers.
  5. Bar and tendon supports.
  6. Pocket formers.
  7. Sheathing repair tape.
  8. Stressing-pocket patching material.
  9. Encapsulation system, if specified in the Structural Contract Drawings.
- B. Shop Drawings: Include the following, prepared by or under the supervision of a qualified professional engineer, detailing tendon layout and installation procedures:
1. Installation drawings including plans, elevations, sections, and details.
  2. Numbers, arrangement, and designation of post-tensioning tendons.
  3. Tendon profiles and method of tendon support including chair heights and locations. Show tendon profiles at sufficient scale to clearly indicate all support points, with their associated heights.
  4. Tendon anchorage details including bundled tendon flaring.
  5. Tendon clearances around slab openings and penetrations.
  6. Construction joint locations, pour sequence, locations of anchorages and blockouts required for stressing.
  7. Stressing procedures and jacking force to result in final effective forces used in determining number of tendons required.
  8. Calculated elongations for each tendon.
  9. Details for horizontal curvature around openings and at anchorages.
  10. Details for corners and other locations where tendon layouts may conflict with one another or nonprestressed reinforcing steel.
  11. Locations of nonprestressed reinforcement required for installing post-tensioning tendons including, but not limited to, the following:
    - a. Support bars.
    - b. Backup bars and hairpins at anchorages.
    - c. Hairpins at locations of horizontal curvature.
    - d. Supplemental reinforcement at blockouts.
- C. Delegated-Design Submittal: For post-tensioning system.
1. Sealed design calculations prepared by a qualified structural engineer indicating method of elongation calculation including values used for friction coefficients, anchorage seating loss, elastic shortening, creep, relaxation, and shrinkage.

#### **1.07 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer and manufacturer. Include resume of individual supervising installation and stressing of post-tensioning tendons.
- B. Product Certificates:
  1. For each type of anchorage device and coupler.
  2. For each type of encapsulation system.
- C. Mill Test Reports: Certified mill test reports for prestressing strand used on Project indicating that strand is low relaxation and including the following:
  1. Coil numbers or identification.
  2. Breaking load.
  3. Load at 1 percent extension.

4. Elongation at failure.
  5. Modulus of elasticity.
  6. Diameter and net area of strand.
- D. Procedures Statement: Procedures for cutting excess strand tail and patching stressing pocket.
  - E. Stressing Jack Calibration: Calibration certificates for jacks and gages to be used on Project. Calibrate each jack-and-gage set as a pair.
  - F. Stressing Records: Submit the same day as stressing operations.

## **1.08 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Fabricating plant certified by PTI according to procedures set forth in PTI's "Manual for Certification of Plants Producing Unbonded Single Strand Tendons" as well as five years experience engineering and designing post-tensioning systems, manufacturing or assembling components of such systems, who has completed installations similar in size and complexity to that required; have installed or advised installers on installation of systems similar to those required for this project. Supplies certified hydraulic gauges. Gives initial job-site instruction to Contractor's personnel, if Contractor elects to install post-tensioning with own forces. Manufacturer shall submit project resume detailing their experience.
- B. Installer Qualifications: A qualified installer whose full-time Project superintendent has successfully completed PTI's Level 1 - Field Fundamentals course or has equivalent verifiable experience and knowledge acceptable to Architect.
  1. Superintendent must receive training from post-tensioning supplier in the operation of stressing equipment to be used on Project.
- C. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.
  1. Testing Agency Inspector: Personnel performing field inspections and measuring elongations shall have successfully completed PTI's Level 1 - Field Fundamentals course or shall have equivalent verifiable experience and knowledge acceptable to Architect.

## **1.09 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle post-tensioning materials according to PTI's "Field Procedures Manual for Unbonded Single Strand Tendons."
- B. Immediately remove damaged components from Project site.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Source Limitations: Obtain post-tensioning materials and equipment from single source.
  1. Stressing jacks not provided by post-tensioning supplier must be calibrated and approved for use on Project by post-tensioning supplier.

### **2.02 PRESTRESSING TENDONS**

- A. ACI Publications: Comply with ACI 423.6, "Specification for Unbonded Single Strand Tendons," unless otherwise indicated in the Contract Documents.
- B. Prestressing Strand: ASTM A 416/A 416M, Grade 270 (Grade 1860), uncoated, seven-wire, low-relaxation, 0.5-inch- (12.7-mm-) or 0.6-inch- (15.2-mm-) diameter strand, as indicated in the Structural Contract Drawings.
- C. Post-Tensioning Coating: Compound with friction-reducing, moisture-displacing, and corrosion-inhibiting properties; chemically stable and nonreactive with prestressing steel, nonprestressed reinforcement, sheathing material, and concrete.
  1. Minimum Coating Weight: 2.5 lb (1.14 kg) for 0.5-inch- (12.7-mm-) or 3 lb (1.36 kg) for 0.6-inch- (15.2-mm-) diameter strand per 100 feet (30 m) of strand.
  2. Completely fill annular space between strand and sheathing over entire tendon length with post-tensioning coating.
- D. Tendon Sheathing:
  1. Minimum Thickness: 0.050 inch for polyethylene or polypropylene with a minimum density of 0.034 lb/cu. in.



2. Continuous over length of tendon to provide watertight encapsulation of strand where an encapsulated system has been specified, and between anchorages to prevent intrusion of cement paste or loss of coating for a non-encapsulated system.
- E. Anchorage Device and Coupler Assembly: Assembly of strand, wedges, and anchorage device or coupler complying with static and fatigue testing requirements and capable of developing 95 percent of actual breaking strength of strand.
1. Anchorage Bearing Stresses: Comply with ACI 423.6 for stresses at transfer load and service load.
  2. Fixed-End Anchorage Device Assemblies: Plant fabricated with wedges seated at a load of not less than 80 percent and not more than 85 percent of breaking strength of strand.
- F. Encapsulation System: Watertight encapsulation of prestressing strand consisting of the following:
1. Wedge-Cavity Caps: Attached to anchorages with a positive mechanical connection and completely filled with post-tensioning coating.
    - a. Caps for Fixed- and Stressing-End Anchorage Devices: Designed to provide watertight encapsulation of wedge cavity. Sized to allow required extension of strand past the wedges.
      - 1) Attach cap for fixed-end anchorage device in fabricating plant.
    - b. Caps at Intermediate Anchorages: Open to allow passage of strand.
  2. Sleeves: Attached to anchorage device with positive mechanical connection; overlapped a minimum of 4 inches (100 mm) with sheathing and completely filled with post-tensioning coating.

### 2.03 NONPRESTRESSED STEEL BARS

- A. Support Bars, Reinforcing Bars, Hairpins:
1. Steel: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- B. Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening tendons and tendon support bars 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. For uncoated bars, use all-plastic or CRSI Class 1 plastic-protected bar supports.

### 2.04 ACCESSORIES

- A. Pocket Formers: Capable of completely sealing wedge cavity; sized to provide the required cover over the anchorage and allow access for cutting strand tail.
- B. Anchorage Fasteners: Uncoated-steel nails, wires, and screws used to attach anchorage devices to formwork.
- C. Sheathing Repair Tape: Elastic, self-adhesive, moistureproof tape with minimum width of 2 inches (50 mm), in contrasting color to tendon sheathing; nonreactive with sheathing, coating, or prestressing steel.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Adhesive Tape Products, Ltd.; PWT-20.
    - b. Covalence Adhesives; Polyken 826.
    - c. 3M; Tape 226.

### 2.05 PATCHING MATERIAL

- A. One-component, polymer-modified, premixed patching material containing selected silica aggregates and portland cement, suitable for vertical and overhead applications. Do not use material containing chlorides or other chemicals known to be deleterious to prestressing steel or material that is reactive with prestressing steel, anchorage device material, or concrete.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. BASF Construction Chemicals, LLC - Masteremaco N425 or approved equal.

## **PART 3 - EXECUTION**

### **3.01 FORMWORK**

- A. Provide formwork for post-tensioned elements as specified Section 033000 "Cast-in-Place Concrete." Design formwork to support load redistribution that may occur during stressing operation. Ensure that formwork does not restrain elastic shortening, camber, or deflection resulting from application of prestressing force.
- B. Do not remove forms supporting post-tensioned elements until tendons have been fully stressed and elongations have been approved by Architect.
- C. Do not place concrete in supported floors until tendons on supporting floors have been stressed and elongations have been approved by Architect.

### **3.02 NONPRESTRESSED STEEL REINFORCEMENT PLACEMENT**

- A. Placement of nonprestressed steel reinforcement is specified in Section 033000 "Cast-in-Place Concrete." Coordinate placement of nonprestressed steel reinforcement with installation of post-tensioning tendons.

### **3.03 TENDON INSTALLATION**

- A. Install tendons according to installation drawings and procedures stated in PTI's "Field Procedures Manual for Unbonded Single Strand Tendons."
  - 1. Tolerances: Comply with tolerances in ACI 423.6 for beams and slabs.
- B. Tendon Supports: Provide continuous slab bolsters or bars supported on individual high chairs spaced at a maximum of 42 inches (1070 mm) o.c. to ensure tendons remain in their designated positions during construction operations and concrete placement.
  - 1. Support tendons as required to provide profiles shown on installation drawings. Position supports at high and low points and at intervals not exceeding 48 inches (1220 mm). Ensure that tendon profiles between high and low points are smooth parabolic curves.
  - 2. Attach tendons to supporting chairs and reinforcement without damaging tendon sheathing.
  - 3. Support slab tendons independent of beam reinforcement.
- C. Maintain tendon profile within maximum allowable deviations from design profile as follows:
  - 1. 1/4 inch (6.3 mm) for member depth less than or equal to 8 inches (200 mm).
  - 2. 3/8 inch (9.5 mm) for member depth greater than 8 inches (200 mm) and less than or equal to 24 inches (610 mm).
  - 3. 1/2 inch (13 mm) for member depth greater than 24 inches (610 mm).
- D. Maintain minimum radius of curvature of 480-strand diameters for lateral deviations to avoid openings, ducts, and embedded items. Maintain a minimum of 2 inches (50 mm) of separation between tendons at locations of curvature.
- E. Limit tendon bundles to five tendons. Do not twist or entwine tendons within a bundle. Maintain a minimum distance of 12 inches (300 mm) between center of adjacent bundles.
- F. If tendon locations conflict with nonprestressed reinforcement or embedded items, tendon placement governs. Obtain Architect's approval before relocating tendons or tendon anchorages that interfere with one another.
- G. Deviations in horizontal spacing and location of slab tendons are permitted when required to avoid openings and inserts.
- H. Installation of Anchorage Devices:
  - 1. Place anchorage devices at locations shown on approved installation drawings.
  - 2. Do not switch fixed- and stressing-end anchorage locations.
  - 3. Attach pocket formers, intermediate anchorage devices, and stressing-end anchorage devices securely to bulkhead forms. Install stressing-end and intermediate anchorage devices perpendicular to tendon axis.
  - 4. Install tendons straight, without vertical or horizontal curvature, for a minimum of 12 inches (300 mm) behind stressing-end and intermediate anchorages.
  - 5. Embed intermediate anchorage devices at construction joints in first concrete placed at joint.

6. Minimum splice length in reinforcing bars at anchorages is 24 inches (600 mm). Stagger splices a minimum of 60 inches (1500 mm).
  7. Place fixed-end anchorage devices in formwork at locations shown on installation drawings. Support anchorages firmly to avoid movement during concrete placement.
  8. If an encapsulated system has been specified, remove loose caps on fixed-end anchorages, refill with post-tensioning coating, and re-attach caps to achieve a watertight enclosure.
- I. Maintain minimum concrete cover as follows:
    1. From Exterior Edge of Concrete to Wedge Cavity: 2 inches .
    2. From Exterior Edge of Concrete to Strand Tail: 3/4 inch.
    3. From Exterior Edge of Concrete to Wedge-Cavity Cap (if an encapsulated system has been specified): 1 inch.
    4. Top, Bottom, and Edge Cover for Anchorage Devices: 1 inch.
  - J. Maintain minimum clearance of 6 inches (150 mm) between tendons and openings.
  - K. Do not install sleeves within 48 inches of anchorages after tendon layout has been inspected.
  - L. Do not install conduit, pipe, or embeds requiring movement of tendons after tendon layout has been inspected.
  - M. Do not use couplers unless location has been approved by Architect.

#### **3.04 SHEATHING INSPECTION AND REPAIR**

- A. Inspect sheathing for damage after installing tendons. Repair damaged areas by restoring post-tensioning coating and repairing or replacing tendon sheathing.
  1. Ensure that sheathing is watertight and there are no air voids.
  2. Follow tape repair procedures in PTI's "Field Procedures Manual for Unbonded Single Strand Tendons."
- B. Maximum length of exposed strand behind anchorages is as follows (for non-encapsulated systems if specified):
  1. Fixed End: 12 inches (300 mm)
  2. Intermediate and Stressing End: 1 inch (25 mm).
    - a. Cover exposed strand with sheathing repair tape to prevent contact with concrete.
- C. Immediately remove and replace tendons that have damaged strand.

#### **3.05 CONCRETE PLACEMENT**

- A. Do not place concrete until placement of tendons and nonprestressed-steel reinforcement has been inspected by special inspector/testing agency.
- B. Provide Architect and special inspector/testing agency a minimum of 48 hours' notice before concrete placement.
- C. Place concrete as specified in Section 033000 "Cast-in-Place Concrete." Ensure compaction of concrete around anchorages.
- D. Ensure that position of tendon and nonprestressed-steel reinforcement does not change during concrete placement. Reposition tendons and nonprestressed-steel reinforcement moved during concrete placement to original location.
- E. Ensure that method of concrete placement does not damage tendon sheathing. Do not support pump lines, chutes, or other concrete-placing equipment on tendons.

#### **3.06 TENDON STRESSING**

- A. Calibrate stressing jacks and gages at start of project and at least every six months thereafter. Keep copies of calibration certificates for each jack-and-gage pair on Project site that are available for inspection. Exercise care in handling stressing equipment to ensure that proper calibration is maintained.
- B. Stress tendons only under supervision of a qualified post-tensioning superintendent.
- C. Do not begin stressing operations until concrete strength has reached 75% of specified 28-day strength as indicated by compression tests of field-cured cylinders.
- D. Complete stressing within 96 hours of concrete placement.

- E. If concrete has not reached required strength, obtain Architect's approval to partially stress tendons and delay final stressing until concrete has reached required strength.
- F. Stage stress transfer girders, foundation mats & two-way slabs according to schedule shown on the Contract Drawings.
- G. If detensioning and restressing of tendon is required, discard wedges used in original stressing and provide new wedges.
- H. Mark and measure elongations according to PTI's "Field Procedures Manual for Unbonded Single Strand Tendons." Measure elongations to closest 1/8 inch.
- I. Submit stressing records within one day of completion of stressing. If discrepancies between measured and calculated elongations exceed plus or minus 7 percent, resolve these discrepancies to satisfaction of Architect.
- J. Prestressing will be considered acceptable if gage pressures shown on stressing record correspond to required stressing force and calculated and measured elongations agree within 7 percent.
- K. If measured elongations deviate from calculated elongations by more than 7 percent, additional testing, restressing, strengthening, or replacing of affected elements may be required.
- L. Stressing Records: Testing agency shall record the following information during stressing operations:
  - 1. Name of Project.
  - 2. Date of approved installation drawings used for installation and stressing.
  - 3. Floor number and concrete placement area.
  - 4. Date of stressing operation.
  - 5. Weather conditions including temperature and rainfall.
  - 6. Name and signature of inspector.
  - 7. Name of individual in charge of stressing operation.
  - 8. Serial or identification numbers of jack and gage.
  - 9. Date of jack-and-gage calibration certificates.
  - 10. Gage pressure to achieve required stressing force per supplied calibration chart.
  - 11. Tendon identification mark.
  - 12. Calculated tendon elongation.
  - 13. Actual tendon elongation.
  - 14. Actual gage pressure.

### 3.07

#### **TENDON FINISHING**

- A. Do not cut strand tails or cover anchorages until stressing records have been reviewed and approved by Architect.
- B. Cut strand tails as soon as possible after approval of elongations.
- C. Cut strand tail between 1/2 and 3/4 inch (13 and 19 mm) from wedges. Do not damage tendon or concrete during removal of strand tail. Acceptable methods of cutting strand tail include the following:
  - 1. Oxyacetylene flame.
  - 2. Abrasive wheel.
  - 3. Hydraulic shears.
  - 4. Plasma cutting.
- D. If an encapsulated system has been specified, install caps and sleeves on intermediate anchorages within one day of stressing.
- E. If an encapsulated system has been specified, cut strand tails and install caps on stressing-end anchorages within one day of Architect's acceptance of elongations.
- F. Patch stressing pockets within one day of cutting strand tail. Clean inside surface of pocket to remove laitance or post-tensioning coating before installing patch material. Finish patch material flush with adjacent concrete.

### **3.08 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified special inspector or testing agency to perform tests and inspections.
  - 1. Before concrete placement, Special Inspector or Testing Agency will inspect the following for compliance with post-tensioning installation drawings and the Contract Documents:
    - a. Location and number of tendons.
    - b. Tendon profiles and cover.
    - c. Installation of backup bars, hairpins, and other nonprestressed reinforcement shown on post-tensioning installation drawings.
    - d. Installation of pocket formers and anchorage devices.
    - e. Repair of damaged sheathing.
    - f. Connections between sheathing and anchorage devices (if an encapsulated system has been specified).
  - 2. Special inspector or Testing agency will record tendon elongations during stressing.
  - 3. Special inspector or Testing agency will immediately report deviations from the Contract Documents to Architect.
- B. Prepare test and inspection reports.

### **3.09 PROTECTION**

- A. Do not expose tendons to electric ground currents, welding sparks, or temperatures that would degrade components.
- B. Prevent water from entering tendons during installation and stressing.
- C. Provide weather protection to stressing-end anchorages if strand tails are not cut within 10 days of stressing the tendons.

### **3.10 REPAIRS**

- A. Submit repair procedure to Architect for evaluation and approval.
- B. Do not proceed with repairs requiring removal of concrete unless authorized in writing by Architect.

**END OF SECTION**

**SECTION 03 45 00**  
**PRECAST ARCHITECTURAL CONCRETE**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Architectural precast concrete wall panels.
- B. Architectural precast concrete accessories.
- C. Supports, anchors, and attachments.
- D. Grouting under panels.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Sealing perimeter and intermediate joints.

**1.03 REFERENCE STANDARDS**

- A. ACI 301 - Specifications for Structural Concrete; 2016.
- B. ACI 318 - Building Code Requirements for Structural Concrete and Commentary; 2014 (Errata 2018).
- C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.
- D. ASTM C1602/C1602M - Standard Specification for Mixing Water Used in the Production of Hydraulic Cement Concrete; 2012.
- E. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.
- F. ASTM C150/C150M - Standard Specification for Portland Cement; 2020.
- G. ASTM C1088 - Standard Specification for Thin Veneer Brick Units Made From Clay or Shale; 2020.
- H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- I. IAS AC157 - Accreditation Criteria for Fabricator Inspection Programs for Reinforced and Precast/Prestressed Concrete; 2017.
- J. PCI MNL-117 - Manual for Quality Control for Plants and Production of Architectural Precast Concrete Products; 2013.
- K. PCI MNL-120 - PCI Design Handbook - Precast and Prestressed Concrete; 2017.
- L. PCI MNL-122 - Architectural Precast Concrete; 2007.
- M. PCI MNL-123 - Design and Typical Details of Connections for Precast and Prestressed Concrete; 1988.
- N. PCI MNL-135 - Tolerance Manual for Precast and Prestressed Concrete Construction; 2000.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's information on accessory products, including pigments, admixtures, inserts, plates, etc.
- C. Shop Drawings: Indicate layout, unit locations, configuration, unit identification marks, reinforcement, connection details, support items, location of lifting devices, dimensions, openings, and relationship to adjacent materials.
- D. Samples: Submit two 2, 12" x 12" inch in size, illustrating surface finish, color and texture.
- E. Designer's Qualification Statement.
- F. Fabricator's Qualification Statement: Provide documentation showing precast concrete fabricator is accredited under IAS AC157.

### **1.05 QUALITY ASSURANCE**

- A. Design Engineer Qualifications: Design precast concrete units under direct supervision of a Professional Structural Engineer experienced in design of precast concrete and licensed in the State in which the Project is located.
- B. Fabricator Qualifications:
  - 1. Firm having at least 2 years of documented experience in production of precast concrete of the type required.
  - 2. Plant certified under Precast/Prestressed Concrete Institute Plant Certification Program; product group and category A1 - Architectural Precast Concrete.
  - 3. Plant certified under Architectural Precast Association Plant Certification Program for production of architectural precast concrete.
  - 4. Fabricator Qualifications: Precast concrete fabricator accredited by IAS according to IAS AC157.

### **1.06 MOCK-UP**

- A. Provide precast mock-up, 6 feet long by 8 feet wide, with lifting device, and attachment points, and finish in accordance with approved sample.
- B. See Section 01 40 00 - Quality Requirements for additional requirements.
- C. Locate where directed.
- D. Mock-up may remain as part of the Work.

### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Handling: Lift and support precast units only from support points.
- B. Blocking and Lateral Support During Transport and Storage: Use materials that are clean, non-staining, and non-harmful to exposed surfaces. Provide temporary lateral support to prevent bowing and warping.
- C. Protect units to prevent staining, chipping, or spalling of concrete.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Architectural Precast Concrete:
  - 1. Any manufacturer holding a PCI Group A Plant Certification for the types of products specified; see [www.pci.org/#sle](http://www.pci.org/#sle).

### **2.02 PRECAST UNITS, GENERAL**

- A. Precast Architectural Concrete Units: Comply with PCI MNL-120, PCI MNL-122, PCI MNL-123, PCI MNL-135, and ACI 318.
  - 1. Concrete Face Mix: Minimum 5000 psi, 28 day strength, air entrained to 5 to 7 percent; comply with ACI 301.
  - 2. Design Loads: Static loads, anticipated dynamic loading, including positive and negative wind loads, thermal movement loads, and erection forces as defined by applicable code.
  - 3. Calculate structural properties of units in accordance with ACI 318.
  - 4. Accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.
  - 5. Provide connections that accommodate building movement and thermal movement and adjust to misalignment of structure without unit distortion or damage.
- B. Finish Type A: Ensure exposed-to-view finish surfaces of precast units are uniform in color and appearance. Prepare surface to receive finish applied coating.
- C. Finish Type D: Thin brick veneer. Remove excess concrete from joints and faces of thin brick units. Protect adjacent surfaces.

### **2.03 REINFORCEMENT**

- A. Reinforcing Steel: ASTM A615/A615M, Grade 40 (40,000 psi).

1. Deformed billet-steel bars.
2. Unfinished.

#### **2.04 CONCRETE MATERIALS**

- A. Cement: ASTM C150/C150M, Type I - Normal Portland type.
- B. Fine and Coarse Structural Aggregates: ASTM C33/C33M.
- C. Water: ASTM C1602/C1602M; clean, potable, and not detrimental to concrete.

#### **2.05 THIN BRICK**

- A. Manufacturers:
  1. Acme Brick Company
  2. Endicott Clay Products Co
  3. General Shale, Inc.
  4. Glen-Gery Corporation
  5. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Thin Brick: ASTM C1088.
  1. Type: TBX.
  2. Size: Manufacturer's standard Modular.
  3. Thickness: 5/8 inch.
  4. Tolerances: 1/16 inch.
  5. Color, texture, range, special shapes: As selected by Architect from manufacturer's standard range of colors, textures and blends.
  6. Protective Coating: Wax.

#### **2.06 FABRICATION**

- A. Fabricate in compliance with PCI MNL-117 and PCI MNL-135.
- B. Place thin brick in form liner in accordance with manufacturer's instructions. Mix bricks from several cartons for uniform distribution of color variations.
- C. Maintain consistent quality during manufacture.
- D. Fabricate connecting devices, plates, angles, inserts, bolts, and accessories. Fabricate to permit initial placement and final attachment.
- E. Embed reinforcing steel, anchors, inserts plates, angles, and other cast-in items.
- F. Locate hoisting devices to permit removal after erection.
- G. Minor patching in plant is acceptable, providing structural adequacy and appearance of units is not impaired.
- H. Remove protective coating from thin brick using method recommended by manufacturer. Do not damage brick or concrete material in joints.

#### **2.07 FABRICATION TOLERANCES**

- A. Comply with PCI MNL-117 and PCI MNL-135, except as specifically amended below.
  1. Maximum Variation From Nominal Face Dimensions: Plus or minus 3/32 in.
  2. Maximum Variation From Square or Designated Skew: Plus or minus 1/8 inch in 10 feet.
  3. Maximum Variation from Thickness: Plus or minus 1/8 in.
  4. Maximum Misalignment of Anchors, Inserts, Openings: Plus or minus 1/8 inch.
  5. Maximum Bowing of Members: Plus or minus length/360.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that building structure, anchors, devices, and openings are ready to receive work of this section.



**SECTION 04 20 00**  
**UNIT MASONRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Concrete block.
- B. Mortar and grout.
- C. Reinforcement and anchorage.
- D. Flashings.
- E. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Installation of dovetail slots for masonry anchors.
- B. Section 05 50 00 - Metal Fabrications: Loose steel lintels.
- C. Section 06 10 00 - Rough Carpentry: Nailing strips built into masonry.
- D. Section 07 92 00 - Joint Sealants: Sealing control and expansion joints.

**1.03 REFERENCE STANDARDS**

- A. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019.
- B. ASTM A951/A951M - Standard Specification for Steel Wire for Masonry Joint Reinforcement; 2016, with Editorial Revision (2018).
- C. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2018a.
- D. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.
- E. ASTM C150/C150M - Standard Specification for Portland Cement; 2020.
- F. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2019.
- G. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.
- H. ASTM C476 - Standard Specification for Grout for Masonry; 2020.
- I. ASTM C1714/C1714M - Standard Specification for Preblended Dry Mortar Mix for Unit Masonry; 2016.
- J. ASTM D4637/D4637M - Standard Specification for EPDM Sheet Used in Single-Ply Roof Membrane; 2015.
- K. BIA Technical Notes No. 7 - Water Penetration Resistance – Design and Detailing; 2017.
- L. BIA Technical Notes No. 28B - Brick Veneer/Steel Stud Walls; 2005.
- M. BIA Technical Notes No. 46 - Maintenance of Brick Masonry; 2017.
- N. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.
- C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.
- D. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the type of products specified in this section with minimum three years of documented experience.

- B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

## **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

## **PART 2 PRODUCTS**

### **2.01 CONCRETE MASONRY UNITS**

- A. Concrete Block: Comply with referenced standards and as follows:
  - 1. Size: Standard units with nominal face dimensions of 16 by 8 inches and nominal depth of 8 inches.

### **2.02 MORTAR AND GROUT MATERIALS**

- A. Masonry Cement: ASTM C91/C91M, Type N.
- B. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.
- C. Grout Aggregate: ASTM C404.
- D. Water: Clean and potable.
- E. Packaged Dry Material for Mortar for Unit Masonry: Premixed Portland cement, hydrated lime, and sand; complying with ASTM C1714/C1714M and capable of producing mortar of the specified strength in accordance with ASTM C270 with the addition of water only.
  - 1. Color: Standard gray.

### **2.03 REINFORCEMENT AND ANCHORAGE**

- A. Manufacturers:
  - 1. Blok-Lok Limited: [www.blok-lok.com/#sle](http://www.blok-lok.com/#sle).
  - 2. Hohmann & Barnard, Inc; X-Seal Anchor: [www.h-b.com/#sle](http://www.h-b.com/#sle).
  - 3. WIRE-BOND [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Single Wythe Joint Reinforcement: ASTM A951/A951M.
  - 1. Type: Truss or ladder.
  - 2. Material: ASTM A1064/A1064M steel wire, mill galvanized to ASTM A641/A641M, Class 3.
  - 3. Size: 0.1483 inch side rods with 0.1483 inch cross rods; width as required to provide not less than 5/8 inch of mortar coverage on each exposure.

### **2.04 FLASHINGS**

- A. Membrane Non-Asphaltic Flashing Materials:
  - 1. EPDM Flashing: ASTM D4637/D4637M, Type I, 0.040 inch thick.
    - a. Manufacturers:
      - 1) Heckmann Building Products, Inc: [www.heckmannbuildingprods.com/#sle](http://www.heckmannbuildingprods.com/#sle)
      - 2) Hohmann & Barnard, Inc: [www.h-b.com/#sle](http://www.h-b.com/#sle).
      - 3) WIRE-BOND: [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
      - 4) Substitutions: See Section 01 60 00 - Product Requirements.

### **2.05 ACCESSORIES**

- A. Preformed Control Joints: Rubber material. Provide with corner and tee accessories, fused joints.
  - 1. Manufacturers:
    - a. Blok-Lok Limited: [www.blok-lok.com/#sle](http://www.blok-lok.com/#sle).
    - b. Hohmann & Barnard, Inc: [www.h-b.com/#sle](http://www.h-b.com/#sle).
    - c. WIRE-BOND: [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; in maximum lengths available.
  - 1. Manufacturers:
    - a. Hohmann & Barnard, Inc: [www.h-b.com/#sle](http://www.h-b.com/#sle).
    - b. WIRE-BOND: [www.wirebond.com/#sle](http://www.wirebond.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

## **2.06 MORTAR AND GROUT MIXING**

- A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
  - 1. Masonry below grade and in contact with earth: Type S.
  - 2. Exterior, loadbearing masonry: Type N.
  - 3. Exterior, non-loadbearing masonry: Type N.
  - 4. Interior, loadbearing masonry: Type N.
  - 5. Interior, non-loadbearing masonry: Type O.
- B. Grout: ASTM C476; consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive masonry.
- B. Verify that related items provided under other sections are properly sized and located.

### **3.02 PREPARATION**

- A. Direct and coordinate placement of metal anchors supplied for installation under other sections.
- B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

### **3.03 COLD AND HOT WEATHER REQUIREMENTS**

- A. Maintain materials and surrounding air temperature to minimum 40 degrees F prior to, during, and 48 hours after completion of masonry work.
- B. Maintain materials and surrounding air temperature to maximum 90 degrees F prior to, during, and 48 hours after completion of masonry work.

### **3.04 COURSING**

- A. Establish lines, levels, and coursing indicated. Protect from displacement.
- B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.
- C. Concrete Masonry Units:
  - 1. Bond: Running.
  - 2. Coursing: One unit and one mortar joint to equal 8 inches.
  - 3. Mortar Joints: Concave.

### **3.05 PLACING AND BONDING**

- A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.
- B. Lay hollow masonry units with face shell bedding on head and bed joints.
- C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.
- D. Remove excess mortar and mortar smears as work progresses.
- E. Remove excess mortar with water repellent admixture promptly. Do not use acids, sandblasting or high pressure cleaning methods.

- F. Interlock intersections and external corners, except for units laid in stack bond.
- G. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.
- H. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.
- I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.
- J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

### **3.06 REINFORCEMENT AND ANCHORAGE - GENERAL AND SINGLE WYTHE MASONRY**

- A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches on center.
- B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches each side of opening.
- C. Place continuous joint reinforcement in first and second joint below top of walls.
- D. Embed longitudinal wires of joint reinforcement in mortar joint with at least 5/8 inch mortar cover on each side.
- E. Lap joint reinforcement ends minimum 6 inches.

### **3.07 MASONRY FLASHINGS**

- A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
  - 1. Extend flashings full width at such interruptions and at least 6 inches, minimum, into adjacent flashings or turn up flashing ends at least 1 inch, minimum, to form watertight pan at non-masonry construction.
  - 2. Remove or cover protrusions or sharp edges that could puncture flashings.
  - 3. Seal lapped ends and penetrations of flashing before covering with mortar.
- B. Terminate flashing up 8 inches minimum on vertical surface of backing:
- C. Extend laminated and EPDM flashings to within 1/2 inch of exterior face of masonry and adhere to top of stainless steel angled drip with hemmed edge.
- D. Lap end joints of flashings at least 6 inches, minimum, and seal watertight with flashing sealant/adhesive.

### **3.08 LINTELS**

- A. Install loose steel lintels over openings.
- B. Install reinforced unit masonry lintels over openings where steel or precast concrete lintels are not scheduled.
  - 1. Openings to 42 inches: Place two, No. 3 reinforcing bars 1 inch from bottom web.
  - 2. Openings from 42 inches to 78 inches: Place two, No. 5 reinforcing bars 1 inch from bottom web.

### **3.09 CONTROL AND EXPANSION JOINTS**

- A. Do not continue horizontal joint reinforcement through control or expansion joints.
- B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.
- C. Size control joints as indicated on drawings; if not indicated, 3/4 inch wide and deep.
- D. Form expansion joint as detailed on drawings.

### **3.10 BUILT-IN WORK**

- A. As work progresses, install built-in metal door frames and glazed frames and other items to be built into the work and furnished under other sections.

- B. Install built-in items plumb, level, and true to line.
- C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
  - 1. Fill adjacent masonry cores with grout minimum 12 inches from framed openings.

### **3.11 TOLERANCES**

- A. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and 1/2 inch in 20 ft or more.
- B. Maximum Variation from Plumb: 1/4 inch per story non-cumulative; 1/2 inch in two stories or more.
- C. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.
- D. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch.

### **3.12 CLEANING**

- A. Remove excess mortar and mortar droppings.
- B. Replace defective mortar. Match adjacent work.
- C. Clean soiled surfaces with cleaning solution.
- D. Use non-metallic tools in cleaning operations.

### **3.13 PROTECTION**

- A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

**END OF SECTION**

**SECTION 05-12-00**  
**STRUCTURAL STEEL FRAMING**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. This Section includes the following:
  - 1. Structural steel.
  - 2. Grout.
- B. Related Sections include the following:
  - 1. Division 01 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
  - 2. Division 05 Section "Steel Decking" for field installation of shear connectors.
  - 3. Division 05 Section "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame not defined as structural steel.
  - 4. Division 13 Section "Metal Building Systems" for structural steel.

**1.03 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.

**1.04 PERFORMANCE REQUIREMENTS**

- A. Select and complete connections using schematic details indicated and AISC's "Manual of Steel Construction, Load and Resistance Factor Design," Volume 2, Part 9.
  - 1. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections.
- B. Construction: Type 2, simple framing.

**1.05 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication of structural-steel components.
  - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
  - 2. Include embedment drawings.
  - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
  - 4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
  - 5. For structural-steel connections indicated to comply with design loads, include structural analysis data prepared by the qualified professional engineer responsible for their preparation.
- C. Welding certificates.
- D. Source quality-control test reports.

**1.06 QUALITY ASSURANCE**

- A. Fabricator Qualifications: A qualified fabricator who has completed similar projects in the last 5 years.
- 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 "Seismic Provisions for Structural Steel Buildings" and "Supplement No. 2."
3. AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings."
4. AISC's "Specification for the Design of Steel Hollow Structural Sections."
5. AISC's "Specification for Load and Resistance Factor Design of Single-Angle Members."
6. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

#### **1.07 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.

#### **1.08 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**

#### **2.01 STRUCTURAL-STEEL MATERIALS**

- A. W-Shapes: ASTM A 992/A 992M.
- B. Channels, Angles[, M] [, S]-Shapes: ASTM A 36/A 36M.
- C. Plate and Bar: ASTM A 36/A 36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B, structural tubing.
- E. Steel Pipe: ASTM A 53/A 53M, Type E or S, Grade B.
  1. Weight Class: Standard.
  2. Finish: Black.
- F. Welding Electrodes: Comply with AWS requirements.

#### **2.02 BOLTS, CONNECTORS, AND ANCHORS**

- A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 (ASTM A 325M), Type 1, heavy hex steel structural bolts; ASTM A 563 (ASTM A 563M) heavy hex carbon-steel nuts; and ASTM F 436 (ASTM F 436M) hardened carbon-steel washers.
  1. Finish: Plain.
- 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: ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6).
  1. Configuration: Hooked.
  2. Nuts: ASTM A 563 (ASTM A 563M) heavy hex carbon steel.
  3. Plate Washers: ASTM A 36/A 36M carbon steel.
  4. Washers: ASTM F 436 (ASTM F 436M) hardened carbon steel.
  5. Finish: Plain.

#### **2.03 PRIMER**

- A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.
- B. Galvanizing Repair Paint: ASTM A 780.

## 2.04 GROUT

- A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404, Size No. 2. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

## 2.05 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" and AISC's "Load and Resistance Factor Design Specification for Structural Steel Buildings."
  - 1. Camber structural-steel members where indicated.
  - 2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
  - 3. Mark and match-mark materials for field assembly.
  - 4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
  - 1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.
- C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted according to SSPC-SP 3, "Power Tool Cleaning."
- F. 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.
- G. 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.

## 2.06 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: Snug tightened.
- 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. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
  - 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.

## 2.07 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 (50 mm).
  - 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 3, "Power Tool 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 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.
  1. Stripe paint corners, crevices, bolts, welds, and sharp edges.
  2. Apply two coats of shop paint to inaccessible surfaces after assembly or erection. Change color of second coat to distinguish it from first.
- D. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils (0.038 mm).

## **2.08 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, shelf angles attached to structural-steel frame and located in exterior walls.

## **2.09 SOURCE QUALITY CONTROL**

- A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
  1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
- B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.
- C. Bolted Connections: Shop-bolted connections will be tested and inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."
- D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
  1. Liquid Penetrant Inspection: ASTM E 165.
  2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
  3. Ultrasonic Inspection: ASTM E 164.
  4. Radiographic Inspection: ASTM E 94.
- E. In addition to visual inspection, shop-welded shear connectors will be tested and inspected according to requirements in AWS D1.1 for stud welding and as follows:
  1. Bend tests will be performed if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
  2. Tests will be conducted on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.

## **PART 3 - EXECUTION**

### **3.01 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.

### **3.02 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.

### **3.03 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" and "Load and Resistance Factor Design Specification for Structural Steel Buildings."
- B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
  1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
  2. Weld plate washers to top of base plate.
  3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
  4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure.
- 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. Remove erection bolts on welded, architecturally exposed structural steel; fill holes with plug welds; and grind smooth at exposed surfaces.
- G. Do not use thermal cutting during erection.
- H. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.
- I. 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.

### **3.04 FIELD CONNECTIONS**

- A. High-Strength Bolts: 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: Snug tightened.
- 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" and "Load and Resistance Factor Design Specification for Structural Steel Buildings" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.
  2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
  3. 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.

### **3.05 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.
- B. Bolted Connections: Shop-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: Field welds will be visually inspected according to AWS D1.1.
  - 1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:
    - a. Liquid Penetrant Inspection: ASTM E 165.
    - b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
    - c. Ultrasonic Inspection: ASTM E 164.
    - d. Radiographic Inspection: ASTM E 94.
- D. In addition to visual inspection, test and inspect field-welded shear connectors according to requirements in AWS D1.1 for stud welding and as follows:
  - 1. Perform bend tests if visual inspections reveal either a less-than- continuous 360-degree flash or welding repairs to any shear connector.
  - 2. Conduct tests on additional shear connectors if weld fracture occurs on shear connectors already tested, according to requirements in AWS D1.1.
- E. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

### **3.06 REPAIRS 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 installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, 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.
- C. Touchup Painting: Cleaning and touchup painting are specified in Division 09 painting Sections.

**END OF SECTION**

**SECTION 05 40 00**  
**COLD-FORMED METAL FRAMING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Formed steel stud exterior wall and interior wall framing.
- B. Exterior wall sheathing.
- C. Water-resistive barrier over sheathing.

**1.02 RELATED REQUIREMENTS**

- A. Section 04 20 01 - Masonry Veneer: Veneer masonry supported by wall stud metal framing.
- B. Section 06 10 00 - Rough Carpentry: Wood blocking and miscellaneous framing.
- C. Section 06 10 00 - Rough Carpentry: Roof and wall sheathing.
- D. Section 07 92 00 - Joint Sealants.

**1.03 REFERENCE STANDARDS**

- A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2012.
- B. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- C. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members; 2018, with Editorial Revision.
- D. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2020.
- E. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
- F. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).

**1.04 ADMINISTRATIVE REQUIREMENTS**

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, limitations.
- C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
  - 1. Indicate stud layout.
  - 2. Describe method for securing studs to tracks and for bolted framing connections.
  - 3. Design data:
    - a. Shop drawings signed and sealed by a professional structural engineer.
- D. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Metal Framing:
  - 1. ClarkDietrich: [www.clarkdietrich.com/#sle](http://www.clarkdietrich.com/#sle).
  - 2. Jaimes Industries: [www.jaimesind.com/#sle](http://www.jaimesind.com/#sle).
  - 3. Marino: [www.marinoware.com/#sle](http://www.marinoware.com/#sle).
  - 4. Steel Construction Systems: [www.steelconsystems.com/#sle](http://www.steelconsystems.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

- B. Framing Connectors and Accessories:
  - 1. Same manufacturer as metal framing.

## **2.02 FRAMING SYSTEM**

- A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.
- B. Design Requirements: Provide completed framing system having the following characteristics:
  - 1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-12.
  - 2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
  - 3. Design Loads: In accordance with applicable codes.
  - 4. Live load deflection meeting the following, unless otherwise indicated:
    - a. Exterior Walls: Maximum horizontal deflection under wind load of 1/180 of span.
  - 5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
  - 6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

## **2.03 FRAMING MATERIALS**

- A. Studs and Track: ASTM C955; studs formed to channel, C- or Sigma-shaped with punched web; U-shaped track in matching nominal width and compatible height.
  - 1. Gauge and Depth: As required to meet specified performance levels.

## **2.04 FASTENERS**

- A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
- B. Anchorage Devices: Powder actuated.

## **2.05 WALL SHEATHING**

- A. Glass mat faced gypsum board; ASTM C1177/C1177M, square long edges, 5/8 inch thick, Type X - Fire Resistant.

## **2.06 ACCESSORIES**

- A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
- B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.
- C. Water-Resistive Barrier: As specified in Section 07 25 00.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify field measurements and adjust installation as required.

### **3.02 INSTALLATION OF STUDS**

- A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
- B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 16 inches on center. Coordinate installation of sealant with floor and ceiling tracks.
- C. Place studs at 12 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using clip and tie method.

- D. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.
- E. Install load-bearing studs full length in one piece. Splicing of studs is not permitted.
- F. Install load-bearing studs, brace, and reinforce to develop full strength and achieve design requirements.
- G. Touch-up field welds and damaged galvanized surfaces with primer.

### **3.03 INSTALLATION OF WALL SHEATHING**

- A. Install wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
  - 1. Provide glass mat gypsum wall sheathing at least 32 inches wide at building corners, measured horizontally.
  - 2. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges, and ends.

**END OF SECTION**

**SECTION 05 50 00**  
**METAL FABRICATIONS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Shop fabricated steel items.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.
- B. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.
- C. Section 05 51 00 - Metal Stairs.
- D. Section 05 52 13 - Pipe and Tube Railings.
- E. Section 09 91 13 - Exterior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- C. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2018.
- D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2014, with Editorial Revision (2017).
- E. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- F. SSPC-SP 2 - Hand Tool Cleaning; 2018.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.

**PART 2 PRODUCTS**

**2.01 MATERIALS - STEEL**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.
- C. Plates: ASTM A283/A283M.
- D. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- E. Bolts, Nuts, and Washers: ASTM A307, Grade A, plain.
- F. Shop and Touch-Up Primer: inorganic zinc rich primer, complying with VOC limitations of authorities having jurisdiction.

**2.02 FABRICATION**

- A. Fit and shop assemble items in largest practical sections, for delivery to site.
- B. Fabricate items with joints tightly fitted and secured.
- C. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.
- D. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

### **2.03 FABRICATED ITEMS**

- A. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish.
- B. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.
- C. Lintels: As detailed; prime paint finish.
- D. Door Frames for Overhead Door Openings and Wall Openings: Channel sections; prime paint finish.
- E. Elevator Hoistway Divider Beams: Beam sections; prime paint finish.
- F. Elevator Pit Ladders: As detailed; prime paint finish.

### **2.04 FINISHES - STEEL**

- A. Prime paint steel items.
  - 1. Exceptions: Galvanize items to be embedded in concrete and items to be embedded in masonry.
- B. Prepare surfaces to be primed in accordance with SSPC-SP2.
- C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- D. Prime Painting: One coat.

### **2.05 FINISHES - ALUMINUM**

- A. Exterior Aluminum Surfaces: Class I color anodized.

### **2.06 FABRICATION TOLERANCES**

- A. Squareness: 1/8 inch maximum difference in diagonal measurements.
- B. Maximum Offset Between Faces: 1/16 inch.
- C. Maximum Misalignment of Adjacent Members: 1/16 inch.
- D. Maximum Bow: 1/8 inch in 48 inches.
- E. Maximum Deviation From Plane: 1/16 inch in 48 inches.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

- A. Clean and strip primed steel items to bare metal where site welding is required.
- B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### **3.03 INSTALLATION**

- A. Install items plumb and level, accurately fitted, free from distortion or defects.
- B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Obtain approval prior to site cutting or making adjustments not scheduled.

**END OF SECTION**



**SECTION 05 51 00**  
**METAL STAIRS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Stairs with concrete treads.
- B. Structural steel stair framing and supports.
- C. Handrails and guards.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete fill in stair pans; mesh reinforcement for landings.
- B. Section 03 30 00 - Cast-in-Place Concrete: Placement of metal anchors in concrete.
- C. Section 04 20 00 - Unit Masonry: Placement of metal fabrications in masonry.
- D. Section 05 50 00 - Metal Fabrications.
- E. Section 05 52 13 - Pipe and Tube Railings: Metal handrails for the stairs specified in this section.
- F. Section 09 91 13 - Exterior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures; 2006.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2020.
- G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2014.
- H. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.
- I. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- J. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019.
- K. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- L. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- M. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- N. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).
- O. SSPC-SP 2 - Hand Tool Cleaning; 2018.

#### **1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
  - 2. Include the design engineer's seal and signature on each sheet of shop drawings.
- C. Design Data: As required by authorities having jurisdiction.
- D. Welders' Certificates.

#### **1.05 QUALITY ASSURANCE**

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.
- C. Fabricator Qualifications:
  - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.

### **PART 2 PRODUCTS**

#### **2.01 METAL STAIRS - GENERAL**

- A. Metal Stairs: Provide stairs of the design specified, complete with landing platforms, vertical and horizontal supports, railings, and guards, fabricated accurately for anchorage to each other and to building structure.
  - 1. Regulatory Requirements: Provide stairs and railings that comply with most stringent requirements of local, state, and federal regulations; where requirements of Contract Documents exceed those of regulations, comply with Contract Documents.
  - 2. Dimensions: As indicated on drawings.
  - 3. Shop assemble components; disassemble into largest practical sections suitable for transport and access to site.
  - 4. No sharp or rough areas on exposed travel surfaces and surfaces accessible to touch.
  - 5. Separate dissimilar metals using paint or permanent tape.
- B. Metal Jointing and Finish Quality Levels:
  - 1. Architectural: All joints as inconspicuous as possible, whether welded or mechanical.
    - a. Welded Joints: Continuously welded and ground smooth and flush.
    - b. Mechanical Joints: Butted tight, flush, and hairline; concealed fastenings only.
    - c. Exposed Edges and Corners: Eased to small uniform radius.
    - d. Metal Surfaces to be Painted: Sanded or ground smooth, suitable for highest quality gloss finish.
- C. Fasteners: Same material or compatible with materials being fastened; type consistent with design and specified quality level.
- D. Anchors and Related Components: Same material and finish as item to be anchored, except where specifically indicated otherwise; provide all anchors and fasteners required.

#### **2.02 METAL STAIRS WITH CONCRETE TREADS**

- A. Jointing and Finish Quality Level: Architectural, as defined above.
- B. Risers: Closed.
- C. Treads: Metal pan with field-installed concrete fill.
  - 1. Concrete Depth: 1-1/2 inches, minimum.
  - 2. Tread Pan Material: Steel sheet.
  - 3. Tread Pan Thickness: As required by design; 14 gauge, 0.075 inch minimum.

4. Concrete Reinforcement: Welded wire mesh.
5. Concrete Finish: Steel troweled.
- D. Risers: Same material and thickness as tread pans.
  1. Riser/Nosing Profile: Sloped riser with rounded nosing of minimum radius.
  2. Nosing Depth: Not more than 1 inch overhang.
  3. Nosing Return: Flush with top of concrete fill, not more than 1/2 inch wide.
- E. Stringers: Rolled steel channels.
  1. Stringer Depth: As indicated on drawings.
  2. End Closure: Sheet steel of same thickness as risers welded across ends.
- F. Landings: Same construction as treads, supported and reinforced as required to achieve design load capacity.
- G. Railings: Steel pipe railings.
- H. Finish: Shop- or factory-prime painted.

### **2.03 HANDRAILS AND GUARDS**

- A. Guards: Pipe railings, see Section 05 52 13.

### **2.04 MATERIALS**

- A. Steel Sections: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500/A500M or ASTM A501/A501M structural tubing, round and shapes as indicated.
- C. Pipe: ASTM A53/A53M, Grade B Schedule 40, black finish.
- D. Ungalvanized Steel Sheet: Hot- or cold-rolled, except use cold-rolled where finished work will be exposed to view.
  1. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Designation CS (commercial steel).
  2. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Designation CS (commercial steel).
- E. Concrete Fill: Portland cement Type I, 3000 psi 28 day strength, 2 to 3 inch slump.
- F. Concrete Reinforcement: Mesh type as detailed, galvanized.

### **2.05 ACCESSORIES**

- A. Steel Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, and galvanized to ASTM A153/A153M where connecting galvanized components.
- B. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.
- C. Shop and Touch-Up Primer: SSPC-Paint 15, and comply with VOC limitations of authorities having jurisdiction.

### **2.06 SHOP FINISHING**

- A. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.
- B. Do not prime surfaces in direct contact with concrete or where field welding is required.
- C. Prime Painting: Use specified shop- and touch-up primer.
  1. Preparation of Steel: In accordance with SSPC-SP 2, Hand Tool Cleaning.
  2. Number of Coats: One.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

- A. When field welding is required, clean and strip primed steel items to bare metal.
- B. Supply items required to be cast into concrete and embedded in masonry with setting templates.

### **3.03 INSTALLATION**

- A. Install components plumb and level, accurately fitted, free from distortion or defects.
- B. Allow for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.
- C. Provide welded field joints where specifically indicated on drawings. Perform field welding in accordance with AWS D1.1/D1.1M.
- D. Other field joints may be either welded or bolted provided the result complies with the limitations specified for jointing quality levels.
- E. Obtain approval prior to site cutting or creating adjustments not scheduled.
- F. After erection, prime welds, abrasions, and surfaces not shop primed or galvanized, except surfaces to be in contact with concrete.

### **3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.

**END OF SECTION**

**SECTION 05 52 13**  
**PIPE AND TUBE RAILINGS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Stair railings and guardrails.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Placement of anchors in concrete.
- B. Section 04 20 00 - Unit Masonry: Placement of anchors in masonry.
- C. Section 05 51 00 - Metal Stairs: Handrails other than those specified in this section.
- D. Section 09 91 13 - Exterior Painting: Paint finish.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. AISC 201 - AISC Certification Program for Structural Steel Fabricators, Standard for Steel Building Structures; 2006.
- C. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2018.
- D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2020.
- E. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2012.
- F. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 1999 (Ed. 2004).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.
  - 1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
  - 2. Include the design engineer's seal and signature on each sheet of shop drawings.

**1.05 QUALITY ASSURANCE**

- A. Structural Designer Qualifications: Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located, or personnel under direct supervision of such an engineer.
- B. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.
- C. Fabricator Qualifications:
  - 1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 201.

**PART 2 PRODUCTS**

**2.01 RAILINGS - GENERAL REQUIREMENTS**

- A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.
- B. Allow for expansion and contraction of members and building movement without damage to connections or members.
- C. Dimensions: See drawings for configurations and heights.
  - 1. Top Rails and Wall Rails: 1-1/2 inches diameter, round.
  - 2. Intermediate Rails: 1-1/2 inches diameter, round.
  - 3. Intermediate Rails: 1-1/4 by 1 inch rectangular.

4. Posts: 1-1/2 inches diameter, round.
  5. Posts: 1-1/2 inches square.
  6. Balusters: 1/2 inch square solid bar.
- D. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.
1. For anchorage to concrete, provide inserts to be cast into concrete, for bolting anchors.
  2. For anchorage to masonry, provide brackets to be embedded in masonry, for bolting anchors.
- E. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

## **2.02 STEEL RAILING SYSTEM**

- A. Steel Tube: ASTM A500/A500M, Grade B cold-formed structural tubing.
- B. Steel Pipe: ASTM A53/A53M, Grade B Schedule 80, black finish.
- C. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no bolts or screw fasteners.
- D. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.
- E. Exposed Fasteners: No exposed bolts or screws.
- F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

## **2.03 FABRICATION**

- A. Accurately form components to suit specific project conditions and for proper connection to building structure.
- B. Fit and shop assemble components in largest practical sizes for delivery to site.
- C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.
- D. Welded Joints:
1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
  2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
  3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.

### **3.02 PREPARATION**

- A. Supply items required to be cast into concrete with setting templates, for installation as work of other sections.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.
- C. Install railings in compliance with ADA Standards for accessible design at applicable locations.

- D. Anchor railings securely to structure.
- E. Field weld anchors as indicated on drawings. Touch-up welds with primer. Grind welds smooth.
- F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

**3.04 TOLERANCES**

- A. Maximum Variation From Plumb: 1/4 inch per floor level, non-cumulative.
- B. Maximum Offset From True Alignment: 1/4 inch.
- C. Maximum Out-of-Position: 1/4 inch.

**END OF SECTION**

**SECTION 06 10 00**  
**ROUGH CARPENTRY**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Roof-mounted curbs.
- B. Roofing nailers.
- C. Roofing cant strips.
- D. Preservative treated wood materials.
- E. Communications and electrical room mounting boards.
- F. Concealed wood blocking, nailers, and supports.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Setting anchors in concrete.
- B. Section 05 50 00 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.
- C. Section 07 25 00 - Weather Barriers: Water-resistive barrier over sheathing.
- D. Section 07 62 00 - Sheet Metal Flashing and Trim: Sill flashings.

**1.03 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- C. AWPA U1 - Use Category System: User Specification for Treated Wood; 2018.
- D. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- E. PS 1 - Structural Plywood; 2009.
- F. PS 20 - American Softwood Lumber Standard; 2020.
- G. SPIB (GR) - Grading Rules; 2014.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
- B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. Species: Spruce-Pine-Fir (South), unless otherwise indicated.
  - 2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.



3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee ([www.alsc.org](http://www.alsc.org)) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

## **2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).
- B. Sizes: Nominal sizes as indicated on drawings, S4S.
- C. Moisture Content: S-dry or MC19.
- D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
  1. Lumber: S4S, No. 2 or Standard Grade.
  2. Boards: Standard or No. 3.

## **2.03 CONSTRUCTION PANELS**

- A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

## **2.04 ACCESSORIES**

- A. Fasteners and Anchors:
  1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
  2. Anchors: Toggle bolt type for anchorage to hollow masonry.
- B. Water-Resistive Barrier: As specified in Section 07 25 00.

## **2.05 FACTORY WOOD TREATMENT**

- A. Treated Lumber and Plywood: Comply with requirements of AWWA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
  1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
  2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWWA standards.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION - GENERAL**

- A. Select material sizes to minimize waste.
- B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
- C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

### **3.02 BLOCKING, NAILERS, AND SUPPORTS**

- A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.
- B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.
- C. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

- D. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.
- E. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

### **3.03 ROOF-RELATED CARPENTRY**

- A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.
- B. Provide wood curb at all roof openings except where specifically indicated otherwise. Form corners by alternating lapping side members.

### **3.04 INSTALLATION OF CONSTRUCTION PANELS**

- A. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches on center on all edges and into studs in field of board.
  - 1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
  - 2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
  - 3. Install adjacent boards without gaps.

**END OF SECTION**

**SECTION 07 16 16**  
**CRYSTALLINE WATERPROOFING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Crystalline waterproofing.
- B. Preparation of surfaces to be waterproofed, including plugging active water leaks.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Concrete work to be waterproofed.

**1.03 REFERENCE STANDARDS**

- A. COE CRD-C 48 - Method of Test for Water Permeability of Concrete; 1992.
- B. NRCA (WM) - The NRCA Waterproofing Manual; 2005.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
  - 1. Test data showing hydraulic permeability.
  - 2. Preparation instructions and recommendations.
  - 3. Storage and handling requirements and recommendations.
  - 4. Installation methods.
  - 5. Details for waterproofing at joints, intersections, and other special conditions.
- C. Specimen warranty.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacture of products of the type specified.
- B. Installer Qualifications: Acceptable to manufacturer, with documented experience on at least five projects of similar nature within last five years.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Take necessary precautions to keep cementitious materials dry.

**1.07 FIELD CONDITIONS**

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results; do not install products under environmental conditions outside manufacturer's absolute limits.

**1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide installer's warranty agreeing to correct leaking waterproofing for two years from Date of Substantial Completion, unless leakage is caused by structural failure, movement of the structure, or other causes beyond the installer's control.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Crystalline Waterproofing:
  - 1. Euclid Chemical Company; VANDEX SUPER: [www.euclidchemical.com/#sle](http://www.euclidchemical.com/#sle).
  - 2. Vandex: [www.vandex-usa.com/#sle](http://www.vandex-usa.com/#sle).
  - 3. Xypex Chemical Corporation; XYPEX Concentrate: [www.xypex.com/#sle](http://www.xypex.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.02 APPLICATIONS**

- A. Crystalline Waterproofing for Building Surfaces:
  - 1. Negative (interior side) of elevator pits.

## **2.03 MATERIALS**

- A. Crystalline Waterproofing: Portland cement, quartz or silica sand, and other active chemicals that when applied to surface of concrete forms insoluble crystals in capillary pores preventing passage of liquids, while having no adverse effect on normal properties of concrete.
  - 1. Hydraulic Permeability of Applied Concrete: No measurable leakage or water flow at pressure ranging from 175 psi to 200 psi when tested in accordance with COE CRD-C 48, using at least 2 inch thick sample, and with applied surface preparation and installation in accordance with NRCA (WM).
  - 2. Toxicity: Non-toxic.
    - a. NSF-approved for use with potable water.
  - 3. Color: Gray.
- B. Plugging Compound: Cementitious compound meeting requirements specified for waterproofing, with additional characteristic of rapid set under water, recommended or approved by waterproofing manufacturer.
- C. Patching Compound: Ready-mixed cementitious mortar recommended or approved by waterproofing manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under project conditions, and use sand blasting, water blasting, or acid etching as recommended.
- C. Plug water leaks.
- D. Patch holes, construction joints, and cracks; remove defective concrete.
- E. Obtain approval of manufacturer's field representative before beginning installation.

### **3.03 INSTALLATION**

- A. Install in strict accordance with manufacturer's instructions, maintain environmental conditions required and recommended by manufacturer, and keep a copy of manufacturer's instructions on site.
- B. Coordinate installation with installation of products that must penetrate waterproofed surfaces.
- C. Prevent excessive drying of surface.
  - 1. Cure waterproofing for at least three days, or length of time required by manufacturer, with water spray and adequate air circulation.
  - 2. Do not use chemical curing agents unless explicitly approved by waterproofing manufacturer.
- D. Do not backfill, fill water or liquid holding structures, or apply finish coatings until time period recommended by manufacturer has passed.

### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.

- B. Flood test waterproofing application by filling water holding structures to capacity and allowing to stand for not less than 24 hours.
- C. If any leaks appear, notify Architect and drain.
  - 1. Repair leaks at no additional cost to Owner.
  - 2. Repeat flood test until any leakage is eliminated.

**3.05 PROTECTION**

- A. Protect from damage by weather; do not cover with impermeable (plastic) sheeting unless air circulation is provided.
- B. Touch-up, repair or replace damaged waterproofing after Date of Substantial Completion.

**END OF SECTION**

**SECTION 07 21 19**  
**FOAMED-IN-PLACE INSULATION**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Foamed-in-place insulation.
  - 1. In masonry cavity walls.

**1.02 REFERENCE STANDARDS**

- A. ASTM C518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus; 2017.
- B. ASTM D2842 - Standard Test Method for Water Absorption of Rigid Cellular Plastics; 2019.
- C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- E. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week prior to commencing work of this section.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide product description, insulation properties, overcoat properties, and preparation requirements.
- C. Certificates: Certify that products of this section meet or exceed specified requirements.
- D. Manufacturer's Installation Instructions: Indicate special procedures, and perimeter conditions requiring special attention.
- E. Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- F. Installer Qualification: Submit documentation of current contractor accreditation and current installer certification. Keep copies of all contractor accreditation and installer certification on site during and after installation. Present on-site documentation upon request.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with not less than three years of documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified, with minimum three years documented experience, and approved by manufacturer.

**1.06 FIELD CONDITIONS**

- A. Do not apply foam when temperature is below that specified by the manufacturer for ambient air and substrate.
- B. Do not apply foam when temperature is within 5 degrees F of dew point.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Foamed-In-Place Insulation:
  - 1. BASF Corporation; WALLTITE US Series Closed Cell: [www.spf.basf.com/#sle](http://www.spf.basf.com/#sle).
  - 2. Icynene-Lapolla; Icynene ProSeal (MD-C-200 v3): [www.icynene.com/#sle](http://www.icynene.com/#sle).
  - 3. Johns Manville; JM Corbond III Closed Cell Spray Polyurethane Foam: [www.jm.com/#sle](http://www.jm.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.02 MATERIALS**

- A. Foamed-In-Place Insulation: Low-density, flexible, open or closed cell, water vapor permeable polyurethane foam; foamed on-site, using blowing agent of water or non-ozone-depleting gas.
  - 1. Thermal Resistance: R-value of 5.0, minimum, per 1 inch thickness at 75 degrees F mean temperature when tested in accordance with ASTM C518.
  - 2. Air Permeance: 0.04 cfm per square foot, maximum, when tested at intended thickness in accordance with ASTM E2178 at 1.57 psf.
  - 3. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/450, maximum, when tested in accordance with ASTM E84.
  - 4. Basis of Design:
    - a. Carlisle Spray Foam Insulation; SealTite Pro Open Cell: [www.carlisesfi.com/#sle](http://www.carlisesfi.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.03 ACCESSORIES**

- A. Primer: As required by insulation manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify work within construction spaces or crevices is complete prior to insulation application.
- B. Verify that surfaces are clean, dry, and free of matter that may inhibit insulation or overcoat adhesion.

### **3.02 PREPARATION**

- A. Mask and protect adjacent surfaces from over spray or dusting.
- B. Apply primer in accordance with manufacturer's instructions.

### **3.03 APPLICATION**

- A. Apply insulation in accordance with manufacturer's instructions.
- B. Apply insulation by spray method, to a uniform monolithic density without voids.

### **3.04 PROTECTION**

- A. Do not permit subsequent construction work to disturb applied insulation.

**END OF SECTION**

**SECTION 07 25 00**  
**WEATHER BARRIERS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Water-Resistive Barrier: Under exterior wall cladding, over sheathing or other substrate; not air tight or vapor retardant.
- B. Vapor Retarders: Materials to make exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls water vapor resistant and air tight.
- C. Air Barriers: Materials that form a system to stop passage of air through exterior walls, joints between exterior walls and roof, and joints around frames of openings in exterior walls.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Vapor retarder under concrete slabs on grade.
- B. Section 06 10 00 - Rough Carpentry: Water-resistive barrier under exterior cladding.

**1.03 DEFINITIONS**

- A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
- B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.
- C. Vapor Retarder: Air tight barrier made of material that is relatively water vapor impermeable, to the degree specified, with sealed seams and with sealed joints to adjacent surfaces.
  - 1. Water Vapor Permeance: For purposes of conversion,  $57.2 \text{ ng}/(\text{Pa s sq m}) = 1 \text{ perm}$ .
- D. Water-Resistive Barrier: Water-shedding barrier made of material that is moisture resistant, to the degree specified, intended to be installed to shed water without sealed seams.

**1.04 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. AATCC Test Method 127 - Water Resistance: Hydrostatic Pressure Test; 2018.
- C. ASTM D1970/D1970M - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection; 2019.
- D. ASTM E96/E96M - Standard Test Methods for Water Vapor Transmission of Materials; 2016.
- E. ASTM E2178 - Standard Test Method for Air Permeance of Building Materials; 2013.
- F. ICC-ES AC148 - Acceptance Criteria for Flexible Flashing Materials; 2017.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on material characteristics.
- C. ABAA Field Quality Control Submittals: Submit third-party reports of testing and inspection required by ABAA QAP.
- D. Manufacturer's Installation Instructions: Indicate preparation.
- E. ABAA Manufacturer Qualification: Submit documentation of current evaluation of proposed manufacturer and materials.
- F. ABAA Installer Qualification: Submit documentation of current contractor accreditation and current installer certification; keep copies of each contractor accreditation and installer certification on site during and after installation, and present on-site documentation upon request.



- G. Warranty Documentation for Installation of Building Rainscreen Assembly: Submit installer warranty and ensure that forms have been completed in Owner's name and registered with installer.

## **1.06 QUALITY ASSURANCE**

- A. Air Barrier Association of America (ABAA) Quality Assurance Program (QAP); [www.airbarrier.org/#sle](http://www.airbarrier.org/#sle):
  - 1. Installer Qualification: Use accredited contractor, certified installers, evaluated materials, and third-party field quality control audit.
  - 2. Manufacturer Qualification: Use evaluated materials from a single manufacturer regularly engaged in air barrier material manufacture, and use secondary materials approved in writing by primary material manufacturer.

## **1.07 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

## **PART 2 PRODUCTS**

### **2.01 WEATHER BARRIER ASSEMBLIES**

- A. Water-Resistive Barrier: Provide on exterior walls under exterior cladding.
- B. Air Barrier:
  - 1. On outside surface of sheathing of exterior walls use air barrier sheet, mechanically fastened type.
- C. Exterior Vapor Retarder:
  - 1. On outside surface of sheathing use vapor retarder coating.

### **2.02 VAPOR RETARDER MATERIALS (AIR BARRIER AND WATER-RESISTIVE)**

- A. Vapor Retarder Coating: Liquid applied, resilient, UV-resistant coating and associated joint treatment.
  - 1. Dry Film Thickness (DFT): 40 mils, 0.040 inch, minimum.
  - 2. Water Vapor Permeance: 1.0 perm, maximum, when tested in accordance with ASTM E96/E96M.
  - 3. VOC Content: Less than 50 g per L when tested in accordance with 40 CFR 59, Subpart D (EPA Method 24).
  - 4. Suitable for use on concrete, masonry, plywood and gypsum sheathing.
  - 5. Joint Preparation Treatment: Coating manufacturer's recommended method, either tape or reinforcing mesh saturated with coating material.
  - 6. Manufacturers:
    - a. Carlisle Coatings and Waterproofing, Inc; Barriseal-R: [www.carlisleccw.com/#sle](http://www.carlisleccw.com/#sle).
    - b. Epro Services, Inc; ECOFLEX-S: [www.eproserv.com/#sle](http://www.eproserv.com/#sle).
    - c. Henry Company; Air-Bloc 16MR: [www.henry.com/#sle](http://www.henry.com/#sle).
    - d. Master Builders Solutions by BASF; MasterSeal AWB 660 I: [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
    - e. PROSOCO, Inc; R-GUARD VB: [www.prosoco.com/r-guard/#sle](http://www.prosoco.com/r-guard/#sle).
    - f. Sto Corp; Sto VaporSeal (40 mil application): [www.stocorp.com/#sle](http://www.stocorp.com/#sle).
    - g. Substitutions: See Section 01 60 00 - Product Requirements.
  - 7. Joint Filler: As recommended by coating manufacturer and suitable to the substrate.

### **2.03 ACCESSORIES**

- A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
- B. Flexible Flashing: Self-adhesive sheet flashing complying with ASTM D1970/D1970M, except slip resistance requirement is waived if not installed on a roof.
- C. Pre-formed Transition Membrane: Semi-rigid silicone or polyester composition, tapered edges, and tear resistant.

- D. Liquid Flashing: One part, fast curing, non-sag, elastomeric, gun grade, trowelable liquid flashing.
  - 1. Manufacturers:
    - a. Master Builders Solutions by BASF; MasterSeal AWB 900: [www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
    - b. Master Wall Inc; SuperiorFlash: [www.masterwall.com/#sle](http://www.masterwall.com/#sle).

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that surfaces and conditions are ready to accept the work of this section.

#### **3.02 PREPARATION**

- A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

#### **3.03 INSTALLATION**

- A. Install materials in accordance with manufacturer's instructions.
- B. Vapor Retarders: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
- C. Coatings:
  - 1. Prepare substrate in manner recommended by coating manufacturer; treat joints in substrate and between dissimilar materials as recommended by manufacturer.
  - 2. Use flashing to seal to adjacent construction and to bridge joints.
- D. Openings and Penetrations in Exterior Weather Barriers:
  - 1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
  - 2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
  - 3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
  - 4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
  - 5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
  - 6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

#### **3.04 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for additional requirements.
- B. Coordination of ABAA Tests and Inspections:
  - 1. Provide testing and inspection required by ABAA QAP.
  - 2. Notify ABAA in writing of schedule for air barrier work, and allow adequate time for testing and inspection.
  - 3. Cooperate with ABAA testing agency.
  - 4. Allow access to air barrier work areas and staging.
  - 5. Do not cover air barrier work until tested, inspected, and accepted.

#### **3.05 PROTECTION**

- A. Do not leave materials exposed to weather longer than recommended by manufacturer.

**END OF SECTION**

**SECTION 07 42 13.23**  
**METAL COMPOSITE MATERIAL WALL PANELS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Exterior cladding consisting of formed metal composite material (MCM) sheet, secondary supports, and anchors to structure, attached to solid backup.
- B. Matching flashing and trim.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Installation of anchors.
- B. Section 04 20 00 - Unit Masonry: Installation of anchors.
- C. Section 05 40 00 - Cold-Formed Metal Framing: Panel support framing.
- D. Section 07 25 00 - Weather Barriers: Weather barrier behind wall panel system.
- E. Section 07 62 00 - Sheet Metal Flashing and Trim: Metal flashing components integrated with this wall system.
- F. Section 07 92 00 - Joint Sealants: Sealing joints between siding and adjacent construction and fixtures.

**1.03 REFERENCE STANDARDS**

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. ASHRAE Std 90.1 I-P - Energy Standard for Buildings Except Low-Rise Residential Buildings; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.
- C. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- D. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2017.
- E. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2016a.
- F. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.
- G. ASTM A480/A480M - Standard Specification for General Requirements for Flat-Rolled Stainless and Heat-Resisting Steel Plate, Sheet, and Strip; 2020.
- H. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- I. ASTM A666 - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2015.
- J. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process; 2010 (Reapproved 2015).
- K. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- L. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- M. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- N. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- O. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- P. ASTM D1781 - Standard Test Method for Climbing Drum Peel for Adhesives; 1998 (Reapproved 2012).
- Q. ASTM D1929 - Standard Test Method for Determining Ignition Temperature of Plastics; 2020.

- R. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2020.
- S. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2019.
- T. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2016).

#### **1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Pre-Installation Meeting: Convene one week before starting work of this section to verify project requirements, coordinate with installers of other work, establish condition and completeness of building substrate, and review manufacturers' installation instructions and warranty requirements.
  - 1. Require attendance by the installer and relevant sub-contractors.
  - 2. Include MCM sheet manufacturer's representative and wall system manufacturer's representative to review storage and handling procedures.
  - 3. Review in detail truck transportation, parking, vertical transportation, schedule, personnel, installation of adjacent materials and substrate.
  - 4. Review procedures for protection of work and other construction.

#### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data - MCM Sheets: Manufacturer's data sheets on each product to be used, including thickness, physical characteristics, and finish, and:
  - 1. Finish manufacturer's data sheet showing physical and performance characteristics.
  - 2. Storage and handling requirements and recommendations.
  - 3. Fabrication instructions and recommendations.
- C. Product Data - Wall System: Manufacturer's data sheets on each product to be used, including:
  - 1. Physical characteristics of components shown on shop drawings.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation instructions and recommendations.
  - 4. Specimen warranty for wall system, as specified herein.
- D. Shop Drawings: Show layout and elevations, dimensions and thickness of panels, connections, details and location of joints, sealants and gaskets, method of anchorage, support clips, exposed fasteners, number of anchors, supports, reinforcement, trim, flashings, and accessories.
  - 1. Indicate panel numbering system.
  - 2. Differentiate between shop and field fabrication.
  - 3. Indicate substrates and adjacent work with which the wall system must be coordinated.
  - 4. Include large-scale details of anchorages and connecting elements.
  - 5. Include large-scale details or schematic, exploded or isometric diagrams to fully explain flashing at a scale of not less than 1-1/2 inches per 12 inches.
  - 6. Include design engineer's stamp or seal on shop drawings for attachments and anchors.
- E. Selection Samples: For each finish product specified, submit at least three sample color chips representing manufacturer's standard range of available colors and patterns.
  - 1. Sealant Color: Color to match wall panels.
- F. Verification Samples: For each finish product specified, submit at least three samples, minimum size 12 inch square, and representing actual product in color and texture.
- G. Design Data: Submit structural calculations stamped by design engineer, for Architect's information and project record.
- H. Test Report: Submit report of full-size mock-up tests for air infiltration, water penetration, and wind performance.

- I. Manufacturer's Field Reports: Provide within 48 hours of field review. State what was observed and what changes, if any, were requested or required.
- J. Testing Agency's Qualification Statement.
- K. Maintenance Data: Care of finishes and warranty requirements.
- L. Executed Warranty: Submit warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- M. Warranty Documentation for Installation of Building Rainscreen Assembly: Submit installer warranty and ensure that forms have been completed in Owner's name and registered with installer.

#### **1.06 QUALITY ASSURANCE**

- A. Field Measurements: Verify actual dimensions by field measurement before fabrication; show recorded measurements on shop drawings.
- B. Design Engineer's Qualifications: Design structural supports and anchorages under direct supervision of a Structural Engineer experienced in design of this type of work and licensed in the State in which the Project is located.
- C. Testing Agency Qualifications: Independent agency experienced in testing assemblies of the type required for this project and having the necessary facilities for full-size mock-up testing of the type specified.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products in manufacturer's original, unopened, undamaged containers with identification labels intact.
  - 1. Protect finishes by applying heavy-duty removable plastic film during production.
  - 2. Package for protection against transportation damage.
  - 3. Provide markings to identify components consistently with drawings.
  - 4. Exercise care in unloading, storing, and installing panels to prevent bending, warping, twisting, and surface damage.
- B. Store products protected from exposure to harmful weather conditions and at temperature conditions recommended by manufacturer.
  - 1. Store in well-ventilated space out of direct sunlight.
  - 2. Protect from moisture and condensation with tarpaulins or other suitable weathertight covering installed to provide ventilation.
  - 3. Store at a slope to ensure positive drainage of accumulated water.
  - 4. Do not store in enclosed space where ambient temperature can exceed 120 degrees F.
  - 5. Avoid contact with other materials that might cause staining, denting, or other surface damage.

#### **1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion, including defects in water tightness and integrity of seals for insulated metal wall panel systems.
- C. Correct defective work within a five year period after Date of Substantial Completion for degradation of panel finish, including color fading caused by exposure to weather.
- D. Installation Warranty for Building Rainscreen Assembly: Installer of exterior rainscreen assembly (including air/vapor barrier and attachments, framing, and exterior panels) to provide 10-year warranty that includes coverage for defective materials and/or workmanship. This warranty will also clearly include materials, labor, necessary activity to access these areas, and removal of any materials to effect repairs and restore to watertight conditions.  
[www.edacontractors.com/#sle](http://www.edacontractors.com/#sle)

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Metal Composite Material (MCM) Sheet Manufacturers:
  - 1. 3A Composites USA; Alucobond Plus: [www.3acompositesusa.com/#sle](http://www.3acompositesusa.com/#sle).
  - 2. Alcotex, Inc; Alcotex PE - Aluminum Composite Material (ACM): [www.alcotex.com/#sle](http://www.alcotex.com/#sle).
  - 3. Alfrex, LLC; Alfrex fr: [www.alfrexusa.com/#sle](http://www.alfrexusa.com/#sle).
  - 4. ALPOLIC Materials; ALPOLIC/fr (Fire Retardant core): [www.alpolic-americas.com/#sle](http://www.alpolic-americas.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 WALL PANEL SYSTEM**

- A. Wall Panel System: Metal panels, fasteners, and anchors designed to be supported by framing or other substrate provided by others; provide installed panel system capable of maintaining specified performance without defects, damage, or failure.
  - 1. Provide structural design by or under direct supervision of a Structural Engineer licensed in the State in which the Project is located.
  - 2. Provide panel jointing and weatherseal using a "wet", sealant-sealed system.
  - 3. Anchor panels to supporting framing without exposed fasteners.

### **2.03 PERFORMANCE REQUIREMENTS**

- A. Thermal Movement: Provide for free and noiseless vertical and horizontal thermal movement due to expansion and contraction under material temperature range of minus 20 degrees F to 180 degrees F without buckling, opening of joints, undue stress on fasteners, or other detrimental effects; allow for ambient temperature at time of fabrication, assembly, and erection procedures.
- B. Air Infiltration: 0.06 cfm/sq ft of wall area, maximum, when tested at 1.57 psf in accordance with ASTM E283/E283M.
- C. Water Penetration: No water penetration under static pressure when tested in accordance with ASTM E331 at a differential of 10 percent of inward acting design load, 6.24 psf minimum, after 15 minutes.
  - 1. Water penetration is defined as the appearance of uncontrolled water on the interior face of the wall.
  - 2. Design to drain leakage and condensation to the exterior face of the wall.
- D. Building Envelope Performance: Complies with ASHRAE Std 90.1 I-P when tested as part of a building envelope assembly.

### **2.04 PANELS**

- A. Panels: two inch deep pans formed of metal composite material sheet by routing back edges of sheet, removing corners, and folding edges.
  - 1. Reinforce corners with riveted aluminum angles.
  - 2. Provide concealed attachment to supporting structure by adhering attachment members to back of panel; attachment members may also function as stiffeners.
  - 3. Maintain maximum panel bow of 0.8 percent of panel dimension in width and length; provide stiffeners of sufficient size and strength to maintain panel flatness without showing local stresses or read-through on panel face.
  - 4. Secure members to back face of panels using structural silicone sealant approved by MCM sheet manufacturer.
  - 5. Fabricate panels under controlled shop conditions.
  - 6. Where final dimensions cannot be established by field measurement before commencement of manufacturing, make allowance for field adjustments without requiring field fabrication of panels.
  - 7. Fabricate as indicated on drawings and as recommended by MCM sheet manufacturer.
    - a. Make panel lines, breaks, curves, and angles sharp and true.
    - b. Keep plane surfaces free from warp or buckle.
    - c. Keep panel surfaces free of scratches or marks caused during fabrication.

8. Provide joint details providing a watertight and structurally sound wall panel system that allows no uncontrolled water penetration on inside face of panel system.

## **2.05 MATERIALS**

- A. Metal Composite Material (MCM) Sheet: Two sheets of aluminum sandwiching a core of extruded thermoplastic material; no foamed insulation material content.
  1. Overall Sheet Thickness: 0.118 inch, minimum.
  2. Bond and Peel Strength: No adhesive failure of the bond between the core and the skin nor cohesive failure of the core itself below 22.4 inch-pound/inch with no degradation in bond performance, when tested in accordance with ASTM D1781, simulating resistance to panel delamination, after 8 hours of submersion in boiling water and after 21 days of immersion in water at 70 degrees F.
  3. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
  4. Flammability: Self-ignition temperature of 650 degrees F or greater when tested in accordance with ASTM D1929.
- B. Metal Framing Members: Include sub-girts, zee-clips, base and sill angles and channels, hat-shaped and rigid channels, and furring channels required for complete installation.
  1. Provide material strength, dimensions, configuration as required to meet the applied loads applied and in compliance with applicable building code.
  2. Sheet Steel Components: ASTM A653/A653M galvanized to G90/Z275 or zinc-iron alloy-coated to A60/ZF180; or ASTM A792/A792M aluminum-zinc coated to AZ60/AZM180.
  3. Stainless Steel Sheet Components: ASTM A480/A480M.
  4. Aluminum Components: ASTM B209 (ASTM B209M); or ASTM B221 (ASTM B221M).

## **2.06 FINISHES**

- A. Finish: Factory finished highly polished Class I natural anodized finish; AAMA 611 AA-M12C22A41, anodic coating not less than 0.7 mils, 0.0007 inch thick.
- B. Color/Texture: As selected by Architect from manufacturer's standard range.

## **2.07 ACCESSORIES**

- A. Flashing: Sheet aluminum; 0.040 inch thick, minimum; finish and color to match MCM sheet; refer to Section 07 62 00 for additional requirements.
- B. Cladding Support Clips: Thermally-broken, galvanized steel clips for support of cladding z-girts, angles, channels and other framing.
  1. Galvanized Steel Sheet: ASTM A653/A653M, with G90/Z275 galvanized coating.
- C. Anchors, Clips, and Accessories: Use one of the following:
  1. Stainless steel complying with ASTM A276/A276M, ASTM A480/A480M, or ASTM A666.
  2. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A153/A153M.
  3. Steel complying with ASTM A36/A36M and hot-dipped galvanized to ASTM A123/A123M Coating Grade 10.
- D. Fasteners:
  1. Exposed Fasteners: Stainless steel; permitted only where absolutely unavoidable and subject to prior approval of the Architect.
  2. Screws: Self-drilling or self-tapping Type 410 stainless steel or zinc-alloy steel hex washer head, with EPDM or PVC washer under heads of fasteners bearing on weather side of metal wall panels.
  3. Bolts: Stainless steel.
  4. Fasteners for Flashing and Trim: Blind fasteners of high-strength aluminum or stainless steel.
- E. Joint Sealer: Provide color to match wall panels silicone sealant of type approved by MCM sheet manufacturer, and in compliance with ASTM C920.

- F. Provide panel system manufacturer's and installer's standard corrosion resistant accessories, including fasteners, clips, anchorage devices, and attachments.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine dimensions, tolerances, and interfaces with other work.
  - 1. Verify that weather barrier system is properly installed; refer to Section 07 25 00 for requirements.
- B. Examine substrate on-site to determine that conditions are acceptable for product installation in accordance with manufacturer's written instructions.
- C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.
- D. Notify Architect in writing of conditions detrimental to proper and timely completion of work, and do not proceed with erection until unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Protect adjacent work areas and finish surfaces from damage during installation.
- B. Provide anchorage items to be cast into concrete or built into masonry to appropriate installer(s) together with setting templates.
  - 1. Refer to Section 03 30 00 for additional cast in place concrete requirements.
  - 2. Refer to Section 04 20 00 for additional unit masonry requirements.

### **3.03 INSTALLATION**

- A. Do not install products that are defective, including warped, bowed, dented, and broken members, and members with damaged finishes.
- B. Comply with instructions and recommendations of MCM sheet manufacturer and wall system manufacturer, as well as with approved shop drawings.
- C. Install wall system securely allowing for necessary thermal and structural movement; comply with wall system manufacturer's instructions for installation of concealed fasteners.
- D. Do not handle or tool products during erection in manner that damages finish, decreases strength, or results in visual imperfection or failure in performance. Return component parts that require alteration to shop for refabrication, if possible, or for replacement with new parts.
- E. Do not form panels in field unless required by wall system manufacturer and approved by the Architect; comply with MCM sheet manufacturer's instructions and recommendations for field forming.
- F. Separate dissimilar metals; use gasket fasteners, isolation shims, or isolation tape where needed to eliminate possibility of electrolytic action between metals.
- G. Where joints are designed for field-applied sealant, seal joints completely with specified sealant.
- H. Install flashings as indicated on shop drawings. At flashing butt joints, provide a lap strap under flashing and seal lapped surfaces with a full bed of non-hardening sealant.
- I. Install square, plumb, straight, and true, accurately fitted, with tight joints and intersections maintaining the following installation tolerances:
  - 1. Variation From Plane or Location: 1/2 inch in 30 feet of length and up to 3/4 inch in 300 feet, maximum.
  - 2. Deviation of Vertical Member From True Line: 0.1 inch in 25 feet run, maximum.
  - 3. Deviation of Horizontal Member From True Line: 0.1 inch in 25 feet run, maximum.
  - 4. Offset From True Alignment Between Two Adjacent Members Abutting End To End, In Line: 0.03 inch, maximum.
- J. Replace damaged products.



#### **3.04 FIELD QUALITY CONTROL**

- A. Wall System Manufacturer's Field Services: Provide field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with instructions.

#### **3.05 CLEANING**

- A. Ensure weep holes and drainage channels are unobstructed and free of dirt and sealants.
- B. Remove protective film after installation of joint sealers, after cleaning of adjacent materials, and immediately prior to completion of work.
- C. Remove temporary coverings and protection of adjacent work areas.
- D. Clean installed products in accordance with manufacturer's instructions.

#### **3.06 PROTECTION**

- A. Protect installed panel system from damage until Date of Substantial Completion.

**END OF SECTION**

**SECTION 07 54 00**  
**THERMOPLASTIC MEMBRANE ROOFING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Adhered system with thermoplastic roofing membrane.
- B. Insulation, tapered.
- C. Vapor retarder.
- D. Deck sheathing.
- E. Flashings.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood nailers and curbs.
- B. Section 06 10 00 - Rough Carpentry: Wood cant strips.

**1.03 REFERENCE STANDARDS**

- A. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2019.
- B. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.
- C. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2019.
- D. ASTM D4263 - Standard Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method; 1983 (Reapproved 2018).
- E. ASTM D6878/D6878M - Standard Specification for Thermoplastic Polyolefin Based Sheet Roofing; 2019.
- F. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.
- G. NRCA (RM) - The NRCA Roofing Manual; 2019.
- H. NRCA (WM) - The NRCA Waterproofing Manual; 2005.
- I. UL (DIR) - Online Certifications Directory; Current Edition.
- J. UL (FRD) - Fire Resistance Directory; Current Edition.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Preinstallation Meeting: Convene one week before starting work of this section.
  - 1. Review preparation and installation procedures and coordinating and scheduling required with related work.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.
- C. Shop Drawings: Submit drawings that indicate joint or termination detail conditions and conditions of interface with other materials.
- D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
- E. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.
- F. Manufacturer's Qualification Statement.
- G. Installer's Qualification Statement.
- H. Warranty Documentation:

1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
2. Submit installer's certification that installation complies with warranty conditions for waterproof membrane.

#### **1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section with at least three years of documented experience.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
- B. Store materials in weather protected environment, clear of ground and moisture.
- C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
- D. Protect foam insulation from direct exposure to sunlight.

#### **1.08 FIELD CONDITIONS**

- A. Do not apply roofing membrane during unsuitable weather.
- B. Do not apply roofing membrane when ambient temperature is below 40 degrees F or above 90 degrees F.
- C. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- D. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
- E. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

#### **1.09 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes.
  1. Warranty Term: 20 years.
  2. For repair and replacement include costs of both material and labor in warranty.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Thermoplastic Polyolefin (TPO) Membrane Roofing Materials:
  1. Carlisle Roofing Systems, Inc; FleeceBACK Fully Adhered TPO: [www.carlisle-syntec.com/#sle](http://www.carlisle-syntec.com/#sle).
  2. Firestone Building Products, LLC: [www.firestonebpco.com/#sle](http://www.firestonebpco.com/#sle).
  3. GAF; EverGuard Extreme TPO 60 mil: [www.gaf.com/#sle](http://www.gaf.com/#sle).
  4. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Insulation:
  1. Carlisle SynTec; SecurShield Insulation: [www.carlisle-syntec.com/#sle](http://www.carlisle-syntec.com/#sle).
  2. Dow Chemical Company: [www.dowbuildingsolutions.com/#sle](http://www.dowbuildingsolutions.com/#sle).
  3. GAF: [www.gaf.com/#sle](http://www.gaf.com/#sle).
  4. Substitutions: See Section 01 60 00 - Product Requirements.

#### **2.02 ROOFING - UNBALLASTED APPLICATIONS**

- A. Thermoplastic Membrane Roofing: One ply membrane, fully adhered, over insulation.

- B. Acceptable Insulation Types - Tapered Application: Any of types specified.
  - 1. Tapered polyisocyanurate or extruded polystyrene board.

### **2.03 MEMBRANE ROOFING AND ASSOCIATED MATERIALS**

- A. Membrane Roofing Materials:
  - 1. TPO: Thermoplastic polyolefin (TPO) complying with ASTM D6878/D6878M, sheet contains reinforcing fabrics or scrim.
    - a. Thickness: 60 mil, 0.060 inch, minimum.
  - 2. Sheet Width: Factory fabricated into largest sheets possible.
  - 3. Solar Reflectance: 0.75, minimum, initial, and 0.65, minimum, 3-year, certified by Cool Roof Rating Council.
  - 4. Color: White.
- B. Seaming Materials: As recommended by membrane manufacturer.
- C. Membrane Fasteners: As recommended and approved by membrane manufacturer.
- D. Vapor Retarder: Material approved by roof manufacturer complying with requirements of fire rating classification; compatible with roofing and insulation materials.
  - 1. Fire-retardant adhesive.
- E. Flexible Flashing Material: Same material as membrane.

### **2.04 DECK SHEATHING**

- A. Deck Sheathing: Glass-mat faced gypsum panels complying with ASTM C1177/C1177M.
  - 1. Thickness: 1/4 inch, fire-resistant.
  - 2. Manufacturers:
    - a. Georgia-Pacific; DensDeck Prime with EONIC Technology: [www.densdeck.com/#sle](http://www.densdeck.com/#sle).
    - b. National Gypsum Company; DEXcell Glass Mat Roof Board: [www.nationalgypsum.com/#sle](http://www.nationalgypsum.com/#sle).
    - c. USG Corporation; Securock Ultralight Glass-Mat Roof Board: [www.usg.com/#sle](http://www.usg.com/#sle).
    - d. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.05 INSULATION**

- A. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
  - 1. Tapered Board: Slope as indicated; minimum thickness 1 inch; fabricate of fewest layers possible.
  - 2. Board Edges: Square.
  - 3. Manufacturers:
    - a. Dow Chemical Company: [www.dowbuildingsolutions.com](http://www.dowbuildingsolutions.com).
    - b. GAF; EnergyGuard Polyiso Insulation: [www.gaf.com/#sle](http://www.gaf.com/#sle).
    - c. Substitutions: See Section 01 60 00 - Product Requirements.
- B. Extruded Polystyrene (XPS) Board Insulation: Comply with ASTM C578 with natural skin surface, drainage channels on one face.
  - 1. Tapered Board: Slope as indicated; minimum thickness 1/2 in; fabricate of fewest layers possible.
  - 2. Board Edges: Square.
  - 3. Manufacturers:
    - a. Owens Corning Corporation: [www.ocbuildingspec.com/#sle](http://www.ocbuildingspec.com/#sle).

### **2.06 ACCESSORIES**

- A. Sheathing Joint Tape: Paper type, 2 inch wide, self-adhering.
- B. Insulation Joint Tape: Glass fiber reinforced type as recommended by insulation manufacturer, compatible with roofing materials; 6 inches wide; self-adhering.
- C. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
  - 1. Length as required for thickness of insulation material and penetration of deck substrate, with metal washers.

- D. Membrane Adhesive: As recommended by membrane manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces and site conditions are ready to receive work.
- B. Verify deck is supported and secure.
- C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
- D. Verify deck surfaces are dry and free of snow or ice.
- E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.

### **3.02 PREPARATION - CONCRETE DECK**

- A. Fill surface honeycomb and variations with latex filler.
- B. Do not begin work until elevated concrete substrate has cured at least 28 days and moisture content is five percent or less.
  - 1. Test as Follows:
    - a. Concrete Moisture Content: No beading water under plastic after 16 hours when tested in accordance with ASTM D4263.
    - b. Relative Humidity in Concrete: Not greater than 75 percent when tested in accordance with ASTM F2170.

### **3.03 PREPARATION - METAL DECK**

- A. Install deck sheathing on metal deck:
  - 1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
  - 2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
  - 3. Tape joints.

### **3.04 INSTALLATION, GENERAL**

- A. Perform work in accordance with manufacturer's instructions, NRCA (RM), and NRCA (WM) applicable requirements.
- B. Do not apply roofing membrane during cold or wet weather conditions.
- C. Do not apply roofing membrane when ambient temperature is outside the temperature range recommended by manufacturer.
- D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
- E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.

### **3.05 INSTALLATION - VAPOR RETARDER AND INSULATION, UNDER MEMBRANE**

- A. Install vapor retarder to deck surface with adhesive in accordance with manufacturer's instructions.
  - 1. Extend vapor retarder under cant strips and blocking to deck edge.
  - 2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and seal to provide continuity of the air barrier plane.
- B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.
- C. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of preceding layer.
- D. Place tapered insulation to the required slope pattern in accordance with manufacturer's instructions.

- E. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck flutes.
- F. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to perimeter blocking and around penetrations through roof.
- G. Tape joints of insulation in accordance with roofing and insulation manufacturers' instructions.
- H. Do not install more insulation than can be covered with membrane in same day.

### **3.06 INSTALLATION - MEMBRANE**

- A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching.
- B. Shingle joints on sloped substrate in direction of drainage.
- C. Fully Adhered Application: Install adhesive to substrate at rate of as per manufacturer gal/sq ft. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion joints. Fully adhere one roll before proceeding to adjacent rolls.
- D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal permanently waterproof. Install uniform bead of sealant to joint edge.
- E. At intersections with vertical surfaces:
  - 1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
  - 2. Fully adhere flexible flashing over membrane and up to nailing strips.
- F. Around roof penetrations, seal flanges and flashings with flexible flashing.
- G. Coordinate installation of roof drains and sumps and related flashings.

### **3.07 FIELD QUALITY CONTROL**

- A. See Section 01 40 00 - Quality Requirements, for general requirements for field quality control and inspection.
- B. Require site attendance of roofing and insulation material manufacturers daily during installation of the work.

### **3.08 CLEANING**

- A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.
- B. Remove bituminous markings from finished surfaces.
- C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.
- D. Repair or replace defaced or damaged finishes caused by work of this section.

### **3.09 PROTECTION**

- A. Protect installed roofing and flashings from construction operations.
- B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

**END OF SECTION**

**SECTION 07 62 00**  
**SHEET METAL FLASHING AND TRIM**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Fabricated sheet metal items, including flashings and counterflashings.
- B. Sealants for joints within sheet metal fabrications.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood nailers for sheet metal work.
- B. Section 07 92 00 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

**1.04 QUALITY ASSURANCE**

- A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
- B. Prevent contact with materials that could cause discoloration or staining.

**PART 2 PRODUCTS**

**2.01 SHEET MATERIALS**

- A. Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gauge, (0.0239 inch) thick base metal.
- B. Aluminum: ASTM B209 (ASTM B209M); 20 gauge, 0.032 inch thick; anodized finish to match metal panel finish.
  - 1. Clear Anodized Finish: AAMA 611 AA-M12C22A41 Class I clear anodic coating not less than 0.7 mils thick.

**2.02 FABRICATION**

- A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
- B. Form pieces in longest possible lengths.
- C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
- D. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
- E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
- F. Fabricate flashings to allow toe to extend 2 inches over roofing gravel. Return and brake edges.

**2.03 ACCESSORIES**

- A. Fasteners: Galvanized steel, with soft neoprene washers.
- B. Primer: Zinc chromate type.
- C. Concealed Sealants: Non-curing butyl sealant.
- D. Exposed Sealants: ASTM C920; elastomeric sealant, with minimum movement capability as recommended by manufacturer for substrates to be sealed; color to match adjacent material.

- E. Plastic Cement: ASTM D4586/D4586M, Type I.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
- B. Verify roofing termination and base flashings are in place, sealed, and secure.

#### **3.02 PREPARATION**

- A. Install starter and edge strips, and cleats before starting installation.
- B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

#### **3.03 INSTALLATION**

- A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted.
- B. Apply plastic cement compound between metal flashings and felt flashings.
- C. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

**END OF SECTION**



**SECTION 07 71 00**  
**ROOF SPECIALTIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Manufactured roof specialties, including copings.

**1.02 REFERENCE STANDARDS**

- A. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum; 2014 (2015 Errata).
- B. ANSI/SPRI/FM 4435/ES-1 - Test Standard for Edge Systems Used with Low Slope Roofing Systems; 2017.
- C. NRCA (RM) - The NRCA Roofing Manual; 2019.
- D. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on shape of components, materials and finishes, anchor types and locations.
- C. Shop Drawings: Indicate configuration and dimension of components, adjacent construction, required clearances and tolerances, and other affected work.
- D. Samples: Submit two appropriately sized samples of coping.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

- A. Roof Edge Flashings and Copings:
  - 1. Architectural Products Co: [www.archprod.com/#sle](http://www.archprod.com/#sle).
  - 2. Metal Roofing Systems, Inc; Rapid Lock Coping: [www.metalroofingsystems.biz/#sle](http://www.metalroofingsystems.biz/#sle).
  - 3. OMG Roofing Products; Formed Coping Plus: [www.omgroofing.com/#sle](http://www.omgroofing.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 COMPONENTS**

- A. Copings: Factory fabricated to sizes required; corners mitered; concealed fasteners.
  - 1. Configuration: Concealed continuous hold down cleat at both legs; internal splice piece at joints of same material, thickness, and finish as cap; concealed stainless steel fasteners.
  - 2. Pull-Off Resistance: Tested in accordance with ANSI/SPRI/FM 4435/ES-1 using test method RE-3 to positive and negative design wind pressure as defined by applicable local building code.
  - 3. Wall Width: As indicated on drawings.
  - 4. Outside Face Height: 4 inches.
  - 5. Inside Face Height: 4 inches.
  - 6. Material: Formed aluminum sheet, 0.040 inch thick, minimum.
  - 7. Color: To be selected by Architect from manufacturer's standard range.

**2.03 FINISHES**

- A. Color Anodized Finish: AAMA 611 AA-M12C22A42/44 Class I integrally or electrolytically colored anodic coating not less than 0.7 mils thick.

**2.04 ACCESSORIES**

- A. Sealant for Joints in Linear Components: As recommended by component manufacturer.
- B. Adhesive for Anchoring to Roof Membrane: Compatible with roof membrane and approved by roof membrane manufacturer.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that deck, curbs, roof membrane, base flashing, and other items affecting work of this Section are in place and positioned correctly.

### **3.02 INSTALLATION**

- A. Install components in accordance with manufacturer's instructions and NRCA (RM) applicable requirements.
- B. Seal joints within components when required by component manufacturer.
- C. Anchor components securely.
- D. Coordinate installation of components of this section with installation of roofing membrane and base flashings.
- E. Coordinate installation of sealants and roofing cement with work of this section to ensure water tightness.

**END OF SECTION**

**SECTION 07 91 00**  
**PREFORMED JOINT SEALS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Precompressed foam seals.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Liquid and mastic joint sealants and their backing materials.

**1.03 REFERENCE STANDARDS**

- A. ASTM D1056 - Standard Specification for Flexible Cellular Materials-Sponge or Expanded Rubber; 2014.
- B. ASTM D2240 - Standard Test Method for Rubber Property--Durometer Hardness; 2015, with Editorial Revision (2017).
- C. ASTM D2628 - Standard Specification for Preformed Polychloroprene Elastomeric Joint Seals for Concrete Pavements; 1991 (Reapproved 2016).
- D. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Manufacturer's technical data sheets for each product, including chemical composition, movement capability, color availability, limitations on application, and installation instructions.
- C. Color Cards: For color selection.
- D. Manufacturer's Qualification Statement.
- E. Installer's Qualification Statement.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing work of the type specified in this section with at least three years of documented experience.

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a two year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealers that fail to achieve watertight seal or exhibit loss of adhesion or cohesion.

**PART 2 PRODUCTS**

**2.01 PRECOMPRESSED FOAM SEALS**

- A. Precompressed Foam Seal: Comprised of urethane, modified-acrylic impregnated, or closed-cell neoprene foam impregnated with water-repellent, and with self-adhesive faces protected prior to installation by release paper.
  - 1. Color: Gray.
  - 2. Size as required to provide water-tight seal when installed.
  - 3. Measure size of existing joints before selecting seal width.
  - 4. Applications:
    - a. Exterior wall expansion joints.
    - b. Parking deck joints.
  - 5. Manufacturers:

- a. BASF Watson Bowman Acme Corporation; Wabo Evazote UV: [www.wbacorp.com/#sle](http://www.wbacorp.com/#sle).
- b. EMSEAL Joint Systems, Ltd; DSM System: [www.emseal.com/#sle](http://www.emseal.com/#sle).
- c. Tremco Commercial Sealants & Waterproofing; ExoAir Eco: [www.tremcosealants.com/#sle](http://www.tremcosealants.com/#sle).
- d. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.02 ACCESSORIES**

- A. Adhesive: As recommended by seal manufacturer.
- B. Masking Tape: Self-adhesive, nonabsorbent, non-staining, removable without adhesive residue, and compatible with surfaces adjacent to joints and strip seal.
- C. Substrate Cleaner: Non-corrosive, non-staining type recommended by seal manufacturer; compatible with joint forming materials.
- D. Primer: Type recommended by seal manufacturer to suit application; non-staining.
- E. Backing Tape: Self-adhesive polyethylene tape with surface that seal will not adhere to.
- F. Provide Wabo SafetyFlex cover at building expansion joints.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that joints are ready to receive this work.
- B. Measure joint dimensions and verify that seal products are of the correct size to properly seal the joints.

### **3.02 PREPARATION**

- A. Properly prepare construction components adjacent to the work of this section to prevent damage and disfigurement due to this work.

### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's written instructions.
- B. Precompressed Foam Seals:
  - 1. Install only when ambient temperature is within recommended application temperature range of adhesive. Consult manufacturer when installing outside this temperature range.
  - 2. Prepare joints and install seals in accordance with manufacturer's written recommendations.
  - 3. Remove loose materials and foreign matter that could impair adhesion of sealant.
  - 4. Do not stretch precompressed seal; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

### **3.04 CLEANING**

- A. Clean adjacent soiled surfaces.

### **3.05 PROTECTION**

- A. Protect joints from damage until adhesives have properly cured.

**END OF SECTION**

**SECTION 07 92 00**  
**JOINT SEALANTS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Nonsag gunnable joint sealants.
- B. Self-leveling pourable joint sealants.
- C. Joint backings and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 95 13 - Expansion Joint Cover Assemblies: Sealants forming part of expansion joint cover assemblies.
- B. Section 08 71 00 - Door Hardware: Setting exterior door thresholds in sealant.
- C. Section 08 80 00 - Glazing: Glazing sealants and accessories.

**1.03 REFERENCE STANDARDS**

- A. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
- B. ASTM C794 - Standard Test Method for Adhesion-In-Peel of Elastomeric Joint Sealants; 2018.
- C. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- D. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2016.
- E. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- F. ASTM C1248 - Standard Test Method for Staining of Porous Substrate by Joint Sealants; 2018.
- G. ASTM C1521 - Standard Practice for Evaluating Adhesion of Installed Weatherproofing Sealant Joints; 2019 (Reapproved 2020).
- H. SCAQMD 1168 - Adhesive and Sealant Applications; 1989 (Amended 2017).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data for Sealants: Submit manufacturer's technical data sheets for each product to be used, that includes the following.
  - 1. Physical characteristics, including movement capability, VOC content, hardness, cure time, and color availability.
  - 2. List of backing materials approved for use with the specific product.
  - 3. Substrates that product is known to satisfactorily adhere to and with which it is compatible.
  - 4. Substrates the product should not be used on.
- C. Color Cards for Selection: Where sealant color is not specified, submit manufacturer's color cards showing standard colors available for selection.
- D. Preconstruction Laboratory Test Reports: Submit at least four weeks prior to start of installation.
- E. Preinstallation Field Adhesion Test Plan: Submit at least two weeks prior to start of installation.
- F. Preinstallation Field Adhesion Test Reports: Submit filled out Preinstallation Field Adhesion Test Reports log within 10 days after completion of tests; include bagged test samples and photographic records.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in performing the work of this section and with at least three years of documented experience.

- C. Preconstruction Laboratory Testing: Arrange for sealant manufacturer(s) to test each combination of sealant, substrate, backing, and accessories.
  - 1. Adhesion Testing: In accordance with ASTM C794.
  - 2. Compatibility Testing: In accordance with ASTM C1087.
  - 3. Allow sufficient time for testing to avoid delaying the work.
  - 4. Deliver to manufacturer sufficient samples for testing.
  - 5. Report manufacturer's recommended corrective measures, if any, including primers or techniques not indicated in product data submittals.
  - 6. Testing is not required if sealant manufacturer provides data showing previous testing, not older than 24 months, that shows satisfactory adhesion, lack of staining, and compatibility.
- D. Preinstallation Field Adhesion Test Plan: Include destructive field adhesion testing of one sample of each combination of sealant type and substrate, except interior acrylic latex sealants, and include the following for each tested sample.
  - 1. Identification of testing agency.
  - 2. Preinstallation Field Adhesion Test Log Form: Include the following data fields, with known information filled out.
    - a. Test date.
    - b. Location on project.
    - c. Sealant used.
    - d. Test method used.
    - e. Date of installation of field sample to be tested.
    - f. Date of test.
    - g. Copy of test method documents.
    - h. Age of sealant upon date of testing.
    - i. Test results, modeled after the sample form in the test method document.
    - j. Indicate use of photographic record of test.
- E. Field Adhesion Test Procedures:
  - 1. Allow sealants to fully cure as recommended by manufacturer before testing.
  - 2. Have a copy of the test method document available during tests.
  - 3. Record the type of failure that occurred, other information required by test method, and the information required on the Field Quality Control Log.
  - 4. When performing destructive tests, also inspect the opened joint for proper installation characteristics recommended by manufacturer, and report any deficiencies.
  - 5. Deliver the samples removed during destructive tests in separate sealed plastic bags, identified with project, location, test date, and test results, to Owner.
  - 6. If any combination of sealant type and substrate does not show evidence of minimum adhesion or shows cohesion failure before minimum adhesion, report results to Architect.
- F. Destructive Field Adhesion Test: Test for adhesion in accordance with ASTM C1521, using Destructive Tail Procedure.
  - 1. Sample: At least 18 inches long.
  - 2. Minimum Elongation Without Adhesive Failure: Consider the tail at rest, not under any elongation stress; multiply the stated movement capability of the sealant in percent by two; then multiply 1 inch by that percentage; if adhesion failure occurs before the "1 inch mark" is that distance from the substrate, the test has failed.
  - 3. If either adhesive or cohesive failure occurs prior to minimum elongation, take necessary measures to correct conditions and re-test; record each modification to products or installation procedures.

## 1.06 WARRANTY

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective work within a five year period after Date of Substantial Completion.
- C. Warranty: Include coverage for installed sealants and accessories that fail to achieve watertight seal, exhibit loss of adhesion or cohesion, or do not cure.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Non-Sag Sealants: Permits application in joints on vertical surfaces without sagging or slumping.
  - 1. Dow Chemical Company:  
[consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
  - 2. Master Builders Solutions by BASF; \_\_\_\_\_:  
[www.master-builders-solutions.basf.us/en-us/#sle](http://www.master-builders-solutions.basf.us/en-us/#sle).
  - 3. Pecora Corporation: [www.pecora.com/#sle](http://www.pecora.com/#sle).
  - 4. Sika Corporation: [www.usa-sika.com/#sle](http://www.usa-sika.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 JOINT SEALANT APPLICATIONS**

- A. Scope:
  - 1. Exterior Joints: Seal open joints, whether or not the joint is indicated on drawings, unless specifically indicated not to be sealed. Exterior joints to be sealed include, but are not limited to, the following items.
    - a. Wall expansion and control joints.
    - b. Joints between door, window, and other frames and adjacent construction.
    - c. Joints between different exposed materials.
    - d. Openings below ledge angles in masonry.
    - e. Other joints indicated below.
  - 2. Interior Joints: Do not seal interior joints unless specifically indicated to be sealed. Interior joints to be sealed include, but are not limited to, the following items.
    - a. Joints between door, window, and other frames and adjacent construction.
    - b. Other joints indicated below.
  - 3. Do not seal the following types of joints.
    - a. Intentional weepholes in masonry.
    - b. Joints indicated to be treated with manufactured expansion joint cover or some other type of sealing device.
    - c. Joints where sealant is specified to be provided by manufacturer of product to be sealed.
    - d. Joints where installation of sealant is specified in another section.
    - e. Joints between suspended panel ceilings/grid and walls.

### **2.03 JOINT SEALANTS - GENERAL**

- A. Sealants and Primers: Provide products having lower volatile organic compound (VOC) content than indicated in SCAQMD 1168.
- B. Colors: As indicated on drawings.

### **2.04 NONSAG JOINT SEALANTS**

- A. Type S-1 - Non-Staining Silicone Sealant: ASTM C920, Grade NS, Uses M and A; not expected to withstand continuous water immersion or traffic.
  - 1. Movement Capability: Plus and minus 50 percent, minimum.
  - 2. Non-Staining To Porous Stone: Non-staining to light-colored natural stone when tested in accordance with ASTM C1248.
  - 3. Dirt Pick-Up: Reduced dirt pick-up compared to other silicone sealants.
  - 4. Color: Match adjacent finished surfaces.
  - 5. Manufacturers:
    - a. Dow Chemical Company; DOWSIL 790 Silicone Building Sealant:  
[consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
    - b. Dow Chemical Company; DOWSIL 795 Silicone Building Sealant:  
[consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).

## **2.05 SELF-LEVELING SEALANTS**

- A. Type P - Self-Leveling Silicone Sealant: ASTM C920, Grade P, Uses M and A; single or multicomponent, explicitly approved by manufacturer for traffic exposure when recessed below traffic surface; not expected to withstand continuous water immersion.
  - 1. Movement Capability: Plus 100 percent, minus 50 percent, minimum.
  - 2. Hardness Range: 0 to 15, Shore A, when tested in accordance with ASTM C661.
  - 3. Color: To be selected by Architect from manufacturer's standard range.
  - 4. Service Temperature Range: Minus 40 to 180 degrees F.
  - 5. Manufacturers:
    - a. Dow Chemical Company; DOWSIL FC Parking Structure Sealant: [consumer.dow.com/en-us/industry/ind-building-construction.html/#sle](http://consumer.dow.com/en-us/industry/ind-building-construction.html/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

## **2.06 ACCESSORIES**

- A. Backer Rod: Cylindrical cellular foam rod with surface that sealant will not adhere to, compatible with specific sealant used, and recommended by backing and sealant manufacturers for specific application.
  - 1. Open Cell: 40 to 50 percent larger in diameter than joint width.
- B. Backing Tape: Self-adhesive polyethylene tape with surface that sealant will not adhere to and recommended by tape and sealant manufacturers for specific application.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that joints are ready to receive work.
- B. Verify that backing materials are compatible with sealants.
- C. Verify that backer rods are of the correct size.
- D. Preinstallation Adhesion Testing: Install a sample for each test location indicated in the test plan.
  - 1. Test each sample as specified in PART 1 under QUALITY ASSURANCE article.
  - 2. Notify Architect of date and time that tests will be performed, at least seven days in advance.
  - 3. Record each test on Preinstallation Adhesion Test Log as indicated.
  - 4. If any sample fails, review products and installation procedures, consult manufacturer, or take whatever other measures are necessary to ensure adhesion; re-test in a different location; if unable to obtain satisfactory adhesion, report to Architect.
  - 5. After completion of tests, remove remaining sample material and prepare joint for new sealant installation.

### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean joints, and prime as necessary, in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Mask elements and surfaces adjacent to joints from damage and disfigurement due to sealant work; be aware that sealant drips and smears may not be completely removable.

### **3.03 INSTALLATION**

- A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
- B. Perform installation in accordance with ASTM C1193.
- C. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
  - 1. Width/depth ratio of 2:1.



2. Neck dimension no greater than 1/3 of the joint width.
  3. Surface bond area on each side not less than 75 percent of joint width.
- D. Install bond breaker backing tape where backer rod cannot be used.
  - E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags, and without getting sealant on adjacent surfaces.
  - F. Do not install sealant when ambient temperature is outside manufacturer's recommended temperature range, or will be outside that range during the entire curing period, unless manufacturer's approval is obtained and instructions are followed.
  - G. Nonsag Sealants: Tool surface concave, unless otherwise indicated; remove masking tape immediately after tooling sealant surface.

#### **3.04 FIELD QUALITY CONTROL**

- A. Perform field quality control inspection/testing as specified in PART 1 under QUALITY ASSURANCE article.
- B. Remove and replace failed portions of sealants using same materials and procedures as indicated for original installation.

#### **3.05 POST-OCCUPANCY**

- A. Post-Occupancy Inspection: Perform visual inspection of entire length of project sealant joints at a time that joints have opened to their greatest width; i.e. at low temperature in thermal cycle. Report failures immediately and repair.

**END OF SECTION**

**SECTION 07 95 13**  
**EXPANSION JOINT COVER ASSEMBLIES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Expansion joint cover assemblies for floor surfaces.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 91 00 - Preformed Joint Seals: Sealing expansion and control joints using preformed joint seals.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide joint assembly profiles, profile dimensions, anchorage devices and available colors and finish.
- C. Shop Drawings: Indicate joint and splice locations, miters, layout of the work, affected adjacent construction and anchorage locations.
- D. Manufacturer's Installation Instructions: Indicate rough-in sizes and required tolerances for item placement.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 for additional provisions.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

**2.02 EXPANSION JOINT COVER ASSEMBLY APPLICATIONS**

- A. Interior Floor Joints Subject to Thermal Movement:
  - 1. Manufacturers:
    - a. BASF Watson Bowman Acme Corporation; Wabo Safety Flex:  
[www.wbacorp.com/#sle](http://www.wbacorp.com/#sle).
    - b. Substitutions: See Section 01 60 00 - Product Requirements.

**2.03 EXPANSION JOINT COVER ASSEMBLIES**

- A. Expansion Joint Cover Assemblies - General: Factory-fabricated and assembled; designed to completely fill joint openings, sealed to prevent passage of air, dust, water, smoke; suitable for traffic expected.
  - 1. Joint Dimensions and Configurations: As indicated on drawings.
  - 2. Joint Cover Sizes: Selected to suit joint width and configuration, based on manufacturer's published recommendations and limitations.
  - 3. Lengths: Provide covers in full lengths required; avoid splicing wherever possible.
  - 4. Anchors, Fasteners, and Fittings: Provided by cover manufacturer.
- B. Floor Joint Covers: Coordinate with indicated floor coverings.

**2.04 MATERIALS**

- A. Extruded Aluminum: ASTM B221 (ASTM B221M), 6063 alloy, T6 temper; or ASTM B308/B308M, 6061 alloy, T6 temper.
  - 1. Exposed Finish Outdoors: Dark bronze anodized.
- B. Backing Paint for Aluminum Components in Contact with Cementitious Materials: Asphaltic type.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that joint preparation and dimensions are acceptable and in accordance with manufacturer's requirements.

### **3.02 INSTALLATION**

- A. Install components and accessories in accordance with manufacturer's instructions.
- B. Align work plumb and level, flush with adjacent surfaces.
- C. Rigidly anchor to substrate to prevent misalignment.

### **3.03 PROTECTION**

- A. Do not permit traffic over unprotected floor joint surfaces.

**END OF SECTION**

**SECTION 08 11 13**  
**HOLLOW METAL DOORS AND FRAMES**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal doors and frames.
- B. Fire-rated hollow metal doors and frames.
- C. Thermally insulated hollow metal doors with frames.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 71 00 - Door Hardware.
- B. Section 09 91 13 - Exterior Painting: Field painting.

**1.03 ABBREVIATIONS AND ACRONYMS**

- A. ANSI: American National Standards Institute.
- B. HMMA: Hollow Metal Manufacturers Association.
- C. NAAMM: National Association of Architectural Metal Manufacturers.
- D. SDI: Steel Door Institute.
- E. UL: Underwriters Laboratories.

**1.04 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ANSI/SDI A250.3 - Test Procedure and Acceptance Criteria for Factory Applied Finish Coatings for Steel Doors and Frames; 2007 (Reaffirmed 2011).
- C. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- D. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2017.
- E. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- F. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2020.
- G. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2018.
- H. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2018a.
- I. ASTM C143/C143M - Standard Test Method for Slump of Hydraulic-Cement Concrete; 2015a.
- J. ASTM C476 - Standard Specification for Grout for Masonry; 2020.
- K. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames; 2016.
- L. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.
- M. ITS (DIR) - Directory of Listed Products; current edition.
- N. NAAMM HMMA 830 - Hardware Selection for Hollow Metal Doors and Frames; 2002.
- O. NAAMM HMMA 831 - Hardware Locations for Hollow Metal Doors and Frames; 2011.
- P. NAAMM HMMA 840 - Guide Specifications For Receipt, Storage and Installation of Hollow Metal Doors and Frames; 2007.

- Q. NAAMM HMMA 861 - Guide Specifications for Commercial Hollow Metal Doors and Frames; 2014.
- R. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2019.
- S. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2017.
- T. SDI 117 - Manufacturing Tolerances for Standard Steel Doors and Frames; 2013.
- U. UL (DIR) - Online Certifications Directory; Current Edition.
- V. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

### **1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.

### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Comply with NAAMM HMMA 840 or ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
- B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion and adverse effects on factory applied painted finish.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Hollow Metal Doors and Frames:
  - 1. Ceco Door, an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 2. Curries, an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 3. Fleming Door Products, an Assa Abloy Group company: [www.assaabloydss.com/#sle](http://www.assaabloydss.com/#sle).
  - 4. Republic Doors, an Allegion brand: [www.republicdoor.com/#sle](http://www.republicdoor.com/#sle).
  - 5. Steelcraft, an Allegion brand: [www.allegion.com/#sle](http://www.allegion.com/#sle).
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 PERFORMANCE REQUIREMENTS**

- A. Requirements for Hollow Metal Doors and Frames:
  - 1. Steel Sheet: Comply with one or more of the following requirements; galvanized steel complying with ASTM A653/A653M, cold-rolled steel complying with ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel complying with ASTM A1011/A1011M, commercial steel (CS) Type B, for each.
  - 2. Accessibility: Comply with ICC A117.1 and ADA Standards.
  - 3. Exterior Door Top Closures: Flush end closure channel, with top and door faces aligned.
  - 4. Door Edge Profile: Manufacturers standard for application indicated.
  - 5. Typical Door Face Sheets: Flush.
  - 6. Hardware Preparations, Selections and Locations: Comply with NAAMM HMMA 830 and NAAMM HMMA 831 or BHMA A156.115 and ANSI/SDI A250.8 (SDI-100) in accordance with specified requirements.
  - 7. Zinc Coating for Typical Interior and/or Exterior Locations: Provide metal components zinc-coated (galvanized) and/or zinc-iron alloy-coated (galvanized) by the hot-dip process in accordance with ASTM A653/A653M, with manufacturer's standard coating thickness, unless noted otherwise for specific hollow metal doors and frames.
- B. Combined Requirements: If a particular door and frame unit is indicated to comply with more than one type of requirement, comply with the specified requirements for each type; for instance, an exterior door that is also indicated as being sound-rated must comply with the

requirements specified for exterior doors and for sound-rated doors; where two requirements conflict, comply with the most stringent.

### **2.03 HOLLOW METAL DOORS**

- A. Door Finish: Factory primed and field finished.
- B. Exterior Doors: Thermally insulated.
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 2 - Heavy-duty.
    - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
  - 2. Door Thickness: 1-3/4 inches, nominal.
- C. Fire-Rated Doors:
  - 1. Based on SDI Standards: ANSI/SDI A250.8 (SDI-100).
    - a. Level 2 - Heavy-duty.
    - b. Physical Performance Level B, 500,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 18 gauge, 0.042 inch, minimum.
  - 2. Fire Rating: As indicated on Door Schedule, tested in accordance with UL 10C and NFPA 252 ("positive pressure fire tests").
  - 3. Provide units listed and labeled by UL (DIR) or ITS (DIR).
    - a. Attach fire rating label to each fire rated unit.
  - 4. Door Thickness: 1-3/4 inches, nominal.

### **2.04 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. Exterior Door Frames: Full profile/continuously welded type.
  - 1. Galvanizing: Components hot-dipped zinc-iron alloy-coated (galvannealed) in accordance with ASTM A653/A653M, with A40/ZF120 coating.
  - 2. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.
  - 3. Frame Finish: Factory primed and field finished.
  - 4. Weatherstripping: Separate, see Section 08 71 00.
- C. Door Frames, Fire-Rated: Full profile/continuously welded type.
  - 1. Fire Rating: Same as door, labeled.
  - 2. Frame Metal Thickness: 18 gauge, 0.042 inch, minimum.
  - 3. Frame Finish: Factory primed and field finished.
- D. Provide mortar guard boxes for hardware cut-outs in frames to be installed in masonry or to be grouted.
- E. Frames in Masonry Walls: Size to suit masonry coursing with head member 4 inches high to fill opening without cutting masonry units.

### **2.05 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.
- B. Factory Finish: Complying with ANSI/SDI A250.3, manufacturer's standard coating.
  - 1. Color: As selected by Architect from manufacturer's standard range.
- C. Bituminous Coating: Cold-applied asphalt mastic, compounded for 15 mil, 0.015 inch dry film thickness (DFT) per coat; provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.
  - 1. Fire-Rated Frames: Comply with fire rating requirements indicated.

## **2.06 ACCESSORIES**

- A. Grout for Frames: Mortar grout complying with ASTM C476 with maximum slump of 4 inches as measured in accordance with ASTM C143/C143M for hand troweling in place; plaster grout and thinner pumpable grout are prohibited.
- B. Silencers: Resilient rubber, fitted into drilled hole; provide three on strike side of single door, three on center mullion of pairs, and two on head of pairs without center mullions.
- C. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Verify that finished walls are in plane to ensure proper door alignment.

### **3.02 PREPARATION**

- A. Coat inside of frames to be installed in masonry or to be grouted, with bituminous coating, prior to installation.

### **3.03 INSTALLATION**

- A. Install doors and frames in accordance with manufacturer's instructions and related requirements of specified door and frame standards or custom guidelines indicated.
- B. Install fire rated units in accordance with NFPA 80.
- C. Coordinate frame anchor placement with wall construction.
- D. Grout frames in masonry construction, using hand trowel methods; brace frames so that pressure of grout before setting will not deform frames.
- E. Install door hardware as specified in Section 08 71 00.
- F. Touch up damaged factory finishes.

### **3.04 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified frame standards or custom guidelines indicated in accordance with SDI 117 or NAAMM HMMA 861.
- B. Maximum Diagonal Distortion: 1/16 inch measured with straight edge, corner to corner.

### **3.05 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

### **3.06 SCHEDULE**

- A. Refer to Door and Frame Schedule on the drawings.

**END OF SECTION**

**SECTION 08 44 13**  
**GLAZED ALUMINUM CURTAIN WALLS**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Aluminum-framed curtain wall, with vision glazing and glass infill panels.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Weld plates embedded in concrete for attachment of anchors.
- B. Section 07 92 00 - Joint Sealants: Sealing joints between frames and adjacent construction.
- C. Section 08 80 00 - Glazing.

**1.03 REFERENCE STANDARDS**

- A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site; 2015.
- B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum (Combined Document); 2015.
- C. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2017a.
- D. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.
- E. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2014.
- F. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2013.
- G. ASTM C661 - Standard Test Method for Indentation Hardness of Elastomeric-Type Sealants by Means of a Durometer; 2015.
- H. ASTM C793 - Standard Test Method for Effects of Laboratory Accelerated Weathering on Elastomeric Joint Sealants; 2005 (Reapproved 2017).
- I. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- J. ASTM C1087 - Standard Test Method for Determining Compatibility of Liquid-Applied Sealants with Accessories Used in Structural Glazing Systems; 2016.
- K. ASTM C1135 - Standard Test Method for Determining Tensile Adhesion Properties of Structural Sealants; 2015.
- L. ASTM C1184 - Standard Specification for Structural Silicone Sealants; 2018, with Editorial Revision.
- M. ASTM C1249 - Standard Guide for Secondary Seal for Sealed Insulating Glass Units for Structural Sealant Glazing Applications; 2018.
- N. ASTM C1401 - Standard Guide for Structural Sealant Glazing; 2014.
- O. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes; 2017.

**1.04 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate with installation of other components that comprise the exterior enclosure.

**1.05 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, and infill.



- C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
- D. Shop Drawings: Provide details of proposed structural sealant glazing (SSG) and weather sealant joints indicating dimensions, materials, bite, thicknesses, profile, and support framing.
- E. Samples: Submit two samples 4 by 4 inches in size illustrating finished aluminum surface, glazing, infill panels, and glazing materials.
- F. Design Data: Provide framing member structural and physical characteristics and engineering calculations, and identify dimensional limitations; include load calculations at points of attachment to building structure.
- G. Designer's Qualification Statement.
- H. Manufacturer's Qualification Statement.
- I. Installer's Qualification Statement.
- J. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

#### **1.06 QUALITY ASSURANCE**

- A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.
- B. Verify that each component is appropriate for use in structural sealant glazing (SSG) application in regards to at least the following properties; size, shape, dimensions, material, self-life, storage conditions, and color.
- C. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than three years of documented experience.
- D. Installer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Handle products of this section in accordance with AAMA CW-10.
- B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

#### **1.08 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Correct defective Work within a five year period after Date of Substantial Completion.
- C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
- D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

### **PART 2 PRODUCTS**

#### **2.01 MANUFACTURERS**

- A. Glazed Aluminum Curtain Walls Manufacturers:
  - 1. Coral Architectural Products, a division of Coral Industries, Inc; PW 256 Impact Resistant Curtain Wall System: [www.coralap.com/#sle](http://www.coralap.com/#sle).
  - 2. Kawneer North America: [www.kawneer.com/#sle](http://www.kawneer.com/#sle).
  - 3. Oldcastle Building Envelope: [www.oldcastlebe.com/#sle](http://www.oldcastlebe.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.

## 2.02 CURTAIN WALL

- A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
  - 1. Outside glazed, with pressure plate and mullion cover.
  - 2. Fabrication Method: Field fabricated stick system.
  - 3. Glazing Method: Field glazed system.
  - 4. Vertical Mullion Dimensions: 2-1/2 inches wide by 7-1/2 inches deep.
  - 5. Finish: High performance organic coatings.
    - a. Factory finish surfaces that will be exposed in completed assemblies.
    - b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
    - c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
  - 6. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
  - 7. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
  - 8. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
- B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
  - 1. Design Wind Loads: Comply with the requirements of ASCE 7.
  - 2. Seismic Loads: Design and size components to withstand seismic loads and sway displacement in accordance with requirements of ASCE 7.
  - 3. Wind-Borne-Debris Resistance: Identical full-size glazed assembly without auxiliary protection tested by independent agency in accordance with ASTM E1996 for Wind Zone 3 - Enhanced Protection for Large and Small Missile impact and pressure cycling at design wind pressure.
  - 4. Movement: Accommodate the following movement without damage to components or deterioration of seals:
    - a. Expansion and contraction caused by 180 degrees F surface temperature.
    - b. Expansion and contraction caused by cycling temperature range of 170 degrees F over a 12 hour period.
    - c. Movement of curtain wall relative to perimeter framing.
    - d. Deflection of structural support framing, under permanent and dynamic loads.
  - 5. Structural Sealant Glazing (SSG) System: For individual glass lites, design framing members to not exceed a deflection normal to the wall of L/175 between supports with 3/4 inch maximum, and a deflection parallel to the wall of L/360 with 1/8 inch maximum, whichever is less.

## 2.03 COMPONENTS

- A. Aluminum Framing Members: Tubular aluminum sections, drainage holes and internal weep drainage system.
- B. Glazing: As specified in Section 08 80 00.

## 2.04 MATERIALS

- A. Extruded Aluminum: ASTM B221 (ASTM B221M).
- B. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.
- C. Concealed Flashings: Sheet aluminum, 26 gauge, 0.017 inch minimum thickness.

- D. Structural Sealant Glazing (SSG) Adhesive: Neutral curing, silicone sealant formulated for SSG applications in compliance with ASTM C1184 and structural glazing industry guidelines, ASTM C1401.
  - 1. SSG adhesive in compliance with ASTM C920; Type S - Single-component, Grade NS, Class 50, Use NT, G, and A.
  - 2. Ultimate Tensile Strength: Minimum of 50 psi as determined by test method ASTM C1135 under the following conditions.
    - a. Exposure to air temperatures of 190 degrees F and minus 20 degrees F.
    - b. Water immersion for seven (7) days, minimum.
    - c. Exposure to weathering for 5,000 hours, minimum.
  - 3. Sealant Design Tensile Strength: 20 psi, maximum.
  - 4. Hardness: 20 to 60 with Type A-2 durometer in compliance with test method ASTM C661.
  - 5. Color: Black.
  - 6. SSG sealant tested for compatibility with glazing accessories in compliance with ASTM C1087, tested for accelerated weathering in compliance with ASTM C793, and in compliance with insulating glass secondary sealant design standards of ASTM C1249.
- E. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.
- F. Glazing Accessories: As specified in Section 08 80 00.

## **2.05 FINISHES**

- A. High Performance Organic Coatings: AAMA 2604; multiple coats, thermally cured fluoropolymer system.
- B. Color: Black.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify dimensions, tolerances, and method of attachment with other related work.
- B. Verify that curtain wall openings and adjoining air and vapor seal materials are ready to receive work of this section.
- C. Verify that anchorage devices have been properly installed and located.

### **3.02 INSTALLATION**

- A. Install curtain wall system in accordance with manufacturer's instructions.
- B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
- C. Provide alignment attachments and shims to permanently fasten system to building structure.
- D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
- E. Provide thermal isolation where components penetrate or disrupt building insulation.
- F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
- G. Structural Sealant Glazing (SSG) Adhesive: Install structural sealant glazing adhesive and weatherseal sealant in accordance with manufacturer's instructions.
- H. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

### **3.03 TOLERANCES**

- A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 0.5 inches per 100 ft, whichever is less.
- B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

- C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 3/4 inch and minimum of 1/4 inch.

#### **3.04 ADJUSTING**

- A. Adjust operating sash for smooth operation.

#### **3.05 CLEANING**

- A. Remove protective material from pre-finished aluminum surfaces.
- B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, take care to remove dirt from corners, and wipe surfaces clean.
- C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

#### **3.06 PROTECTION**

- A. Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION**

## SECTION 08 71 00

### DOOR HARDWARE

#### 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 commercial door hardware for the following:
1. Swinging doors.
  2. Sliding doors.
  3. Other doors to the extent indicated.
- B. Door hardware includes, but is not necessarily limited to, the following:
1. Mechanical door hardware.
  2. Cylinders specified for doors in other sections.
- C. Related Sections:
1. Division 06 Section "Rough Carpentry".
  2. Division 06 Section "Finish Carpentry".
  3. Division 08 Section "Operations and Maintenance".
  4. Division 08 Section "Door Schedule".
  5. Division 08 Section "Hollow Metal Doors and Frames".
  6. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
  2. ICC/IBC - International Building Code.
  3. NFPA 70 - National Electrical Code.
  4. NFPA 80 - Fire Doors and Windows.
  5. NFPA 101 - Life Safety Code.
  6. NFPA 105 - Installation of Smoke Door Assemblies.
  7. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
1. ANSI/BHMA Certified Product Standards - A156 Series.
  2. UL10C - Positive Pressure Fire Tests of Door Assemblies.

3. ANSI/UL 294 - Access Control System Units.
4. UL 305 - Panic Hardware.
5. ANSI/UL 437- Key Locks.

### 1.3 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
  1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
  2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
  3. Content: Include the following information:
    - a. Type, style, function, size, label, hand, and finish of each door hardware item.
    - b. Manufacturer of each item.
    - c. Fastenings and other pertinent information.
    - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
    - e. Explanation of abbreviations, symbols, and codes contained in schedule.
    - f. Mounting locations for door hardware.
    - g. Door and frame sizes and materials.
    - h. Warranty information for each product.
  4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.
- D. Informational Submittals:
  1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

- E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

#### 1.4 QUALITY ASSURANCE

- A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.
- B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).
- C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.
- D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.
- E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
  - 1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
- F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.
- G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
  - 1. Function of building, purpose of each area and degree of security required.
  - 2. Plans for existing and future key system expansion.
  - 3. Requirements for key control storage and software.
  - 4. Installation of permanent keys, cylinder cores and software.
  - 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.
  - 1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors.

Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.

2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
  3. Review sequence of operation narratives for each unique access controlled opening.
  4. Review and finalize construction schedule and verify availability of materials.
  5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

## **1.5 DELIVERY, STORAGE, AND HANDLING**

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

## **1.6 COORDINATION**

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

## **1.7 WARRANTY**

- A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
  1. Structural failures including excessive deflection, cracking, or breakage.
  2. Faulty operation of the hardware.
  3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
  4. Electrical component defects and failures within the systems operation.



- C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 SCHEDULED DOOR HARDWARE**

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
  - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Please note that ASSA ABLOY is transitioning the Yale Commercial brand to Arrow. This affects only the brand name; the products and product numbers will remain unchanged. The brand transition is expected to be complete in or about May of 2024, and products shipping after that time will be branded Arrow.
- D. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

### **2.2 HANGING DEVICES**

- A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
  - 1. Quantity: Provide the following hinge quantity:
    - a. Two Hinges: For doors with heights up to 60 inches.
    - b. Three Hinges: For doors with heights 61 to 90 inches.
    - c. Four Hinges: For doors with heights 91 to 120 inches.
    - d. For doors with heights more than 120 inches, provide 4 hinges, plus 1 hinge for every 30 inches of door height greater than 120 inches.
  - 2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
    - a. Widths up to 3'0": 4-1/2" standard or heavy weight as specified.
    - b. Sizes from 3'1" to 4'0": 5" standard or heavy weight as specified.
  - 3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:

- a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
  - b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
4. Hinge Options: Comply with the following:
- a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for the all out-swinging lockable doors.
5. Manufacturers:
- a. Hager Companies (HA) - BB Series, 5 knuckle.
  - b. McKinney (MK) - TA/T4A Series, 5 knuckle.
  - c. dormakaba Best (ST) - F/FBB Series, 5 knuckle.
- B. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
1. Manufacturers:.
- a. Hager Companies (HA).
  - b. Pemko (PE).
  - c. Select Hinges (SL).

### **2.3 DOOR OPERATING TRIM**

- A. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Push/Pull Plates: Minimum .050 inch thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
  2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
  3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
  4. Pulls, where applicable, shall be provided with a 10" clearance from the finished floor on the push side to accommodate wheelchair accessibility.
  5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets.
6. Manufacturers:
- a. Hiawatha, Inc. (HI).
  - b. Rockwood (RO).
  - c. Trimco (TC).

## 2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
  - 1. Threaded mortise cylinders with rings and cams to suit hardware application.
  - 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
  - 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
  - 4. Tubular deadlocks and other auxiliary locks.
  - 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
  - 6. Keyway: Manufacturer's Standard.
- C. Keying System: Each type of lock and cylinders to be factory keyed.
  - 1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
  - 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
  - 3. Existing System: Key locks to existing key system as directed by the Owner. Schlage SC keyway  
Schlage key: SC4Q
- D. Key Quantity: Provide the following minimum number of keys:
  - 1. Change Keys per Cylinder: Two (2)
  - 2. Master Keys (per Master Key Level/Group): Five (5).
  - 3. Construction Keys (where required): Ten (10).
- E. Construction Keying: Provide construction master keyed cylinders.
- F. Key Registration List (Bitting List):
  - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
  - 2. Provide transcript list in writing or electronic file as directed by the Owner.

## 2.5 MECHANICAL LOCKS AND LATCHING DEVICES

- A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed.
  - 1. Heavy duty cylindrical locks shall have a seven-year warranty.
  - 2. Vertical Impact: Exceed 100 vertical impacts (20 times ANSI/BHMA A156.2 requirements).
  - 3. Furnish with solid cast levers, standard 2 3/4" backset, and 1/2" (3/4" at rated paired openings) throw brass or stainless steel latchbolt.
  - 4. Locks are to be non-handed and fully field reversible.

5. Manufacturers:
  - a. Arrow, formerly known as Yale (YA) - 5400LN Series.
  - b. Corbin Russwin Hardware (RU) - CLX3300 Series.
  - c. dormakaba Best (BE) - 9K Series.
  - d. Sargent Manufacturing (SA) - 10X Line.

## 2.6 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
  1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
  2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
  3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
  4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
  1. Strikes for Mortise Locks and Latches: BHMA A156.13.
  2. Strikes for Bored Locks and Latches: BHMA A156.2.
  3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
  4. Dustproof Strikes: BHMA A156.16.

## 2.7 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
  1. Exit devices shall have a five-year warranty.
  2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
  3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer's catalog and template book for specific requirements.
  4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
  5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
  - a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
  - b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2" wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

## **2.8 DOOR CLOSERS**

- A. All door closers specified herein shall meet or exceed the following criteria:
  1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
  2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
  3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
  4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
  5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
  6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Commercial Duty): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, institutional grade door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck, closing sweep, and latch speed control valves. Provide non-handed units standard.

1. Manufacturers:
  - a. Arrow, formerly known as Yale (YA) - 3500 Series.
  - b. LCN Closers (LC) - 1450 Series.
  - c. Norton Rixson (NO) - 8500 Series.
  - d. Sargent Manufacturing (SA) - 1431 Series.

## **2.9 DOOR STOPS AND HOLDERS**

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.
- B. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
  1. Manufacturers:
    - a. Hiawatha, Inc. (HI).
    - b. Rockwood (RO).
    - c. Trimco (TC).

## **2.10 ARCHITECTURAL SEALS**

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
  1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
  1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:

1. National Guard Products (NG).
2. Pemko (PE).
3. Reese Enterprises, Inc. (RE).

## **2.11 FABRICATION**

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

## **2.12 FINISHES**

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

### **3.2 PREPARATION**

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

### **3.3 INSTALLATION**

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.
- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
  1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
  2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
  3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
  4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

### **3.4 FIELD QUALITY CONTROL**

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
  1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

### **3.5 ADJUSTING**

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.



### **3.6 CLEANING AND PROTECTION**

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

### **3.7 DEMONSTRATION**

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

### **3.8 DOOR HARDWARE SETS**

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
  - 1. Quantities listed are for each pair of doors, or for each single door.
  - 2. The supplier is responsible for handing and sizing all products.
  - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.
  - 4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.
- B. Manufacturer's Abbreviations:
  - 1. MK - McKinney
  - 2. PE - Pemko
  - 3. SA - SARGENT
  - 4. RO - Rockwood
  - 5. NO - Norton

**Hardware Sets****Set: 1.0**

Doors: EXTe

Description: EXT - ELEV LOBBY - ALUM

1 Continuous Hinge	CFMXXHD1		PE
1 Rim Exit Device, Storeroom	SC AD8504 Less Pull	US32D	SA
1 Door Pull	BF168	US32D	RO
1 Surface Closer	CLP8501T	689	NO
1 Threshold	2005AT MSES25SS		PE
1 Gasketing	by door / frame mfg		

**Set: 2.0**

Doors: EXTa, EXTb, EXTc, EXTd

Description: EXT - ELEV LOBBY - ALUM

1 Continuous Hinge	CFMXXHD1		PE
1 Rim Exit Device, Storeroom	SC AD8504 Less Pull	US32D	SA
1 Rim Exit Device, Storeroom	SC AD8504 ETP	US32D	SA
1 Surface Closer	CLP8501T	689	NO
1 Threshold	2005AT MSES25SS		PE
1 Gasketing	by door / frame mfg		

**Set: 3.0**

Doors: 104a, 116a

Description: GAR - ELEC

3 Hinge, Full Mortise	TA2314 x NRP 4-1/2" x 4-1/2"	US32D	MK
1 Rim Exit Device, Storeroom	SC 8804 ETP	US32D	SA
1 Surface Closer	CLP8501	689	NO
1 Threshold	271A MSES25SS		PE
1 Gasketing	S88BL X LAR		PE
1 Sweep	315CN		PE

**Set: 4.0**

Doors: 105a, 110a, 111a, 114a, 114b, 114c, 115a, 304a, 305a, 310a, 311a, 504a, 505a, 506a, 511a, 512a, 513a, 514a

Description: GAR - MEP / DATA

3 Hinge, Full Mortise	TA2314 x NRP 4-1/2" x 4-1/2"	US32D	MK
1 Storeroom/Closet Lock	SC 10XG04 LP	US26D	SA
1 Surface Closer	CLP8501	689	NO
1 Threshold	271A MSES25SS		PE
1 Gasketing	S88BL X LAR		PE
1 Sweep	315CN		PE

**Set: 5.0**

Doors: 117a

Description: OVERHEAD DOOR

1 HBO	All hardware By door mfg
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**END OF SECTION 08 71 00**

**SECTION 08 80 00**  
**GLAZING**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Glazing units.
- B. Glazing compounds and accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Sealants for other than glazing purposes.
- B. Section 08 44 13 - Glazed Aluminum Curtain Walls: Glazing furnished as part of wall assembly.

**1.03 REFERENCE STANDARDS**

- A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.
- B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015.
- C. ASTM C864 - Standard Specification for Dense Elastomeric Compression Seal Gaskets, Setting Blocks, and Spacers; 2005 (Reapproved 2015).
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2018.
- E. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.
- F. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.
- G. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.
- H. GANA (SM) - GANA Sealant Manual; 2008.
- I. ICC (IBC) - International Building Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data on Insulating Glass Unit Glazing Types: Provide structural, physical and environmental characteristics, size limitations, special handling and installation requirements.
- C. Product Data on Glazing Compounds and Accessories: Provide chemical, functional, and environmental characteristics, limitations, special application requirements, and identify available colors.
- D. Warranty Documentation: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
- E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
  - 1. See Section 01 60 00 - Product Requirements, for additional provisions.
  - 2. Extra Insulating Glass Units: One of each glass size and each glass type.

**1.05 MOCK-UPS**

- A. See Section 01 40 00 - Quality Requirements, for additional mock-up requirements.
- B. Provide on-site glazing mock-up with the specified glazing components.
- C. Locate where directed.
- D. Mock-ups may remain as part of the Work.

**1.06 FIELD CONDITIONS**

- A. Do not install glazing when ambient temperature is less than 40 degrees F.
- B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

**1.07 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Laminated Glass: Provide a five (5) year manufacturer warranty to include coverage for delamination, including providing products to replace failed units.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Laminated Glass Manufacturers:
  - 1. Guardian Glass, LLC
  - 2. Cardinal Glass Industries: [www.cardinalcorp.com/#sle](http://www.cardinalcorp.com/#sle).
  - 3. Pilkington North America; NSG Group
  - 4. Saint-Gobain Glass Corp.
  - 5. Viracon, Architectural Glass segment of Apogee Enterprises, Inc: [www.viracon.com/#sle](http://www.viracon.com/#sle).
  - 6. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 PERFORMANCE REQUIREMENTS - EXTERIOR GLAZING ASSEMBLIES**

- A. Provide type and thickness of exterior glazing assemblies to support assembly dead loads, and to withstand live loads caused by positive and negative wind pressure acting normal to plane of glass.
  - 1. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
  - 2. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/175 of their lengths under specified design load.
  - 3. Glass thicknesses listed are minimum.
  - 4. Assembly to be minimum 65% translucent.
  - 5.

**2.03 GLASS MATERIALS**

- A. Laminated Glass: Float glass laminated in accordance with ASTM C1172.
  - 1. Laminated Safety Glass: Complies with ANSI Z97.1 - Class B or 16 CFR 1201 - Category I impact test requirements.

**2.04 GLAZING UNITS**

- A. Type GL-1 - Monolithic Exterior Vision Glazing:
  - 1. Applications: Glazed lites in doors, and glazed sidelite to doors.
  - 2. Glass Type: Laminated float glass.
  - 3. Tint: Clear.
  - 4. Thickness: 9/16" inch, nominal.
- B. Type GL-2 - Monolithic Interior Vision Glazing:
  - 1. Applications: As scheduled.
  - 2. Glass Type: Laminated float glass.
  - 3. Tint: Gray.
  - 4. Thickness: 9/16" inch, nominal.
  - 5. Visible Light Transmittance (VLT): 65 percent, nominal.
  - 6. Visible Light Reflectance, Outside: 15 percent, nominal.
  - 7. Manufacturers:
    - a. Pilkington North America; [www.pilkington.com](http://www.pilkington.com).
    - b. Cardinal Glass, LLC.
    - c. Guardian Glass, LLC
    - d. Vitro Architectural Glass
    - e. Saint-Gobain Glass Corp.
    - f. Substitutions: See Section 01 60 00 - Product Requirements.

**2.05 ACCESSORIES**

- A. Setting Blocks: Silicone, with 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch by width of glazing rabbet space minus 1/16 inch by height to suit glazing method and pane weight and area.
- B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long by one half the height of the glazing stop by thickness to suit application, self adhesive on one face.

**PART 3 EXECUTION****3.01 VERIFICATION OF CONDITIONS**

- A. Verify that openings for glazing are correctly sized and within tolerances, including those for size, squareness, and offsets at corners.
- B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and support framing is ready to receive glazing system.
- C. Verify that sealing between joints of glass framing members has been completed effectively.
- D. Proceed with glazing system installation only after unsatisfactory conditions have been corrected.

**3.02 PREPARATION**

- A. Clean contact surfaces with appropriate solvent and wipe dry within maximum of 24 hours before glazing. Remove coatings that are not tightly bonded to substrates.
- B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
- C. Prime surfaces scheduled to receive sealant where required for proper sealant adhesion.

**3.03 INSTALLATION, GENERAL**

- A. Install glazing sealants in accordance with ASTM C1193, GANA (SM), and manufacturer's instructions.
- B. Set glass lites in proper orientation so that coatings face exterior or interior as indicated.
- C. Prevent glass from contact with any contaminating substances that may be the result of construction operations such as, and not limited to the following; weld splatter, fire-safing, plastering, mortar droppings, etc.

**3.04 CLEANING**

- A. Remove excess glazing materials from finish surfaces immediately after application using solvents or cleaners recommended by manufacturers.
- B. Remove non-permanent labels immediately after glazing installation is complete.
- C. Clean glass and adjacent surfaces after sealants are fully cured.
- D. Clean glass on both exposed surfaces not more than 4 days prior to Date of Substantial Completion in accordance with glass manufacturer's written recommendations.

**3.05 PROTECTION**

- A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.
- B. Remove and replace glass that is damaged during construction period prior to Date of Substantial Completion.

**END OF SECTION**

**SECTION 09 65 00**  
**RESILIENT FLOORING**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Resilient sheet flooring.
- B. Resilient tile flooring.

**1.02 REFERENCE STANDARDS**

- A. ASTM F1066 - Standard Specification for Vinyl Composition Floor Tile; 2004 (Reapproved 2018).

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.
- C. Selection Samples: Submit manufacturer's complete set of color samples for Architect's initial selection.

**1.04 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing specified flooring with minimum three years documented experience.
- B. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.
- B. Maintain temperature in storage area between 55 degrees F and 90 degrees F.
- C. Protect roll materials from damage by storing on end.

**PART 2 PRODUCTS****2.01 SHEET FLOORING****2.02 TILE FLOORING**

- A. Vinyl Composition Tile - Type VCT 1: Homogeneous, with color extending throughout thickness.
  - 1. Manufacturers:
    - a. Armstrong Flooring, Inc; Excelon SDT: [www.armstrongflooring.com/#sle](http://www.armstrongflooring.com/#sle).
    - b. Johnsonite, a Tarkett Company: [www.johnsonite.com/#sle](http://www.johnsonite.com/#sle).
  - 2. Minimum Requirements: Comply with ASTM F1066, of Class corresponding to type specified.
  - 3. Size: 12 by 12 inch.
  - 4. Thickness: 0.125 inch.
  - 5. Color: To be selected by Architect from manufacturer's full range.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

**3.02 PREPARATION**

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Prohibit traffic until filler is fully cured.

- C. Clean substrate.

### **3.03 INSTALLATION - GENERAL**

- A. Starting installation constitutes acceptance of subfloor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Adhesive-Applied Installation:
  - 1. Place copper grounding strip in conductive adhesive and apply additional adhesive to top side of strip before installing static control flooring. Allow strip to extend beyond flooring in accordance with static control flooring manufacturer's instructions. Refer to Section 26 05 26 for grounding and bonding to building grounding system.
  - 2. Fit joints and butt seams tightly.
  - 3. Set flooring in place, press with heavy roller to attain full adhesion.

### **3.04 INSTALLATION - SHEET FLOORING**

- A. Lay flooring with joints and seams parallel to longer room dimensions, to produce minimum number of seams. Lay out seams to avoid widths less than 1/3 of roll width; match patterns at seams.

### **3.05 INSTALLATION - TILE FLOORING**

- A. Mix tile from container to ensure shade variations are consistent when tile is placed, unless otherwise indicated in manufacturer's installation instructions.
- B. Install square tile to ashlar pattern. Allow minimum 1/2 full size tile width at room or area perimeter.

### **3.06 SCHEDULE**

- A. Elevators
  - 1. Type: VCT.

**END OF SECTION**



**SECTION 09 91 13**  
**EXTERIOR PAINTING**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
  - 1. Exposed surfaces of steel lintels and ledge angles.
  - 2. Hollow Metal Doors and Frames.
  - 3. Steel stair railings, pans and stringers.
  - 4. Bollards.
- D. Do Not Paint or Finish the Following Items:
  - 1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
  - 2. Items indicated to receive other finishes.
  - 3. Items indicated to remain unfinished.
  - 4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
  - 5. Non-metallic roofing and flashing.
  - 6. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
  - 7. Floors, unless specifically indicated.
  - 8. Glass.
  - 9. Concealed pipes, ducts, and conduits.

**1.02 RELATED REQUIREMENTS**

- A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
- B. Section 05 50 00 - Metal Fabrications: Shop-primed items.
- C. Section 05 51 00 - Metal Stairs: Shop-primed items.

**1.03 REFERENCE STANDARDS**

- A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.
- B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2016.
- C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2005 (Reapproved 2017).
- D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.
- E. SSPC V1 (PM1) - Good Painting Practice: Painting Manual, Volume 1; 2016.
- F. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).
- G. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of products to be used, with the following information for each:
  - 1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
  - 2. MPI product number (e.g. MPI #47).

3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
  4. Manufacturer's installation instructions.
  5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.
- C. Samples: Submit two painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on tempered hardboard, 6 inch in size.
- D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.
- E. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.
- F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

### **1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.
- B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.
- C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

### **1.06 FIELD CONDITIONS**

- A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.
- B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.
- C. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

## **PART 2 PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.
- B. Paints:
  1. PPG Paints: [www.ppgpaints.com/#sle](http://www.ppgpaints.com/#sle).
  2. Sherwin-Williams Company: [www.sherwin-williams.com/#sle](http://www.sherwin-williams.com/#sle).
- C. Primer Sealers: Same manufacturer as top coats.
- D. Substitutions: See Section 01 60 00 - Product Requirements.

### **2.02 PAINTS AND FINISHES - GENERAL**

- A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
  1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
  3. Supply each paint material in quantity required to complete entire project's work from a single production run.
  4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

- B. Volatile Organic Compound (VOC) Content:
  - 1. Provide paints and finishes that comply with the most stringent requirements specified in the following:
    - a. 40 CFR 59, Subpart D--National Volatile Organic Compound Emission Standards for Architectural Coatings.
  - 2. Determination of VOC Content: Testing and calculation in accordance with 40 CFR 59, Subpart D (EPA Method 24), exclusive of colorants added to a tint base and water added at project site; or other method acceptable to authorities having jurisdiction.
- C. Colors: To be selected from manufacturer's full range of available colors.
  - 1. Selection to be made by Architect after award of contract.
  - 2. Allow for minimum of three colors for each system, unless otherwise indicated, without additional cost to Owner.
  - 3. Extend colors to surface edges; colors may change at any edge as directed by Architect.

### **2.03 PAINT SYSTEMS - EXTERIOR**

- A. Paint E-OP - Exterior Surfaces to be Painted, Unless Otherwise Indicated: Including Precast Concrete.
  - 1. Two top coats and one coat primer.
  - 2. Top Coat(s): Exterior Pigmented Elastomeric, Water Based; MPI #113.
    - a. Products:
      - 1) Behr Premium Elastomeric Masonry, Stucco and Brick Paint [No. 68]. (MPI #113)
      - 2) PPG Paints Perma-Crete Pitt-Flex Elastomeric Coating, 4-110XI Series, Flat. (MPI #113)
      - 3) Sherwin-Williams Conflex XL Smooth. (MPI #113)
      - 4) Substitutions: Section 01 60 00 - Product Requirements.
- B. Paint ME-OP-2A - Ferrous Metals: Hollow Metal Doors and Frames, Miscellaneous Protected Steel; Shop Primed, Alkyd, 2 Coat:
  - 1. Semi-gloss: Two coats of alkyd enamel; Two coat primer.
    - a. Field Applied Primer: Pro Industrial pro-Cryl Universal Primer.
    - b. Top Coats: Pro Industrial Water Based Alkyd Urethane (no chalk); B53W01051 Series.
- C. Paint ME-OP-2A - Ferrous Metals: Steel Bollards, Stair Stringers, Pans, Railings; Shop Primed, Alkyd, 2 Coat.
  - 1. Semi-gloss: Two Coats.
    - a. Field Applied Primer: Pro Industrial pro-Cryl Universal Primer.
    - b. Top Coats: Sherwin Williams Acrolon 218 HS.
- D. Paint E-Pav - Pavement Marking Paint:
  - 1. White: One coat; meet the performance requirements given in ASTM D 6628 .
    - a. Class 1 Paint: Manufacturers of Class 1 paint shall participate in ALDOT-420, Acceptance Program for Traffic Marking Materials.

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.
- C. Test shop-applied primer for compatibility with subsequent cover materials.

### **3.02 PREPARATION**

- A. Clean surfaces thoroughly and correct defects prior to application.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

- C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.
- D. Seal surfaces that might cause bleed through or staining of topcoat.
- E. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.
- F. Ferrous Metal:
  - 1. Solvent clean according to SSPC-SP 1.
  - 2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
  - 3. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.
- G. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

### **3.03 APPLICATION**

- A. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".
- B. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- C. Apply each coat to uniform appearance.
- D. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- E. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

### **3.04 CLEANING**

- A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

### **3.05 PROTECTION**

- A. Protect finishes until completion of project.
- B. Touch-up damaged finishes after Substantial Completion.

### **3.06 SCHEDULE - PAINT SYSTEMS**

- A. Shop-Primed Metal Items: Finish surfaces exposed to view.
  - 1. Finish the following items:
    - a. Exposed surfaces of lintels.
    - b. Elevator pit ladders.
    - c. Exposed surfaces of steel stairs and railings.
  - 2. Exterior: Paint-ME-OP-2A, semi-gloss.
- B. Exterior Pavement Markings: Paint E-Pav.

**END OF SECTION**

**SECTION 10 44 00**  
**FIRE PROTECTION SPECIALTIES**

**PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Accessories.

**1.02 REFERENCE STANDARDS**

- A. FM (AG) - FM Approval Guide; current edition.
- B. NFPA 10 - Standard for Portable Fire Extinguishers; 2017, with Errata (2018).
- C. UL (DIR) - Online Certifications Directory; Current Edition.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate locations of individual fire extinguishers, mounting measurements for wall bracket, and installation procedures.
- C. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Fire Extinguishers:
  - 1. Activar Construction Products Group, Inc. - JL Industries; Cosmic Extinguisher - Multipurpose Chemical: [www.activarcpg.com/#sle](http://www.activarcpg.com/#sle).
  - 2. Ansul, a Tyco Business: [www.ansul.com/#sle](http://www.ansul.com/#sle).
  - 3. Kidde, a unit of United Technologies Corp: [www.kidde.com/#sle](http://www.kidde.com/#sle).
  - 4. Pyro-Chem, a Tyco Business: [www.pyrochem.com/#sle](http://www.pyrochem.com/#sle).
  - 5. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 FIRE EXTINGUISHERS**

- A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
  - 1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.
- B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gauge.
  - 1. Class: A:B:C type.
  - 2. Size: 10 pound.
  - 3. Finish: Baked polyester powder coat, Red color.
  - 4. Temperature range: Minus 40 degrees F to 120 degrees F.

**2.03 ACCESSORIES**

- A. Extinguisher Brackets: Formed steel, chrome-plated.
- B. Extinguisher sign: Projecting wall-mounted sign located above extinguisher.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify rough openings for cabinet are correctly sized and located.

**3.02 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Secure rigidly in place.

**3.03 MAINTENANCE**

- A. See Section 01 70 00 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

**END OF SECTION**

**SECTION 14 21 23.16**  
**MACHINE ROOM-LESS ELECTRIC TRACTION PASSENGER ELEVATORS**

**PART 1 GENERAL**

1.01 SUMMARY

- A. Section includes Machine room-less electric traction passenger elevators as shown and specified. Elevator work includes:
1. Gearless electric traction passenger elevators.
  2. Elevator car enclosures, hoistway entrances and signal equipment.
  3. Operation and control systems.
  4. Accessibility provisions for physically disabled persons.
  5. Equipment, machines, controls, systems and devices as required for safely operating the specified elevators at their rated speed and capacity.
  6. Materials and accessories as required to complete the elevator installation.
- B. Related Sections:
1. Division 1 General Requirements: Meet or exceed all referenced sustainability requirements.
  2. Division 3 Concrete: Installing inserts, sleeves and anchors in concrete.
  3. Division 4 Masonry: Installing inserts, sleeves and anchors in masonry.
  4. Division 5 Metals:
    - a. Providing hoist beams, pit ladders, steel framing, auxiliary support steel and divider beams for supporting guide-rail brackets.
    - b. Providing steel angle sill supports and grouting hoistway entrance sills and frames.
  5. Division 9 Finishes: Providing elevator car finish flooring and field painting unfinished and shop primed ferrous materials.
  6. Division 16 Sections:
    - a. Providing electrical service to elevators, including fused disconnect switches where permitted. (Note: fused disconnect switch to be provided as part of elevator manufacture product)
    - b. Emergency power supply, transfer switch and auxiliary contacts.
    - c. Heat and smoke sensing devices.
    - d. Convenience outlets and illumination in control room (if applicable), hoistway and pit.
  7. Division 22 Plumbing
    - a. Sump pit
  8. Division 23 Heating, Ventilation and Air Conditioning
    - a. Heating and ventilating hoistways and/or control room.
- C. Work Not Included: General contractor shall provide the following in accordance with the requirements of the Model Building Code and ASME A17.1 Code. For specific rules, refer to ASME A17.1, Part 2 for traction elevators. State or local requirements must be used if more stringent. The cost of this work is not included in the TK Elevator's proposal since it is a part of the building construction.
1. A plumb and legal hoistway, properly framed and enclosed including a pit of proper depth, and a pit ladder for each elevator. Hoistway walls require a minimum two hours of fire rating. Hoistway should be clear and plumb with variations not to exceed 1/2" at any point. Drains, lights, access doors, waterproofing and hoistway ventilation, as required.
  2. Elevator controller space

- a. Door jamb controller option - controller landing wall thickness must be a minimum of 8 1/2 inches thick. This is due to the controller being mounted on the top floor landing in the door frame on the return side of the door. For center opening doors, the controller is located on the right hand frame (from inside the elevator cab looking out). Provide telephone line, light fixture (200 lx / 19 fc), and convenience outlet in the hoistway at the landing where the elevator controller is located. Final location must be coordinated with elevator contractor. These requirements must be coordinated between the general contractor and the elevator contractor.
  - b. Control room option - provide a suitable control closet with access and ventilation in accordance with all applicable codes and regulations. The control closet shall be maintained at a temperature between 32 F (0 C) and 104 F (40 C). To be measured at 6 feet (1830 mm) above the floor and 1 foot (305 mm) out from the front center of the car controller(s). Relative humidity is not to exceed 95% non-condensing. Local codes may require tighter temperature ranges, and higher ventilation levels, please check with your local code authority for the exact requirements in your area. If your control closet temperatures exceed these requirements, contact your local TK Elevator sales representative for assistance. All telephone wiring to controller room control panel, and installation of telephone instrument or other communication equipment in elevator cab with all connections to elevator in controller room.
3. Hoistway must be maintained between 32°F (0°C) and 122°F (50°C) measured at the machine.
  4. Adequate supports to carry the loads of all equipment, including overhead machine and machine beams located in hoistway including supports for guide rail brackets.
  5. Complete 3 phase connections from the electric power mains to each controller, including necessary circuit breakers and fused mainline disconnect switches unless otherwise specified herein by elevator manufacture.
  6. Electric power of the same characteristics as the permanent supply without charge for the construction, testing and adjusting.
  7. Provide proper piping and conduit.
  8. Divider beams for rail bracket support as required.
  9. Cutting of walls floor, etc. and removal of such obstructions as may be necessary for proper installation of the elevator.
  10. Grouting of door sills, hoistway frames, and signal fixtures after installation of the elevator equipment.
  11. All painting, except as otherwise specified.
  12. Provide hoistway walls designed and constructed in accordance with the required fire rating (including those places where elevator fixture boxes, rail bracket fastenings, and any other penetration into the hoistway walls).
  13. Temporary enclosures, barricades and other protection from open hoistways and elevator work area during the time the elevator is being installed to meet all permanent installation safety codes. A temporary work platform to be provided at the top landing across the hoistway; if required, it should conform to all code and safety requirements.
  14. Smoke detector /sensing devices and contacts wired to elevator control as required by local code. A means to automatically disconnect the main line power supply to the elevator prior to the application of water in the elevator controller room shall be furnished by the electrical contractor. This means shall not be self-resetting.
  15. Before erection of rough walls and doors; erect hoistway sills, headers, and frames. After rough walls are finished; erect fascias and toe guards. Set sill level and slightly above finished floor at landings.



16. A standby power source, including necessary transfer switches and auxiliary contact, where elevator operation from an alternate power supply is required.
17. Adequate storage facilities for elevator equipment prior to and during installation at ground level within 150 feet of hoistway.
18. Setting of anchors and sleeves.
19. Install bevel guards at 75° on all recesses, projections or setbacks over 2" (4" for A17.1 2000 areas) except for loading or unloading.
20. For car light and fan: provide a feeder and branch wiring circuits to elevator control cabinet.
21. Locate a light fixture (200 lx / 19 fc) and convenience outlet in pit with switch located adjacent to the access door.
22. Where pit access is by means of the lowest hoistway entrance, a vertical ladder of non-combustible material extending 42" minimum, (48" minimum for A17.1-2019 areas) shall be provided at the same height, above sill of access door or handgrips.

## 1.02 SUBMITTALS

- A. Product data: When requested, the elevator contractor shall provide standard cab, entrance and signal fixture data to describe product for approval.
- B. Shop drawings:
1. Show equipment arrangement in the corridor, pit, and hoistway and/or optional control room. Provide plans, elevations, sections and details of assembly, erection, anchorage, and equipment location.
  2. Indicate elevator system capacities, sizes, performances, safety features, finishes and other pertinent information.
  3. Show floors served, travel distances, maximum loads imposed on the building structure at points of support and all similar considerations of the elevator work.
  4. Indicate electrical power requirements and branch circuit protection device recommendations.
- C. Paint selection: Submit manufacturer's standard selection charts for exposed finishes and materials.
- D. Integrated laminate selection: Submit manufacturer's standard selection charts for exposed finishes and materials.
- E. Metal Finishes: Upon request, standard metal samples provided.
- F. Operation and maintenance data. Include the following:
1. Generic owner's manuals and no wiring diagrams.
  2. Parts list, with recommended parts inventory.

## 1.03 QUALITY ASSURANCE

- A. Manufacturer Qualifications: An approved manufacturer with minimum 15 years of experience in manufacturing, installing, and servicing elevators of the type required for the project.
1. The manufacturer of machines, controllers, signal fixtures, door operators, cabs, entrances, and all other major parts of elevator operating equipment.
    - a. The major parts of the elevator equipment shall be manufactured by the installing company, and not be an assembled system.

2. The manufacturer shall have a documented, on-going quality assurance program.
  3. ISO-9001:2000 Manufacturer Certified
  4. ISO-14001:2004 Environmental Management System Certified
  5. LEED Gold certified elevator manufacturing facility.
- B. Installer Qualifications: The manufacturer or an authorized agent of the manufacturer with not less than 15 years of satisfactory experience installing elevators equal in character and performance to the project elevators.
- C. Regulatory Requirements:
1. ASME A17.1 Safety Code for Elevators and Escalators, latest edition or as required by the local building code.
  2. NFPA 70 National Electrical Code.
  3. NFPA 80 Fire Doors and Windows.
  4. Americans with Disabilities Act - Accessibility Guidelines (ADAAG)
  5. Section 407 in ICC A117.1, when required by local authorities
  6. CAN/CSA C22.1 Canadian Electrical Code
  7. CAN/CSA B44 Safety Code for Elevators and Escalators.
- D. Fire-rated entrance assemblies: Opening protective assemblies including frames, hardware, and operation shall comply with ASTM E2074, CAN4-S104 (ULC-S104), UL10(b), and NFPA Standard 80. Provide entrance assembly units bearing Class B or 1 1/2 hour label by a Nationally Recognized Testing Laboratory (2 hour label in Canada).
- E. Inspection and testing:
1. Elevator Installer shall obtain and pay for all required inspections, tests, permits and fees for elevator installation.
  2. Arrange for inspections and make required tests.
  3. Deliver to the Owner upon completion and acceptance of elevator work.
- F. Sustainable Product Qualifications:
1. Environmental Product Declaration:
    - a. GOOD: If Product Category Rules (PCR) are not available, produce a publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate scope.
    - b. BEST: If Product Category Rules (PCR) are available, produce and publish an Environmental Product Declaration (EPD) based on a critically reviewed life-cycle assessment conforming to ISO 14044, with external verification recognized by the EPD program operator.
  2. Material Transparency:
    - a. GOOD: Provide Health Product Declaration at any level
    - b. BETTER: Provide Health Product Declaration (HPD v2 or later). Complete, published declaration with full disclosure of known hazards, prepared using the Health Product Declaration Collaborative's "HPD builder" on-line tool.
    - c. BEST: Cradle to Cradle Material Health Certificate v3, Bronze level or higher.
  3. LEED v4 – Provide documentation for all Building Product Disclosure AND Optimization credits in LEED v4 for product specified.

#### 1.04 DELIVERY, STORAGE AND HANDLING

A. Manufacturing shall deliver elevator materials, components and equipment and the contractor is responsible to provide secure and safe storage on job site.

#### 1.05 PROJECT CONDITIONS

A. Temporary Use: Elevators shall not be used for temporary service or for any other purpose during the construction period before Substantial Completion and acceptance by the purchaser unless agreed upon by Elevator Contractor and General Contractor with signed temporary agreement.

#### 1.06 WARRANTY

A. Warranty: Submit elevator manufacturer's standard written warranty agreeing to repair, restore or replace defects in elevator work materials and workmanship not due to ordinary wear and tear or improper use or care for 12 months after final acceptance.

#### 1.07 MAINTENANCE

A. Furnish maintenance and call back service for a period of 12 months for each elevator after completion of installation or acceptance thereof by beneficial use, whichever is earlier, during normal working hours excluding callbacks.

1. Service shall consist of periodic examination of the equipment, adjustment, lubrication, cleaning, supplies and parts to keep the elevators in proper operation. Maintenance work, including emergency call back repair service, shall be performed by trained employees of the elevator contractor during regular working hours.
2. Submit parts catalog and show evidence of local parts inventory with complete list of recommended spare parts. Parts shall be produced by manufacturer of original equipment.
3. Manufacturer shall have a service office and full time service personnel within a 100 mile radius of the project site.

### **PART 2 PRODUCTS**

#### 2.01 MANUFACTURERS

A. Manufacturer: Design based around TK Elevator's EOX Self-Supported Machine Room-Less elevator.

#### 2.02 MATERIALS, GENERAL

B. All Elevator Cab materials including frame, buttons, lighting, wall and ceiling assembly, laminates and carpet shall have an EPD and an HPD.

C. Colors, patterns, and finishes: As selected by the Architect from manufacturer's full range of standard colors, patterns, and finishes.

D. Steel:

1. Shapes and bars: Carbon.
2. Sheet: Cold- and hot-rolled stainless steel sheet, galvanized.

3. Finish: Factory-applied paint for structural parts, painted for architectural parts. Color selection must be based on elevator manufacture's standard selections.

E. Integrated laminate: Decorative surface finishes, pressure sensitive, acrylic type, nominal 0.014" thickness. Laminate selection must be based on elevator manufacture's standard selections.

F. Flooring by others.

## 2.03 HOISTWAY EQUIPMENT

A. Platform: Fabricated frame of formed or structural steel shapes, gusseted and riveted/clinched. The car platform shall be designed and fabricated to support one-piece loads weighing up to 25% of the rated capacity.

B. Deflector Sheaves: None

C. Guide Rails: Dry, non-lubricated steel, fastened to the building with steel brackets.

D. Guides: Slide guides shall be mounted on top and bottom of the car.

E. Buffers: Provide substantial buffers in the elevator pit. Mount buffers on continuous channels fastened to the elevator guide rail or securely anchored to the pit floor. Predefined buffer stands for 4' and 5' pit depths.

F. Machine: The hoisting machine shall be a compact energy efficient permanent magnet Gearless traction type, consisting of PMAC motor, brake and driving sheave mounted on a rigid bedplate in the top of the hoistway. A large solid, forged shaft shall serve as a support for the motor rotor assembly and for the drive sheave and brake system. It shall be supported by roller bearings mounted in the machine housing.

G. Drive System:

1. The drive system shall be of the Variable Voltage Variable Frequency (VVVF) regenerative.
2. The system shall be a vector controlled pulse-width modulated AC drive. The variable voltage variable frequency drive shall convert the AC power supply using a two-step process to a variable voltage variable frequency power supply for use by the hoist motor.
3. The speed control shall be by means of vector control providing direct torque and field excitation automatically provided by permanent magnet. A digital absolute velocity encoder shall be provided giving feedback to the controller on armature position and motor speed.
4. Dual solid state electronics (IGBT Insulated Gate Bipolar Transistor) in series shall be used in place of mechanical contactors.

H. Motor/Machine: The motor shall be PMAC, totally enclosed, non-ventilated with class "F" insulation. The motor armature shall be dynamically balanced and supported by roller bearings of ample capacity. The armature and driving sheave shall be properly balanced for smooth, high-speed elevator performance. The PM machine shall be mounted horizontally in the top of the hoistway in a unitized formed steel structure on bearing plates furnished by the elevator installer. The unitized formed steel structure shall be securely fastened to the supports supplied by other trades.

I. Brake: The brake shall be a spring applied electric brake; held open by an electro-magnet actuated by a digital brake controller and designed to make smooth, positive stops. The Brake shall be designed to automatically apply in the event of interruption of power supply from any cause. Operation and control of the brake shall be all digital. The setting and lifting of the brake shall be software based and all electronic. All adjustments and setup of the brake shall be made using a PC interface. No contactors or resistors shall be used in the actuation of the brake.

J. Suspension Belts and Governor Rope: Suspension belts shall be flat belts of polyurethane with an inner core of 14 steel cords with an FT1 fire rating such that hoistway sprinklers are not required by NFPA-13. Each belt shall have a suspension strength of 64 KN (14,388 pounds).

1. Three belts.
2. Suspension tension monitor shall detect differences in belt tension and for loss of tension. If fault is detected, the car shall stop at the nearest floor and an Out of Service call be registered.
3. Trip criteria shall be monitored, and data shall be stored in redundant non-volatile locations. Belts shall be replaced prior to the end of service life. Messages shall be issued at 180, 90, and 30 days prior to the last day of service life.
4. Governor ropes shall be of steel wire construction.
5. Any special tools, devices, software or equipment required for monitoring the wear of suspension shall be included with the installation of the equipment and become the property of the owner at time of elevator completion. This includes special ongoing monitoring systems, special tools and instruction needed to monitor the suspension system.

K. Counterweight: Counterbalance each elevator for smooth and economical operation by using steel and/or cement weights securely fastened in a steel counterweight frame. Counterweight shall equal the weight of the complete elevator car and approximately 50 percent of the specified capacity load.

L. Safety and Governor: Car safety shall be mounted on the bottom members of the car frame and be operated by a centrifugal speed governor. The governor shall be designed to cut off power to the motor and apply the brake whenever the governor indicates the car has excessive speed. The governor shall function when the car over speeds.

M. Emergency Terminal Limits: Place electric limit devices in the hoistway near the terminal landings. Limit switch(es) shall be designed to cut off the electric current and stop the car if it runs beyond either terminal landing.

N. Automatic Self-Leveling: Provide each elevator car with a self-leveling feature to automatically bring the car to the floor landings and correct for over travel or under travel. Self-leveling shall, within its zone, be automatic and independent of the operating device. The car shall be maintained approximately level with the landing irrespective of its load.

## 2.04 HOISTWAY ENTRANCES

A. Doors and Frames: Provide complete hollow metal type hoistway entrances at each hoistway opening bolted\knock down construction.

1. Manufacturer's standard entrance design consisting of hangers, doors, hanger supports, hanger covers, fascia plates (where required), sight guards, and necessary hardware.  
Hoistway access: Allows inspectors and other authorized users access to the elevator

hoistway from the lobby hall using the keyswitch marked ACCESS located in the entrance frame. Key can be rotated to either UP or DN (down).

2. Communication failure indicator: A Communication failure is a jewel that is located in the jamb and lights up if the connection with the phone in the elevator becomes faulty. Communication failure is tested on the SIL3 rated devices by inspectors to ensure the car will not run or accept a car call when there is a loss of communication between the car and controller.
3. Main landing door & frame finish: with no. 4 brushed finish entrance frame.
4. Typical door & frame finish: with no. 4 brushed finish entrance frame.

**B.** Interlocks: Equip each hoistway entrance with an approved type of interlock, tested as required by code. Provide door restriction devices as required by code.

**C.** Door Hanger and Tracks: Provide sheave type two-point suspension hangers and tracks for each hoistway horizontal sliding door.

1. Sheaves: Polyurethane tires with ball bearings properly sealed to retain grease.
2. Hangers: Provide an adjustable device beneath the track to limit the up thrust of the doors during operation.
3. Tracks: Drawn steel shapes, smooth surface and shaped to conform to the hanger sheaves.

**D.** Hoistway Sills: Extruded metal, with groove(s) in top surface. Provide mill finish on aluminum.

## 2.05 PASSENGER ELEVATOR CAR ENCLOSURE

**A.** Car Enclosure:

1. Walls: Cab type, stainless steel. Wall panels shall be constructed of stainless steel, no 4 brushed finish. Columns shall be stainless steel.
2. Canopy: Galvanized steel with chain rope exit.
3. Ceiling: Stainless steel downlight type, metal pans with suspended LED downlights. Number of downlights shall be dependent on platform size with a minimum of four. The metal pans shall be finished with a stainless steel, no. 4 brushed finish.
4. Cab Fronts, Return, Transom, Soffit and Strike: Provide panels faced with brushed stainless steel.
5. Doors: Horizontal sliding car doors reinforced with steel for panel rigidity. Hang doors on sheave type hangers with polyurethane tires that roll on a polished steel track and are guided at the bottom by non-metallic sliding guides.
  - a. Door Finish: Stainless steel.
  - b. Cab Sills: Extruded, aluminum mill finish.
6. Support rail: Provide 1.5" (38 mm) diameter formed cylindrical metal bar on side and/or rear walls on front opening cars and side walls only on front and rear opening cars. Support rails shall have a stainless steel, no. 4 brushed finish.
7. Ventilation: Manufacturer's standard exhaust fan, mounted on the car top.
8. Protection pads: Not required

**B.** Car Top Inspection: Provide a car top inspection station with an "Auto-Inspection" switch, an "emergency stop" switch, and constant pressure "up and down" direction and safety buttons to make the

normal operating devices inoperative. The station shall give the inspector complete control of the elevator. The car top inspection station shall be mounted in the door operator assembly.

## 2.06 DOOR OPERATION

**A. Door Operation:** Provide a direct or alternating current motor driven heavy duty operator designed to operate the car and hoistway doors simultaneously. The door control system shall be digital closed loop and the closed loop circuit shall give constant feedback on the position and velocity of the elevator door. The motor torque shall be constantly adjusted to maintain the correct door speed based on its position and load. All adjustments and setup shall be through the computer based service tool. Door movements shall follow a field programmable speed pattern with smooth acceleration and deceleration at the ends of travel. The mechanical door operating mechanism shall be arranged for manual operation in event of power failure. Doors shall automatically open when the car arrives at the landing and automatically close after an adjustable time interval or when the car is dispatched to another landing. AC controlled units with oil checks, or other deviations are not acceptable.

1. **No Un-Necessary Door Operation:** The car door shall open only if the car is stopping for a car or hall call, answering a car or hall call at the present position or selected as a dispatch car.
2. **Door Open Time Saver:** If a car is stopping in response to a car call assignment only (no coincident hall call), the current door hold open time is changed to a shorter field programmable time when the electronic door protection device is activated.
3. **Double Door Operation:** When a car stops at a landing with concurrent up and down hall calls, no car calls, and no other hall call assignments, the car door opens to answer the hall call in the direction of the car's current travel. If an onward car call is not registered before the door closes to within 6 inches of fully closed, the travel shall reverse and the door shall reopen to answer the other call.
4. **Nudging Operation:** The doors shall remain open as long as the electronic detector senses the presence of a passenger or object in the door opening. If door closing is prevented for a field programmable time, a buzzer shall sound. When the obstruction is removed, the door shall begin to close at reduced speed. If the infra-red door protection system detects a person or object while closing on nudging, the doors shall stop and resume closing only after the obstruction has been removed.
5. **Door Reversal:** If the doors are closing and the infra-red beam(s) is interrupted, the doors shall reverse and reopen. After the obstruction is cleared, the doors shall begin to close.
6. **Door Open Watchdog:** If the doors are opening, but do not fully open after a field adjustable time, the doors shall recycle closed then attempt to open six times to try and correct the fault.
7. **Door Close Watchdog:** If the doors are closing, but do not fully close after a field adjustable time, the doors shall recycle open then attempt to close six times to try and correct the fault.
8. **Door Close Assist:** When the doors have failed to fully close and are in the recycle mode, the door drive motor shall have increased torque applied to possibly overcome mechanical resistance or differential air pressure and allow the door to close.

**B. Door Protection Device:** Provide a door protection system using microprocessor controlled infra-red light beams supporting 2D or 3D light curtains per code. The beams shall project across the car opening detecting the presence of a passenger or object. If door movement is obstructed, the doors shall immediately reopen.

## 2.07 CAR OPERATING STATION

Car Operating Station, General: The main car control in each car shall contain the devices required for specific operation mounted in a surface-mounted panel requiring no applied faceplate. COP shall have a brushed stainless steel finish. The main car operating panel shall be mounted in the return and comply with handicap requirements. Pushbuttons that illuminate using long lasting LED's shall be included for each floor served, and emergency buttons and switches shall be provided per code. Switches for car light and accessories shall be provided. Visual highlight is the standard equipped, integrated multimedia display.

A. Emergency Communications System: Integral phone system provided. For improved accessibility, there are visual and acoustic confirmation for button inputs as well as a voice synthesizer for travel and floor announcements.

B. Column Mounted Car Riding Lantern: A car riding lantern shall be installed in the elevator cab and located in the entrance. The lantern, when illuminated, will indicate the intended direction of travel. The lantern will illuminate, and a signal will sound when the car arrives at a floor where it will stop. The lantern shall remain illuminated until the door(s) begin to close.

C. Special Equipment:  
Hoistway Access: Not Applicable

D. Digital Services: Cloud-based IoT monitoring system comes standard with these options:

Remote Monitoring with Application Programming Interface (API) Integration

ADA Phone - Code Compliant Cellular Connectivity

Smart Device Elevator Calling with occupant app API integration

E. Digitally Native: Digital expansion for evolving ecosystem of digitally augmented services. DEP infotainment display comes standard.

## 2.08 CONTROL SYSTEMS

A. Controller: The elevator control system shall be microprocessor based and software oriented. The system shall operate in real time, continuously analyzing the car(s) changing position, condition, and work load. All controller and operational circuits including the brake control and drive system shall be digital. Control of the elevator shall be automatic in operation by means of push buttons in the car numbered to correspond to floors served, for registering car stops, and by "up-down" push buttons at each intermediate landing and "call" push buttons at terminal landings.

1. Momentary pressing of one or more buttons shall dispatch the car to the designated landings in the order in which the landings are reached by the car, irrespective of the sequence in which the buttons are pressed. Each landing call shall be canceled when answered.
2. When the car is traveling in the up direction, it shall stop at all floors for which car buttons or "up" hall buttons have been pressed. The car shall not stop at floors where "down" buttons



have been pressed, unless the stop for that floor has been registered by a car button or unless the down call is at the highest floor for which any buttons have been pressed. Pressing the "up" button when the car is traveling in the down direction shall not intercept the travel unless the stop for that floor has been registered by a car button or unless the up call is the lowest for which any button has been pressed.

3. When the car has responded to its highest or lowest stop, and stops are registered for the opposite direction, its direction of travel shall reverse automatically and it shall then answer the calls registered for that direction. If both up and down calls are registered at an intermediate floor, only the call corresponding to the direction of car travel shall be canceled upon the stopping of the car at the landing.
4. A car that is stopping for the last hall call in the preference direction, and that hall call is for the opposite direction with no onward car calls, shall reverse preference when the selector position advances to the landing at which the car is committed to stop. A car that is stopping for the last hall call in the preference direction, and that hall call is for the same direction, shall hold its preference until the door is almost closed allowing time for a passenger to register an onward car call which shall maintain the preference. If no car call is registered before the door is almost closed, the car shall lose its preference and shall be available to accept calls in either direction.

**B. Operation: Selective Collective – ETA based.** The system is optimized to get a car to the floor where a hall call has been registered, in the shortest time. The system receives input information from standard call pushbuttons located in the hall, car position and car load information from individual car loadweighers.

1. When group operation is required, the group supervisory operation shall be embedded within selected car controllers. No separate group controller shall be supplied. The microprocessor shall constantly scan the system for hall calls. When hall calls are registered, the control system shall immediately calculate the estimated time for arrival using such information as, number of floors to travel from the current position, the time it takes to travel one floor at top speed, calls assigned to a car, and car reversal time to respond to a call in the opposite direction of travel. When a car's status changes or additional hall calls are registered, the estimated time of arrival shall be recalculated and calls reassigned if necessary.
2. Traffic Pattern: The microprocessor shall provide flexibility to meet well defined patterns of traffic, including up peak, down peak, and heavy interfloor demands, and adjust for indeterminate variations in these patterns which occur in buildings.
3. Artificial Intelligence: Artificial Intelligence shall be an integral part of the group control system software. The enhanced artificial intelligence shall optimize the interfloor traffic performance. Inputs for the artificial intelligence shall include accurate passenger load from an electronic loadweigher, probable car calls generated from each hall call, type of building and observed traffic patterns.

**C. Load Weighing Device:** Provide a load weighing device on each car which, when the particular car is filled to an adjustable percentage of the capacity load, shall cause the car to bypass landing calls but not car calls. The passed landing calls shall remain registered for the next following car.

1. The device shall be unaffected by the action of compensating chain or rope. The device shall detect a 50-pound (23 Kg.) load change under all conditions.
2. The load sensor shall use a load cell to accurately measure the weight in the car. The information shall be transferred via a serial link to the elevator controller.

D. Anti-Nuisance Call Control: The microprocessor control system shall evaluate the number of people on the car and compare that value to the number of car calls registered. If the number of car calls exceeds the number of people by a field programmable value, the car calls shall be canceled after the first call has been answered.

E. Position Selector: The position selector shall be part of the microprocessor system. The car position in the hoistway shall be digitized through a primary position encoder. The microprocessor control system shall store the floor position and slow down points in memory.

F. Motion Control: The drive control system shall be dual-loop feedback system based primarily on car position. The velocity profile shall be calculated by the microprocessor control system producing extremely smooth and accurate stops. The velocity encoder shall permit continuous comparison of machine speed to velocity profile and to actual car speed. This accurate position/velocity feedback shall permit a fast and accurate control of acceleration and retardation.

G. Motor Pre-Torque: Current shall be applied to the elevator drive before the brake is released and the speed pattern is dictated to eliminate roll back and sling shot effects of unbalanced loads in the car. The electronic loadweigher shall determine the load on the car determining a pre-torque reference to send to the drive.

H. Emergency Power Operation: In the event of power loss, this elevator(s) should be equipped with a battery powered automatic rescue operation device. This operation is designed to only move the car up or down to the nearest landing depending on the load in the car. It is NOT designed to lower the car to a specified landing such as Battery Lowering used for Hydraulic applications. An isolation transformer is required if the building voltage is NOT 480VAC. A single rescue unit is not capable of rescuing a group of cars --- this is a per car option. Maximum travel on rescue operation is 100 feet. Average time of operation for Rescue is 3 minutes. This feature is only available for jobs with 60HP and below. This battery automatic rescue operation is not allowed with the Green Drive.

I. Automatic Light and Fan shut down: The control system shall evaluate the system activity and automatically turn off the cab lighting and ventilation fan during periods of inactivity. The settings shall be field programmable.

J. Special Operation:

Hoistway access: A keyswitch shall be provided to initiate access to the elevator hoistway from the lobby hall using the keyswitch marked ACCESS located in the entrance frame. Key can be rotated to either UP or DN (down).

K. Digital Services:

Cloud-based IoT Monitoring System (standard): Contractor shall provide a cloud-based IoT (internet of things) monitoring system capable of tracking door movements and timing, trips, power cycles, car calls, out-of-service events and modes. This observation will continue 24/7 and it shall be capable of providing service technicians a minimum of three recommended solutions for defined failure events and automatically dispatch service technicians in the event of failure(s) while sending notifications to end users of changes in their equipment's state via both email and

mobile device. Access to IoT and related equipment data and status will be made available in both a web portal and mobile application secured by password and username with at least two-factor authentication. Finally, this system must be self-contained and not require internet provision by others.

Along with the monitoring system, options are available.

Remote Monitoring with Application Programming Interface (API) Integration: Contractor shall provide a portal and mobile device application (app) that communicates relevant service and operational information such as elevator operational status, open service call tickets, call ticket history and performance and service history. This system shall provide a REST application programming interface (API) capable of transmitting relevant information from the cloud-based IoT monitoring system. This data includes equipment operational status, door movements, service and maintenance history, traffic statistics and failure alerts.

ADA Phone – Code Compliant Cellular Connectivity: Contractor shall provide a phone service through a self-contained cellular based VoIP system. This system shall meet code, include a backup battery capable of powering the emergency communication equipment for 4+ hours in the event of a power outage. The solution shall have remote monitoring capability to ensure continuous connectivity with a means of remote troubleshooting. Remote monitoring capability shall include, at a minimum, the ability to monitor connectivity and power supply. Remote monitoring shall be capable of providing local alerts to response personnel when on-site intervention is required.

Smart Device Elevator Calling with Occupant app API Integration: Contractor will provide an elevator calling application for smart devices (app) that can be accessed through Android and IOS smart device operating systems. This calling service shall be accomplished on both, Destination Dispatch and Traditional ETA elevator control system applications. Furthermore, a single, common and consistent app shall have the same user experience and user interface on both Destination Dispatch and Traditional ETA dispatching control systems. To enable mobile calling functionality without creating unnecessary wear on elevator components resulting from false calls, proximity detection beacons shall be installed in the elevator lobby at each floor. These beacons shall detect user smart devices and restrict calling of elevators when the user is not within a pre-configured range of elevator entrance. Beacon-based proximity detection distance must be configurable to accommodate various building and floor layouts. Once Bluetooth signal is detected, the user can place a floor call directly from their handheld or wearable device. The elevator calling app shall remove the need for interaction with hall fixtures, buttons or kiosks. This system shall be capable of placing an automatic call to a user-configured destination floor automatically based on both location in building (floor) and time of day. App users shall be able to configure their own source or starting floor, destination floor and schedule of automatic calling service, and be able to configure multiple automatic calling services and routines. System shall have reasonable ability to auto-provision users from access control system and not require duplicate entry of users for access control purposes. Finally, all services above shall be made available via an application programming interface (API) so that a 3rd party or tenant occupant app could be integrated with elevator smart device calling service so that users could receive multiple occupant experience-based services in a single, common, 3rd party mobile device application (app).

L. Digitally Native:

EOX has all the components needed for digital expansion from day one. No additional technician dispatching. On-site installation or modernization is required to enable new digital services giving you confidence that your elevator will remain up-to-date for years to come. It is born digital, connected to TK Elevator's evolving ecosystem of digitally augmented services.

## 2.09 HALL STATIONS

A. Hall Stations, General: Buttons shall illuminate to indicate call has been registered at that floor for the indicated direction.

1. Provide one pushbutton riser with faceplates having a brushed stainless steel finish, surface-mounted in the entrance jamb.
  - a. Phase 1 firefighter's service key switch, with instructions, shall be incorporated into the entrance frame at the designated level.

B. Floor Identification Pads: Provide door jamb pads at each floor. Jamb pads shall comply with Americans with Disabilities Act (ADA) requirements.

C. Combo Hall Lantern and Position Indicator: An electronic position indicator shall be provided and mounted for optimal viewing. As the car travels, its position in the hoistway shall be indicated by the illumination of the alphanumeric character corresponding to the landing which the elevator is stopped or passing. Hall lantern is combined in the display with the directional arrow to indicate the travel direction in the same faceplate. Faceplates shall match the hall stations.

D. Special Equipment:

Hoistway Access: Provide keyswitch at main landing to gain access to the cartop or pit.

## 2.10 CONTROLLER LOCATION

A. Door Jamb Mount is integrated with controller in the door jamb. Control power and cab light are provided by the elevator contractor and included with the integrated assembly. Main power disconnect is provided by the general contractor.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Before starting elevator installation, inspect hoistway, hoistway openings, pits and/or control room, as constructed, verify all critical dimensions, and examine supporting structures and all other conditions under which elevator work is to be installed. Do not proceed with elevator installation until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

B. Installation constitutes acceptance of existing conditions and responsibility for satisfactory performance.

### 3.02 INSTALLATION

- A. Install elevator systems components and coordinate installation of hoistway wall construction.
  - 1. Work shall be performed by competent elevator installation personnel in accordance with ASME A17.1, manufacturer's installation instructions and approved shop drawings.
  - 2. Comply with the National Electrical Code for electrical work required during installation.
- B. Perform work with competent, skilled workmen under the direct control and supervision of the elevator manufacturer's experienced foreman.
- C. Supply in ample time for installation by other trades, inserts, anchors, bearing plates, brackets, supports, and bracing including all setting templates and diagrams for placement.
- D. Welded construction: Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS standards for workmanship and for qualification of welding operators.
- E. Coordination: Coordinate elevator work with the work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines, and levels designated by the Contractor, to ensure dimensional coordination of the work.
- F. Install machinery, guides, controls, car and all equipment and accessories to provide a quiet, smoothly operating installation, free from side sway, oscillation or vibration.
- G. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with cars. Where possible, delay final adjustment of sills and doors until car is operable in shaft. Reduce clearances to minimum safe, workable dimensions at each landing.
- H. Erect hoistway sills, headers, and frames before erection of rough walls and doors; erect fascia and toe guards after rough walls finished. Set sill units accurately aligned and slightly above finish floor at landings.
- I. Lubricate operating parts of system, including ropes, as recommended by the manufacturer.

### 3.03 FIELD QUALITY CONTROL

- A. Acceptance testing: Upon completion of the elevator installation and before permitting use of elevator, perform acceptance tests as required and recommended by Code and governing regulations or agencies. Perform other tests, if any, as required by governing regulations or agencies.
- B. Advise Owner, Contractor, Architect, and governing authorities in advance of dates and times tests are to be performed on the elevator.

### 3.04 ADJUSTING

- A. Make necessary adjustments of operating devices and equipment to ensure elevator operates smoothly and accurately.

### 3.05 CLEANING

- A. Before final acceptance, remove protection from finished surfaces and clean and polish surfaces in accordance with manufacturer's recommendations for type of material and finish provided. Stainless steel shall be cleaned with soap and water and dried with a non-abrasive surface; it shall not be cleaned with bleach-based cleansers.
- B. At completion of elevator work, remove tools, equipment, and surplus materials from site. Clean equipment rooms and hoistway. Remove trash and debris.
1. Use environmentally preferable and low VOC emitting cleaners for each application type. Cleaners that contain solvents, pine and/or citrus oils are not permitted.

### 3.06 PROTECTION

- A. At time of Substantial Completion of elevator work, or portion thereof, provide suitable protective coverings, barriers, devices, signs, or other such methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.

### 3.07 DEMONSTRATION

- A. Instruct Owner's personnel in proper use, operations, and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner's personnel in normal procedures to be followed in checking for sources of operational failures or malfunctions.
- B. Make a final check of each elevator operation, with Owner's personnel present, immediately before date of substantial completion. Determine that control systems and operating devices are functioning properly.

### 3.08 ELEVATOR SCHEDULE

- A. Elevator Qty. 6
1. Elevator Model: EOX
  2. Elevator Type: Gearless Traction Machine Room-Less, Passenger
  3. Rated Capacity: 2500 lbs.
  4. Rated Speed: 150 ft./min.
  5. Operation System: EOX controller
  6. Travel: 61'-0"
  7. Landings: 6 total
  8. Openings:
    - a. Front: 6
    - b. Rear: 0
  9. Clear Car Inside: 6'-9" wide x 4'-3 1/2" deep
  10. Inside clear height: 7'-4" standard
  11. Door clear height: 7'-0" standard

12. Hoistway Entrance Size: 3'-6" wide x 7'-0" high
13. Door Type: One-speed Center opening
14. Power Characteristics: volts, 3 Phase, 60 Hz.
  - a. Note: Isolation Transformer required for jobs with less than 460vac as well as 575vac, 3 Phase building power.
15. Seismic Requirements: No
16. Hoistway Dimensions: 8'-6" wide x 5'-9" deep
  - a. Note: Hoistway dimensions listed above are for Non-Seismic areas only. If you have chosen the option for seismic requirements, please consult your local TK Elevator Sales Representative for the proper hoistway dimensions.
17. Pit Depth: 5'-0"
18. Button & Fixture Style: EOX Signal Fixtures
19. Special Operations:  
Hoistway access
  
20. Digital Services:  
Remote Monitoring with Application Programming Interface (API) Integration  
  
ADA Phone - Code Compliant Cellular Connectivity  
  
Smart Device Elevator Calling with occupant app API integration
  
21. Digitally Native

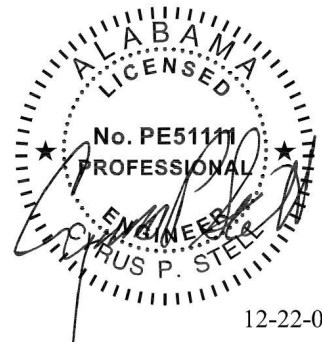
3.09 SPECIAL CONDITIONS (Note: Add Special Conditions as Needed)

**END OF SECTION**

**MOBILE CIVIC CENTER  
PARKING FACILITY**  
Mobile, AL

Bernhard TME, LLC Project # 12-22-0093  
Client Project # 4308

08/05/23



12-22-0093

**Index**

**DIVISION 21**

**FIRE PROTECTION SPECIFICATIONS**

Section 21 04 51	General Fire Protection Requirements
Section 21 04 52	Identification for Fire Protection Piping and Equipment
Section 21 04 53	Basic Fire Protection Materials and Methods
Section 21 04 55	Fire Protection System

**DIVISION 22**

**PLUMBING SPECIFICATIONS**

Section 22 04 01	General Plumbing Requirements
Section 22 04 03	Basic Plumbing Materials and Methods
Section 22 04 05	Identification for Plumbing Piping and Equipment
Section 22 04 07	Plumbing Systems Insulation
Section 22 04 10	Plumbing Piping
Section 22 04 40	Plumbing Fixtures

**DIVISION 23**

**HEATING VENTILATING AND AIR CONDITIONING SPECIFICATIONS**

Section 23 00 10	General HVAC Requirements
Section 23 00 53	Basic HVAC Materials and Methods
Section 23 00 62	Hangers and Supports for HVAC Piping and Equipment
Section 23 00 77	Identification for HVAC Piping and Equipment
Section 23 01 81	Hydronic Piping
Section 23 01 83	Refrigerant Piping
Section 23 05 13	Condensing Boilers
Section 23 07 12	HVAC Systems Insulation
Section 23 07 38	Mini Split System AC Units
Section 23 07 62	Unit Heaters
Section 23 09 50	Testing, Adjusting and Balancing



## SECTION 21 04 51

### GENERAL FIRE PROTECTION REQUIREMENTS

#### PART 1 - GENERAL

##### 1.1 RELATED DOCUMENTS

- A. Division 01 – Section “ALTERNATES”: Coordinate related Division 21 work and modify surrounding work to integrate the Work of each Alternate.

##### 1.2 SUMMARY

- A. Description of General Fire Protection Requirements. Applies to all Division 21, Section 210450's (Fire Protection).

##### 1.3 DEFINITIONS

- A. "Provide" means to furnish and install, complete and ready for operation.

##### 1.4 REFERENCES

- A. ASME: American Society for Mechanical Engineers.
- B. ASTM: American Society of Testing and Materials.
- C. AWWA: American Water Work Association.
- D. FM: Factory Mutual.
- E. NEMA: National Electrical Manufacturer's Association.
- F. NFPA: National Fire Protection Association.
- G. MSS: Manufacturer's Standardization Society of the Valve and Fitting Industry.
- H. UL: Underwriters Laboratories, Inc.

##### 1.5 REGULATORY REQUIREMENTS

- A. Comply with current edition, unless otherwise noted, of the following codes and standards.
  - 1. ASME B31.9 - Building Services Piping.
  - 2. ADA - American's with Disabilities Act.
  - 3. NFPA 13 – Installation of Sprinkler System.
  - 4. NFPA 70 - National Electrical Code.
  - 5. NFPA 101 - Life Safety Code.
  - 6. IBC - International Building Code with Fire, Mechanical, Plumbing and Gas Codes; 2015 Edition.
  - 7. IFC – International Fire Code, 2015 Edition.
- B. Permits, Licenses, Inspections and Fees.
  - 1. Obtain and pay for all permits, licenses, inspections and fees, and comply with all rules, laws and ordinances pertaining to the Contractor's portion of the Work.
  - 2. Obtain and pay for certificates of required inspections, and file certificates with Owner.

## 1.6 PRODUCT REQUIREMENTS

- A. Provide new standard, materials throughout.
- B. Multiple items of similar equipment shall be the product of the same manufacturer.
- C. Substitutions:
  - 1. Comply with the provisions of Division 01, Section "Product Requirements" and the following:
  - 2. When several manufacturers are named in the specifications, the corresponding products and models made by the specified manufacturers will be accepted and Contractor may base his bid on any one of those products. However, if the Contractor's bid is based on products other than the scheduled or specified **basis of design**, it shall be understood that there will be no extra cost involved whatsoever, and the effect on other trades has been included in the Contractor's proposal. Coordination with other trades for substituted equipment or use of products other than the named basis of design shall be the responsibility of the Contractor furnishing the equipment.
  - 3. The basis of design manufacturer's equipment has been used to determine space requirements. Should another approved manufacturer's equipment be used in preparing proposals, Contractor shall be responsible for determining that said equipment will fit space allocated. Submission of shop drawings or product data on such equipment shall be considered as indicating that the Contractor has reviewed the space requirements and the submitted equipment will fit the space allocated with due consideration given to access required for maintenance and code purposes.
  - 4. The basis of design manufacturer's equipment and scheduled Fire Protection equipment electrical requirements have been used to coordinate the electrical requirements of the plumbing equipment with the electrical systems serving that equipment.
    - a. Contractor shall coordinate the electrical requirements of the equipment actually furnished on this project and provide the electrical systems required by that equipment at no additional cost to the Owner.
    - b. Equipment of higher or lower electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified at no additional cost to the Owner.
    - c. Prior to approval of submittals of Fire Protection equipment with electrical requirements that are greater or lower than those shown on the Drawings, Contractor shall submit letter verifying that required changes to the electrical system, serving the specific piece of equipment in question, have been coordinated with the electrical contractor. Letter to be included with the associated equipment submittal, addressed to the Architect with a copy to the electrical engineer.
  - 5. Each bidder may submit to the Architect a list of any substitutes which he proposes to use in lieu of the equipment or material named in the specifications with a request for the approval of proposed substitutes. To be considered, such requests must be delivered to the office of the Architect not later than 10 days prior to bid due date. The submittal shall include the following:
    - a. Specific equipment or material proposed for substitution giving manufacturer, catalog and model number.
    - b. All performance and dimensional data necessary for comparison of the proposed substitute with the equipment or material specified.
    - c. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the substitute may require.
  - 6. The burden of proof of the merit of the proposed substitute is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution is final.
- D. Value Engineering / Value Analysis (VE/VA)
  - 1. If this project undergoes a value engineering or value analysis process, the Contractor/Bidders are required to do the following:
    - a. If the Contractor's VE or VA offering is based on products other than the scheduled or specified **basis of design**. The Contractor shall inform all trades of the offering so the effect on other trades is included in the General / Mechanical Contractor's proposal. Coordination with other trades for substituted

equipment or use of products, other than the named basis of design, shall be the responsibility of the Contractor furnishing the equipment.

- b. The Contractor shall be responsible for determining that offered equipment will fit space allocated. Submission of the VE or VA offering shall be considered as indicating that the Contractor has reviewed the space requirements and the equipment will fit in the space allocated with due consideration given to access required for maintenance and code purposes.
- c. The burden of proof of the merit of the proposed substitute is upon the proposer.

## 1.7 SUBMITTALS

- A. Submit under provisions of Division 01, Section "Submittal Procedures" and the following:
  - B. Sprinkler calculations and shop drawings shall be designed under the direction of a professional engineer licensed in the State of Alabama. Engineer shall sign and seal each drawing sheet, and the cover sheet for the hydraulic calculations, as required by the State Board of Professional Engineers and Land Surveyors and the State Fire Marshal for the State of Alabama.
  - C. Product Data: Submit to the Architect and obtain his approval of a complete list of materials and equipment which are to be provided under the 210450 Sections of Division 21.
    1. List shall be complete with manufacturer's names, catalog number, dimensions, specifications, rating data and options utilized. Capacities shall be in the terms specified.
    2. Call attention to deviations from specified items as to operation and physical dimensions.
    3. Performance curves for pumps shall be included.
    4. Final equipment orders shall not be placed until submittals have been returned marked "No Exceptions Noted" or "Make Corrections Noted".
    5. Submittals shall be submitted electronically:
      - a. Initial submittal should include a complete index for each type of equipment to be submitted.
      - b. Submittals shall be submitted by Section. Do not include products or materials from multiple sections in a single electronic file.
      - c. Submittals shall be generated via printing to PDF files, not from scanning (scanned files are too large and difficult to manipulate).
  - D. Shop Drawings: Before starting work, submit and obtain approval from Architect of detailed drawings of the following, fully dimensional (including elevations of ductwork and piping) and drawn to 1/4" to 1'-0" scale. Submit electronic file of each drawing in PDF format. Engineer will return electronic copy of marked-up drawings. Failure to submit shop drawings will make the Contractor responsible for changes required to facilitate installation
    1. Fire Protection Systems. See Division 21, Section "Fire Protection System."
    2. For multi-story buildings, submit detailed floor penetration sleeve layout drawings. See Division 21, Section "Basic Fire Protection Materials and Methods," Article "Informational Submittals."

## 1.8 QUALITY ASSURANCE

- A. Installer's Qualifications: Firm experienced in installation of systems similar in size and complexity to those required for this project, plus the following:
  1. Acceptable to, or licensed by, manufacturer.
  2. Not less than 3 years' experience with systems.
  3. Successfully completed not less than 5 comparable scale projects using systems similar to those for this project.
  4. Professional Engineer licensed in the State in which the work occurs.

## 1.9 SUMMARY OF WORK

- A. Scope: Provide all labor, materials, equipment, and services necessary for the completion of all fire protection work

shown or specified, except work specified to be done or furnished by others, complete and ready for operation.

#### 1.10 DRAWING INTERPRETATION AND COORDINATION

- A. Drawings are intended to show size, capacity, approximate location, direction, and general relationship of one phase to another, but not exact detail or arrangement.
- B. Do not scale drawings for location of system components. Check all measurements, location of pipe, ducts, and equipment with the detail architectural, structural, and electrical drawings and conditions existing in the field and lay out work to fit in with ceiling grids, lighting and other parts.
- C. Make minor adjustments in the field as required to provide the optimum result to facilitate ease of service, efficient operation, and best appearance.
- D. Where doubt arises as to the meaning of the Drawings and Specifications, obtain the Architect's written decision before proceeding with parts affected; otherwise assume liability for damage to other work and for making necessary corrections to work in question.
- E. Refer to Architectural Drawings for all dimensions and location of lights, ceiling diffusers and sprinkler heads.

#### 1.11 PROJECT/SITE CONDITIONS

- A. Visiting Site: Visit site and become familiar with location and various conditions affecting work. No additional allowance will be granted because of lack of knowledge of such conditions.
- B. Determine sizes and locations, and inverts of existing and new utilities near site.
- C. Cause as little interference or interruption of existing utilities and services as possible. Schedule work which will cause interference or interruption in advance with Owner, authorities having jurisdiction, and all affected trades.

#### 1.12 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit under provisions of Division 1 Sections - "Closeout Procedures" and "Project Record Documents" and the following.
- B. Record Drawings:
  1. Keep accurate record of corrections, variations, and deviations, including those required by change orders to the Fire Protection drawings.
  2. Accurately show location, size and elevation of new exterior work dimensioned from permanent structure.
  3. Record changes daily on a set of prints kept at the job site.
  4. Submit prints marked as noted above to Architect for review prior to request for final payment.
  5. Marked prints will be returned to Contractor for use in preparing Record Drawings.
- C. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:
  1. Record drawings – fire protection piping (PDF reproducibles) and electronic files in AutoCAD.
  2. Equipment Submittal Data (2).
  3. Equipment operating and maintenance manuals (2).
  4. Equipment warranty dates and guarantees (2).
  5. List of Owner's Personnel who have received operating and maintenance instructions.
- D. Contractor's Material and Test Certificate for above ground piping.
- E. Contractor's Material and Test Certificate for underground piping.

PART 2 - PRODUCTS - Not Used

PART 3 - EXECUTION - Not Used

END OF SECTION 21 04 51

## SECTION 21 04 52

## IDENTIFICATION FOR FIRE PROTECTION PIPING AND EQUIPMENT

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
1. Equipment labels.
  2. Warning signs and labels.
  3. Pipe labels.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated, including color and letter style.

## 1.3 QUALITY ASSURANCE

- A. NFPA Compliance: Comply with applicable NFPA codes for label of fire protection.

## 1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustical ceilings and similar concealment.

## PART 2 - PRODUCTS

## 2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16-inch thick, and having predrilled holes for attachment hardware.
  2. Color Coding:
 

<u>System</u>	<u>Background Color</u>	<u>Letters</u>
Equipment	Red	White
  3. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4-inch.
  4. Minimum Letter Size: Minimum 1/2-inch high. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  5. Fasteners: Stainless-steel self-tapping screws.
  6. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number.
- C. Equipment label in existing buildings should follow the existing label format and numbering sequence.

## 2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16-inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Yellow.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4-inch.
- F. Minimum Letter Size: Minimum 1/2-inch high for viewing distances up to 72-inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information as indicated elsewhere in the Specifications and on the Drawings.

## 2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
  - 1. Colors: Comply with ASME A13.1, unless otherwise indicated.
  - 2. Lettering: Use piping system terms indicated on the Drawings. Abbreviate only as necessary for each application length.
- B. Pre-tensioned Pipe Labels: Pre-coiled, semi-rigid plastic formed to partially cover circumference of pipe on lines 6-inches outside diameter and smaller; Snap on, on lines over 6- inches outside diameter and secure with nylon straps.
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on the Drawings and an arrow(s) indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions; or as a separate unit on each pipe label to indicate flow direction.
  - 2. Lettering Size: At least 1-1/4-inches high for 2-1/2-inch and larger pipe outside diameter.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

### 3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of Fire Protection equipment.
- B. Install or permanently fasten labels on starters furnished under this Division.

- C. Locate equipment labels where accessible and visible.

### 3.3 WARNING-SIGNS AND LABELS INSTALLATION

- A. Write required message on, and attach warning tags to equipment and other items where required in the specifications or shown on the Drawings.

### 3.4 PIPE LABEL INSTALLATION

- A. Identify piping specified under this Division in accordance with ANSI/ASME A13.1.
1. Label Fire Protection mains only.
- B. Locate pipe labels where piping is exposed, or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows: **(Note: In finished spaces, obtain direction from Architect prior to installing pipe labels.)**
1. Near each valve and control device.
  2. Near each branch connection, excluding short takeoffs for terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
  4. Near each change in direction.
  5. At access doors, manholes, and similar access points that permit view of concealed piping.
  6. Near major equipment items and other points of origination and termination.
  7. Spaced at maximum intervals of 20 feet along each run.
- C. Pipe Label Color Schedule:

<u>Piping System</u>	<u>Background Color</u>	<u>Letter Color</u>
Fire Protection Mains	Red	White

END OF SECTION 21 04 52



**SECTION 21 04 53****BASIC FIRE PROTECTION MATERIALS AND METHODS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Description of common piping, equipment, materials and installation for Fire Protection systems.
- B. This Section includes the following:
  - 1. Piping materials and installation instructions common to most Fire Protection piping systems.
  - 2. Mechanical sleeve seals.
  - 3. Sleeves.
  - 4. Concrete.
  - 5. Grout.
  - 6. Escutcheons.
  - 7. Access doors - Building.
  - 8. Flashing
  - 9. Workmanship.
  - 10. Cutting and patching.
  - 11. Excavation, trenching and backfilling.
  - 12. Connection to existing systems.
  - 13. Piping systems installation - Common Requirements.
  - 14. Equipment installation - Common Requirements.
  - 15. Painting and finishing.
  - 16. Concrete bases.
  - 17. Supports and anchorages.
  - 18. Protection and cleaning of equipment and materials.

**1.2 DEFINITIONS**

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.

**1.3 SUBMITTALS**

- A. Product Data: For the following:
  - 1. Mechanical sleeve seals.
  - 2. Escutcheons.
  - 3. Access doors - building.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Shop Drawings: For multi-story buildings, submit detailed drawings of the floor penetration sleeve sizes and locations, including the following information:

1. Fully dimensioned off column lines with location respective to adjacent walls shown.
2. Sleeve size.
3. Pipe size.
4. Pipe service.

## 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture. If pipes do not ship with end caps, cover ends of pipe stored on site with 6 mil plastic.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

## 1.6 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for Fire Protection installations.
- B. Coordinate installation of required supporting devices and set sleeves and inserts in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate installation of building access doors for fire protection items requiring access that are concealed behind finished surfaces.
- D. Electrical Characteristics for Fire Protection Equipment:
  1. Coordinate electrical system installation to match requirements of equipment actually furnished on this project.
  2. Include a letter with the respective equipment submittal from the electrical contractor and approved by electrical design consultant, detailing changes to the electrical system required to accommodate changes in the power distribution system to accommodate Fire Protection equipment that has different electrical power requirements from that equipment used as basis of design, or power provisions, as shown on the electrical drawings.

## PART 2 - PRODUCTS

### 2.1 PIPE, TUBE AND FITTINGS

- A. Refer to individual Division 21 Fire Protection Piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

### 2.2 JOINING MATERIALS

- A. Refer to individual Division 21 Fire Protection Piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
  2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.

- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated.

### 2.3 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
  1. Available Manufacturers:
    - a. Calpico, Inc.
    - b. Innerlynx, Advance Products & Systems, Inc.
    - c. Link-Seal by Thunderline.
    - d. Metraflex Co.
    - e. Pipeline Seal and Insulator, Inc.
  2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  3. Pressure Plates: Plastic. Include two for each sealing element.
  4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.
  5. Provide high temperature and U.L. fire rating at fire rated wall penetrations.

### 2.4 SLEEVES

- A. Galvanized-Steel Sheet: 20 gauge minimum thickness; round tube closed with longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Firestopping Sealant: See Division 07 Sections "Through-Penetration Firestop Systems" and "Fire Resistive Joint Systems" for firestopping sealant requirements.
- D. Stuffing Insulation: Glass fiber type, non-combustible.

### 2.5 CONCRETE

- A. Nominal weight concrete (145 PCF) using Type I Portland Cement, 1-inch maximum size coarse aggregate to provide a minimum 28 day compressive strength of 3000 psi.

### 2.6 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
  1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  2. Design Mix: 5000-psi, 28-day compressive strength.
  3. Packaging: Premixed and factory packaged.

### 2.7 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.

1. Finish: Polished chrome-plated.

## **2.8 ACCESS DOORS – BUILDING**

- A. Manufacturers:
  1. Bilco.
  2. Milcor.
  3. Nystrom.
- B. Construction:
  1. Door: 14-gauge, cold rolled steel.
  2. Frame: 16-gauge, cold rolled steel of configuration to suit material application.
  3. Hinge: Concealed spring hinge.
  4. Latch: Screwdriver cam latch.
  5. Finish: Phosphate dipped and prime coated.
  6. UL labeled when in fire-rated construction with rating to match construction.
  7. Stainless steel (Type 304) shall be used in ceramic tile or glazed structural tile.
- C. Size: 16 inch x 16 inch minimum, as indicated on drawings, or as required to allow inspection, service, and removal of concealed items.

## **2.9 FLASHING**

- A. Flexible Flashing: 47 mil thick sheet butyl compatible with roofing.
- B. Lead Flashing: Waterproofing, 5 lb/SF sheet lead.
- C. Pitch Cups: 20 gauge galvanized steel, minimum 8 inches deep, bases mitered and soldered and extending at least 4 inches horizontally.

## **PART 3 - EXECUTION**

### **3.1 WORKMANSHIP**

- A. First class and in accordance with best practice. Work to be orderly, neat, workmanlike in appearance and performed by skilled craftsman.
- B. Poor or improper workmanship shall be removed and replaced as directed by the Architect without additional cost to the Owner or design professionals.

### **3.2 CUTTING AND PATCHING**

- A. Comply with the requirements of other Divisions for the cutting and patching required to accommodate the installation of Fire Protection work. Repair and finish to match surrounding.
- B. Architect's approval required before cutting any part where strength, or appearance of finished work is involved.
- C. Openings are to be laid out and built-in, set sleeves and inserts and furnish detailed layout drawings to other trades in advance of their work.
- D. Core drill or saw cut openings in existing masonry construction.

**3.3 EXCAVATION, TRENCHING AND BACKFILLING**

- A. Provide trenching, excavation, backfilling necessary for performance of work, including excavation of rock and all other materials which may be encountered.
- B. Grade bottom of trenches evenly and excavate bell holes to insure uniform bearing for the full pipe length. Excavate minimum 6 inches below pipe. Refill cuts below grade with sand.
- C. Backfill after inspection by Architect and authorities having jurisdiction. Backfill compacted areas (engineered fill) with sand or fine gravel in accordance with requirements in Division 31. Section "Earthwork" no less than 95% compactancy. Backfill paved areas with sand or fine gravel compacted to meet requirements of Paving Section. Backfill shall be free of rock, wood, steel, brick, etc. Do not disturb pipe.
- D. Refer to Division 21, Fire Protection Piping Sections for specific bedding and backfill requirements.
- E. Restore existing pavement, curbs, sidewalks, sodding, bushes, etc., matching surroundings.
- F. Restore all pavement cuts to meet the requirements of the cuts of the local authority.

**3.4 CONNECTION TO EXISTING SYSTEMS**

- A. Make connections to existing systems only at time authorized, in writing, by Owner.
- B. Take existing systems and/or equipment out of service only at times authorized by Owner.
- C. Drain existing systems and fill, vent, test, and put existing systems into operation after connections have been made.

**3.5 PIPING SYSTEMS INSTALLATION - COMMON REQUIREMENTS**

- A. Install piping according to the following requirements and Division 21 Fire Protection Piping Sections specifying piping systems.
- B. Drawings, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas and stairwells.
- D. Install piping indicated to be exposed and in service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.
- E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- F. Install piping to permit valve servicing.
- G. Install piping at indicated slopes.
- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections. No mitering or notching for fittings permitted.
- J. Select system components with pressure rating equal to or greater than system operating pressure.
- K. Install escutcheons where exposed piping penetrates walls, ceilings, and floors in finished spaces.

### 3.6 SLEEVES

- A. Sleeves are not required for core-drilled holes.
  - 1. In mechanical room floors and other potentially wet areas, provide 1-1/2 inch angle ring or square set in silicone adhesive around penetration.
  
- B. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
  - 1. Cut sleeves to length so that sleeve extends out 1/2 inch from both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas, or other potentially wet areas, 1-1/2 inches above finished floor level. Caulk space outside of sleeves water tight.
  - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
  - 3. Use the following sleeve materials:
    - a. Sleeves for Piping Through Concrete Beams, Concrete Walls, Footings, and Potentially Wet Floors: Steel pipe.
    - b. Sleeves for Piping Through Masonry Walls and Gypsum Board Partitions: 22 gauge galvanized sheet metal sleeves 1/2 inch larger than pipe or pipe covering.
  - 4. Where piping penetrates non-rated equipment room wall, floors or roofs outside of a shaft, close off space between pipe and adjacent work with stuffing insulation and caulk air tight.
  - 5. Above ground, non-rated, exterior wall penetrations: Seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
  - 6. Seal space around the outside of sleeves with grout at masonry walls and floors and dry wall mud at gypsum board partitions.
  
- C. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
  - 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
  - 2. Fill void between pipe and sleeve with urethane foam and water proof around pipe on below grade end.
  
- D. Fire-Rated Penetrations: Where pipes pass through fire-rated and fire-resistive floors, walls, and partitions, install appropriately rated sleeves and firestopping sealant. Firestopping materials and installation methods are specified in Division 07 Sections "Through Penetration Firestop Systems" and "Fire Resistive Joint Systems".

### 3.7 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 21 Fire Protection Piping Sections specifying piping systems.
  
- B. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
  
- C. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
  
- D. Flanged Joints:
  - 1. 125 Pound Cast Iron Flange (Plain Face): Mating flange shall have raised face, if any, removed to avoid overstressing the cast iron flange.
  - 2. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.

### 3.8 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, and at final connection to each piece of equipment.
  2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.

### 3.9 PIPE CLEANING

- A. Keep pipe clean and free of dirt. Keep caps on ends of pipe when it is stored on site and reinstall caps on ends of installed piping at the end of each day.

### 3.10 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations.
- D. Install equipment in accordance with manufacturer's instructions. If manufacturer's instructions conflict with Contract Documents, obtain Architect's decision before proceeding.
- E. Install equipment to allow right of way for piping installed at a required slope.
- F. All equipment shall be firmly fastened in place:
1. Pad mounted equipment shall be secured to pads using poured in place anchor bolts or cinch anchors.
  2. Vibration isolators shall be secured to floors or pads and equipment shall be bolted to the isolators.

### 3.11 PAINTING AND FINISHING

- A. Except as specified below or noted on the Drawing, requirements for painting of Fire Protection systems, equipment, and components are specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.

### 3.12 CONCRETE BASES

- A. Provide concrete foundations with nominal dimensions conforming to the following schedule for floor-mounted equipment:

<u>Equipment</u>	<u>Foundation</u>
Equipment located in equipment rooms	4" high pad

- B. Concrete bases shall be continuous and shall have beveled edges and smooth float finish. Concrete bases shall be reinforced with No. 3 bars a maximum of 12" on center each way, and held in place with dowel rods at each corner anchored in the slab. Dowel rods shall not penetrate through the slab.
- C. Roughen and clean exposed slabs before pouring foundations. Apply bonding agent to surfaces in contact.

- D. Concrete pads shall extend a minimum of 4" beyond the equipment footprint in all directions, including appurtenances, vibration isolators, base elbow supports, and motors.
- E. Equipment attached directly to foundations or inertia bases; bases provided with grout holes; and bases consisting of a structural frame shall have voids filled with grout after attachment to foundation.
- F. Fill voids between baseplates and foundations, and level equipment, with grout.

### **3.13 ERECTION OF METAL SUPPORTS AND ANCHORAGES**

- A. Refer to Division 05 Section "Metal Fabrications" requirements.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing and fire protection materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

### **3.14 GROUTING**

- A. Mix and install grout for Fire Protection equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will come into contact with grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

### **3.15 ACCESS DOORS – BUILDING**

- A. Provide access doors in wall and inaccessible ceilings to allow access to service and maintain concealed equipment, valves, etc.
- B. Coordinate installation of access doors with Divisions responsible for Building System in which panels are being installed.

### **3.16 FLASHING**

- A. Provide flexible flashing and metal counterflashing where pitch cups and piping penetrate weather or waterproofed walls, floors and roofs.

### **3.17 PROTECTION AND CLEANING OF EQUIPMENT, FIXTURES, AND MATERIALS**

- A. Equipment and materials shall be carefully handled, properly stored, and protected from weather, dust-producing procedures, or damage during construction.



- B. At completion of all work, thoroughly clean exposed materials (pipe, etc.) and equipment and make ready for painting.

**END SECTION 21 04 53**

**SECTION 21 04 55**  
**FIRE PROTECTION SYSTEM**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Pipe, Fittings, Valves for:
  - 1. Dry Standpipe system.

**1.2 RELATED SECTIONS**

- A. Section 210451 – General Fire Protection Requirements.
- B. Section 210452 – Identification for Fire Protection Piping and Equipment.
- C. Section 210453 – Basic Fire Protection Materials and Methods.

**1.3 SYSTEM**

- A. A dry standpipe system for the parking deck.
- B. Parking deck is to be fully sprinklered.

**1.4 SUBMITTALS FOR REVIEW**

- A. Submit under provisions of Division 01, Section "Submittal Procedures" and the following:
- B. Product Data: Submit to the Architect and obtain his approval of a complete list of materials and equipment which are to be furnished under Division 21.
  - 1. List shall be complete with manufacturer's names, catalog number, dimensions, specifications, rating data and options utilized. Capacities shall be in the terms specified.
  - 2. Call attention to deviations from specified items as to operation and physical dimensions.
  - 3. Grooved joint couplings and fittings may be shown on drawings and product submittals, and shall be specifically identified by the manufacturer's style or series designation.
  - 4. Performance curves for equipment such as pumps shall be included.
  - 5. Final equipment orders shall not be placed until submittals have been returned marked "No Exceptions Noted" or "Make Corrections Noted".
  - 6. Bind all equipment submittals and provide index tab for each type of equipment. Submit all at one time. Reserve two sets for project close-out documents.
- C. Shop Drawings: (Dry Standpipe System)
  - 1. Prepare a working pipe shop drawing based on hydraulic calculations. The piping shop drawing shall indicate routing and configuration of piping, size of pipe, piping support, elevation of piping and coordination of piping with ductwork. Shop drawings shall include low point drain downs.
  - 2. When drawings and hydraulic calculations are submitted to the Engineer for review, they shall bear the seals of review and approval of the Architect, General Contractor, the Owners Insurance Underwriter. Hydraulic calculations and sprinkler shop drawings for building fire protection systems must be prepared under the supervision of an engineer licensed in the State of Alabama and bear his/her licensure seal with signature and date.

3. The Contractor shall incorporate all comments for approval by local Fire Marshall's Office and any State of Alabama Reviewing Agency. Contractor shall provide signed, sealed and approved set of plans to Engineer upon approval by state and local authorities.
4. Each system calculations, components and alarming to be on shop drawings. Refer to following sections for Special Hazard Systems.

## 1.5 REGULATORY REQUIREMENTS

- A. Materials: Conform to UL and FM Global Requirements and Standards.
- B. Sprinkler System: Conform to NFPA 13, State of Alabama Fire Marshall Requirements, City of Mobile Fire and Rescue Requirements and Alabama State Building Commission Requirements.
- C. Standpipe and Hose Systems: Conform to NFPA 14.
- D. Applicable Building Codes.
- E. Welding Materials and Procedures: Conform to ASME Code.
- F. Valves: Bear UL, FM label or marking. Provide manufacturer's name and pressure rating marked on valve body.
- G. Products Requiring Electrical Connection: Listed and classified as suitable for the purpose specified and indicated.

## 1.6 EXTRA MATERIALS

- A. Provide extra sprinklers under provisions of NFPA 13, State and Local requirements.
- B. Provide suitable wrenches for each sprinkler type.
- C. Provide metal storage cabinet in location designated. (Designate location).

## PART 2 - PRODUCTS

### 2.1 PIPING BELOW GRADE AND BELOW SLAB ON GRADE

- A. Underground fire protection and lead in piping shall be ductile iron class 50, 51, or 52 conforming to the latest revision of ANSI/AWWA C151/A21.51. Pipe shall have standard asphaltic coating on the exterior. Pipe shall also have a cement-mortar lining on the interior in accordance with ANSI/AWWA C104/A21.4, of latest revision. Install pipe as specifically required by the manufacturer, NFPA 24, and all AHJ. Consult local AHJ for underground material, means, and methods. Other underground pipes acceptable to the local water works and fire department are acceptable for use on this project.
- B. Underground fittings shall be cement lined ductile iron mechanical joint conforming to ANSI/AWWA C104 A21.4 of latest revision. Install fittings as specifically required by the manufacturer, NFPA 24, and all AHJ.
- C. In-Building Riser: At the Contractor's option, the IBR may be installed in lieu of the traditional mechanical joint fitting and pipe arrangement. Riser shall be composed of a single extended 90 degree fitting of fabricated 304 stainless steel tubing, maximum working pressure 200psi (14 bar). The fitting shall have a grooved-end connection on the outlet (building) side and a CIPS coupler on the inlet (underground) side. The In-Building Riser shall be an Ames Fire & Waterworks Series IBR. NOTE: It shall not be acceptable to shorten, extend or otherwise alter the IBR in any way. If an IBR will not suffice for an installation due to depth of bury, distance of slab above grade, etc., then install traditional ductile iron and mechanical joint lead-in, rodded together as per NFPA and local AHJ requirements.

## 2.2 ABOVE GROUND PIPING

- A. Above ground fire protection wet piping shall be Schedule 10 roll grooved black steel meeting all NFPA 13 or Schedule 40 threaded or grooved black steel meeting all NFPA 13. All pipe end preparations shall meet the requirements of NFPA 13.
- B. Flanged fittings shall be standard class 125# cast iron. Grooved fittings and couplings shall be UL/FM approved for 300 PSI working pressure. The use of grooved reducing couplings is acceptable on wet systems only. Grooved couplings installed on all dry systems and pre-action systems shall utilize the "flush seal" type gaskets. Fittings and couplings for screwed pipe shall be standard class cast iron 125# or 150# malleable iron. No sock it type fittings will be acceptable. All grooved fittings to be of the same manufacturer. Installer is cautioned to NOT mismatch grooved material. Welded outlets on piping shall comply the requirements of ANSI B1.20.1; ASTM A-53, Grades A or B, Type E. Welded outlets to be UL listed, FM approved for use conforming to NFPA. NOTE: The outlet type used shall match the pipe type installed. For example, a schedule 40 branch line shall connect via a schedule 40 welded outlet; however, the pipe being welded may be Schedule 10 or Schedule 40. Segment welded fittings are not acceptable.
- C. CPVC pipe and Fittings shall not be allowed on any portion of this project, including sleeves or drains – No Exceptions.
- D. Fire Department Connection Piping: Above ground Fire Department Connection piping passing through exterior walls or exposed to the elements, shall be hot-dipped galvanized Schedule 40 welded, threaded, or grooved steel meeting all NFPA 13 and Factory Mutual requirements. All pipe end preparations shall meet the requirements of NFPA 13. Hot-dip or spray cold galvanize all threads, welds, and grooves for corrosion protection.
- E. Fire Department Connection Fittings: Above ground Fire Department Connection fittings exposed to the elements shall be hot dip galvanized meeting all NFPA 13 and Factory mutual requirements.

## 2.3 SPRINKLER SYSTEM

- A. Pipe Hangers and Supports:
  1. Conform to NFPA 13.
  2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch: Carbon steel, adjustable swivel, split ring.
  3. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
  4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
  5. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
  6. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
  7. Vertical Support: Steel riser clamp.
  8. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
  9. Copper Plate Support: Carbon steel ring, adjustable, copper plated.
  10. All hangers to be a maximum of 12 inches from all 90 deg ells, the end of a branch line and mains, or an arm-over for drop.
- B. Gate Valves:
  1. Up to and including 2 Inches:
    - a. Manufactures:
      - 1) Nibco Model T-104-O.
      - 2) Where Nibco is listed, Victaulic, Stockham, Watts, Tyco and Milwaukee are equal.
    - b. Bronze body, bronze trim 175 psi WP, UL Listed, rising stem, handwheel, solid wedge or disc, threaded ends.
  2. Over 2 Inches:
    - a. Manufactures:
      - 1) Nibco Model F-607-OTS.
      - 2) Victaulic Model 771.
      - 3) Where Nibco is listed, Victaulic, Stockham, Watts, Tyco and Milwaukee are equal.

- b. Iron body, bronze trim 175 psi WP, UL Listed, rising stem pre-grooved for mounting tamper switch, handwheel, OS&Y, solid bronze or cast iron wedge, flanged or grooved ends.
  
- C. Butterfly Valves:
  - 1. Cast or Ductile Iron Body
    - a. Manufactures:
      - 1) Nibco Model GD-4765-4/8.
      - 2) Victaulic Series 705.
      - 3) Where Nibco is listed, Victaulic, Stockham, Watts, Tyco and Milwaukee are equal.
  - 2. Cast or ductile iron, chrome or electroless-nickel plated ductile iron or aluminum bronze disc, resilient replaceable EPDM pressure responsive seat, lug, or grooved ends, and stainless steel stem. (Stem shall be offset from the disc centerline to provided complete 360-degree circumferential seating.) Valve shall have an extended neck, handwheel and weatherproof actuator housing with gear drive and integral indicating device, and internal tamper switch rated, UL / FM approved.
  
- D. Alarm Check Valve:
  - 1. Victaulic Series 751 grooved end valve or Viking Model J-1 flanged valve complete with retard chamber, drains, gages, by-passes and all accessories required to prevent accidental alarms due to fluctuations in system pressure and testing of the valve while in service. Provide both mechanical and electrical means for actuation of Fire Alarm. Pipe all drains full size to daylight through exterior wall. The alarm check valve's internal components shall be replaceable without removing the valve from the installed position.
  
- E. Dry Pipe Valve:
  - 1. Valves 4" and 6" shall be equivalent to Reliable Model D. UL/FM/ULC approved with working pressure of 175 PSI, flange to mate with ANSI B 16.1 flange and groove per ANSI/AWWA C606. Install Reliable Model D galvanized trim kit, which is to incorporate an electric sprinkler alarm switch. Provide and install Reliable model A-2 or B-1 automatic air maintenance device as required. Verify electrical characteristics with Electrical Section. Pipe drains to daylight through exterior wall.
  
- F. Check Valves:
  - 1. Up to and including 2-1/2 inches to 8 inches:
    - a. Manufacturers:
      - 1) Nibco Model G-917-W.
      - 2) Victaulic Series 717.
      - 3) Where Nibco is listed, Victaulic, Stockham, Watts, Tyco and Milwaukee are equal.
    - b. Iron body and swing disc, bronze seat, stainless steel spring, grooved ends, 250 psi WP; suitable for vertical or horizontal installation.
  
- G. Water Motor Alarm:
  - 1. Hydraulically operated impeller type alarm with aluminum alloy chrome plated gong and motor housing, nylon bearings, and inlet strainer. Victaulic Series 760.
  
- H. Water Flow Switch:
  - 1. System sensor.
  
- I. Supervisory Switches:
  - 1. System sensor.
  
- J. Fire Department Valve:
  - 1. 2-1/2" Croker 5000 Series angle hose valve with cap and chain. Outlet threads shall match that of the local fire department.
  - 2. 2-1/2" Croker 5000 Series pressure regulating angle hose valve with cap and chain at locations where pressure exceeds 65 psi. Outlet threads shall match that of the local fire department.

- K. Test and Drain Assembly:
  1. Victaulic TestMaster II Style 720 or Viking Model A-1 complete with sight glass and ½" orifice for test purpose. Pipe discharge to drain riser on to exterior and spill on splash block.
- L. Double Check Assembly
  1. Watts #709DCDA complete with OS&Y gate valves, by-pass meter and supervisory switches on valves, unless noted otherwise on plan.

## 2.4 FIRE STOP SYSTEMS

- A. All wall and floor penetrations are to be closed. Refer to the Arch. Life Safety Plans and close all openings with a U.L. listed assembly compatible with the rating of the wall or floor being penetrated.
- B. Non-rated walls – sheet rock joint compound may be used to seal opening.
- C. For piping passing through listed sheet rock walls or partitions:
  1. Uninsulated pipe passing through 2 hour walls or partitions – minimum 5/8" depth of Hilti FS 605 filling annular space between wall and pipe on both sides of wall. U.L. Listing #WL1056.
  2. Uninsulated pipe passing through 2 hour walls or partitions – minimum 1-1/4" depth of Hilti FS 601 filling annular space between pipe and wall on both sides of wall, U.L. Listing #WL1054.
- D. For piping passing through concrete floors, concrete walls or concrete block walls.
  1. Uninsulated Schedule 40 steel pipe; fill annular space between pipe and opening with Hilti #FS 605. U.L. Listing #CJ1184.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Install piping in accordance with NFPA 13 for sprinkler systems and NFPA 14 for standpipe and hose systems.
- B. Route piping in orderly manner, plumb and parallel to building structure. Maintain gradient.
- C. Grooved joint shall be installed in accordance with the manufacturer's written recommendations. Grooved ends shall be clean and free from indentations, projections, or roll marks. The gasket shall be molded and produced by the coupling manufacturer of an elastomer suitable for the intended service. The coupling manufacturer's factory trained representative shall provide on-site training for the contractor's field personnel in the use of grooving tools and installation of product. The representative shall periodically visit the job site to ensure best practices in grooved product installation are being followed. (A distributor's representative is not considered qualified to conduct the training.)
- D. Install piping to conserve building space, to not interfere with use of space and other work.
- E. Group piping whenever practical at common elevations.
- F. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- G. Inserts:
  1. Provide inserts for placement in concrete formwork.
  2. Provide inserts for suspending hangers from reinforcement concrete slabs and sides of reinforced concrete beams.
  3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
  4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

- H. Pipe Hanger and Supports:
  - 1. Install in accordance with NFPA 13 and NFPA 14.
  - 2. Hangers on branch lines to comply with NFPA 13, 9.2.3.
  - 3. Hangers on mains to comply with NFPA 13, 9.2.4.
  - 4. All hangers to be a maximum of 12 inches from the end of a branch line or an arm-over for a drop.
  - 5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
  - 6. Where several pipes can be installed in parallel and at same elevation, provide multiple trapeze hangers may be used.
  - 7. Provide copper plated hangers and supports for copper piping.
  - 8. Prime coat exposed steel hangers and supports. Hangers and supports located in crawl spaces, pipe shafts, and suspended ceiling spaces are not considered exposed.
  
- I. Slope piping and arrange systems to drain at low points.
  
- J. Prepare pipe, fittings, supports, and accessories for finish painting. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
  
- K. Do not penetrate building structural members unless indicated.
  
- L. Provide sleeves when penetrating floors and wall. Seal pipe and sleeve penetrations to achieve fire resistance equivalent to fire separation required.
  
- M. When installing more than one piping system material, ensure system components are compatible and joined to ensure the integrity of the system. Provide necessary joining fittings. Ensure flanges, unions, and couplings for servicing are consistently provided.
  
- N. Die cut threaded joints with full cut standard taper pipe threads and connect with Teflon tape or Teflon pipe compound applied to male threads.
  
- O. Install valves with stems upright or horizontal, not inverted.
  
- P. Provide valves for shut-off or isolating service and where shown on plans.
  
- Q. Provide drain valves at main shut-off valves, low points of piping and apparatus.

**END OF SECTION 21 04 55**

**SECTION 22 04 01****GENERAL PLUMBING REQUIREMENTS****PART 1 - GENERAL**

## 1.1 SUMMARY

- A. This Section includes general plumbing requirements. Applies to all Division 220400 sections.

## 1.2 DEFINITIONS

- A. "Provide" means to furnish and install, complete and ready for operation.

## 1.3 REFERENCES

- A. AGA: American Gas Association.
- B. ANSI: American National Standards Institute, Inc.
- C. ASHRAE: American Society of Heating, Refrigeration, and Air Conditioning Engineers.
- D. ASME: American Society for Mechanical Engineers.
- E. ASSE: American Society of Sanitary Engineers.
- F. ASTM: American Society of Testing and Materials.
- G. AWWA: American Water Works Association.
- H. CISPI: Cast Iron Soil Pipe Institute.
- I. FM: Factory Mutual.
- J. NAIMA: North American Insulation Manufacturers Association.
- K. NEMA: National Electrical Manufacturers Association.
- L. NFPA: National Fire Protection Association.
- M. NSF: National Sanitation Foundation.
- N. MSS: Manufacturers Standardized Society of the Valve and Fittings Industry.
- O. PDI: Plumbing and Drainage Institute.
- P. UL: Underwriters Laboratories, Inc.

## 1.4 REGULATORY REQUIREMENTS

- A. Comply with current edition, unless otherwise noted, of the following codes and standards:
  - 1. ASME B31.9 – Building Services Piping.
  - 2. ADA – American's with Disabilities Act.



3. ASME – Boiler and Pressure Code.
4. NFPA 30 – Flammable and Combustible Liquids Code.
5. NFPA 31 – Installation of Oil-Burning Equipment.
6. NFPA 45 – Fire Protection for Laboratories Code.
7. NFPA 54 – National Fuel Gas Code.
8. NFPA 70 – National Electrical Code.
9. NFPA 101 – Life Safety Code.
10. IBC – International Building Code with Fire, Mechanical, Plumbing, and Gas Codes; 2015 Edition.
11. Alabama Boiler and Pressure Vessel Code.
12. Local Health Department.

B. Permits, Licenses, Inspections and Fees:

1. Obtain and pay all permits, licenses, inspections and fees, and comply with all rules, laws and ordinances pertaining to the Contractor's portion of the Work.
2. Obtain and pay for certificates of required inspections, and file certificates with Owner.

1.5 PRODUCT REQUIREMENTS

A. Provide new standard, materials throughout.

B. Multiple items of similar equipment shall be the product of the same manufacturer.

C. Substitutions:

1. Comply with the provisions of Division 01, Section "Product Requirements" and the following.
2. When several manufacturers are named in the specifications, the corresponding products and models made by the specified manufacturers will be accepted and Contractor may base his bid on any one of those products. However, if the Contractor's bid is based on products other than the scheduled or specified **basis of design**, it shall be understood that there will be no extra cost involved whatsoever, and the effect on other trades has been included in the Contractor's proposal. Coordination with other trades for substituted equipment or use of products other than the named basis of design shall be the responsibility of the Contractor furnishing the equipment.
3. The basis of design manufacturer's equipment has been used to determine space requirements. Should another approved manufacturer's equipment be used in preparing proposals, Contractor shall be responsible for determining that said equipment will fit space allocated. Submission of shop drawings or product data on such equipment shall be considered as indicating that the Contractor has reviewed the space requirements and the submitted equipment will fit the space allocated with due consideration given to access required for maintenance and code purposes.
4. The basis of design manufacturer's equipment and scheduled Plumbing equipment electrical requirements have been used to coordinate the electrical requirements of the plumbing equipment with the electrical systems serving that equipment.
  - a. Contractor shall coordinate the electrical requirements of the equipment actually furnished on this project and provide the electrical systems required by that equipment at no additional cost to the Owner.
  - b. Equipment of higher or lower electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified at no additional cost to the Owner.
  - c. Prior to approval of submittals of plumbing equipment with electrical requirements that are greater or lower than those shown on the Drawings, Contractor shall submit letter verifying that required changes to the electrical system, serving the specific piece of equipment in question, have been coordinated with the electrical contractor. Letter to be included with the associated equipment submittal, addressed to the Architect with a copy to the electrical engineer.
  - d. If minimum energy ratings or efficiencies are specified, equipment shall comply with specified requirements.

5. Each Bidder may submit to the Architect a list of any substitutes which he proposes to use in lieu of the equipment or material named in the specifications with a request for the approval of proposed substitutes. To be considered, such requests must be delivered to the office of the Architect not later than 10 days prior to bid due date. The submittal shall include the following:
  - a. Specific equipment or material proposed for substitution giving manufacturer, catalog and model number.
  - b. All performance and dimensional data necessary for comparison of the proposed substitute with the equipment or material specified.
  - c. A statement setting forth any changes in other materials, equipment or other Work that incorporation of the substitute may require.
6. The burden of proof of the merit of the proposed substitute is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution is final.

#### 1.6 SUBMITTALS

- A. Submit under provisions of Division 01, Section "Submittal Procedures" and the following.
- B. Product Data: Submit to the Architect and obtain his approval of a complete list of materials and equipment which are to be provided under the 220400 Sections of Division 22.
  1. List shall be complete with manufacturer names, catalog number, dimensions, specifications, rating data and options utilized. Capacities shall be in the terms specified.
  2. Call attention to deviations from specified items as to operation and physical dimensions.
  3. Include performance curves for pumps.
  4. Final equipment orders shall not be placed until submittals have been returned marked "No Exceptions Noted" or "Make Corrections Noted."
  5. Bind all equipment submittals and provide index tab for each type of equipment. Submit all at one time. Reserve two sets for project Close-Out Documents.
- C. Shop Drawings: Before starting work, submit and obtain approval from Architect of detailed drawings of the following, fully dimensional (including elevations of ductwork and piping) and drawn to 1/4" to 1'-0" scale. Submit electronic file of each drawing in PDF format. Engineer will return electronic copy of marked-up drawings. Failure to submit shop drawings will make the Contractor responsible for changes required to facilitate installation.
  1. For multi-story buildings, submit detailed floor penetration sleeve layout drawings. See Division 22, Section "Plumbing Basic Materials and Methods," Article "Informational Submittals."

#### 1.7 QUALITY ASSURANCE

- A. Installer's Qualifications: Firm experienced in installation of systems similar in size and complexity to those required for this project, plus the following:
  1. Acceptable to, or licensed by, manufacturer.
  2. Not less than 3 years experience with systems.
  3. Successfully completed no less than 5 comparable scale projects using systems similar to these for this project.
  4. Current Master Plumbing's Certificate and Master's Gas Certificate issued by the State, County, and City in which the work occurs.

#### 1.8 SUMMARY OF WORK

- A. Scope: Provide all labor, materials, equipment and services necessary for the completion of all plumbing work shown or specified, except work specified to be done or furnished by others, complete and ready for operation.
- B. Equipment Furnished by Others:
  1. Connect to all equipment shown on plumbing drawings that require plumbing connections.
  2. Provide piping, shut-off valves, and unions required for a complete installation.

### 1.9 DRAWING INTERPRETATION AND COORDINATION

- A. Drawings are intended to show size, capacity, approximate location, direction and general relationship of one phase to another, but not exact detail or arrangement.
- B. Do not scale drawings for location of system components. Check all measurements, location of pipe, ducts, and equipment with the detail architectural, structural, and electrical drawings and conditions existing in the field and lay out work so as to fit in with ceiling grids, lighting and other parts.
- C. Make minor adjustments in the field as required to provide the optimum result to facilitate ease of service, efficient operation, and best appearance.
- D. Where doubt arises as to the meaning of the drawings and specifications, obtain the Architect's written decision before proceeding with parts affected; otherwise assume liability for damage to other work and for making necessary corrections to work in question.
- E. Refer to Architectural Drawings for all dimensions.

### 1.10 PROJECT / SITE CONDITIONS

- A. Visiting Site: Visit site and become familiar with location and various conditions affecting work. No additional allowance will be granted because of lack of knowledge of such conditions.
- B. Determine sizes, locations, and inverts of existing and new utilities near site.
- C. Cause as little interference or interruption of existing utilities and service as possible. Schedule work which will cause interference or interruption in advance with Owner, authorities having jurisdiction, and all affected trades.

### 1.11 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Submit under provisions of Division 01, Sections "Closeout Procedures" and "Project Record Documents" and the following.
- B. Record Drawings:
  - 1. Keep accurate record of corrections, variations, and deviations, including those required by change orders to the Plumbing drawings.
  - 2. Accurately show location, size and elevation of new exterior work dimensioned from permanent structure.
  - 3. Record changes daily on a set of prints kept at the job site.
  - 4. Submit prints marked as noted above to Architect for review prior to request for final payment.
  - 5. Marked prints will be returned to Contractor for use in preparing Record Drawings.
- C. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of the following:
  - 1. Record drawings – plumbing piping (PDF reproducibles) and electronic files in AutoCAD.
  - 2. Equipment Submittal Data (2).
  - 3. Equipment operating and maintenance manuals (2).
  - 4. Equipment warranty dates and guarantees (2).
  - 5. Pressure vessel certificates (2).
  - 6. Certificate of Disinfection of domestic water lines.
  - 7. List of Owner's Personnel who have received operating and maintenance instructions.

## 1.12 TEMPORARY USE OF PLUMBING EQUIPMENT

- A. Use of new installed plumbing equipment to provide plumbing services during construction will be permitted subject to compliance with the requirements of Division 01, Section "Temporary Facilities and Controls", Article "Temporary Utility Installation", and the following:
  - 1. Equipment specified to have factory supervised start-up shall have had such start-up.
  - 2. Units shall be properly lubricated, balanced, and aligned. Vibrations must be eliminated.
  - 3. Plumbing equipment must be operated as a complete system and be fully maintained by operating personnel.
- B. Prior to final inspection, the equipment or parts used which show wear and tear beyond normal, shall be replaced with identical replacements, at no additional cost to the Owner.
- C. Warranty dates shall start at Date of Substantial Completion. Provide extended warranty from manufacturer to cover time period between start-up and substantial completion.

**PART 2 - PRODUCTS (Not Applicable)****PART 3 - EXECUTION (Not Applicable)**

END OF SECTION 22 04 01

**SECTION 22 04 03****BASIC PLUMBING MATERIALS AND METHODS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Description of common piping, equipment, materials, and installation for Plumbing systems.
- B. This Section includes the following:
  - 1. Piping materials and installation instructions common to most Plumbing piping systems.
  - 2. Transition fittings.
  - 3. Dielectric fittings.
  - 4. Mechanical sleeve seals.
  - 5. Sleeves.
  - 6. Concrete.
  - 7. Grout.
  - 8. Escutcheons.
  - 9. Access doors - Building.
  - 10. Flashing
  - 11. Workmanship.
  - 12. Cutting and patching.
  - 13. Excavation, trenching and backfilling.
  - 14. Piping systems installation - Common Requirements.
  - 15. Equipment installation - Common Requirements.
  - 16. Painting and finishing.
  - 17. Concrete bases.
  - 18. Supports and anchorages.
  - 19. Protection and cleaning of equipment and materials.

**1.2 DEFINITIONS**

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. The following are industry abbreviations for rubber materials:
  - 1. EPDM: Ethylene-propylene-diene terpolymer rubber.

### 1.3 SUBMITTALS

- A. Product Data: For the following:
  - 1. Transition fittings.
  - 2. Dielectric fittings.
  - 3. Mechanical sleeve seals.
  - 4. Escutcheons.
  - 5. Access doors - building.

### 1.4 INFORMATIONAL SUBMITTALS

- A. Shop Drawings: For multi-story buildings, submit detailed drawings of the floor penetration sleeve sizes and locations, including the following information:
  - 1. Fully dimensioned off column lines with location respective to adjacent walls shown.
  - 2. Sleeve size.
  - 3. Pipe size and insulation thickness.
  - 4. Pipe service.

### 1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and to prevent entrance of dirt, debris, and moisture. If pipes do not ship with end caps, cover ends of pipe stored on site with 6 mil plastic.
- B. Store plastic pipes protected from direct sunlight. Support to prevent sagging and bending.

### 1.6 COORDINATION

- A. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction, to allow for Plumbing installations.
- B. Coordinate installation of required supporting devices and set sleeves and inserts in poured-in-place concrete and other structural components as they are constructed.
- C. Coordinate installation of building access doors for Plumbing items requiring access that are concealed behind finished surfaces.
- D. Electrical Characteristics for Plumbing Equipment:
  - 1. Coordinate electrical system installation to match requirements of equipment furnished on this project.
  - 2. If minimum energy ratings or efficiencies are specified, equipment shall comply with these requirements.
  - 3. Include a letter with the respective equipment submittal from the electrical contractor and approved by electrical design consultant, detailing changes to the electrical system required to accommodate changes in the power distribution system to accommodate Plumbing equipment that has different electrical power requirements from that equipment used as basis of design, or power provisions, as shown on the electrical drawings.

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
  - 1. Manufacturers: Subject to compliance with requirements. Provide products by one of the following:

## 2.2 PIPE, TUBE AND FITTINGS

- A. Refer to individual Division 22 Plumbing Piping Sections for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

## 2.3 JOINING MATERIALS

- A. Refer to individual Division 22 Plumbing Piping Sections for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
  - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
    - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
    - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
  - 2. AWWA C110, rubber, flat face, 1/8 inch thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BCuP Series, copper-phosphorus alloys for general-duty brazing, unless otherwise indicated.

## 2.4 TRANSITION FITTINGS

- A. Plastic-to-Metal Transition Fittings:
  - 1. For pipe sizes NPS 2 and smaller: PVC or CPVC, Schedule 80, one-piece fitting; one end with threaded brass insert, and one solvent-cement socket or threaded end.
  - 2. For pipe sizes larger than NPS 2: Flanged joints.
- B. Fitting-Type Transition Couplings:
  - 1. Manufactured piping coupling or specified piping system fitting.

## 2.5 DIELECTRIC FITTINGS

- A. Dielectric Nipples:
  - 1. Manufacturers:
    - a. Perfection Corp.
    - b. Precision Plumbing Products, Inc.
    - c. Sioux Chief Manufacturing Co., Inc.
    - d. Victaulic Co. of America; Clearflow Dielectric Waterway Style 47.
  - 2. Zinc electroplated steel nipple with inert and noncorrosive, thermoplastic lining; treaded ends; and 300 psig minimum working pressure at 230 deg F. Ring-groove to lock liner to steel casing and provide indentifying roll marking.
- B. Dielectric Flanges:
  - 1. Manufacturers:
    - a. Capital Manufacturing.

- b. Central Plastics.
- c. Watts.
- d. Wilkins, a Zurn Company.
- 2. Standard: ASSE 1079.
- 3. Factory-fabricated, bolted, companion-flange assembly.
- 4. End Connections: Solder-joint or thread copper alloy and thread ferrous.
- 5. Dielectric Flange Insulating Kits:
  - a. Non-conducting materials for field assembly or companion flanges.
  - b. Gasket: Neoprene or phenolic.
  - c. Bolt Sleeves: Phenolic or polyethylene.
  - d. Washers: Phenolic with steel backing washers.

## 2.6 MECHANICAL SLEEVE SEALS

- A. Description: Modular sealing element unit, designed for field assembly, to fill annular space between pipe and sleeve.
  - 1. Available Manufacturers:
    - a. Calpico, Inc.
    - b. Innerlynx, Advance Products & Systems, Inc.
    - c. Link-Seal by Thunderline.
    - d. Metraflex Co.
    - e. Pipeline Seal and Insulator, Inc.
  - 2. Sealing Elements: EPDM interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
  - 3. Pressure Plates: Plastic. Include two for each sealing element.
  - 4. Connecting Bolts and Nuts: Carbon steel with corrosion-resistant coating of length required to secure pressure plates to sealing elements. Include one for each sealing element.
  - 5. Provide high temperature and U.L. fire rating at fire rated wall penetrations.

## 2.7 SLEEVES

- A. Galvanized-Steel Sheet: 20 gauge minimum thickness; round tube closed with longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- C. Firestopping Sealant: See Division 07 Sections "Through-Penetration Firestop Systems" and "Fire Resistive Joint Systems" for firestopping sealant requirements.
- D. Stuffing Insulation: Glass fiber type, non-combustible.

## 2.8 CONCRETE

- A. Nominal weight concrete (145 PCF) using Type I Portland Cement, 1-inch maximum size coarse aggregate to provide a minimum 28 day compressive strength of 3000 psi.

## 2.9 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
  - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.
  - 3. Packaging: Premixed and factory packaged.



**2.10 ESCUTCHEONS**

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
1. Finish: Polished chrome-plated.

**2.11 ACCESS DOORS – BUILDING**

- A. Manufacturers:
1. Bilco.
  2. Milcor.
  3. Nystrom.
- B. Construction:
1. Door: 14-gauge, cold rolled steel.
  2. Frame: 16-gauge, cold rolled steel of configuration to suit material application.
  3. Hinge: Concealed spring hinge.
  4. Latch: Screwdriver cam latch.
  5. Finish: Phosphate dipped and prime coated.
  6. UL labeled when in fire-rated construction with rating to match construction.
  7. Stainless steel (Type 304) shall be used in ceramic tile or glazed structural tile.
- C. Size: 16 inch x 16 inch minimum, as indicated on drawings, or as required to allow inspection, service, and removal of concealed items.

**2.12 FLASHING**

- A. Flexible Flashing: 47 mil thick sheet butyl compatible with roofing.
- B. Lead Flashing: Waterproofing, 5 lb/SF sheet lead.
- C. Pitch Cups: 20 gauge galvanized steel, minimum 8 inches deep, bases mitered and soldered and extending at least 4 inches horizontally.

**PART 3 - EXECUTION****3.1 WORKMANSHIP**

- A. First class and in accordance with best practice. Work to be orderly, neat, workmanlike in appearance and performed by skilled craftsman.
- B. Poor or improper workmanship shall be removed and replaced as directed by the Architect without additional cost to the Owner or design professionals.

**3.2 CUTTING AND PATCHING**

- A. Comply with the requirements of other Divisions for the cutting and patching required to accommodate the installation of Plumbing work. Repair and finish to match surrounding.
- B. Architect's approval required before cutting any part where strength or appearance of finished work is involved.
- C. Openings are to be laid out and built-in, set sleeves and inserts and furnish detailed layout drawings to other trades in advance of their work.

1. See Part 1 – 1.4 Informational Submittals above.

D. Core drill or saw cut openings in existing masonry construction.

### 3.3 EXCAVATION, TRENCHING AND BACKFILLING

A. Provide trenching, excavation, backfilling necessary for performance of work, including excavation of rock and all other materials which may be encountered.

B. Grade bottom of trenches evenly and excavate bell holes to insure uniform bearing for the full pipe length. Excavate minimum 6 inches below pipe. Refill cuts below grade with sand.

C. Backfill after inspection by Architect and authorities having jurisdiction. Backfill compacted areas (engineered fill) with sand or fine gravel in accordance with requirements in Division 31. Section "Earthwork" no less than 95% compactancy. Backfill paved areas with sand or fine gravel compacted to meet requirements of Paving Section. Backfill shall be free of rock, wood, steel, brick, etc. Do not disturb pipe.

D. Refer to Division 22, Plumbing Piping Sections for specific bedding and backfill requirements.

1. For factory or field insulation or coated piping, the bedding shall be a minimum of 6 inches of sand. The first 12 inches of backfill above the pipe shall be sand.

E. Restore existing pavement, curbs, sidewalks, sodding, bushes, etc., matching surroundings.

F. Restore all pavement cuts to meet the requirements of the cuts of the local authority.

### 3.4 CONNECTION TO EXISTING SYSTEMS

A. Make connections to existing systems only at time authorized, in writing, by Owner.

B. Take existing systems and/or equipment out of service only at times authorized by Owner.

C. Drain existing systems and fill, vent, test, and put existing systems into operation after connections have been made.

D. Repair existing insulation at points of connection to existing work.

### 3.5 PIPING SYSTEMS INSTALLATION - COMMON REQUIREMENTS

A. Install piping according to the following requirements and Division 22 Plumbing Sections specifying piping systems.

B. Drawings, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on Shop Drawings.

C. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.

D. Install piping indicated to be exposed and in service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

E. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.

F. Install piping to permit valve servicing.

G. Install piping at indicated slopes.

- H. Install piping free of sags and bends.
- I. Install fittings for changes in direction and branch connections. No mitering or notching for fittings permitted.
- J. Install piping to allow application of insulation.
- K. Select system components with pressure rating equal to or greater than system operating pressure.
- L. Install escutcheons where exposed, non-insulated piping penetrates walls, ceilings, and floors in finished spaces.

### 3.6 SLEEVES

- A. Sleeves are not required for core-drilled holes, or wall hydrants.
  - 1. In mechanical room floors and other potentially wet areas, provide 1-1/2 inch angle ring or square set in silicone adhesive around penetration.
- B. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
  - 1. Cut sleeves to length so that sleeve extends out 1/2 inch from both surfaces.
    - a. Exception: Extend sleeves installed in floors of mechanical equipment areas, or other potentially wet areas, 1-1/2 inches above finished floor level. Caulk space outside of sleeves water tight.
  - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
  - 3. Use the following sleeve materials:
    - a. Sleeves for Piping Through Concrete Beams, Concrete Walls, Footings, and Potentially Wet Floors: Steel pipe.
    - b. Sleeves for Piping Through Masonry Walls and Gypsum Board Partitions: Steel sheet sleeves 1/2 inch larger than pipe or pipe covering.
  - 4. Where piping penetrates non-rated equipment room wall, floors or roofs outside of a shaft, close off space between pipe or duct and adjacent work with stuffing insulation and caulk air tight.
  - 5. Above ground, non-rated, exterior wall penetrations: Seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 07 Section "Joint Sealants" for materials and installation.
  - 6. Provide for continuous insulation wrapping thru sleeve.
  - 7. Seal space around the outside of sleeves with grout at masonry walls and floors and dry wall mud at gypsum board partitions.
- C. Underground, Exterior-Wall Pipe Penetrations: Install cast-iron "wall pipes" for sleeves. Seal pipe penetrations using mechanical sleeve seals. Select sleeve size to allow for 1-inch annular clear space between pipe and sleeve for installing mechanical sleeve seals.
  - 1. Mechanical Sleeve Seal Installation: Select type and number of sealing elements required for pipe material and size. Position pipe in center of sleeve. Assemble mechanical sleeve seals and install in annular space between pipe and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.
- D. Fire-Rated Penetrations: Where pipes pass through fire-rated and fire-resistive floors, walls, and partitions, install appropriately rated sleeves and firestopping sealant. Firestopping materials and installation methods are specified in Division 07 Sections "Through Penetration Firestop Systems" and "Fire Resistive Joint Systems".
- E. Cast in Place Sleeving System Installation:
  - 1. General: Install penetration firestopping to comply with manufacturer's published installation instructions and drawings for products and applications indicated.
  - 2. Install forming materials and other accessories of types required to support fill materials during application in the position needed to produce cross-sectional shapes and depths required for the fire ratings required:

- a. After installing fill materials and allowing them to fully cure, remove combustible forming materials and accessories not indicated as permanent components of firestopping.

### 3.7 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements and Division 22 Plumbing Piping Sections specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
  1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
- G. Flanged Joints:
  1. 125 Pound Cast Iron Flange (Plain Face): Mating flange shall have raised face, if any, removed to avoid overstressing the cast iron flange.
  2. Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- H. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
  1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
  2. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
  3. PVC Nonpressure Piping: Join according to ASTM D 2855.
- I. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- J. Composite automatic couplers:
  1. Composite automatic couplers shall be installed in accordance with manufacturers installation instructions.

### 3.8 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
  1. Install unions, in piping NPS 2 and smaller at final connection to each piece of equipment.
  2. Install flanges, in piping NPS 2-1/2 and larger, adjacent to flanged valves and at final connection to each piece of equipment.
  3. Wet Piping Systems: Install dielectric fittings to connect piping materials of dissimilar metals.

### 3.9 PIPE CLEANING

- A. Keep pipe clean and free of dirt. Keep caps on ends of pipe when it is stored on site and reinstall caps on ends of installed piping at the end of each day.

### 3.10 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.
- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations.
- D. Install equipment in accordance with manufacturer's instructions. If manufacturer's instructions conflict with Contract Documents, obtain Architect's decision before proceeding.
- E. Install equipment to allow right of way for piping installed at a required slope.
- F. All equipment shall be firmly fastened in place:
  1. Pad mounted equipment shall be secured to pads using poured in place anchor bolts or cinch anchors.
  2. Vibration isolators shall be secured to floors or pads and equipment shall be bolted to the isolators.

### 3.11 PAINTING AND FINISHING

- A. Except as specified below or noted on the Drawing, requirements for painting of Plumbing systems, equipment, and components are specified in Division 09 Sections "Interior Painting" and "Exterior Painting."
- B. Damage and Touchup: Repair marred and damaged factory-painted finishes with materials and procedures to match original factory finish.
- C. Paint water pipe and insulation downstream of backflow preventor (non-potable water) to termination point, or to connection with mechanical system piping, purple.

### 3.12 CONCRETE BASES

- A. Provide concrete foundations with nominal dimensions conforming to the following schedule for floor-mounted equipment:
 

<u>Equipment</u>	<u>Foundation</u>
Equipment and piping stands and supports	4" high pad
- B. Concrete bases shall be continuous and shall have beveled edges and smooth float finish. Concrete bases shall be reinforced with No. 3 bars a maximum of 12" on center each way, and held in place with dowel rods at each corner anchored in the slab. Dowel rods shall not penetrate through the slab.
- C. Roughen and clean exposed slabs before pouring foundations. Apply bonding agent to surfaces in contact.
- D. Concrete pads shall extend a minimum of 4" beyond the equipment footprint in all directions, including appurtenances, vibration isolators, base elbow supports, and motors.
- E. Equipment attached directly to foundations or inertia bases; bases provided with grout holes; and bases consisting of a structural frame shall have voids filled with grout after attachment to foundation.
- F. Fill voids between baseplates and foundations, and level equipment, with grout.

**3.13 ERECTION OF METAL SUPPORTS AND ANCHORAGES**

- A. Refer to Division 05 Section "Metal Fabrications" requirements.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor plumbing materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

**3.14 GROUTING**

- A. Mix and install grout for Plumbing equipment base bearing surfaces, pump and other equipment base plates, and anchors.
- B. Clean surfaces that will encounter grout.
- C. Provide forms as required for placement of grout.
- D. Avoid air entrapment during placement of grout.
- E. Place grout, completely filling equipment bases.
- F. Place grout on concrete bases and provide smooth bearing surface for equipment.
- G. Place grout around anchors.
- H. Cure placed grout.

**3.15 ACCESS DOORS – BUILDING**

- A. Provide access doors in wall and inaccessible ceilings to allow access to service and maintain concealed Plumbing equipment, valves, etc.
- B. Coordinate installation of access doors with Divisions responsible for Building System in which panels are being installed.

**3.16 FLASHING**

- A. Provide flexible flashing and metal counterflashing where pitch cups and piping penetrate weather or waterproofed walls, floors and roofs.
- B. Flashing for vent pipes through the roof and roof drains specified under Division 07.
- C. Flashing floor drains and floor sinks in floors with topping over finished area with lead, 10-inches clearance sides with minimum 36x36 inch sheet size. Fasten flashing to drain clamp device.
- D. Seal floor and shower drains water tight to adjacent materials.

**3.17 PROTECTION AND CLEANING OF EQUIPMENT, FIXTURES, AND MATERIALS**

- A. Equipment, fixtures, and materials shall be carefully handled, properly stored, and protected from weather, dust-producing procedures, or damage during construction.

- B. At completion of all work, thoroughly clean, exposed materials (pipe, etc.), equipment, and fixtures and make ready for painting.

**END SECTION 22 04 03**

## SECTION 22 04 05

## IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
1. Equipment labels.
  2. Warning signs and labels.
  3. Pipe labels.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated, including color and letter style.

## 1.3 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping, unless otherwise noted herein.

## 1.4 COORDINATION

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- B. Coordinate installation of identifying devices with locations of access panels and doors.
- C. Install identifying devices before installing acoustic ceilings and similar concealment.

## PART 2 - PRODUCTS

## 2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16-inch thick, and having predrilled holes for attachment hardware.
  2. Color Coding:

<u>System</u>	<u>Background Color</u>	<u>Letters</u>
Equipment served by emergency power	Red	White
Other equipment	Black	White

3. Temperatures up to 160 deg F.
  4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4-inch.
  5. Minimum Letter Size: Minimum 1/2-inch high. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  6. Fasteners: Stainless-steel self-tapping screws.
  7. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number.



## 2.2 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16-inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: White.
- C. Background Color: Yellow.
- D. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
- E. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4-inch.
- F. Minimum Letter Size: Minimum 1/2-inch high for viewing distances up to 72-inches, and proportionately larger lettering for greater viewing distances. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
- G. Fasteners: Stainless-steel self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information as indicated elsewhere in the Specifications and on the Drawings.

## 2.3 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
  - 1. Colors: Comply with ASME A13.1, unless otherwise indicated.
  - 2. Colors Medical Gases: Comply with NFPA 99.
  - 3. Lettering: Use piping system terms indicated on the Drawings. Abbreviate only as necessary for each application length.
- B. Pre-tensioned Pipe Labels: Pre-coiled, semi-rigid plastic formed to partially cover circumference of pipe on lines 6-inches outside diameter, including insulation, and smaller; Snap on, on lines over 6-inches outside diameter, including insulation, and secure with nylon straps.
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on the Drawings and an arrow(s) indicating flow direction.
  - 1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions; or as a separate unit on each pipe label to indicate flow direction.
  - 2. Lettering Size: At least 1-1/4-inches high for 2-1/2-inch and larger pipe outside diameter, including insulation.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Clean piping and equipment surface of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

### 3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of Plumbing equipment.
- B. Install or permanently fasten labels on starters furnished under this Division.
- C. Locate equipment labels where accessible and visible.

### 3.3 WARNING-SIGNS AND LABELS INSTALLATION

- A. Write required message on, and attach warning tags to equipment and other items where required in the specifications or shown on the Drawings.

### 3.4 PIPE LABEL INSTALLATION

- A. Identify piping specified under this Division in accordance with ANSI/ASME A13.1.
- B. Locate pipe labels where piping is exposed, or above accessible ceilings in finished spaces; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior exposed locations as follows:  
**(Note: In finished spaces, obtain direction from Architect prior to installing pipe labels.)**
  1. Near each valve and control device.
  2. Near each branch connection, excluding short takeoffs for terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
  4. Near each change in direction.
  5. At access doors, manholes, and similar access points that permit view of concealed piping.
  6. Near major equipment items and other points of origination and termination.
  7. Spaced at maximum intervals of 20 feet along each run.
- C. Pipe Label Color Schedule:

<u>Piping System</u>	<u>Background Color</u>	<u>Letter Color</u>
Domestic Cold-Water	Green	White
Waste	Green	White
Vent	Green	White
Storm	Green	White

- D. Heat Traced Pipes: Apply "Electric Traced" signs to outside of thermal insulation jacket.

END OF SECTION 22 04 05

**SECTION 22 04 07**  
**PLUMBING SYSTEMS INSULATION**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. Piping insulation.
- B. Jackets and Accessories.
- C. Equipment Insulation.
- D. Covering.

**1.2 RELATED SECTIONS**

- A. Division 07 – Firestopping.
- B. Division 22 – Section 220405 “Identification for Plumbing Piping and Equipment.”
- C. Division 22 – Section 220410 “Plumbing Piping”: Placement of hangers and hanger inserts.

**1.3 SUBMITTALS FOR REVIEW**

- A. Section 220401: Procedures for submittals.
- B. Product Data: Provide product description, thermal characteristics, list of materials and thickness for each service, and locations.

**1.4 QUALITY ASSURANCE**

- A. Applicator Qualifications: Company specializing in performing insulation work with minimum 3 years’ experience.

**1.5 REGULATORY REQUIREMENTS**

- A. Conform to maximum flame spread/smoke developed rating of 25/50 in accordance with ASTM E84, NFPA 255 or UL 723.
- B. All insulation materials, adhesives, mastic and coating shall be asbestos free.

**PART 2 - PRODUCTS**

**2.1 MANUFACTURERS**

- A. Acceptable Manufactures for Fiberglass Insulation Materials:
  - 1. Owens-Corning.
  - 2. Certaineed.
  - 3. Knauf.
  - 4. Johns Manville Corporation

- B. Acceptable Manufacturers for Adhesives, Mastics and Coatings:
  1. Armstrong.
  2. Benjamin Foster.
  3. Childers.
  4. Marathon.

## 2.2 GLASS FIBER PIPE INSULATION

- A. Manufacturer: Owens-Corning Model SSL-11.
- B. Insulation: ASTM C547; rigid molded, noncombustible.
  1. 'K' value: ASTM C177, 0.24 at 75 degrees F.
  2. Maximum service temperature: 850 degrees F.
  3. Maximum moisture absorption: 0.2 percent by volume.
- C. Vapor Barrier Jacket:
  1. White kraft paper with glass fiber yarn, bonded to aluminized film.
  2. Moisture vapor transmission: ASTM E96; 0.02 perm-inches.
- D. Tie Wire: 0.048-inch stainless steel with twisted ends on maximum 12 inch centers.
- E. Vapor Barrier Lap Adhesive:
  1. Compatible with insulation.
- F. Insulating Cement/Mastic:
  1. ASTM C195; hydraulic setting on mineral wool.

## 2.3 JACKETS – PIPING AND EQUIPMENT

- A. PVDC Jacket for Indoor Applications: 4-mil thick, white PVDC biaxially oriented barrier film with a permeance at 0.02 perms when tested according to ASTM E96 and with a flame-spread index of 5 and a smoke-developed index of 20 when tested according to ASTM E84.
- B. Canvas Jacket: UL Listed.
  1. Fabric: ASTM C921, 6 oz/sq yd plain weave cotton treated with dilute fire retardant lagging adhesive.
  2. Lagging Adhesive: Compatible with insulation.

## 2.4 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-C-19565C, Type II.
- B. Vapor-Barrier Mastic: Water based; suitable for indoor and jacketed outdoor use on below ambient services.
  1. Products:
    - a. Childers Products, Division of ITW; CP-35.
    - b. Foster Products Corporation, H.B. Fuller Company; 30-90.
    - c. ITW TACC, Division of Illinois Tool Works; CB-50.
    - d. Marathon Industries, Inc.; 590.
    - e. Mon-Eco Industries, Inc.; 55-40.
    - f. Vimasco Corporation; 749.
  2. Water-Vapor Permeance: ASTM E 96, Procedure B, 0.013 perm at 43-mil dry film thickness.
  3. Service Temperature Range: Minus 20 to plus 180 deg F.
  4. Solids Content: ASTM D 1644, 59 percent by volume and 71 percent by weight.
  5. Color: White.

**PART 3 - EXECUTION****3.1 EXAMINATION**

- A. Verify that piping and equipment have been tested before applying insulation materials.
- B. Verify that surfaces are clean and dry, with foreign material removed.

**3.2 INSTALLATION**

- A. Install in accordance with NAIMA National Insulation Standards.
- B. Exposed Piping: Locate insulation and cover seams in least visible locations.
- C. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
- D. Fit pipe hangers over insulation.
- E. Inserts and Shields:
  - 1. Application: Protect insulated piping at hangers and supports with insulation shield. On pipe sizes over 2 inches, provide insert.
  - 2. Insulation Protection Shield: Galvanized steel formed in half circle to fit insulation. Length and gauge as follows:
    - a. Up to NPS 4: 12 inches long and 22 gauge.
    - b. NPS 6: 18 inches long and 22 gauge.
    - c. NPS 8 through 12: 24 inches long and 18 gauge.
    - d. NPS 14 and Large: 24 inches long and 16 gauge.
  - 3. Insulation-Insert Material: Water repellent treated, ASTM C533, Type I calcium silicate; or ASTM C552, Type II cellular glass of same thickness and vapor barrier jacket specified for surrounding insulation. Insert shall be a minimum of 2 inches longer than the shield.
  - 4. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
  - 5. For Clevis Hangers: Insert shall cover lower 180 degrees of pipe.
  - 6. Option: At Contractor's option, insert may be factory fabricated Thermal Hanger Shield (insulation insert encased in sheet metal shield) equal to Pipe Shield, Inc. "Insulated Pipe Supports."
  - 7. Option: At Contractor's option, steel pipe saddles may be used on hot water pipe in lieu of insert and shield. Fill interior void of saddle with insulation that matches adjoining insulation.
- F. Continue insulation through metal studs, walls, sleeves, pipe hangers, and other pipe penetrations. Finish firestopping at supports, protrusions, and interruptions. At fire separations, refer to Division 07 and Section 220410: Sleeves.
- G. Exterior Applications: Provide vapor barrier jacket. Insulate fittings, joints and valves with insulation of like material and thickness as adjoining pipe, and finish with glass mesh reinforced vapor barrier cement. Cover with aluminum jacket with seams located on bottom side of horizontal piping.

**3.3 GLASS FIBER PIPE INSULATION APPLICATION**

- A. Provide vapor barrier jackets, factory or field-applied. Secure with self-sealing longitudinal laps and butt strips with pressure sensitive adhesive. Secure with outward clinch expanding stapes 4 inch on center and vapor barrier mastic.
- B. Insulate fittings, joints and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor barrier adhesive or PVC fitting covers.

**3.4 JACKETS - PIPING**

- A. Aluminum Jacket:
  1. Rivet jacketing in place and band with aluminum bands 18 inches on center.
  2. Finish fittings on aluminum jacketed lines with vinyl acrylic mastic reinforced with glass fab. Provide preformed aluminum insulation covers for outdoor fittings.
  3. For exterior applications, locate jacket seams on bottom side of horizontal pipes.

**3.5 SCHEDULES - PIPING**

- A. Plumbing Piping:
  1. Roof Drain Bodies and Horizontal Storm Piping, Above Grade:
    - a. Glass Fiber Pipe Insulation
      - 1) All pipe sizes: 1 inch thick.
      - 2) Insulation not required on emergency roof overflow drains and piping.
  2. Floor Drain Bodies, Traps and Waste Piping Between Floor Drain and Waste Stack for Floor Drains Serving Refrigeration Equipment and AC Units; Above Grade:
    - a. Cellular Glass Pipe Insulation
      - 1) All pipe sizes: 1-1/2 inch thick.
  3. Domestic Water Lines Outdoors, Above Grade:
    - a. Cellular Glass Pipe Insulation
      - 1) All pipe sizes: 1-1/2 inch thick.
      - 2) Apply insulation over electric heat trace.
      - 3) Jacket lines with aluminum jacket.

**3.6 INSTALLATION – EQUIPMENT INSULATION GENERAL**

- A. Install in accordance with NAIMA Insulation Standards.
- B. Factory Insulated Equipment: Do not insulate.
- C. Exposed Equipment: Locate insulation and cover seams in least visible locations.
- D. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires or bands.
- E. Fill joints, cracks, seams and depressions with bedding compound to form smooth surface. On cold equipment, use vapor barrier cement.
- F. Insulated equipment containing fluids below ambient temperature: Insulate entire system.
- G. Finish insulation at supports, protrusions, and interruptions.
- H. Equipment in Mechanical Rooms or Finished Spaces: Finish with canvas jacket or as scheduled.
- I. Nameplates and ASME Stamps: Bevel and seal insulation around; do not insulate over.
- J. Equipment Requiring Access for Maintenance, Repair, or Cleaning: Install insulation so it can be easily removed and replaced without damage.

**END OF SECTION 22 04 07**

**SECTION 22 04 10****PLUMBING PIPING****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Pipe, pipe fittings, valves for the following piping systems:
  - 1. Storm (Rainwater) piping.
  - 2. Domestic cold water piping.
  - 3. Valves and specialties.

**1.2 RELATED SECTIONS**

- A. Section 220401 – General Plumbing Requirements.
- B. Section 220403 – Basic Plumbing Materials and Methods.
- C. Section 220405 – Identification for Plumbing Piping and Equipment.
- D. Section 220407 – Plumbing Systems Insulation.

**1.3 SUBMITTALS FOR REVIEW**

- A. Division 01 – Submittals and Section 220401: Procedures for submittals.
- B. Provide product data on the following:
  - 1. Pipe materials, pipe fittings and accessories.
  - 2. Manufacturers catalogue data and cut sheets on all fixtures and equipment.
  - 3. Valve data and ratings.
- C. Manufacturer's drawings of listed closing methods to be used to close penetrations through rated assemblies.

**1.4 QUALITY ASSURANCE**

- A. Perform work in accordance with the City of Mobile, Alabama, codes and standards.
- B. Valves: Manufacturer's name and pressure rating marked on valve body.

**PART 2 - PRODUCTS****2.1 STORM WATER PIPING, BELOW GRADE OR BELOW SLAB ON GRADE**

- A. Cast Iron Pipe:
  - 1. Pipe: ASTM A74 service weight, bituminous coated.
  - 2. Fittings: Cast iron, bituminous coated.
  - 3. Joints: Hub-and-Spigot with ASTM C564 neoprene gaskets or lead and oakum.

**2.2 STORM WATER PIPING, ABOVE SLAB ON GRADE**

- A. Cast Iron Pipe:

1. Pipe: CISPI 301, hubless, service weight, bituminous coating.
2. Fittings: Cast iron, bituminous coating.
3. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies. All standard duty hubless couplings shall meet CISPI 310 and be listed by NSF International.
  - a. Approved manufacturers: Husky HD 2000, Mission Heavyweight or Clamp All-80.

### 2.3 WATER PIPING, BELOW SLAB ON GRADE OR BELOW GRADE

- A. Water piping: Copper tube.
- B. Copper Tubing:
  1. Pipe: ASTM B88, Type K soft copper.
  2. Fittings: ASME B16.22 wrought copper and bronze.
  3. Joints: "Sil-Fos".
  4. Piping to be installed to minimize the number of joints below grade of or below slab on grade.
  5. Encase all below ground copper piping in plastic sleeve or 1/2" unsplit foam insulation.

### 2.4 WATER PIPING, ABOVE GRADE

- A. Water piping: copper tube.
- B. Copper Tubing:
  1. Pipe: ASTM B88, Type L, hard drawn.
  2. Fittings: ASME B16.22, wrought copper and bronze.
  3. Joints: ASTM B32, 95-5 solder, Grade 95TA, lead free with lead free flux.

### 2.5 FLEXIBLE PIPE CONNECTIONS

- A. Stainless steel corrugated tubing with stainless steel wire braid.
- B. Working pressure 200 psi minimum.
- C. End connections 2" and smaller-male pipe threads, larger than 2" flanged.
- D. Manufacturers: Minnesota Flexible Corporation, Metaflex, Flexicraft and Hyspan.

### 2.6 FLANGES, UNIONS, AND COUPLINGS

- A. Pipe Size 2 Inches and Under:
  1. Ferrous pipe: Class 150 malleable iron threaded unions.
  2. Copper tube and pipe: Class 150 bronze unions with soldered joints.
- B. Pipe Size Over 2 Inches:
  1. Ferrous pipe: Class 150 malleable iron threaded or forged steel slip-on flanges; preformed neoprene gaskets.
  2. Copper tube and pipe: Class 150 slip-on bronze flanges; preformed neoprene gaskets.
- C. Dielectric Connections: Dielectric waterway; zinc electroplated steel nipple with thermoplastic liner and threaded ends.
- D. Expansion Joints: Fernco No. XJ or approved equal.

### 2.7 PIPE HANGERS AND SUPPORTS

- A. Hangers:



1. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Carbon steel, adjustable swivel, split ring.
2. Hangers for Pipe Sizes 2 Inches and Over: Carbon steel, adjustable, clevis.
3. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods or Unistrut multiuse channel.
4. Wall Support for Pipe Sizes to 3 Inches: Cast iron hook.
5. Wall Support for Pipe Sizes 4 Inches and Over: Welded steel bracket and wrought steel clamp.
6. Vertical Support: Steel riser clamp.
7. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
8. Copper Pipe Support when applied directly to the copper piping: Copper steel ring, adjustable.
9. Install hanger over insulation on insulated pipe with sheet metal saddle rolled on the ends centered in hanger. See Section 220407.

- B. Hanger Rods: Mild steel threaded both ends, threaded one end, or continuous threaded.
- C. Inserts: Malleable iron case of steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods.
- D. Roof Supports:
1. Hangers for Pipe Sizes 1/2 to 1-1/2 Inch: Erico PP50H6.
  2. Hangers for Pipe Sizes 2 Inches and Over: Erico PP50H6.
  3. Vertical Support: Steel riser clamp.
- E. For fasteners in existing concrete structures, use drilled in expansion anchors with load rating 150% greater than the pipe hanger rating. Note: Powder drive anchors are not acceptable.
- F. Beam Clamps: Grinnell Figure #229.

## 2.8 BALL VALVES (LEAD FREE)

- A. Up to and including 4 inches:
1. Manufacturers:
    - a. Jomar JF-100SG / JF-100TG full port.
    - b. Nibco, Apollo, Milwaukee, Kitz 868M/869M (3/8"-2").
  2. MSS-SP-110 Class 125, lead free bronze body, 316 stainless steel full port ball and stem, PTFE seats and seals, blow-out proof stem and threaded ends.

## 2.9 WATER PRESSURE REDUCING VALVES

- A. Provide water pressure reducing valve at the service entry on all buildings where main pressure is in excess of 80 psi. Set out pressure at 65 psi.
- B. Up to and Including 2 Inches:
1. Manufactures:
    - a. Watts Model U5B.
    - b. Wilkins, Cash, Acme.
  2. MSS SP-80, bronze body, stainless steel and thermoplastic internal parts, fabric reinforced diaphragm, internal by-pass, inlet strainer, threaded ends with single union and ball valve upstream of strainer.
- C. Over 2 Inches:
1. Manufactures:
    - a. Watts ACV 115.
    - b. Williams, Cash, Acme.
  2. MSS SP-85, cast iron body, bronze fitted, elastomeric diaphragm and seat disc, flanged.

- D. Provide pressure gage (0-150 PSI) with needle valve stop on leaving side of pressure reducing valve

## 2.10 PRESSURE GAUGE (DOMESTIC WATER)

- A. Manufacturers:
  1. Terrice.
  2. Weiss.
  3. Weksler.
  4. Winters.
- B. 4-1/2-inch diameter, minimum dial face, stamped stainless steel, replaceable glass lens, with snap-on rings. Phosphor bronze tube, bronze brushed rotary movement, silver brazed or soldered to brass socket and brass tip, 1/4-inch bottom connection. Accuracy, on (1.0) percent of included scale range. White dial face with black numerals, graduated in pounds; equipped with bronze pulsation dampener or snubber and needle valve.

## 2.11 SLEEVES

- A. Refer to Division 22, Section "Basic Plumbing Materials and Methods" for requirements.

## 2.12 FIRE STOP SYSTEM

- A. All wall and floor penetrations are to be closed. Refer to the Arch. Life Safety Plans and close all openings with a U.L. Listed assembly compatible with the rating of the wall or floor being penetrated.
- B. Non-rated walls:
  1. Sheet rock joint compound may be used to seal opening. Insulation to be continuous through wall.
- C. For piping passing through sheet rock walls or partitions:
  1. Insulated pipe passing through 2 walls or partitions – Hilti FS605 with sleeve U.L. Listing #WL1056.
  2. Insulated pipe passing through 2 hour walls or partitions – Hilti FS611A with no sleeve, U.L. Listing #WL5029. Insulation to be continuous through sleeve.
- D. For piping passing through concrete floors, concrete walls or concrete block walls:
  1. Uninsulated Schedule 40 steel on copper pipe: Hilti #F5605 with sleeve, U.L. #CAT155.
  2. Insulated Schedule 40 steel on insulated copper pipe: Hilti #FS6114A, U.L. #CAT5045.
- E. For non-metallic piping passing through concrete floors, walls or concrete block.
  1. 2" and smaller piping: Hilti #FS611A, U.L. #CAT2062 or U.L. #CAT2065.
  2. Larger than 2": Hilti #FS611A with collar, U.L. #CAT095.

## 2.13 FLASHING

- A. Refer to Division 22, Section "Basic Plumbing Materials and Methods" for requirements.

## 2.14 ELECTRIC PIPE LINE HEATERS

- A. Electric Pipe Line Heaters to be self-regulating heaters applied in a straight line method to the piping prior to installation of insulation.
- B. Provide thermostat in area subject to freezing to activate heaters at 45 deg F.
- C. Raychem XL-Trace, 5 Watts per foot minimum, 120/1/60, or approved equal.

**PART 3 - EXECUTION****3.1 PREPARATION**

- A. Cut pipe square and ream pipe and tube ends. Remove burrs.
- B. Remove scale and dirt, on inside and outside, before assembly.
- C. Provide quarter turn, full port ball valve between all pressure gauges and piping system.

**3.2 PIPING INSTALLATION GENERAL**

- A. Install in accordance with manufacturer's instructions.
- B. Provide dielectric fittings wherever jointing dissimilar metals.
- C. Make piping connections to equipment with flanges or unions.
- D. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
- E. Run piping concealed, except where specifically shown to be exposed.
- F. Install piping to maintain headroom, conserve space, and not interfere with use of space.
- G. Group piping whenever practical at common elevations.
- H. Install piping to allow for expansion and contraction without stressing pipe, joints or connected equipment.
- I. Provide clearance in hanger and from structure and other equipment for installation of insulation and access to valves and fittings.
- J. Provide access where valve is not accessible. Provide minimum 18"x18" access doors at valves in hard ceiling.
- K. Establish elevations of buried pressure piping outside the building to ensure not less than 18 inches of cover.
- L. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
- M. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 099100.
- N. Install chrome plated floor, wall and ceiling plates on all exposed piping passing through finished surfaces in finished spaces.
- O. Install bell and spigot pipe with bell end upstream.
- P. Install valves with stems upright or horizontal, not inverted.
- Q. Inserts:
  - 1. Provide inserts for placement in concrete formwork.
  - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
  - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
  - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.

5. Where inserts are omitted, or in existing concrete structures use drilled in expansion anchors with load rating at least 150% of pipe hanger rating (powder driven anchors not acceptable).

R. Pipe Hangers and Supports:

1. Support horizontal piping as scheduled.
2. Install hangers to provide minimum ½-inch space between finished covering and adjacent work.
3. Place hangers within 12 inches of each horizontal elbow.
4. Use hangers with 1-1/2-inch minimum vertical adjustment. Design hangers for pipe movement without disengagement of supported pipe.
5. Support vertical piping at every floor. Support riser piping independently of connected horizontal piping.
6. Where several pipes can be installed in parallel and at same elevation, trapeze hangers may be used.
7. Provide copper hangers and supports when applied directly to copper piping.
8. Prime coat exposed steel hangers and supports located outdoors, in crawl spaces, pipe shafts. Above suspended ceiling spaces is not considered exposed.
9. Provide hangers adjacent to motor driven equipment.
10. Support cast iron drainage and vent piping at every joint and minimum 5'-0" on center.
11. Support of all pipe, tubing and fixtures and equipment shall be accomplished by means of engineered products specified to each application. Makeshift, field devised methods of plumbing pipe supports, such as scrap wood, wire or duct tape are not allowed. These shall be HoldRite, B-Line, Sioux Chief or approved equal.

- S. Provide pipe line markers in accordance with other sections of the specifications.

T. Sleeves:

1. Refer to Division 22, Section "Basic Plumbing Materials and Methods" for requirements.

U. Flashing:

1. Refer to Division 22, Section "Basic Plumbing Materials and Methods" for requirements.

### 3.3 EXCAVATION AND BACKFILLING

- A. Refer to Division 22, Section "Basic Plumbing Materials and Methods" for requirements.

### 3.4 APPLICATION

- A. Install unions at equipment or apparatus connections.
- B. Install brass male adapters each side of valves in copper piped system.
- C. Install valves for shut-off and to isolate equipment, part of systems, or vertical risers.
- D. Provide check valves on discharge of water pumps.
- E. Provide flow indicators in water recirculating systems where indicated.

### 3.5 ERECTION TOLERANCES

- A. Slope all sanitary waste piping and storm piping at a minimum 1/8" per foot.
- B. Arrange all water piping to drain to low points and provide ball valve with plug at low point.

### 3.6 STORM WATER SYSTEM

- A. Install deck drains, roof drains and overflow roof drains where shown. Flashing for roof drains is under another section.

- B. Connect to site storm sewer system approximately 5'-0" from building. Verify with Civil Drawings exact size, locations, and inverts of piping prior to beginning work.
- C. Spill on grade or through curb as shown.
- D. Insulate all deck drain bodies, roof drain bodies and horizontal storm piping above grade. Emergency overflow drains and piping need not be insulated.
- E. Insulate all mechanical floor and hub drain bodies and horizontal piping between drain and connection to stack on elevated floors.

### 3.7 WATER PIPING SYSTEM

- A. Connect to site water service approximately 5'-0" from building installed under another section. Verify with Civil drawings exact size and location of site water service.

### 3.8 FIELD QUALITY CONTROL

- A. Perform all tests as required by local codes. Contractor shall furnish testing equipment and keep a record of all testing listing tests made, results and those witnessing test. Include testing record in close out documents.
- B. If local codes are more stringent than the following, local codes shall govern.
- C. Rain Water Systems:
  1. Test piping by stopping lower outlets and filling to 10 feet hydrostatic head for a minimum period of 15 minutes with all joints exposed throughout test. Stop all leaks and retest system until tight.
  2. Test all piping by stopping all outlets and applying 5 pounds per square inch of air pressure to the system for a period of 15 minutes. Stop all leaks and retest system until tight.
  3. Provide ball test on all piping 3" and larger.
- D. Domestic Water Piping:
  1. Hydrostatic test at 150 psig without pressure drop for 4 hours. Stop all leaks and retest system until free from leaks.
  2. Leave City pressure on system for duration of project.

### 3.9 DISINFECTION OF DOMESTIC WATER PIPING SYSTEM

- A. Prior to starting work, verify hot and cold water systems are complete, flushed and clean.
- B. Ensure PH of water to be treated is between 7.4 and 7.6.
- C. Inject disinfectant, free chlorine in liquid, powder, tablet or gas form, throughout system to obtain 50 to 80 ppm residual.
- D. Bleed water from outlets to ensure distribution and test for disinfectant residual at minimum 15 percent of outlets.
- E. Maintain disinfectant in system for 24 hours.
- F. If final disinfectant residual tests less than 25 ppm, repeat treatment.
- G. Flush disinfectant from system until residual equal to that of incoming water.
- H. Submit sample of water from all new or modified systems to local Health Department and receive certification that water is acceptable for human consumption. Include certification of water in close out documents.

**3.10 SCHEDULES**

- A. Pipe Hanger Spacing:
1. Metal Piping:
    - a. Pipe size: 1/2 to 1-1/4 inches:
      - 1) Maximum hanger spacing: 6.5 ft.
      - 2) Hanger rod diameter: 3/8 inch.
    - b. Pipe size: 1-1/2 to 2 inches:
      - 1) Maximum hanger spacing: 10 ft.
      - 2) Hanger rod diameter: 3/8 inch.
    - c. Pipe size: 2-1/2 to 3 inches:
      - 1) Maximum hanger spacing: 10 ft.
      - 2) Hanger rod diameter: 1/2 inch.
    - d. Pipe size: 4 to 6 inches:
      - 1) Maximum hanger spacing: 10 ft.
      - 2) Hanger rod diameter: 5/8 inch.
    - e. Pipe size: 8 to 12 inches:
      - 1) Maximum hanger spacing: 14 ft.
      - 2) Hanger rod diameter: 7/8 inch.
    - f. Pipe size: 14 inches and over:
      - 1) Maximum hanger spacing: 20 ft.
      - 2) Hanger rod diameter: 1 inch.

**END OF SECTION 22 04 10**

**SECTION 22 04 40****PLUMBING FIXTURES****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Plumbing fixtures.
- B. Plumbing miscellaneous equipment.

**1.2 RELATED SECTIONS**

- A. Section 220401 – Basic Plumbing Requirements.
- B. Section 220403 – Basic Plumbing Materials and Methods.
- C. Section 220405 – Identification for Plumbing Piping and Equipment.
- D. Section 220407 – Plumbing Systems Insulation.
- E. Section 220410 – Plumbing Piping.

**1.3 SUBMITTALS FOR REVIEW**

- A. See Section 220401, Submittal for Review.
- B. Plumbing Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, trim and finishes.

**1.4 SUBMITTALS AT PROJECT CLOSEOUT**

- A. Refer to Division 01 and Section 220401 – Submittals for Project Closeout.
- B. Maintenance Data: Provide 3 sets of manufacturer's maintenance and parts listing including the manufacturer's nearest sales and service representative. Include the sales representative's address and telephone number. Provide with the listing, a suggested maintenance schedule for all equipment along with warranty dates. Items are to be provided in three ring binders with tabs identifying different equipment types.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.5 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years' experience.

**1.6 REGULATORY REQUIREMENTS**

- A. Products Requiring Electrical Connection: Listed and classified by Underwriters Laboratories Inc., as suitable for the purpose specified and indicated.

**1.7 DELIVERY, STORAGE AND PROTECTION**

- A. Accept fixtures on site in factory packaging, inspect for damage and store.
- B. Protect installed fixtures from damage by securing areas and by leaving factory packaging in place to protect fixtures and prevent use.

**1.8 WARRANTY**

- A. See other sections of the specification for additional warranty information.
- B. The Contractor shall warrant all materials, workmanship, and equipment for a period of one year from the date of substantial completion. Any defect in equipment or workmanship shall be made known to the Contractor within 1 year. Such deficiencies shall be corrected by the Contractor at no cost to the Owner.

**1.9 EXTRA MATERIALS**

- A. See other sections of the specification for additional extra material requirements.
- B. Provide two sets of cartridges or washers for all faucet types, two flush valve repair kits for all flush valve type and one loose key for each hose bibb or wall hydrant.

**PART 2 - PRODUCTS****2.1 DRAINS**

- A. Roof Drain (RD): Zurn Z100, complete with underdeck clamp and cast iron or aluminum dome. Provide 4" high, 1/16" thick perforated stainless steel gravel stop around dome.
- B. Trap Guard (TG): J.R. Smith #2692 quad close "stink stopper" trap seal device.
- C. Trench Drain: J.R. Smith EnviroFlo #9931-SSP channels with heavy duty perforated stainless steel grate. Provide sloping sections to #9935 catch basin with stainless steel trash bucket. Chem Caulk 900 all joints and install per manufacturers recommendations.
- D. Deck Drain (DD): Zurn Z537 square top heavy duty parking deck drain with support flange.

**2.2 HOSE BIBB**

- A. (HB) Un-Finished areas: Chicago Faucet #998 rough chrome plated brass with, drain plug, tee handle and vacuum breaker. Install with center line 24" above finished floor.

**2.3 CLEANOUTS**

- A. Furnish and install cleanouts where indicated on drawings and at all 90-degree bends, angle, upper terminals and not over 75 feet apart on straight runs. All cleanouts on cast iron piping to have bronze countersunk tapered slotted plugs. Flush-with-floor cleanout access covers shall have non-skid covers. All wall cleanout access covers shall have polished satin finish. All cleanouts shall be full size of pipe, piping larger than 6" shall have minimum 6" cleanout covers.
- B. Exposed Cleanouts: Cast brass plug type, J.R. Smith #4470.



- C. Wall type cleanout plug and access covers, J.R. Smith #4472. Cleanout plug must be within 1" of finish wall and must be tapped for access cover.
- D. Floor type cleanout access covers: J.R. Smith #4248-NB. Plug must be within 3" of finished floor. Provide J.R. Smith #4188 where installed in terrazzo floors and J.R. Smith #4168 where located in floor with asphalt or vinyl tile covering. Grout cleanout below access cover to seal watertight. Provide option "Y" cleanout carpet markers where installed in carpeted floors.
- E. Outside Cleanouts: J.R. Smith #4258 cleanout access encased in a 18" X 18" X 6" deep concrete pad. See Detail on Drawings.

#### **2.4 REDUCED PRESSURE ZONE BACKFLOW PREVENTER AND DOUBLE CHECK VALVE ASSEMBLIES**

- A. 1 inch and larger: Equal to lead free Watts #LF909 with ball valves and inlet strainer. Provide additional valve upstream of strainer. Clayton, Beeco, Febco, Conbraco, Wilkins or equal. Provide same size as piping. Must be installed in a horizontal position.
- B. Pipe relief from backflow preventer full size to nearest floor drain. Provide factory air gap for relief connection.
- C. Watts model LF7R dual check valve back flow preventer, lead free copper silicon alloy body, stainless steel springs and EPDM seals. Backflow preventer to match line size.
- D. Backflow preventer assemblies must be calibrated by a certified tester at the time of installation, prior to completion of project, to ascertain that the assembly is in full working order.

#### **2.5 PLUMBING FIXTURES AND EQUIPMENT**

- A. Unless otherwise specified, all fixtures complete as catalogued.
- B. Fixtures and brass shall be securely anchored.
- C. Mount all fixtures at standard mounting height unless otherwise noted.
- D. All similar products shall be by the same manufacturer.

#### **2.6 ELEVATOR SUMP PUMP**

- A. ESP-1 Elevator Sump Pump: Liberty ELV280 system complete submersible 0.5 hp pump, control panel and leads of sufficient length to reach from pump to control box unbroken. Provide a 4" PVC conduit through wall between elevator and control panel. Install wiring through conduit and seal providing a 2-hour water tight closure. 115/1/60. See detail on Drawings.
- B. ESP-2 Elevator Sump Pump: LEiberty ELV280 system complete submersible 0.5 hp pump, control panel and leads of sufficient length to reach from pump to control box unbroken. Provide a 4" PVC conduit through wall between elevator and control panel. Install wiring through conduit and seal providing a 2-hour water tight closure. 115/1/60. See detail on Drawings.
- C. ESP-3 Elevator Sump Pump: Liberty ELV280 system complete submersible 0.5 hp pump, control panel and leads of sufficient length to reach from pump to control box unbroken. Provide a 4" PVC conduit through wall between elevator and control panel. Install wiring through conduit and seal providing a 2-hour water tight closure. 115/1/60. See detail on Drawings.

**2.7 ACCEPTABLE MANUFACTURERS**

- A. Where J. R. Smith and Zurn is listed above, Josam, Mifab, Watts, Jones Stephens or Wade may be substituted.
- B. Where Stancor is listed above, Weil, Liberty, Myers, ITT-Bell & Gossett, or Zoeller may be substituted.
- C. Where McGuire is listed above for traps, supplies and stops, Kohler, Crane, Eljer, Zurn, Deerborn, or American Standard may be substituted.
- D. Where J.R. Smith trap guards are listed above, ProSet and Sureseal may be substituted.
- E. Where Chicago Faucet is listed for hydrants/bibbs; Woodford, Zurn, Josam, Watts, or Mifab may be substituted.

**PART 3 - EXECUTION****3.1 INSTALLATION**

- A. Verify all electrical characteristics of electrical motors, starters and equipment with Electrical Drawings. Should the Contractor change the characteristics of the electrical equipment, it shall be the responsibility of the Contractor to coordinate all changes with the other trades and bear all costs of such changes.
- B. Install all fixtures and equipment in accordance with manufacturer's recommendations.
- C. Adjust all valves for intended water flow rate.
- D. Clean plumbing fixtures and equipment and remove tags.

**END OF SECTION 22 04 40**

**SECTION 23 00 10**  
**GENERAL HVAC REQUIREMENTS**

**PART 1 - GENERAL**

**1.1 SUMMARY**

- A. Description of General HVAC Administrative and Procedural Requirements which apply to all Division 23 sections.
  - 1. Definitions.
  - 2. Abbreviations and Acronyms.
  - 3. Regulatory Requirements.
  - 4. Fees, Permits, and Inspections.
  - 5. Substitutions.
  - 6. Submittal Requirements.
  - 7. Products Requirements.
  - 8. Closeout Documents.
  - 9. Summary of the Work.
  - 10. Installer's Qualifications.
  - 11. Drawing Interpretation and Coordination.
  - 12. Project/Site Conditions.

**1.2 RELATED DOCUMENTS**

- A. Drawings and General Provisions of this Contract, including General and Supplementary Conditions and Division 01 Specification sections apply to all Division 23 Specification sections.

**1.3 RELATED SECTIONS**

- A. Section 012300 "Alternates" for administrative and procedural requirements for alternates. Coordinate related Division 23 work and modify surrounding work to integrate the work of each Alternate.
- B. Section 013300 "Submittal Procedures" for administrative and procedural requirements for submitting Shop Drawings, Product Data, Samples, and other submittals.

**1.4 DEFINITIONS**

- A. Approved: When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- B. Directed: A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- C. Indicated: Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- D. Furnish: Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- E. Install: Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

- F. Provide: Furnish and install, complete and ready for the intended use.
- G. Action Submittals: Written and graphic information and physical samples that require Engineer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- H. Informational Submittals: Written and graphic information and physical samples that do not require Engineer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."
- I. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- J. Subsystem: A portion of a system with characteristics similar to a system.

## 1.5 ABBREVIATIONS AND ACRONYMS

- A. AFF: Above Finished Floor.
- B. AMCA: Air Movement and Control Association International, Inc.
- C. ANSI: American National Standards Institute, Inc.
- D. ARI: Air-Conditioning & Refrigeration Institute.
- E. ASHRAE: American Society of Heating, Refrigeration, and Air Conditioning Engineers.
- F. ASME: American Society for Mechanical Engineers.
- G. ASTM: American Society of Testing and Materials.
- H. MEPFP: Mechanical, Electrical, Plumbing, Fire Protection.
- I. MSS: Manufacturers Standardization Society of the Valve and Fitting Industry.
- J. NAIMA: North American Insulation Manufacturers Association.
- K. NEMA: National Electrical Manufacturers Association.
- L. NFPA: National Fire Protection Association.
- M. NPS: Nominal Pipe Size.
- N. SMACNA: Sheet Metal and Air Conditioning Contractors' National Association.
- O. UL: Underwriters Laboratories, Inc.

## 1.6 REGULATORY REQUIREMENTS

- A. All materials and workmanship shall comply with all applicable codes, specifications, local ordinances, industry standards and utility company regulations. Where specific code requirements apply, they shall be included in the job, whether or not specifically shown or elsewhere specified.
  1. ADA – Americans with Disabilities Act.
  2. ASHRAE 15 – Safety Code for Mechanical Refrigeration.
  3. NFPA 70 – National Electrical Code.
  4. NFPA 90A – Installation of Air Conditioning and Ventilating Systems.

5. NFPA 101 – Life Safety Code.
  6. IBC – International Building Code with Fire, Mechanical, Plumbing and Gas Codes; 2021 Edition.
- B. 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.
- C. Fees, Permits, And Inspections
1. All required fees, permits, and inspections of all kinds shall be obtained and paid for by the Contractor under the section of the specifications for which they are required.
  2. Obtain and pay for all certificates of required inspections, and file certificates with Owner.

## 1.7 SUBSTITUTIONS

- A. Conform to the requirements of Section 012500 "Substitutions."
- B. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms will be considered by the Architect provided the correct data is submitted and validation of the reason of the request.
- C. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner, which are favorable to the Owner in schedule or dollars, may be considered by the Architect providing the correct data is submitted and validation of the reason of the request.

## 1.8 SUBMITTAL REQUIREMENTS

- A. General: Prepare and submit submittals required by individual Specification Sections under provisions of Section 013300 "Submittal Procedures" and the following:
- B. Digital Data Files:
1. Electronic digital data files of the Project drawings may be provided by Engineer for Contractor's use in preparing submittals.
  2. Electronic digital data files supplied for use in submittal preparation will be subject to terms and conditions of the Engineer's Release Form. A signed release form and any payment required must be returned to the Engineer prior to the transmission of an electronic digital data files.
  3. Electronic digital data file formats may include AutoCAD drawings, Revit converted to AutoCAD drawings, or Revit Model.
- C. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Submittals shall be submitted by Section. Do not include products or materials from multiple sections in a single electronic file.
  2. Name file with submittal number or other unique identifier, including revision identifier.
    - a. File name shall use Specification Section number.
- D. Resubmit submittals until they are marked with approval notation from Engineer's action stamp.
- E. Product Data: Submit to the Architect and obtain his approval of a complete list of materials and equipment that are to be provided under Division 23.
1. List shall be complete with manufacturer's names, catalog number, dimensions, specifications, rating data, and options utilized. Capacities shall be in the terms specified.
  2. Call attention to deviations from specified items as to operation and physical dimensions.
  3. Performance curves for equipment such as fans and pumps shall be included.

- F. Shop Drawings: Before starting work, submit and obtain approval from Architect of detailed drawings of the following, fully dimensional (including elevations of ductwork and piping) and drawn to 1/4" to 1'-0" scale. Submit electronic file of each drawing in PDF format. Engineer will return electronic copy of marked-up drawings.
1. Ductwork. See Section 233113 "Metal Ducts."
  2. Submit complete automatic temperature control system control and power wiring diagrams for approval before installing controls. See Division 23 Section "HVAC Instrumentation and Controls."

## 1.9 PRODUCT REQUIREMENTS AND COMPATIBLE PRODUCTS

- A. Provide products in accordance with Section 016000 "Product Requirements" and the following.
- B. Multiple items of similar equipment shall be the product of the same manufacturer.
- C. Basis-of-Design Product Specification:
1. General: A specification in which 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 additional manufacturers named in the specification.
  2. When several manufacturers are named in the specifications, the corresponding products and models made by the specified manufacturers will be accepted and Contractor may base his bid on any one of those products. However, if the Contractor's bid is based on products other than the scheduled or specified **basis of design**, it shall be understood that there will be no extra cost involved, and the effect on other trades has been included in the Contractor's proposal. Coordination with other trades for substituted equipment or use of products other than the named basis of design shall be the responsibility of the Contractor.
  3. The basis of design manufacturer's equipment has been used to determine space requirements. Should another approved manufacturer's equipment be used in preparing proposals, Contractor shall be responsible for determining that said equipment will fit space allocated. Submission of shop drawings or product data on such equipment shall be considered as indicating that the Contractor has reviewed the space requirements and the submitted equipment will fit the space allocated with due consideration given to access required for maintenance and code purposes.
  4. The basis of design manufacturer's equipment and scheduled mechanical equipment electrical requirements has been used to coordinate the electrical requirements of the HVAC equipment with the electrical systems serving that equipment.
    - a. Contractor shall coordinate the electrical requirements of the equipment actually furnished on this project and provide the power distribution system required by that equipment at no additional cost to the Owner.
    - b. Equipment of higher or lower electrical characteristics may be furnished provided such proposed equipment is approved in writing and connecting electrical services, circuit breakers, and conduit sizes are appropriately modified at no additional cost to the Owner.
    - c. Refer to Section 230053 "Basic HVAC Material and Methods" Article "Coordination" for additional requirements.
  5. Each bidder may submit to the Architect a list of any Comparable Products which he proposes to use in lieu of the equipment or material named in the specifications with a request for the approval of proposed substitutions. To be considered, such requests must be delivered to the office of the Architect no later than 10 days prior to bid due date. The submittal shall include the following:
    - a. Specific equipment or material proposed for substitution giving manufacturer, catalog, and model number.
    - b. All performance and dimensional data necessary for comparison of the proposed substitute with the equipment or material specified.
    - c. Evidence that the proposed product does not require 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.

- d. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
- e. Evidence that proposed product provides specified warranty.
- f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
- g. **A statement setting forth any changes in other materials, equipment or Work of other trades that incorporation of the substitute may require.**

D. Value Engineering / Value Analysis (VE/VA)

- 1. If this project undergoes a value engineering or value analysis process, the Contractor/Bidders are required to do the following:
  - a. If the Contractor's VE or VA offering is based on products other than the scheduled or specified **basis of design**. The Contractor shall inform all trades of the offering so the effect on other trades is included in the General / Mechanical Contractor's proposal. Coordination with other trades for substituted equipment or use of products, other than the named basis of design, shall be the responsibility of the Contractor furnishing the equipment.
  - b. The Contractor shall be responsible for determining that offered equipment will fit space allocated. Submission of the VE or VA offering shall be considered as indicating that the Contractor has reviewed the space requirements and the equipment will fit in the space allocated with due consideration given to access required for maintenance and code purposes.
  - c. The burden of proof of the merit of the proposed substitute is upon the proposer.

### 1.10 CLOSEOUT DOCUMENTS

- A. Submit under provisions of Section 017700 "Closeout Procedures" and Section 017839 "Project Record Documents" and the following:
- B. Record Drawings:
  - 1. Keep accurate record of corrections, variations, and deviations, including those required by change orders to the HVAC ductwork, HVAC piping, and HVAC control drawings.
  - 2. Accurately show location, size and elevation of new exterior work dimensioned from permanent structure.
  - 3. Record changes daily on a set of prints kept at the job site.
  - 4. Submit prints, marked as noted above, to Architect for review prior to request for final payment.
  - 5. Marked prints will be returned to Contractor for use in preparing Record Drawings.
- C. Prior to the issuance of a certificate for final payment, submit to Architect and obtain his approval of one (1) hard copy and electronic files of the following: (Submit electronic copy for approval prior to generating hard copy.)
  - 1. Record Drawings – piping. Electronic files in PDF and AutoCAD.
  - 2. Record Drawings – controls systems.
  - 3. Air Balance Report - (Section 230950 "Testing, Adjusting and Balancing.")
  - 4. Approved Equipment Submittal Data.
  - 5. Equipment operating and maintenance manuals.
  - 6. Equipment warranty dates and guarantees.
  - 7. List of Owner's personnel who have received operating and maintenance instructions.
  - 8. Letter certifying that the cleaning program for the chilled water systems has been completed in accordance to the Specifications. (See Section 230181 "Hydronic Piping.")

### 1.11 SUMMARY OF WORK

- A. Scope: Provide all labor, materials, and equipment and services necessary for the completion of all mechanical work shown or specified, except work specified to be done or furnished by others, complete and ready for operation.

**1.12 QUALITY ASSURANCE**

- A. Installer's Qualifications: Firm experienced in installation of systems similar in size and complexity to those required for this project, plus the following:
  - 1. Acceptable to, or licensed, by manufacturer.
  - 2. Not less than 3 years' experience with systems.
  - 3. Successfully completed not less than 5 comparable scale projects using systems similar to those on this project.

**1.13 DRAWING INTERPRETATION AND COORDINATION**

- A. Drawings are intended to show size, capacity, approximate location, direction and general relationship of one phase to another, but not exact detail or arrangement.
- B. Do not scale drawings for location of system components. Check all measurements, location of pipe, ducts, and equipment with the detail architectural, structural, and electrical drawings and conditions existing in the field and layout work so as to fit in with ceiling grids, lighting, and other parts.
- C. Make minor adjustments in the field, as required to provide the optimum result to facilitate ease of service, efficient operation and best appearance.
- D. Where doubt arises as to the meaning of the Drawings and Specifications, obtain the Architect's written decision before proceeding with parts affected; otherwise assume liability for damage to other work and for making necessary corrections to work in question.
- E. Refer to Architectural drawings for all dimensions and locations of ceiling diffusers.

**1.14 PROJECT/SITE CONDITIONS**

- A. Visiting Site: Visit site and become familiar with location and various conditions affecting this Work. No additional allowance will be granted because of lack of knowledge of unforeseen conditions.
- B. Cause as little interference or interruption of existing utilities serving existing facilities as possible. Schedule work which will cause interference or interruption in advance with Owner, authorities having jurisdiction, and all other affected trades.

**PART 2 - PRODUCTS – Not Used.**

**PART 3 - EXECUTION – Not Used.**

**END SECTION 23 00 10**



**SECTION 23 00 53****BASIC HVAC MATERIALS AND METHODS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Description of common piping, equipment, materials and installation for HVAC systems.
- B. This Section includes the following:
  - 1. Sleeves.
  - 2. Concrete.
  - 3. Grout.
  - 4. Workmanship.
  - 5. Equipment installation - Common Requirements.
  - 6. Concrete bases.
  - 7. Protection and cleaning of equipment and materials.

**1.2 DEFINITIONS**

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct chases, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations and equipment mounted at grade.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and within chases.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.

**1.3 INFORMATIONAL SUBMITTALS**

- A. Floor penetration sleeves and openings: For multi-story buildings, submit a detailed drawing at minimum eighth (1/8) scale, indicating all penetrations through floor slabs noting duct and pipe sizes, hole sizes with dimensions off column lines to the center of the holes.
  - 1. Refer to Part 3 Article "Sleeves and Openings in Floor Slabs in Post Tension Slab Construction" for addition requirements.

**1.4 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation or moisture damage.

- C. Deliver pipes and tubes 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. If pipes do not ship with end caps, cover ends of pipe stored on site with 6 mil plastic.
- D. For ductwork and HVAC equipment, refer to Part 3, Article "Protection and Cleaning of Equipment and Materials."

## 1.5 COORDINATION

- A. Arrange for pipe spaces and openings in building structure during progress of construction, to allow for HVAC installations.
- B. Coordinate installation of required supporting devices and set sleeves and inserts in poured-in-place concrete and other structural components as they are constructed.
- C. Electrical Characteristics for HVAC Equipment:
  1. Coordinate electrical system installation to match requirements of equipment actually furnished on this project.
  2. **Include a letter with the respective equipment submittal from the electrical contractor and approved by electrical design consultant, detailing changes to the electrical system required to accommodate changes in the power distribution system required to accommodate HVAC equipment that has different electrical power requirements from that equipment used as basis-of-design, or the power provisions as shown on the Electrical Drawings.**

## PART 2 - PRODUCTS

### 2.1 SLEEVES

- A. Galvanized-Steel Sheet: 20-gauge minimum thickness; round tube closed with longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.
- A. Factory Fabricated Sleeving System:
  1. Basis of Design Manufacturer: HoldRite HydroFlame Pro Series Hollow Sleeves.
  2. General: Factory-assembled devices for use in cast-in-place concrete floors and consisting of an outer non-metallic (polypropylene) sleeve lined with an intumescent strip, a radial extended flange attached to one end of the sleeve for fastening to concrete formwork, and a neoprene gasket
  3. Provide telescoping and non-telescoping as required.
  4. Provide with Mid-Body Water Seal and "locator whiskers."
- B. Refrigerant Piping: Refer to Section 230183 "Refrigerant Piping" for exterior wall and roof penetrations.

### 2.2 CONCRETE

- A. Nominal weight concrete (145 PCF) using Type I Portland Cement, 1-inch maximum size coarse aggregate to provide a minimum 28-day compressive strength of 3000 psi.

### 2.3 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
  1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
  2. Design Mix: 5000-psi, 28-day compressive strength.
  3. Packaging: Premixed and factory packaged.

**PART 3 - EXECUTION****3.1 WORKMANSHIP**

- A. First class and in accordance with best practice. Work to be orderly, neat, workmanlike in appearance and performed by skilled craftsman.
- B. Poor or improper workmanship shall be removed and replaced as directed by the Architect without additional cost to the Owner or design professionals.

**3.2 SLEEVES**

- A. Sleeves are not required for core-drilled holes.
- B. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor slabs.
  - 1. Cut sleeves to length so that sleeve extends out 1/2-inch from both surfaces.
  - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
  - 3. Use the following sleeve materials:
    - a. Sleeves for Piping Through Concrete Beams, Concrete Walls, Footings, and Potentially Wet Floors: Steel pipe.
    - b. Sleeves for Piping Through Masonry Walls: Steel sheet sleeves 1/2-inch larger than pipe or pipe covering. Provide ductile iron sleeves for below grade penetrations.
  - 4. Provide for continuous insulation wrapping thru sleeve.
  - 5. Seal space around the outside of sleeves with grout at masonry walls and floors.

**3.3 SLEEVES AND OPENINGS IN FLOOR SLABS IN POST TENSION SLAB CONSTRUCTION**

- A. The floor slab is post tension concrete slab construction. Core drilling of the slab is not permitted. It is the responsibility of the Contractor to coordinate, provide and install sleeves that are required for mechanical, plumbing, fire protection, electrical, architectural, etc. slab penetrations. These openings/sleeves shall be installed prior to placing and curing of the concrete slab.
- B. The general size and location of the anticipated floor slab openings are shown on the Structural Drawings. Each subcontractor shall submit detailed drawings of all the required floor penetrations, sleeve sizes and locations, including the following information:
  - 1. Fully dimensioned off column lines (or other common working lines used by other trades) with location respective to adjacent walls shown.
  - 2. Sleeve/opening size.
  - 3. Pipe size and insulation thickness.
  - 4. Pipe/opening service.
  - 5. Duct size.
- C. The General Contractor will be responsible for consolidating all slab openings/sleeves into a single Floor Slab Sleeve/Opening Coordination Drawing. Refer to Division 01 for requirements.
- D. In instances where concrete is placed and the contractor determines that a post slab pour opening is required, Contractor shall hire, at his own expense, a testing agency to x-ray or perform ground penetrating radar (GPR) investigations of the area as directed by the Architect, prior to coring the slab.

**3.4 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS**

- A. Install equipment to allow maximum possible headroom unless specific mounting heights are indicated.

- B. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.
- C. Install HVAC equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations.
- D. Install equipment in accordance with manufacturer's instructions. If manufacturer's instructions conflict with Contract Documents, obtain Architect's decision before proceeding.
- E. Install equipment to allow right of way for piping installed at a required slope.
- F. All equipment shall be firmly fastened in place:
  1. Pad mounted equipment shall be secured to pads using poured in place anchor bolts or cinch anchors.

### 3.5 CONCRETE BASES

- A. Provide concrete foundations with nominal dimensions conforming to the following schedule for floor-mounted equipment:

<u>Equipment</u>	<u>Foundation</u>
Air-cooled condensing units	4-inch high pad

- B. Concrete bases shall be continuous and shall have beveled edges and smooth float finish. Concrete bases shall be reinforced with No. 3 bars a maximum of 12-inch on center each way and held in place with dowel rods at each corner anchored in the slab. Dowel rods shall not penetrate through the slab.
- C. Roughen and clean exposed slabs before pouring foundations. Apply bonding agent to surfaces in contact.
- D. Concrete pads shall extend a minimum of 4-inches beyond the equipment footprint in all directions, including appurtenances, vibration isolators, base elbow supports, and motors.
- E. Equipment attached directly to foundations; bases provided with grout holes; and bases consisting of a structural frame shall have voids filled with grout after attachment to foundation. Vertical inline pumps are not to be anchored to concrete base.

### 3.6 GROUTING

- A. Mix and install grout around the outside of sleeves.
- B. Clean surfaces that will come into contact with grout.
- C. Avoid air entrapment during placement of grout.
- D. Cure placed grout.

### 3.7 PROTECTION AND CLEANING OF EQUIPMENT AND MATERIALS

- A. Comply with SMACNA "IAQ Guidelines for Occupied Buildings Under Construction," 2<sup>nd</sup> Edition 2007 (Chapters 3 and 4).
- B. Equipment and materials shall be carefully handled, properly stored, and protected from weather, dust-producing procedures, or damage during construction. For equipment stored in the construction area, seal outlets on air handling units with 6-mil plastic sheeting. Stand-alone units (e.g. fan coil units, air terminal units, etc.) shall be wrapped with plastic and sealed with tape. Repair or replace damaged work, materials and equipment.

- C. Take immediate measures to dry any equipment that becomes wet. If any mold growth develops on equipment due to becoming wet, remediate by following procedures approved by U.S. EPA (2001), "Mold Remediation in Schools and Commercial Buildings."
- D. At completion of all work, thoroughly clean, exposed materials (duct, pipe, etc.) and equipment and make ready for painting.

**END SECTION 23 00 53**

**SECTION 23 00 62****HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes the following hangers and supports for HVAC system piping and equipment:
  - 1. Insulation couplings, strut-mounted.
  - 2. Fastener systems.

**1.2 RELATED SECTIONS**

- A. Division 23, Section "HVAC Systems Insulation": Inserts, shields, and steel pipe saddles at hangers and supports for insulated piping systems.

**1.3 DEFINITIONS**

- A. MSS: Manufacturers Standardization Society for The Valve and Fittings Industry Inc.
- B. Terminology: As defined in MSS SP-58.

**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 Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, manufacturers specified.

**2.2 INSULATION COUPLINGS, STRUT-MOUNTED**

- A. Description: One piece, tubular sleeve with an internal configuration that supports, secures, and seals tubular insulation and supports copper tubing without crushing the insulation.
- B. Available Manufacturers:
  - 1. Klo-Shure, Inc., Series 7.
- C. General:
  - 1. Manufactured from high strength TPO plastic suitable for indoor and outdoor use. Material to be UL 2043 classified for use in plenums.
  - 2. ASTM E84 tested for a maximum 25/50 flame spread/smoke developed index.
  - 3. For copper tubing 1/4 to 4-inch.
  - 4. For preformed foamed plastic (elastomeric) and fiberglass insulation 1/2 to 1-1/2-inch wall thickness.
  - 5. Insulation coupling creates a vapor barrier with no requirement for additional wrappings of insulation, tape, or glue.
  - 6. Strut-mounted (Series 7) provided with coupling, clamp halves (with welded fastener and locknut).
- D. Coatings (All Components):
  - 1. Interior Dry Locations: Electro-plated.

## 2.3 INSERTS

- A. Inserts: Malleable iron case of steel shell and expander plug for threaded connection with lateral adjustment, top slot for reinforcing rods, lugs for attaching to forms; size inserts to suit threaded hanger rods. Anvil Figure 282.

## 2.4 FASTENER SYSTEMS

- A. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
  - 1. Available Manufacturers:
    - a. Hilti, Inc.
    - b. ITW Ramset/Red Head.
  - 2. Anchor rating to be at least 150% of hanger load rating.
- B. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel, for use in hardened portland cement concrete with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.
  - 1. Available Manufacturers:
    - a. Hilti, Inc.
    - b. ITW Ramset/Red Head.
  - 2. Anchor rating to be at least 150% of hanger load rating.

## 2.5 MISCELLANEOUS MATERIALS

- A. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
  - 1. Use galvanized members and fasteners where installed outside, in fan plenums and areas of high humidity or condensation.
  - 2. Provide other members with prime coat. Coat prior to installation.
- B. Hanger Rods: Mild steel threaded both ends of continuous threaded with an electro-plated coating.

## PART 3 - EXECUTION

### 3.1 HANGER AND SUPPORT INSTALLATION

- A. Inserts:
  - 1. Provide inserts for placement in concrete formwork.
  - 2. Provide inserts for suspending hangers from reinforced concrete slabs and sides of reinforced concrete beams.
  - 3. Provide hooked rod to concrete reinforcement section for inserts carrying pipe over 4 inches.
  - 4. Where concrete slabs form finished ceiling, locate inserts flush with slab surface.
- B. Fastener System Installation:
  - 1. Use powder-actuated fasteners or mechanical-expansion anchors where inserts are omitted and in existing concrete construction.
  - 2. Install powder-actuated fasteners and mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
  - 3. Do not use powder-actuated fasteners in light weight concrete or concrete less than 4 inches thick.
  - 4. Refer to Article below "Anchoring to Slab for Post Tension Construction," for faster system installation.
- C. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

- D. Install building attachments within concrete slabs or attach to structural steel. Install additional attachments at concentrated loads, including valves, flanges, and strainers, NPS 2-1/2 and larger and at changes in direction of piping.
- E. Load Distribution: Install hangers and supports so piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- F. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes.
- G. Insulation Couplings, Strut-Mounted; Insulated Copper Pipe:
  1. All copper pipe and tubing (1/4 to 4-inch) supported by a strut style metal framing system shall be secured to the anchor channel with resilient insulation couplings with metal clamps.
  2. When pipe is insulated with foamed plastic, apply adhesive to end of insulation prior to inserting into the coupling.

### 3.2 ANCHORING TO SLAB FOR POST TENSION CONSTRUCTION

- A. The floor slab construction is a post-tension concrete slab. Drilled anchors, power driven anchors, and coring of the slab will not be permitted. It is the responsibility of the contractor to coordinate, provide, and install threaded inserts, hangers, embeds, etc. that may be required to attach mechanical, electrical, plumbing, fire protection, signage, bracing, formwork, etc. to the slab. These items shall be installed prior to placing and curing of the concrete slab.
- B. The Contractor shall not post install any anchor deeper the 3/4-inch into the slab. Where more capacity than 3/4-inch embedment will provide is required, the Contractor shall provide cast inserts. The Contractor shall provide, layout, and install these inserts prior to placement of concrete.
- C. In instances where concrete is placed and the Contractor determines, post the slab pour, that additional anchors are needed, in excess of the allowable 3/4-inch embedment, the Contractor shall hire, at his own expense, a testing agency to x-ray, or perform ground penetrating radar (GPR) investigations of the area, as directed by the Architect, prior to installing any post pour anchors.

### 3.3 SCHEDULES – PIPE HANGERS/SUPPORTS

- A. Pipe Hanger/Support Spacing – Type L, copper:

Pipe Size (Inches)	Maximum Hanger Spacing (Feet)	Minimum Hanger Rod Diameter (Inches)
1/4 to 3/4	5	3/8
1	6	3/8

END OF SECTION 23 00 62



## SECTION 23 00 77

## IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
1. Equipment labels.

## 1.2 SUBMITTALS

- A. Product Data: For each type of product indicated, including color and letter style.

## 1.3 QUALITY ASSURANCE

- A. ASME Compliance: Comply with ASME A13.1, "Scheme for the Identification of Piping Systems," for letter size, length of color field, colors, and viewing angles of identification devices for piping, unless otherwise noted herein.

## PART 2 - PRODUCTS

## 2.1 EQUIPMENT LABELS

- A. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/16-inch thick, and having predrilled holes for attachment hardware.
  2. Color Coding:
 

<u>System</u>	<u>Background Color</u>	<u>Letters</u>
Equipment	Black	White
  3. Temperatures up to 160 deg F.
  4. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4-inch.
  5. Minimum Letter Size: Minimum 1/2-inch high. Include secondary lettering two-thirds to three-fourths the size of principal lettering.
  6. Fasteners: Stainless-steel self-tapping screws.
- B. Label Content: Include equipment's Drawing designation or unique equipment number.

## PART 3 - EXECUTION

## 3.1 PREPARATION

- A. Clean piping and equipment surfaces of substances that could impair bond of identification devices, including dirt, oil, grease, release agents, and incompatible primers, paints, and encapsulants.

## 3.2 EQUIPMENT LABEL INSTALLATION

- A. Install or permanently fasten labels on each major item of HVAC equipment.

- B. Install or permanently fasten labels on starters furnished under this Division.
- C. Locate equipment labels where accessible and visible.

**END OF SECTION 23 00 77**

**SECTION 23 01 81****HYDRONIC PIPING****PART 1 - GENERAL****1.1 SECTION INCLUDES**

- A. Pipe and pipe fittings for:
  - 1. Equipment drains and overflows.

**1.2 SYSTEM DESCRIPTION**

- A. Where more than one piping system material is specified, ensure system components are compatible and joined to ensure the integrity of the system is not jeopardized. Provide necessary joining fittings. Ensure flanges, union, and couplings for servicing is consistently provided.
- B. Use unions at equipment or apparatus connections. Do not use direct connections to equipment or other apparatus.
- C. Use non-conducting dielectric connections whenever jointing dissimilar metals.

**1.3 SUBMITTALS**

- A. Product Data: Include data on pipe material, pipe fittings, valves, and accessories. Provide manufacturers catalog information. Indicate valve data and ratings.

**1.4 QUALIFICATIONS**

- A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum three years experience.
- B. Installer: Company specializing in performing the work of this section with minimum three years documented experience.

**1.5 DELIVERY, STORAGE AND HANDLING**

- A. Protect piping systems from entry of foreign materials by temporary covers, completing sections of the work, and isolating parts of completed system.

**PART 2 - PRODUCTS****2.1 EQUIPMENT DRAINS AND OVERFLOWS**

- A. Copper Tubing: ASTM B88, Type L, hard drawn.
  - 1. Fittings: ASME B16.18, cast brass, or ASME B16.22 solder wrought copper.
  - 2. Joints: Solder, lead free, ASMT B32, 95-5 tin-antimony, or tin and silver, with melting range of 430 to 535 degrees F.

**2.2 PIPE HANGERS AND SUPPORTS**

- A. Provide hangers and supports in accordance with Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."

### 2.3 UNIONS AND COUPLINGS

- A. Unions for Pipe 2 Inches and Under:
  - 1. Ferrous Piping: 150 psig malleable iron, threaded.
  - 2. Copper Pipe: Bronze, soldered joints.
- B. Dielectric Connections: Dielectric waterway; zinc electroplated steel nipple with thermoplastic liner and threaded ends.

## PART 3 - EXECUTION

### 3.1 PREPARATION

- A. Ream pipe and tube ends. Remove burrs. Bevel plain end ferrous pipe.
- B. Remove scale and dirt on inside and outside before assembly.
- C. Prepare piping connections to equipment with unions.
- D. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

### 3.2 INSTALLATION

- A. Install in accordance with manufactures instructions.
- B. Route piping in orderly manner, parallel to building structure, and maintain gradient.
- C. Install piping to conserve building space, and not interfere with use of space.
- D. Group piping whenever practical at common elevations.
- E. Sleeve pipe passing through walls and floors.
- F. Slope piping and arrange to drain at low points.
- G. Install fittings for changes in direction and branch connections. No mitering or notching for fittings allowed.
- H. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.
- I. Inserts:
  - 1. See Division 23 Section "Hangers and Supports for HVAC Piping and Supports."
- J. Pipe Hangers and Supports:
  - 1. Install in accordance with Division 23 Section "Hanger and Supports for HVAC Piping and Equipment."
  - 2. For insulated, strut-mounted copper piping (1/4" to 4"), provide Insulation Couplings per the requirements of Division 23, Section "Hangers and Supports for HVAC Piping and Equipment."

### 3.3 SCHEDULES

- A. Pipe Hanger Spacing - Refer to Division 23, Section "Hangers and Supports for HVAC Piping and Equipment" for pipe hanger spacing and hanger rod sizing requirements.

END OF SECTION 23 01 81

**SECTION 23 01 83****REFRIGERANT PIPING****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes:
  - 1. Refrigerant piping used for air-conditioning applications.

**1.2 PERFORMANCE REQUIREMENTS**

- A. Line Test Pressure for Refrigerant R-410A:
  - 1. Suction Lines for Air-Conditioning Applications: 300 psig.
  - 2. Hot-Gas and Liquid Lines: 535 psig.

**1.3 SUBMITTALS**

- A. Product Data: For each type of valve and refrigerant piping specialty indicated. Include pressure drop, based on manufacturer's test data, for the following:
  - 1. Thermostatic expansion valves.
  - 2. Solenoid valves.
  - 3. Hot-gas bypass valves.
  - 4. Filter dryers.
- B. Field quality-control test reports.
- C. Operation and Maintenance Data: For refrigerant valves and piping specialties to include in maintenance manuals.

**1.4 PRODUCT STORAGE AND HANDLING**

- A. Store piping in a clean and protected area with end caps in place to ensure that piping interior and exterior are clean when installed.

**1.5 COORDINATION**

- A. Coordinate size and location of equipment supports and wall penetrations.

**PART 2 - PRODUCTS****2.1 COPPER TUBE AND FITTINGS FOR REFRIGERANT PIPING**

- A. Copper Tube: ASTM B 280, Type ACR.
- B. Wrought-Copper Fittings: ASME B16.22.
- C. Wrought-Copper Unions: ASME B16.22.

**2.2 REFRIGERANTS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Atofina Chemicals, Inc.
  2. DuPont Company; Fluorochemicals Div.
  3. Honeywell, Inc.; Genetron Refrigerants.
  4. INEOS Fluor Americas LLC.
- B. ASHRAE 34, R-410A: Pentafluoroethane/Difluoromethane.

### **PART 3 - EXECUTION**

#### **3.1 PIPING APPLICATIONS FOR ALL REFRIGERANT TYPES**

- A. Lines NPS 5/8 and Smaller: Copper, Type ACR, annealed-temper ("soft") tubing and wrought-copper fittings with brazed joints.
- B. Lines NPS 3/4 and Larger: Copper, Type ACR, drawn-temper ("hard") tubing and wrought-copper fittings with brazed joints.

#### **3.2 VALVE AND SPECIALTY APPLICATIONS**

- A. Install solenoid valves upstream from each expansion valve and hot-gas bypass valve. Install solenoid valves in horizontal lines with coil at top.
- B. Install thermostatic expansion valves as close as possible to distributors on evaporators.
1. Install valve so diaphragm case is warmer than bulb.
  2. Secure bulb to clean, straight, horizontal section of suction line using two bulb straps. Do not mount bulb in a trap or at bottom of the line.
  3. If external equalizer lines are required, make connection where it will reflect suction-line pressure at bulb location.
- C. Install moisture/liquid indicators in liquid line at the inlet of the thermostatic expansion valve or at the inlet of the evaporator coil capillary tube.
- D. Install filter dryers in liquid line between compressor and thermostatic expansion valve, and in the suction line at the compressor.

#### **3.3 PIPING INSTALLATION**

- A. Drawings, schematics, and diagrams indicate general location and arrangement of piping systems. Install piping as indicated unless deviations to layout are approved on Shop Drawings.
- B. Install refrigerant piping according to ASHRAE 15.
- C. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited, unless specifically indicated otherwise.
- D. Install piping adjacent to equipment to allow service and maintenance.
- E. Install piping free of sags and bends.
- F. Drawn-Temper Tubing: Install fittings for changes in direction.
- G. Annealed-Temper ("soft") Tubing: Make changes in directions greater than 30 degrees with pipe/conduit bending tool to avoid crimping of pipe.

- H. Select system components with pressure rating equal to or greater than system operating pressure.
- I. Install piping as short and direct as possible, with a minimum number of joints, elbows, and fittings.
- J. Arrange piping to allow inspection and service of refrigeration equipment. Install valves and specialties in accessible locations to allow for service and inspection.
- K. Install pipe sleeves at penetrations in walls and floor assemblies.
- L. Install piping with adequate clearance between pipe and adjacent walls and hangers or between pipes for insulation installation.
- M. Install sleeves through floors or walls, sized to permit installation of full-thickness insulation.
- N. Seal pipe penetrations through exterior walls according to Division 07 Section "Joint Sealants" for materials and methods.

### **3.4 PIPE JOINT CONSTRUCTION**

- A. Pipe joints to be constructed in accordance with the requirements of Division 23, Section "Basic HVAC Materials and Methods."

### **3.5 HANGERS AND SUPPORTS**

- A. Hanger, support, and anchor products are specified in Division 23 Section "Hangers and Supports for HVAC Piping and Equipment."
- B. For strut-mounted insulated piping, provide Insulation Couplings per the requirements of Division 23, Section "Hangers and Supports for HVAC Piping and Equipment."

**END OF SECTION 23 01 83**

**SECTION 23 05 13****COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT****PART 1 - GENERAL****1.1 SUMMARY**

- A. Section includes general requirements for single-phase, general-purpose, horizontal, small and medium, squirrel-cage induction motors for use on ac power systems up to 600 V and installed at equipment manufacturer's factory or shipped separately by equipment manufacturer for field installation.

**1.2 COORDINATION**

- A. Coordinate features of motors, installed units, and accessory devices to be compatible with the following:
  - 1. Motor controllers.
  - 2. Torque, speed, and horsepower requirements of the load.
  - 3. Ratings and characteristics of supply circuit and required control sequence.
  - 4. Ambient and environmental conditions of installation location.

**PART 2 - PRODUCTS****2.1 GENERAL MOTOR REQUIREMENTS**

- A. Comply with requirements in this Section except when stricter requirements are specified in HVAC equipment schedules or Sections.
- B. Comply with NEMA MG 1 unless otherwise indicated.
- C. Motors mounted outdoors shall be TEFC. Provide motor end covers/shields, when exposed to direct rain.

**2.2 MOTOR CHARACTERISTICS**

- A. Duty: Continuous duty at ambient temperature of 40 deg C and at altitude of 3300 feet above sea level.
- B. Capacity and Torque Characteristics: Sufficient to start, accelerate, and operate connected loads at designated speeds, at installed altitude and environment, with indicated operating sequence, and without exceeding nameplate ratings or considering service factor.

**2.3 SINGLE-PHASE MOTORS**

- A. Motors larger than 1/20 hp shall be one of the following, to suit starting torque and requirements of specific motor application or as scheduled on the drawings:
  - 1. Permanent-split capacitor.
  - 2. Split phase.
  - 3. Capacitor start, inductor run.
  - 4. Capacitor start, capacitor run
  - 5. Electronically commutated.
- B. Bearings: Pre-lubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- C. Motors 1/20 HP and Smaller: Shaded-pole type.



- D. Thermal Protection: Internal protection to automatically open power supply circuit to motor when winding temperature exceeds a safe value calibrated to temperature rating of motor insulation. Thermal-protection device shall automatically reset when motor temperature returns to normal range.

**PART 3 - EXECUTION (Not Applicable)**

**END OF SECTION 23 05 13**

**SECTION 23 07 12**  
**HVAC SYSTEMS INSULATION**

**PART 1 - GENERAL**

**1.1 SECTION INCLUDES**

- A. HVAC Piping Insulation.
- B. Jackets and Accessories.

**1.2 RELATED SECTIONS**

- A. Section 230062 "Hangers and Supports for HVAC Piping and Equipment": Insulation Couplings.

**1.3 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated. Include thermal conductivity, water-vapor permeance, thickness, and jackets (both factory- and field- applied).
  - 1. Provide product description, list of materials and thickness for each service and location.
  - 2. For adhesives and sealants, documentation including printed statement of VOC content.
  - 3. Thermal-hanger inserts and shields.

**1.4 INFORMATIONAL SUBMITTALS**

- A. Qualification Data; For qualified installer.

**1.5 QUALITY ASSURANCE**

- A. Applicator Qualifications: Company specializing in performing insulation work with minimum 3 years' experience.
- B. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
  - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

**PART 2 - PRODUCTS**

**2.1 INSULATION MATERIALS**

- A. Comply with requirements in Part 3 insulation application articles for where insulating materials shall be applied. Where more than one insulation material is specified for an application, Contractor may use any of the listed insulation materials for that application.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.

## 2.2 FOAMED PLASTIC PIPE INSULATION

- A. Products: Subject to compliance with the requirements, provide one of the following:
  - 1. Armacell LLC; AP Armaflex AP; AP Armaflex FS (Flame Spread).
  - 2. Aeroflex USA; Aerocel.
  - 3. RBX Corporation; Insul-Tube 180.
  
- B. Insulation: ASTM C534, Type 1; flexible, closed-cell, cellular elastomeric insulation, pre-slit or slip on.
  - 1. 'K' value: ASTM C177; 0.27 at 75 degrees F.
  - 2. Minimum service temperature: -70 degrees F.
  - 3. Maximum service temperature: 220 degrees F.
  - 4. Moisture vapor absorption: ASTM D1056; 5.0 percent by weight.
  - 5. Moisture vapor transmission: ASTM E96; 0.10 perm-inches.
  - 6. Flame/Smoke Spread: ASTM E84; 20/50 Flame/Smoke.
  - 7. Connection: Waterproof vapor barrier adhesive.
  
- C. Elastomeric Foam Adhesive:
  - 1. Air dried adhesive, compatible with insulation.
  - 2. For indoor applications, adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  
- D. Protective Coating/Jacket: Weather resistant, compatible with insulation equal to Armaflex WB finish.
  
- E. Do not use indoors unless meets ASTM E-84 flame spread rating of less than 25 and smoke density rating of less than 50.

## PART 3 - EXECUTION

### 3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation tolerances and other conditions affecting performance of insulation application.
  - 1. Verify that systems to be insulated have been tested and are free of defects.
  - 2. Verify that surfaces to be insulated are clean and dry. Chilled water pipe and equipment shall be at ambient temperature.
  - 3. Pressure and leak test all piping, ductwork and equipment and obtain review and acceptance prior to the application of insulation.
  - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.2 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

### 3.3 INSTALLATION - GENERAL REQUIREMENTS

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout.
  
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of the system as specified in insulation system schedules.
  
- C. Install accessories compatible with insulation materials and suitable for the service.

- D. Install insulation with longitudinal seams at top of horizontal runs.
- E. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- F. Where vapor barrier is indicated, seal joints, seams, and penetrations in insulation at hangers, supports, anchors, and other projections with vapor-barrier mastic.
  - 1. Install insulation continuously through hangers and around anchor attachments.
  - 2. For insulation application where vapor barriers are indicated, extend insulation on anchor legs from point of attachment to supported item to point of attachment to structure. Taper and seal ends at attachment to structure with vapor-barrier mastic.
  - 3. Install insert materials and install insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by insulation material manufacturer.
  - 4. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect jacket from tear or puncture by hanger, support, and shield.
- G. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.

### **3.4 PENETRATIONS**

- A. Insulation Installation at Interior Wall Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- B. Insulation Installation at Floor Penetrations:
  - 1. Pipe: Install insulation continuously through floor penetrations.

### **3.5 INSTALLATION – PIPING INSULATION GENERAL**

- A. Exposed Piping: Locate insulation and cover seams in least visible locations.
- B. Insulated pipes conveying fluids below ambient temperature: Insulate entire system including fittings, valves, unions, etc.
- C. Fit pipe hangers over insulation.

### **3.6 FOAMED PLASTIC PIPE INSULATION APPLICATION**

- A. Pipe insulation may be seamless insulation slipped over piping before erection or may be slit longitudinally and installed over erected pipe.
- B. Fabricate fittings from mitered sections of pipe insulation.
- C. Seal longitudinal seams and end joints with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Paint entire insulation with two coats of manufacturer's approved weather-resistant protective finish.
- E. For strut-mounted copper piping (NPS 4 and smaller) systems, provide Insulation Couplings per the requirements of Section 230062 "Hangers and Supports for HVAC Piping and Equipment."

### 3.7 SCHEDULES – PIPING INSULATION

- A. General: Acceptable preformed pipe and tubular insulation materials and thicknesses are identified for each piping system and pipe size range. If more than one material is listed for a piping system, selection from materials listed is Contractor's option.
  
- B. Definitions:
  - 1. Runouts: Runouts to individual terminal units not exceeding 4 feet long. Runouts exceeding 4 feet in length to be insulated same as mains.
  
- C. HVAC Piping
  - 1. Refrigerant Liquid Lines on Mini Split System, Indoors and Outdoors Above Grade:
    - a. Foamed Plastic Pipe Insulation, Indoors Above Grade:
      - 1) All pipe sizes: 1/2-inch thick.
  - 2. AC Unit Drain Lines, Indoors, Above Grade:
    - a. Foamed Plastic Pipe Insulation
      - 1) All pipe sizes: 1/2-inch thick.

END OF SECTION 23 07 12

## SECTION 23 07 38

### MINI SPLIT-SYSTEM AIR-CONDITIONING UNITS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. This Section includes mini split-system air-conditioning units consisting of separate evaporator-fan and compressor-condenser components. Units are designed for exposed mounting.

##### 1.2 SUBMITTALS

- A. Product Data: Include rated capacities, furnished specialties, and accessories for each type of product indicated. Include performance data in terms of capacities, outlet velocities, static pressures, sound power characteristics, motor requirements, and electrical characteristics.
- B. Shop Drawings: Diagram power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For split-system air-conditioning units to include in emergency, operation, and maintenance manuals.
- E. Warranty: Special warranty specified in this Section.

##### 1.3 QUALITY ASSURANCE

- A. Product Options: Drawings indicate size, profiles, and dimensional requirements of split-system units and are based on the specific system indicated. Refer to Division 01 Section "Product Requirements."
- B. 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.
- C. Energy-Efficiency Ratio: Equal to or greater than prescribed by ASHRAE 90.1, "Energy Efficient Design of New Buildings except Low-Rise Residential Buildings."
- D. Units shall be designed to operate with HCFC-free refrigerants.

##### 1.4 COORDINATION

- A. Coordinate size and location of concrete bases for units. Cast anchor-bolt inserts into bases. Concrete, reinforcement, and formwork are specified in Division 23 Section "Basic HVAC Materials and Methods."

##### 1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of split-system air-conditioning units that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Carrier Air Conditioning; Div. of Carrier Corporation.
  - 2. Daikin.
  - 3. Fujitsu General American, Inc.
  - 4. Gree Corporation.
  - 5. LG.
  - 6. Mitsubishi Electronics America, Inc.; HVAC Division. (Basis of Design)

### **2.2 WALL-MOUNTING, EVAPORATOR-FAN COMPONENTS**

- A. Cabinet: Enameled steel with removable panels on front and ends in color selected by Architect, and discharge drain pans with drain connection.
- B. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with thermal-expansion valve.
- C. Fan: Direct drive, centrifugal fan.
- D. Fan Motors: Comply with requirements in Division 23 Section "Motors."
  - 1. Special Motor Features: Multi-tapped, multi-speed with internal thermal protection and permanent lubrication.
- E. Filters: Permanent, cleanable.

### **2.3 AIR-COOLED, COMPRESSOR-CONDENSER COMPONENTS**

- A. Casing: Steel, finished with baked enamel in color selected by Architect, with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Provide brass service valves, fittings, and gage ports on exterior of casing.
- B. Compressor: Hermetically sealed with crankcase heater and mounted on vibration isolation. Compressor motor shall have thermal- and current-sensitive overload devices, start capacitor, relay, and contactor.
  - 1. Compressor Type: Scroll.
  - 2. Refrigerant Charge: R-410A.
- C. Refrigerant Coil: Copper tube, with mechanically bonded aluminum fins, complying with ARI 210/240, and with liquid sub-cooler.
- D. Fan: Aluminum-propeller type, directly connected to motor.
- E. Motor: Permanently lubricated, with integral thermal-overload protection.
- F. Low-Ambient Kit: Permits operation down to 10 deg F.

### **2.4 CONTROLS**

- A. Overview:
  - 1. The control system shall consist of a minimum of one microprocessor on each indoor unit and one in the outdoor unit, communicating via A-Control data over power transmission. The microprocessor located in the indoor unit shall have the capability of monitoring return air temperature and indoor coil temperature, receiving

and processing commands from the wired or wireless controller, providing emergency operation and controlling the outdoor unit. The control signal between the indoor and outdoor unit shall be pulse signal 24 volts DC. Indoor units shall have the ability to control supplemental heat via connector CN24 and a 12 VDC output.

2. For A-Control, a three (3) conductor 14-gauge AWG wire with ground shall provide power feed and bi-directional control transmission between the outdoor and indoor units.
3. The system shall be capable of automatic restart when power is restored after power interruption. The system shall have self-diagnostics ability, including total hours of compressor run time. Diagnostics codes for indoor and outdoor units shall be displayed on the wireless controller panel.

B. Wireless, Wall Mounted Remote Controller Kit:

1. The Wireless, wall mounted remote controller kit (MHK2) shall consist of a wireless, wall mounted controller (MRCH2), a wireless receiver (MIFH2) and a cable (MRC2) to connect the receiver to connector CN105 on the indoor unit control board.
2. The controller shall be white in color with a blue LCD display and a backlight feature. The controller shall have a built-in temperature sensor and a battery holder, using two AA alkaline batteries. Temperature shall be displayed in either Fahrenheit (°F) or Celsius (°C), and temperature changes shall be by increments of 1°F (0.5°C).
3. The MHK2 uses Honeywell RedLINK™ technology, and the wireless receiver is specially designed for Mitsubishi units. Linking to the wireless network shall be done from the receiver and from the remote controller. There shall not be any interference with other wireless devices or neighboring RedLINK™ products. Communication shall be automatically restored after power resumes and after batteries are replaced.
4. The MHK2 and the kumo cloud adapter shall be able to work together on the same indoor unit using a Wireless Interface 2 (PAC-USWHS002-WF-2).

C. Wireless Temperature & Humidity Sensor for kumo Cloud:

1. The Wireless Sensor shall transmit Temperature and Humidity information to the indoor unit.
2. Uses Bluetooth Low Energy with a range of 33ft (10m). Has a 1 year battery life with push notifications associated with any errors.
3. Operation Mode: Transmits data from controller to indoor unit.
4. Discover Mode: Allows the Wireless sensor to be connected to the kumo cloud app. A series of beeps indicates that the wireless sensor is in discover mode.
5. Push Notifications: Sends the user information through the kumo cloud app. Includes error messages, filter replacement information, and battery change notifications.

D. kumo Station:

1. 4-Channel equipment controller with Outside Air Temperature monitoring.
2. Manages and stages heat pump, integrated through kumo cloud.
3. Operation Mode: Transmits data from controller to indoor unit.
4. Discover mode: Allows the Wireless sensor to be connected to the kumo cloud app. A series of beeps indicates that the wireless sensor is in discover mode.
5. Push Notifications: Sends the user information through the kumo cloud app. Includes error messages, filter replacement information, and battery change notifications.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install units level and plumb.
- B. Install evaporator-fan components using manufacturer's standard mounting devices securely fastened to building structure.



- C. Install ground-mounting, compressor-condenser components on 4-inch- thick, reinforced concrete base; 4 inches larger on each side than unit. Concrete, reinforcement, and formwork are specified in Division 23 Section "Basic HVAC Materials and Methods" Coordinate anchor installation with concrete base.

### **3.2 CONNECTIONS**

- A. Piping installation requirements are specified in other Division 23 Sections. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to unit to allow service and maintenance.
- C. Ground equipment per Division 26 Section "Grounding and Bonding."
- D. Electrical Connections: Comply with requirements in Division 26 Sections for power wiring, switches, and motor controls.

### **3.3 FIELD QUALITY CONTROL**

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Remove and replace malfunctioning units and retest as specified above.

### **3.4 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain units. Refer to Division 01 Section " Demonstration and Training."

**END OF SECTION 23 07 38**

## SECTION 23 07 62

### UNIT HEATERS

#### PART 1 - GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Wall heaters with electric-resistance heating coils.

##### 1.2 SUBMITTALS

- A. Product Data: Include rated capacities, operating characteristics, furnished specialties, and accessories for each product indicated.
- B. Shop Drawings: Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 1. Drawings, elevations, sections, and details.
  - 2. Location and size of each field connection.
  - 3. Details of anchorages and attachments to structure and to supported equipment.
  - 4. Equipment schedules to include rated capacities, operating characteristics, furnished specialties, and accessories.
  - 5. Wiring Diagrams: Power, signal, and control wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For unit heaters to include in operation and maintenance manuals.

##### 1.3 QUALITY ASSURANCE

- A. 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.

#### PART 2 - PRODUCTS

##### 2.1 WALL HEATERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Berko Electric Heating; a division of Marley Engineered Products.
  - 2. Chromalox, Inc.; a division of Emerson Electric Company.
  - 3. Indeeco.
  - 4. Markel Products; a division of TPI Corporation.
  - 5. Marley Electric Heating; a division of Marley Engineered Products.
  - 6. Ouellet Canada Inc.
  - 7. QMark Electric Heating; a division of Marley Engineered Products.
  - 8. Trane.
- B. Description: An assembly including chassis, electric heating coil, and controls. Comply with UL 2021.
- C. Electric-Resistance Heating Coil: Nickel-chromium heating wire, free from expansion noise and hum, embedded in magnesium oxide refractory and sealed in corrosion-resistant metallic sheath. Terminate elements in stainless-steel,

machine-staked terminals secured with stainless-steel hardware, and limit controls for high temperature protection. Provide integral circuit breaker for overcurrent protection.

- D. Controls: Unit-mounted tamper-resistant thermostat.
- E. Electrical Connection: Factory wire motors and controls for a single field connection.
- F. Capacities and Characteristics: As scheduled.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Examine areas to receive unit heaters for compliance with requirements for installation tolerances and other conditions affecting performance.
- B. Examine roughing-in for electrical connections to verify actual locations before unit heater installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.2 INSTALLATION**

- A. Install wall boxes in finished wall assembly; seal and weatherproof. Joint-sealant materials and applications are specified in Division 07 Section "Joint Sealants."
- B. Install heaters level and plumb.

#### **3.3 CONNECTIONS**

- A. Ground equipment according to Division 26 Section "Grounding and Bonding."
- B. Connect wiring according to Division 26 Section "Conductors and Cables."

#### **3.4 FIELD QUALITY CONTROL**

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. Operational Test: After electrical circuitry has been energized, start units to confirm proper motor rotation and unit operation.
  - 2. Operate electric heating elements through each stage to verify proper operation and electrical connections.
  - 3. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.
- B. Remove and replace malfunctioning units and retest as specified above.

**END OF SECTION 23 07 62**

## SECTION 23 09 50

### TESTING, ADJUSTING, AND BALANCING

#### PART 1 - GENERAL

##### 1.1. SUMMARY

- A. This Section includes TAB to produce design objectives for the following:
  1. Verifying that automatic control devices are functioning properly.
  2. Reporting results of activities and procedures specified in this Section.

##### 1.2. DEFINITIONS

- A. Adjust: To regulate fluid flow rate and air patterns at the terminal equipment, such as to reduce fan speed or adjust a damper.
- B. Balance: To proportion flows within the distribution system, including submains, branches, and terminals, according to indicated quantities.
- C. Barrier or Boundary: Construction, either vertical or horizontal, such as walls, floors, and ceilings that are designed and constructed to restrict the movement of airflow, smoke, odors, and other pollutants.
- D. Draft: A current of air, when referring to localized effect caused by one or more factors of high air velocity, low ambient temperature, or direction of airflow, whereby more heat is withdrawn from a person's skin than is normally dissipated.
- E. System Effect: A phenomenon that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
- F. System Effect Factors: Allowances used to calculate a reduction of the performance ratings of a fan when installed under conditions different from those presented when the fan was performance tested.
- G. TAB: Testing, adjusting, and balancing.
- H. Terminal: A point where the controlled medium, such as fluid or energy, enters or leaves the distribution system.

##### 1.3. SUBMITTALS

- A. Qualification Data: Submit evidence that TAB firm and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article and below.
- B. Sample Report Forms: Submit sample TAB report forms.
- C. Certified TAB Reports: Submit three copies of reports prepared, as specified in this Section, on approved forms certified by TAB firm.

##### 1.4. QUALITY ASSURANCE

- A. TAB Firm Qualifications: Engage a TAB firm certified by either AABC or NEBB.
- B. Certification of TAB Reports: Certify TAB field data reports. This certification includes the following:
  1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.

2. Certify that TAB team complied with approved TAB plan and the procedures specified and referenced in this Specification.
- C. TAB Report Forms: Use TAB firm's forms approved by Architect.
- D. Instrumentation Type, Quantity, and Accuracy: As described in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems," Section II, "Required Instrumentation for NEBB Certification."
- E. Instrumentation Calibration: Calibrate instruments at least every six months or more frequently if required by instrument manufacturer.
  1. Keep an updated record of instrument calibration that indicates date of calibration and the name of party performing instrument calibration.

### **1.5. PROJECT CONDITIONS**

- A. Partial Owner Occupancy: Owner may occupy completed areas of building before Substantial Completion. Cooperate with Owner during TAB operations to minimize conflicts with Owner's operations.

### **1.6. COORDINATION**

- A. Coordinate the efforts of factory-authorized service representatives for systems and equipment, HVAC controls installers, and other mechanics to operate HVAC systems and equipment to support and assist TAB activities.
- D. Coordinate all TAB work through the contract schedule. Certified TAB reports are required one month prior to Substantial Completion to allow thorough review. The Certified TAB report must be approved by the Owner, Engineer and Commissioning Firm (if applicable) before the project can receive Substantial Completion.

## **PART 2 - PRODUCTS (Not Applicable)**

## **PART 3 - EXECUTION**

### **3.1 EXAMINATION**

- A. Examine approved submittal data of HVAC systems and equipment.
- B. Examine system and equipment installations to verify that they are complete and that testing, cleaning, adjusting, and commissioning specified in individual Sections have been performed.
- C. Examine equipment for installation and for properly operating safety interlocks and controls.
- D. Examine automatic temperature system components to verify the following:
  1. Thermostats are located to avoid adverse effects of sunlight, drafts, and cold walls.
  2. Sensors are located to sense only the intended conditions.
  3. Sequence of operation for control modes is according to the Contract Documents.
  4. Controller set points are set at indicated values.
  5. Interlocked systems are operating.
- E. Report deficiencies discovered before and during performance of TAB procedures. Observe and record system reactions to changes in conditions. Record default set points if different from indicated values.

### **3.2 PROCEDURES FOR TESTING AND BALANCING**

- A. Perform testing and balancing procedures on each system according to the procedures contained in AABC's "National Standards for Testing and Balancing Heating, Ventilating, and Air Conditioning Systems" or NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems" and this Section.
- B. Take and report testing and balancing measurements in inch-pound (IP) units.

### **3.3 GENERAL PROCEDURES FOR BALANCING AIR SYSTEMS**

- A. Prepare test reports for both fans and outlets. Obtain manufacturer's outlet factors and recommended testing procedures. Crosscheck the summation of required outlet volumes with required fan volumes.
- B. Check for airflow blockages.
- C. Check for proper sealing of air-handling unit components.
- D. for proper sealing of air duct system.

### **3.4 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS**

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.

### **3.5 TOLERANCES**

- A. Set HVAC system airflow and water flow rates within the following tolerances:
  - 1. Equipment with Fans: Plus 10 to minus 10 percent.

### **3.7 REPORTING**

- A. Status Reports: As Work progresses, prepare reports to describe deficiencies and problems found in systems being tested and balanced.

### **3.8 FINAL REPORT**

- A. General: Typewritten, or computer printout in letter-quality font, on standard bond paper, bound, tabulated and divided into sections by tested and balanced systems.
- B. Include a certification sheet in front of binder signed by the certified testing and balancing Agent.
  - 1. Include a list of instruments used for procedures, along with proof of calibration.
- C. General Report Data: In addition to form titles and entries, include the following data in the final report, as applicable:
  - 1. Title page.
  - 2. Name and address of TAB firm.
  - 3. Project name.
  - 4. Project location.
  - 5. Architect's name and address.
  - 6. Engineer's name and address.
  - 7. Contractor's name and address.
  - 8. Report date.
  - 9. Signature of TAB firm who certifies the report.
  - 10. Table of Contents.
  - 11. Summary of contents including the following:
    - a. Indicated versus final performance.
    - b. Notable characteristics of systems.
    - c. Description of system operation sequence if it varies from the Contract Documents.

12. Nomenclature sheets for each item of equipment.
  13. Data for terminal units, including manufacturer, type and size.
  14. Notes to explain why certain final data in the body of reports varies from indicated values.
  15. Test conditions for fans and pump performance forms including the following:
    - a. Settings for outside-, return-, and exhaust-air dampers.
    - b. Conditions of filters.
    - c. Face and bypass damper settings at coils.
    - d. Fan drive settings including settings and percentage of maximum pitch diameter.
    - e. Settings for supply-air, static-pressure controller.
    - f. Other system operating conditions that affect performance.
- D. System Diagrams: Include schematic layouts of air distribution systems. Present each system with single-line diagram and include the following:
1. Quantities of outside, supply, return, and exhaust airflows.
  2. Terminal units.
  3. Balancing stations.
- E. Fan Test Reports: Include the following:
1. Fan Data:
    - a. System identification.
    - b. Location.
  2. Motor Data:
    - a. Make and frame type and size.
    - b. Horsepower and rpm.
    - c. Volts, phase, and hertz.
    - d. Full-load amperage and service factor.
    - e. Sheave make, size in inches, and bore.
    - f. Sheave dimensions, center-to-center, and amount of adjustments in inches.
    - g. Number of belts, make, and size.
  3. Test Data (Indicated and Actual Values):
    - a. Total airflow rate in cfm.
    - b. Total system static pressure in inches wg.
    - c. Fan rpm.
    - d. Discharge static pressure in inches wg.
    - e. Suction static pressure in inches wg.
- F. Instrument Calibration Reports:
1. Report Data:
    - a. Instrument type and make.
    - b. Serial number.
    - c. Application.
    - d. Dates of calibration.

### 3.9 INSPECTIONS

- A. Before final acceptance of the Tab Report:
1. Owner or Architect shall randomly select measurements documented in the final report to be rechecked. The rechecking shall be limited to either 10 percent of the total measurements recorded, or the extent of measurements that can be accomplished in a normal 8-hour business day.
  2. If the rechecks yield measurements that differ from the measurements documented in the final report by more than the tolerances allowed, the measurements shall be noted as "FAILED."
  3. If the number of "FAILED" measurements is greater than 10 percent of the total measurements checked during the final inspection, the testing and balancing shall be considered incomplete and shall be rejected.

4. TAB firm shall recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes and resubmit the final report.
5. Request a second final inspection.

**END OF SECTION 23 09 50**



## SECTION 26 05 00

### OVERCURRENT PROTECTIVE DEVICE COORDINATION STUDY AND ARC FLASH HAZARD STUDY.

#### PART 1 GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

##### 1.02 SUMMARY

- A. This Section includes computer-based, fault-current and overcurrent protective device coordination studies, and ARC flash studies. Protective devices shall be set based on results of the protective device coordination study.

##### 1.03 ACTION SUBMITTALS

- A. Product Data: For computer software program to be used for studies.
- B. Other Action Submittals: The following submittals shall be made after the approval process for system protective devices has been completed. Submittals shall be in digital form.
  - 1. Coordination-study input data, including completed computer program input data sheets.
  - 2. Study and Equipment Evaluation Reports.
  - 3. Coordination-Study Report.
  - 4. ARC Flash Hazard Report

##### 1.04 INFORMATIONAL SUBMITTALS

- A. Product Certificates: For coordination-study, fault-current-study, ARC Flash Hazard computer software programs, certifying compliance with IEEE 399 and 1584.

##### 1.05 QUALITY ASSURANCE

- A. Studies shall use computer programs that are distributed nationally and are in wide use. Software algorithms shall comply with requirements of standards and guides specified in this Section. Manual calculations are not acceptable.
- B. Study Specialist Qualifications: An entity experienced in the application of computer software used for studies, having performed successful studies of similar magnitude on electrical distribution systems using similar devices.
  - 1. Professional engineer, licensed in the state where Project is located, shall be responsible for the study. All elements of the study shall be performed under the direct supervision and control of engineer.
- C. Comply with IEEE 242 for short-circuit currents and coordination time intervals.
- D. Comply with IEEE 399 for general study procedures.
- E. Comply with IEEE 1584 for Arc-Flash hazard calculations.

#### PART 2 PRODUCTS

##### 2.01 COMPUTER SOFTWARE DEVELOPERS

- A. Computer Software Developers: Subject to compliance with requirements, provide products by one of the following:
  - 1. SKM Systems Analysis, Inc.

##### 2.02 COMPUTER SOFTWARE PROGRAM REQUIREMENTS

- A. Comply with IEEE 399 and 1584.
- B. Analytical features of fault-current-study computer software program shall include "mandatory," "very desirable," and "desirable" features as listed in IEEE 399.
- C. Computer software program shall be capable of plotting and diagramming time-current-characteristic curves as part of its output. Computer software program shall report device settings and ratings of all overcurrent protective devices and shall demonstrate selective coordination by computer-generated, time-current coordination plots.
  - 1. Optional Features:
    - a. Arcing faults.
    - b. Simultaneous faults.
    - c. Explicit negative sequence.

- d. Mutual coupling in zero sequence.
- D. Computer software program shall be capable of determining: bolted fault currents, arc fault currents, protective device characteristics, duration of arcs, incident energy for all equipment, flash-boundary of all equipment.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine Project overcurrent protective device submittals for compliance with electrical distribution system coordination requirements and other conditions affecting performance. Devices to be coordinated are indicated on Drawings.
  - 1. Proceed with coordination study only after relevant equipment submittals have been assembled. Overcurrent protective devices that have not been submitted and approved prior to coordination study may not be used in study.

#### **3.02 POWER SYSTEM DATA**

- A. Gather and tabulate the following input data to support coordination study:
  - 1. Product Data for overcurrent protective devices specified in other electrical Sections and involved in overcurrent protective device coordination studies. Use equipment designation tags that are consistent with electrical distribution system diagrams, overcurrent protective device submittals, input and output data, and recommended device settings.
  - 2. Impedance of utility service entrance.
  - 3. Electrical Distribution System Diagram: In hard-copy and electronic-copy formats, showing the following:
    - a. Circuit-breaker and fuse-current ratings and types.
    - b. Relays and associated power and current transformer ratings and ratios.
    - c. Transformer kilovolt amperes, primary and secondary voltages, connection type, impedance, and X/R ratios.
    - d. Generator kilovolt amperes, size, voltage, and source impedance.
    - e. Cables: Indicate conduit material, sizes of conductors, conductor material, insulation, and length.
    - f. Busway ampacity and impedance.
    - g. Motor horsepower and code letter designation according to NEMA MG 1.
  - 4. Data sheets to supplement electrical distribution system diagram, cross-referenced with tag numbers on diagram, showing the following:
    - a. Special load considerations, including starting inrush currents and frequent starting and stopping.
    - b. Transformer characteristics, including primary protective device, magnetic inrush current, and overload capability.
    - c. Motor full-load current, locked rotor current, service factor, starting time, type of start, and thermal-damage curve.
    - d. Generator thermal-damage curve.
    - e. Ratings, types, and settings of utility company's overcurrent protective devices.
    - f. Special overcurrent protective device settings or types stipulated by utility company.
    - g. Time-current-characteristic curves of devices indicated to be coordinated.
    - h. Manufacturer, frame size, interrupting rating in amperes rms symmetrical, ampere or current sensor rating, long-time adjustment range, short-time adjustment range, and instantaneous adjustment range for circuit breakers.
    - i. Manufacturer and type, ampere-tap adjustment range, time-delay adjustment range, instantaneous attachment adjustment range, and current transformer ratio for overcurrent relays.
    - j. Panelboards, switchboards, motor-control center ampacity, and interrupting rating in amperes rms symmetrical.

#### **3.03 FAULT-CURRENT STUDY**

- A. Calculate the maximum available short-circuit current in amperes rms symmetrical at circuit-breaker positions of the electrical power distribution system. The calculation shall be for a current immediately after initiation and for a three-phase bolted short circuit.
- B. Calculate momentary and interrupting duties on the basis of maximum available fault current.

- C. Calculations to verify interrupting ratings of overcurrent protective devices shall comply with IEEE 241 and IEEE 242.
  - 1. Transformers:
    - a. ANSI C57.12.10.
    - b. ANSI C57.12.22.
    - c. ANSI C57.12.40.
    - d. IEEE C57.12.00.
    - e. IEEE C57.96.
  - 2. Low-Voltage Circuit Breakers: IEEE 1015 and IEEE C37.20.1.
- D. Calculate Arc-Flash hazards per IEEE 1584.
- E. Study Report:
  - 1. Show calculated X/R ratios and equipment interrupting rating (1/2-cycle) fault currents on electrical distribution system diagram.
- F. Equipment Evaluation Report:
  - 1. For 600-V overcurrent protective devices, ensure that interrupting ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.
  - 2. For devices and equipment rated for asymmetrical fault current, apply multiplication factors listed in the standards to 1/2-cycle symmetrical fault current.
  - 3. Verify adequacy of phase conductors at maximum three-phase bolted fault currents; verify adequacy of equipment grounding conductors and grounding electrode conductors at maximum ground-fault currents. Ensure that short-circuit withstand ratings are equal to or higher than calculated 1/2-cycle symmetrical fault current.

### **3.04 COORDINATION STUDY**

- A. Perform coordination study using approved computer software program. Prepare a written report using results of fault-current study. Comply with IEEE 399.
  - 1. Calculate the maximum and minimum 1/2-cycle short-circuit currents.
  - 2. Calculate the maximum and minimum ground-fault currents.
- B. Comply with IEEE 241 recommendations for fault currents and time intervals.
- C. Transformer Primary Overcurrent Protective Devices:
  - 1. Device shall not operate in response to the following:
    - a. Inrush current when first energized.
    - b. Self-cooled, full-load current or forced-air-cooled, full-load current, whichever is specified for that transformer.
    - c. Permissible transformer overloads according to IEEE C57.96 if required by unusual loading or emergency conditions.
  - 2. Device settings shall protect transformers according to IEEE C57.12.00, for fault currents.
- D. Conductor Protection: Protect cables against damage from fault currents according to ICEA P-32-382, ICEA P-45-482, and conductor melting curves in IEEE 242. Demonstrate that equipment withstands the maximum short-circuit current for a time equivalent to the tripping time of the primary relay protection or total clearing time of the fuse. To determine temperatures that damage insulation, use curves from cable manufacturers or from listed standards indicating conductor size and short-circuit current.
- E. Coordination-Study Report: Prepare a written report indicating the following results of coordination study:
  - 1. Tabular Format of Settings Selected for Overcurrent Protective Devices:
    - a. Device tag.
    - b. Relay-current transformer ratios; and tap, time-dial, and instantaneous-pickup values.
    - c. Circuit-breaker sensor rating; and long-time, short-time, and instantaneous settings.
    - d. Fuse-current rating and type.
    - e. Ground-fault relay-pickup and time-delay settings.
  - 2. Coordination Curves: Prepared to determine settings of overcurrent protective devices to achieve selective coordination. Graphically illustrate that adequate time separation exists between devices installed in series, including power utility company's upstream devices. Prepare separate sets of curves for the switching schemes and for emergency periods where the power source is local generation. Show the following information:
    - a. Device tag.

- b. Voltage and current ratio for curves.
- c. Three-phase and single-phase damage points for each transformer.
- d. No damage, melting, and clearing curves for fuses.
- e. Cable damage curves.
- f. Transformer inrush points.
- g. Maximum fault-current cutoff point.

F. Completed data sheets for setting of overcurrent protective devices.

### **3.05 ARC FLASH STUDY REPORT**

A. Tabular format showing the following:

1. Bus Name
2. Protective Device Name
3. Bus kV
4. Bus Bolted Fault (kA)
5. Bus Arcing Fault (kA)
6. Protective Device Bolted Fault (kA)
7. Protective Device Arcing Fault (kA)
8. Trip/Delay Time
9. Breaker Opening Time
10. Ground
11. Equipment Type
12. Gap (mm)
13. Arc Flash Boundary (in)
14. Working Distance (in)
15. Incident Energy ( cal/cm<sup>2</sup>)
16. PPE Level

B. Provide labels for all equipment Per NEC 70E, NEC 70, OSHA, and IEEE 1584.

**END OF SECTION**

## SECTION 26 05 19

### LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes:
  - 1. Copper building wire rated 600 V or less.
  - 2. Fire-alarm wire and cable.
  - 3. Connectors, splices, and terminations rated 600 V and less.
- B. Related Requirements:
  - 1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
  - 2. Section 271500 "Communications Horizontal Cabling" for cabling used for voice and data circuits.

##### 1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.

##### 1.03 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

#### PART 2 PRODUCTS

##### 2.01 COPPER BUILDING WIRE

- A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
- B. Standards:
  - 1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
  - 2. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
- C. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
- D. Conductor Insulation:
  - 1. Type RHH and Type RHW-2: Comply with UL 44.
  - 2. Type USE-2 and Type SE: Comply with UL 854.
  - 3. Type THHN and Type THWN-2: Comply with UL 83.
  - 4. Type THW and Type THW-2: Comply with NEMA WC-70/ICEA S-95-658 and UL 83.
  - 5. Type XHHW-2: Comply with UL 44.

##### 2.02 CONNECTORS AND SPLICES

- A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
- C. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
  - 1. Material: Copper.
  - 2. Type: One hole with standard barrels.
  - 3. Termination: Compression.

#### PART 3 EXECUTION

##### 3.01 CONDUCTOR MATERIAL APPLICATIONS

- A. Feeders:
  - 1. Copper; solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.
- B. Branch Circuits:
  - 1. Copper, Solid for No. 10 AWG and smaller; stranded for No. 8 AWG and larger.

### **3.02 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS**

- A. Service Entrance: Type XHHW-2, single conductors in raceway.
- B. Exposed Feeders: Type THHN/THWN-2, single conductors in raceway.
- C. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- D. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.
- E. Exposed Branch Circuits, Including in Crawlspace: Type THHN/THWN-2, single conductors in raceway.
- F. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway.
- G. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

### **3.03 INSTALLATION OF CONDUCTORS AND CABLES**

- A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
- B. Complete raceway installation between conductor and cable termination points according to Section 260533 "Raceways and Boxes for Electrical Systems" prior to pulling conductors and cables.
- C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
- D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
- E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
- F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

### **3.04 CONNECTIONS**

- A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
- B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
- C. Wiring at Outlets: Install conductor at each outlet, with at least 12 inch (300 mm) of slack.

### **3.05 IDENTIFICATION**

- A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
- B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

### **3.06 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 260544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

### **3.07 FIRESTOPPING**

- A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Section 078413 "Penetration Firestopping."

**END OF SECTION**

**SECTION 26 05 26**  
**GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SUMMARY**

A. Section Includes:

1. Grounding and bonding conductors.
2. Grounding and bonding clamps.
3. Grounding and bonding bushings.
4. Grounding and bonding hubs.
5. Grounding and bonding connectors.
6. Intersystem bonding bridge grounding connector.
7. Grounding and bonding busbars.
8. Grounding (earthing) electrodes.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

**1.02 ACTION SUBMITTALS**

A. Product Data:

1. For each type of product indicated.

B. Field Quality-Control Submittals:

1. Field quality-control reports.

**1.03 CLOSEOUT SUBMITTALS**

A. Operation and Maintenance Data:

1. In addition to items specified in Section 260010 "Supplemental Requirements for Electrical," include the following:

**PART 2 PRODUCTS**

**2.01 GROUNDING AND BONDING CONDUCTORS**

A. Equipment Grounding Conductor:

1. General Characteristics: 600 V, THHN/THWN-2, copper wire or cable, green color, in accordance with Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

B. ASTM - Bare Copper Grounding and Bonding Conductor:

1. Referenced Standards: Complying with one or more of the following:
  - a. Soft or Annealed Copper Wire: ASTM B3
  - b. Concentric-Lay Stranded Copper Conductor: ASTM B8.
  - c. Tin-Coated Soft or Annealed Copper Wire: ASTM B33.
  - d. 19-Wire Combination Unilay-Stranded Copper Conductor: ASTM B787/B787M.

**2.02 GROUNDING AND BONDING CLAMPS**

A. Description: Clamps suitable for attachment of grounding and bonding conductors to grounding electrodes, pipes, tubing, and rebar. Grounding and bonding clamps specified in this article are also suitable for use with communications applications; see Section 270526 "Grounding and Bonding for Communications Systems," for selection and installation guidelines.

B. Performance Criteria:

1. Regulatory Requirements:
  - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria:
  - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
  - b. Grounding and Bonding Equipment for Communications: UL CCN KDSH; including UL 467.

**2.03 GROUNDING AND BONDING BUSHINGS**

A. Description: Bonding bushings connect conduit fittings, tubing fittings, threaded metal conduit, and unthreaded metal conduit to metal boxes and equipment enclosures, and have one or more

bonding screws intended to provide electrical continuity between bushing and enclosure. Grounding bushings have provision for connection of bonding or grounding conductor and may or may not also have bonding screws.

B. Performance Criteria:

1. Regulatory Requirements:
  - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria:
  - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

**2.04 GROUNDING AND BONDING HUBS**

A. Description: Hubs with certified grounding or bonding locknut.

B. Performance Criteria:

1. Regulatory Requirements:
  - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria:
  - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

**2.05 GROUNDING AND BONDING CONNECTORS**

A. Performance Criteria:

1. Regulatory Requirements:
  - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria:
  - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
  - b. Grounding and Bonding Equipment for Communications: UL CCN KDSH; including UL 467.

**2.06 INTERSYSTEM BONDING BRIDGE GROUNDING CONNECTORS**

A. Description: Devices that provide means for connecting communications systems grounding and bonding conductors at service equipment or at disconnecting means for buildings or structures.

B. Performance Criteria:

1. Regulatory Requirements:
  - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria:
  - a. Grounding and Bonding Equipment for Communications: UL CCN KDSH; including UL 467.

**2.07 GROUNDING AND BONDING BUSBARS**

A. Description: Miscellaneous grounding and bonding device that serves as common connection for multiple grounding and bonding conductors.

B. Performance Criteria:

1. Regulatory Requirements:
  - a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
2. Listing Criteria:
  - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.

**2.08 GROUNDING (EARTHING) ELECTRODES**

A. Description: Grounding electrodes include rod electrodes, ring electrodes, metal underground water pipes, metal building frames, concrete-encased electrodes, and pipe and plate electrodes.

B. Performance Criteria:

1. Regulatory Requirements:



- a. Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.
  2. Listing Criteria:
    - a. Grounding and Bonding Equipment: UL CCN KDER; including UL 467.
- C. UL KDER - Rod Electrode:
1. General Characteristics: Copper-clad steel; 5/8 inch by 8 ft (16 mm by 2.4 m).

## **PART 3 EXECUTION**

### **3.01 EXAMINATION**

- A. Examine facility's grounding electrode system and equipment grounding for compliance with requirements for maximum ground-resistance level and other conditions affecting performance of grounding and bonding of electrical system.
- B. Inspect test results of grounding system measured at point of electrical service equipment connection.
- C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- D. Proceed with connection of electrical service equipment only after unsatisfactory conditions have been corrected.

### **3.02 SELECTION OF BUSBARS**

- A. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
  1. Install bus horizontally, on insulated spacers 2 inch (50 mm) minimum from wall, 6 inch (150 mm) above finished floor unless otherwise indicated.
  2. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.

### **3.03 SELECTION OF GROUNDING AND BONDING CONDUCTORS**

- A. Conductors: Install solid conductor for 8 AWG and smaller, and stranded conductors for 6 AWG and larger unless otherwise indicated.
- B. Custom-Length Insulated Equipment Bonding Jumpers: 6 AWG, 19-strand, Type THHN.
- C. Bonding Cable: 28 kcmil, 14 strands of 17 AWG conductor, 1/4 inch (6 mm) in diameter.
- D. Bonding Conductor: 4 AWG or 6 AWG, stranded conductor.
- E. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.
- F. Tinned Bonding Jumper: Tinned-copper tape, braided conductors terminated with copper ferrules; 1-5/8 inch (41 mm) wide and 1/16 inch (1.6 mm) thick.
- G. Underground Grounding Conductors: Install bare tinned-copper conductor, 2/0 AWG minimum.
  1. Bury at least 30 inch (750 mm) below grade.

### **3.04 SELECTION OF CONNECTORS**

- A. Conductor Terminations and Connections:
  1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
  2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
  3. Connections to Ground Rods at Test Wells: Bolted connectors.
  4. Connections to Structural Steel: Welded connectors.

### **3.05 INSTALLATION**

- A. Comply with manufacturer's published instructions.
- B. Reference Standards:
  1. Ground Bonding Common with Lightning Protection System: Comply with NFPA 780 and UL 96 when interconnecting with lightning protection system. Bond electrical power system ground directly to lightning protection system grounding conductor at closest point to electrical service grounding electrode. Use bonding conductor sized same as system grounding electrode conductor, and install in conduit.
  2. Consult Architect for resolution of conflicting requirements.

### C. Special Techniques:

1. Conductors:
  - a. Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
2. Connections: Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact are galvanically compatible.
  - a. Use electroplated or hot-tin-coated materials to ensure high conductivity and to make contact points closer in order of galvanic series.
  - b. Make connections with clean, bare metal at points of contact.
  - c. Make aluminum-to-steel connections with stainless steel separators and mechanical clamps.
  - d. Make aluminum-to-galvanized-steel connections with tin-plated copper jumpers and mechanical clamps.
  - e. Coat and seal connections having dissimilar metals with inert material to prevent future penetration of moisture to contact surfaces.
  - f. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
    - 1) Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate adjacent parts.
    - 2) Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
    - 3) Use exothermic-welded connectors for outdoor locations; if disconnect-type connection is required, use bolted clamp.
  - g. Grounding and Bonding for Piping:
    - 1) Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use bolted clamp connector or bolt lug-type connector to pipe flange by using one of lug bolts of flange. Where dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
    - 2) Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with bolted connector.
    - 3) Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.
  - h. Grounding for Steel Building Structure: Install driven ground rod at base of each corner column and at intermediate exterior columns at distances not more than 60 ft (18 m) apart.
3. Electrodes:
  - a. Ground Rods: Drive rods until tops are 2 inch (50 mm) below finished floor or final grade unless otherwise indicated.
    - 1) Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
    - 2) Use exothermic welds for below-grade connections.
  - b. For grounding electrode system, install at least three rods spaced at least one-rod length from each other and located at least same distance from other grounding electrodes, and connect to service grounding electrode conductor.
4. Grounding at Service:
  - a. Equipment grounding conductors and grounding electrode conductors must be connected to ground bus. Install main bonding jumper between neutral and ground buses.
5. Equipment Grounding:
  - a. Install insulated equipment grounding conductors with feeders and branch circuits.
    - b. Install insulated equipment grounding conductors with the following items, in addition to those required by NFPA 70:
      - 1) Feeders and branch circuits.

- 2) Lighting circuits.
- 3) Receptacle circuits.
- 4) Single-phase motor and appliance branch circuits.
- 5) Three-phase motor and appliance branch circuits.
- 6) Flexible raceway runs.
- c. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Install separate insulated equipment grounding conductor to each electric water heater and heat-tracing cable. Bond conductor to heater units, piping, connected equipment, and components.
- d. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

### **3.06 FIELD QUALITY CONTROL**

- A. Field tests and inspections may be witnessed by Architect, Owner, or authorities having jurisdiction. Coordinate field tests in advance.
- B. Tests and Inspections:
  - 1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
  - 2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with calibrated torque wrench in accordance with manufacturer's published instructions.
  - 3. Test completed grounding system at each location where maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at individual ground rods. Make tests at ground rods before conductors are connected.
    - a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
    - b. Perform tests by fall-of-potential method in accordance with IEEE Std 81.
    - c. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.
  - 4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to record of tests and observations. Include number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
- C. Nonconforming Work:
  - 1. Grounding system will be considered defective if it does not pass tests and inspections.
  - 2. Remove and replace defective components and retest.
- D. Collect, assemble, and submit test and inspection reports.
  - 1. Report measured ground resistances that exceed the following values:
    - a. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 10  $\Omega$ .
    - b. Power Distribution Units or Panelboards Serving Electronic Equipment: 3  $\Omega$ .

### **3.07 PROTECTION**

- A. After installation, protect grounding and bonding cables and equipment from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

**END OF SECTION**

## SECTION 26 05 29

### HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes:

1. Steel slotted support systems.
2. Conduit and cable support devices.
3. Support for conductors in vertical conduit.
4. Structural steel for fabricated supports and restraints.
5. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.
6. Fabricated metal equipment support assemblies.

#### PART 2 PRODUCTS

##### 2.01 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32 inch (10 mm) diameter holes at a maximum of 8 inch (200 mm) on center in at least one surface.
  1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
  2. Material for Channel, Fittings, and Accessories: Galvanized steel.
  3. Channel Width: Selected for applicable load criteria.
  4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
- B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored electrical conductors or cables in riser conduits. Plugs must have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body must be made of malleable iron.
- D. Structural Steel for Fabricated Supports and Restraints: ASTM A36/A36M steel plates, shapes, and bars; black and galvanized.
- E. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
  1. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
  2. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
  3. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
  4. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325 (Grade A325M).
  5. Toggle Bolts: All steel springhead type.
  6. Hanger Rods: Threaded steel.

##### 2.02 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

- A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
- B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

#### PART 3 EXECUTION

##### 3.01 SELECTION

- A. Comply with the following standards for selection and installation of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA NEIS 101
  2. NECA NEIS 102.
- B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
- C. Comply with requirements for raceways and boxes specified in Section 260533 "Raceway and Boxes for Electrical Systems."
- D. Retain first paragraph below if vibration or seismic design requirements apply.
- E. In "Maximum Support Spacing and Minimum Hanger Rod Size for Raceways" Paragraph below, spacings for supports in NECA NEIS 1, Table 1 are more detailed, specific, and generally stricter than those permitted by NFPA 70 for EMT, IMC, and ERM. Revise to suit Project, and consider retaining reference to NECA table for critical projects.
- F. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and ERM as required by NFPA 70. Minimum rod size must be 1/4 inch (6 mm) in diameter.
- G. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
1. Secure raceways and cables to these supports with two-bolt conduit clamps.
- H. Retain paragraph below for projects where seismic design requirements do not apply. Consider retaining for light-commercial projects only.
- I. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2 inch (38 mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

### **3.02 INSTALLATION OF SUPPORTS**

- A. Comply with NECA NEIS 101 for installation requirements except as specified in this article.
- B. Retain "Raceway Support Methods" Paragraph below to permit raceways running perpendicular to bar joists and trusses to be supported by letting them rest within the joist or truss openings. NECA NEIS 1 does not mention this method. If seismic design requirements apply, consult structural engineer or authorities having jurisdiction before permitting this support method.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination must be weight of supported components plus 200 lb (90 kg).
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
1. To Wood: Fasten with lag screws or through bolts.
  2. To New Concrete: Bolt to concrete inserts.
  3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
  4. To Existing Concrete: Expansion anchor fasteners.
  5. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts or Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
  6. To Light Steel: Sheet metal screws.
  7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

### **3.03 INSTALLATION OF FABRICATED METAL SUPPORTS**

- A. Comply with installation requirements in Section 055000 "Metal Fabrications" for site-fabricated metal supports.

- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
- C. Field Welding: Comply with AWS D1.1/D1.1M. Submit welding certificates.

**END OF SECTION**

**SECTION 26 05 33**  
**RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SUMMARY**

A. Section Includes:

1. Type EMT-S raceways and elbows.
2. Type ENT raceways and fittings.
3. Type ERMC-S raceways, elbows, couplings, and nipples.
4. Type FMC-S raceways.
5. Type IMC raceways.
6. Type LFMC raceways.
7. Type PVC raceways and fittings.
8. Fittings for conduit, tubing, and cable.
9. Threaded metal joint compound.
10. Solvent cements.
11. Surface metal raceways and fittings.
12. Wireways and auxiliary gutters.
13. Metallic outlet boxes, device boxes, rings, and covers.
14. Nonmetallic outlet boxes, device boxes, rings, and covers.
15. Termination boxes.
16. Cabinets, cutout boxes, junction boxes, and pull boxes.
17. Cover plates for device boxes.
18. Hoods for outlet boxes.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

**PART 2 PRODUCTS**

**2.01 TYPE EMT-S RACEWAYS AND ELBOWS**

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 797 and UL Category Control Number FJMX.

B. Steel Electrical Metal Tubing (EMT-S) and Elbows:

1. Material: Steel.
2. Options:
  - a. Exterior Coating: Zinc.
  - b. Interior Coating: Zinc with organic top coating.
  - c. Minimum Trade Size: Metric designator 21 (trade size 3/4).
  - d. Colors: As indicated on Drawings.

**2.02 TYPE ENT RACEWAYS AND FITTINGS**

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 1653 and UL Category Control Number FKHU.

B. Electrical Nonmetallic Tubing (ENT) and Fittings:

1. Options:
  - e. Minimum Trade Size: Metric designator 21 (trade size 3/4).
  - f. Fittings:
    - 1) Mechanically Attached Fittings: UL 1653.
    - 2) Solvent-Attached Fittings: UL 651.

**2.03 TYPE ERMC-S RACEWAYS, ELBOWS, COUPLINGS, AND NIPPLES**

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 6 and UL Category Control Number DYIX.

- B. Galvanized-Steel Electrical Rigid Metal Conduit (ERMC-S-G), Elbows, Couplings, and Nipples:
  - 1. Exterior Coating: Zinc.
  - 2. Options:
    - g. Interior Coating: Zinc with organic top coating.
    - h. Minimum Trade Size: Metric designator 21 (trade size 3/4).
    - i. Colors: As indicated on Drawings.

#### **2.04 TYPE FMC-S RACEWAYS**

- A. Performance Criteria:
  - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
  - 2. General Characteristics: UL 1 and UL Category Control Number DXUZ.
- B. Steel Flexible Metal Conduit (FMC-S):
  - 1. Material: Steel.
  - 2. Options:
    - j. Minimum Trade Size: Metric designator 21 (trade size 3/4).
    - k. Colors: As indicated on Drawings.

#### **2.05 TYPE IMC RACEWAYS**

- A. Performance Criteria:
  - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
  - 2. General Characteristics: UL 1242 and UL Category Control Number DYBY.
- B. Steel Electrical Intermediate Metal Conduit (IMC):
  - 1. Options:
    - l. Exterior Coating: Zinc.
    - m. Interior Coating: Zinc with organic top coating.
    - n. Minimum Trade Size: Metric designator 21 (trade size 3/4).
    - o. Colors: As indicated on Drawings.

#### **2.06 TYPE LFMC RACEWAYS**

- A. Performance Criteria:
  - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
  - 2. General Characteristics: UL 360 and UL Category Control Number DXHR.
- B. Steel Liquidtight Flexible Metal Conduit (LFMC-S):
  - 1. Material: Steel.
  - 2. Options:
    - p. Minimum Trade Size: Metric designator 21 (trade size 3/4).
    - q. Colors: As indicated on Drawings.

#### **2.07 TYPE PVC RACEWAYS AND FITTINGS**

- A. Performance Criteria:
  - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
  - 2. General Characteristics: UL 651 and UL Category Control Number DZYR.
- B. Schedule 40 Rigid PVC Conduit (PVC-40) and Fittings:
  - 1. Dimensional Specifications: Schedule 40.
  - 2. Options:
    - r. Minimum Trade Size: Metric designator 21 (trade size 3/4).
- C. Schedule 80 Rigid PVC Conduit (PVC-80) and Fittings:
  - 1. Dimensional Specifications: Schedule 80.
  - 2. Options:
    - s. Minimum Trade Size: Metric designator 21 (trade size 3/4).

#### **2.08 FITTINGS FOR CONDUIT, TUBING, AND CABLE**

- A. Performance Criteria:
  - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
- B. Fittings for Type ERMC, Type IMC, and Type PVC Raceways:
  - 1. General Characteristics: UL 514B and UL Category Control Number DWTT.



2. Options:
  - t. Material: Steel.
  - u. Coupling Method: Raintight compression coupling with distinctive color gland nut.
  - v. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
  - w. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

C. Fittings for Type EMT Raceways:

1. General Characteristics: UL 514B and UL Category Control Number FKAV.
2. Options:
  - x. Material: Steel.
  - y. Coupling Method: Raintight compression coupling with distinctive color gland nut.
  - z. Conduit Fittings for Hazardous (Classified) Locations: UL 1203.
  - aa. Expansion and Deflection Fittings: UL 651 with flexible external bonding jumper.

D. Fittings for Type FMC Raceways:

1. General Characteristics: UL 514B and UL Category Control Number ILNR.

E. Fittings for Type LFMC Raceways:

1. General Characteristics: UL 514B and UL Category Control Number DXAS.

## **2.09 ELECTRICALLY CONDUCTIVE CORROSION-RESISTANT COMPOUNDS FOR THREADED CONDUIT**

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 2419 and UL Category Control Number FOIZ.

## **2.10 SOLVENT CEMENTS**

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: As recommended by conduit manufacturer in accordance with UL 514B and UL Category Control Number DWTT.
3. Sustainability Characteristics:

## **2.11 METALLIC OUTLET BOXES, DEVICE BOXES, RINGS, AND COVERS**

A. Performance Criteria:

1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
2. General Characteristics: UL 514A and UL Category Control Number QCIT.

B. Metallic Outlet Boxes:

1. Description: Box having pryout openings, knockouts, threaded entries, or hubs in either the sides of the back, or both, for entrance of conduit, conduit or cable fittings, or cables, with provisions for mounting outlet box cover, but without provisions for mounting wiring device directly to box.
2. Options:
  - bb. Material: Cast metal.
  - cc. Sheet Metal Depth: Minimum 2 inch (50 mm).
  - dd. Cast-Metal Depth: Minimum 2.4 inch (60.3 mm).
  - ee. Luminaire Outlet Boxes and Covers: Nonadjustable, listed and labeled for attachment of luminaire weighing up to 50 lb (23 kg).

C. Metallic Conduit Bodies:

1. Description: Means for providing access to interior of conduit or tubing system through one or more removable covers at junction or terminal point. In the United States, conduit bodies are listed in accordance with outlet box requirements.

D. Metallic Device Boxes:

1. Description: Box with provisions for mounting wiring device directly to box.
2. Options:
  - ff. Material: Cast metal.

E. Metallic Concrete Boxes and Covers:

1. Description: Box intended for use in poured concrete.

## **2.12 TERMINATION BOXES**

- A. Description: Enclosure for termination base consisting of lengths of bus bars, terminal strips, or terminal blocks with provision for wire connectors to accommodate incoming or outgoing conductors or both.
- B. Performance Criteria:
  - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
  - 2. General Characteristics: UL 1773 and UL Category Control Number XCKT.

## **2.13 CABINETS, CUTOFF BOXES, JUNCTION BOXES, AND PULL BOXES**

- A. Performance Criteria:
  - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
  - 2. General Characteristics:
    - gg. Non-Environmental Characteristics: UL 50.
    - hh. Environmental Characteristics: UL 50E.
- B. Indoor Sheet Metal Junction and Pull Boxes:
  - 1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
  - 2. Additional Characteristics: UL Category Control Number BGUZ.
- C. Indoor Cast-Metal Junction and Pull Boxes:
  - 1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
  - 2. Additional Characteristics: UL Category Control Number BGUZ.
- D. Outdoor Sheet Metal Junction and Pull Boxes:
  - 1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
  - 2. Additional Characteristics: UL Category Control Number BGUZ.
- E. Outdoor Cast-Metal Junction and Pull Boxes:
  - 1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
  - 2. Additional Characteristics: UL Category Control Number BGUZ.
- F. Outdoor Polymeric Junction and Pull Boxes:
  - 1. Description: Box with a blank cover that serves the purpose of joining different runs of raceway or cable.
  - 2. Additional Characteristics: UL Category Control Number BGUZ.

## **2.14 COVER PLATES FOR DEVICES BOXES**

- A. Performance Criteria:
  - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
  - 2. General Characteristics:
    - ii. Reference Standards: UL 514D and UL Category Control Numbers QCIT and QCMZ.
    - jj. Wallplate-Securing Screws: Metal with head color to match wallplate finish.
- B. Metallic Cover Plates for Device Boxes:
  - 1. Options:
    - kk. Damp and Wet Locations: Listed, labeled, and marked for location and use. Provide gaskets and accessories necessary for compliance with listing.
    - ll. Wallplate Material: 0.032 inch (0.8 mm) thick Type 302/304 non-magnetic stainless steel with brushed finish.

## **2.15 HOODS FOR OUTLET BOXES**

- A. Performance Criteria:
  - 1. Regulatory Requirements: Listed and labeled in accordance with NFPA 70 and marked for intended location and use.
  - 2. General Characteristics:
    - mm. Reference Standards:
      - 1) UL 514D and UL Category Control Numbers QCIT and QCMZ.

- 2) Receptacle, hood, cover plate, gaskets, and seals comply with UL 498 Supplement SA when mated with box or enclosure complying with UL 514A, UL 514C, or UL 50E.
  3. Mounts to box using fasteners different from wiring device.
- B. Retractable or Reattachable Hoods for Outlet Boxes:
1. Options:
    - nn. Provides clear, weatherproof, "while-in-use" cover.

### **PART 3 EXECUTION**

#### **3.01 SELECTION OF RACEWAYS**

- A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of raceways. Consult Architect for resolution of conflicting requirements.
- B. Outdoors:
1. Exposed and Subject to Severe Physical Damage: ERM C.
  2. Exposed and Subject to Physical Damage: ERM C.
    - oo. Locations less than 2.5 m (8 ft) above finished floor.
  3. Exposed and Not Subject to Physical Damage: IM C.
  4. Concealed Aboveground: IM C.
  5. Direct Buried: PVC-80.
  6. Concrete Encased Not in Trench: PVC-80.
  7. Concrete Encased in Trench: PVC-40.
  8. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
- C. Indoors:
1. Exposed and Subject to Severe Physical Damage: ERM C. Subject to severe physical damage includes the following locations:
    - pp. Parking Deck.
    - qq. Mechanical rooms.
  2. Exposed and Subject to Physical Damage: ERM C. Subject to physical damage includes the following locations:
    - rr. Locations less than 2.5 m (8 ft) above finished floor.
    - ss. Stub-ups to above suspended ceilings.
  3. Exposed and Not Subject to Physical Damage: IM C.
  4. Concealed in Ceilings and Interior Walls and Partitions: EMT.
  5. Damp or Wet Locations: IM C.
  6. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
- D. Raceway Fittings: Select fittings in accordance with NEMA FB 2.10 guidelines.
1. ERM C and IM C: Provide threaded type fittings unless otherwise indicated.

#### **3.02 SELECTION OF BOXES AND ENCLOSURES**

- A. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for selection of boxes and enclosures. Consult Architect for resolution of conflicting requirements.
- B. Degree of Protection:
1. Outdoors:
    - tt. Type 3R unless otherwise indicated.
    - uu. Locations Exposed to Hosedown: Type 4.
    - vv. Locations Subject to Potential Flooding: Type 6P.
    - ww. Locations in-Ground or Exposed to Corrosive Agents: Type 4X.
  2. Indoors:
    - xx. Type 1 unless otherwise indicated. Parking deck is considered an Exterior area.
- C. Exposed Boxes Installed Less Than 2.5 m (8 ft) Above Floor:
1. Provide cast-metal boxes. Boxes with knockouts or unprotected openings are prohibited.

#### **3.03 INSTALLATION OF RACEWAYS**

- A. Installation Standards:

1. Unless more stringent requirements are specified in Contract Documents or manufacturers' written instructions, comply with NFPA 70 for installation of raceways. Consult Architect for resolution of conflicting requirements.
2. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.
3. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for hangers and supports.
4. Comply with NECA NEIS 101 for installation of steel raceways.
5. Comply with NECA NEIS 111 for installation of nonmetallic raceways.
6. Install raceways square to the enclosure and terminate at enclosures without hubs with locknuts on both sides of enclosure wall. Install locknuts hand tight, plus one-quarter turn more.
7. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install bushings on conduits up to metric designator 35 (trade size 1-1/4) and insulated throat metal bushings on metric designator 41 (trade size 1-1/2) and larger conduits terminated with locknuts. Install insulated throat metal grounding bushings on service conduits.
8. Raceway Terminations at Locations Subject to Moisture or Vibration:
  - yy. Provide insulating bushings to protect conductors, including conductors smaller than No. 4 AWG. Install insulated throat metal grounding bushings on service conduits.

B. General Requirements for Installation of Raceways:

1. Complete raceway installation before starting conductor installation.
2. Provide stub-ups through floors with coupling threaded inside for plugs, set flush with finished floor. Plug coupling until conduit is extended above floor to final destination or a minimum of 2 ft (0.6 m) above finished floor.
3. First subparagraph below is more restrictive than NFPA 70, which permits up to four quarter bends in a conduit run. Retain subparagraph for more conservative design, with less stress being placed on conductors being pulled in.
4. Install no more than equivalent of three 90-degree bends in conduit run except for control wiring conduits, for which no more than equivalent of two 90-degree fewer bends are permitted. Support within 12 inch (300 mm) of changes in direction.
5. Make bends in raceway using large-radius preformed ells except for parallel bends. Field bending must be in accordance with NFPA 70 minimum radii requirements. Provide only equipment specifically designed for material and size involved.
6. Conceal conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.
7. Support conduit within 12 inch (300 mm) of enclosures to which attached.
8. Install raceway sealing fittings at accessible locations in accordance with NFPA 70 and fill them with listed sealing compound. For concealed raceways, install fitting in flush steel box with blank cover plate having finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings in accordance with NFPA 70.
9. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal interior of raceways at the following points:
  - a. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
  - b. Where an underground service raceway enters a building or structure.
  - c. Conduit extending from interior to exterior of building.
  - d. Conduit extending into pressurized duct and equipment.
  - e. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
  - f. Where otherwise required by NFPA 70.
10. Do not install raceways or electrical items on "explosion-relief" walls or rotating equipment.
11. Do not install conduits within 2 inch (50 mm) of the bottom side of a metal deck roof.
12. Keep raceways at least 6 inch (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.
13. Cut conduit perpendicular to the length. For conduits metric designator 53 (trade size 2) and larger, use roll cutter or a guide to make cut straight and perpendicular to the length. Ream inside of conduit to remove burrs.

14. Install pull wires in empty raceways. Provide polypropylene or monofilament plastic line with not less than 200 lb (90 kg) tensile strength. Leave at least 12 inch (300 mm) of slack at both ends of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

C. Requirements for Installation of Specific Raceway Types:

1. Types ERM and IMC:
  - a. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound that maintains electrical conductivity to threads of raceway and fittings before making up joints. Follow compound manufacturer's written instructions.
2. Types FMC and LFMC:
  - b. Comply with NEMA RV 3. Provide a maximum of 36 inch (915 mm) of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
3. Type PVC:
  - c. Do not install Type PVC conduit where ambient temperature exceeds **[122 deg F (50 deg C)]**. Conductor ratings must be limited to 75 deg C except where installed in a trench outside buildings with concrete encasement, where 90 deg C conductors are permitted.
  - d. Comply with manufacturer's written instructions for solvent welding and fittings.

D. Raceways Embedded in Slabs:

1. Run raceways larger than metric designator 27 (trade size 1) below concrete slab..
2. Arrange raceways to cross building expansion joints with expansion fittings at right angles to the joint.
3. Arrange raceways to ensure that each is surrounded by a minimum of 2 inch (50 mm) of concrete without voids.
4. Do not embed threadless fittings in concrete unless locations have been specifically approved by Architect.
5. Change from ENT to ERM before rising above floor.

E. Stub-ups to Above Recessed Ceilings:

1. Provide EMT, IMC, or ERM for raceways.
2. Provide a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

F. Raceway Fittings: Install fittings in accordance with NEMA FB 2.10 guidelines.

1. ERM-S-PVC: Provide only fittings listed for use with this type of conduit. Patch and seal joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Provide sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
2. EMT: Provide setscrew, steel fittings. Comply with NEMA FB 2.10.
3. Flexible Conduit: Provide only fittings listed for use with flexible conduit type. Comply with NEMA FB 2.20.

G. Expansion-Joint Fittings:

1. Install in runs of aboveground PVC that are located where environmental temperature change may exceed 30 deg F (17 deg C) and that have straight-run length that exceeds 25 ft (7.6 m). Install in runs of aboveground ERM and EMT conduit that are located where environmental temperature change may exceed 100 deg F (55 deg C) and that have straight-run length that exceeds 100 ft (30 m).
2. Install type and quantity of fittings that accommodate temperature change listed for the following locations:
  - e. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
  - f. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C) temperature change.
  - g. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F

(0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.

4. Install expansion fittings at locations where conduits cross building or structure expansion joints.
5. Install expansion-joint fitting with position, mounting, and piston setting selected in accordance with manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

H. Raceways Penetrating Rooms or Walls with Acoustical Requirements:

1. Seal raceway openings on both sides of rooms or walls with acoustically rated putty or firestopping.

### **3.04 INSTALLATION OF SURFACE RACEWAYS**

- A. Install surface raceways only where indicated on Drawings.
- B. Install surface raceway with a minimum 2 inch (50 mm) radius control at bend points.
- C. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inch (1200) mm) and with no less than two supports per straight raceway section. Support surface raceway in accordance with manufacturer's written instructions. Tape and glue are unacceptable support methods.

### **3.05 INSTALLATION OF BOXES AND ENCLOSURES**

- A. Provide boxes in wiring and raceway systems wherever required for pulling of wires, making connections, and mounting of devices or fixtures.
- B. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.
- C. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between box and cover plate or supported equipment and box, whether installed indoors or outdoors.
- D. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.
- E. Locate boxes so that cover or plate will not span different building finishes.
- F. Support boxes in recessed ceilings independent of ceiling tiles and ceiling grid.
- G. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for purpose.
- H. Fasten junction and pull boxes to, or support from, building structure. Do not support boxes by conduits.
- I. Do not install aluminum boxes, enclosures, or fittings in contact with concrete or earth.
- J. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure to ensure a continuous ground path.
- K. Boxes and Enclosures in Areas or Walls with Acoustical Requirements:
  1. Seal openings and knockouts in back and sides of boxes and enclosures with acoustically rated putty.
  2. Provide gaskets for wallplates and covers.

### **3.06 FIRESTOPPING**

- A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

### **3.07 PROTECTION**

- A. Protect coatings, finishes, and cabinets from damage and deterioration.
  1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
  2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

### **3.08 CLEANING**

- A. Boxes: Remove construction dust and debris from device boxes, outlet boxes, and floor-mounted enclosures before installing wallplates, covers, and hoods.

**END OF SECTION**

## SECTION 26 05 44

### SLEEVES AND SLEEVE SEALS FOR ELECTRICAL RACEWAYS AND CABLING

#### PART 1 GENERAL

##### 1.01 SUMMARY

###### A. Section Includes:

1. Round sleeves.
2. Rectangular sleeves.
3. Sleeve-seal systems.
4. Sleeve-seal fittings.
5. Grout.

###### B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

##### 1.02 ACTION SUBMITTALS

###### A. Product Data: For each type of product.

#### PART 2 PRODUCTS

##### 2.01 ROUND SLEEVES

###### A. Steel Wall Sleeves:

1. General Characteristics: ASTM A53/A53M, Type E, Grade B, Schedule 40, zinc coated, plain ends and integral waterstop.

###### B. Round, Galvanized-Steel, Sheet Metal Sleeves:

1. General Characteristics: Galvanized-steel sheet; thickness not less than 0.0239 inch (0.6 mm); round tube closed with welded longitudinal joint, with tabs for screw-fastening the sleeve to the board.

##### 2.02 RECTANGULAR SLEEVES

###### A. Rectangular, Galvanized-Steel, Sheet Metal Sleeves:

1. General Characteristics:
  - a. Material: Galvanized sheet steel.
  - b. Minimum Metal Thickness:
    - 1) For sleeve cross-section rectangle perimeter less than 50 inch (1270 mm) and with no side larger than 16 inch (400 mm), thickness must be 0.052 inch (1.3 mm).
    - 2) For sleeve cross-section rectangle perimeter not less than 50 inch (1270 mm) or with one or more sides larger than 16 inch (400 mm), thickness must be 0.138 inch (3.5 mm).

##### 2.03 SLEEVE-SEAL SYSTEMS

###### A. General Characteristics: Modular sealing device, designed for field assembly, to fill annular space between sleeve and raceway or cable or between raceway and cable.

###### B. Options:

1. Sealing Elements: EPDM rubber interlocking links shaped to fit surface of pipe. Include type and number required for pipe material and size of pipe.
2. Pressure Plates: Carbon steel.
3. Connecting Bolts and Nuts: Carbon steel, with corrosion-resistant coating, of length required to secure pressure plates to sealing elements.

##### 2.04 SLEEVE-SEAL FITTINGS

###### A. General Characteristics: Manufactured plastic, sleeve-type, waterstop assembly made for embedding in concrete slab or wall. Unit must have plastic or rubber waterstop collar with center opening to match piping OD.

##### 2.05 GROUT

###### A. General Characteristics: Nonshrink; recommended for interior and exterior sealing openings in non-fire-rated walls or floors.

1. Standard: ASTM C1107/C1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.



2. Design Mix: 5000 psi (34.5 MPa), 28-day compressive strength.
3. Packaging: Premixed and factory packaged.

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION OF SLEEVES FOR NON-FIRE-RATED ELECTRICAL PENETRATIONS**

- A. Sleeves for Conduits Penetrating Above-Grade, Non-Fire-Rated, Concrete and Masonry-Unit Floors and Walls:
1. Interior Penetrations of Non-Fire-Rated Walls and Floors:
    - a. Seal space outside of sleeves with mortar or grout. Pack sealing material solidly between sleeve and wall or floor so no voids remain. Tool exposed surfaces smooth; protect material while curing.
    - b. Seal annular space between sleeve and raceway or cable, using joint sealant appropriate for size, depth, and location of joint. Comply with requirements in Section 079200 "Joint Sealants."
  2. Use pipe sleeves unless penetration arrangement requires rectangular sleeved opening.
  3. Size pipe sleeves to provide 1/4 inch (6.4 mm) annular clear space between sleeve and raceway or cable, unless sleeve-seal system is to be installed.
  4. Install sleeves for wall penetrations unless core-drilled holes or formed openings are used. Install sleeves during erection of walls. Cut sleeves to length for mounting flush with both surfaces of walls. Deburr after cutting.
  5. Install sleeves for floor penetrations. Extend sleeves installed in floors 2 inch (50 mm) above finished floor level. Install sleeves during erection of floors.
- B. Sleeves for Conduits Penetrating Non-Fire-Rated Wall Assemblies:
1. Use circular metal sleeves unless penetration arrangement requires rectangular sleeved opening.
  2. Seal space outside of sleeves with approved joint compound for wall assemblies.
- C. Roof-Penetration Sleeves: Seal penetration of individual raceways and cables with flexible boot-type flashing units applied in coordination with roofing work.
- D. Aboveground, Exterior-Wall Penetrations: Seal penetrations using steel pipe sleeves and mechanical sleeve-seal systems. Size sleeves to allow for 1 inch (25 mm) annular clear space between pipe and sleeve for installing mechanical sleeve seals.
- E. Underground, Exterior-Wall and Floor Penetrations:
1. Install steel pipe sleeves with integral waterstops. Size sleeves to allow for 1 inch (25 mm) annular clear space between raceway or cable and sleeve for installing sleeve-seal system. Install sleeve during construction of floor or wall.
  2. Install steel pipe sleeves. Size sleeves to allow for 1 inch (25 mm) annular clear space between raceway or cable and sleeve for installing sleeve-seal system. Grout sleeve into wall or floor opening.

#### **3.02 INSTALLATION OF RECTANGULAR SLEEVES AND SLEEVE SEALS**

- A. Install sleeves in existing walls without compromising structural integrity of walls. Do not cut structural elements without reinforcing the wall to maintain the designed weight bearing and wall stiffness.
- B. Install conduits and cable with no crossings within the sleeve.
- C. Fill opening around conduits and cables with expanding foam without leaving voids.
- D. Provide metal sheet covering at both wall surfaces and finish to match surrounding surfaces. Metal sheet must be same material as sleeve.

#### **3.03 INSTALLATION OF SLEEVE-SEAL SYSTEMS**

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at raceway entries into building.
- B. Install type and number of sealing elements recommended by manufacturer for raceway or cable material and size. Position raceway or cable in center of sleeve. Assemble mechanical sleeve seals and install in annular space between raceway or cable and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make watertight seal.

**END OF SECTION**

**SECTION 26 05 53**  
**IDENTIFICATION FOR ELECTRICAL SYSTEMS**

**PART 1 GENERAL**

**1.01 SUMMARY**

A. Section Includes:

1. Labels.
2. Bands and tubes.
3. Tapes and stencils.
4. Tags.
5. Signs.
6. Cable ties.
7. Miscellaneous identification products.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

**1.02 ACTION SUBMITTALS**

A. Product Data:

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for electrical identification products.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

A. Comply with ASME A13.1.

B. Comply with 29 CFR 1910.144 for color identification of hazards; 29 CFR 1910.145 for danger, caution, warning, and safety instruction signs and tags; and the following:

1. Fire-protection and fire-alarm equipment, including raceways, must be finished, painted, or suitably marked safety red.
2. Ceiling-mounted hangers, supports, cable trays, and raceways must be finished, painted, or suitably marked safety yellow where less than 7.7 ft (2.3 m) above finished floor.

C. Signs, labels, and tags required for personnel safety must comply with the following standards:

1. Safety Colors: NEMA Z535.1.
2. Facility Safety Signs: NEMA Z535.2.
3. Safety Symbols: NEMA Z535.3.
4. Product Safety Signs and Labels: NEMA Z535.4.
5. Safety Tags and Barricade Tapes for Temporary Hazards: NEMA Z535.5.

D. Comply with Section 260500 Coordination and Arc Flash Studies requirements for arc-flash warning labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, must comply with UL 969.

F. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

**2.02 COLOR AND LEGEND REQUIREMENTS**

A. Raceways and Cables Carrying Circuits at 1000 V or Less:

1. Black letters on orange field.
2. Legend: Indicate voltage and system or service type.

B. Color-Coding for Phase- and Voltage-Level Identification, 1000 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.

1. Color must be factory applied.
2. Colors for 208Y/120 V Circuits:
  - a. Phase A: Black.
  - b. Phase B: Red.
  - c. Phase C: Blue.
3. Colors for 480Y/277 V Circuits:

- a. Phase A: Brown.
  - b. Phase B: Orange.
  - c. Phase C: Yellow.
  - 4. Color for Neutral: White.
  - 5. Color for Equipment Grounds: Green.
- C. Warning Label Colors:
- 1. Identify system voltage with black letters on orange background.
- D. Warning labels and signs must include, but are not limited to, the following legends:
- 1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
  - 2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 3 FEET MINIMUM."
- E. Equipment Identification Labels:
- 1. Black letters on white field.

### **2.03 LABELS**

- A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.
- B. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters and that stay in place by gripping action.
- C. Self-Adhesive Wraparound Labels: Preprinted, 3 mil (0.08 mm) thick, vinyl flexible label with acrylic pressure-sensitive adhesive.
  - 1. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating, protective shield over legend. Labels sized such that clear shield overlaps entire printed legend.
  - 2. Marker for Labels:
    - a. Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.
- D. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3 mil (0.08 mm) thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
  - 1. Minimum Nominal Size:
    - a. 1-1/2 by 6 inch (37 by 150 mm) for raceway and conductors.
    - b. 3-1/2 by 5 inch (76 by 127 mm) for equipment.
    - c. As required by authorities having jurisdiction.

### **2.04 BANDS AND TUBES**

- A. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inch (50 mm) long, with diameters sized to suit diameters and that stay in place by gripping action.
- B. Heat-Shrink Preprinted Tubes: Flame-retardant polyolefin tubes with machine-printed identification labels, sized to suit diameter and shrunk to fit firmly. Full shrink recovery occurs at maximum of 200 deg F (93 deg C). Comply with UL 224.

### **2.05 TAPES AND STENCILS**

- A. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.
- B. Self-Adhesive Vinyl Tape: Colored, heavy duty, waterproof, fade resistant; not less than 3 mil (0.08 mm) thick by 1 to 2 inch (25 to 50 mm) wide; compounded for outdoor use.
- C. Tape and Stencil: 4 inch (100 mm) wide black stripes on 10 inch (250 mm) centers placed diagonally over orange background and are 12 inch (300 mm) wide. Stop stripes at legends.
- D. Floor Marking Tape: 2 inch (50 mm) wide, 5 mil (0.125 mm) pressure-sensitive vinyl tape, with yellow and black stripes and clear vinyl overlay.
- E. Underground-Line Warning Tape:
  - 1. Tape:
    - a. Recommended by manufacturer for method of installation and suitable to identify and locate underground electrical and communications utility lines.
    - b. Printing on tape must be permanent and may not be damaged by burial operations.

- c. Tape material and ink must be chemically inert and not be subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
  - 2. Color and Printing:
    - a. Comply with APWA Uniform Color Code using NEMA Z535.1 safety colors.
    - b. Inscriptions for Red Tapes: "CAUTION BURIED ELECTRIC LINE BELOW".
    - c. Inscriptions for Orange Tapes: "CAUTION BURIED COMMUNICATION LINE BELOW".
- F. Stenciled Legend: In nonfading, waterproof, black ink or paint. Minimum letter height must be 1 inch (25 mm).

## 2.06 TAGS

- A. Write-on Tags:
  - 1. Polyester Tags: 0.010 inch (0.25 mm) thick, with corrosion-resistant grommet and cable tie for attachment.
  - 2. Marker for Tags:
    - a. Permanent, waterproof, black ink marker recommended by tag manufacturer.
    - b. Machine-printed, permanent, waterproof, black ink marker recommended by printer manufacturer.

## 2.07 SIGNS

- A. Baked-Enamel Signs:
  - 1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
  - 2. 1/4 inch (6.4 mm) grommets in corners for mounting.
  - 3. Nominal Size: 7 by 10 inch (180 by 250 mm).
- B. Metal-Backed Butyrate Signs:
  - 1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs, with 0.0396 inch (1 mm) galvanized-steel backing, punched and drilled for fasteners, and with colors, legend, and size required for application.
  - 2. 1/4 inch (6.4 mm) grommets in corners for mounting.
  - 3. Nominal Size: 10 by 14 inch (250 by 360 mm).
- C. Laminated Acrylic or Melamine Plastic Signs:
  - 1. Engraved legend.
  - 2. Thickness:
    - a. For signs up to 20 sq. inch (129 sq. cm), minimum 1/16 inch (1.6 mm) thick.
    - b. For signs larger than 20 sq. inch (129 sq. cm), 1/8 inch (3.2 mm) thick.
    - c. Engraved legend with black letters on white face.
    - d. Self-adhesive.
    - e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

## 2.08 CABLE TIES

- A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
  - 1. Minimum Width: 3/16 inch (5 mm).
  - 2. Tensile Strength at 73 deg F (23 deg C) in accordance with ASTM D638: 12,000 psi (82.7 MPa).
  - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
  - 4. Color: Black, except where used for color-coding.
- B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.
  - 1. Minimum Width: 3/16 inch (5 mm).
  - 2. Tensile Strength at 73 deg F (23 deg C) in accordance with ASTM D638: 12,000 psi (82.7 MPa).
  - 3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
  - 4. Color: Black.
- C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.
  - 1. Minimum Width: 3/16 inch (5 mm).
  - 2. Tensile Strength at 73 deg F (23 deg C) in accordance with ASTM D638: 7000 psi (48.2 MPa).

3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
5. Color: Black.

## **2.09 MISCELLANEOUS IDENTIFICATION PRODUCTS**

- A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).
- B. Fasteners for Labels and Signs: Self-tapping, stainless steel screws or stainless steel machine screws with nuts and flat and lock washers.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

### **3.02 INSTALLATION**

Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

- A. Install identifying devices before installing acoustical ceilings and similar concealment.
- B. Verify identity of item before installing identification products.
- C. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.
- D. Apply identification devices to surfaces that require finish after completing finish work.
- E. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
- F. System Identification for Raceways and Cables under 1000 V: Identification must completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
  1. Secure tight to surface of conductor, cable, or raceway.
- G. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
- H. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from floor.
- I. Vinyl Wraparound Labels:
  1. Secure tight to surface of raceway or cable at location with high visibility and accessibility.
  2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to location and substrate.
- J. Snap-Around Labels: Secure tight to surface at location with high visibility and accessibility.
- K. Self-Adhesive Wraparound Labels: Secure tight to surface at location with high visibility and accessibility.
- L. Self-Adhesive Labels:
  1. Install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
  2. Unless otherwise indicated, provide single line of text with 1/2 inch (13 mm) high letters on 1-1/2 inch (38 mm) high label; where two lines of text are required, use labels 2 inch (50 mm) high.
- M. Snap-Around Color-Coding Bands: Secure tight to surface at location with high visibility and accessibility.
- N. Heat-Shrink, Preprinted Tubes: Secure tight to surface at location with high visibility and accessibility.
- O. Marker Tapes: Secure tight to surface at location with high visibility and accessibility.
- P. Self-Adhesive Vinyl Tape: Secure tight to surface at location with high visibility and accessibility.

1. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for minimum distance of 6 inch (150 mm) where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding.
- Q. Tape and Stencil: Comply with requirements in painting Sections for surface preparation and paint application.
- R. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's instructions.
- S. Underground Line Warning Tape:
1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inch (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in common trench or concrete envelope exceeds 16 inch (400 mm) overall.
  2. Install underground-line warning tape for direct-buried cables and cables in raceways.
- T. Write-on Tags:
1. Place in location with high visibility and accessibility.
  2. Secure using UV-stabilized cable ties.
- U. Baked-Enamel Signs:
1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.
  2. Unless otherwise indicated, provide single line of text with 1/2 inch (13 mm) high letters on minimum 1-1/2 inch (38 mm) high sign; where two lines of text are required, use signs minimum 2 inch (50 mm) high.
- V. Metal-Backed Butyrate Signs:
1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.
  2. Unless otherwise indicated, provide single line of text with 1/2 inch (13 mm) high letters on 1-1/2 inch (38 mm) high sign; where two lines of text are required, use labels 2 inch (50 mm) high.
- W. Laminated Acrylic or Melamine Plastic Signs:
1. Attach signs that are not self-adhesive type with mechanical fasteners appropriate to location and substrate.
  2. Unless otherwise indicated, provide single line of text with 1/2 inch (13 mm) high letters on 1-1/2 inch (38 mm) high sign; where two lines of text are required, use labels 2 inch (50 mm) high.
- X. Cable Ties: General purpose, for attaching tags, except as listed below:
1. Outdoors: UV-stabilized nylon.
  2. In Spaces Handling Environmental Air: Plenum rated.

### **3.03 IDENTIFICATION SCHEDULE**

- A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.
- B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
- C. Accessible Raceways and Metal-Clad Cables, 1000 V or Less, for Service, Feeder, and Branch Circuits, More Than 30 A and 120 V to Ground: Identify with self-adhesive raceway labels.
1. Locate identification at changes in direction, at penetrations of walls and floors, at 50 ft (15 m) maximum intervals in straight runs, and at 25 ft (7.6 m) maximum intervals in congested areas.
- D. Accessible Fittings for Raceways and Cables within Buildings: Identify cover of junction and pull box of the following systems with self-adhesive labels containing wiring system legend and system voltage. System legends must be as follows:
1. "POWER."
- E. Auxiliary Electrical Systems Conductor Identification: Self-adhesive vinyl tape that is uniform and consistent with system used by manufacturer for factory-installed connections.
1. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, and pull points. Identify by system and circuit designation.

- F. Locations of Underground Lines: Underground-line warning tape for power, lighting, communication, and control wiring and optical-fiber cable.
- G. Workspace Indication: Apply floor marking tape or tape and stencil to finished surfaces. Show working clearances in direction of access to live parts. Workspace must comply with NFPA 70 and 29 CFR 1926.403 unless otherwise indicated. Do not install at flush-mounted panelboards and similar equipment in finished spaces.
- H. Instructional Signs: Self-adhesive labels, including color code for grounded and ungrounded conductors.
- I. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive labels.
  - 1. Apply to exterior of door, cover, or other access.
- J. Arc Flash Warning Labeling: Self-adhesive labels.
- K. Operating Instruction Signs: Self-adhesive labels.
- L. Equipment Identification Labels:
  - 1. Indoor Equipment: Laminated acrylic or melamine plastic sign.
  - 2. Outdoor Equipment: Stenciled legend 4 inch (100 mm) high.

**END OF SECTION**

**SECTION 26 09 43.23**  
**RELAY-BASED LIGHTING CONTROLS**

**PART 1 GENERAL**

**1.01 SUMMARY**

A. Section Includes:

1. Lighting control relay panels.
2. Manual switches and cover plates.
3. Field-mounted signal sources.
4. Conductors and cables.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

**1.02 ACTION SUBMITTALS**

A. Product Data:

For each type of product.

B. Shop Drawings: For each relay panel and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types and details for types other than Type 1.
3. Detail wiring partition configuration, current, and voltage ratings.
4. Short-circuit current rating of relays.
5. Address Drawing: Reflected ceiling plan and floor plans, showing connected luminaires, address for each luminaire, and luminaire groups. Base plans on construction plans, using the same legend, symbols, and schedules.
6. Point List and Data Bus Load: Summary list of all control devices, sensors, ballasts, and other loads. Include percentage of rated connected load and device addresses.
7. Wire Termination Diagrams and Schedules: Coordinate nomenclature and presentation with Drawings and block diagram. Differentiate between manufacturer-installed and field-installed wiring.

C. Field Quality-Control Submittals:

1. Field quality-control reports.

**1.03 INFORMATIONAL SUBMITTALS**

A. Sample warranties.

**1.04 DELIVERY, STORAGE, AND HANDLING**

A. Handle and prepare panels for installation in accordance with NECA 407.

**1.05 WARRANTY**

A. Special Manufacturer Extended Warranty: Manufacturer warrants that components of standalone multipreset modular dimming controls perform in accordance with specified requirements and agrees to provide repair or replacement of components that fail to perform as specified within extended warranty period.

1. Initial Extended Warranty Period: Two year(s) from date of Substantial Completion, for labor, materials, and equipment.

**PART 2 PRODUCTS**

**2.01 SYSTEM DESCRIPTION**

A. Sequence of Operations: Input signal from field-mounted manual switches, or digital signal sources, must open or close one or more lighting control relays in the lighting control panels. Any combination of inputs must be programmable to any number of control relays.

B. Surge Protective Device: Factory installed as an integral part of control components or field-mounted surge suppressors complying with UL 1449, SPD Type 2.

C. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70 by qualified electrical testing laboratory recognized by authorities having jurisdiction and marked for intended location and application.

D. Comply with 47 CFR 15, Subparts A and B, for Class A digital devices.



E. Comply with UL 916.

## **2.02 LIGHTING CONTROL RELAY PANELS**

A. Description: Standalone lighting control panel using mechanically latched relays to control lighting and appliances. See drawings for basis of design.

B. Lighting Control Panel:

1. A single enclosure with incoming lighting branch circuits, control circuits, switching relays, and on-board timing and control unit.
2. A vertical barrier separating branch circuits from control wiring.

C. Control Unit: Contain the power supply and electronic control for operating and monitoring individual relays.

1. Timing Unit:

- a. 365-day calendar, astronomical clock, and automatic adjustments for daylight savings and leap year.
- b. Clock configurable for 12-hour (A.M./P.M.) or 24-hour format.
- c. Eight independent schedules, each having 24 time periods.
- d. Schedule periods settable to the minute.
- e. Day-of-week, day-of-month, day-of-year with one-time or repeating capability.
- f. 15 special date periods.

2. Sequencing Control with Override:

- a. Automatic sequenced on and off switching of selected relays at times set at the timing unit, allowing timed overrides from external switches.
- b. Sequencing control must operate relays one at a time, completing the operation of all connected relays in not more than 10 seconds.
- c. Override control must allow any relay connected to it to be switched on or off by a field-deployed manual switch or by an automatic switch, such as an occupancy sensor.
- d. Override control "blink warning" must warn occupants approximately five minutes before actuating the off sequence.

3. Nonvolatile memory must retain all setup configurations. After a power failure, the controller must automatically reboot and return to normal system operation, including accurate time of day and date.

D. Relays:

1. Electrically operated, mechanically held single-pole switch, rated at 20 A at 277 V. Short-circuit current rating must be not less than 5 kA. Control must be three-wire, 24 V(ac).

E. Power Supply: NFPA 70, Class 2, sized for connected equipment, plus 20 percent spare capacity. Powered from a dedicated branch circuit of the panelboard that supplies power to the line side of the relays, sized to provide control power for the local panel-mounted relays, bus system, control-voltage inputs, field-installed occupancy sensors, and photo sensors.

F. Operator Interface:

1. Integral alphanumeric keypad and digital display, and intuitive drop-down menus to assist in programming.
2. Log and display relay on-time.
3. Connect relays to one or more time and sequencing schemes.

## **2.03 MANUAL SWITCHES AND COVER PLATES**

A. Push-Button Switches: Modular, momentary contact, three wire, for operating one or more relays and to override automatic controls.

1. Match color and style specified in Section 262726 "Wiring Devices."
2. Integral green LED pilot light to indicate when circuit is on.
3. Internal white LED locator light to illuminate when circuit is off.

B. Cover Plates: Single and multigang cover plates as specified in Section 262726 "Wiring Devices."

C. Legend: Engraved or permanently silk-screened on cover plate where indicated. Use designations indicated on Drawings.

## **2.04 CONDUCTORS AND CABLES**

A. Power Wiring to Supply Side of Class 2 Power Source: Not smaller than No. 12 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

- B. Classes 2 and 3 Control Cables: Multiconductor cable with copper conductors not smaller than No. 18 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- C. Class 1 Control Cables: Multiconductor cable with copper conductors not smaller than No. 14 AWG. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

### **PART 3 EXECUTION**

#### **3.01 INSTALLATION OF WIRING**

- A. Wiring Methods:
  - 1. Install cables in raceways.
  - 2. Install conductors and cables concealed in accessible ceilings, walls, and floors where possible.
  - 3. Conceal raceway and cables except in unfinished spaces.
  - 4. Comply with requirements for raceways and boxes specified in Section 260533 "Raceway and Boxes for Electrical Systems."
- B. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

#### **3.02 INSTALLATION OF PANELS**

- A. Install panels and accessories in accordance with NECA 407.
- B. Comply with mounting and anchoring requirements specified in Section 260548.16 "Seismic Controls for Electrical Systems."
- C. Mount top of trim 90 inch (2286 mm) above finished floor maximum unless otherwise indicated.
- D. Mount panel cabinet plumb and rigid without distortion of box.
- E. Install filler plates in unused spaces.

#### **3.03 IDENTIFICATION**

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- B. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Section 260553 "Identification for Electrical Systems."
- C. Create a directory to indicate loads served by each relay; incorporate Owner's final room designations. Obtain approval before installing. Use a PC or typewriter to create directory; handwritten directories are unacceptable.
- D. Lighting Control Panel Nameplates: Label each panel with a nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

#### **3.04 FIELD QUALITY CONTROL**

- A. Field tests must be witnessed by Architect and Owner.
- B. Nonconforming Work:
  - 1. Lighting control panel will be considered defective if it does not pass tests and inspections.
  - 2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.
- C. Prepare test and inspection reports, including a certified report that identifies lighting control panels and describes scanning results. Include notation of deficiencies detected, remedial action taken, and observations made after remedial action.
- D. Manufacturer Services:
  - 1. Engage factory-authorized service representative to support field tests and inspections.

#### **3.05 SYSTEM STARTUP**

- A. Engage a factory-authorized service representative to perform startup service.

#### **3.06 ADJUSTING**

- A. Occupancy Adjustments: When requested within 12 months from date of Substantial Completion, provide on-site assistance in adjusting system to suit actual occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

**3.07 MAINTENANCE**

A. Software and Firmware Service Agreement:

1. Technical Support: Beginning at Substantial Completion, verify that software and firmware service agreement includes software support for two years.

**END OF SECTION**

**SECTION 26 24 16**  
**PANELBOARDS**

**PART 1 GENERAL**

**1.01 SUMMARY**

A. Section Includes:

1. Power panelboards.
2. Lighting and appliance branch-circuit panelboards.
3. Disconnecting and overcurrent protective devices.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

**1.02 DEFINITIONS**

A. GFEP: Ground-fault equipment protection.

B. VPR: Voltage protection rating.

**1.03 ACTION SUBMITTALS**

A. Product Data:

1. Power panelboards.
2. Lighting and appliance branch-circuit panelboards.
3. Electronic-grade panelboards.
4. Disconnecting and overcurrent protective devices.
5. Include materials, switching and overcurrent protective devices, SPDs, accessories, and components indicated.
6. Include dimensions and manufacturers' technical data on features, performance, electrical characteristics, ratings, and finishes.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details.
2. Show tabulations of installed devices with nameplates, conductor termination sizes, equipment features, and ratings.
3. Detail enclosure types including mounting and anchorage, environmental protection, knockouts, corner treatments, covers and doors, gaskets, hinges, and locks.
4. Detail bus configuration, current, and voltage ratings.
5. Short-circuit current rating of panelboards and overcurrent protective devices.
6. Include evidence of listing, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for SPD as installed in panelboard.
7. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.

C. Field Quality-Control Submittals:

1. Field quality-control reports.

**1.04 INFORMATIONAL SUBMITTALS**

A. Panelboard Schedules: For installation in panelboards.

B. Manufacturers' Published Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer for the following:

1. Recommended procedures for installing panelboards.
2. Recommended torque settings for bolted connections on panelboards.
3. Recommended temperature range for energizing panelboards.

C. Sample warranties.

**1.05 CLOSEOUT SUBMITTALS**

A. Warranty documentation.

## **1.06 MAINTENANCE MATERIAL SUBMITTALS**

### **1.07 WARRANTY**

- A. Special Installer Extended Warranty: Installer warrants that fabricated and installed panelboards perform in accordance with specified requirements and agrees to repair or replace components or products that fail to perform as specified within warranty period.

## **PART 2 PRODUCTS**

### **2.01 PANELBOARDS COMMON REQUIREMENTS**

- A. Fabricate and test panelboards in accordance with IEEE 344 to withstand seismic forces defined in Section 260548.16 "Seismic Controls for Electrical Systems."
- B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing agency recognized by authorities having jurisdiction, and marked for intended location and application.
- C. Comply with NEMA PB 1.
- D. Comply with NFPA 70.
- E. Enclosures: Flush and Surface-mounted, dead-front cabinets as indicated on drawings.
  - 1. Rated for environmental conditions at installed location.
    - a. Indoor Dry and Clean Locations: UL 50E, Type 1.
    - b. Outdoor Locations: UL 50E, Type 3R. Select first option in first subparagraph below for areas subject to lighter levels of contaminants and second option for areas subject to heavier levels.
  - 2. Height: 7 ft (2.13 m) maximum.
  - 3. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box. Trims must cover live parts and may have no exposed hardware.
- F. Incoming Mains:
  - 1. Location: As indicated on the drawings.
- G. Phase, Neutral, and Ground Buses:
  - 1. Material: Hard-drawn copper, 98 percent conductivity.
- H. Conductor Connectors: Suitable for use with conductor material and sizes.
  - 1. Material: Hard-drawn copper, 98 percent conductivity.
  - 2. Main and Neutral Lugs: Compression type, with lug on neutral bar for each pole in panelboard.
  - 3. Ground Lugs and Bus-Configured Terminators: Mechanical type, with lug on bar for each pole in panelboard.
- I. Future Devices: Panelboards must have mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.
- J. Panelboard Short-Circuit Current Rating:
  - 1. Fully rated to interrupt symmetrical short-circuit current available at terminals. Assembly listed, by qualified electrical testing laboratory recognized by authorities having jurisdiction, for 100 percent interrupting capacity.
- K. Surge Suppression: Factory installed as integral part of indicated panelboards, complying with UL 1449 SPD Type 1.

### **2.02 POWER PANELBOARDS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton.
  - 2. Siemens Industry, Inc., Energy Management Division.
  - 3. Square D; Schneider Electric USA.
- B. Listing Criteria: NEMA PB 1, distribution type.
- C. Doors: Secured with vault-type latch with tumbler lock; keyed alike.
  - 1. For doors more than 36 inch (914 mm) high, provide two latches, keyed alike.
- D. Mains: Circuit breaker or Lugs only as indicated on the drawings.

- E. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes 125 A and Smaller: Bolt-on circuit breakers.
- F. Branch Overcurrent Protective Devices for Circuit-Breaker Frame Sizes Larger Than 125 A: Plug-in circuit breakers where individual positive-locking device requires mechanical release for removal.

### 2.03 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton.
  - 2. Siemens Industry, Inc., Energy Management Division.
  - 3. Square D; Schneider Electric USA.
- B. Listing Criteria: NEMA PB 1, lighting and appliance branch-circuit type.
- C. Mains: Circuit breaker or lugs only as indicated on the drawings.
- D. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

### 2.04 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Eaton.
  - 2. Siemens Industry, Inc., Energy Management Division.
  - 3. Square D; Schneider Electric USA.
- B. MCCB: Comply with UL 489, with interrupting capacity to meet available fault currents.
  - 1. Thermal-Magnetic Circuit Breakers:
    - a. Inverse time-current element for low-level overloads.
    - b. Instantaneous magnetic trip element for short circuits.
    - c. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
  - 2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
  - 3. Electronic Trip Circuit Breakers:
    - a. RMS sensing.
    - b. Field-replaceable rating plug or electronic trip.
    - c. Digital display of settings, trip targets, and indicated metering displays.
    - d. Multi-button keypad to access programmable functions and monitored data.
    - e. Ten-event, trip-history log. Each trip event must be recorded with type, phase, and magnitude of fault that caused trip.
    - f. Integral test jack for connection to portable test set or laptop computer.
    - g. Field-Adjustable Settings:
      - 1) Instantaneous trip.
      - 2) Long- and short-time pickup levels.
      - 3) Long and short time adjustments.
      - 4) Ground-fault pickup level, time delay, and I squared T response.
  - 4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
  - 5. GFCI Circuit Breakers: Single- and double-pole configurations with Class A ground-fault protection (6 mA trip).
  - 6. GFEP Circuit Breakers: Class B ground-fault protection (30 mA trip).
  - 7. Subfeed Circuit Breakers: Vertically mounted.
  - 8. MCCB Features and Accessories:
    - a. Standard frame sizes, trip ratings, and number of poles.
    - b. Breaker handle indicates tripped status.
    - c. UL listed for reverse connection without restrictive line or load ratings.
    - d. Lugs: Mechanical style, suitable for number, size, trip ratings, and conductor materials.
    - e. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and HID lighting circuits.
    - f. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.

- g. Shunt Trip: 24 V trip coil energized from separate circuit, set to trip at 55 percent of rated voltage.
- h. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.
- i. Handle Clamp: Loose attachment, for holding circuit-breaker handle in on position.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Comply with manufacturer's published instructions.
- B. Reference Standards:
  - 1. Panelboards: Unless more stringent requirements are specified in Contract Documents or manufacturers' published instructions, comply with NECA 407.
  - 2. Consult Architect for resolution of conflicting requirements.
- C. Special Techniques:
  - 1. Mount top of trim 7.5 ft (2.3 m) maximum above finished floor unless otherwise indicated. Comply with NEC regarding overcurrent device height.
  - 2. Mount panelboard cabinet plumb and rigid without distortion of box.
  - 3. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.
  - 4. Install overcurrent protective devices and controllers not already factory installed.
    - a. Set field-adjustable, circuit-breaker trip ranges.
  - 5. Make grounding connections and bond neutral for services and separately derived systems to ground. Make connections to grounding electrodes, separate grounds for isolated ground bars, and connections to separate ground bars.
  - 6. Install filler plates in unused spaces.

### **3.02 IDENTIFICATION**

- A. Identify field-installed conductors, interconnecting wiring, and components; install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems."
- B. Panelboard Nameplates: Label each panelboard with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- C. Device Nameplates: Label each branch circuit device in power panelboards with nameplate complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems."
- D. Install warning signs complying with requirements in Section 260553 "Identification for Electrical Systems" identifying source of remote circuit.
- E. Panelboard Label: Manufacturer's name and trademark, voltage, amperage, number of phases, and number of poles must be located on interior of panelboard door.
- F. Breaker Labels: Faceplate must list current rating, UL and IEC certification standards, and AIC rating.
- G. Circuit Directory:
  - 1. Provide computer-generated circuit directory mounted inside panelboard door with transparent plastic protective cover.
    - a. Circuit directory must identify specific purpose with detail sufficient to distinguish it from other circuits.
  - 2. Create directory to indicate installed circuit loads; incorporate Owner's final room designations. Obtain approval before installing. Handwritten directories are not acceptable. Install directory inside panelboard door.

### **3.03 FIELD QUALITY CONTROL**

- A. Acceptance Testing Preparation:
  - 1. Test insulation resistance for each panelboard bus, component, connecting supply, feeder, and control circuit.
  - 2. Test continuity of each circuit.
- B. Field tests and inspections shall be coordinate with the Architect and may be witnessed by Architect and Owner.
- C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test for low-voltage air circuit breakers and low-voltage surge arrestors stated in NETA ATS, Paragraph 7.6 Circuit Breakers and Paragraph 7.19.1 Surge Arrestors, Low-Voltage. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Nonconforming Work:

1. Panelboards will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective units and retest.

E. Collect, assemble, and submit test and inspection reports, including certified report that identifies panelboards included and that describes scanning results, with comparisons of two scans. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

F. Manufacturer Services:

1. Engage factory-authorized service representative to support field tests and inspections.

**END OF SECTION**



**SECTION 26 27 26**  
**WIRING DEVICES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
1. Standard-grade receptacles, 125 V, 20 A.
  2. USB receptacles.
  3. GFCI receptacles, 125 V, 20 A.
  4. Toggle switches, 120/277 V, 20 A.
  5. Occupancy sensors.
  6. Wall-box dimmers.
  7. Wall plates.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.
- C. Samples: One for each type of device and wall plate specified, in each color specified.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**PART 2 PRODUCTS**

**2.01 GENERAL WIRING-DEVICE REQUIREMENTS**

- A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- B. Comply with NFPA 70.
- C. RoHS compliant.
- D. Comply with NEMA WD 1.
- E. Device Color:
1. Wiring Devices Connected to Normal Power System: As selected by Architect unless otherwise indicated or required by NFPA 70 or device listing.
- F. Wall Plate Color: For plastic covers, match device color.
- G. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

**2.02 STANDARD-GRADE RECEPTACLES, 125 V, 20 A**

- A. Duplex Receptacles, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding.
  2. Configuration: NEMA WD 6, Configuration 5-20R.
  3. Standards: Comply with UL 498 and FS W-C-596.
- B. Weather-Resistant Duplex Receptacle, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
  2. Configuration: NEMA WD 6, Configuration 5-20R.
  3. Standards: Comply with UL 498.
  4. Marking: Listed and labeled as complying with NFPA 70, "Receptacles in Damp or Wet Locations" Article.

**2.03 GFCI RECEPTACLES, 125 V, 20 A**

- A. Duplex GFCI Receptacles, 125 V, 20 A:
1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding.
  2. Configuration: NEMA WD 6, Configuration 5-20R.
  3. Type: Non-feed through.
  4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

## **2.04 TOGGLE SWITCHES, 120/277 V, 20 A**

- A. Single-Pole Switches, 120/277 V, 20 A:
  - 1. Standards: Comply with UL 20 and FS W-S-896.
- B. Two-Pole Switches, 120/277 V, 20 A:
  - 1. Comply with UL 20 and FS W-S-896.
- C. Three-Way Switches, 120/277 V, 20 A:
  - 1. Comply with UL 20 and FS W-S-896.

## **2.05 WALL PLATES**

- A. Single Source: Obtain wall plates from same manufacturer of wiring devices.
- B. Single and combination types shall match corresponding wiring devices.
  - 1. Plate-Securing Screws: Metal with head color to match plate finish.
  - 2. Material for Finished Spaces: 0.035-inch- (1-mm-) thick, satin-finished, Type 302 stainless steel.
  - 3. Material for Unfinished Spaces: Galvanized steel.
  - 4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.
- C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, die-cast aluminum with lockable cover.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
- B. Coordination with Other Trades:
  - 1. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
  - 2. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
  - 3. Install wiring devices after all wall preparation, including painting, is complete.
- C. Device Installation:
  - 1. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
  - 2. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
- D. Receptacle Orientation:
  - 1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.
- E. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
- F. Dimmers:
  - 1. Install dimmers within terms of their listing.
  - 2. Verify that dimmers used for fan-speed control are listed for that application.
  - 3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device, listing conditions in the written instructions.
- G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
- H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

### **3.02 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  - 1. Test Instruments: Use instruments that comply with UL 1436.
  - 2. Test Instrument for Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.

B. Tests for Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.

C. Test straight-blade for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz. (115 g).

D. Wiring device will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

**END OF SECTION**

## SECTION 26 28 13

### FUSES

#### PART 1 GENERAL

##### 1.01 SUMMARY

- A. Section Includes:
1. Cartridge fuses rated 600 V ac and less for use in the following:
    - a. Enclosed switches.

##### 1.02 ACTION SUBMITTALS

- A. Product Data: For each type of product.

##### 1.03 CLOSEOUT SUBMITTALS

- A. Operation and maintenance data.

#### PART 2 PRODUCTS

##### 2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Bussmann, Eaton, Electrical Sector.
  2. Littelfuse, Inc.

##### 2.02 CARTRIDGE FUSES

- A. Characteristics: NEMA FU 1, current-limiting, nonrenewable cartridge fuses with voltage ratings consistent with circuit voltages.
1. Type RK-1: 600-V, zero- to 600-A rating, 200 kAIC.
  2. Type RK-5: 600-V, zero- to 600-A rating, 200 kAIC.
  3. Type CC: 600-V, zero- to 30-A rating, 200 kAIC.
  4. Type CD: 600-V, 31- to 60-A rating, 200 kAIC.
  5. Type J: 600-V, zero- to 600-A rating, 200 kAIC.
  6. Type L: 600-V, 601- to 6000-A rating, 200 kAIC.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- C. Comply with NEMA FU 1 for cartridge fuses.
- D. Comply with NFPA 70.
- E. Coordinate fuse ratings and type with utilization equipment nameplate limitations of maximum fuse size and with system short-circuit current levels.

#### PART 3 EXECUTION

##### 3.01 INSTALLATION

- A. Install fuses in fusible devices. Arrange fuses so rating information is readable without removing fuse.

##### 3.02 IDENTIFICATION

- A. Install labels complying with requirements for identification specified in Section 260553 "Identification for Electrical Systems" and indicating fuse replacement information inside of door of each fused switch and adjacent to each fuse block, socket, and holder.

**END OF SECTION**

**SECTION 26 28 16**  
**ENCLOSED SWITCHES AND CIRCUIT BREAKERS**

**PART 1 GENERAL**

**1.01 SUMMARY**

A. Section Includes:

1. Fusible switches.
2. Nonfusible switches.
3. Molded-case circuit breakers (MCCBs).
4. Enclosures.

B. Related Requirements:

1. Section 260010 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.

**1.02 DEFINITIONS**

A. GFEP: Ground-fault circuit-interrupter for equipment protection.

B. GFLS: Ground-fault circuit-interrupter for life safety.

**1.03 ACTION SUBMITTALS**

A. Product Data:

1. For each type of enclosed switch, circuit breaker, accessory, and component indicated. Include nameplate ratings, dimensioned elevations, sections, weights, and manufacturers' technical data on features, performance, electrical characteristics, ratings, accessories, and finishes.
2. Enclosure types and details for types other than UL 50E, Type 1.
3. Current and voltage ratings.
4. Short-circuit current ratings (interrupting and withstand, as appropriate).
5. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices, accessories, and auxiliary components.

B. Field Quality-Control Submittals:

1. Field quality-control reports.

**1.04 INFORMATIONAL SUBMITTALS**

A. Sample warranties.

**1.05 CLOSEOUT SUBMITTALS**

A. Warranty documentation.

**PART 2 PRODUCTS**

**2.01 GENERAL REQUIREMENTS**

A. Product Selection for Restricted Space: Drawings indicate maximum dimensions for enclosed switches and circuit breakers, including clearances between enclosures, and adjacent surfaces and other items. Comply with indicated maximum dimensions.

B. Electrical Components, Devices, and Accessories: Listed and labeled in accordance with NFPA 70, by qualified electrical testing laboratory recognized by authorities having jurisdiction, and marked for intended location and application.

**2.02 FUSIBLE AND NONFUSIBLE SWITCHES**

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
2. Siemens Industry, Inc., Energy Management Division.
3. Square D; Schneider Electric USA.

B. Type HD, Heavy Duty:

1. Single throw.
2. Three pole.
3. 600 V(ac).
4. 1200 A and smaller.
5. UL 98 and NEMA KS 1, horsepower rated, with clips or bolt pads to accommodate indicated fuses.

6. Lockable handle with capability to accept three padlocks, and interlocked with cover in closed position.

C. Accessories:

1. Equipment Ground Kit: Internally mounted and labeled for copper and aluminum ground conductors.
2. Neutral Kit: Internally mounted; insulated, capable of being grounded and bonded; labeled for copper and aluminum neutral conductors.
3. Isolated Ground Kit: Internally mounted; insulated, labeled for copper and aluminum neutral conductors.
4. Class R Fuse Kit: Provides rejection of other fuse types when Class R fuses are specified.

## 2.03 MOLDED-CASE CIRCUIT BREAKERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton.
2. Siemens Industry, Inc., Energy Management Division.
3. Square D; Schneider Electric USA.

- B. Circuit breakers must be constructed using glass-reinforced insulating material. Current carrying components must be completely isolated from handle and accessory mounting area.

- C. Circuit breakers must have toggle operating mechanism with common tripping of all poles, which provides quick-make, quick-break contact action. Circuit-breaker handle must be over center, be trip free, and reside in tripped position between on and off to provide local trip indication. Circuit-breaker escutcheon must be clearly marked on and off in addition to providing international I/O markings. Equip circuit breaker with push-to-trip button, located on face of circuit breaker to mechanically operate circuit-breaker tripping mechanism for maintenance and testing purposes.

- D. If series rated breakers are not allowed, delete the references to series rated in first paragraph below.

- E. MCCBs must be equipped with device for locking in isolated position.

- F. Lugs must be suitable for 75 deg C rated wire.

- G. Standard: Comply with UL 489 with required interrupting capacity for available fault currents.

- H. Thermal-Magnetic Circuit Breakers: Inverse time-current thermal element for low-level overloads and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.

- I. Electronic Trip Circuit Breakers: Field-replaceable rating plug, RMS sensing, with the following field-adjustable settings:

1. Instantaneous trip.
2. Long- and short-time pickup levels.
3. Long- and short-time time adjustments.
4. Ground-fault pickup level, time delay, and I-squared t response.

- J. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller, and let-through ratings less than NEMA FU 1, RK-5.

- K. Features and Accessories:

1. Standard frame sizes, trip ratings, and number of poles.
2. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge lighting circuits.
3. Shunt Trip: Trip coil energized from separate circuit, with coil-clearing contact.

## 2.04 ENCLOSURES

- A. Enclosed Switches and Circuit Breakers: UL 489, NEMA KS 1, UL 50E, and UL 50, to comply with environmental conditions at installed location.

- B. Enclosure Finish: Enclosure must be finished with gray baked enamel paint.

- C. Conduit Entry: UL 50E Types 4, 4X, and 12 enclosures may not contain knockouts. UL 50E Types 7 and 9 enclosures must be provided with threaded conduit openings in both endwalls.

- D. Operating Mechanism: Circuit-breaker operating handle must be externally operable with operating mechanism being integral part of box, not cover. Cover interlock mechanism must have externally operated override. Override may not permanently disable interlock mechanism, which

must return to locked position once override is released. Tool used to override cover interlock mechanism must not be required to enter enclosure in order to override interlock.

### **PART 3 EXECUTION**

#### **3.01 SELECTION OF ENCLOSURES**

- A. Indoor, Dry and Clean Locations: UL 50E, Type 1.
- B. Outdoor Locations: UL 50E, Type 3R.

#### **3.02 INSTALLATION**

- A. Comply with manufacturer's published instructions.
- B. Special Techniques:
  - 1. Coordinate layout and installation of switches, circuit breakers, and components with equipment served and adjacent surfaces. Maintain required workspace clearances and required clearances for equipment access doors and panels.
  - 2. Install individual wall-mounted switches and circuit breakers with tops at uniform height unless otherwise indicated.
  - 3. Temporary Lifting Provisions: Remove temporary lifting of eyes, channels, and brackets and temporary blocking of moving parts from enclosures and components.
  - 4. Install fuses in fusible devices.

#### **3.03 IDENTIFICATION**

- A. Comply with requirements in Section 260553 "Identification for Electrical Systems."
  - 1. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs.
  - 2. Label each enclosure with engraved metal or laminated-plastic nameplate.

#### **3.04 FIELD QUALITY CONTROL**

- A. Field tests and inspections may be witnessed by Architect or Owner. Coordinate testing in advance.
- B. Tests and Inspections for Switches:
  - 1. Visual and Mechanical Inspection:
    - a. Inspect physical and mechanical condition.
    - b. Inspect anchorage, alignment, grounding, and clearances.
    - c. Verify that unit is clean.
    - d. Verify blade alignment, blade penetration, travel stops, and mechanical operation.
    - e. Verify that fuse sizes and types match the Specifications and Drawings.
    - f. Verify that each fuse has adequate mechanical support and contact integrity.
- C. Tests and Inspections for Molded-Case Circuit Breakers:
  - 1. Visual and Mechanical Inspection:
    - a. Verify that equipment nameplate data are as described in the Specifications and shown on Drawings.
    - b. Inspect physical and mechanical condition.
    - c. Inspect anchorage, alignment, grounding, and clearances.
    - d. Verify that unit is clean.
    - e. Operate circuit breaker to ensure smooth operation.
    - f. Perform adjustments for final protective device settings in accordance with coordination study.
  - 2. Test and adjust controls, remote monitoring, and safeties.
- D. Nonconforming Work:
  - 1. Enclosed switches and circuit breakers will be considered defective if they do not pass tests and inspections.
  - 2. Remove and replace defective units and retest.
- E. Collect, assemble, and submit test and inspection reports.
  - 1. Test procedures used.
  - 2. Include identification of each enclosed switch and circuit breaker tested and describe test results.
  - 3. List deficiencies detected, remedial action taken, and observations after remedial action.
- F. Manufacturer Services:
  - 1. Engage factory-authorized service representative to support field tests and inspections.

**3.05 ADJUSTING**

- A. Adjust moving parts and operable components to function smoothly and lubricate as recommended by manufacturer.
- B. Set field-adjustable circuit-breaker trip ranges as specified in 260500 Coordination and Arc Flash Studies.

**END OF SECTION**



**SECTION 26 41 13**  
**LIGHTNING PROTECTION FOR STRUCTURES**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section includes lightning protection for structures.

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For air terminals and mounting accessories.
1. Layout of the lightning protection system, along with details of the components to be used in the installation.
  2. Include indications for use of raceway, data on how concealment requirements will be met, and calculations required by NFPA 780 for bonding of grounded and isolated metal bodies.
- C. Field quality-control reports.

**1.03 QUALITY ASSURANCE**

- A. Installer Qualifications: Certified by UL, trained and approved for installation of units required for this Project.
- B. System Certificate:
1. UL Master Label.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 780, "Definitions" Article.

**PART 2 PRODUCTS**

**2.01 LIGHTNING PROTECTION SYSTEM COMPONENTS**

- A. Comply with UL 96 and NFPA 780.
- B. Roof-Mounted Air Terminals: NFPA 780, Class I, copper unless otherwise indicated.
1. Air Terminals More than 24 Inches (600 mm) Long: With brace attached to the terminal at not less than half the height of the terminal.
  2. Single-Membrane, Roof-Mounted Air Terminals: Designed specifically for single-membrane roof system materials. Comply with requirements in roofing Sections.
- C. Main and Bonding Conductors: Copper.
- D. Ground Rods: Copper-clad steel; 3/4 inch (19 mm) in diameter by 10 feet (3 m) long.

**PART 3 EXECUTION**

**3.01 INSTALLATION**

- A. Install lightning protection components and systems according to UL 96A and NFPA 780.
- B. Conceal the following conductors:
1. System conductors.
  2. Down conductors.
  3. Interior conductors.
  4. Conductors within normal view of exterior locations at grade within 200 feet (60 m) of building.
- C. Cable Connections: Use crimped or bolted connections for all conductor splices and connections between conductors and other components. Use exothermic-welded connections in underground portions of the system.
- D. Air Terminals on Single-Ply Membrane Roofing: Comply with roofing membrane and adhesive manufacturer's written instructions.
- E. Ground Loop: Install ground-level, potential equalization conductor and extend around the perimeter of structure.
1. Bury ground ring not less than 24 inches (600 mm) from building foundation.
  2. Bond ground terminals to the ground loop.
  3. Bond grounded building systems to the ground loop conductor within 12 feet (3.6 m) of grade level.

**3.02 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS**

- A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies. Comply with requirements in Section 26 0544 "Sleeves and Sleeve Seals for Electrical Raceways and Cabling."

**3.03 CORROSION PROTECTION**

- A. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.
- B. Use conductors with protective coatings where conditions cause deterioration or corrosion of conductors.

**3.04 FIELD QUALITY CONTROL**

- A. Notify Architect at least 48 hours in advance of inspection before concealing lightning protection components.
- B. UL Inspection: Meet requirements to obtain a UL Master Label for system.

**END OF SECTION**

**SECTION 26 51 19**  
**LED INTERIOR LIGHTING**

**PART 1 GENERAL**

**1.01 SUMMARY**

**1.02 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
- B. Shop Drawings: For nonstandard or custom luminaires.
  - 1. Include plans, elevations, sections, and mounting and attachment details.
  - 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 3. Include diagrams for power, signal, and control wiring.

**1.03 CLOSEOUT SUBMITTALS**

- A. Operation and maintenance data.

**1.04 QUALITY ASSURANCE**

- A. Provide luminaires from a single manufacturer for each luminaire type.
- B. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.

**1.05 WARRANTY**

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
- B. Warranty Period: Five year(s) from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 PERFORMANCE REQUIREMENTS**

- A. Ambient Temperature: 5 to 104 deg F (Minus 15 to plus 40 deg C).
  - 1. Relative Humidity: Zero to 95 percent.
- B. Altitude: Sea level to 1000 feet (300 m).

**2.02 LUMINAIRE REQUIREMENTS**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
  - 1. Label shall include the following lamp characteristics:
    - a. "USE ONLY" and include specific lamp type.
    - b. Lamp diameter, shape, size, wattage, and coating.
    - c. CCT and CRI.
- C. Recessed luminaires shall comply with NEMA LE 4.

**2.03 MATERIALS**

- A. Metal Parts:
  - 1. Free of burrs and sharp corners and edges.
  - 2. Sheet metal components shall be steel unless otherwise indicated.
  - 3. Form and support to prevent warping and sagging.
- B. Steel:
  - 1. ASTM A36/A36M for carbon structural steel.
  - 2. ASTM A568/A568M for sheet steel.
- C. Stainless Steel:
  - 1. 1. Manufacturer's standard grade.
  - 2. 2. Manufacturer's standard type, ASTM A240/240M.
- D. Galvanized Steel: ASTM A653/A653M.
- E. Aluminum: ASTM B209.

## **2.04 METAL FINISHES**

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

## **2.05 LUMINAIRE SUPPORT**

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.
- B. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- C. Wires: ASTM A641/A641M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm).
- D. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- E. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

## **PART 3 EXECUTION**

### **3.01 INSTALLATION**

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
  - 1. Sized and rated for luminaire weight.
  - 2. Able to maintain luminaire position after cleaning and relamping.
  - 3. Provide support for luminaire without causing deflection of ceiling or wall.
  - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- E. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for wiring connections.

### **3.02 IDENTIFICATION**

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

### **3.03 FIELD QUALITY CONTROL**

- A. Perform the following tests and inspections:
  - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
  - 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

### **3.04 STARTUP SERVICE**

- A. Comply with requirements for startup specified in Section 260943.23 "Relay-Based Lighting Controls."

**END OF SECTION**

**SECTION 26 56 13**  
**LIGHTING POLES AND STANDARDS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Poles and accessories for support of luminaires.
  - 2. Luminaire-lowering devices.

**1.02 DEFINITIONS**

- A. EPA: Equivalent projected area.
- B. Luminaire: Complete luminaire.
- C. Pole: Luminaire-supporting structure, including tower used for large-area illumination.
- D. Standard: See "Pole."

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each pole, accessory, and luminaire-supporting and -lowering device.
- B. Shop Drawings:
  - 1. Include plans, elevations, sections, and mounting and attachment details.
  - 2. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 3. Detail fabrication and assembly of poles and pole accessories.
  - 4. Anchor bolt templates keyed to specific poles and certified by manufacturer.
  - 5. Method and procedure of pole installation. Include manufacturer's written installations.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Pole and Support Component Certificates: Signed by manufacturers of poles, certifying that products are designed for indicated load requirements according to AASHTO LTS-6-M and that load imposed by luminaire and attachments has been included in design. The certification shall be based on design calculations signed and sealed by a professional engineer.
- B. Material test reports.
- C. Field quality-control reports.
- D. Sample warranty.
- E. Soil test reports.

**1.05 CLOSEOUT SUBMITTALS**

- A. Operation and maintenance data for pole-lowering devices and pole-mounted accessories.

**1.06 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace components of pole(s) that fail in materials or workmanship; that corrode; or that fade, stain, perforate, erode, or chalk due to effects of weather or solar radiation within a specified warranty period. Manufacturer may exclude lightning damage, hail damage, vandalism, abuse, or unauthorized repairs from special warranty period.
  - 1. Warranty Period: Five years from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 GENERAL FINISH REQUIREMENTS**

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

**PART 3 EXECUTION**

**3.01 POLE FOUNDATION**

- A. Pole foundations are part of the Parking Deck Structure.
- B. Anchor Bolts: Install plumb using manufacturer-supplied template, uniformly spaced.

### **3.02 POLE INSTALLATION**

- A. Concrete Pole Foundations: Set anchor bolts according to anchor-bolt templates furnished by pole manufacturer. Concrete materials, installation, and finishing requirements are specified in Section 033000 "Cast-in-Place Concrete."
- B. Raise and set pole using web fabric slings (not chain or cable) at locations indicated by manufacturer.

### **3.03 CORROSION PREVENTION**

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum using insulating fittings or treatment.
- B. Steel Conduits: Comply with requirements in Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50-percent overlap.

### **3.04 GROUNDING**

- A. Ground Metal Poles and Support Structures: Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems."
  - 1. Install grounding electrode for each pole unless otherwise indicated.

**END OF SECTION**

**SECTION 26 56 19**  
**LED EXTERIOR LIGHTING**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
  - 1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.
  - 2. Luminaire supports.
  - 3. Luminaire-mounted photoelectric relays.
- B. Related Requirements:
  - 1. Section 265613 "Lighting Poles and Standards" for poles and standards used to support exterior lighting equipment.

**1.02 DEFINITIONS**

- A. CCT: Correlated color temperature.
- B. CRI: Color rendering index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. Lumen: Measured output of lamp and luminaire, or both.
- F. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of luminaire.
- B. Shop Drawings: For nonstandard or custom luminaires.
  - 1. Include plans, elevations, sections, and mounting and attachment details.
  - 2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
  - 3. Include diagrams for power, signal, and control wiring.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Product Certificates: For each type of the following:
  - 1. Luminaire.
  - 2. Photoelectric relay.
- B. Sample warranty.

**1.05 CLOSEOUT SUBMITTALS**

- A. Operation and maintenance data.
  - 1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
  - 2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

**1.06 FIELD CONDITIONS**

- A. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

**1.07 WARRANTY**

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Period: 5 year(s) from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 LUMINAIRE REQUIREMENTS**

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.
- C. UL Compliance: Comply with UL 1598 and listed for wet location.
- D. Lamp base complying with ANSI C81.61 or IEC 60061-1.

- E. L70 lamp life of 50,000 hours.
- F. Lamps dimmable from 100 percent to 0 percent of maximum light output.
- G. Lamp Rating: Lamp marked for outdoor use.
- H. Source Limitations:
  - 1. For luminaires, obtain each color, grade, finish, type, and variety of luminaire from single source with resources to provide products of consistent quality in appearance and physical properties.

## **2.02 LUMINAIRE SUPPORT COMPONENTS**

- A. Comply with requirements in Section 260529 "Hangers and Supports for Electrical Systems" for channel and angle iron supports and nonmetallic channel and angle supports.

## **PART 3 EXECUTION**

### **3.01 GENERAL INSTALLATION REQUIREMENTS**

- A. Comply with NECA 1.
- B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.
- C. Install lamps in each luminaire.
- D. Fasten luminaire to structural support.
- E. Supports:
  - 1. Sized and rated for luminaire weight.
  - 2. Able to maintain luminaire position after cleaning and relamping.
  - 3. Support luminaires without causing deflection of finished surface.
  - 4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
- F. Wall-Mounted Luminaire Support:
  - 1. Attached to structural members in walls.
- G. Wiring Method: Install cables in raceways. Conceal raceways and cables.
- H. Install luminaires level, plumb, and square with finished grade unless otherwise indicated.
- I. Coordinate layout and installation of luminaires with other construction.
- J. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.
- K. Comply with requirements in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" and Section 260533 "Raceways and Boxes for Electrical Systems" for wiring connections and wiring methods.

### **3.02 CORROSION PREVENTION**

- A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.
- B. Steel Conduits: Comply with Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

### **3.03 IDENTIFICATION**

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

### **3.04 FIELD QUALITY CONTROL**

- A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
  - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
  - 2. Verify operation of photoelectric controls.
- C. Luminaire will be considered defective if it does not pass tests and inspections.



D. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

**3.05 DEMONSTRATION**

A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires and photocell relays.

**END OF SECTION**

**SECTION 28 46 21.11**  
**ADDRESSABLE FIRE-ALARM SYSTEMS**

**PART 1 GENERAL**

**1.01 SUMMARY**

- A. Section Includes:
1. Fire-alarm control unit.
  2. Manual fire-alarm boxes.
  3. System smoke detectors.
  4. Heat detectors.
  5. Notification appliances.
  6. Remote annunciator.
  7. Addressable interface device.
  8. Digital alarm communicator transmitter.

**1.02 ACTION SUBMITTALS**

- A. General Submittal Requirements:
1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
  2. Shop Drawings shall be prepared by persons with the following qualifications:
    - a. Trained and certified by manufacturer in fire-alarm system design.
    - b. NICET-certified, fire-alarm technician; Level III minimum.
    - c. Licensed or certified by authorities having jurisdiction.
- B. Product Data: For each type of product, including furnished options and accessories.
- C. Shop Drawings: For fire-alarm system.
1. Comply with recommendations and requirements in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
  2. Include plans, elevations, sections, details, and attachments to other work.
  3. Include details of equipment assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and locations. Indicate conductor sizes, indicate termination locations and requirements, and distinguish between factory and field wiring.
  4. Detail assembly and support requirements.
  5. Include voltage drop calculations for notification-appliance circuits.
  6. Include battery-size calculations.
  7. Include input/output matrix.
  8. Include statement from manufacturer that all equipment and components have been tested as a system and meet all requirements in this Specification and in NFPA 72.
  9. Include performance parameters and installation details for each detector.
  10. Include plans, sections, and elevations of heating, ventilating, and air-conditioning ducts, drawn to scale; coordinate location of duct smoke detectors and access to them.
    - a. Show critical dimensions that relate to placement and support of sampling tubes, detector housing, and remote status and alarm indicators.
    - b. Show field wiring required for HVAC unit shutdown on alarm.
    - c. Locate detectors according to manufacturer's written recommendations.
  11. Include floor plans to indicate final outlet locations showing address of each addressable device. Show size and route of cable and conduits and point-to-point wiring diagrams.

**1.03 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For Installer.
- B. Field quality-control reports.
- C. Sample warranty.

**1.04 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals.
1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:
    - a. Comply with the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

- b. Provide "Fire Alarm and Emergency Communications System Record of Completion Documents" according to the "Completion Documents" Article in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
- c. Complete wiring diagrams showing connections between all devices and equipment.
- d. Riser diagram.
- e. Record copy of site-specific software.
- f. Provide "Inspection and Testing Form" according to the "Inspection, Testing and Maintenance" chapter in NFPA 72, and include the following:
  - 1) Equipment tested.
  - 2) Frequency of testing of installed components.
  - 3) Frequency of inspection of installed components.
  - 4) Requirements and recommendations related to results of maintenance.
  - 5) Manufacturer's user training manuals.
- g. Manufacturer's required maintenance related to system warranty requirements.
- h. Abbreviated operating instructions for mounting at fire-alarm control unit and each annunciator unit.

**B. Software and Firmware Operational Documentation:**

- 1. Software operating and upgrade manuals.
- 2. Program Software Backup: On magnetic media or compact disk, complete with data files.
- 3. Device address list.
- 4. Printout of software application and graphic screens.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
- B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level II technician and licensed through the State of Alabama Fire Marshall's Office.
- C. NFPA Certification: Obtain certificate on according to NFPA 72 by a UL-listed alarm company.

**1.06 WARRANTY**

- A. Special Warranty: Manufacturer agrees to repair or replace fire-alarm system equipment and components that fail in materials or workmanship within specified warranty period.
  - 1. Warranty Extent: All equipment and components not covered in the Maintenance Service Agreement.
  - 2. Warranty Period: Five years from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 SYSTEM DESCRIPTION**

- A. Source Limitations for Fire-Alarm System and Components: Components shall be compatible with, and operate as an extension of, existing system. Provide system manufacturer's certification that all components provided have been tested as, and will operate as, a system.
- B. Noncoded, UL-certified addressable system, with multiplexed signal transmission and horn/strobe evacuation.
- C. Automatic sensitivity control of certain smoke detectors.
- D. All components provided shall be listed for use with the selected system.
- E. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

**2.02 SYSTEMS OPERATIONAL DESCRIPTION**

- A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
  - 1. Manual stations.
  - 2. Heat detectors.
  - 3. Smoke detectors.
  - 4. Automatic sprinkler system water flow.
  - 5. Fire-extinguishing system operation.
  - 6. Fire standpipe system.
  - 7. Dry system pressure flow switch.
- B. Fire-alarm signal shall initiate the following actions:
  - 1. Continuously operate alarm notification appliances.

2. Identify alarm and specific initiating device at fire-alarm control unit and remote annunciators.
  3. Transmit an alarm signal to the remote alarm receiving station.
  4. Unlock electric door locks in designated egress paths.
  5. Release fire and smoke doors held open by magnetic door holders.
  6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
  7. Close smoke dampers in air ducts of designated air-conditioning duct systems.
  8. Recall elevators to primary or alternate recall floors.
  9. Activate emergency lighting control.
  10. Activate emergency shutoffs for gas and fuel supplies.
  11. Record events in the system memory.
- C. Supervisory signal initiation shall be by one or more of the following devices and actions:
1. Valve supervisory switch.
  2. High- or low-air-pressure switch of a dry-pipe or preaction sprinkler system.
  3. Loss of communication with any panel on the network.
- D. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.
  2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
  3. Loss of communication with any addressable sensor, input module, relay, control module, or remote annunciator.
  4. Loss of primary power at fire-alarm control unit.
  5. Ground or a single break in internal circuits of fire-alarm control unit.
  6. Abnormal ac voltage at fire-alarm control unit.
  7. Break in standby battery circuitry.
  8. Failure of battery charging.
  9. Abnormal position of any switch at fire-alarm control unit or annunciator.
- E. System Supervisory Signal Actions:
1. Initiate notification appliances.
  2. Identify specific device initiating the event at fire-alarm control unit and remote annunciators.
  3. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.

## **2.03 PERFORMANCE REQUIREMENTS**

### **2.04 FIRE-ALARM CONTROL UNIT**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Notifier.
  2. Siemens Industry, Inc.; Fire Safety Division.
  3. SimplexGrinnell LP.
- B. General Requirements for Fire-Alarm Control Unit:
1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864.
  2. Addressable Initiation Device Circuits: The FACP shall indicate which communication zones have been silenced and shall provide selective silencing of alarm notification appliance by building communication zone.
  3. Addressable Control Circuits for Operation of Notification Appliances and Mechanical Equipment: The FACP shall be listed for releasing service.
- C. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
1. Annunciator and Display: Liquid-crystal type, 80 characters, minimum.
  2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.
- D. Initiating-Device, Notification-Appliance, and Signaling-Line Circuits:
1. Pathway Class Designations: NFPA 72, Class A.
  2. Pathway Survivability: Comply with NFPA 72.

E. Notification-Appliance Circuit:

1. Audible appliances shall sound in a three-pulse temporal pattern, as defined in NFPA 72.
2. Where notification appliances provide signals to sleeping areas, the alarm signal shall be a 520-Hz square wave with an intensity 15 dB above the average ambient sound level or 5 dB above the maximum sound level, or at least 75 dBA, whichever is greater, measured at the pillow.
3. Visual alarm appliances shall flash in synchronization where multiple appliances are in the same field of view, as defined in NFPA 72.

F. Elevator Recall:

1. Elevator recall shall be initiated only by one of the following alarm-initiating devices:
  - a. Elevator lobby detectors except the lobby detector on the designated floor.
  - b. Smoke detector in elevator machine room.
  - c. Smoke detectors in elevator hoistway.
2. Elevator controller shall be programmed to move the cars to the alternate recall floor if lobby detectors located on the designated recall floors are activated.
3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.
  - a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.

G. Door Controls: Door hold-open devices that are controlled by smoke detectors at doors in smoke-barrier walls shall be connected to fire-alarm system.

H. Remote Smoke-Detector Sensitivity Adjustment: Controls shall select specific addressable smoke detectors for adjustment, display their current status and sensitivity settings, and change those settings. Allow controls to be used to program repetitive, time-scheduled, and automated changes in sensitivity of specific detector groups. Record sensitivity adjustments and sensitivity-adjustment schedule changes in system memory.

I. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

J. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory and digital alarm communicator transmitters shall be powered by 24-V dc source.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

K. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

## 2.05 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38.

1. Single-action mechanism, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
2. Station Reset: Key- or wrench-operated switch.

## 2.06 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.
2. Detectors shall be four-wire type.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type, indicating detector has operated.

B. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
  - a. Primary status.

- b. Device type.
- c. Present average value.
- d. Present sensitivity selected.
- e. Sensor range (normal, dirty, etc.).

C. Ionization Smoke Detector:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
  - a. Primary status.
  - b. Device type.
  - c. Present average value.
  - d. Present sensitivity selected.
  - e. Sensor range (normal, dirty, etc.).

D. Duct Smoke Detectors: Photoelectric type complying with UL 268A.

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
  - a. Primary status.
  - b. Device type.
  - c. Present average value.
  - d. Present sensitivity selected.
  - e. Sensor range (normal, dirty, etc.).
3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector for smoke detection in HVAC system ducts.
4. Each sensor shall have multiple levels of detection sensitivity.
5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
6. Relay Fan Shutdown: Fully programmable relay rated to interrupt fan motor-control circuit.

## 2.07 HEAT DETECTORS

A. General Requirements for Heat Detectors: Comply with UL 521.

1. Temperature sensors shall test for and communicate the sensitivity range of the device.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature or a rate of rise.

1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature.

1. Mounting: Twist-lock base interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

## 2.08 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Connected to notification-appliance signal circuits, zoned as indicated, equipped for mounting as indicated, and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated, and with screw terminals for system connections.

B. Chimes: Vibrating type.

C. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464.

D. Visible Notification Appliances: Xenon strobe lights complying with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Mounting: Wall mounted unless otherwise indicated.
2. Flashing shall be in a temporal pattern, synchronized with other units.
3. Strobe Leads: Factory connected to screw terminals.

4. Mounting Faceplate: Factory finished, red, white.

## **2.09 REMOTE ANNUNCIATOR**

- A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.
  1. Mounting: Flush cabinet, NEMA 250, Type 1.
- B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

## **2.10 ADDRESSABLE INTERFACE DEVICE**

- A. General:
  1. Include address-setting means on the module.
  2. Store an internal identifying code for control panel use to identify the module type.
  3. Listed for controlling HVAC fan motor controllers.
- B. Monitor Module: Microelectronic module providing a system address for alarm-initiating devices for wired applications with normally open contacts.
- C. Integral Relay: Capable of providing a direct signal to elevator controller to initiate elevator recall and to circuit-breaker shunt trip for power shutdown.
  1. Allow the control panel to switch the relay contacts on command.
  2. Have a minimum of two normally open and two normally closed contacts available for field wiring.
- D. Control Module:
  1. Operate notification devices.
  2. Operate solenoids for use in sprinkler service.

## **2.11 DIGITAL ALARM COMMUNICATOR TRANSMITTER**

- A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632.
- B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture two telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.
- C. Local functions and display at the digital alarm communicator transmitter shall include the following:
  1. Verification that both telephone lines are available.
  2. Programming device.
  3. LED display.
  4. Manual test report function and manual transmission clear indication.
  5. Communications failure with the central station or fire-alarm control unit.
- D. Digital data transmission shall include the following:
  1. Address of the alarm-initiating device.
  2. Address of the supervisory signal.
  3. Address of the trouble-initiating device.
  4. Loss of ac supply.
  5. Loss of power.
  6. Low battery.
  7. Abnormal test signal.
  8. Communication bus failure.
- E. Secondary Power: Integral rechargeable battery and automatic charger.
- F. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

## **PART 3 EXECUTION**

### **3.01 EQUIPMENT INSTALLATION**

- A. Comply with NFPA 72, NFPA 101, and requirements of authorities having jurisdiction for installation and testing of fire-alarm equipment. Install all electrical wiring to comply with requirements in NFPA 70 including, but not limited to, Article 760, "Fire Alarm Systems."
- B. Connecting to Existing Equipment: Verify that existing fire-alarm system is operational before making changes or connections.
- C. Equipment Mounting: Install fire-alarm control unit on finished floor.
- D. Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.
- E. Manual Fire-Alarm Boxes:
  - 1. Install manual fire-alarm box in the normal path of egress within 60 inches (1520 mm) of the exit doorway.
  - 2. Mount manual fire-alarm box on a background of a contrasting color.
  - 3. The operable part of manual fire-alarm box shall be between 42 inches (1060 mm) and 48 inches (1220 mm) above floor level. All devices shall be mounted at the same height unless otherwise indicated.
- F. Smoke- or Heat-Detector Spacing: Comply with NFPA 72.
- G. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct. Tubes more than 36 inches (9100 mm) long shall be supported at both ends.
- H. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.
- I. Remote Status and Alarm Indicators: Install in a visible location near each smoke detector, sprinkler water-flow switch, and valve-tamper switch that is not readily visible from normal viewing position.
- J. Audible Alarm-Indicating Devices: Install not less than 6 inches (150 mm) below the ceiling. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille. Install all devices at the same height unless otherwise indicated.
- K. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches (150 mm) below the ceiling. Install all devices at the same height unless otherwise indicated.
- L. Device Location-Indicating Lights: Locate in public space near the device they monitor.

### **3.02 PATHWAYS**

- A. Pathways shall be installed in EMT.
- B. Exposed EMT shall be painted red enamel.

### **3.03 CONNECTIONS**

- A. For fire-protection systems related to doors in fire-rated walls and partitions and to doors in smoke partitions, comply with requirements in Section 087100 "Door Hardware." Connect hardware and devices to fire-alarm system.
  - 1. Verify that hardware and devices are listed for use with installed fire-alarm system before making connections.
- B. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 36 inches (910 mm) from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
  - 1. Smoke dampers in air ducts of designated HVAC duct systems.
  - 2. Magnetically held-open doors.
  - 3. Electronically locked doors and access gates.
  - 4. Alarm-initiating connection to elevator recall system and components.
  - 5. Alarm-initiating connection to activate emergency lighting control.
  - 6. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
  - 7. Supervisory connections at valve supervisory switches.
  - 8. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
  - 9. Supervisory connections at fire-extinguisher locations.



### **3.04 IDENTIFICATION**

- A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."
- B. Install framed instructions in a location visible from fire-alarm control unit.

### **3.05 GROUNDING**

- A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
- B. Ground shielded cables at the control panel location only. Insulate shield at device location.

### **3.06 FIELD QUALITY CONTROL**

- A. Field tests shall be witnessed by Architect and authorities having jurisdiction.
- B. Perform the following tests and inspections with the assistance of a factory-authorized service representative:
  - 1. Visual Inspection: Conduct visual inspection prior to testing.
    - a. Inspection shall be based on completed record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter.
    - b. Comply with the "Visual Inspection Frequencies" table in the "Inspection" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
  - 2. System Testing: Comply with the "Test Methods" table in the "Testing" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
  - 3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
  - 4. Test audible appliances for the private operating mode according to manufacturer's written instructions.
  - 5. Test visible appliances for the public operating mode according to manufacturer's written instructions.
  - 6. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" section of the "Fundamentals" chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" section of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
- C. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- D. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.
- F. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- G. Annual Test and Inspection: One year after date of Substantial Completion, test fire-alarm system complying with visual and testing inspection requirements in NFPA 72. Use forms developed for initial tests and inspections.

### **3.07 SOFTWARE SERVICE AGREEMENT**

- A. Comply with UL 864.
- B. Technical Support: Beginning at Substantial Completion, service agreement shall include software support for two years.
- C. Upgrade Service: At Substantial Completion, update software to latest version. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system and new or revised licenses for using software.
  - 1. Upgrade Notice: At least 30 days to allow Owner to schedule access to system and to upgrade computer equipment if necessary.

### **3.08 DEMONSTRATION**

- A. Train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

**END OF SECTION**

**SECTION 31 10 00**  
**SITE CLEARING**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawing and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Alabama Department of Transportation (ALDOT) Standard Specifications for Highway Construction (latest edition).
- C. Alabama Handbook for Erosion & Sediment Control and Stormwater Management on Construction Sites and Urban Areas.

**1.02 SUMMARY**

- A. Section Includes:
  - 1. Protecting existing vegetation to remain.
  - 2. Removing existing vegetation.
  - 3. Clearing and grubbing.
  - 4. Stripping and stockpiling topsoil.
  - 5. Removing above- and below-grade site improvements.
  - 6. Disconnecting, capping or sealing, and removing site utilities.
  - 7. Temporary erosion and sedimentation control measures.
- B. Related Sections:
  - 1. Section 01 5000 "Temporary Facilities and Controls" for temporary utility services, construction and support facilities, security and protection facilities, and temporary erosion and sedimentation control measures.
  - 2. Section 01 7000 "Execution and Closeout Requirements" for field engineering and surveying.

**1.03 DEFINITIONS**

- A. Subsoil: All soil beneath the topsoil layer of the soil profile, and typified by the lack of organic matter and soil organisms.
- B. Surface Soil: Soil that is present at the top layer of the existing soil profile at the Project site. In undisturbed areas, the surface soil is typically topsoil; but in disturbed areas such as urban environments, the surface soil can be subsoil.
- C. Topsoil: Top layer of the soil profile consisting of existing native surface topsoil or existing in-place surface soil and is the zone where plant roots grow. Its appearance is generally friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of subsoil and weeds, roots, toxic materials, or other nonsoil materials.
- D. Tree-Protection Zone: Area surrounding individual trees or groups of trees to be protected during construction, and defined by a circle concentric with each tree with a radius 1.5 times the diameter of the drip line unless otherwise indicated
- E. Vegetation: Trees, shrubs, groundcovers, grass, and other plants.

**1.04 MATERIAL OWNERSHIP**

- A. Except for stripped topsoil and other materials indicated to be stockpiled or otherwise remain Owner's property, cleared materials shall become Contractor's property and shall be removed from Project site.

## **1.05 INFORMATIONAL SUBMITTALS**

- A. Existing Conditions: Documentation of existing trees and plantings, adjoining construction, and site improvements that establishes preconstruction conditions that might be misconstrued as damage caused by site clearing.
  - 1. Use sufficiently detailed photographs or videotape.
  - 2. Include plans and notations to indicate specific wounds and damage conditions of each tree or other plants designated to remain.
- B. Record Drawings: Identifying and accurately showing locations of capped utilities and other subsurface structural, electrical, and mechanical conditions.

## **1.06 PROJECT CONDITIONS**

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Salvable Improvements: Carefully remove items indicated to be salvaged and store on Owner's premises as directed.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before site clearing.
- D. Do not commence site clearing operations until temporary erosion- and sedimentation-control measures are in place.
- E. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking vehicles or equipment.
  - 3. Foot traffic.
  - 4. Erection of sheds or structures.
  - 5. Impoundment of water.
  - 6. Excavation or other digging unless otherwise indicated.
  - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.
- H. Soil Stripping, Handling, and Stockpiling: Perform only when the topsoil is dry or slightly moist.

## **PART 2 PRODUCTS**

### **2.01 MATERIALS**

- A. Satisfactory Soil Material: Requirements for satisfactory soil material are specified in Section 312000 "Earth Moving."
  - 1. Obtain approved borrow soil material off-site when satisfactory soil material is not available on-site.

## **PART 3 EXECUTION**

### **3.01 PREPARATION**

- A. Protect and maintain benchmarks and survey control points from disturbance during construction.

- B. Locate and clearly identify trees, shrubs, and other vegetation to remain.
- C. Protect existing site improvements to remain from damage during construction.
  - 1. Restore damaged improvements to their original condition, as acceptable to Owner and to the Engineer's satisfaction.

### **3.02 TEMPORARY EROSION AND SEDIMENTATION CONTROL**

- A. Provide temporary erosion- and sedimentation-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways, according to erosion- and sedimentation-control Drawings and requirements of authorities having jurisdiction.
- B. General: Employ erosion control management practices as required by the General Permit for Storm Water Discharges. The owner shall be responsible for obtaining a "notice of intent"(noi) from adem. the contractor shall be responsible for transferring the permit, paying the transfer fee and signing as the responsible official. The contractor shall be responsible for the city erosion control permit. The contractor shall be responsible for all monitoring, inspections, etc. to ensure the owner that the site is at all times in accordance with adem rules & regulations. documentation of inspections by a q.c.i. or q.c.p. shall be maintained by the contractor and provided to the owner at his/her request. any and all fees, fines, etc., shall be the responsibility of the contractor. Control and abate water pollution and erosion at its potential source; employ downstream sediment entrapment measures as a backup to primary control at the source.
- C. Take all reasonable precautions to prevent and suppress fires and other detrimental occurrences which may be caused by construction operations.
- D. Straw wattles shall be anchored by use of stakes.
- E. Once installed, maintain silt fence until its capacity has been reached or erosion activity in the areas has been stabilized. When a silt fence has reached its capacity to function and need for a backup fence becomes evident, provide an additional line of silt fences. Repair of a damaged silt fence shall be accomplished by utilizing same type of materials used in original construction.
- F. Remove erosion and sedimentation controls once areas have been stabilized. Restore and stabilize areas disturbed during removal.

### **3.03 TREE AND PLANT PROTECTION**

- A. General: Protect trees and plants remaining on-site according to Landscape Plans and Specifications.

### **3.04 EXISTING UTILITIES**

- A. Owner will arrange for disconnecting and sealing indicated utilities that serve existing structures before site clearing, when requested by Contractor.
  - 1. Verify that utilities have been disconnected and capped before proceeding with site clearing.
- B. Locate, identify, disconnect, and seal or cap utilities indicated to be removed or abandoned in place.
  - 1. Arrange with utility companies to shut off indicated utilities.
- C. Locate, identify, and disconnect utilities indicated to be abandoned in place.
- D. Interrupting Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
  - 1. Notify Owner not less than two days in advance of proposed utility interruptions.
- E. Excavate for and remove underground utilities indicated to be removed.

### **3.05 CLEARING AND GRUBBING**

- A. Remove obstructions, trees, shrubs, and other vegetation to permit installation of new construction.
  - 1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
  - 2. Grind down stumps and remove roots, obstructions, and debris to a depth of 24 inches below exposed subgrade.
  - 3. Use only hand methods for grubbing within protection zones.
- B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material unless further excavation or earthwork is indicated.
  - 1. Place fill material in accordance with Section 312000 "Earth Moving."

### **3.06 TOP SOIL STRIPPING**

- A. Remove sod and grass before stripping topsoil.
- B. Strip topsoil in a manner to prevent intermingling with underlying subsoil or other waste materials.
  - 1. Remove subsoil and nonsoil materials from topsoil, including clay lumps, gravel, and other objects more than 2 inches in diameter; trash, debris, weeds, roots, and other waste materials.
- C. Stockpile topsoil away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust and erosion by water.
  - 1. Limit slope of topsoil stockpiles to 3 horizontal to 1 vertical.
  - 2. Do not stockpile topsoil within protection zones.

### **3.07 SITE IMPROVEMENTS**

- A. Remove existing above- and below-grade improvements as indicated and necessary to facilitate new construction.
- B. Remove slabs, foundations, paving, curbs, gutters, and aggregate base as indicated.
  - 1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut along line of existing pavement to remain before removing adjacent existing pavement. Saw-cut faces vertically and to full depth of pavement to leave a clean straight edge.

### **3.08 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials including trash and debris, and legally dispose of them off Owner's property.

**END OF SECTION**

## SECTION 31 20 00

### Earth Moving

#### PART 1 GENERAL

##### 1.01 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Geotechnical Engineering Report prepared by Geotechnical Engineering-Testing, Inc. as project number 23-157, dated July 7, 2023.
- D. Alabama Department of Transportation (ALDOT) Standard Specifications for Highway Construction (latest edition).

##### 1.02 SUMMARY

- A. Section Includes:
  - 1. Preparing subgrades for slabs-on-grade, walks, pavements, turf and grasses and plants.
  - 2. Excavating and backfilling for buildings and structures.
  - 3. Undercutting and replacement of unsuitable soils.
  - 4. Moisture conditioning of existing soils.
  - 5. Drainage course for concrete slabs-on-grade.
  - 6. Subbase course for concrete walks, pavements.
  - 7. Subbase course and base course for asphalt paving.
  - 8. Subsurface drainage backfill for walls and trenches.
  - 9. Excavating and backfilling trenches for utilities and pits for buried utility structures.
- B. Related Sections:
  - 1. Divisions 21, 22, 23, 26, 27, 28, and 33 Sections for installing underground mechanical and electrical utilities and buried mechanical and electrical structures.
  - 2. Division 31 20 00 Section "Site Clearing" for site stripping, grubbing, stripping topsoil, and removal of above- and below-grade improvements and utilities.

##### 1.03 UNIT PRICES

- A. A. All excavation is to be unclassified to the "Cut line" regardless of material encountered. This shall include, but not limited to the following:
  - 1. Stripping, stockpiling, re-plating, of topsoil where applicable and removal of all excess topsoil from the site.
  - 2. Grubbing.
  - 3. Utility trench excavations.
  - 4. Excavation and embankment placement to required lines, grades, and elevations.
  - 5. Preparation of areas to receive fill and preparation of excavation areas.
  - 6. Undercutting of soft, unsuitable soils and replaced with compacted engineered fill from an off-site source.
  - 7. Moisture conditioning & re-compacting the on-site soils for suitable placement as engineered fill.
  - 8. Preparing subgrades for slabs on grade, walks, pavements, lawns, and plantings.

##### 1.04 DEFINITIONS

- A. Backfill: Soil material or controlled low-strength material used to fill an excavation.
  - 1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
  - 2. Final Backfill: Backfill placed over initial backfill to fill a trench.

- B. Base Course: Aggregate layer placed between the subbase course and hot-mix asphalt paving.
- C. Bedding Course: Aggregate layer placed over the excavated subgrade in a trench before laying pipe.
- D. Borrow Soil: Satisfactory soil imported from off-site for use as fill or backfill.
- E. Drainage Course: Aggregate layer supporting the slab-on-grade that also minimizes upward capillary flow of pore water.
- F. Excavation: Removal of material encountered above subgrade elevations and to lines and dimensions indicated.
  - 1. Authorized Additional Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions as directed by Architect. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
  - 2. Bulk Excavation: Excavation more than 10 feet in width and more than 30 feet in length.
  - 3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated lines and dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.
- G. Fill: Soil materials used to raise existing grades.
- H. Rock: Rock material in beds, ledges, unstratified masses, conglomerate deposits, and boulders of rock material that exceed 1 cu. yd. for bulk excavation or 3/4 cu. yd. for footing, trench, and pit excavation that cannot be removed by rock excavating equipment equivalent to the following in size and performance ratings, without systematic drilling, ram hammering, ripping, or blasting, when permitted:
  - 1. Excavation of Footings, Trenches, and Pits: Late-model, track-mounted hydraulic excavator; equipped with a 42-inch- wide, maximum, short-tip-radius rock bucket; rated at not less than 138-hp flywheel power with bucket-curling force of not less than 28,700 lbf and stick-crowd force of not less than 18,400 lbf with extra-long reach boom; measured according to SAE J-1179.
  - 2. Bulk Excavation: Late-model, track-mounted loader; rated at not less than 230-hp flywheel power and developing a minimum of 47,992-lbf breakout force with a general-purpose bare bucket; measured according to SAE J-732.
- I. 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.
- J. Subbase Course: Aggregate layer placed between the subgrade and base course for hot-mix asphalt pavement, or aggregate layer placed between the subgrade and a cement concrete pavement or a cement concrete or hot-mix asphalt walk.
- K. Subgrade: Uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, drainage fill, drainage course, or topsoil materials.
- L. Cut Line: In a cut section, the cut line shall be defined as subgrade elevation or elevation required by other specified hold down, over excavation, trench excavation, etc. In a fill section, the cut line shall be defined as the elevation achieved upon completion of all topsoil stripping, grubbing operations, etc. as approved by the owner's onsite geotechnical engineer prior to placing fill material.
- M. Utilities: On-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

#### **1.05 SUBMITTALS**

- A. Product Data: For each type of the following manufactured products required:
  - 1. Geotextiles.
  - 2. Warning tapes.

- B. Qualification Data: For qualified testing agency.
- C. Material Test Reports: For each on-site and borrow soil material proposed for fill and backfill as follows:
  - 1. Classification according to ASTM D 2487.
  - 2. Laboratory compaction curve according to ASTM D 698.

#### **1.06 QUALITY ASSURANCE**

- A. Geotechnical Testing Agency Qualifications: Qualified according to ASTM E 329 and ASTM D 3740 for testing indicated.

#### **1.07 PROJECT CONDITIONS**

- A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during earth moving operations.
  - 1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.
  - 2. Provide alternate routes around closed or obstructed traffic ways if required by Owner or authorities having jurisdiction.
- B. Improvements on Adjoining Property: Authority for performing earth moving indicated on property adjoining Owner's property will be obtained by Owner before award of Contract.
  - 1. Do not proceed with work on adjoining property until directed by Architect.
- C. Utility Locator Service: Notify utility locator service for area where Project is located before beginning earth moving operations.
- D. Do not commence earth moving operations until temporary erosion- and sedimentation-control measures, specified in Division 31 Section "Site Clearing," are in place.
- E. The following practices are prohibited within protection zones:
  - 1. Storage of construction materials, debris, or excavated material.
  - 2. Parking vehicles or equipment.
  - 3. Foot traffic.
  - 4. Erection of sheds or structures.
  - 5. Impoundment of water.
  - 6. Excavation or other digging unless otherwise indicated.
  - 7. Attachment of signs to or wrapping materials around trees or plants unless otherwise indicated.
- F. Do not direct vehicle or equipment exhaust towards protection zones.
- G. Prohibit heat sources, flames, ignition sources, and smoking within or near protection zones.

### **PART 2 PRODUCTS**

#### **2.01 SOIL MATERIALS**

- A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.
- B. Satisfactory Soils (on site): Soil Classification Groups GW, GP, GM, GC, SC, SW, SP, SM, ML, and CL according to ASTM D 2487, or a combination of these groups; free of rock or gravel larger than 4 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter.
  - 1. Liquid Limit: less than 50
  - 2. Plasticity Index: less than 25



- C. Unsatisfactory Soils: Soil Classification Groups OL, CH, MH, OH, and PT according to ASTM D 2487, or a combination of these groups.
  - 1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.
- D. Offsite Borrow Soils: granular soils that are free of organics or deleterious materials with no more than 20 percent passing a No. 200 sieve and that have a plasticity index of no more than 6.
- E. Subbase Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- F. Base Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 95 percent passing a 1-1/2-inch sieve and not more than 8 percent passing a No. 200 sieve.
- G. Engineered Fill: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; with at least 90 percent passing a 1-1/2-inch sieve and not more than 12 percent passing a No. 200 sieve.
- H. Bedding Course: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.
- I. Drainage Course: Narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ASTM D 448; coarse-aggregate grading Size 57; with 100 percent passing a 1-1/2-inch sieve and 0 to 5 percent passing a No. 8 sieve.
- J. Filter Material: Narrowly graded mixture of natural or crushed gravel, or crushed stone and natural sand; ASTM D 448; coarse-aggregate grading Size 67; with 100 percent passing a 1-inch sieve and 0 to 5 percent passing a No. 4 sieve.
- K. Sand: ASTM C 33; fine aggregate.
- L. Impervious Fill: Clayey gravel and sand mixture capable of compacting to a dense state.

## **2.02 ACCESSORIES**

- A. Warning Tape: Acid- and alkali-resistant, polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick, continuously inscribed with a description of the utility; 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.
- B. 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**

### **3.01 PREPARATION**

- A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earth moving operations.
- B. Protect and maintain erosion and sedimentation controls during earth moving operations.
- C. Protect subgrades and foundation soils from freezing temperatures and frost. Remove temporary protection before placing subsequent materials.

### **3.02 DEWATERING**

Dewatering methods, execution and compliance with applicable regulations is the sole responsibility of the contractor.

- A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.
- B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.
  - 1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.

### **3.03 EXPLOSIVES (DO NOT USE)**

### **3.04 EXCAVATION, GENERAL**

- A. All excavation on this project is unclassified regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.
- B. Material encountered in grading operation that, in the opinion of the Geotechnical Engineer or Owner, is unsuitable or undesirable shall be as follows:
  - 1. The removal of unsuitable material will be directed by the Geotechnical Engineer or his field representative. All unsuitable material that is removed by the Contractor shall become the property of the Contractor and be disposed of off site or in a manner satisfactory to the Owner at no additional cost.
  - 2. Back fill for these areas will be with material approved by the Geotechnical Engineer, with layers of acceptable material compacted to the requirements set forth in these specifications.
- C. Undercutting and replacement of unsuitable soils may be required to the underlying stiff soils. All undercut and replacement shall be directed by the Geotechnical Engineer.

### **3.05 EXCAVATION FOR STRUCTURES**

- A. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.1 ft. Extend excavations a minimum of 5' in 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.
- B. Undercutting and replacement of unsuitable soils may be required to the underlying stiff soils. All undercut and replacement shall be directed by the Geotechnical Engineer.

### **3.06 EXCAVATION FOR WALKS AND PAVEMENTS**

- A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades, to a distance of 5' beyond the edge of these walks and pavements.

### **3.07 EXCAVATION FOR UTILITY TRENCHES**

- A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.
- B. Excavate trenches to uniform widths to provide the following clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit unless otherwise indicated.
  1. Clearance: 12 inches each side of pipe or conduit.
- C. Trench Bottoms: Excavate trenches 4 inches deeper than bottom of pipe and conduit elevations to allow for bedding course. Hand-excavate deeper for bells of pipe.
  1. Excavate trenches 6 inches deeper than elevation required in rock or other unyielding bearing material to allow for bedding course.

### **3.08 SUBGRADE INSPECTION**

- A. Notify the onsite Geotechnical Engineer when excavations have reached required subgrade.
- B. If the onsite Geotechnical Engineer determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
- C. In the presence and at the direction of the onsite Geotechnical Engineer proof-roll subgrade below the building slabs and pavements with a pneumatic-tired and loaded 10-wheel, tandem-axle dump truck weighing not less than 15 tons to identify soft pockets and areas of excess yielding. Do not proof-roll wet or saturated subgrades.
  1. Completely proof-roll subgrade in one direction, repeating proof-rolling in direction perpendicular to first direction. Limit vehicle speed to 3 mph.
  2. Excavate soft spots, unsatisfactory soils, and areas of excessive pumping or rutting, as determined by the onsite Geotechnical Engineer, and replace with compacted backfill or fill as directed.
- D. Authorized additional excavation and replacement material will be paid for according to Contract provisions for unit prices.
- E. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by the onsite Geotechnical Engineer, without additional compensation.

### **3.09 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 of 3000 psi, may be used when approved by Architect.
  1. Fill unauthorized excavations under other construction, pipe, or conduit as directed by Architect.

### **3.10 EXCAVATION, GENERAL**

- A. Stockpile borrow soil materials and excavated satisfactory soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
  1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

### **3.11 BACKFILL**

- A. Place and compact backfill in excavations promptly, but not before completing the following:
  1. Construction below finish grade including, where applicable, subdrainage, dampproofing, waterproofing, and perimeter insulation.
  2. Surveying locations of underground utilities for Record Documents.

3. Testing and inspecting underground utilities.
  4. Removing concrete formwork.
  5. Removing trash and debris.
  6. Removing temporary shoring and bracing, and sheeting.
  7. Installing permanent or temporary horizontal bracing on horizontally supported walls.
- B. Place backfill on subgrades free of mud, frost, snow, or ice.

### **3.12 UTILITY TRENCH BACKFILL**

- A. Place backfill on subgrades free of mud, frost, snow, or ice.
- B. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.
- C. Trenches under Footings: Backfill trenches excavated under footings and within 18 inches of bottom of footings with satisfactory soil; fill with concrete to elevation of bottom of footings. Concrete is specified in Division 03 Section "Cast-in-Place Concrete."
- D. Backfill with acceptable borrow or dense-graded crushed stone in 4 to 6 inch loose lifts compacted with mechanical piston tampers. Compaction outside of pavement areas shall be to at least 95 percent of Standard Proctor Density. Compaction beneath pavement or building areas shall be to at least 98 percent of Standard Proctor Density.
- E. Backfill voids with satisfactory soil while removing shoring and bracing.
- F. Place and compact initial backfill of satisfactory soil, free of particles larger than 1 inch in any dimension, to a height of 12 inches over the pipe or conduit.
1. Carefully compact initial backfill under pipe haunches and compact evenly up on both sides and along the full length of piping or conduit to avoid damage or displacement of piping or conduit. Coordinate backfilling with utilities testing.
- G. Controlled Low-Strength Material: Place initial backfill of controlled low-strength material to a height of 12 inches over the pipe or conduit. Coordinate backfilling with utilities testing.
- H. Place and compact final backfill of satisfactory soil to final subgrade elevation.
- I. Controlled Low-Strength Material: Place final backfill of controlled low-strength material to final subgrade elevation.
- J. Install warning tape directly above utilities, 12 inches below finished grade, except 6 inches below subgrade under pavements and slabs.

### **3.13 SOIL FILL**

- A. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.
- B. Place and compact fill material in layers to required elevations as follows:
1. Under grass and planted areas, use satisfactory soil material.
  2. Under walks and pavements, use satisfactory soil material.
  3. Under steps and ramps, use engineered fill.
  4. Under building slabs, use engineered fill.
  5. Under footings and foundations, use engineered fill.
- C. Place soil fill on subgrades free of mud, frost, snow, or ice.

### **3.14 SOIL MOISTURE CONTROL**

- A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill soil layer before compaction to within 2 percent of optimum moisture content.
1. Do not place backfill or fill soil material on surfaces that are muddy, frozen, or contain frost or ice.

2. Remove and replace, or scarify and air dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

### **3.15 COMPACTION OF SOIL BACKFILLS AND FILLS**

- A. Place backfill and fill soil materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.
- B. Place backfill and fill soil materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.
- C. Compact soil materials to not less than the following percentages of Standard Proctor Density according to ASTM D 698:
  1. Under structures, pools, building slabs, and steps, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill soil material to at least 100 percent.
  2. Under walkways and pavements, scarify and recompact top 8 inches of material either existing after cutting to grade or fill material to at least 100 percent. Each layer of backfill/fill soils, up to the top layer, should be compacted to at least 98 percent.
  3. Under turf or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill soil material at 95 percent.
  4. For utility trenches, compact each layer of initial and final backfill soil material at 98 percent.

### **3.16 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 Rough Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
  1. Turf or Unpaved Areas: Plus or minus 1 inch.
  2. Walks: Plus or minus 1/2 inch.
  3. Pavements: Plus or minus 1/2 inch.
- C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

### **3.17 SUBBASE AND BASE COURSES UNDER PAVEMENTS AND WALKS**

- A. Place subbase course and base course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place subbase course 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 course and base course to required crown elevations and cross-slope grades.
  3. Place subbase course and base course 6 inches or less in compacted thickness in a single layer.
  4. Place subbase course 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 course and base course at optimum moisture content to required grades, lines, cross sections, and thickness to not less than 98 percent of Standard Proctor Density according to ASTM D 698.
- C. Pavement Shoulders: Place shoulders along edges of subbase course 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 98 percent of Standard Proctor Density according to ASTM D 698.

### **3.18 DRAINAGE COURSE UNDER CONCRETE SLABS-ON-GRADE**

- A. Place drainage course on subgrades free of mud, frost, snow, or ice.
- B. On prepared subgrade, place and compact drainage course under cast-in-place concrete slabs-on-grade as follows:
  1. Place drainage course 6 inches or less in compacted thickness in a single layer.
  2. Place drainage 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 drainage course to required cross sections and thicknesses to not less than 98 percent of Standard Proctor Density to ASTM D 698.

### **3.19 FIELD QUALITY CONTROL**

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
  1. Determine prior to placement of fill that site has been prepared in compliance with requirements.
  2. Determine that fill material and maximum lift thickness comply with requirements.
  3. Determine, at the required frequency, that in-place density of compacted fill complies with requirements.
- B. Testing Agency: Owner will engage a qualified geotechnical engineering testing agency to perform tests and inspections.
- C. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earth moving only after test results for previously completed work comply with requirements.
- D. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.
- E. Testing agency will test compaction of soils in place according to ASTM D 1556, ASTM D 2167, ASTM D 2922, and ASTM D 2937, as applicable. Tests will be performed at the following locations and frequencies at a minimum:
  1. Paved and Building Slab Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2500 sq. ft. or less of paved area or building slab, but in no case fewer than three tests.
  2. Foundation Wall Backfill: At each compacted backfill layer, at least one test for every 100 feet or less of wall length, but no fewer than two tests.
  3. Trench Backfill: At each compacted initial and final backfill layer, at least one test for every 150 feet or less of trench length, but no fewer than two tests.
- F. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil materials to depth required; recompact and retest until specified compaction is obtained.

### **3.20 PROTECTION**

- A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, ponding of water and erosion. Keep free of trash and debris.
- B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
  - 1. Scarify or remove and replace soil material to depth as directed by the Geotechnical Engineer; reshape and recompact.
- C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
  - 1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

### **3.21 DISPOSAL OF SURPLUS AND WASTE MATERIALS**

- A. Remove surplus satisfactory soil and waste materials, including unsatisfactory soil, trash, and debris, and legally dispose of them off Owner's property.

**END OF SECTION**

**SECTION 31 31 16**  
**TERMITE CONTROL**

**PART 1 GENERAL**

**1.01 SECTION INCLUDES**

- A. Chemical soil treatment.

**1.02 RELATED REQUIREMENTS**

- A. Section 03 30 00 - Cast-in-Place Concrete: Vapor barrier placement under concrete slab-on-grade.

**1.03 REFERENCE STANDARDS**

- A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; 2006.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.
- C. Certificate of compliance from authority having jurisdiction indicating approval of toxicants.
- D. Manufacturer's Instructions: Indicate caution requirement.
- E. Installer Qualifications: Company specializing in performing work of the type specified and with minimum three (3) years of documented experience.
- F. Warranty: Submit warranty and ensure that forms have been completed in Owner's name.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing this type of work and:
  - 1. Approved by manufacturer of treatment materials.
  - 2. Licensed in the State in which the Project is located.

**1.06 WARRANTY**

- A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
- B. Provide five year installer's warranty against damage to building caused by termites.

**PART 2 PRODUCTS**

**2.01 CHEMICAL SOIL TREATMENT**

- A. Toxicant Chemical: EPA (Title 7, United States Code, 136 through 136y) approved; synthetically color dyed to permit visual identification of treated soil.
- B. Diluent: Recommended by toxicant manufacturer.
- C. Manufacturers:
  - 1. Bayer Environmental Science Corp: [www.backedbybayer.com/pest-management/#sle](http://www.backedbybayer.com/pest-management/#sle).
  - 2. FMC Professional Solutions: [www.fmcprosolutions.com/#sle](http://www.fmcprosolutions.com/#sle).
  - 3. Syngenta Professional Products: [www.syngentaprofessionalproducts.com/#sle](http://www.syngentaprofessionalproducts.com/#sle).
  - 4. Substitutions: See Section 01 60 00 - Product Requirements.
- D. Mixes: Mix toxicant to manufacturer's instructions.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.
- B. Verify final grading is complete.



### **3.02 APPLICATION - CHEMICAL TREATMENT**

- A. Comply with requirements of U.S. EPA and applicable state and local codes.
- B. Spray apply toxicant in accordance with manufacturer's instructions.
- C. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.
- D. Re-treat disturbed treated soil with same toxicant as original treatment.
- E. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

### **3.03 PROTECTION**

- A. Do not permit soil grading over treated work.

**END OF SECTION**

**SECTION 31 6213  
CONCRETE PILES**

**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 solid, precast prestressed concrete piles.

**1.3 BASIS FOR PAYMENT – UNIT PRICES**

- A. Basis of Bids: Bid concrete piling construction on the Engineer's estimated quantities and Unit Price Schedule. The total will be used in determining the Base Price.
- B. Quantities are furnished for Bid purposes and are not intended to identify specific field conditions. Payment will be on actual field measured quantities based on the Unit Prices bid. The add and deduct cost per foot from the base bid estimated quantity will be at the same unit price.
- C. Basis for Payment: Payment will be made only on approved actual quantities at the Unit Price Bid (No payment will be made for rejected piles, including piles driven out of tolerance, defective piles, or piles damaged during handling or driving).
  - 1. Concrete Piling Construction (Overhead, including move in and move out, layout, removal of spoils and supervision): Lump Sum
  - 2. Piling (Length of piling purchased and delivered): Linear Foot.
  - 3. Piling (Length of piling driven, includes labor, materials, tools, equipment and incidentals for driving, cutting off, predrilling, and disposing of cutoffs.): Linear Foot.
  - 4. Static Load Tests: Lump Sum
  - 5. Dynamic Load Tests: Lump Sum
  - 6. Restrike Test of Production Piles: Lump Sum

**1.4 PERFORMANCE REQUIREMENTS**

- A. Structural Performance: Piles shall withstand transportation, erection, and driving stresses and design loads within limits indicated and under conditions existing at Project site.
  - 1. Design Working Loads:  
18", -60 ft; compression – 245 kips; uplift – 110 kips
- B. Delegated Design: Design piles, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

**1.5 SUBMITTALS**

- A. Product Data: For each type of product indicated.

- B. Shop Drawings: For concrete piles. Prepared by or under the supervision of a qualified professional engineer detailing fabrication and lifting devices necessary for handling and driving piles.
  - 1. Indicate pile dimensions, cross sections, locations, and sizes. Show details of pile splices and shoes.
  - 2. Indicate types of reinforcement, including prestressing strand, and detail fabricating, bending, and placing.
  - 3. Indicate layout and dimensions, and identify each pile. Indicate welded connections by AWS standard symbols. Detail cast-in hardware.
  - 4. Indicate transportation, storage, and lifting points.
- C. Delegated-Design Submittal: For concrete piles indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
- D. Qualification Data: For qualified Installer, manufacturer, professional engineer, and testing agency.
- E. Design Mixes: For each concrete mix.
- F. Material Certificates: For steel reinforcements prestressing strand and concrete admixtures, from manufacturer.
- G. Material Test Reports: For concrete materials.
- H. Pile-Driving Equipment Data: Include type, make, and rated energy range; weight of striking part of hammer; weight of drive cap; and, type, size, and properties of hammer cushion.
- I. Dynamic Pile Test Reports: Submit within three days of completing each test.
- J. Static Pile Test Report: Submit within three days of completing each test.
- K. Pile-Driving Records: Submit within three days of driving each pile.
- L. Field quality-control reports.
- M. Preconstruction Photographs: Photographs or video of existing conditions of adjacent construction. Submit before the Work begins.
- N. Certified Pile As Built Survey: Submit within 7 days of pile driving completion.

## **1.6 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: A qualified manufacturer complying with the following:
  - 1. Engineering Responsibility: Assumes engineering responsibility to comply with requirements in "Performance Requirements" Article by engaging a qualified professional engineer to prepare design calculations, Shop Drawings, and other structural data for piles.
  - 2. PCI Plant Certification Program: Participates in PCI's Plant Certification Program and is designated a PCI-Certified Plant for C2 product group and category, or better.
- B. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
  - 1. Installer's responsibility includes engaging a qualified professional engineer to prepare pile-driving records.

- C. Testing Agency Qualifications: An Owner hired independent testing agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
- D. Design Practices: Comply with ACI 318 (ACI 318M) and the recommendations in PCI Committee Report: "Recommended Practice for Design, Manufacture and Installation of Prestressed Concrete Piling."
- E. Quality-Control Standard: For manufacturing procedures and testing requirements, quality-control recommendations, and dimensional tolerances for piles, comply with applicable requirements in PCI MNL-116, "Manual for Quality Control for Plants and Production of Structural Precast Concrete Products."
- F. Comply with requirements in ACI 301, "Specifications for Structural Concrete."
- G. Preinstallation Conference: Conduct conference at Project site.

### **1.7 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver piles to Project site in such quantities and at such times to ensure continuity of installation. Handle and store piles at Project site to prevent cracking, distorting, warping, or other physical damage, and so markings are visible.
- B. Lift and support piles only at designated lifting or supporting points as shown on Shop Drawings.

### **1.8 PROJECT CONDITIONS**

- A. Protect structures, underground utilities, and other construction from damage caused by pile driving.
- B. Site Information: A geotechnical report has been prepared for this Project and is included elsewhere in the Project Manual for information only.
- C. Preconstruction Photographs: Inventory and record the condition of adjacent structures, underground utilities, and other construction. Provide photographs or video of conditions that might be misconstrued as damage caused by pile driving. Comply with Section 013233 "Photographic Documentation."

## **PART 2 - PRODUCTS**

### **2.1 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. Gulf Coast Pre-stress Incorporated.
  - 2. Standard Concrete Products.

### **2.2 MOLD MATERIALS**

- A. Molds: Provide molds of metal, plastic, wood, or another material that is nonreactive with concrete and will produce required finish surfaces.

### **2.3 STEEL REINFORCEMENT**

- A. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (Grade 420); deformed.
- B. Low-Alloy-Steel Reinforcing Bars: ASTM A 706/A 706M.
- C. Epoxy-Coated Reinforcing Bars: ASTM A 775/A 775M or ASTM A 934/A 934M, as follows:

1. Steel Reinforcement: ASTM A 615/A 615M, Grade 60 (Grade 420), deformed.
- D. Plain Steel Wire: ASTM A 82/A 82M, as drawn galvanized.
- E. Deformed-Steel Wire: ASTM A 496/A 496M.
- F. Epoxy-Coated-Steel Wire: ASTM A 884/A 884M, Class A coated, deformed.

## **2.4 PRESTRESSING TENDONS**

- A. Prestressing Strand: ASTM A 416/A 416M, 270 or 1860; uncoated, seven-wire, low-relaxation strand.

## **2.5 CONCRETE MATERIALS**

- A. General: Limit water-soluble chloride ions in concrete to the maximum percentage by mass of cementitious material permitted by ACI 318 (ACI 318M), but not more than 0.06 percent.
- B. Portland Cement: ASTM C 150, Type II, of same type, brand, and source.
  1. Fly Ash: ASTM C 618, Class C or F.
  2. Silica Fume: ASTM C 1240, amorphous silica.
- C. Normal-Weight Aggregates: Except as modified by PCI MNL-116, ASTM C 33, with coarse aggregates complying with Class 4S. Provide aggregates from single source.
  1. Nominal Maximum Size of Aggregate: 3/4 inch (19 mm).
- D. Water: Potable, free of deleterious material that may affect color stability, setting, or strength of concrete, and complying with chemical limits of PCI MNL-116.
- E. Admixtures: Provide admixtures certified by manufacturer to be compatible with other admixtures.
  1. Air-Entraining Admixture: ASTM C 260.
  2. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  3. Retarding Admixture: ASTM C 494/C 494M, Type B.
  4. Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type D.
  5. Water-Reducing and Accelerating Admixture: ASTM C 494/C 494M, Type E.
  6. High-Range, Water-Reducing Admixture: ASTM C 494/C 494M, Type F.
  7. High-Range, Water-Reducing and Retarding Admixture: ASTM C 494/C 494M, Type G.
  8. Plasticizing and Retarding Admixture: ASTM C 1017/C 1017M, Type II.

## **2.6 CONCRETE MIXES**

- A. Prepare design mixes for each type of concrete required.
  1. Limit use of fly ash and silica fume to not exceed, in total, 25 percent of portland cement by weight.

- B. Design mixes may be prepared by a qualified independent testing agency or by qualified personnel at precast manufacturing plant at precast manufacturer's option.
- C. Proportion mixes by either laboratory trial batch or field test data methods according to ACI 211.1, with materials to be used on Project, to provide normal-weight concrete with the following properties:
  - 1. Compressive Strength (28 Days): 6000 psi (41.4 MPa).
  - 2. Maximum Water-Cementitious Material Ratio: 0.40.
- D. Add air-entraining admixture at manufacturer's prescribed rate to result in normal-weight concrete at point of placement having an air content of 6.0 percent, plus or minus 1.5 percent.

## 2.7 FABRICATION

- A. Molds: Accurately construct molds, mortar tight, of sufficient strength to withstand pressures due to concrete placement, temperature changes, and for pretensioning and detensioning operations. Maintain molds to provide completed piles of shapes, lines, and dimensions indicated, within fabrication tolerances specified in PCI MNL-116 and PCI MNL-135.
  - 1. Unless molds are stripped before detensioning, design molds so stresses are not induced in piles due to deformation of concrete under prestress or movement during detensioning.
  - 2. Chamfer edges and corners of square piles.
- B. Reinforcement: Comply with recommendations in CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement. Clean reinforcement of loose rust and mill scale, earth, and other materials that reduce or destroy bond with concrete.
  - 1. Accurately position, support, and secure reinforcement against displacement by molds, construction, or concrete placement. Locate and support reinforcement by metal chairs, runners, bolsters, spacers, and hangers, as required.
  - 2. Place reinforcement to obtain at least the minimum coverages for concrete protection. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position while placing concrete. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- C. Prestress tendons for piles by either pretensioning or post-tensioning methods. Comply with PCI MNL-116.
- D. Mix concrete according to PCI MNL-116 and requirements in this Section. After initial concrete batching, no additional water may be added.
- E. Place concrete in a continuous operation to prevent seams or planes of weakness from forming in piles. Comply with requirements in PCI MNL-116 for measuring, mixing, transporting, and placing concrete.
  - 1. Thoroughly consolidate placed concrete by internal and external vibration without dislocating or damaging reinforcement and built-in items. Use equipment and procedures complying with PCI MNL-116.
  - 2. Comply with ACI 306.1 procedures for cold-weather concrete placement.
  - 3. Comply with ACI 305R recommendations for hot-weather concrete placement.
- F. Identify pickup points of piles with permanent markings corresponding with markings indicated on Shop Drawings. Imprint casting date on each pile.

- G. Cure concrete according to requirements in PCI MNL-116 by moisture retention without heat or by accelerated heat curing using low-pressure live steam or radiant heat and moisture.
- H. Delay detensioning piles until concrete has attained at least 70 percent of its compressive strength as established by test cylinders cured under the same conditions as concrete.
  - 1. If concrete has been heat cured, detension while concrete is still warm and moist to avoid dimensional changes that may cause cracking or undesirable stresses.
  - 2. Detension pretensioned tendons either by gradually releasing tensioning jacks or by heat-cutting tendons, using a sequence and pattern to prevent shock or unbalanced loading.
- I. Where ends of strands will not be enclosed or covered, cut flush and cover with a high-strength mortar bonded to unit with an epoxy-resin bonding agent.
- J. Fabricate precast prestressed concrete piles straight and true to size and shape with exposed edges and corners precise and true so each finished unit complies with PCI MNL-116 and PCI MNL-135 product tolerances.
- K. Finish: Fabricate concrete piles with normal plant-run finish produced in forms that impart a smooth finish to concrete. Small surface holes caused by air bubbles, normal color variations, form joint marks, and minor chips and spalls will be tolerated. Major or unsightly imperfections, honeycombs, or structural defects are not permitted.
- L. Finish unformed surfaces by trowel unless otherwise indicated. Consolidate concrete, bring to proper level with straightedge, float, and trowel to a smooth, uniform finish.
- M. Pile-Length Markings: Mark each pile with horizontal lines at 12-inch (305-mm) intervals; label the distance from pile tip at 60-inch (1.52-m) intervals. Maintain markings on piles until driven.

## **2.8 SOURCE QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified testing agency to evaluate pile manufacturer's quality-control and testing methods.
  - 1. Allow Owner's testing agency access to material storage areas, concrete production equipment, concrete placement, and curing facilities. Cooperate with Owner's testing agency and provide samples of materials and concrete mixes as may be requested for additional testing and evaluation.
- B. Testing: Test and inspect piles according to PCI MNL-116.
- C. Strength of piles will be considered deficient if units fail to comply with requirements.
- D. Testing: If there is evidence that strength of piles may be deficient or may not comply with PCI MNL-116 requirements, Owner will employ an independent testing agency to obtain, prepare, and test cores drilled from hardened concrete to determine compressive strength according to ASTM C 42/C 42M.
  - 1. A minimum of three representative cores shall be taken from piles of suspect strength, from locations directed by Architect.
  - 2. Cores shall be tested, following immersion in water, in a wet condition per ACI 301 if piles will be wet under service conditions.
  - 3. Cores shall be tested in an air-dry condition per ACI 301 if piles will be dry under service conditions.

4. Strength of concrete for each series of three cores shall be considered satisfactory if average compressive strength is at least 85 percent of the 28-day design compressive strength and no core compressive strength is less than 75 percent of the 28-day design compressive strength.
5. Test results shall be reported in writing on same day that tests are performed, with copies to Architect, Contractor, and pile manufacturer. Test reports shall include the following:
  - a. Project identification name and number.
  - b. Date when tests were performed.
  - c. Name of precast concrete manufacturer.
  - d. Name of concrete testing agency.
  - e. Identification letter, name, and type of pile represented by core tests; design compressive strength; type of break; compressive strength at break, corrected for length-diameter ratio; and direction of applied load to core in relation to horizontal plane of concrete as placed.
- E. Patching: If core test results are satisfactory and piles comply with requirements, solidly fill core holes with patching mortar and finish to match adjacent pile surfaces.
- F. Piles will be considered defective if they do not pass tests and inspections.

### **PART 3 - EXECUTION**

#### **3.1 EXAMINATION**

- A. Site Conditions: Do not start pile-driving operations until earthwork fills have been completed or excavations have reached an elevation of 6 to 12 inches (152 to 305 mm) above bottom of footing or pile cap.

#### **3.2 DRIVING EQUIPMENT**

- A. Pile Hammer: Air-, steam-, hydraulic-, or diesel-powered type capable of consistently delivering adequate peak-force duration and magnitude to develop the ultimate capacity required for type and size of pile driven and character of subsurface material anticipated.
  1. Use pile hammer capable of adjustment to deliver reduced impact to maintain tensile stress within 70 percent of yield strength of pile reinforcement.
- B. Hammer Cushions and Driving Caps: Between hammer and top of pile, provide hammer cushion and steel driving cap as recommended by hammer manufacturer and as required to drive pile without damage.
- C. Leads: Use fixed, semifixed, or hanging-type pile-driver leads that will hold full length of pile firmly in position and in axial alignment with hammer.

#### **3.3 STATIC LOAD TESTING**

- A. General: A representative test pile shall be driven in the designated location and loaded to verify the minimum bearing capacity. The minimum bearing capacity shall be verified by static testing methods. Correlation between static and dynamic test results will be required prior to using a dynamic test to verify minimum bearing capacity of other test and production piles. The correlation shall also consist of applying a dynamic restrike to the test pile within 48 hours after completion of the static load test using the approved hammer system.



- B. The capacity determined by either test method is assumed to represent the minimum bearing capacity for each of the production piles that the test pile represents. A test pile represents a specific group of production piles that have the same size, design loading and site soil conditions. The test pile locations and the groups of production piles that each test pile represents will be designated by the project geotechnical engineer.
- C. Unless otherwise directed, test piles shall be driven at such locations as will permit their use in the finished structure. In no case shall test piles driven out of permanent pile locations be pulled and redriven as production piles. Test piles specified to be used as permanent piles in a structure shall have sufficient length to be cut off at plan grade for top of pile. In general, the specified length of test piles will be greater than the estimated length of production piles in order to provide for variation in soil conditions. Precast concrete test piles shall be a minimum of 10 feet {3 m} longer than the estimated length of piling shown on the plans.
- D. The driving equipment, aids and methods used for driving test piles shall be identical to that which the Contractor proposes to use on the production piling. Approval of driving equipment shall conform with the requirements of these specifications. If piling are to be driven in a pile footing, then the Contractor shall excavate the ground at each test pile footing location to the elevation of the bottom of the footing, before the pile is driven, unless shown on the plans or directed otherwise by the Engineer.
- E. Test piles shall be driven to a hammer blow count given on the blow count/bearing capacity graph. This graph shall be used as an estimate of the test pile's bearing capacity which uses the required minimum bearing capacity (equal to twice the design load) and stroke to obtain the required blow count for the test pile. Once the required blow count is reached, the bearing capacity shall be proven after a 7 day wait with a Static Load Test. This blow count and stroke, or the equivalent blow count and stroke, recorded during the last foot of driving of a passing Static Load Test Pile shall be used as the acceptance criteria for the production piling represented by this test pile. A revised bearing graph will be provided by the Geotechnical Engineer of Record that reflects the actual capacity of the test pile which shall be used to determine the bearing capacity of all production piles represented by this test pile.
- F. The Static Load Test indicates a failure if the bearing capacity determined from the load test is not equal to or greater than twice the design load. If the load test is a failure, the test pile shall be redriven. The blow count for the redrive shall be obtained by determining the blow count required for a theoretical increased bearing capacity. The blow count for the redrive shall be taken from the blow count/bearing capacity graph in accordance with the following formula:
- G. Load For Obtaining Redrive Blow Count =  $[2 \times (A - B)] + A$  A = Minimum Bearing Capacity, B = Load At Failure
- H. The test pile shall then be reloaded. This process shall be repeated as many times as necessary until the load test is determined to be a passing load test.
- I. Test piles driven to plan grade and not having the hammer blow count required may also be spliced and driven until the required bearing is obtained. Concrete splices must be approved by the Structural Engineer.
- J. Static load testing shall be used to verify the axial load bearing capacity of pile groups or individual piles. Static load testing should be used after a test pile has met the bearing capacity estimate based on blow count and hammer stroke from the provided bearing curves. A static load test may also be used in conjunction with a dynamic load test when verifying axial load bearing capacity of piling.
- K. When required, the length of piles to be driven shall be determined by the actual loading tests of any designated pile (Test or Production) in the structure. The test shall be performed as defined by ASTM D 1143, Standard Test Method for Piles Under Static Axial Compressive Load using the Quick Load Test Method. In general, these tests shall consist of the incremental application and removal of static pressure exerted on the pile through approved rigging, together with suitable apparatus for accurately determining the superimposed weight {mass} of pressure and pile settlement under each increment of load. The safe allowable load shall be determined by the Engineer from the settlement versus load curve generated by the incremental loading based on Davisson's failure criterion.
- L. A minimum 7 day waiting period shall be observed between the driving of a concrete load test pile and the commencement of the load testing unless otherwise specified in the contract or authorized by the Materials and

Tests Engineer. For piles other than concrete this waiting period shall be 36 hours. The Contractor may extend the waiting period as deemed necessary before performing a static load test to allow for maximum soil set up time.

- M. If the Quick Load Test is performed using adjacent production piles as reaction piles for the test pile, the involved production piles should be checked for any permanent upward displacement. If any upward displacement is found, then all production piles used as reaction piles for the Quick Load Test shall be redriven as necessary to correct any possible axial load bearing capacity problem with the involved piles. This redrive shall be performed at the Contractor's expense.
- N. The apparatus for applying the load shall be subject to the approval of the Geotechnical Engineer and have a capacity of 1000 tons {8900 kN} or 300 percent of the design load, whichever is less. Incremental loads of 10% of the design load shall be placed on the pile at 2.5 minute intervals until continuous jacking is required to maintain the incremental load or the capacity of the load frame is reached.
- O. All loading tests will be continually inspected by the Geotechnical Engineer. Time, load, and settlement data will be recorded immediately before and after the application of each load increment and at intermediate time intervals as specified. When the maximum load has been applied, readings will be taken and recorded when jacking has stopped. Additional readings will be taken after 2.5 minutes and again at 5 minutes. If a longer holding period is specified, additional readings will be taken as required. The load shall be removed after the required holding period in 4 equal parts, with time and rebound readings taken at each unloading increment. Readings will be taken immediately following each load removal, allowing 2.5 minutes between increments. Upon removal of the entire load, time and rebound readings will be taken and recorded. Additional time and rebound readings will be taken after 2.5 minutes and again at 5 minutes.
- P. Load test data will be plotted by the Geotechnical Engineer of Record in the form of settlement in inches {millimeters} (ordinate, positive down) versus applied load in kips {kN} (abscissa). Ultimate capacity predictions will be based upon Davisson's failure criterion as applied to the aforementioned settlement curve, as per FHWA's Manual on Design and Construction of Driven Pile Foundations. In this method, the elastic shortening of the pile ( $QL/AE$ , in inches {millimeters}) is superimposed on the settlement curve. In the elastic shortening equation, "Q" represents load in kips {kN}, "L" represents length of pile from settlement instrumentation to tip elevation in inches {meters}, "A" represents cross-sectional area in square inches {square meters} (at voided section, if a void is present), and "E" represents elastic modulus in ksi {MPa} (elastic modulus for concrete piles is preferably obtained from dynamic load testing, but may be calculated as 60,000 {5000} times the square root of the design compressive strength, in psi {MPa}, when dynamic load testing is not performed).
- Q. The aforementioned elastic shortening curve is then increased or offset, by  $0.15+D/120$  in inches { $3.81+D/120$  in millimeters} (where D = pile diameter or width in inches {mm}). The point in which the offset elastic shortening curve intersects the settlement curve is considered the ultimate pile capacity.

### **3.4 DYNAMIC PILE TESTING**

- A. General: Pile load testing: Information from the test pile program will be used by the Engineer to confirm production pile capacities, driving criteria and related installation requirements. Test piles installed successfully in undamaged condition to the minimum required tip elevation and penetration resistance shall be left in place as part of the permanent foundation system unless otherwise directed by the Geotechnical Engineer. Dynamic Pile Testing can be utilized using a Pile Driving Analyzer (PDA).
- B. PDA Testing should be performed in accordance with ASTM D4945.
- C. PDA testing should include CAPWAP analysis of an appropriate pile blow near the end of driving.
- D. Qualifications: PDA Testing Agency and resume of PDA Testing Agency's staff who will conduct the PDA Testing.

- E. PDA Testing Agency: Independent, certified, and at least 2 years' experience in similar testing including installing instrumentation, performing PDA tests, analyzing PDA data and providing CAPWAP results on site, if necessary.
- F. PDA Testing Agency Filed Personnel: At least 2 years' experience in installation of the test pile instrumentation and conduct of PDA testing.
- G. The test piles for each pile type and/or tip elevation shall be driven at the beginning of the project and the results of the tests will be utilized by the Geotechnical Engineer to confirm or modify the tip elevations shown in the drawings.
- H. Instrumentation and Preinstallation Meeting: To be held at least 14 days prior to the start of test pile installation. Attended by the Contractor, personnel from the PDA Testing Agency, pile installation personnel and the Geotechnical Engineer.
- I. Equipment type, Load Carrying Device, Load and Instrumentation: Conform to ASTM D4945 of same type as will be used for pile placement of the Work.
- J. Pile Driving Equipment: Use the same hammer, driving system and ancillary equipment to drive test piles as will be used to drive production piles.
- K. Test pile locations are to be determined by the Geotechnical Engineer. If any test pile becomes damaged or is otherwise unsuitable as a test pile, the number of test piles may be increased by the Geotechnical Engineer.
- L. Test Pile Preparation: Mark entire length of each test pile at 1-foot intervals and number marks consecutively starting at pile toe (tip) for the purpose of recording penetration resistance and depth of pile penetration. Make marks and numbering clearly visible for monitoring personnel. Upon request, place additional marks at 1-inch intervals for selected feet.
- M. Testing:
  - 1. Perform in accordance with ASTM D4945.
  - 2. Assist PDA Testing Agency personnel with testing as follows:
    - a. Prepare pile for dynamic monitoring and attach gauges in accordance with PDA Testing Agency instructions.
    - b. Drill test piles and attach gauges while test pile is on ground to check for proper fit.
    - c. After checking gauge attachments with PDA Testing Agency personnel and Engineer, remove gauges and cables from test pile segment, lift and spot pile, and place in leads.
    - d. Make pile available for instrumentation installation. Furnish and install gauges using necessary cables, bolts, and tools. Make platform available to Engineer upon request for observation of gauge installation.
    - e. Dynamic measurements will be taken by the PDA Testing Agency during pile driving, and during restriking of piles.
    - f. After gauges are attached and accepted by PDA Testing Agency personnel and Engineer, proceed with pile driving.
    - g. During dynamic monitoring, pile driving and installation are typical of ordinary driving. Once cable from gauges hangs freely down along pile to the monitoring station. PDA Testing Agency personnel or Engineer may stop driving to review data or change gauges or other equipment.

- h. Halt driving and assist as requested for gauge removal when level of gauges approaches the ground or water surface. If additional driving is required to reach planned termination depth, complete pile splices as applicable and repeat gauge attachment process at top of next segment prior to continuation of driving.

N. Test Pile Installation:

1. Meet all requirements specified in this section. Provide test piles that are 10 feet longer than estimated length of production piles.
2. Maintain pile orientation during driving:
  - a. Keep hammer concentric with driving train in axial alignment on pile.
  - b. Do not use hammer to limit deviation of pile during driving by exerting lateral forces or striking at an angle.
3. Terminate impact driving based on direction from Engineer.
  - a. Perform initial driving to a pile tip elevation equal to estimated minimum toe elevation as shown on the Plans.
  - b. Engineer will establish tentative driving criteria for test piles, using wave equation analysis and the Pile Hammer Data Sheet Submittal.
4. Provide a stable and suitable means or device to indicate penetration of the test piles, visible to Geotechnical Engineer and at a safe distance from pile driver (such as survey level on the apron).
5. If requested by Geotechnical Engineer, throttle back diesel or hydraulic hammer to operate at a reduced energy level as needed to protect the piles and avoid potential for high tension stresses in the pile.

O. Restriking Test Piles and Production Piles

1. Piles as directed by the Geotechnical Engineer to be restruck with a warmed up hammer unless otherwise directed by the Engineer. Contractor shall conduct HSDT on all test piles to be restruck and on restruck production piles when directed by the Engineer.
2. Time between completion of initial driving and restrike shall be 48 hours minimum unless otherwise directed by the Engineer.
3. Mount driving train on pile to attaching PDA gauges. Assist PDA Testing Agency personnel with gauge removal after completing the restrike but prior to removing pile driving train.
4. Restrike and drive piles to full penetration and termination criteria or practical refusal unless otherwise approved by the Engineer.

P. Frequency of PDA tests and CAPWAP Analysis: Conduct two PDA load tests with CAPWAP analysis for each pile type and/or tip elevation within each major structure. Pile monitoring with PDA shall be continuous over the full duration of installation driving and restrike driving. One CAPWAP analysis during initial driving shall be performed when the test pile penetration reaches the planned tip depth or as directed by the Geotechnical Engineer.

Q. For production piles selected by the Geotechnical Engineer for PDA testing during restrike, conduct PDA testing from start to end of restrike driving and conduct a minimum of two CAPWAP analyses of restruck piles.

R. DAMAGED, MISPLACED, OR OTHERWISE REJECTED PILES

1. Test piles found damaged, necked, or otherwise unfit for use that are located at production pile locations shall be replaced at no additional cost.
  2. Remove from site and replace with conforming piles.
- S. REPORTING: The PDA Testing Agency shall prepare a written report for each pile tested. This report shall include the results of testing work and shall contain a discussion of the pile capacity obtained from the dynamic testing. Plots of pile capacity with depth and hammer blow counts with depth shall be included in the report. The report shall also discuss hammer and driving system performance, driving stress levels, pile integrity and hammer setting or operational recommendations to prevent overstressing the pile during pile driving.

### 3.5 DRIVING PILES

- A. General: Continuously drive piles to elevations or penetration resistance indicated or established by static load testing of piles. Establish and maintain axial alignment of leads and piles before and during driving.
- B. Pre-drilling should not proceed below elevation -15 ft. without approval of the Geotechnical Engineer. The diameter of the pre-drilled hole shall not exceed 75% of the pile size.
1. Firmly seat pile in predrilled hole by driving with reduced energy before starting final driving.
- C. Heaved Piles: Redrive heaved piles to tip elevation at least as deep as original tip elevation with a driving resistance at least as great as original driving resistance.
- D. Driving Tolerances: Drive piles without exceeding the following tolerances, measured at pile heads:
1. Location: 4 inches (102 mm) from location indicated after initial driving, and 6 inches (152 mm) after pile driving is completed.
  2. Plumb: Maintain 1 inch (25 mm) in 4 feet (1.2 m) from vertical, or a maximum of 4 inches (102 mm), measured when pile is aboveground in leads.
  3. Batter Angle: Maximum 1 inch (25 mm) in 4 feet (1.2 m) from required angle, measured when pile is aboveground in leads.
- E. Abandon and cut off rejected piles as directed by Architect. Leave rejected piles in place and install new piles in locations as directed by Architect.
- F. Cutting Off: Cut off tops of driven piles square with pile axis and at elevations indicated.
- G. Buildups: Construct buildups to elevations indicated of cast-in-place reinforced concrete with compressive strength not less than 5000 psi (34.5 MPa) at 28 days.
- H. Pile-Driving Records: The Owner's Testing Agent shall maintain accurate driving records for each pile. Include the following data:
1. Project name and number.
  2. Name of Contractor.
  3. Type of pile and date of casting.
  4. Pile location in pile group and designation of pile group.
  5. Sequence of driving in pile group.

6. Pile dimensions.
  7. Ground elevation.
  8. Elevation of tips after driving.
  9. Final tip and cutoff elevations of piles after driving pile group.
  10. Records of re-driving.
  11. Elevation of splices.
  12. Type, make, model, and rated energy of hammer.
  13. Weight and stroke of hammer.
  14. Type of pile-driving cap used.
  15. Cushion material and thickness.
  16. Actual stroke and blow rate of hammer.
  17. Pile-driving start and finish times, and total driving time.
  18. Time, pile-tip elevation, and reason for interruptions.
  19. Number of blows for every 12 inches (305 mm) of penetration, and number of blows per 1 inch (25 mm) for the last 6 inches (152 mm) of driving.
  20. Pile deviations from location and plumb.
  21. Predrilling, or special procedures used.
  22. Unusual occurrences during pile driving.
- I. Certified Pile Survey: Engage a Professional Land Surveyor to prepare a pile survey showing final location of piles in relation to the property survey and existing benchmarks.
1. Notify Architect when deviations from locations exceed allowable tolerances.

### **3.6 FIELD QUALITY CONTROL**

- A. Special Inspections: Owner will engage a qualified special inspector to perform the following special inspections:
1. Pile foundations.
- B. Testing Agency: Owner will engage a qualified independent testing agency to perform tests and inspections.

### **3.7 DISPOSAL**

- A. Remove withdrawn piles and cutoff sections of piles from site and legally dispose of them off Owner's property.

**END OF SECTION 31 62 13**

## CONCRETE PILING FOUNDATION PROPOSAL FORM

Provide Concrete piling foundation on the lump sum and unit price basis indicated. Include the total of items A through D in the base bid. Quantities indicated are estimated and actual quantities may vary due to variable site conditions. Payment for piling, will be on the actual verified quantities purchased and installed times the unit price bid for either additions to or deductions from the estimated quantities indicated. The final contract amount will be adjusted per change order for the actual quantities installed at the completion of the Work.

A. Overhead (including move-in, move-out, layout, removal of spoils, supervision) \$ \_\_\_\_\_  
Lump Sum

B. Length of piling purchased and delivered  
18" – 22,000 LF (est.) @ \$ \_\_\_\_\_ /LF = \$ \_\_\_\_\_  
add or deduct

C. Length of piling driven (includes labor, materials, tools, equipment and incidentals for driving, cutting off, pre drilling and disposing of cutoffs.)  
18" – 22,000 LF (est.) @ \$ \_\_\_\_\_ /LF = \$ \_\_\_\_\_  
add or deduct

D. Static Load Tests (includes labor, materials, tools, equipment and incidentals for driving, cutting off, and pile testing) \$ \_\_\_\_\_  
Lump Sum/Test

E. Dynamic Load Tests (includes labor, materials, tools, equipment and incidentals for driving, cutting off, and pile testing) \$ \_\_\_\_\_  
Lump Sum/Test

F. Restrike Test of Production Piles (includes labor, materials, tools, equipment and incidentals for driving, cutting off, and pile testing) \$ \_\_\_\_\_  
Lump Sum/Test

TOTAL CONCRETE PILING FOUNDATION ALLOWANCE: \$ \_\_\_\_\_  
Include in Base Bid

**SECTION 32 13 13**  
**CONCRETE PAVING**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section Includes:
  - 1. Driveways.
  - 2. Curbs and gutters.
  - 3. Walks.
- B. Related Sections:
  - 1. Section 321373 "Concrete Paving Joint Sealants" for joint sealants in expansion and contraction joints within concrete paving and in joints between concrete paving and asphalt paving or adjacent construction.

**1.03 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.

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Where concrete pavements are specified, the contractor shall submit a joint plan for review.
- C. Samples for Initial Selection: For each type of product, ingredient, or admixture requiring color selection.
- D. Other Action Submittals:
  - 1. Design Mixtures: For each concrete paving mixture. Include alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

**1.05 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified ready-mix concrete manufacturer.
- B. Material Certificates: For the following, from manufacturer:
  - 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.
  - 8. Joint fillers.
- C. Material Test Reports: For each of the following:
  - 1. Aggregates.



- D. Field quality-control reports.

### **1.06 QUALITY ASSURANCE**

- A. Ready-Mix-Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C 94/C 94M requirements for production facilities and equipment.
  - 1. Manufacturer certified according to NRMCA's "Certification of Ready Mixed Concrete Production Facilities" (Quality Control Manual - Section 3, "Plant Certification Checklist").
- B. Testing Agency Qualifications: Qualified according to ASTM C 1077 and ASTM E 329 for testing indicated.
  - 1. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.
- C. Concrete Testing Service: Engage a qualified testing agency to perform material evaluation tests and to design concrete mixtures.
- D. ACI Publications: Comply with ACI 301 unless otherwise indicated.

### **1.07 PROJECT CONDITIONS**

- A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.
- B. Pavement-Marking Paint: Proceed with pavement marking only on clean, dry surfaces and at a minimum ambient or surface temperature of 40 deg F for oil-based materials, and not exceeding 95 deg F.

## **PART 2 - PRODUCTS**

### **2.01 FORMS**

- A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, and smooth exposed surfaces.
  - 1. Use flexible or uniformly curved forms for curves with a radius of 100 feet or less. Do not use notched and bent forms.
- B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and that will not impair subsequent treatments of concrete surfaces.

### **2.02 STEEL REINFORCEMENT**

- A. Plain-Steel Welded Wire Reinforcement: ASTM A 185/A 185M, fabricated from as-drawn galvanized-steel wire into flat sheets.
- B. Deformed-Steel Welded Wire Reinforcement: ASTM A 497/A 497M, flat sheet.
- C. Reinforcing Bars: ASTM A 615/A 615M, Grade 60; deformed.
- D. Deformed-Steel Wire: ASTM A 496/A 496M.
- E. 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.
- F. Tie Bars: ASTM A 615/A 615M, Grade 60, deformed.
- 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 specified, and as follows:

1. Equip wire bar supports with sand plates or horizontal runners where base material will not support chair legs.

### **2.03 CONCRETE MATERIALS**

- A. Cementitious Material: Use the following cementitious materials, of same type, brand, and source throughout Project:
  1. Portland Cement: ASTM C 150, gray portland cement Type I/II.
    - a. Fly Ash: ASTM C 618, Class C or Class F.
- B. Normal-Weight Aggregates: ASTM C 33, Class 1N, uniformly graded. Provide aggregates from a single source.
  1. Maximum Coarse-Aggregate Size: 3/4 inch nominal.
  2. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.
- C. Water: Potable and complying with ASTM C 94/C 94M.
- D. Air-Entraining Admixture: ASTM C 260.
- E. Chemical Admixtures: Admixtures certified by manufacturer to be compatible with other admixtures and to contain not more than 0.1 percent water-soluble chloride ions by mass of cementitious material.
  1. Water-Reducing Admixture: ASTM C 494/C 494M, Type A.
  2. Retarding Admixture: ASTM C 494/C 494M, Type B.
- F. Color Agent: For all exposed concrete including but not limited to drives, curb and gutters, aprons, walkways, bands, borders, steps, site walls, etc. Unless otherwise noted as requiring different coloring.
  1. Synthetic: ASTM C979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, nonfading, and resistant to lime and other alkalis. Medium Alabama Ochre by Alabama Pigment Company or a pre-approved equal. Mix per manufacturer's recommendation at a rate of 7 lbs/yard.

### **2.04 CURING MATERIALS**

- A. Absorptive Cover: AASHTO M 182, Class 3, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. dry or cotton mats.
- B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.
- C. Water: Potable.
- D. Evaporation Retarder: Waterborne, monomolecular, film forming, manufactured for application to fresh concrete.
- E. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B, dissipating.

### **2.05 RELATED MATERIALS**

- A. Joint Fillers: ASTM D 1751 or D 1752, asphalt-saturated cellulosic fiber in preformed strips.
- B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.
- C. Epoxy Bonding Adhesive: ASTM C 881/C 881M, two-component epoxy resin capable of humid curing and bonding to damp surfaces; of class suitable for application temperature, of grade complying with requirements, and of the following types:
  1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

## **2.06 DETECTABLE WARNING MATERIALS**

- A. Detectable Warnings: Preformed Cast-in-place tile-style detectable warnings. Manufactured by ADA Solutions; Style: Cast-in-Place panel, Color: Brick Red, or an approved equal.
  - 1. Detectable Warning area Size: shall be the area shown on Drawings. In no case shall the area be less than 24" wide in the direction of pedestrian travel.
  - 2. Pattern: Pavers shall be laid in running bond pattern.

## **2.07 PAVEMENT MARKINGS**

- A. Pavement-Marking Paint: Alkyd-resin type, lead and chromate free, ready mixed, complying with AASHTO M 248, Type S; colors complying with FS TT-P-1952.
  - 1. Color: As indicated.

## **2.08 WHEEL STOPS**

- A. Wheel Stops: Precast, air-entrained concrete, 2500-psi minimum compressive strength, 4-1/2 inches high by 9 inches wide by 72 inches long . Provide chamfered corners and drainage slots on underside and holes for anchoring to substrate.
  - 1. Dowels: Galvanized steel, 3/4 inch in diameter, 10-inch minimum length.

## **2.09 CONCRETE MIXTURES**

- A. Prepare design mixtures, proportioned according to ACI 301, for each type and strength of normal-weight concrete, and as determined by either laboratory trial mixtures or field experience.
  - 1. Use a qualified independent testing agency for preparing and reporting proposed concrete design mixtures for the trial batch method.
  - 2. When automatic machine placement is used, determine design mixtures and obtain laboratory test results that meet or exceed requirements.
- B. Proportion mixtures to provide normal-weight concrete with the following properties:
  - 1. Compressive Strength (28 Days): 4000 psi.
  - 2. Maximum Water-Cementitious Materials Ratio at Point of Placement: 0.50.
  - 3. Slump Limit: 5 inches, plus or minus 1 inch.
- C. Chemical Admixtures: Use admixtures according to manufacturer's written instructions.
- D. Color Pigment: Add color pigment to concrete mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

## **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.
  - 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.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Examine exposed subgrades and subbase surfaces for compliance with requirements for dimensional, grading, and elevation tolerances.
- B. Proof-roll prepared subbase surface below concrete paving to identify soft pockets and areas of excess yielding.
  - 1. Completely proof-roll subbase in one direction. Limit vehicle speed to 3 mph.

2. Proof-roll with a pneumatic-tired and loaded, 10-wheel, tandem-axle dump truck weighing not less than 15 tons.
  3. Correct subbase with soft spots and areas of pumping or rutting exceeding depth of 1/2 inch according to requirements in Section 312000 "Earth Moving."
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 PREPARATION**

- A. Remove loose material from compacted subbase surface immediately before placing concrete.

### **3.03 EDGE FORMS AND SCREED CONSTRUCTION**

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.
- B. Clean forms after each use and coat with form-release agent to ensure separation from concrete without damage.

### **3.04 STEEL REINFORCEMENT**

- A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating, placing, and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.
- D. Install welded wire reinforcement in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities, or replace units as required before placement. Set mats for a minimum 2-inch overlap of adjacent mats.

### **3.05 JOINTS**

- A. General: Form construction, isolation, and contraction joints and tool edges true to line, with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline unless otherwise indicated.
1. When joining existing paving, place transverse joints to align with previously placed joints unless otherwise indicated.
- B. Construction Joints: Set construction joints at side and end terminations of paving and at locations where paving operations are stopped for more than one-half hour unless paving terminates at isolation joints.
1. Continue steel reinforcement across construction joints unless otherwise indicated. Do not continue reinforcement through sides of paving strips unless otherwise indicated.
  2. Provide tie bars at sides of paving strips where indicated.
  3. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 50 feet unless otherwise indicated.
  2. Extend joint fillers full width and depth of joint.

3. Terminate joint filler not less than 1/2 inch or more than 1 inch below finished surface if joint sealant is indicated.
  4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
  5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
  6. During concrete placement, protect top edge of joint filler with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.
- D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with grooving tool to a **1/4-inch** radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate grooving-tool marks on concrete surfaces.
    - a. Tolerance: Ensure that grooved joints are within 3 inches either way from centers of dowels.
  2. Sawed Joints (not allowed in concrete sidewalks): 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.
    - a. Tolerance: Ensure that sawed joints are within 3 inches either way from centers of dowels.
  3. Doweled Contraction Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or coat with asphalt one-half of dowel length to prevent concrete bonding to one side of joint.
- E. Edging: After initial floating, tool edges of paving, gutters, curbs, and joints in concrete with an edging tool to a 1/4-inch radius. Repeat tooling of edges after applying surface finishes. Eliminate edging-tool marks on concrete surfaces.

### **3.06 CONCRETE PLACEMENT**

- A. Before placing concrete, inspect and complete formwork installation, steel reinforcement, and items to be embedded or cast-in.
- B. Remove snow, ice, or frost from subbase surface and steel reinforcement before placing concrete. Do not place concrete on frozen surfaces.
- C. Moisten subbase to provide a uniform dampened condition at time concrete is placed. Do not place concrete around manholes or other structures until they are at required finish elevation and alignment.
- D. Comply with ACI 301 requirements for measuring, mixing, transporting, and placing concrete.
- E. Do not add water to concrete during delivery or at Project site. Do not add water to fresh concrete after testing.
- F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.
- G. Consolidate concrete according to ACI 301 by mechanical vibrating equipment supplemented by hand spading, rodding, or tamping.
  1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand spreading and consolidation. Consolidate with care to prevent dislocating reinforcement dowels and joint devices.
- H. Screed paving surface with a straightedge and strike off.
- I. Commence initial floating using bull floats or darbies to impart an open-textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations or spreading surface treatments.

- J. Curbs and Gutters: Use design mixture for automatic machine placement. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing.
- K. Cold-Weather Placement: Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing, or low temperatures. Comply with ACI 306.1 and the following:
  - 1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F at point of placement.
  - 2. Do not use frozen materials or materials containing ice or snow.
  - 3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in design mixtures.
- L. Hot-Weather Placement: Comply with ACI 301 and as follows when hot-weather conditions exist:
  - 1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated in total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
  - 2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
  - 3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### **3.07 FLOAT 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. Medium-to-Fine-Textured Broom Finish: Draw a soft-bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.
  - 2. Medium-to-Coarse-Textured Broom Finish: Provide a coarse finish by striating float-finished concrete surface 1/16 to 1/8 inch deep with a stiff-bristled broom, perpendicular to line of traffic.

### **3.08 DETECTABLE WARNINGS**

- A. Detectable Warnings: Install detectable warnings as indicated in locations and slopes as shown on plans and ramp details and according to manufacturer's written instructions.

### **3.09 CONCRETE PROTECTION AND CURING**

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
- B. Comply with ACI 306.1 for cold-weather protection.
- C. Evaporation Retarder: Apply evaporation retarder to concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete but before float finishing.
- D. Begin curing after finishing concrete but not before free water has disappeared from concrete surface.
- E. Curing Methods: Cure concrete by moisture-retaining-cover curing curing compound or a combination of these as follows:
  - 1. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover, placed in widest practicable width, with sides and ends lapped at least 12 inches and

- sealed by waterproof tape or adhesive. Immediately repair any holes or tears occurring during installation or curing period using cover material and waterproof tape.
2. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas that have been subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating, and repair damage during curing period.

### **3.10 PAVING TOLERANCES**

- A. Comply with tolerances in ACI 117 and as follows:
  1. Elevation: 1/4 inch provided that tolerance does not allow for exceeding maximum allowable slopes within ADA parking and ADA routes. Regardless of tolerance allowances, not ponding of water on a paved surface will be acceptable
  2. Thickness: Plus 3/8 inch, minus 1/4 inch.
  3. Surface: Gap below 10-foot- long, unlevelled straightedge not to exceed 1/2 inch.
  4. Alignment of Tie-Bar End Relative to Line Perpendicular to Paving Edge: 1/2 inch per 12 inches of tie bar.
  5. Lateral Alignment and Spacing of Dowels: 1 inch.
  6. Vertical Alignment of Dowels: 1/4 inch.
  7. Alignment of Dowel-Bar End Relative to Line Perpendicular to Paving Edge: 1/4 inch per 12 inches of dowel.
  8. Joint Spacing: 3 inches.
  9. Contraction Joint Depth: Plus 1/4 inch, no minus.
  10. Joint Width: Plus 1/8 inch, no minus.

### **3.11 PAVEMENT MARKING**

- A. Do not apply pavement-marking paint until layout, colors, and placement have been verified with Architect.
- B. Allow concrete paving to cure for a minimum of 28 days and be dry before starting pavement marking.
- C. Sweep and clean surface to eliminate loose material and dust.
- D. Apply paint with mechanical equipment to produce markings of dimensions indicated with uniform, straight edges. Apply at manufacturer's recommended rates to provide a minimum wet film thickness of 15 mils.
  1. Apply graphic symbols and lettering with paint-resistant, die-cut stencils, firmly secured to concrete surface. Mask an extended area beyond edges of each stencil to prevent paint application beyond stencil. Apply paint so that it cannot run beneath stencil.

### **3.12 WHEEL STOPS**

- A. Securely attach wheel stops to paving with not less than two galvanized-steel dowels located at one-quarter to one-third points. Install dowels in drilled holes in the paving and bond dowels to wheel stop. Recess head of dowel beneath top of wheel stop.

### **3.13 FIELD QUALITY CONTROL**

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements:
  1. Testing Frequency: Obtain at least one composite sample for each 100 cu. yd. or fraction thereof of each concrete mixture placed each day.
    - a. When frequency of testing will provide fewer than five compressive-strength tests for each concrete mixture, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C 143/C 143M; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture. Perform additional tests when concrete consistency appears to change.
  3. Air Content: ASTM C 231, pressure method; one test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
  4. Concrete Temperature: ASTM C 1064/C 1064M; one test hourly when air temperature is 40 deg F and below and when it is 80 deg F and above, and one test for each composite sample.
  5. Compression Test Specimens: ASTM C 31/C 31M; cast and laboratory cure one set of three standard cylinder specimens for each composite sample.
  6. Compressive-Strength Tests: ASTM C 39/C 39M; test one specimen at seven days and two specimens at 28 days.
    - a. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at 28 days.
- C. Strength of each concrete mixture will be satisfactory if average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi.
- D. 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.
- E. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
- F. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
- G. Concrete paving will be considered defective if it does not pass tests and inspections.
- H. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
- I. Prepare test and inspection reports.

### **3.14 REPAIRS AND PROTECTION**

- A. Remove and replace concrete paving that is broken, damaged, or defective or that does not comply with requirements in this Section. Remove work in complete sections from joint to joint unless otherwise approved by Architect.
- B. Drill test cores, where directed by Architect, when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory paving areas with portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete paving from damage. Exclude traffic from paving for at least 14 days after placement. When construction traffic is permitted, maintain paving as clean as possible by removing surface stains and spillage of materials as they occur.
- D. Maintain concrete paving free of stains, discoloration, dirt, and other foreign material. Sweep paving not more than two days before date scheduled for Substantial Completion inspections.

**END OF SECTION**



**SECTION 32 13 73**  
**CONCRETE PAVING JOINT SEALANTS**

**PART 1 - GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section Includes:
1. Cold-applied joint sealants.
  2. Hot-applied joint sealants.
- B. Related Sections:
1. Section 321313 "Concrete Paving" for constructing joints in concrete pavement.

**1.03 PRECONSTRUCTION TESTING**

- A. Preconstruction Compatibility and Adhesion Testing: Submit to joint-sealant manufacturers, for testing indicated below, Samples of materials that will contact or affect joint sealants.
1. Use manufacturer's standard test method to determine whether priming and other specific joint-preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
  2. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
  3. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures including use of specially formulated primers.
  4. Testing will not be required if joint-sealant manufacturers submit joint-preparation data that are based on previous testing, not older than 24 months, of sealant products for compatibility with and adhesion to joint substrates and other materials matching those submitted.

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each joint-sealant product indicated. Color shall be selected by Architect from manufacturer's full range

**1.05 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Product Certificates: For each type of joint sealant and accessory, from manufacturer.
- C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for joint sealants.
- D. Preconstruction Compatibility and Adhesion Test Reports: From joint-sealant manufacturer, indicating the following:
1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility with and adhesion to joint sealants.
  2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

**1.06 QUALITY ASSURANCE**

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.
- B. Source Limitations: Obtain each type of joint sealant from single source from single manufacturer.
- C. Product Testing: Test joint sealants using a qualified testing agency.
  - 1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

**1.07 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 or are below 40 deg F.
  - 2. When joint substrates are wet.
  - 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
  - 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer based on testing and field experience.
- B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

**2.02 COLD-APPLIED JOINT SEALANTS**

- A. Single-Component, Nonsag, Silicone Joint Sealant for Concrete: ASTM D 5893, Type NS.
- B. Single-Component, Self-Leveling, Silicone Joint Sealant for Concrete: ASTM D 5893, Type SL.
- C. Multicomponent, Pourable, Traffic-Grade, Urethane Joint Sealant for Concrete: ASTM C 920, Type M, Grade P, Class 25, for Use T.

**2.03 HOT-APPLIED JOINT SEALANTS**

- A. Hot-Applied, Single-Component Joint Sealant for Concrete: ASTM D 3406.
- B. Hot-Applied, Single-Component Joint Sealant for Concrete and Asphalt: ASTM D 6690, Types I, II, and III.

**2.04 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. Round Backer Rods for Cold- and Hot-Applied Joint Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depth and prevent bottom-side adhesion of sealant.

- C. Backer Strips for Cold- and Hot-Applied Joint Sealants: ASTM D 5249; Type 2; of thickness and width required to control joint-sealant depth, prevent bottom-side adhesion of sealant, and fill remainder of joint opening under sealant.

## **2.05 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**

### **3.01 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.

### **3.02 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, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

### **3.03 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. Joint-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 joint-sealant backings of kind indicated to support joint sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
  - 1. Do not leave gaps between ends of joint-sealant backings.
  - 2. Do not stretch, twist, puncture, or tear joint-sealant backings.
  - 3. Remove absorbent joint-sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install joint sealants using proven techniques that comply with the following and at the same time backings are installed:
  - 1. Place joint sealants so they directly contact and fully wet joint substrates.
  - 2. Completely fill recesses in each joint configuration.
  - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- E. Tooling of Nonsag Joint Sealants: Immediately after joint-sealant application and before skinning or curing begins, tool sealants according to the following requirements to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint:
  - 1. Remove excess joint sealant from surfaces adjacent to joints.

2. Use tooling agents that are approved in writing by joint-sealant manufacturer and that do not discolor sealants or adjacent surfaces.
- F. Provide joint configuration to comply with joint-sealant manufacturer's written instructions unless otherwise indicated.

### **3.04 CLEANING**

- A. Clean off excess joint sealant or sealant smears adjacent to joints as the Work progresses, by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

### **3.05 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 in repaired areas are indistinguishable from the original work.

### **3.06 PAVEMENT-JOINT-SEALANT SCHEDULE**

- A. Joint-Sealant Application: Joints within cement concrete pavement.
1. Joint Location:
    - a. Expansion and isolation joints in cast-in-place concrete pavement.
    - b. Contraction joints in cast-in-place concrete slabs.
    - c. Other joints as indicated.
  2. Silicone Joint Sealant for Concrete: Single component, nonsag or Single component, self-leveling.
  3. Urethane Joint Sealant for Concrete: Multicomponent, pourable, traffic-grade.
  4. Hot-Applied Joint Sealant for Concrete: Single component.
  5. Joint-Sealant Color: As selected by Architect from manufacturer's full range.
- B. Joint-Sealant Application: Joints between cement concrete and asphalt pavement[ <PJS-#>].
1. Joint Location:
    - a. Joints between concrete and asphalt pavement.
    - b. Joints between concrete curbs and asphalt pavement.
    - c. Other joints as indicated.
  2. Hot-Applied Joint Sealant for Concrete and Asphalt: Single component.
  3. Joint-Sealant Color: As selected by Architect from manufacturer's full range.

**END OF SECTION**

## SECTION 328400 - LANDSCAPE IRRIGATION

### PART 1 - GENERAL

#### 1-01 SCOPE OF WORK:

- A. Furnish all labor, materials and equipment for the proper design and installation of an irrigation system to service the landscaped areas of the Logan International Airport West Garage Expansion project. The system is to be designed by a Professional Irrigation Consultant, and installed by a qualified Irrigation Contractor. The design criteria of the system will be directed by the client and the Owner . The General Contractor shall submit to the Owners Representative a complete set of Construction Documents along with a Schedule of Values itemizing the major components of the system, along with the labor required to install said materials.

#### 1-02 SUMMARY OF WORK:

- A. Extent of underground irrigation system is to be shown on the Drawings and in Schedules.
- B. Provide all documents, labor, materials and equipment required by or inferred from the Drawings and Specifications to complete the Work of this section.
- C. Provide additional work and materials required by local authorities at no extra cost to Owner.

#### 1-03 QUALITY ASSURANCE:

- A. Industry Reference Standards: Refer to Division 1 Reference Standards Section.
  1. American Society for Testing and Materials (ASTM).  
D 3139-89 Specification for Joints for Plastic Pressure Piping Using Flexible Elastomeric Seals.
  2. National Electric Code (NEC), 1990 Edition.
- B. Qualifications:
  1. Installer Qualifications: Engage a company specializing in irrigation installation. Installer shall have successfully completed five projects similar in scope and size, as indicated in
    - a. Firm Experience Period: Five years of experience.
    - b. Field Foreman Experience: Five years of experience with installing firm.
  3. Codes and Standards: Perform Irrigation Work in compliance with applicable requirements of governing authorities having jurisdiction. County regulations supersede these specifications. Notify Landscape Architect in writing of all discrepancies immediately.

4. Do not make substitutions: If the Contractor desires to make substitutions of materials, sufficient descriptive literature and material samples must be furnished to establish the material as an equal substitute. In addition, the Contractor must state his reasons for desiring substitute materials. Submit this request and information to Landscape Architect.
5. Approval and Selection of Materials and Work: The selection of all materials and the execution of all operations required under the Drawings and Specifications is subject to the approval of the Owner and Landscape Architect. They have the right to reject any and all materials and any and all Work which, in their opinion, does not meet the requirements of the Contract Documents at any stage of the operations. Remove rejected Work and or materials from Project Site and replace promptly.
6. Workmanship: Install materials and equipment in a neat and professional manner following manufacturer's recommendations.
7. Professional Irrigation Consultant shall be:
  - a. A professional firm whose primary source of income is derived from the professional irrigation design services they offer to the clients they represent.
  - b. A professional consulting firm without any affiliation to contractors, product suppliers, manufacturers or any interest that could be construed as a conflict of interest to the proposed project.
  - c. A professional firm that has experience in the design and administration of projects of similar scope and size as described in the Scope section.
  - d. Is a professional firm covered by all the necessary insurance's including general liability, and Error's & Omissions coverage. (provide proof of insurance documentation)

1-04 SUBMITTALS:

- A. Approval: Obtain approval from Landscape Architect for all submittals prior to the beginning of Work, unless otherwise approved.
- B. Design Drawings: Construction documents shall be prepared in a AutoCAD 2010 format.
- C. Drawings shall be clearly and neatly plotted on a mylar sepia, and submitted along with three (3) sets of blue lines for review and comment by representatives of the Owner. All automatic and manual valves, quick couplers, sprinklers and ancillary equipment shall be shown at scale to determine actual field dimensions.
- D. Construction Documents submittals must be approved by an Owners representatives prior to an official notice to proceed
- E. As-Built Drawings: Any changes in the layout and/or arrangements of the proposed irrigation system, or any other differences between the proposed system and actual installed conditions are to be recorded by the Irrigation Contractor in the form of an "As-Built" Drawing. As-Built Drawing to be clearly and neatly drawn on a mylar sepia base of the original design provided by the Landscape Architect. Provide Owner and Landscape Architect with a reproducible mylar copy of the As-Built Drawings. Provide the Owner and the Landscape Architect with a copy of the As-Built Drawings before Work under this Contract will be considered for Acceptance. All automatic and manual valves, quick couplers, and wire splice locations shall be shown with actual dimensions to permanent bench mark points so they may be located easily in the field. Submittals of approved As-Built Drawings will precede any Application for Final Payment by the Contractor.
- F. Product Data: Submit, for information only, manufacturer's specifications, product data, installation instructions and general recommendations for all components of the irrigation system. Each submittal is to clearly identify the product, series/model number by use of a high lighter.

- G. Installer Certification: Submit written documentation certifying that Irrigation Contractor and Irrigation Consultant complies with requirements of "Installer Qualifications" above.

1-05 DELIVERY, STORAGE AND HANDLING:

- A. Deliver materials and equipment in such a manner as to not damage the parts or decrease the useful life of equipment.
- B. Store materials away from detrimental elements. Coordinate with General Contractor to secure a safe staging area.
- C. Handle, load, unload, stack and transport materials for irrigation system carefully to avoid damage. Handle pipe in accordance with manufacturer's recommendations.

1-06 PROJECT CONDITIONS:

- A. The site irrigation system is comprised of ***two major components***, an irrigation distribution and sprinkler system. The Contractor shall connect the distribution network to the ***irrigation point of connection***. The Contractor will reimburse the Owner for all work deleted and not completed.
- B. The Irrigation System is designed to operate under the following conditions: a minimum of **65 psi** water pressure, and at **least 50 gpm** available water supply.
- C. Insurance on irrigation materials or equipment stored or installed is the responsibility of the Irrigation Contractor. Such insurance shall cover fire, theft and vandalism. Should the Contractor elect not to provide for such insurance, he will in no way hold the Owner responsible for any losses incurred by the aforementioned acts. The Irrigation Contractor is responsible for all costs incurred in replacing damaged or stolen materials or equipment prior to Substantial Completion of the Work.
- D. Obtain all required permits and pay all required fees, at no additional cost to the Owner. Any penalties imposed due to failure to obtain permits or pay fees are the responsibility of the Contractor.
- E. Provide and maintain all passageways, guard fences, warning lights and other protection devices required by the local authorities.
- F. Existing Grades: Existing grades will be within .2 feet of grades shown on the Civil Engineering Drawings at time of irrigation work. Determine condition of existing grades prior to beginning the Work. When irregular or incomplete grading conditions are encountered, notify the Owner in writing before beginning the Work. Perform Work in a manner which will avoid damage to finished grading and drainage resulting from the work covered in these Contract Documents shall be repaired at the Contractor's expense.
- G. Existing Site Improvements: Perform Work in a manner which will avoid possible damage. The Contractor is responsible for any damage of mechanical nature as well as damage resulting from leaks in the irrigation system whether due to negligence or otherwise.
- H. Test water conditions: The Contractor shall check the pressure at the ***irrigation point of connection*** and confirm minimum operating pressure noted in this Specification. If minimum operating pressure cannot be obtained, notify Landscape Architect.
  - 1. In the event the water pressure does not meet minimum operating pressure at the irrigation point of connections noted in this Specification, notify Landscape Architect.

The Irrigation Consultant will make recommendations concerning the development of a booster pump station capable of providing the flow and pressure required as indicated in the Specifications Section 1-06, Paragraph B.

2. In the event the water pressure significantly exceeds the operating pressure noted in this Specification, provide a pressure regulator down stream of the backflow preventer.
  - I. Sleeves, if required, are to be installed by the General Contractor. Irrigation sleeves shall be installed as per details. If sleeving horizontal depth exceeds the detailed requirement by 6 inches (6”), it will be the responsibility of the General Contractor to expose the horizontal ends below finish grade. The General Contractor is to expose irrigation sleeves for Irrigation Contractor prior to start of Irrigation Work in all areas where sleeving is not installed as per details. Coordination and scheduling for excavation of sleeve ends is the responsibility of the Irrigation Contractor.
  - J. Coordinate and schedule all Work with General Contractor.
  - K. Damages resulting from irrigation installation to work of other trades must be repaired at the expense of the Irrigation Contractor in a timely fashion.
  - L. Make minor adjustments to system layout as may be required and requested at no additional cost to the Owner.
  - M. Keep Project Site clean and orderly at all times during construction
  - N. The system must be designed to provide complete separation between turf and shrub/groundcover areas. A system with overlap/broadcasting will not be allowable.

1-07 WARRANTY:

- A. Warranty all Work for a period of one year, starting on the Date of Substantial Completion, against defects in materials, equipment, workmanship and any repairs required resulting from leaks or other defects of workmanship, material or equipment.
- B. Repair unsatisfactory conditions promptly at no cost to the Owner.
- C. Emergency repairs may be made by the Owner without relieving the Irrigation Contractor of his warranty obligations.
- D. Repair settling of backfilled trenches occurring during the warranty period, including restoration of damaged plantings, paving or improvements resulting from settling of trenches or repair operations.
- E. Respond to Owner's request for repair work within ten (10) days. If not, Owner may proceed with such necessary repairs at the Contractor's expense.
- F. *Provide written warranty executed by pump station manufacturer that all system equipment and components will be free from all defects in material and workmanship for a period of one year after the date of Substantial Completion.***

PART 2 - PRODUCTS

2-01 PIPE AND FITTINGS



- A. All Plastic Pipe from sizes 3" and above shall be Class 200, SDR 21, unplasticized rigid PVC pipe with integral bell and rubber ring gasket unless otherwise specified. Pipe from sizes 2 1/2 to 1 1/4 shall be Class 200, solvent weld P.V.C. pipe. Pipe from sizes 1" and 3/4" shall be Class 200, solvent weld P.V.C. pipe. 1/2" pipe shall be Class 315 solvent weld P.V.C. Pipe. All pipe shall be supplied in 20' standard lengths. All pipe that is exposed or not below grade shall be Schedule 80 PVC.
- B. Fittings for integral bell rubber ring gasketed pipe (3" & larger), shall have the gasket type fittings.
- C. All pipe fittings size 3" and greater shall be ductile iron in construction. All fittings 2 1/2" and under shall be Schedule 40 solvent weld fittings rated for 200 psi (ASTM D-3139).
- D. Solvent weld PVC pipe, shall be rigid PVC pipe and shall be assembled using appropriate PVC pipe cleaner/primer and solvent cement in accordance with the manufacturer's recommendations. Solvent cement shall be # 715 Gray NSF approved.
- E. All solvent weld fittings shall conform to Schedule 40 or Schedule 80 PVC dimensions and specifications for solvent weld fittings.
- F. Expansion Joints: Shall consist of integral bell and rubber gasket coupling, install every 300 feet of solvent weld piping.
- G. Runs of pipe over 20' length must be installed with standard 20' length sections..
- H. PVC Pipe Couplings Located Within Sleeves: 4" and smaller to be solvent weld. 6" and larger to be mechanical joints. Upon exiting sleeves, pipe solvent weld or integral bell and rubber gasket, as specified.

2-02 RISERS

- A. Provide Threaded Schedule 80 PVC Risers. All risers above grade to be either dark gray or black PVC pipe.

2-03 ELECTRIC WIRING

- A. 120 Volt AC Wiring: 120 volt service to controller shall consist of three wires: one black, one white, and one ground. Electrical service to be provided by Contractor.
- B. Splices in controller wiring shall be waterproof.
  - 1. Acceptable Manufacturers and Products:
    - a. Manufacturer: 3M
      - (1) Product: DBR/Y-6
- C. Control Wiring shall be 600 volt solid wire U.L. approved for direct burial in ground. Minimum wire size: 14 gauge (red). Control wiring and wiring connections from the controller to the valves is included in this Contract. Common Wiring shall be 12 gauge (white)
  - 1. Acceptable Manufacturers and Products:

- a. Manufacturer: Paige Electric Co.
- b. Manufacturer: King Wire and Cable
- c. Manufacturer: Spectrum Wire Corporation

2-04 SPRINKLER HEADS

- A. Spray and rotary sprinklers: Provide where indicated on the drawings. All spray heads (6" & 12" pop up) shall be provided with an internal pressure regulating device. All sprinkler heads (sprays and rotary) shall have an internal check valve to minimize low head drainage and be installed on (4) four elbow swing joints. Heads shall perform to Manufacturer's Specifications concerning diameter of throw and gallonage at provided pressure.
  - 1. Acceptable Manufacturers and Products:
    - a. Manufacturer: Rainbird
      - (1) Product: Sprays # 1806-SAM and # 1812 PRS-SAM
      - (2) Product: Rotor # 5000 series with Stainless Steel risers
    - b. Manufacturer: Toro
      - (1) Product: Sprays # 570Z-6P-COM AND 570Z-12P-COM
    - c. Manufacturer: Hunter
      - (1) Product: Sprays # PS-06 and # PS-12
      - (2) Product: Rotor I-20-06-SS with Stainless Steel risers

2-05 AUTOMATIC CONTROLLER

- A. Each controller location must be easily accessible for maintenance. Provide for the possibility of making minor timing adjustments to the controller in the field.
- B. Provide controllers capable of fully automatic, as well as manual operation of the system. Controller housing is to be a wall or pedestal mounted, where noted on the drawings, in weatherproof, lockable cabinet.
- C. Provide controller which operates on a minimum of 110 volts AC power input and is capable of operating 24 vole AC electric remote control valves, with a reset circuit breaker to protect from overload. Contractor is responsible for connection to 120 VAC power to controller.
- D. Each station shall have a time setting which can be set for variable timing in increments from 0 to 60 minutes, or set to omit the station from the irrigation cycle.

- E. The controller shall have a master "on-off" switch shall allow the valve power output to be interrupted without affecting the controller.
- F. The controller shall be constructed so that all internal parts are accessible through the controller door without disturbing the cabinet installation.
- G. Acceptable Manufacturers and Products:
  - 1. Manufacturer: Toro
    - a. Product: Sentinel Series (conventional or two-wire)
  - 2. Manufacturer: Rainbird
    - a. Product: ESP-LXME Series or ESP-LXD
  - 3. Manufacturer: Hunter
    - a. Product: ICC Series or ACC-2

2-06 METER

- A. Owner to provide domestic irrigation water meter as indicated on drawings and which will comply with Manufacturer's Specifications and applicable local codes.

2-07 BACKFLOW PREVENTER:

- A. The Contractor shall provide a backflow device at the domestic irrigation water meter. The backflow preventer shall be a double check valve assembly type or reduced pressure assembly (must be in accordance with local codes), capable of having a flow rate of 50 gallons per minute (GPM) with a pressure loss not to exceed 6 pounds per square inch (PSI) and shall be suitable for supply pressure up to 150 PSI. The backflow preventer body to be bronze, internal parts stainless steel, and the check valve assemblies tight seating rubber. The backflow preventer assembly must include two gate valves for isolating unit, and two ball valve test cocks for testing unit to insure proper operations. All backflow devices should conform to all local codes and regulations.
- B. Acceptable Manufacturers:
  - 1. Manufacturer: Watts
  - 2. Manufacturer: Febco
  - 3. Manufacturer: Wilkins

2-08 VALVE BOXES

- A. Control Valves: Shall be in a 12" x 18" standard Valve Box with non-hinged cover.
- B. Backflow Preventer: Shall be in a 20" x 34" Valve Box with non hinged cover.
- C. Isolation Valves and Wire Splices and Quick Coupling Valves: Shall be in a 10" round valve box with cover.

D. All Valve Boxes are to be black in color with black colored covers.

E. Acceptable Manufacturers:

1. Manufacturer: Carson
2. Manufacturer: Ametek
3. Manufacturer: Rain Bird

2-09 SLEEVES

A. Class 200 PVC Pipe Type SDR 21: Size as indicated on drawings.

2-10 QUICK COUPLING VALVES AND KEYS

A. Quick coupling valves shall be used as a source to the pressurized main line so that a hose can be attached for manual hand watering. The quick coupling valve will be constructed of brass with a spring loaded seal that will keep the valve in a closed position until the key is inserted into the valve. The valve will also have a hinged locking purple rubber cover to prevent any debris getting into the internal mechanism of the valve. The cover shall be marked with "Do Not Drink" in English and Spanish. All quick coupling valves will be installed on a triple elbow swing joint. Provide size as indicated on drawings.

B. Quick coupling keys shall be of the single lug variety. Attached to the key will be a hose swivel adapter sized to the commonly used hose on the project. The key and swivel will both be constructed of brass.

C. Acceptable Manufacturers:

1. Manufacturer: Rainbird
2. Manufacturer: Toro
3. Manufacturer: Hunter

2-11 HOSE BIBS:

A. Provide all cast brass or bronze body hose bibb installed below grade in a 12" x 18" valve box.

B. Acceptable Manufacturers:

1. Manufacturer: Hammond
2. Manufacturer: Nibco
3. Manufacturer: Woodford

2-12 CONTROL VALVES:

A. **(Plastic Body)**

Provide electric remote control valves (size as indicated on drawings). Valves are to be constructed of a glass-filled nylon material with a self cleaning stainless steel screen. Low flow/low pressure operating capabilities. Flow: .25 to 200 GPM; Pressure: 20 to 200 PSI. Valves to conform to Manufacturer's Specifications concerning performance and at pressures provided.

**(Brass Body)**

Provide electric remote control valves (size as indicated on drawings). Valves are to be constructed with a brass body and bonnet assembly having a self cleaning screen. Flow and pressure operating capabilities. Flow: 5 to 200 GPM; Pressure: 20 to 200 PSI. Valves to conform to Manufacturer's Specifications concerning performance and at pressures provided.

B. Acceptable Manufacturers:

1. Manufacturer: Rainbird (PEB)
2. Manufacturer: Toro (252)
3. Manufacturer: Hunter (ICV)

C. If two-wire system, will require use of single station decoders.

2-13 SURGE PROTECTION EQUIPMENT

A. Provide lightning arrestor for controllers not equipped with primary surge protection.

2-14 ISOLATION VALVES

A. Provide all gate valves for isolation purposes, allowing full diameter opening when in full open position.

B. Manually operated valves: same size as line.

C. Valves 2" or smaller: Sch 80 PVC True Union Ball Valve

D. Valves 3" or larger: cast iron fitted with rubber ring, slab-type gasket.

1. Acceptable Manufacturers:

- a. Manufacturer: Kennedy
- b. Manufacturer: Mueller
- c. Manufacturer: Clow

2-15 MISCELLANEOUS SYSTEM COMPONENTS

A. Provide risers, reducers, couplings, adapters, fittings as necessary to complete the irrigation system.

B. Provide rain/freeze sensor with adjustable shut-off point from 1/8" to 1" of accumulated rainfall. Switch will interrupt common wire. Unit shall be UL approved.

1. Acceptable Manufacturers and Products:
  - a. Manufacturer: Rainbird
  - b. Manufacturer: Toro
  - c. Manufacturer: Hunter

### PART 3- EXECUTION

#### 3-01 GENERAL

- A. Inspection of Work in progress: During the installation, the Landscape Architect will make regular inspections and reject any work and materials which do not meet the requirements called for in the Contract Documents.
- B. Inspect project site prior to start of Work to determine that all site conditions are acceptable for Irrigation Work to begin. Inform Landscape Architect of unsuitable conditions. Do not proceed with installation of irrigation system until unsatisfactory conditions have been corrected in a manner acceptable to installer.
- C. Locate all existing underground utilities prior to trenching and/or boring operations. Obtain utility locations from Owner and/or General Contractor and utilize utility locating services when necessary.

#### 3-02 EXCAVATION:

- A. All excavation is unclassified and includes all materials encountered that are not classified as rock excavation.
- B. Report exceptions to the Landscape Architect before excavation. An adjustment in price will be established which includes removal and disposal of the unsuitable material, and the acquiring of additional backfill material.
- C. Excavation in newly sodded areas: Prior to excavation, remove sod, preserve and replace after backfilling is completed.
- D. Excavation in established grass or newly seeded areas: After excavation and backfilling is completed, re-grade trenched area consistent with surrounding area and re-seed with 100% pure seed of type grass existing. Mulch with straw and water.
- E. Excavation through existing asphalt, cutting, removal and replacement of asphalt, as noted on the drawing, is the responsibility of the Irrigation Contractor.

#### 3-03 EXCAVATION:

- A. All excavation shall be classified and shall include all materials encountered except materials which cannot be excavated by normal mechanical excavation means. For the purpose of these specifications

“normal” mechanical means shall include the use of all power equipment normally employed in the construction of commercial irrigation systems including chain trenchers with small backhoe units and backhoes units equipped with buckets up to and including 24” wide. Equipment beyond this including blasting equipment, jack hammers, larger backhoes (than described above), backhoes type machines equipped with jack hammer units. or the like shall be considered as being beyond “normal” mechanical means.

- B. Report exceptions to the Landscape Architect before excavation. An adjustment in price will be established which includes removal and disposal of the unsuitable material, and the acquiring of additional backfill material.

**3-04 LEAKAGE TEST:**

- A. The system shall be subjected to a leakage test. Leakage shall be defined as the quantity of water that must be supplied into the pipe to maintain the design working pressure after all air in the pipeline has been expelled and the pipe has been filled with water. Leakage shall not exceed the quantity determined by the formula given below:

$$L = \frac{ND(\text{Square root of } P)}{3700}$$

Where L = allowable leakage in gallons per hour  
N = number of joints in pipeline  
D = nominal diameter of the pipe in inches  
P = average test pressure during the leakage test in psig

If leakage exceed the allowable rate, leaks shall be found and repaired and the test repeated until successful .

**3-04 BACKFILL:**

- A. Backfill material shall be free from rocks, large stones, and other unsuitable substance which could damage the pipe or create unusual settling problems. Backfill in 6" layers and tamp after each layer to prevent excessive settling.
- B. Backfill trenches containing plastic pipe when pipe is cool to avoid excessive contraction in cold water. Such backfilling can be done in early morning hours or the pipe may be water cooled prior to backfilling procedures.
- C. Minimum depth of cover of all pipe is a follows:
  - 1. 1/2" - 1" pipe - minimum depth cover is 12".
  - 2. 1 1/4" - 2" pipe - minimum depth cover is 18".
  - 3. 2 1/2" - 4" pipe - minimum depth cover is 24".
  - 4. 6" - 8" pipe - minimum depth cover is 36"
  - 5. 10" - 12" pipe minimum depth cover is 42"

3-05 SLEEVING:

- A. Location of sleeving shown on the drawings is schematic. General Contractor to make adjustments necessary to accommodate existing vegetation, utilities and other existing conditions.
- B. Repair of damage to existing utilities, structures or other construction resulting from installation of sleeves is the responsibility of the General Contractor.
- C. Irrigation sleeves shall be installed as per details. If sleeving horizontal depth exceeds the detailed requirement by (6") 6 inches, it will be the responsibility of the General Contractor to expose the horizontal ends below finish grade. In all areas where sleeving is not installed as per details the General Contractor is to expose irrigation sleeves for Irrigation Contractor prior to start of the Irrigation Work

3-06 PIPE:

- A. Pipe Joints:
  - 1. Solvent Weld PVC Pipe: Assemble according to Manufacturer's Recommendations, using appropriate PVC pipe cleaner/primer and solvent cement.
- B. Main Line: Install according to Manufacturer's Recommendations. Provide concrete thrust blocks at all directional changes on all pipe 3" and larger that is of the gasketed variety, as per drawings.
- C. Pipes and Fittings:
  - 1. Install according to manufacturer's Recommendations including snaking-in of PVC pipe to prevent excessive strain when contracting in cold weather.
- D. Lateral Lines and Risers:
  - 1. Install according to Manufacturer's Recommendations using standard techniques.
  - 2. Combine lateral lines and main supply lines in common trenches wherever possible.
  - 3. Install risers such that no excessive movement occurs while sprinkler head is in operation. Height of risers to be in accordance with planned and existing plant material. Height of all risers is subject approval of Landscape Architect.
  - 4. Plug lines immediately upon installation to minimize infiltration of foreign matter.
  - 5. Flush lateral lines and risers prior to installation of sprinkler heads.
  - 6. Above ground risers must be dark gray or black in color.

3-07 SPRINKLER HEADS

- A. Low Pop-up Sprinkler Heads: Install in such manner that top is 1" above finish grade. Where finish grade has not been established extend a riser minimum of 12" above existing grade to mark location of head. After finish grade is established install heads as shown on the drawings.
- B. High Pop-Up Shrub Heads: Finish height to be determined by Landscape Architect.



- C. Backfill around sprinkler head assembly in such manner as to stabilize the sprinkler head so that no lateral motion is exhibited during operation.
- D. Sprinkler heads on risers: Install as shown on the drawings. High-pop sprinkler heads shall be installed in landscape areas to retract out of sight when non-operational. Height of all heads in bed areas to be determined in the field by the Landscape Architect.
- E. Drip irrigation emitters are to be located in a manner that will provide optimum concentration of water to the plant material. Drip irrigation shall be installed in a grid pattern with manifolds to insure hydraulic balance.

3-08 ELECTRIC CONTROL WIRES

- A. Install control wires in orderly fashion, locate in main line trench. Bundle wires together and tape at 10' intervals. Position wires to the right of the water supply line in the direction of the water flow.
- B. Provide looped slack at directional changes in supply line to allow for contraction of wires.
- C. Keep wire splices to a minimum and provide 10" round valve box at each splice location.
- D. Pass wires under existing or future paving, construction, etc., through PVC sleeves.
- E. For each open station on any given controller, there shall be spare wires to the furthest (2) two control valves located in diametrically opposed directions from the controller, plus one additional spare wire.

3-09 CONTROL EQUIPMENT:

- A. Install automatic valves and controllers according to Manufacturer's Recommendations and as shown on the Drawings.

3-10 VALVE BOXES:

- A. All valves are to be housed in valve boxes. Install according to Manufacturer's Recommendations, and as shown on the drawings. Position boxes at a height that will not cause them to interfere with maintenance machinery (e.g., movers) and such that soil and mulch do not wash into the box. Locate valve box in mulched or natural areas one foot inside the bed line. Where no mulched areas or natural areas exist within forty feet of valve box locations install valve box in turf area. Install no more than two valve boxes together when installed in turf areas.

3-11 SURGE PROTECTION EQUIPMENT:

- A. Install surge protection equipment on primary (110 VAC) power lines in accordance with the electrical grounding instructions included with each controller. Connect each surge protection unit to at least one 5/8" diameter by 9' long copper clad grounding electrode driven into the soil to its full depth. Place electrodes no closer than two (2) feet from the controller cabinet or any control or power wire. Be consistent in locating ground rods throughout the installation with respect to controller positions.
- B. Ground wire between surge protection device and grounding electrode to be single strand bare copper wire at least one size greater than the wire supplying power to the control unit. Route ground

wire away from power and control wires where possible. When it is necessary to pass through the controller cabinet wall use two (2) #L-70 copper grounding lugs and a brass bolt as noted on the drawings. Use a #WE 5/8 ground rod clamp (single piece and bolt) to make connection between ground rod and ground wire. Bury ground wire passing between controller and ground rod a minimum of ten inches. Cover the top of the rod and the clamp itself with a 4" round cover with lid at grade level.

3-12 BALANCING AND ADJUSTMENT:

- A. Balance and adjust the various components of the sprinkler system so that the overall operation of the system is most efficient. This includes synchronization of the controllers, adjustments to pressure regulators, part circle sprinkler heads, and individual station adjustments on the controllers.
- B. Upon completion of the irrigation system, perform a coverage test with the Owner's representative to determine if the irrigation coverage is adequate. Correct any inadequacies.

3-13 IRRIGATION DISTRIBUTION AND SPRINKLER OPERATION TESTING:

- A. Upon completion of the irrigation system, and after head installation, test the entire system for proper operation. Flush all air from the system and check components for proper operation.

3-14 OWNER ORIENTATION:

- A. Upon completion of the Work and at a time and place acceptable to the Landscape Architect and Owner, the Irrigation Contractor is responsible for the orientation of the Owner's maintenance personnel in the operation, maintenance, and repair of the system. Furnish copies of all available parts lists, trouble shooting lists and specification sheets, to the Landscape Architect.
  - 1. Operating and Maintenance Manuals shall constitute the basis of orientation.
- B. Set the initial watering schedules and programming of the automatic controllers at direction of Landscape Contractor.

3-15 WINTERIZING THE SYSTEM:

- A. The irrigation system shall be winterized the first winter season following Substantial Completion of the Project in total. The irrigation piping shall be winterized by first blowing the system clear of water using compressed air (80 psi maximum) admitted into the piping at a quick coupling valve or hose bib located at a higher elevation on the system piping. Activate individual zones, higher zones first, then proceed successively through the system towards lower elevations. Proceed through all zones twice. The air compressor must be sized to provide the volume requirements necessary to completely evacuate the irrigation piping system. The air compressor used to winterize the system must have an engine separate from the compressor tanks to prevent high temperature air from being injected directly into the PVC piping.

3-16 CLEAN UP AND PROTECTION:

- A. During irrigation Work, keep Project Site clean and orderly.
- B. Upon completion of Work, clear grounds of debris, superfluous materials and all equipment. Remove from site to the satisfaction of the Landscape Architect.

- C. Protect Irrigation Work and materials from damage due to irrigation operations, operations by other contractor and trades and trespassers. Maintain protection until Date of Substantial Completion.
- D. Cover all openings in to the system as it is being installed to prevent obstructions in the pipe and the breakage, misuse or disfigurement of the equipment.
- E. Theft: Irrigation Contractor is responsible for theft of equipment and material at the job site before, during and after installation, until Date of Substantial Completion of the Work in total.

3-17 INSPECTION AND ACCEPTANCE:

- A. Periodic Inspections will be made by the Landscape Architect to review the quality and progress of the work. Work found to be unacceptable must be corrected within five calendar days. Remove rejected materials promptly from the project.
- B. Upon completion of Work, the Contractor shall notify the Landscape Architect and Owner at least ten (10) days prior to requested date of inspection for Substantial Completion of all portions of the Work. Landscape Architect will issue a punch list for work to be corrected. All work on the punch list must be completed within five (5) working days form the date of inspection. Where inspected Irrigation Work does not comply with requirements, replace rejected Work. If such replacements are not completed within the time specified, the Irrigation Contractor may be considered to be in default of the Contract, and the Owner may use the Contract Retainage to hire other Contractors to finish the Work.
- C. It will be the responsibility of the Irrigation Contractor to provide a reliable communication system (i.e.: Two way radios or remote radio control activation system) for Substantial Completion and all periodic inspections.
- D. If an inspection to verify Substantial Completion has been scheduled and the Landscape Architect arrives at the site and determines that the Irrigation System is not substantially complete (all system components in place, operational and checked) the Contractor shall be responsible for all costs incurred by the Landscape Architect to inspect the site. Reimbursable expenses include but are not limited to the following: Mileage, airfare, consultants time, parking fee, meals, rental car, etc. All incurred expenses will be deducted from the final contract amount.
- E. Certificate of Substantial Completion will be issued for acceptable work and completion of "As-Built" Drawings, the Landscape Architect will verify the system for Substantial Completion. If punch list items are issued with the Certificate, they must be corrected within five (5) working days.

END OF SECTION 328400

**SECTION 33 41 00**  
**STORM UTILITY DRAINAGE PIPING**

**PART 1 GENERAL**

**1.01 RELATED DOCUMENTS**

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

**1.02 SUMMARY**

- A. Section Includes:
  - 1. Pipe and fittings.
  - 2. Nonpressure transition couplings.
  - 3. Cleanouts.
  - 4. Drains.
  - 5. Manholes.
  - 6. Catch basins.
  - 7. Stormwater inlets.

**1.03 SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings:
  - 1. Manholes: Include plans, elevations, sections, details, frames, and covers.
  - 2. Catch basins, stormwater inlets and dry wells. Include plans, elevations, sections, details, frames, covers, and grates.
- C. Coordination Drawings: Show pipe sizes, locations, and elevations. Show other piping in same trench and clearances from storm drainage system piping. Indicate interface and spatial relationship between manholes, piping, and proximate structures.
- D. Field quality-control reports.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Do not store plastic manholes, pipe, and fittings in direct sunlight.
- B. Protect pipe, pipe fittings, and seals from dirt and damage.
- C. Handle manholes according to manufacturer's written rigging instructions.
- D. Handle catch basins and stormwater inlets according to manufacturer's written rigging instructions.

**1.05 PROJECT CONDITIONS**

- A. Interruption of Existing Storm Drainage 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 service according to requirements indicated:

1. Notify Owner no fewer than two days in advance of proposed interruption of service.
2. Do not proceed with interruption of service without Owner's written permission.

## **PART 2 PRODUCTS**

### **2.01 PVC PIPE AND FITTINGS**

- A. Corrugated PE Drainage Pipe and Fittings: AASHTO M 294, Type S, with smooth waterway for coupling joints.
  1. Silttight Couplings: AASHTO M 294, corrugated, matching pipe and fittings to form silttight joints.
  2. Silttight Couplings: PE sleeve with ASTM D 1056, Type 2, Class A, Grade 2 gasket material that mates with pipe and fittings to form silttight joints.

### **2.02 CORRUGATED METAL PIPE AND FITTINGS**

- A. The aluminized type 2 Ultra-Flow steel coils shall conform to the applicable requirements of AASHTO M274 or ASTM A929.
- B. The pipe shall be manufactured in accordance with the applicable requirements of AASHTO M36 and A760.

### **2.03 CONCRETE PIPE AND FITTINGS**

- A. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76.
  1. Bell-and-spigot or tongue-and-groove ends and gasketed joints with ASTM C 443, rubber gaskets.
  2. Class III, Wall B.

### **2.04 CLEANOUTS**

- A. Cast-iron Cleanouts:
  1. Description: ASME A112.36.2M, round, gray-iron housing with clamping device and round, secured, scoriated, gray-iron cover. Include gray-iron ferrule with inside calk or spigot connection and countersunk, tapered-thread, brass closure plug.
  2. Top-Loading Classification(s): Heavy Duty and Extra Heavy Duty.
  3. Sewer Pipe Fitting and Riser to Cleanout: ASTM A 74, Service class, cast-iron soil pipe and fittings.

### **2.05 DRAINS**

- A. Cast-iron Area Drains:
  1. Description: ASME A112.6.3, gray-iron round body with anchor flange and round grate. Include bottom outlet with inside calk or spigot connection, of sizes indicated.
  2. Top-Loading Classification(s): Medium and Heavy Duty.

### **2.06 NONPRESSURE TRANSITION COUPLINGS**

- A. Comply with ASTM C 1173, elastomeric, sleeve-type, reducing or transition coupling, for joining underground nonpressure piping. Include ends of same sizes as piping to be joined, and corrosion-resistant-metal tension band and tightening mechanism on each end.
- B. Sleeve Materials:
  1. For Concrete Pipes: ASTM C 443, rubber.
  2. For Plastic Pipes: ASTM F 477, elastomeric seal or ASTM D 5926, PVC.
  3. For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.
- C. Unshielded, Flexible Couplings:

1. Description: Elastomeric sleeve with stainless-steel shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
- D. Shielded, Flexible Couplings:
1. Description: ASTM C 1460, elastomeric or rubber sleeve with full-length, corrosion-resistant outer shield and corrosion-resistant-metal tension band and tightening mechanism on each end.
- E. Ring-Type, Flexible Couplings:
1. Description: Elastomeric compression seal with dimensions to fit inside bell of larger pipe and for spigot of smaller pipe to fit inside ring.

## 2.07 MANHOLES

- A. Standard Precast Concrete Manholes:
1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
  2. Diameter: 48 inches minimum unless otherwise indicated.
  3. Ballast: Increase thickness of precast concrete sections or add concrete to base section as required to prevent flotation.
  4. Base Section: 6-inch minimum thickness for floor slab and 4-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
  5. Riser Sections: 4-inch minimum thickness, and lengths to provide depth indicated.
  6. Top Section: Eccentric-cone type unless concentric-cone or flat-slab-top type is indicated, and top of cone of size that matches grade rings.
  7. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
  8. Resilient Pipe Connectors: ASTM C 923, cast or fitted into manhole walls, for each pipe connection.
  9. Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. Omit steps if total depth from floor of manhole to finished grade is less than 60 inches.
  10. Adjusting Rings: Interlocking HDPE rings with level or sloped edge in thickness and diameter matching manhole frame and cover, and of height required to adjust manhole frame and cover to indicated elevation and slope. Include sealant recommended by ring manufacturer.
  11. Grade Rings: Reinforced-concrete rings, 6- to 9-inch total thickness, to match diameter of manhole frame and cover, and height as required to adjust manhole frame and cover to indicated elevation and slope.
- B. Manhole Frames and Covers:
1. Description: Ferrous; 24-inch ID by 7- to 9-inch riser with 4-inch- minimum width flange and 26-inch- diameter cover. Include indented top design with lettering cast into cover, using wording equivalent to "STORM SEWER."
  2. Material: ASTM A 536, Grade 60-40-18 ductile iron unless otherwise indicated.

## 2.08 CONCRETE

- A. General: Cast-in-place concrete according to ACI 318, ACI 350/350R, and the following:
1. Cement: ASTM C 150, Type II.
  2. Fine Aggregate: ASTM C 33, sand.
  3. Coarse Aggregate: ASTM C 33, crushed gravel.
  4. Water: Potable.
- B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio.
1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
  2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

- C. Manhole Channels and Benches: Factory or field formed from concrete. Portland cement design mix, 4000 psi minimum, with 0.45 maximum water/cementitious materials ratio. Include channels and benches in manholes.
  - 1. Channels: Concrete invert, formed to same width as connected piping, with height of vertical sides to three-fourths of pipe diameter. Form curved channels with smooth, uniform radius and slope.
    - a. Invert Slope: 1 percent through manhole.
  - 2. Benches: Concrete, sloped to drain into channel.
    - a. Slope: 4 percent.
- D. Ballast and Pipe Supports: Portland cement design mix, 3000 psi minimum, with 0.58 maximum water/cementitious materials ratio.
  - 1. Reinforcing Fabric: ASTM A 185/A 185M, steel, welded wire fabric, plain.
  - 2. Reinforcing Bars: ASTM A 615/A 615M, Grade 60 (420 MPa) deformed steel.

## 2.09 CATCH BASINS

- A. Standard Precast Concrete Catch Basins:
  - 1. Description: ASTM C 478, precast, reinforced concrete, of depth indicated, with provision for sealant joints.
  - 2. Base Section: 6-inch minimum thickness for floor slab and 5-inch minimum thickness for walls and base riser section, and separate base slab or base section with integral floor.
  - 3. Riser Sections: 5-inch minimum thickness, 48-inch diameter, and lengths to provide depths indicated.
  - 4. Top Section: Eccentric-cone type unless concrete-cone or flat-slab-top type is indicated. Top of cone of size that matches grade rings.
  - 5. Joint Sealant: ASTM C 990, bitumen or butyl rubber.
  - 6. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch diameter frame and grate.
  - 7. Steps: Individual FRP steps or FRP ladder, wide enough to allow worker to place both feet on one step and designed to prevent lateral slippage off step. Cast or anchor steps into sidewalls at 12- to 16-inch intervals. At least one step is required per manhole.
  - 8. Pipe Connectors: ASTM C 923, resilient, of size required, for each pipe connecting to base section.
- B. Frames and Grates: ASTM A 536, Grade 60-40-18, ductile iron designed for A-16, structural loading. Include flat grate with small square or short-slotted drainage openings.
  - 1. Size: 30 by 30 inches minimum unless otherwise indicated.
  - 2. Grate Free Area: Approximately 50 percent unless otherwise indicated.

## 2.10 STORMWATER INLETS

- A. Curb Inlets: Made with vertical curb opening.
- B. Gutter Inlets: Made with horizontal gutter opening. Include heavy-duty frames and grates.
- C. Combination Inlets: Made with vertical curb and horizontal gutter openings. Include heavy-duty frames and grates.
- D. Frames and Grates: Heavy duty.

## PART 3 EXECUTION

### 3.01 EARTHWORK

- A. Excavation, trenching, and backfilling are specified in Division 31 Section "Earth Moving."

### 3.02 PIPING INSTALLATION

- A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout

take into account design considerations. Install piping as indicated, to extent practical. Where specific installation is not indicated, follow piping manufacturer's written instructions.

- B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements.
- C. Install manholes for changes in direction unless fittings are indicated. Use fittings for branch connections unless direct tap into existing sewer is indicated.
- D. Install proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.
- E. When installing pipe under streets or other obstructions that cannot be disturbed, use pipe-jacking process of microtunneling.
- F. Install gravity-flow, nonpressure drainage piping according to the following:
  - 1. Install piping pitched down in direction of flow.
  - 2. Install piping NPS 6 and larger with restrained joints at tee fittings and at changes in direction. Use corrosion-resistant rods, pipe or fitting manufacturer's proprietary restraint system, or cast-in-place concrete supports or anchors.
  - 3. Install reinforced-concrete sewer piping according to ASTM C 1479 and ACPA's "Concrete Pipe Installation Manual."
  - 4. Install CMP pipe and fittings according to manufacturer's written instructions.
  - 5. Install PE Pipe and fittings according to ASTM D 2321 and manufacturer's written instructions.
  - 6. Install PVC pipe and fitting according to AASHTO Section 30, AASHTO Section 12, and manufacturer's written instructions.

### **3.03 PIPE JOINT CONSTRUCTION**

- A. Join gravity-flow, nonpressure drainage piping according to the following:
  - 1. Join reinforced-concrete sewer piping according to ACPA's "Concrete Pipe Installation Manual" for rubber-gasketed joints.
  - 2. Join pipe and fittings with couplings for Soiltight joints according to manufacturer's written instructions.

### **3.04 CLEANOUT INSTALLATION**

- A. Install cleanouts and riser extensions from sewer pipes to cleanouts at grade. Use cast-iron soil pipe fittings in sewer pipes at branches for cleanouts and cast-iron soil pipe for riser extensions to cleanouts. Install piping so cleanouts open in direction of flow in sewer pipe.
  - 1. Use Light-Duty, top-loading classification cleanouts in earth or unpaved foot-traffic areas.
  - 2. Use Medium-Duty, top-loading classification cleanouts in paved foot-traffic areas.
  - 3. Use Heavy-Duty, top-loading classification cleanouts in vehicle-traffic service areas.
  - 4. Use Extra-Heavy-Duty, top-loading classification cleanouts in roads.
- B. Set cleanout frames and covers in earth in cast-in-place concrete block, 18 by 18 by 12 inches deep. Set with tops 1 inch above surrounding earth grade.
- C. Set cleanout frames and covers in concrete pavement and roads with tops flush with pavement surface.

### **3.05 DRAIN INSTALLATION**

- A. Install type of drains in locations indicated.
  - 1. Use Light-Duty, top-loading classification drains in earth or unpaved foot-traffic areas.
  - 2. Use Medium-Duty, top-loading classification drains in paved foot-traffic areas.
  - 3. Use Heavy-Duty, top-loading classification drains in vehicle-traffic service areas.
  - 4. Use Extra-Heavy-Duty, top-loading classification drains in roads.



- B. Embed drains in 4-inch minimum concrete around bottom and sides.
- C. Fasten grates to drains if indicated.
- D. Set drain frames and covers with tops flush with pavement surface.
- E. Assemble trench sections with flanged joints.
- F. Embed trench sections in 4-inch minimum concrete around bottom and sides.

### **3.06 MANHOLE INSTALLATION**

- A. General: Install manholes, complete with appurtenances and accessories indicated.
- B. Install precast concrete manhole sections with sealants according to ASTM C 891.
- C. Where specific manhole construction is not indicated, follow manhole manufacturer's written instructions.
- D. Set tops of frames and covers flush with finished surface of manholes that occur in pavements. Set tops 3 inches above finished surface elsewhere unless otherwise indicated.

### **3.07 CATCH BASIN INSTALLATION**

- A. Construct catch basins to sizes and shapes indicated.
- B. Set frames and grates to elevations indicated.

### **3.08 CONCRETE PLACEMENT**

- C. Place cast-in-place concrete according to ACI 318.

### **3.09 CONNECTIONS**

- A. Connect nonpressure, gravity-flow drainage piping in building's storm building drains specified in Division 22 Section "Facility Storm Drainage Piping."
- B. Make connections to existing piping and underground manholes.
  - 1. Use commercially manufactured wye fittings for piping branch connections. Remove section of existing pipe; install wye fitting into existing piping; and encase entire wye fitting, plus 6-inch overlap, with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
  - 2. Make branch connections from side into existing piping, NPS 4 to NPS 20. Remove section of existing pipe, install wye fitting into existing piping, and encase entire wye with not less than 6 inches of concrete with 28-day compressive strength of 3000 psi.
  - 3. Make branch connections from side into existing piping, NPS 21 or larger, or to underground manholes and structures by cutting into existing unit and creating an opening large enough to allow 3 inches of concrete to be packed around entering connection. Cut end of connection pipe passing through pipe or structure wall to conform to shape of and be flush with inside wall unless otherwise indicated. On outside of pipe, manhole, or structure wall, encase entering connection in 6 inches of concrete for minimum length of 12 inches to provide additional support of collar from connection to undisturbed ground.
    - a. Use concrete that will attain a minimum 28-day compressive strength of 3000 psi unless otherwise indicated.
    - b. Use epoxy-bonding compound as interface between new and existing concrete and piping materials.
  - 4. Protect existing piping, manholes, and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.
- C. Connect to sediment interceptors specified in Division 22 Section "Sanitary Waste Interceptors."
- D. Pipe couplings, expansion joints, and deflection fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.

1. Use nonpressure-type flexible couplings where required to join gravity-flow, nonpressure sewer piping unless otherwise indicated.
  - a. Unshielded or Shielded flexible couplings for same or minor difference OD pipes.
  - b. Unshielded, increaser/reducer-pattern, flexible couplings for pipes with different OD.
  - c. Ring-type flexible couplings for piping of different sizes where annular space between smaller piping's OD and larger piping's ID permits installation.

### **3.10 CLOSING ABANDONED STORM DRAINAGE SYSTEMS**

- A. Abandoned Piping: Close open ends of abandoned underground piping indicated to remain in place. Include closures strong enough to withstand hydrostatic and earth pressures that may result after ends of abandoned piping have been closed. Use either procedure below:
  1. Close open ends of piping with at least 8-inch- thick, brick masonry bulkheads.
  2. Close open ends of piping with threaded metal caps, plastic plugs, or other acceptable methods suitable for size and type of material being closed. Do not use wood plugs.
- B. Abandoned Manholes and Structures: Excavate around manholes and structures as required and use one procedure below:
  1. Remove manhole or structure and close open ends of remaining piping.
  2. Remove top of manhole or structure down to at least 36 inches below final grade. Fill to within 12 inches of top with stone, rubble, gravel, or compacted dirt. Fill to top with concrete.
- C. Backfill to grade according to Division 31 Section "Earth Moving."

### **3.11 IDENTIFICATION**

- A. Materials and their installation are specified in Division 31 Section "Earth Moving." Arrange for installation of green warning tape directly over piping and at outside edge of underground structures.
  1. Use warning tape or detectable warning tape over ferrous piping.
  2. Use detectable warning tape over nonferrous piping and over edges of underground structures.

### **3.12 FIELD QUALITY CONTROL**

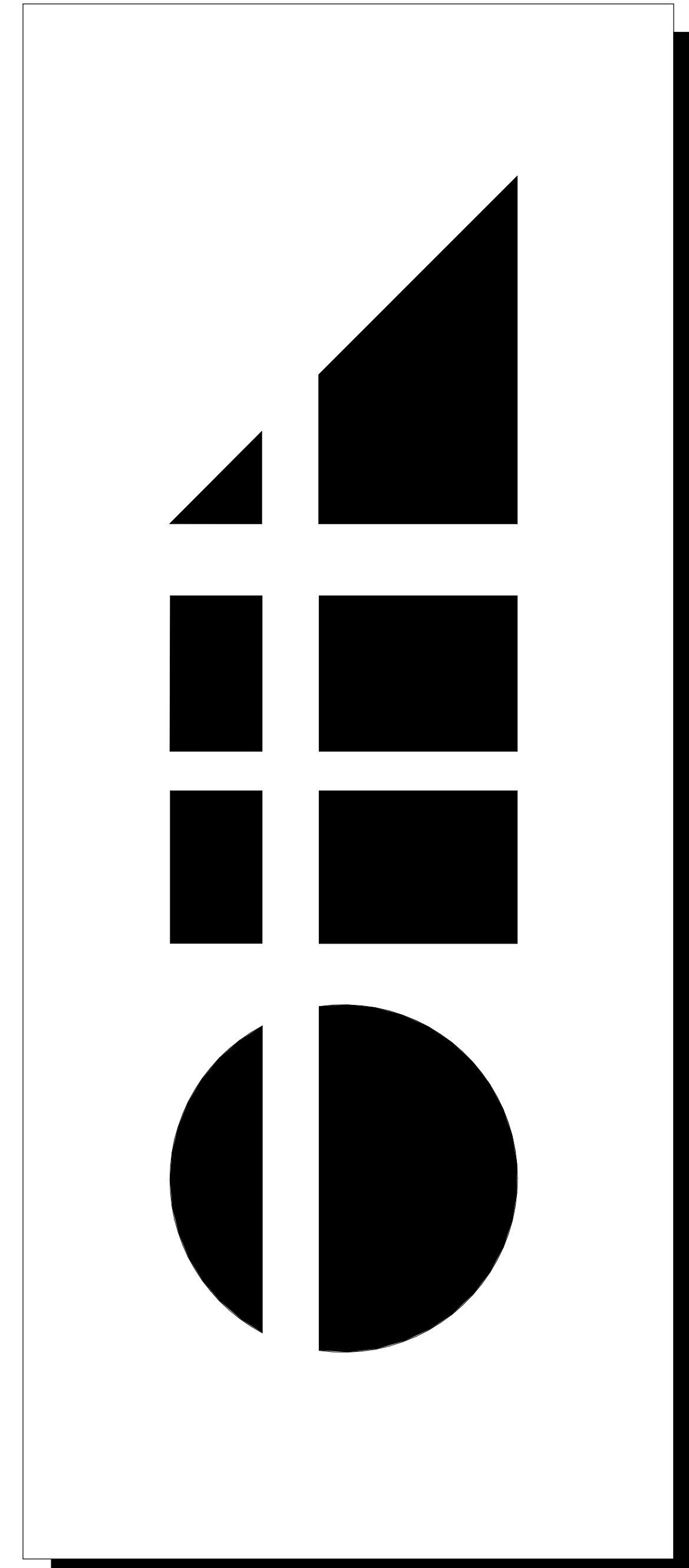
- A. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
  1. Submit separate reports for each system inspection.
  2. Defects requiring correction include the following:
    - a. Alignment: Less than full diameter of inside of pipe is visible between structures.
    - b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
    - c. Damage: Crushed, broken, cracked, or otherwise damaged piping.
    - d. Infiltration: Water leakage into piping.
    - e. Exfiltration: Water leakage from or around piping.
  3. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
  4. Reinspect and repeat procedure until results are satisfactory.
- B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
  1. Do not enclose, cover, or put into service before inspection and approval.
  2. Test completed piping systems according to requirements of authorities having jurisdiction.
  3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
  4. Submit separate report for each test.

5. Gravity-Flow Storm Drainage Piping: Test according to requirements of authorities having jurisdiction, UNI-B-6, and the following:
  - a. Exception: Piping with soiltight joints unless required by authorities having jurisdiction.
  - b. Option: Test plastic piping according to ASTM F 1417.
  - c. Option: Test concrete piping according to ASTM C 924.
- C. Leaks and loss in test pressure constitute defects that must be repaired.
- D. Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

### **3.13 CLEANING**

- A. Clean interior of piping of dirt and superfluous materials. Flush with potable water. Collect and legally dispose of flushing water and debris. Do not allow into downstream receiving drains and waters.

**END OF SECTION**



# Mobile Civic Center Parking Facility

Mobile, Alabama

August 5, 2023  
ETA Job No. 4308  
DCM No. CC-085-22

## Construction Documents

ETA Job No. 4308  
DCM No. CC-085-22  
Construction Documents

Mobile Civic Center  
Parking Facility  
Mobile, Alabama

Evan Terry  
Associates LLC  
Architecture • Accessible Design  
One Perimeter Park South, Suite 2005  
Birmingham, AL 35242 (205) 972-9100

SET NO.

**CIVIL**

001	C1.00	CIVIL GENERAL NOTES
002	C2.00	SITE DEMOLITION PLAN
003	C3.00	SITE LAYOUT PLAN
004	C4.00	SITE UTILITY PLAN
005	C5.00	SITE GRADING PLAN
006	C6.00	SEDIMENT AND EROSION CONTROL PLAN PHASE 1
007	C7.00	SEDIMENT AND EROSION CONTROL PLAN PHASE 2
008	C8.00	CIVIL DETAILS

Engineering Design Group, LLC  
1000 E Laurel Ave  
Foley, AL 36535  
O: (205) 547-9855  
C: (205) 777-9064

**LANDSCAPING**

009	L1.0	PLAN AND IRRIGATION SPECIFICATIONS
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Dave Eyrich and Associates, LLC  
1000 Providence Park, Suite 200  
Birmingham, AL 35242  
205-582-2052

**STRUCTURAL**

010	S1.00	GENERAL NOTES
011	S1.01	GENERAL NOTES & TYPICAL DETAILS
012	S1.02	TYPICAL DETAILS
013	S2.11	LEVEL 1 PLAN - PART A
014	S2.12	LEVEL 1 PLAN - PART B
015	S2.21	LEVEL 2 FRAMING PLAN - PART A
016	S2.22	LEVEL 2 FRAMING PLAN - PART B
017	S2.31	LEVEL 3 FRAMING PLAN - PART A
018	S2.32	LEVEL 3 FRAMING PLAN - PART B
019	S2.41	LEVEL 4 FRAMING PLAN - PART A
020	S2.42	LEVEL 4 FRAMING PLAN - PART B
021	S2.51	LEVEL 5 FRAMING PLAN - PART A
022	S2.52	LEVEL 5 FRAMING PLAN - PART B
023	S2.61	LEVEL 6 FRAMING PLAN - PART A
024	S2.62	LEVEL 6 FRAMING PLAN - PART B
025	S2.71	ROOF FRAMING PLAN - PART A
026	S2.72	ROOF FRAMING PLAN - PART B
027	S3.01	SCHEDULES & TYPICAL DETAILS
028	S5.01	SECTIONS
029	S5.02	SECTIONS

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**ARCHITECTURAL**

030	A0.01	CODE INFORMATION
031	A1.10	LIFE SAFETY PLAN - LEVEL 1 - OVERALL
032	A1.20	LIFE SAFETY PLAN - LEVEL 2 - OVERALL
033	A1.30	LIFE SAFETY PLAN - LEVEL 3 - OVERALL
034	A1.40	LIFE SAFETY PLAN - LEVEL 4 - OVERALL
035	A1.50	LIFE SAFETY PLAN - LEVEL 5 - OVERALL
036	A1.60	LIFE SAFETY PLAN - LEVEL 6 - OVERALL
037	A2.10	LAYOUT PLAN - LEVEL 1 - OVERALL
038	A2.11	LAYOUT PLAN - LEVEL 1 - PART A
039	A2.12	LAYOUT PLAN - LEVEL 1 - PART B
040	A2.20	LAYOUT PLAN - LEVEL 2 - OVERALL
041	A2.21	LAYOUT PLAN - LEVEL 2 - PART A
042	A2.22	LAYOUT PLAN - LEVEL 2 - PART B
043	A2.30	LAYOUT PLAN - LEVEL 3 - OVERALL
044	A2.31	LAYOUT PLAN - LEVEL 3 - PART A
045	A2.32	LAYOUT PLAN - LEVEL 3 - PART B
046	A2.40	LAYOUT PLAN - LEVEL 4 - OVERALL
047	A2.41	LAYOUT PLAN - LEVEL 4 - PART A
048	A2.42	LAYOUT PLAN - LEVEL 4 - PART B
049	A2.50	LAYOUT PLAN - LEVEL 5 - OVERALL
050	A2.51	LAYOUT PLAN - LEVEL 5 - PART A
051	A2.52	LAYOUT PLAN - LEVEL 5 - PART B
052	A2.60	LAYOUT PLAN - LEVEL 6 - OVERALL
053	A2.61	LAYOUT PLAN - LEVEL 6 - PART A
054	A2.62	LAYOUT PLAN - LEVEL 6 - PART B
055	A2.70	ROOF PLAN - OVERALL
056	A3.00	DOOR SCHEDULE
057	A3.01	CURTAIN WALL ELEVATIONS
058	A3.02	CURTAIN WALL ELEVATIONS
059	A3.10	STRIPING PLAN LEVEL 1
060	A3.20	STRIPING PLAN LEVEL 2
061	A3.30	STRIPING PLAN LEVEL 3
062	A3.40	STRIPING PLAN LEVEL 4
063	A3.50	STRIPING PLAN LEVEL 5
064	A3.60	STRIPING PLAN LEVEL 6
065	A3.70	STRIPING DETAILS
066	A4.10	SIGNAGE PLAN - LEVEL 1
067	A4.20	SIGNAGE PLAN - LEVEL 2
068	A4.30	SIGNAGE PLAN - LEVEL 3
069	A4.40	SIGNAGE PLAN - LEVEL 4
070	A4.50	SIGNAGE PLAN - LEVEL 5
071	A4.60	SIGNAGE PLAN - LEVEL 6
072	A4.70	SIGNAGE DETAILS
073	A4.71	SIGNAGE DETAILS
074	A4.72	SIGNAGE DETAILS
075	A5.20	OVERALL BUILDING ELEVATIONS - SOUTH / EAST
076	A5.21	OVERALL BUILDING ELEVATIONS - NORTH / WEST
077	A5.21B	OVERALL BUILDING ELEVATIONS - NORTH / WEST - ALTERNATE NO.1
078	A5.22	EXTERIOR ELEVATIONS - LARGE SCALE - WEST
079	A5.22b	EXTERIOR ELEVATIONS - LARGE SCALE - WEST - ALTERNATE NO.1
080	A5.23	EXTERIOR ELEVATIONS - LARGE SCALE - EAST
081	A5.24	EXTERIOR ELEVATIONS - LARGE SCALE - NORTH / SOUTH
082	A5.24b	EXTERIOR ELEVATIONS - LARGE SCALE NORTH / SOUTH - ALTERNATE NO.1
083	A5.31	TOP OF STAIR ELEVATIONS
084	A6.40	BUILDING SECTIONS
085	A6.10	WALL SECTIONS
086	A6.11	WALL SECTIONS
087	A6.12	WALL SECTIONS
088	A6.13	WALL SECTIONS

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**ARCHITECTURAL (CONTINUED)**

089	A6.14	WALL SECTIONS
090	A6.15	WALL SECTIONS
091	A6.16	WALL SECTIONS
092	A6.30	PRECAST PANEL ELEVATIONS
093	A6.30B	PRECAST PANEL ELEVATIONS - ALTERNATE NO.1
094	A6.31	PRECAST PANEL PROFILES
095	A6.32	PRECAST PANEL PROFILES
096	A6.33	PRECAST DETAILS
097	A7.10A	SOUTHWEST STAIR - ELEVATOR SECTIONS
098	A7.10B	SOUTHWEST STAIR - ELEVATOR SECTIONS
099	A7.11	SOUTHWEST STAIR SECTIONS
100	A7.12	SOUTHWEST STAIR PLANS
101	A7.13	SOUTHWEST STAIR PLANS
102	A7.14	NORTHWEST STAIR PLANS
103	A7.15	NORTHEAST STAIR PLANS
104	A7.16	STAIR DETAILS
105	A7.20	ELEVATOR SECTIONS

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**PLUMBING**

106	F0.01	GENERAL NOTES AND DETAILS - FIRE PROTECTION
107	F2.01	FIRE DETAILS - FIRE PROTECTION
108	F2.10	LAYOUT PLAN - LEVEL 1 - OVERALL FIRE PROTECTION
109	F2.20	LAYOUT PLAN - LEVEL 2 - OVERALL FIRE PROTECTION
110	F2.30	LAYOUT PLAN - LEVEL 3 - OVERALL FIRE PROTECTION
111	F2.40	LAYOUT PLAN - LEVEL 4 - OVERALL FIRE PROTECTION
112	F2.50	LAYOUT PLAN - LEVEL 5 - OVERALL FIRE PROTECTION
113	F2.60	LAYOUT PLAN - LEVEL 6 - OVERALL FIRE PROTECTION
114	P0.01	LEGENDS, NOTES AND SCHEDULES - PLUMBING
115	P2.10	LAYOUT PLAN - LEVEL 1 - OVERALL PLUMBING
116	P2.20	LAYOUT PLAN - LEVEL 2 - OVERALL PLUMBING
117	P2.30	LAYOUT PLAN - LEVEL 3 - OVERALL PLUMBING
118	P2.40	LAYOUT PLAN - LEVEL 4 - OVERALL PLUMBING
119	P2.50	LAYOUT PLAN - LEVEL 5 - OVERALL PLUMBING
120	P2.60	LAYOUT PLAN - LEVEL 6 - OVERALL PLUMBING
121	F2.70	LAYOUT PLAN - ROOF - OVERALL PLUMBING
122	P3.01	RISERS PLUMBING

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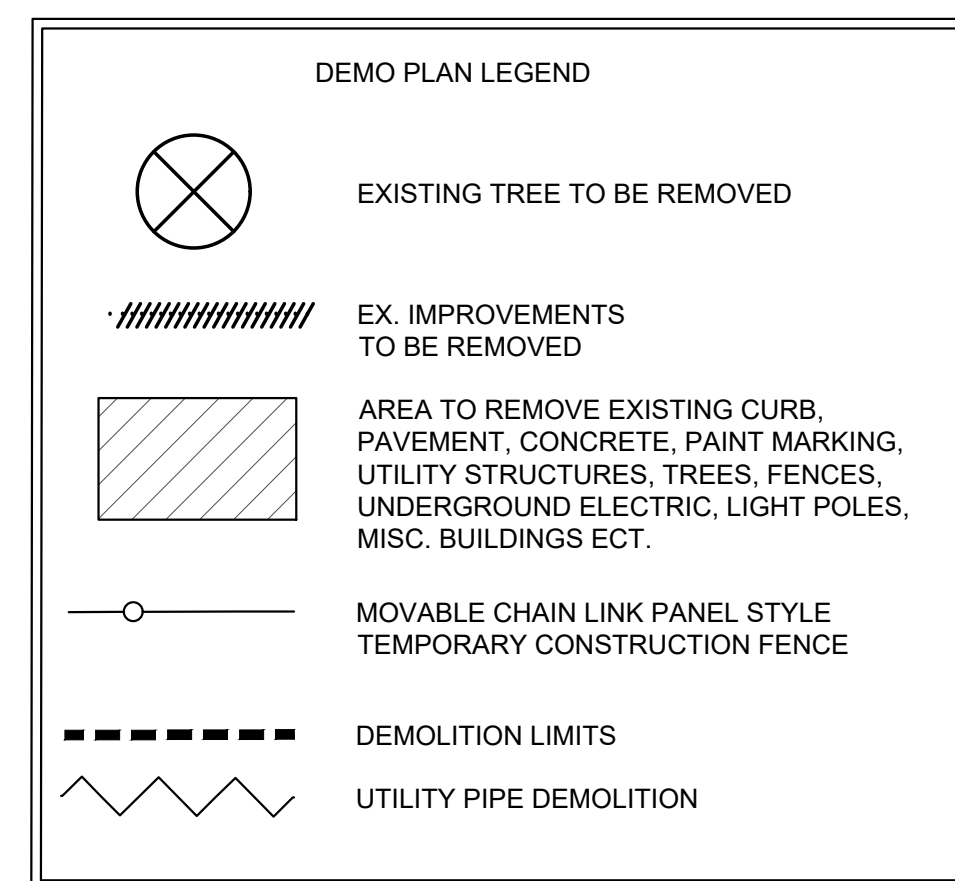
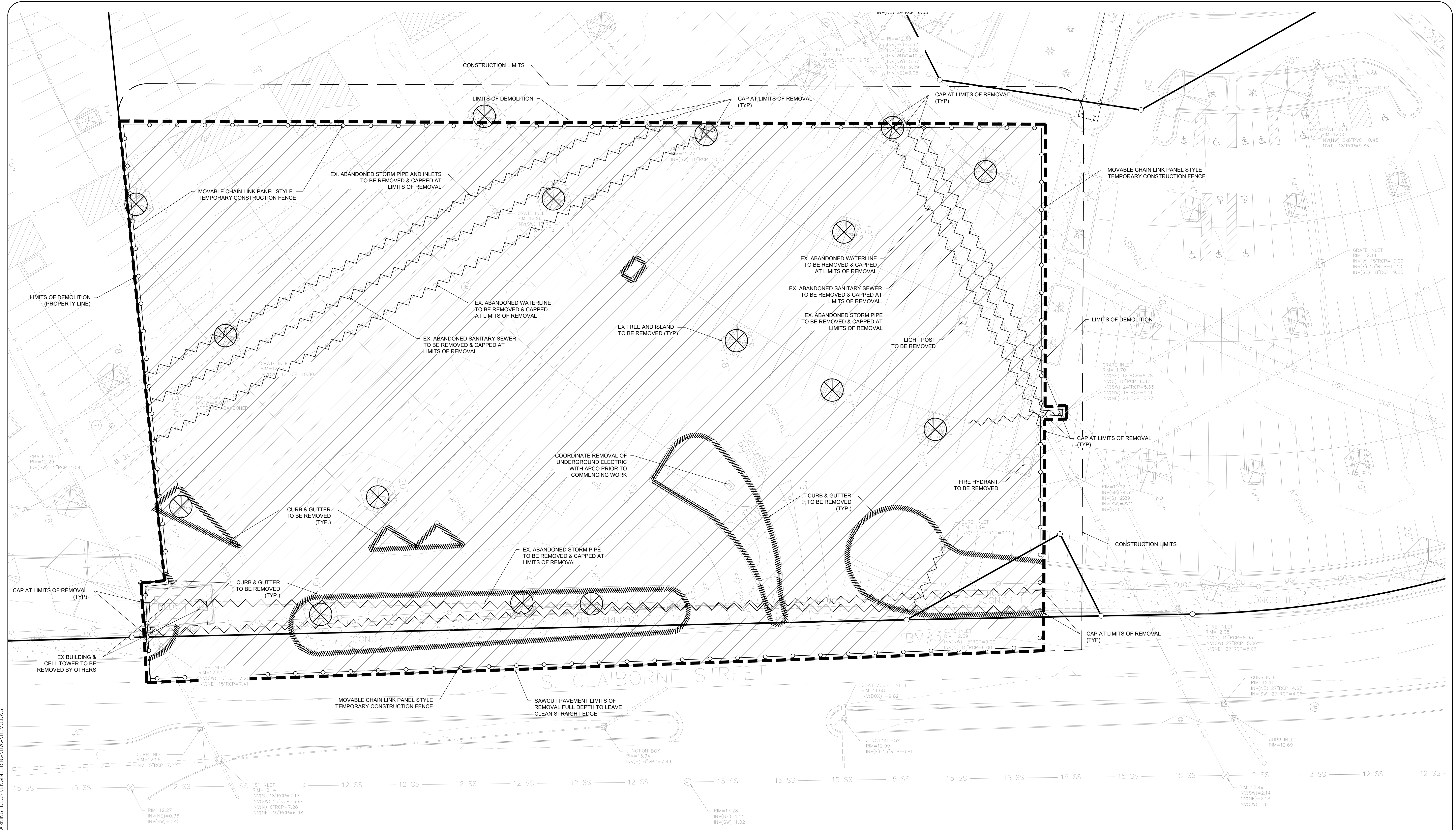
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134	E0.01	LEGEND & NOTES
135	E0.02	RISER DIAGRAM
136	E0.03	PANEL SCHEDULES
137	E0.04	PANEL SCHEDULES
138	E0.05	LIGHT FIXTURE SCHEDULE & DETAILS
139	E0.06	TELE/COMM DETAILS
140	E0.07	POWER DETAILS
141	E0.08	FIRE ALARM DETAILS
142	E0.09	EQUIPMENT SCHEDULE
143	E1.00	SITE PLAN - ELECTRICAL
144	E2.11	LEVEL 1 - PART A - ELECTRICAL
145	E2.12	LEVEL 1 - PART B - ELECTRICAL
146	E2.12	LEVEL 2 - PART A - ELECTRICAL
147	E2.22	LEVEL 2 - PART B - ELECTRICAL
148	E2.31	LEVEL 3 - PART A - ELECTRICAL
149	E2.32	LEVEL 3 - PART B - ELECTRICAL
150	E2.41	LEVEL 4 - PART A - ELECTRICAL
151	E2.42	LEVEL 4 - PART B - ELECTRICAL
152	E2.51	LEVEL 5 - PART A - ELECTRICAL
153	E2.52	LEVEL 5 - PART B - ELECTRICAL
154	E2.61	LEVEL 6 - PART A - ELECTRICAL
155	E2.62	LEVEL 6 - PART B - ELECTRICAL
156	E3.00	ENLARGED PLANS - ELECTRICAL

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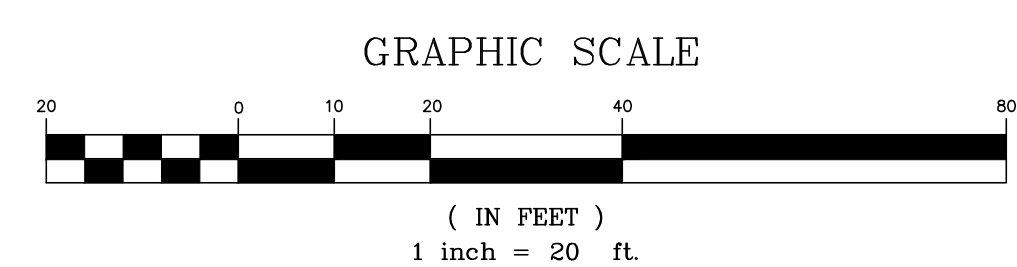


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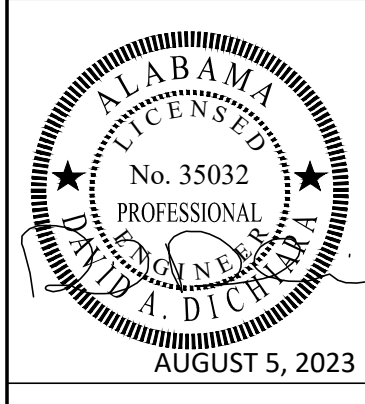
**NOTES:**

- SEE SHEET C1.00 FOR GENERAL DEMOLITION NOTES.



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CC-085-22



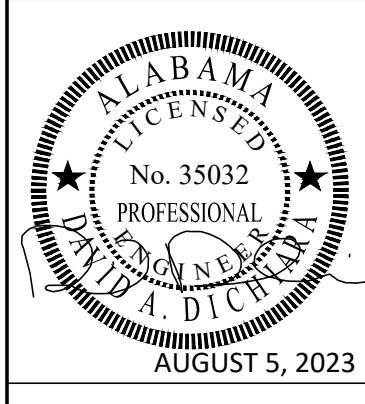
**Evan Terry Associates LLC**  
Architecture • Accessible Design  
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Birmingham, AL 35243 (205) 972-9100

Revisions	
sheet title	
SITE DEMOLITION PLAN	
job no. <b>4308</b>	
dwg. by <b>CAY</b>	sht. no. <b>002</b>
ckd. by <b>DAD</b>	of <b>156</b>
dwg. no. <b>C2.00</b>	
of <b>B</b>	
date <b>AUGUST 5, 2023</b>	
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**Mobile Civic Center  
Parking Facility**  
Mobile, Alabama

# Mobile Civic Center Parking Facility

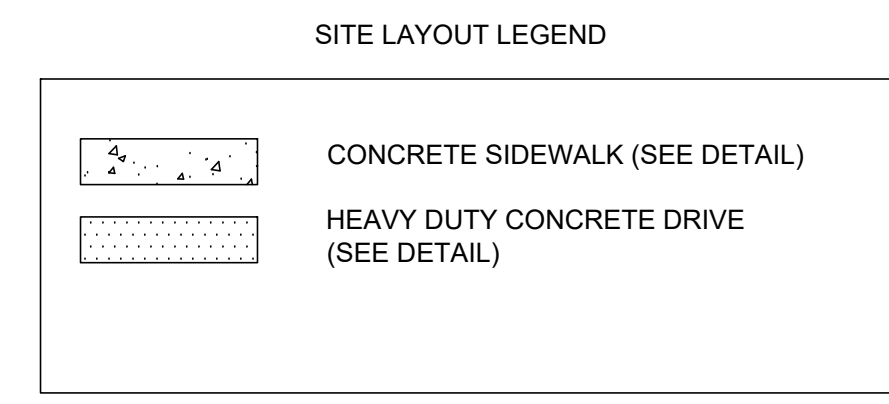
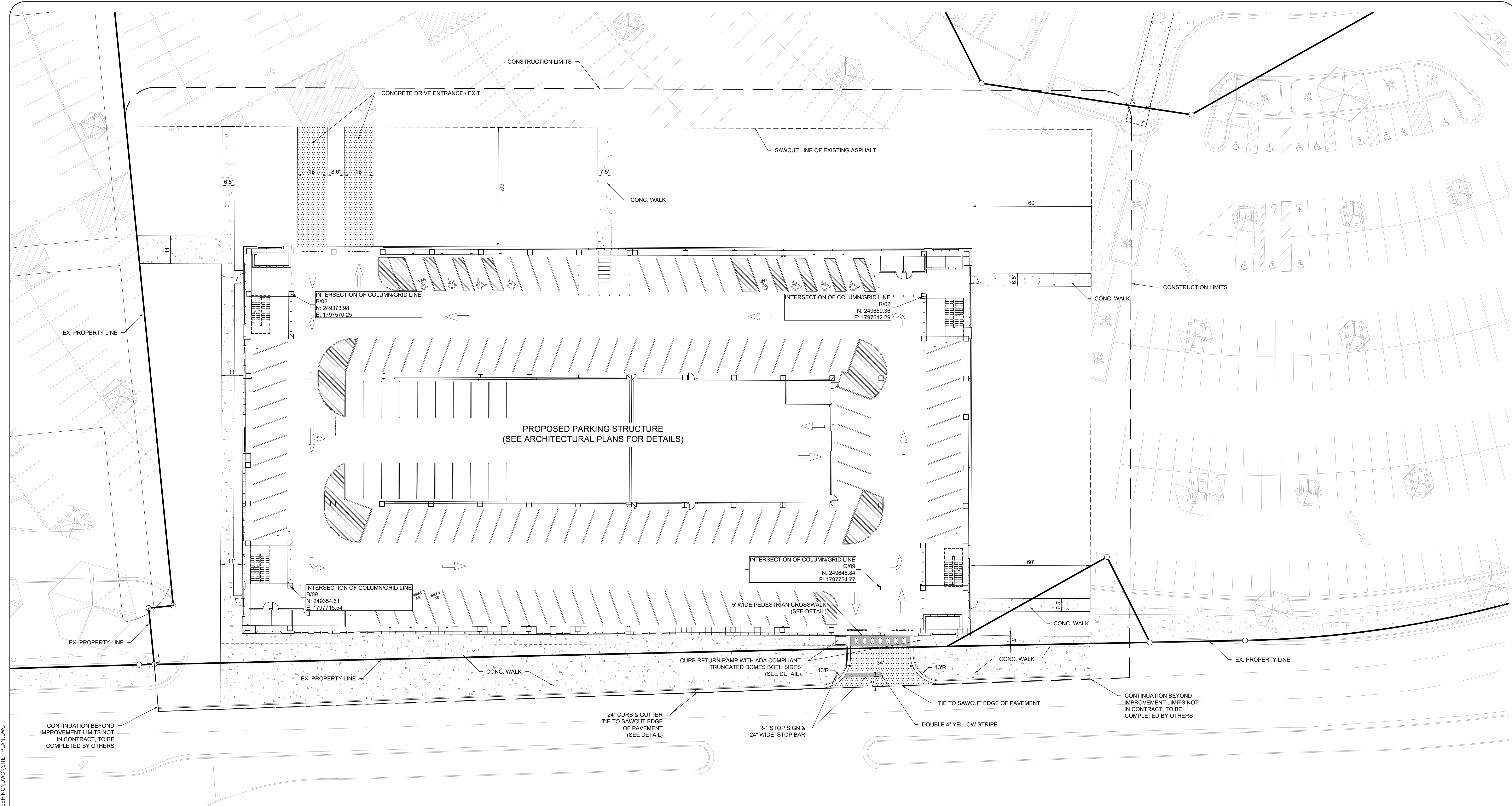
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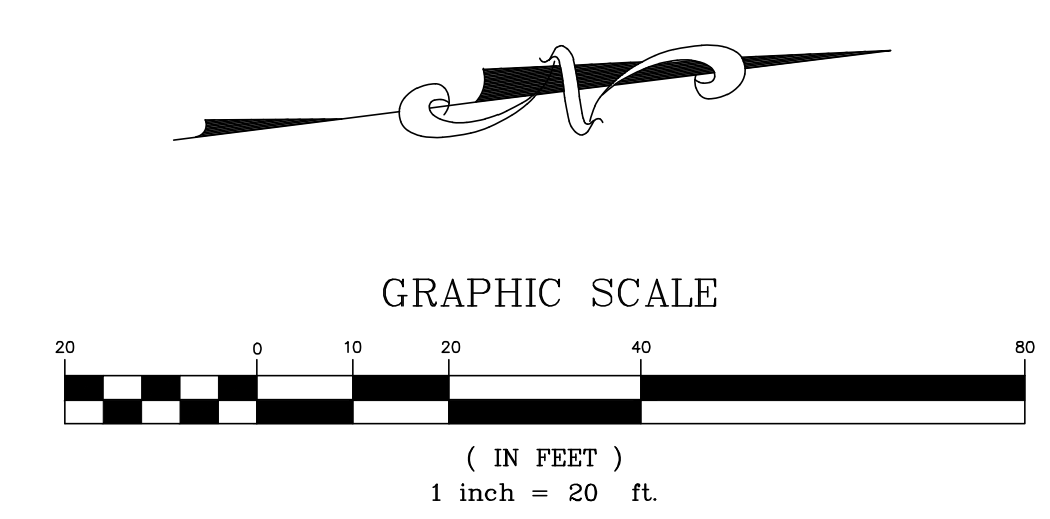
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Architectural Accessible Design  
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Revisions

sheet title	SITE LAYOUT PLAN		
job no.	4308		
dwn. by	CAW	sht. no.	003
ckd. by	DAD	of	156
dwg. no.	C3.00		
date	AUGUST 5, 2023		

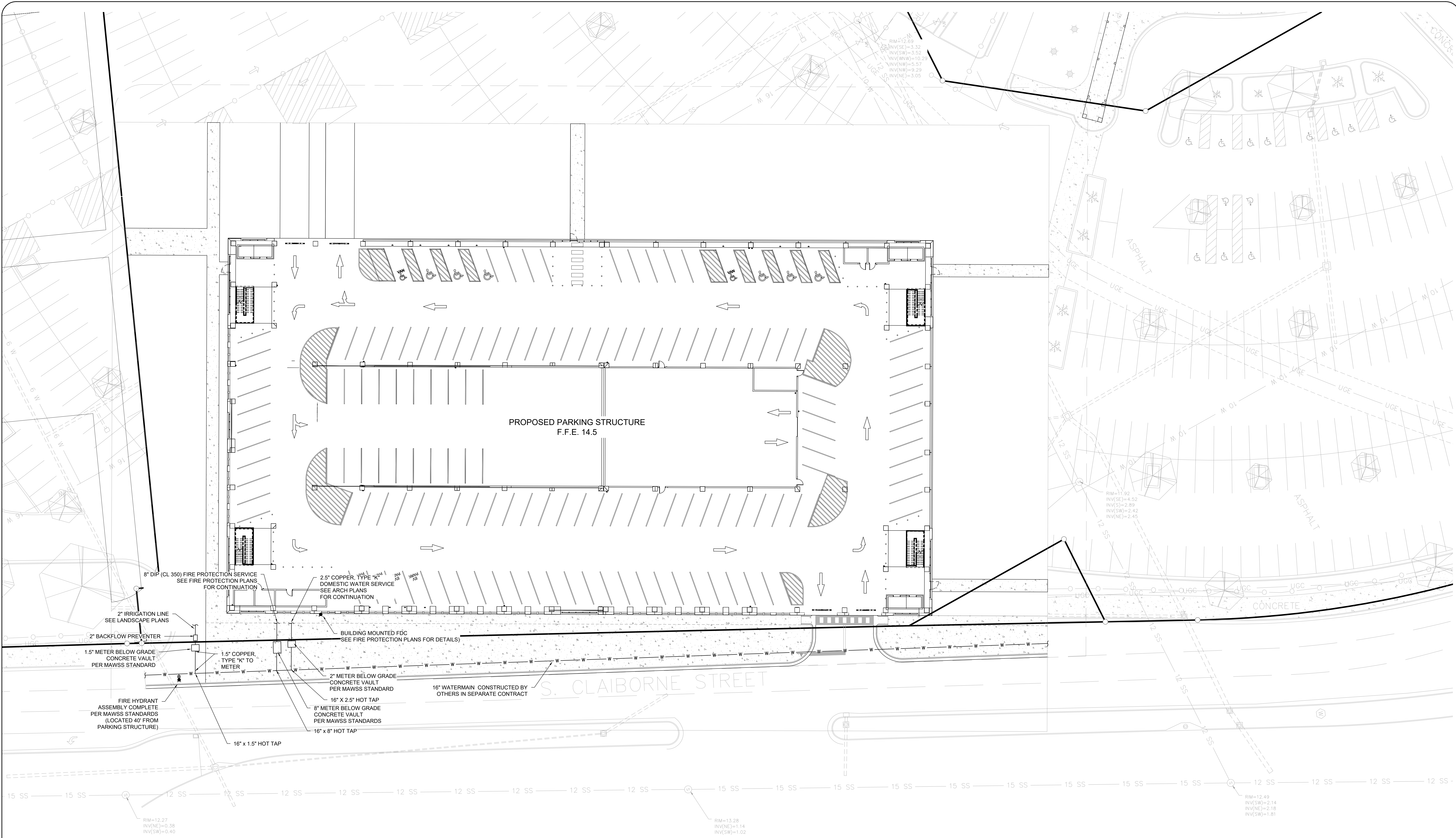


- NOTES:**
- SEE SHEET C0.1 FOR GENERAL SITE LAYOUT NOTES.
  - DIMENSIONS ARE TO BACK OF CURB UNLESS OTHERWISE NOTED.
  - SEE THE ARCHITECTURAL PLANS FOR ALL THE DETAILS OF THE PARKING STRUCTURE. THE STRUCTURE SHOWN ON PLANS IS FOR REFERENCE ONLY.

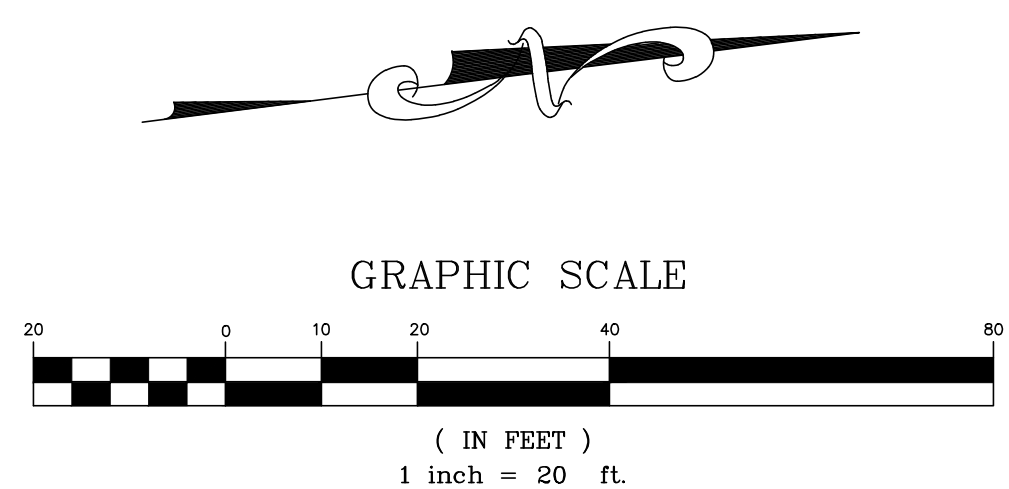


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NOTES:  
1. SEE SHEET C1.00 FOR GENERAL UTILITY NOTES.



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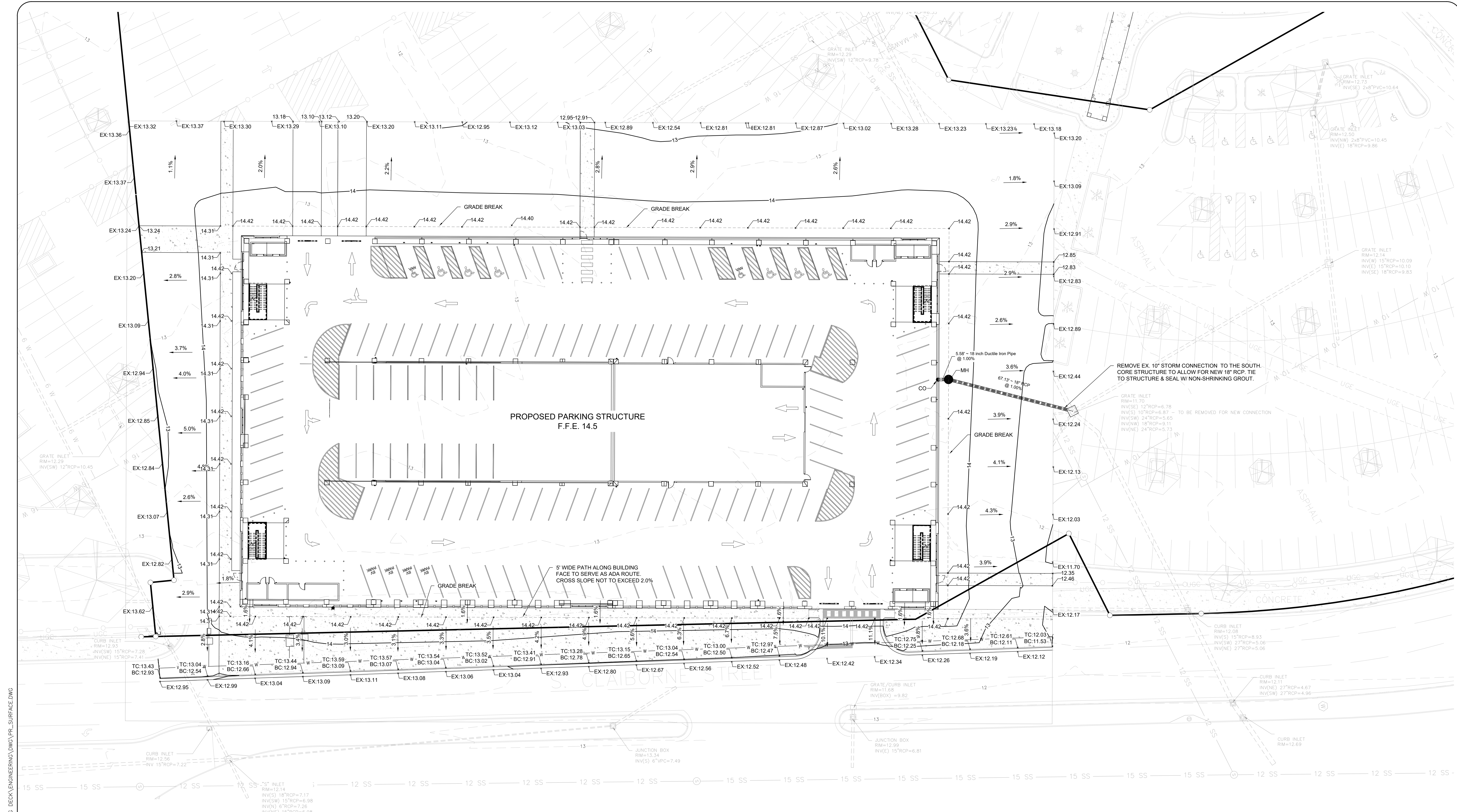
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Revisions	
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dwn. by LAW	<b>004</b>
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dwg. no. <b>C4.00</b>	of 8
date <b>AUGUST 5, 2023</b>	
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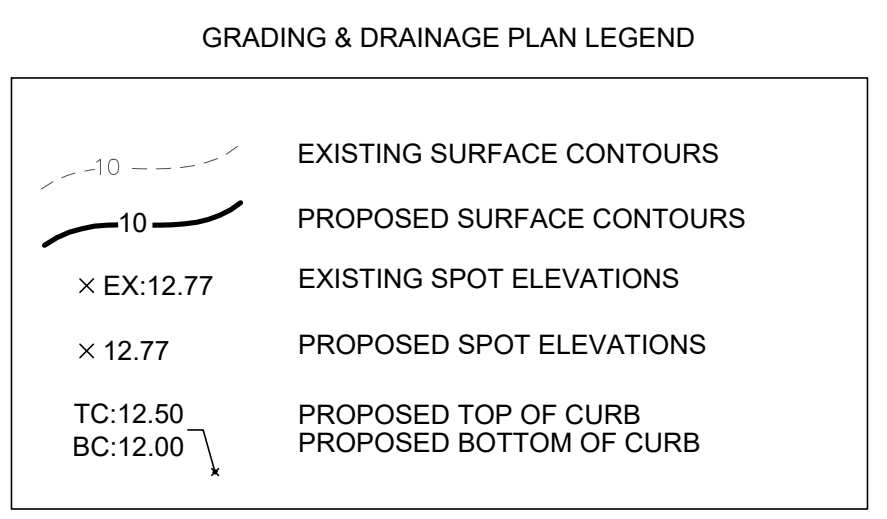
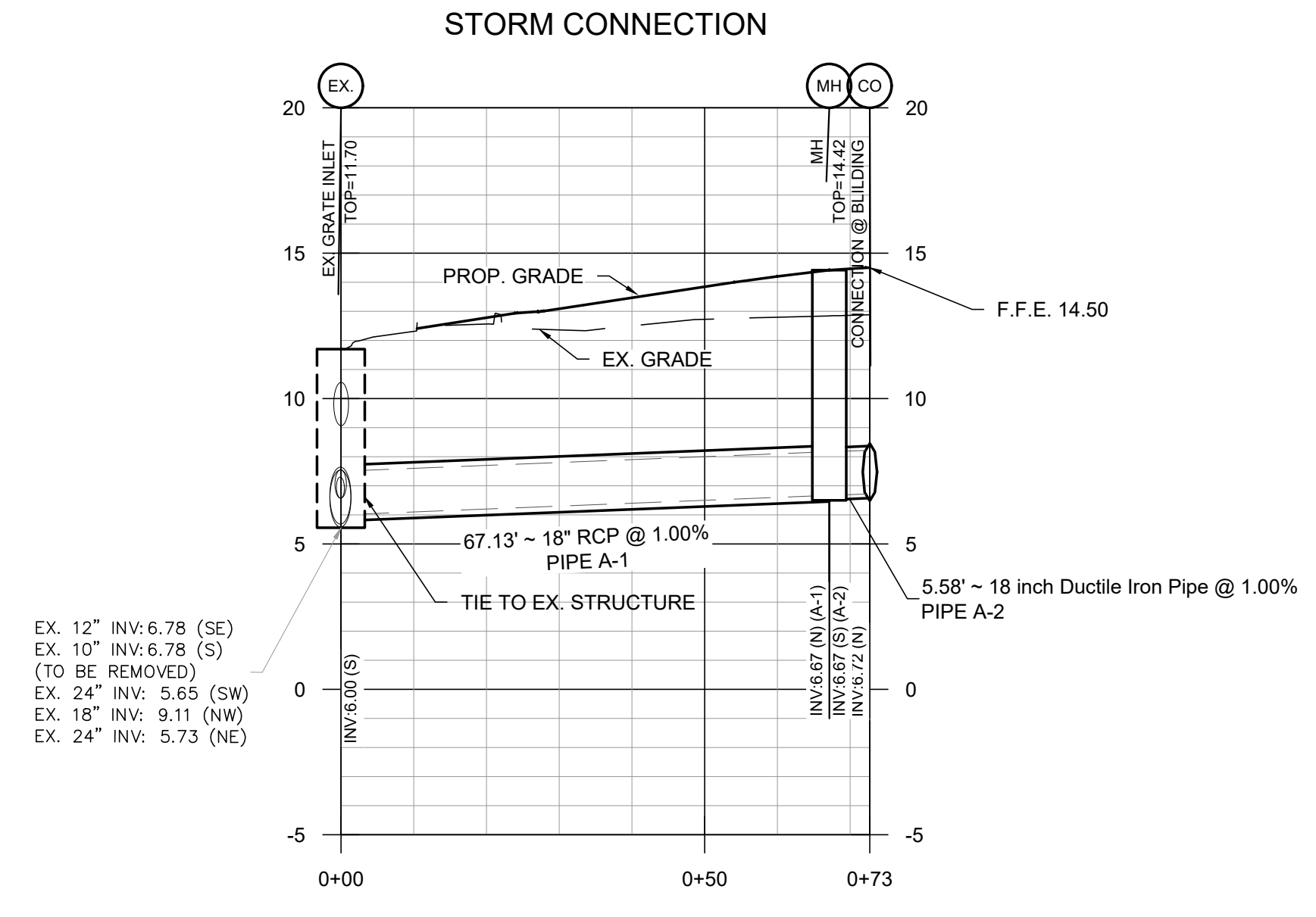
# Mobile Civic Center Parking Facility

Mobile, Alabama

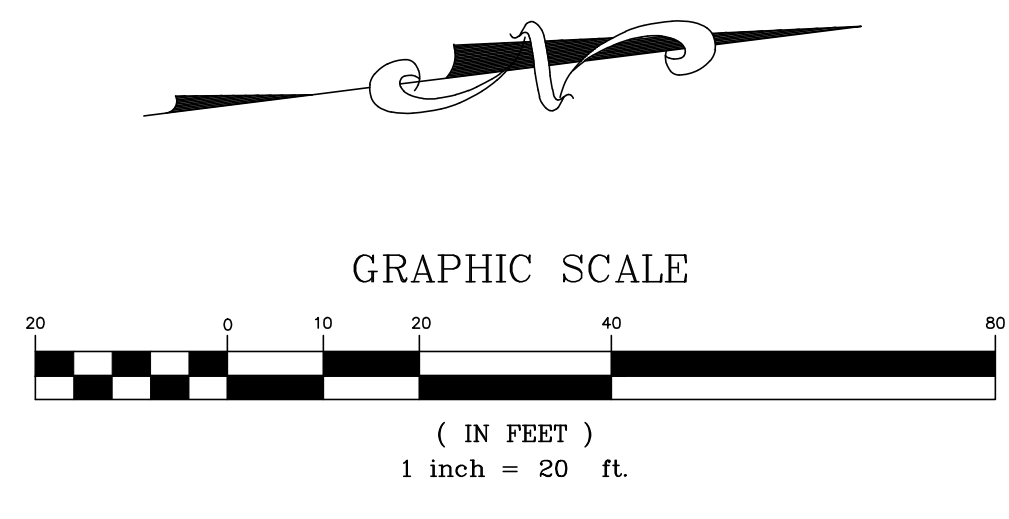




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- NOTES:**
- SEE SHEET C1.00 FOR GENERAL GRADING & DRAINAGE NOTES.
  - SEE THE ARCHITECTURAL PLANS FOR ALL THE DETAILS OF THE PARKING STRUCTURE. THE STRUCTURE SHOWN ON PLANS IS FOR REFERENCE ONLY.



# Mobile Civic Center Parking Facility

Mobile, Alabama



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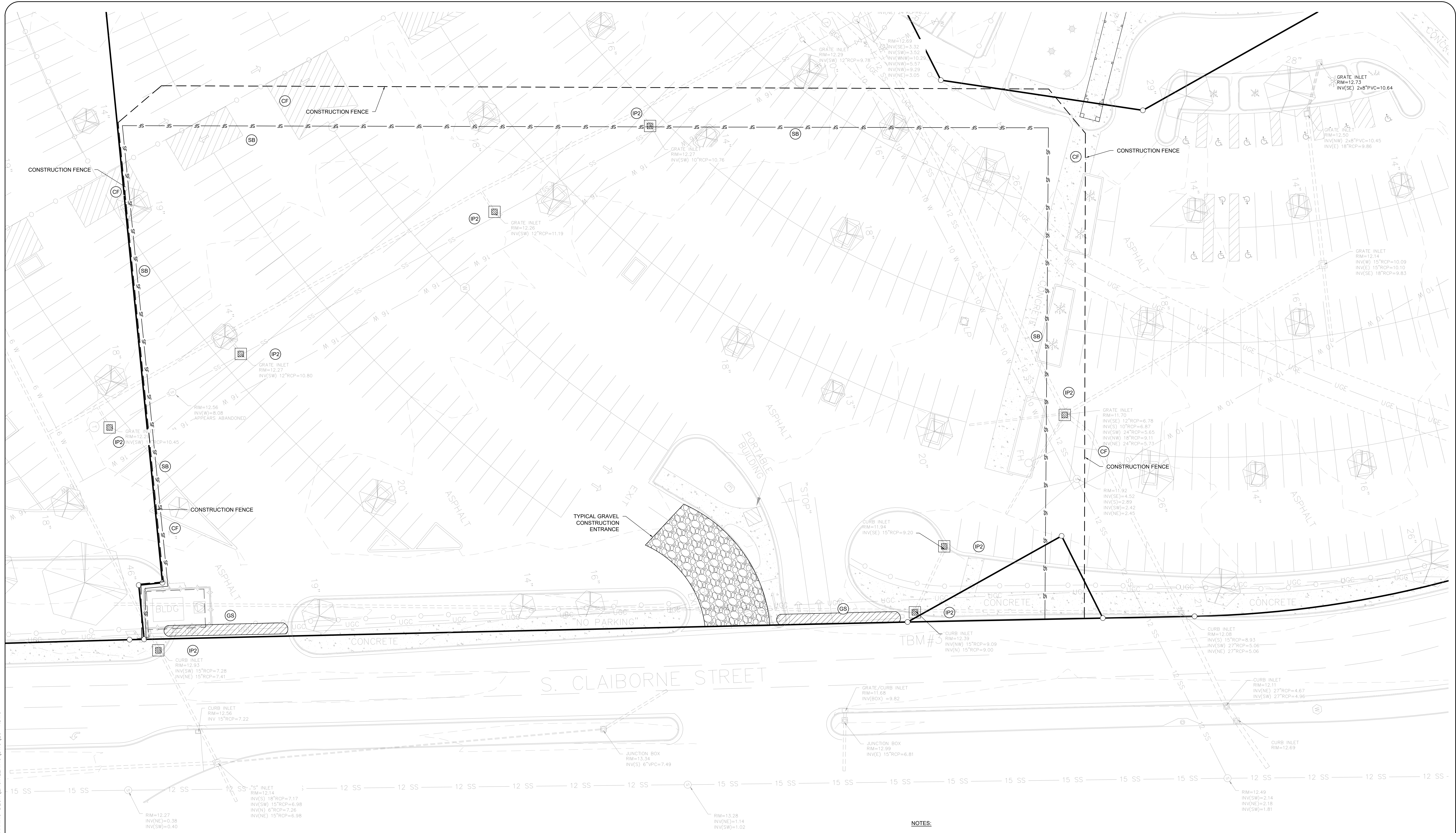
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ckd. by <b>DAD</b>	of <b>156</b>
date <b>AUGUST 5, 2023</b>	



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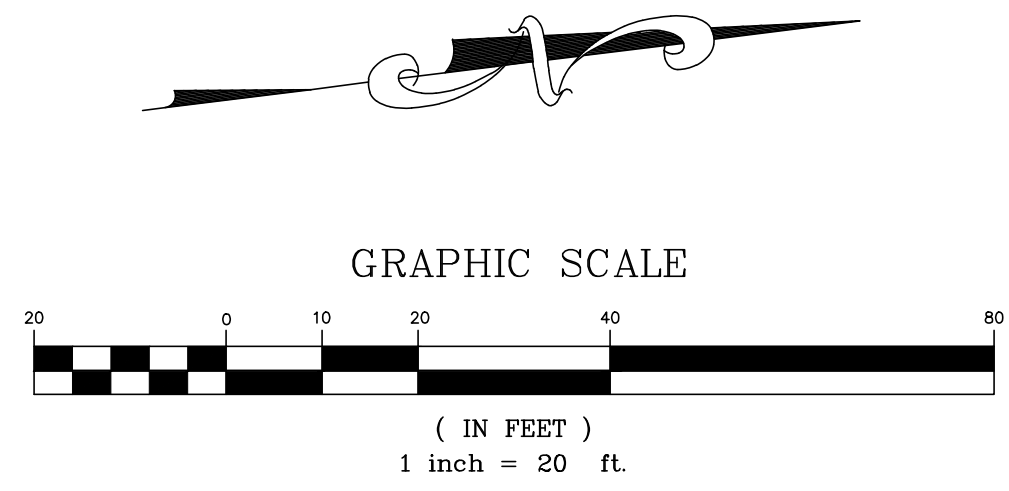
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**ALABAMA EROSION CONTROL LEGEND**

	CF	CONSTRUCTION FENCE
	SB	SILT FENCING
	CEP	CONSTRUCTION EXIT PAD
	CWA	CONCRETE WASHOUT AREA
	GS	GRAVEL SOCK
	IP2	DANDY SACK INLET PROTECTION
	GK	GROUNDS KEEPING
	DC	DUST CONTROL

- NOTES:**
- SEE SHEET C1.00 FOR EROSION CONTROL GENERAL NOTES.
  - THE SEDIMENT AND EROSION CONTROL MEASURES SHOWN ON THIS PLAN ARE THE MINIMUM REQUIRED. THE CONTRACTOR IS TO MAINTAIN AND ADD ADDITIONAL MEASURES AS NECESSARY TO ENSURE NO SEDIMENT LEAVES THE SITE.



# Mobile Civic Center Parking Facility

Mobile, Alabama



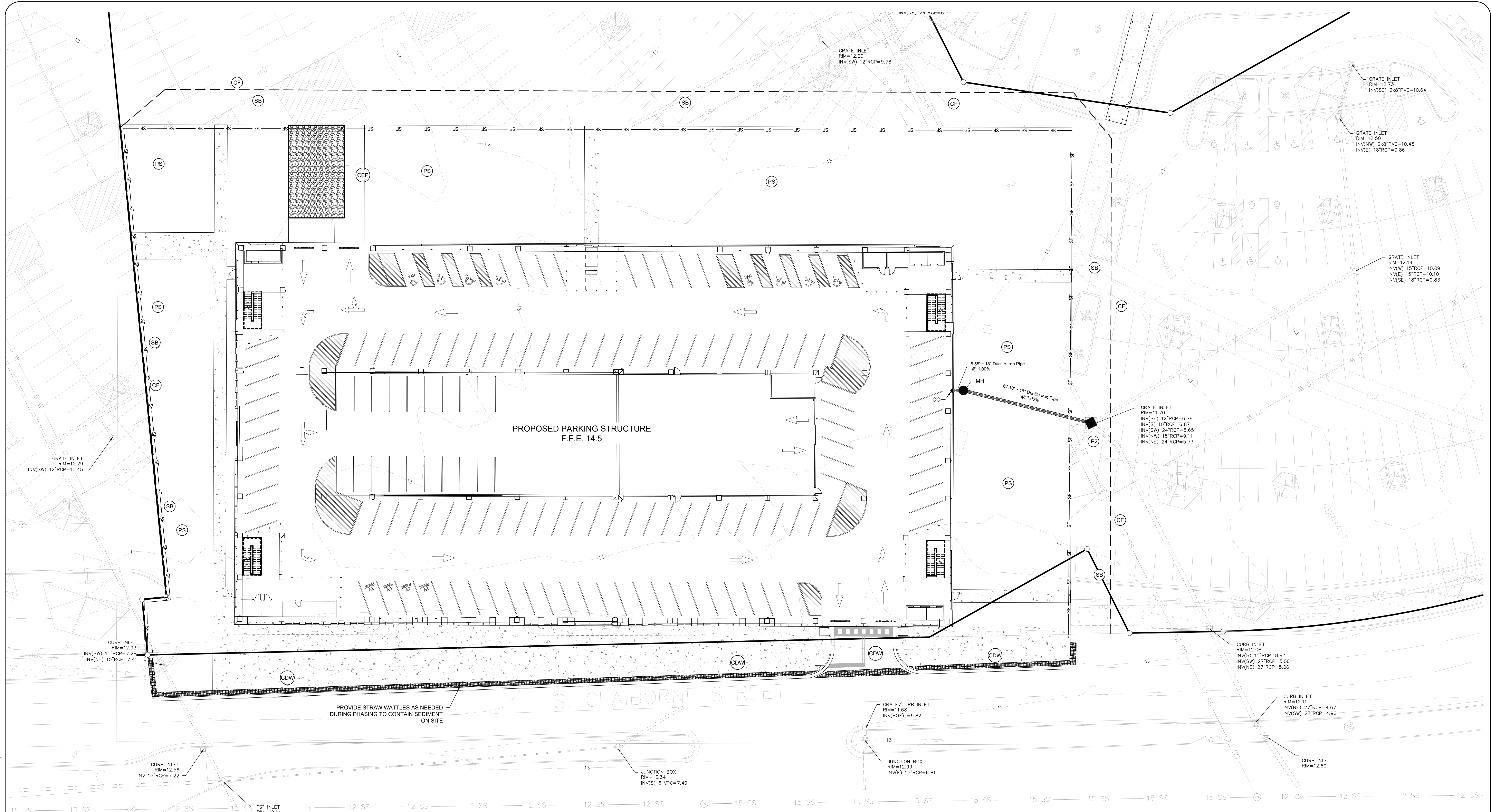
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sheet title	
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job no. <b>4308</b>	dwg. no. <b>C6.00</b>
dwg. by <b>CAW</b>	sht. no. <b>006</b>
ckd. by <b>DAD</b>	of 156
date <b>AUGUST 5, 2023</b>	
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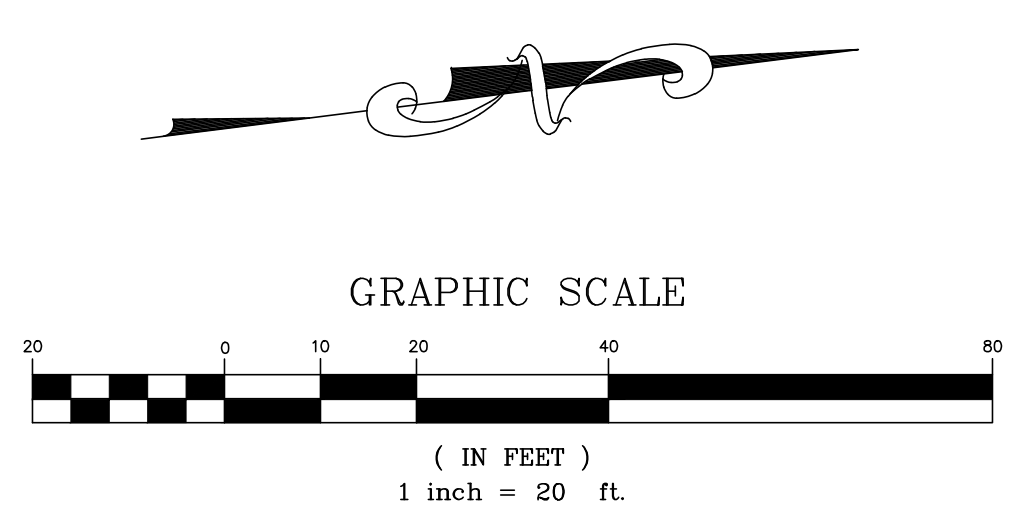
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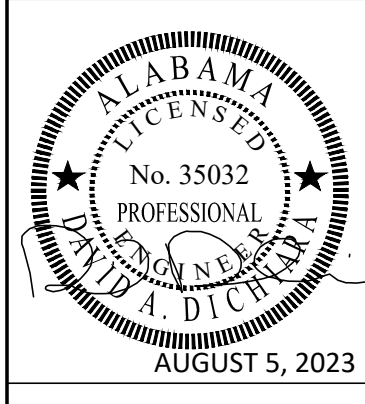


EROSION CONTROL LEGEND	
	CONSTRUCTION FENCE
	SILT FENCING
	WATTLE INLET PROTECTION
	WATTLE CHECK DAM
	CONSTRUCTION EXIT PAD
	OUTLET PROTECTION
	DANDY SACK INLET PROTECTION
	CONCRETE WASHOUT AREA
	PERMANENT SEEDING

- NOTES:**
- SEE SHEET C1.00 FOR GENERAL EROSION CONTROL NOTES
  - SEE LANDSCAPE PLANS FOR FINAL STABILIZATION.
  - MONITOR SITE DAILY TO ENSURE MUD & SEDIMENT DOES NOT LEAVE THE SITE ACCUMULATE IN CLABORNE STREET. STREET SWEEP AS MUCH AS NECESSARY TO KEEP TRAVEL LANES CLEAR OF MUD. THIS IS IMPERATIVE FOR TRAFFIC SAFETY.



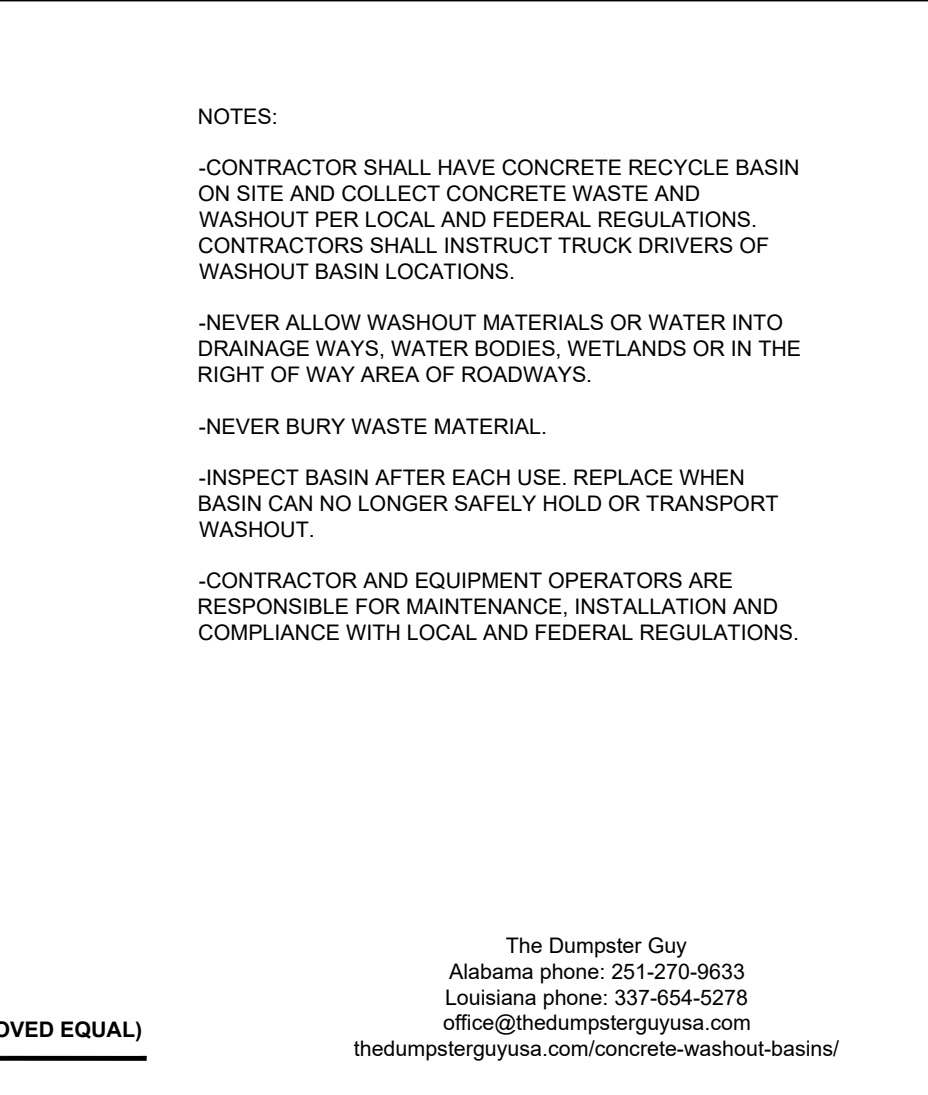
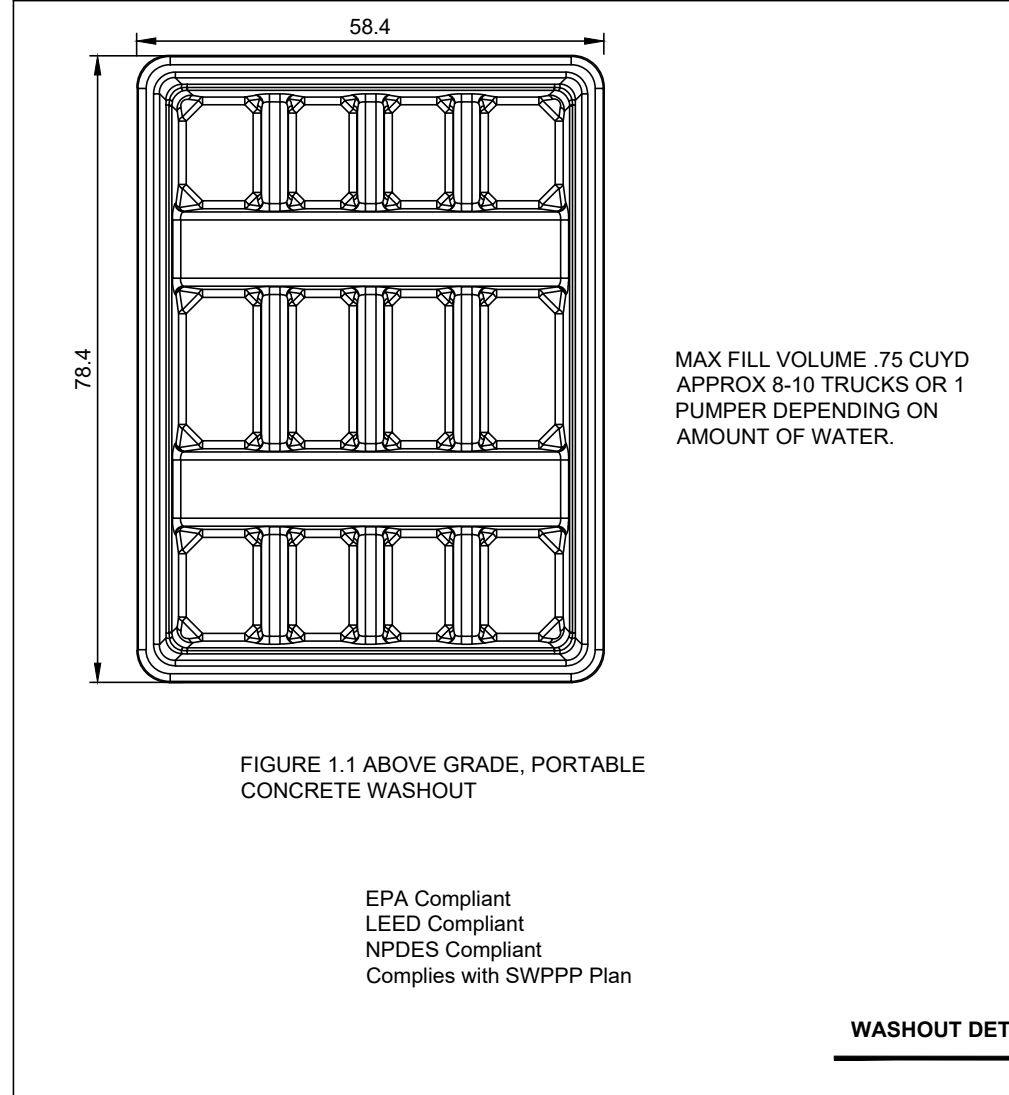
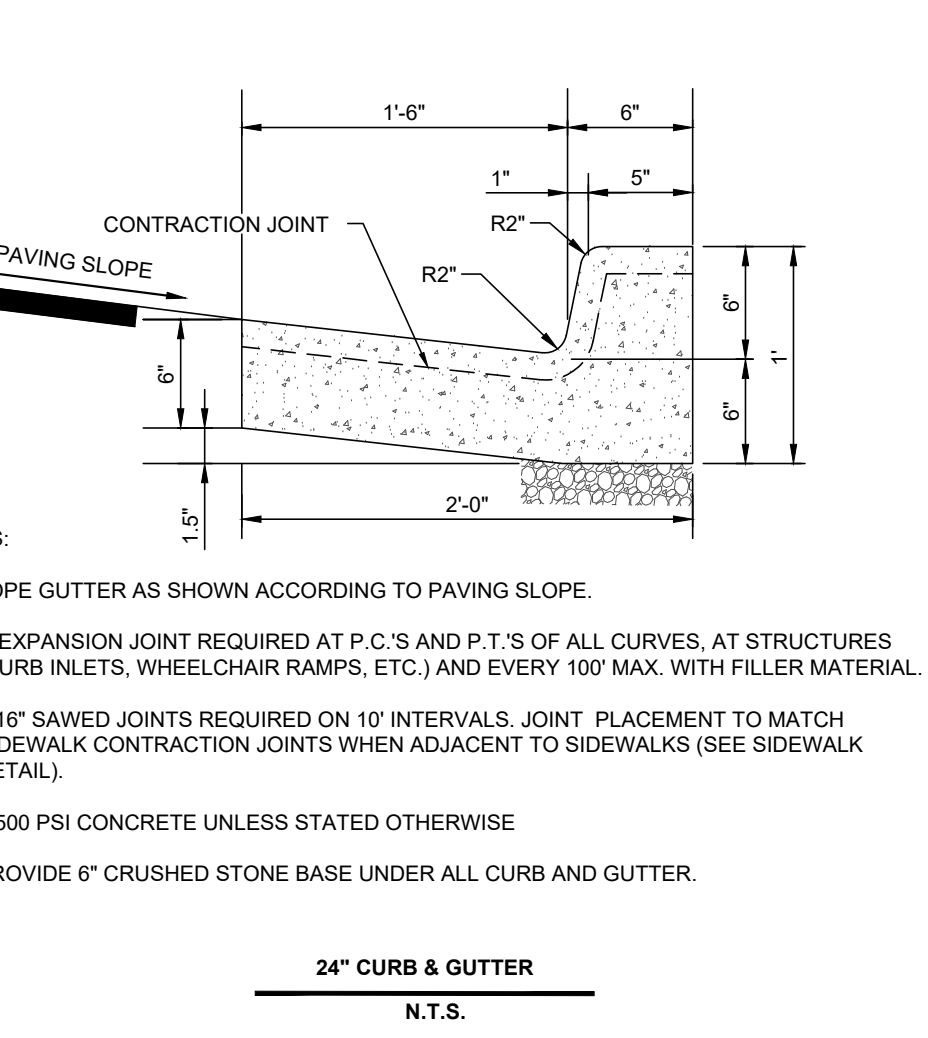
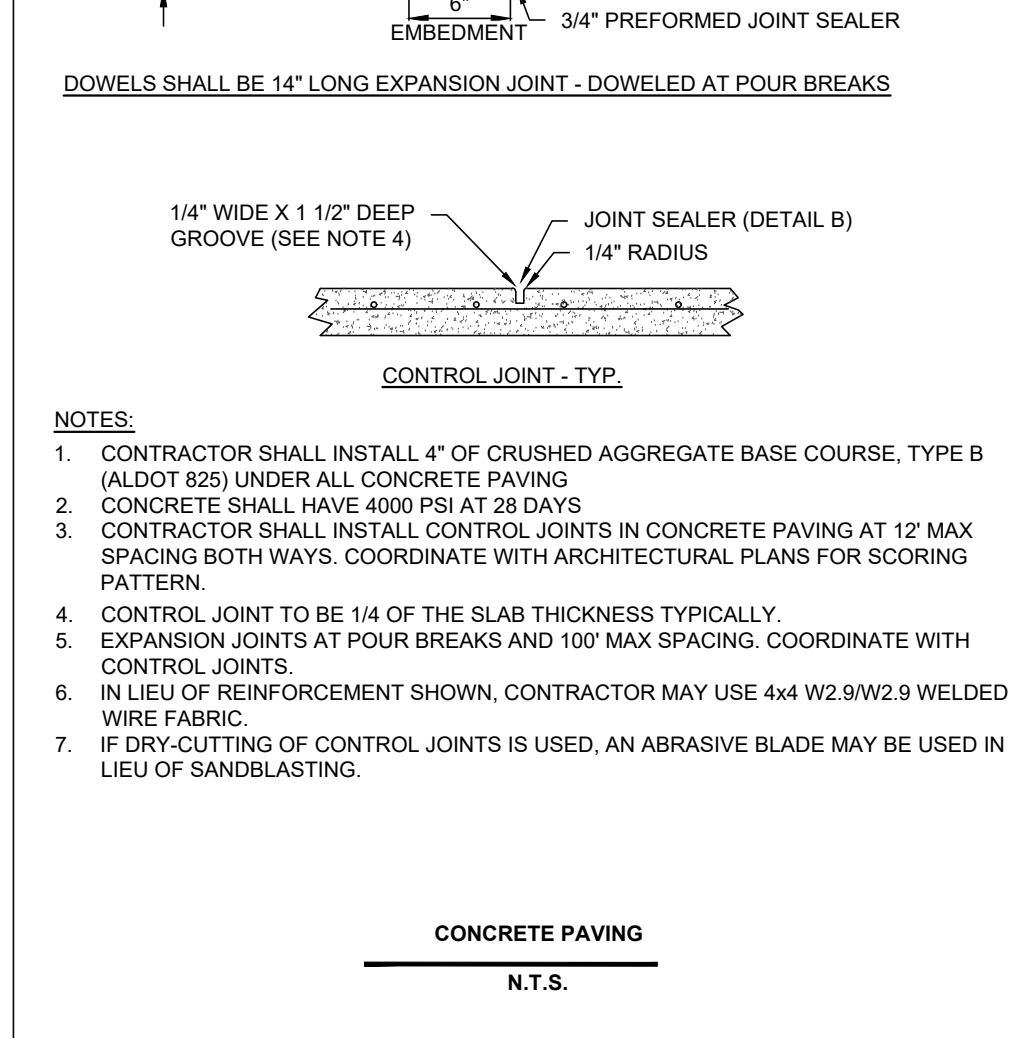
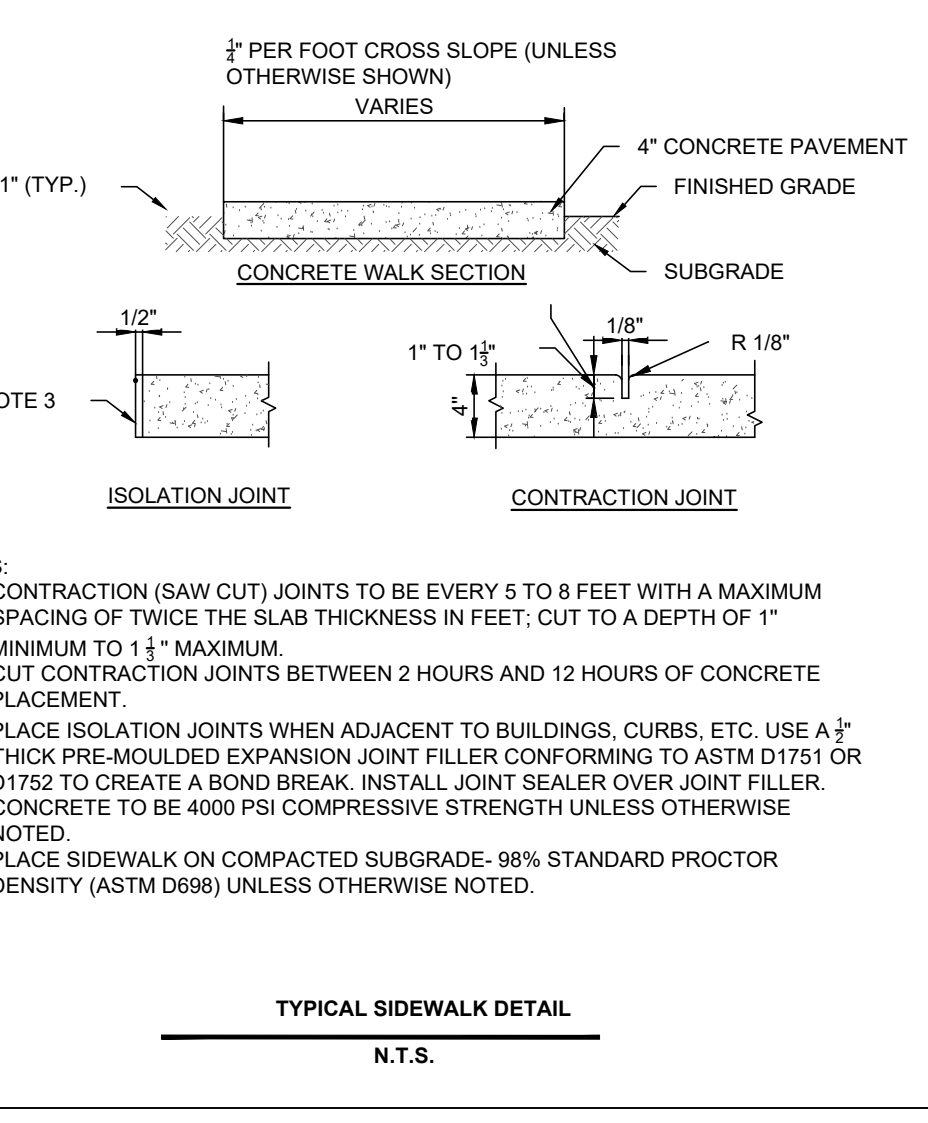
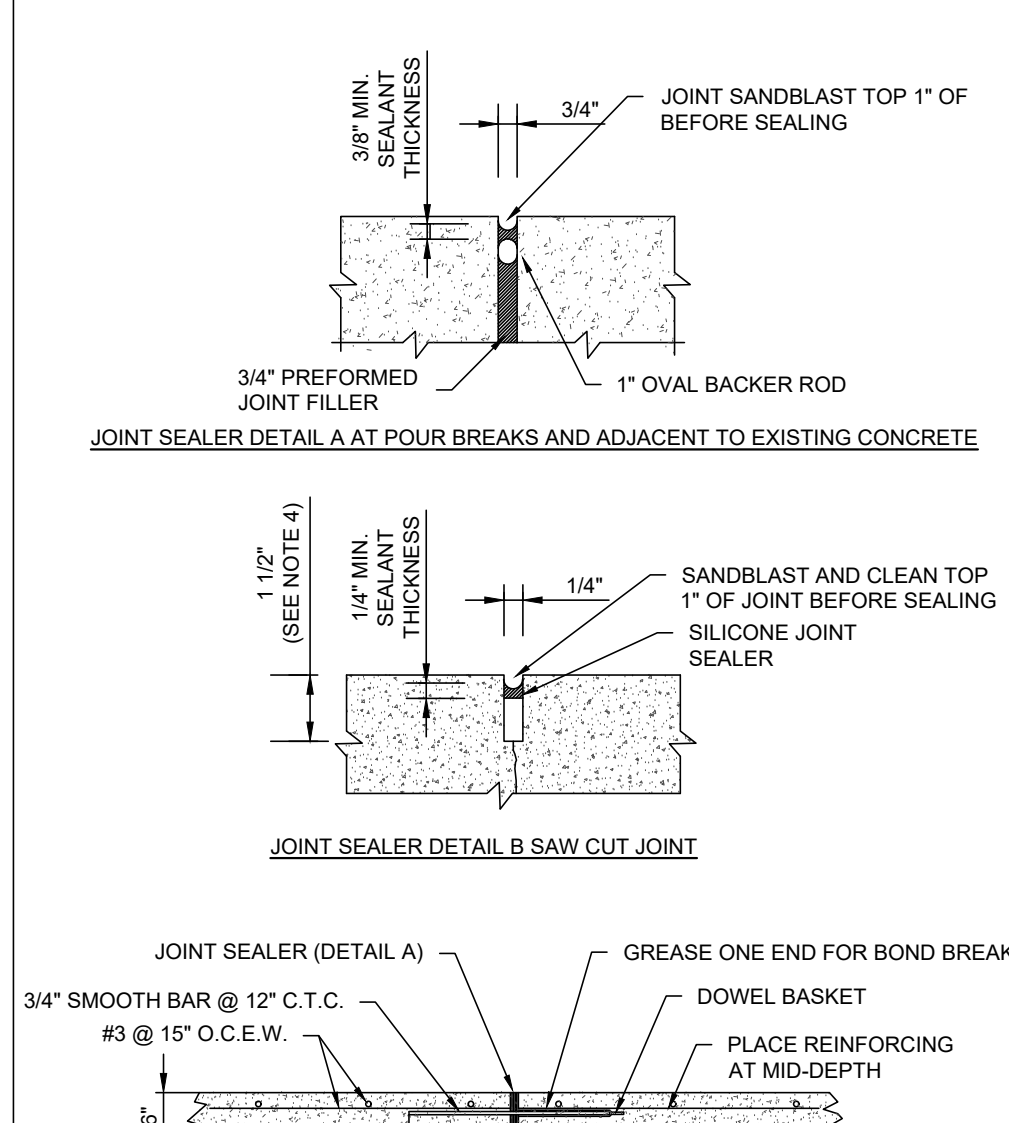
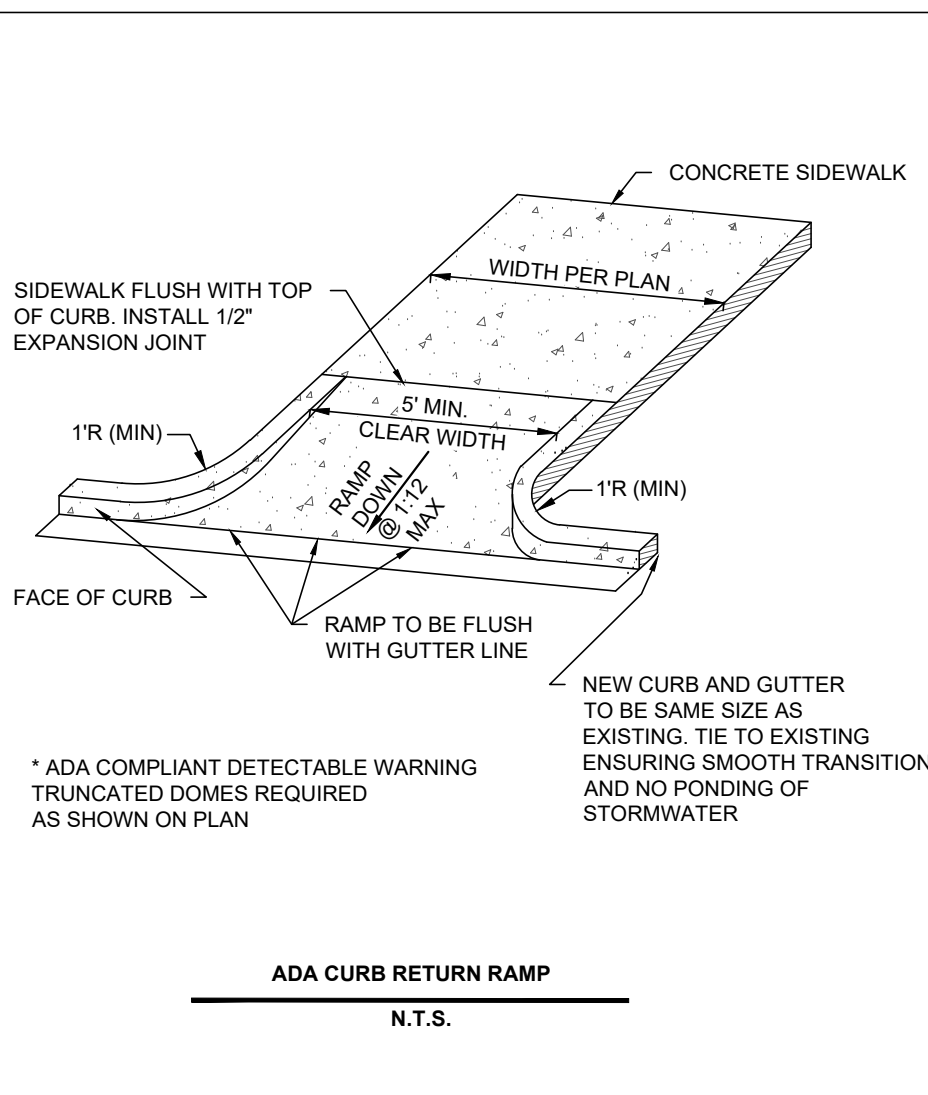
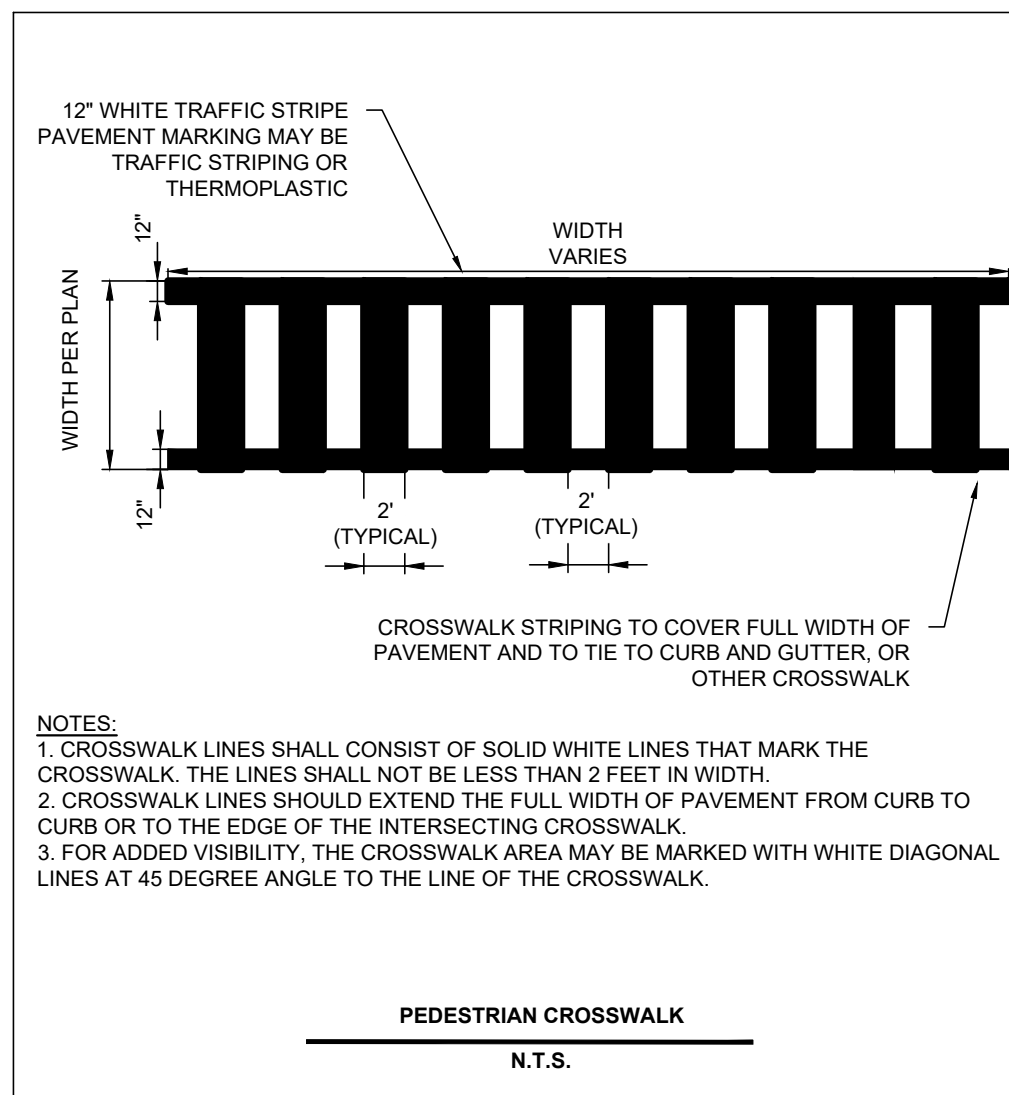
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sheet title	
SEDIMENT AND EROSION CONTROL PLAN PHASE 2	
job no.	<b>4308</b>
dwn. by	shd. no.
CAW	<b>007</b>
ckd. by	of 156
dwg. no.	
<b>C7.00</b>	
of 8	
date AUGUST 5, 2023	
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**Mobile Civic Center  
Parking Facility**  
Mobile, Alabama



Species	Seeding Rates/Ac PLS <sup>1</sup>	North	Central	South
Bahiagrass, Pensacola	40 lbs	-	Mar 1-July 1	Feb 1-Nov 1 <sup>2</sup>
Bermudagrass, Common	10 lbs	Apr 1-July 1	Mar 15-July 15	Mar 1-July 15
Bahiagrass, Pensacola Bermudagrass, Common	30 lbs 5 lbs	-	Mar 1-July 1	Mar 1-July 15
Bermudagrass, Hybrid (Lawn Types)	Solid Sod	Anytime	Anytime	Anytime
Bermudagrass, Hybrid (Lawn Types)	Sprigs 1/sq ft	Mar 1-Aug 1	Mar 1-Aug 1	Feb 15 -Sep 1
Fescue, Tall	40-50 lbs	Sep 1-Nov 1	Sep 1-Nov 1	-
Sericea	40-60 lbs	Mar 15-July 15	Mar 1-July 15	Feb 15 -July 15
Sericea & Common Bermudagrass	40 lbs 10 lbs	Mar 15-July 15	Mar 1-July 15	Feb 15-July 15
Switchgrass, Alamo	4 lbs	Apr 1-Jun 15	Mar 15-Jun 15	Mar 15-Jun 15

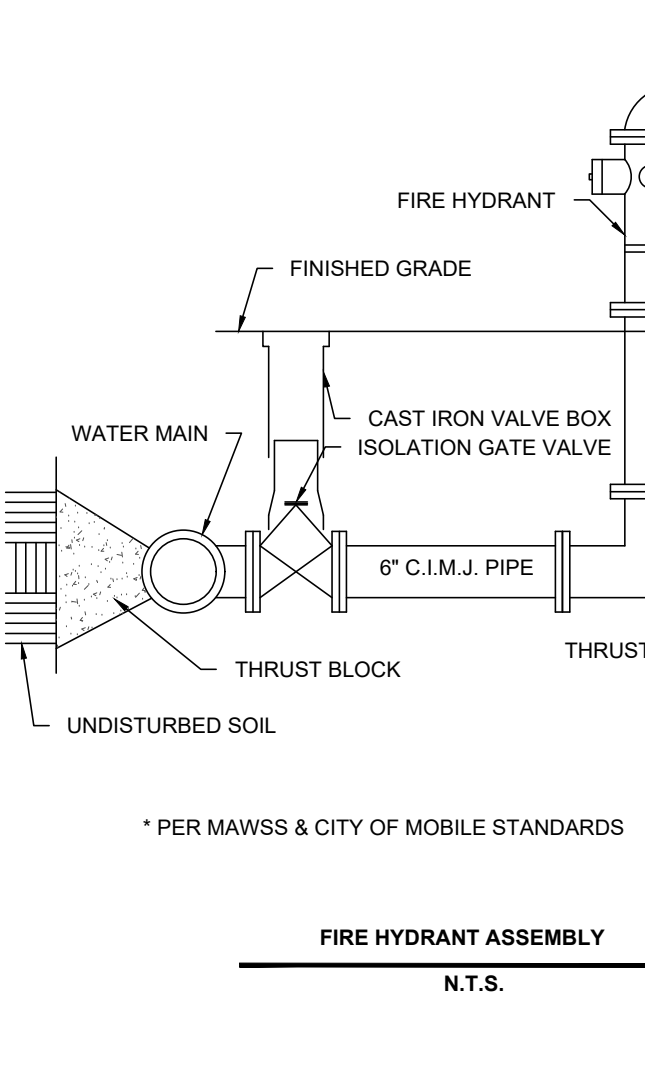
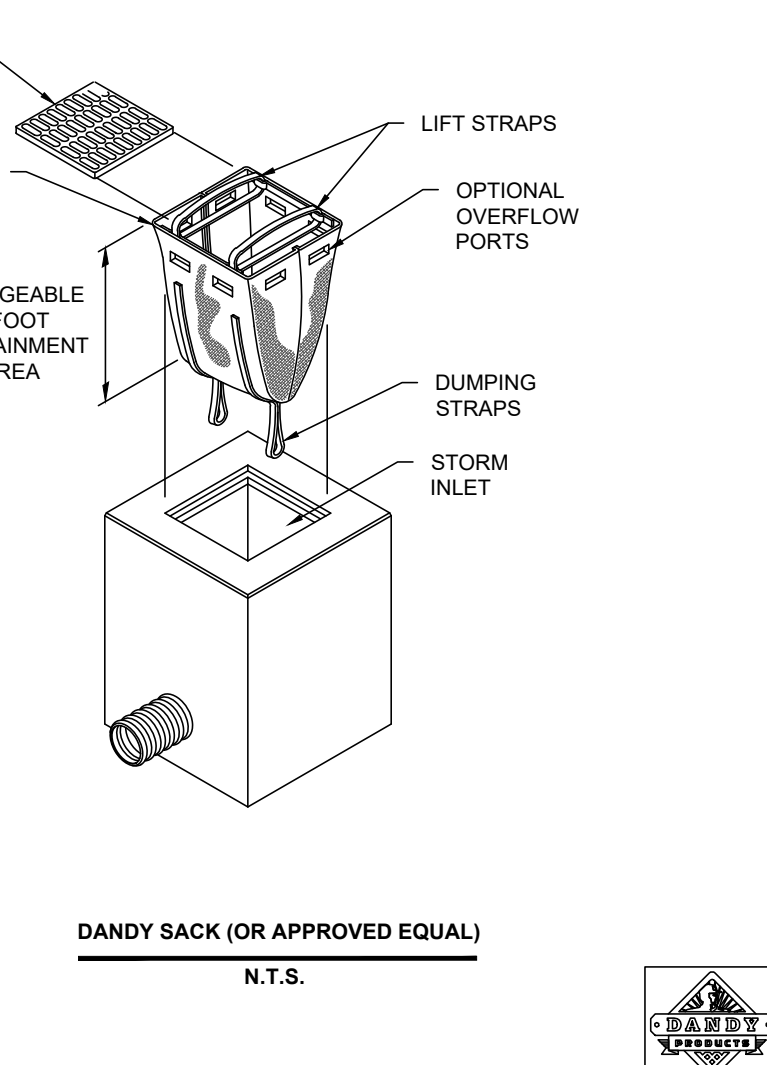


Figure FS-1 Geographical Areas for Species Adaptation

Table MU-1 Mulching Materials and Application Rates

Material	Rate Per Acre and (Per 1000 R.2)	Notes
Straw (with Seed)	1 1/2 - 2 tons (70 lbs - 90 lbs)	Spread by hand or machine; anchor when subject to blowing.
Straw Alone (no seed)	2 1/2 - 3 tons (115 lbs - 160 lbs)	Spread by hand or machine; anchor when subject to blowing.
Wood Chips	5-6 tons (225 lbs - 270 lbs)	Treat with 12 lbs. nitrogen/ton.
Bark	35 cubic yards (0.8 cubic yard)	Can apply with mulch blower.
Pine Straw	1-2 tons (45 lbs - 90 lbs)	Spread by hand or machine; will not blow like straw.
Peanut Hulls	10-20 tons (450 lbs - 900 lbs)	Will wash off slopes. Treat with 12 lbs. nitrogen/ton.

TEMPORARY SEEDING AND MULCHING RATES



Construction Documents

Mobile Civic Center Parking Facility  
Mobile, Alabama

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Revisions

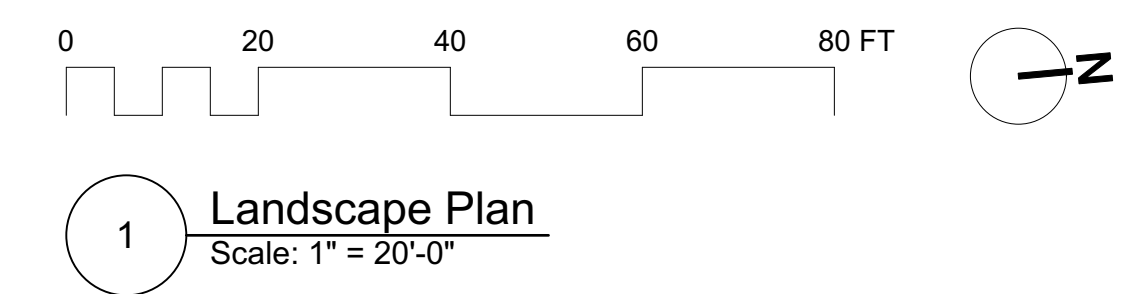
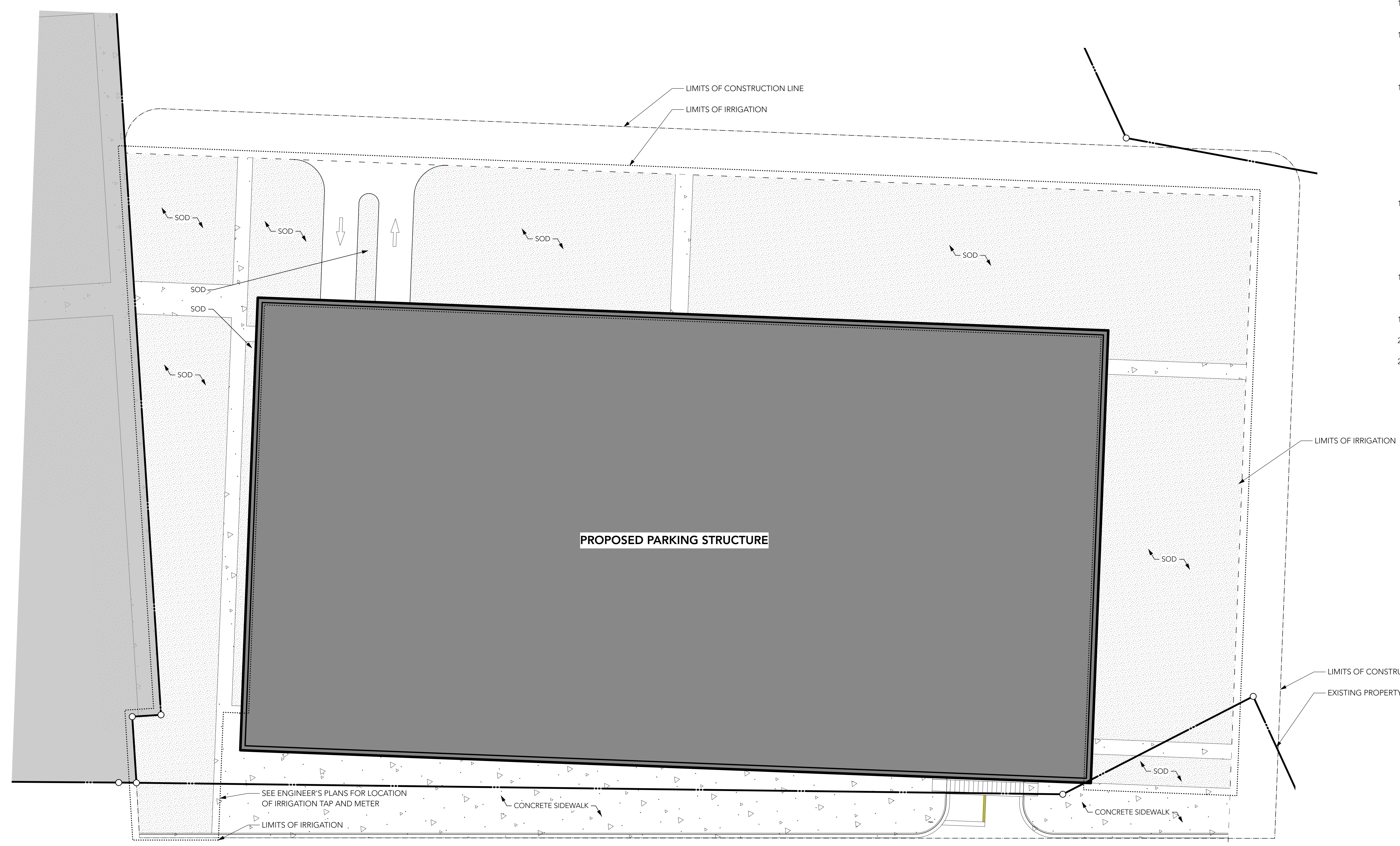
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CIVIL DETAILS

job no. **4308**  
dwn. by **CAW** sht. no. **008**  
ckd. by **DAD** of 156

dwg. no. **C8.00**  
of 8  
date **AUGUST 5, 2023**  
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PLANT SCHEDULE					
Count	Scientific Name	Common Name	Size	Spacing	Root Remarks
<b>Grasses</b>					
SOD	Cynodon dactylon '419'	Bermuda Sod	-	Solid Sod	- Solid sod

- GENERAL PLANTING NOTES**
- CONTRACTOR SHALL HAVE FULL SIZE DRAWINGS ON SITE AT ALL TIMES.
  - CONTRACTOR SHALL BE RESPONSIBLE FOR THE SITE INSPECTION PRIOR TO LANDSCAPE CONSTRUCTION AND INSTALLATION IN ORDER TO ACQUAINT HIMSELF WITH EXISTING CONDITIONS. CONTRACTOR SHALL, FOR HIS OWN PROTECTION, BE RESPONSIBLE FOR LOCATING ALL EXISTING UNDERGROUND UTILITIES BEFORE BEGINNING CONSTRUCTION.
  - DUE TO MODIFICATIONS MADE DURING CONSTRUCTION, SITE CONDITIONS MAY VARY FROM THOSE SHOWN. CONTRACTOR TO VERIFY ALL SUCH CONDITIONS TO HIS SATISFACTION. NO CHANGE IN CONTRACT PRICE WILL BE GRANTED FOR FAILURE TO OBSERVE THIS REQUIREMENT.
  - CONTRACTOR TO VERIFY ALL PLANT MATERIAL QUANTITIES AND PLANTING AREA DIMENSIONS PRIOR TO BEGINNING PLANTING. PROVIDE QUANTITIES AS REQUIRED TO MEET DESIGN INTENT AND REPORT ANY DIFFERENCES.
  - THE LANDSCAPE ARCHITECT RESERVES THE RIGHT TO REJECT ANY PLANT MATERIAL OR WORK CONSTRUCTED OR IMPLIED BY THESE PLANS, AT ANY TIME THROUGHOUT THE PROJECT.
  - CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING POSITIVE DRAINAGE IN COMPLIANCE WITH THE CIVIL ENGINEER'S GRADING PLAN
  - CLEANUP AND DISPOSE OF OFF OWNER'S PROPERTY ALL DEBRIS, WASTE AND EXCESS CONSTRUCTION MATERIALS FOLLOWING COMPLETION AND LEAVE NEAT, CLEAN AND READY FOR OWNER'S USE.
  - CONTRACTOR SHALL GUARANTEE ALL WORK AND PLANT MATERIAL, INCLUDING SEED AND/OR SOD, FOR ONE FULL YEAR FROM DATE OF INSTALLATION.
  - ALL TURF (SEEDED OR SODDED) AREAS SHALL RECEIVE TOPSOIL TO A MINIMUM DEPTH OF 3". UNLESS SPECIFIED OTHERWISE IN THE PLANS.
  - ALL TURF (SEEDED OR SODDED) AREAS SHALL HAVE SOIL TESTED BY TESTING LAB. FERTILIZER AND LIME APPLICATION REGIME SHALL BE DEVELOPED AND FOLLOWED PER LANDSCAPE ARCHITECT REVIEW.
  - CONTRACTOR SHALL PROVIDE 12 MONTH WARRANTY FOR ALL WORK AND MATERIALS.
  - SOD SHALL BE LAID TIGHT AND SMOOTH WITH STAGGERED JOINTS. SOD SHALL BE WHOLE PIECES WITH LAID END TO END WITH NO GAPS EXCEEDING 1".
  - SOD SHALL BE ROLLED SMOOTH AT THE CLOSE OF CONSTRUCTION AND LEFT IN NEW CONDITION, ACTIVELY GROWING.
  - THE CONTRACTOR SHALL MAINTAIN THE SOD AND MOW AS REGULARLY TO MAINTAIN A MAX. 1 1/2" GROWING HEIGHT UNTIL CLOSE OF CONSTRUCTION AND IN RECEIPT OF A LETTER OF SUBSTANTIAL COMPLETION.
  - SOD SHALL BE INSTALLED UPON DELIVERY OR WITHIN A MAXIMUM OF 24 HOURS AFTER HARVESTING. THE LAYER OF SOD FOR EACH PALLET SHALL BE DISCARDED UNLESS THE SOD HAS BEEN DELIVERED BY A COVERED TRUCK. SOD SHALL BE UNIFORMLY GREEN WITH 7 DAYS OF INSTALLATION. PROTECT SOD FROM BREAKAGE OR DRYING.
  - TURFGRASS AND SOD SHALL BE CERTIFIED NUMBER 1 QUALITY / PREMIUM, INCLUDING LIMITATIONS ON THATCH, WEEDS, DISEASES, NEMATODES, INSECTS, COMPLYING WITH "SPECIFICATIONS FOR TURFGRASS SOD MATERIALS" IN TPI'S "GUIDELINES SPECIFICATIONS TO TURFGRASS SODDING". FURNISH VIABLE SOD OF UNIFORM DENSITY, COLOR AND TEXTURE, STRONGLY ROOTED AND CAPABLE OF VIGOROUS GROWTH AND DEVELOPMENT WHEN PLANTED.
- HARVEST, DELIVER, STORE AND HANDLE SOD ACCORDING TO REQUIREMENTS IN "SPECIFICATIONS FOR TURFGRASS SOD MATERIALS" AND "SPECIFICATIONS FOR TURFGRASS SOD TRANSPANTING AND INSTALLATION" IN TPI'S "GUIDELINES SPECIFICATIONS TO TURFGRASS SODDING"
- TOPSOIL SHALL BE SCREENED AND BLENDED, FRIABLE, WITH APPROPRIATE ORGANIC MATTER FOR HEALTHY TURF. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE A SOIL TEST AND RECOMMENDED SOIL REMEDIATION AS RECOMMENDED. TOPSOILS SHALL BE FREE OF DELETERIOUS MATERIALS, ROCKS, GRAVEL, CONSTRUCTION DEBRIS AND GRAVEL, ROOTS, LIMBS AND ANY OTHER MATERIAL THAT WOULD PREVENT GROWTH OR A SMOOTH MOWABLE SURFACE.
  - SUB-GRADE: LOOSEN SUBGRADE TO A MINIMUM DEPTH OF 2". REMOVE STONES LARGER THAN 2" IN ANY DIMENSION, INCLUDING STICKS, ROOTS, RUBBISH AND OTHER EXTRANEIOUS MATTER. DISPOSE OF OFF OWNER'S PROPERTY IN A LEGAL MANNER.
  - REDUCE BLENDED AND SPREAD TOPSOIL SO TO ACCOUNT FOR THICKNESS OF SOD AND SMOOTH TRANSITION BETWEEN LAWN AND PAVED AREAS.
  - SATURATE SOD WITH FINE SPRAY WITHIN TWO HOURS OF PLANTING. WATER DAILY AFTER INSTALLATION AS REQUIRED.
  - REPAIR DEPRESSIONS FROM WORKERS AND EQUIPMENT SATISFACTORY TO THE ENGINEER AND OR LANDSCAPE ARCHITECT.



1 Landscape Plan  
Scale: 1" = 20'-0"

**Dave Eyrich & Associates**  
Landscape Architecture



**Evan Terry Associates LLC**  
Architecture • Accessible Design  
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Birmingham, AL 35243 (205) 872-9100

Revisions	sheet title
	<b>LANDSCAPE PLAN</b>
job no.	<b>4308</b>
dwn. by	shl. no.
HWM	
ckd. by	of
DKE	XXX
dwg. no.	
<b>L1.0</b>	1 of 1
date	<b>August 2, 2023</b>
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**Mobile Civic Center Parking Facility**  
Mobile, Alabama

GENERAL NOTES

- 1 CONTRACTOR SHALL COORDINATE BETWEEN ARCHITECTURAL, STRUCTURAL, MECHANICAL, ELECTRICAL, AND OTHER DRAWINGS. ANY DISCREPANCIES OR CONFLICTS BETWEEN DRAWINGS OF DIFFERENT DISCIPLINES SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT. CONTRACTOR SHALL NOT PROCEED WITH SHOP DRAWING PREPARATION OR ANY CONSTRUCTION UNTIL THE ARCHITECT HAS GIVEN DIRECTION OF RESOLUTION OF THE DISCREPANCY OR CONFLICT.

SITE AND FOUNDATION

- 1. THE DESIGN OF FOUNDATIONS AND RELATED COMPONENTS IS BASED ON THE GEOTECHNICAL ENGINEERING REPORT PREPARED BY GET, PROJECT NO. 23-157, DATED JULY 7, 2023. THE GENERAL CONTRACTOR SHALL ADHERE TO ALL REQUIREMENTS AND RECOMMENDATIONS IN THE REPORT.

CONCRETE

Table with 2 columns: Item description and Value. Includes items like 'CONCRETE SCHEDULES ITEM', 'CONCRETE COLUMNS', 'CONCRETE SLABS & BEAMS', 'CONCRETE COVER OVER REINFORCING (UNO)', 'UNFORMED SURFACE IN CONTACT WITH EARTH', 'UNFORMED SURFACE OVER VAPOR BARRIER', 'FORMED SURFACES EXPOSED TO EARTH OR WEATHER', 'WALLS, SLABS', 'COLUMNS, BEAMS'.

REINFORCING

- 1. CONCRETE AT SLABS ON GRADE SHALL HAVE A NOMINAL MAXIMUM COARSE AGGREGATE SIZE OF 3/4 INCH. ADJUST PORTIONS OF COMBINED COARSE, INTERMEDIATE AND FINE AGGREGATES TO PROVIDE A COARSENESS FACTOR OF 60 TO 75%.

Table titled 'TENSION LAP SPLICE LENGTH' with columns for Bar Size, f'c = 3000 PSI, f'c = 4000 PSI, and f'c = 5000 PSI. Each f'c column has sub-columns for Top Bars and Others Bars.

POST-TENSIONING

- 1. POST-TENSIONING SUPPLIER SHALL SUBMIT DESIGN CALCULATIONS AND SHOP DRAWINGS BEARING THE SEAL OF A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF ALABAMA. SHOP DRAWINGS SHALL SHOW ANCHORAGE DETAILS, TENDON LAYOUTS & PROFILES, SUPPORT BARS, PLACING DETAILS, SLAB OPENING DETAILS, STRESSING PROCEDURES AND LOCATION OF CONSTRUCTION JOINTS. CALCULATIONS SHALL INCLUDE EFFECTIVE TENDON FORCES, PRESTRESS LOSS AND FRICTION CALCULATIONS.

CONCRETE MASONRY

- 1. MASONRY CONSTRUCTION SHALL CONFORM TO ACI 530.1 SPECIFICATION.

STRUCTURAL STEEL

- 1. ALL STRUCTURAL STEEL WIDE FLANGE SHAPES SHALL CONFORM TO ASTM A992

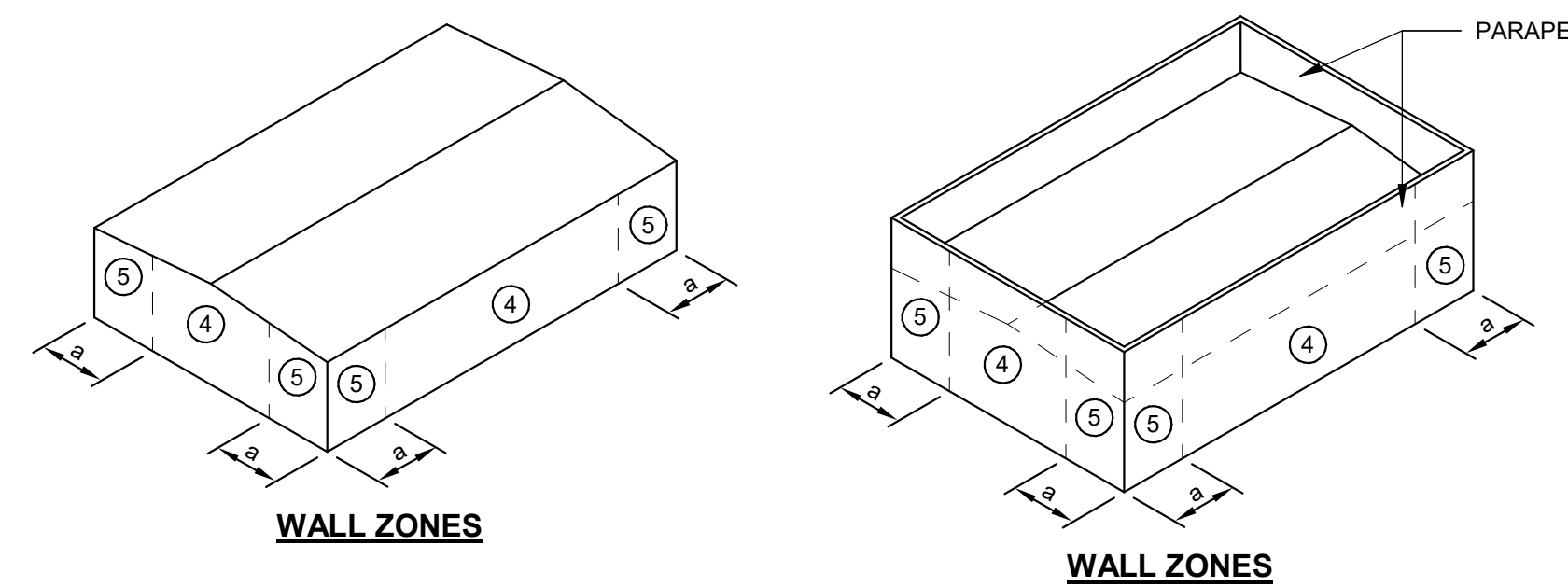
POST-INSTALLED ANCHORS

- EXCEPT WHERE INDICATED ON THE DRAWINGS, POST-INSTALLED ANCHORS SHALL CONSIST OF THE FOLLOWING ANCHOR TYPES AS PROVIDED BY HILTI, INC. CONTACT HILTI AT (800) 879-8000 FOR PRODUCT RELATED QUESTIONS.

Vertical sidebar containing project title 'Mobile Civic Center Parking Facility', location 'Mobile, Alabama', professional seals for Evan Terry Associates LLC and Alabama Professional Engineer, and a table of revisions.

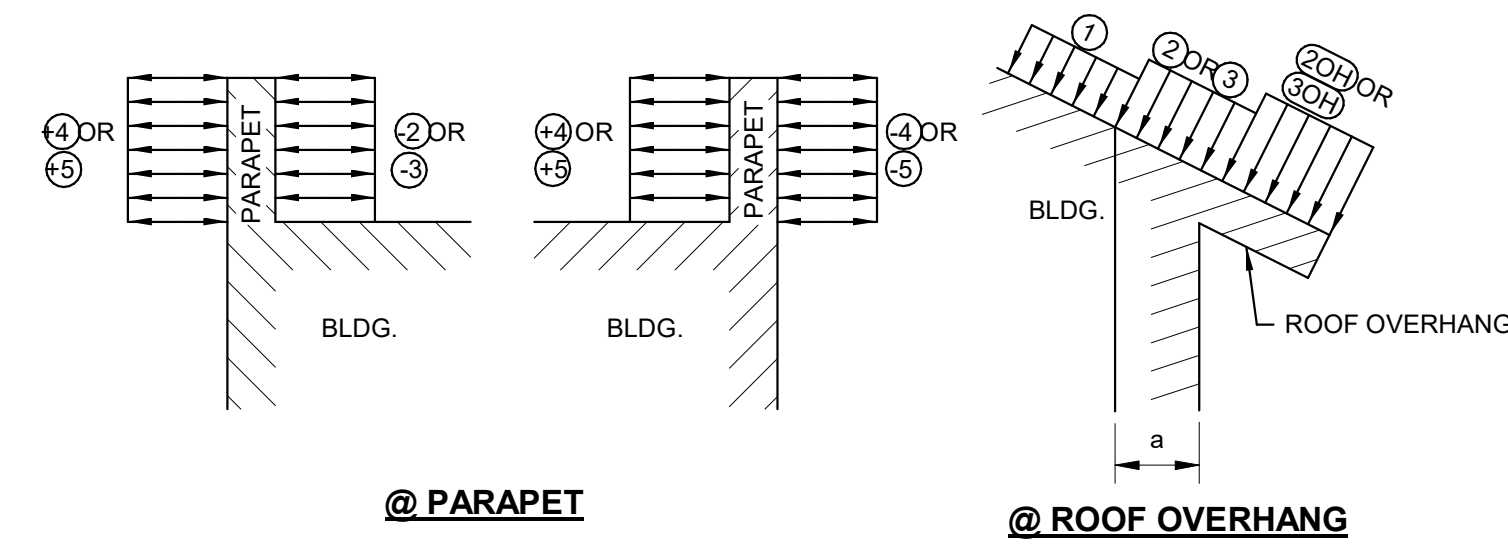
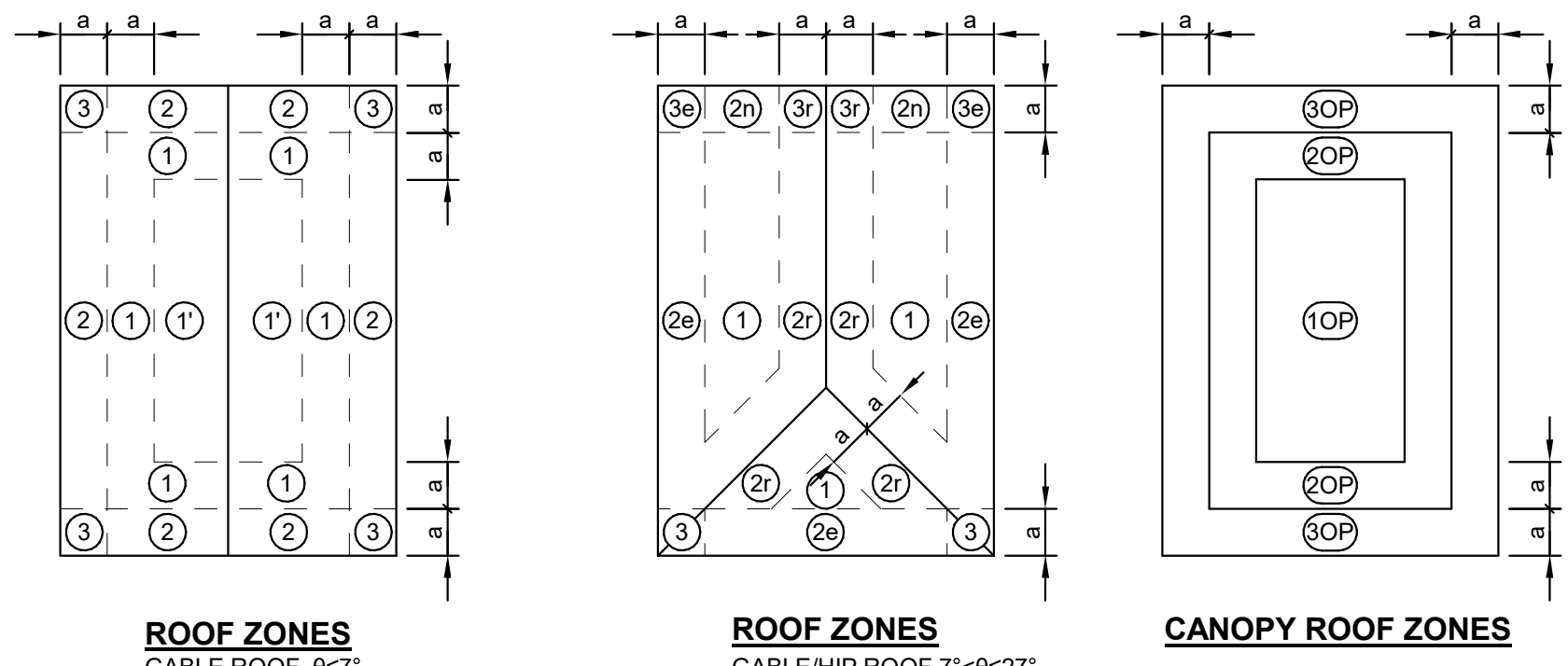
SHOP DRAWINGS

- ALL SHOP DRAWINGS ARE TO BE NEWLY PREPARED. REPRODUCTIONS OF CONTRACT STRUCTURAL DRAWINGS FOR USE AS ERECTION DRAWINGS WILL NOT BE PERMITTED. SHOULD SHOP DRAWING SUBMITTALS CONTAIN ANY REPRODUCTIONS OF CONTRACT STRUCTURAL DRAWINGS, THEY WILL BE REJECTED AND RETURNED WITHOUT ENGINEER REVIEW
- CONTRACTOR TO REVIEW ALL SHOP DRAWING SUBMITTALS AND STAMP WITH APPROVAL PRIOR TO SUBMISSION TO ARCHITECT/ENGINEER. SHOP DRAWINGS RECEIVED BY ARCHITECT/ENGINEER THAT HAVE NOT BEEN CHECKED AND COORDINATED BY THE CONTRACTOR WILL BE RETURNED WITHOUT ARCHITECT/ENGINEER'S REVIEW.
- CONTRACTOR TO PROVIDE NO MORE THAN FOUR COPIES OF EACH STRUCTURAL SHOP DRAWING SUBMITTAL TO THE ENGINEER. THE STRUCTURAL ENGINEER WILL REVIEW AND RETURN TWO OF THE COPIES TO THE ARCHITECT. ADDITIONAL COPIES REQUIRED BY THE CONTRACTOR SHALL BE MADE BY THE CONTRACTOR AFTER THE REVIEW PROCESS.



DESIGN CRITERIA

- BUILDING CODES AND STANDARDS
  - AMERICAN CONCRETE INSTITUTE, A.C.I. 318-19
  - AMERICAN CONCRETE INSTITUTE, A.C.I. 530-13
  - AMERICAN INSTITUTE OF STEEL CONSTRUCTION, A.I.S.C.
  - INTERNATIONAL BUILDING CODE, I.B.C. 2021
  - AMERICAN WELDING SOCIETY, A.W.S.
  - STEEL JOIST INSTITUTE, S.J.I.
  - STEEL DECK INSTITUTE, S.D.I.
- GRAVITY DESIGN LIVE LOADS:
  - PARKING LEVELS: 40 PSF
  - STAIRS, LOBBYS: 100 PSF
  - ROOF: 20 PSF
  - SUPERIMPOSED DEAD LOAD
    - MECH., ELECT., AND CEILING FINISHES (ON STRUCTURE ABOVE): 5 PSF
    - ROOFING: 15 PSF
- STRUCTURAL ELEMENTS ARE PROPORTIONED TO ACCOMMODATE ELEVATOR LOADS AS INDICATED BY THE DOCUMENTS. REFER TO PLAN SHEETS AT ELEVATOR PENTHOUSES FOR ADDITIONAL INFORMATION. ASSUMED REACTIONS, ETC. ANY CHANGES EXCEEDING THE LOADS INDICATED SHALL BE REPORTED TO THE STRUCTURAL ENGINEER OF RECORD FOR VERIFICATION OF THE ADEQUACY OF THE SUPPORTING STRUCTURE PRIOR TO APPROVAL OF ELEVATOR VENDOR'S SUBMITTAL AND BEFORE PLACEMENT OF THE ELEVATORS IN THE BUILDING. ELEVATORS SHALL BE SUBMITTED WITH SEISMIC DESIGN CALCULATIONS PER THE INTERNATIONAL BUILDING CODE AND ASCE 7 CHAPTER 13.
- LATERAL DESIGN LOADS:
  - WIND
    - DESIGNED PER ASCE 7-16
    - BASIC WIND SPEED: 155 MPH
    - WIND IMPORTANCE FACTOR (Iw): 1.0
    - BUILDING CATEGORY: ENCLOSED
    - EXPOSURE CATEGORY: B
    - INTERNAL PRESSURE COEFFICIENT (Gcpi): ±0.18
    - COMPONENTS & CLADDING WIND PRESSURES: SEE CHART
  - EARTHQUAKE
    - SEISMIC IMPORTANCE FACTOR (I): 1.0
    - OCCUPANCY CATEGORY: II
    - SPECTRAL RESPONSE ACCELERATIONS:
      - Ss: 0.094
      - S1: 0.06
    - SOIL SITE CLASS: D
    - SPECTRAL RESPONSE ACCELERATIONS:
      - Sds: 0.10
      - Sd1: 0.096
    - SEISMIC DESIGN CATEGORY: B
    - BASIC SEISMIC-FORCE-RESISTING SYSTEM:
      - INTERMEDIATE CONCRETE MOMENT FRAMES
    - DESIGN BASE SHEAR: 1047 KIPS
    - RESPONSE MODIFICATION FACTOR (R): 5
    - ANALYSIS PROCEDURE: EQUIVALENT LATERAL FORCE

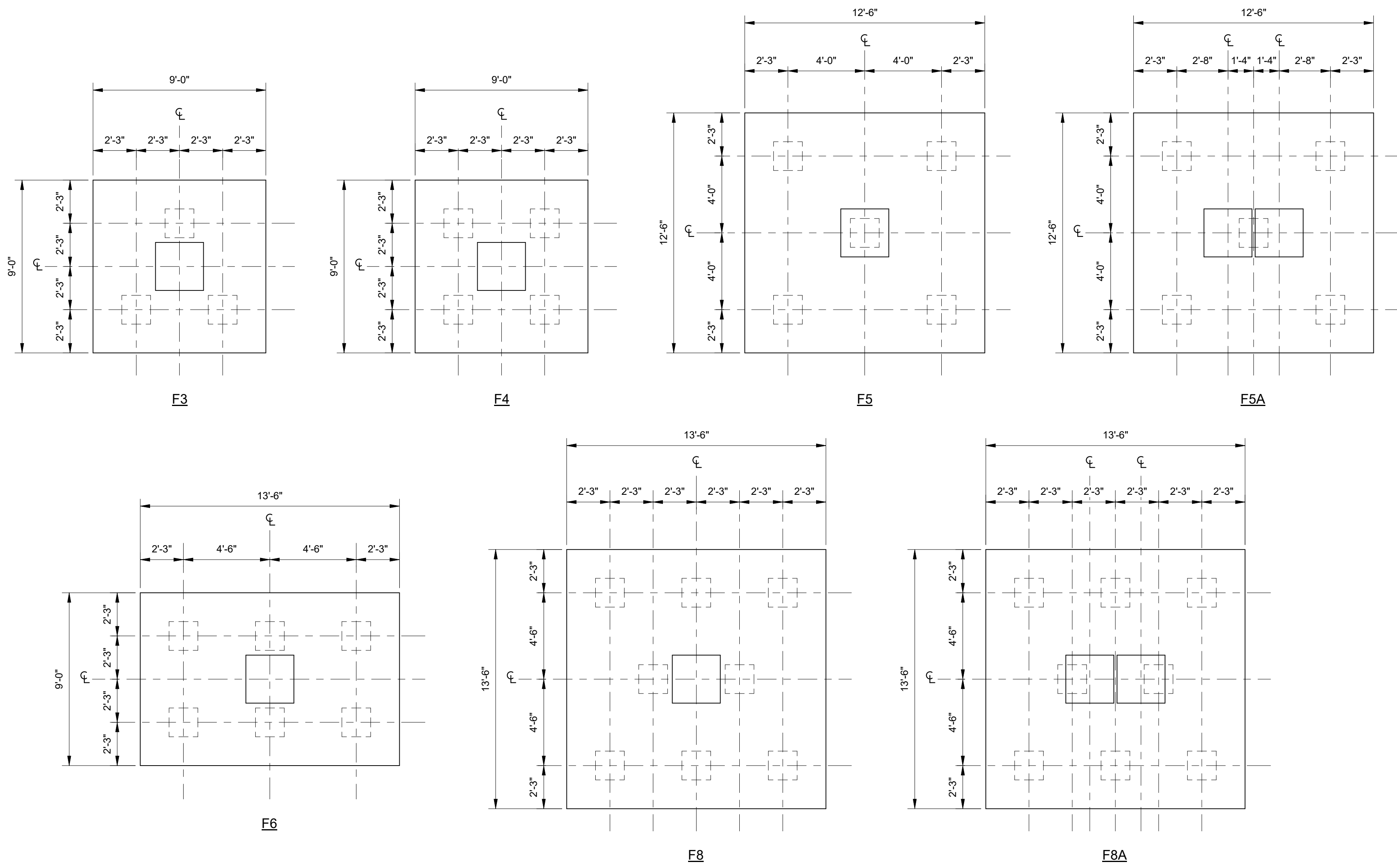


ZONE LAYOUT DIAGRAMS

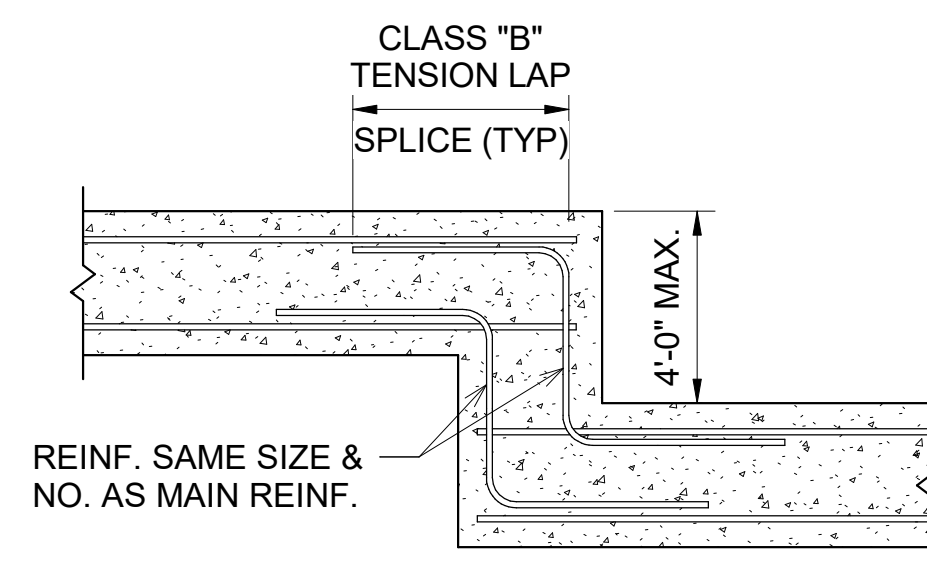
COMPONENTS AND CLADDING DESIGN WIND PRESSURES ASCE 7-16 (PSF)

ZONE	EFFECTIVE WIND AREA					
	10 SF	20 SF	50 SF	100 SF	200 SF	500 SF
1	31	-99	31	-94	31	-87
2	31	-156	31	-147	31	-137
3	31	-212	31	-201	31	-186
4	74	-81	70	-78	65	-74
5	74	-124	70	-116	65	-104
10P	46	-43	46	-43	46	-43
20P	69	-66	69	-66	46	-43
30P	69	-66	69	-66	46	-43

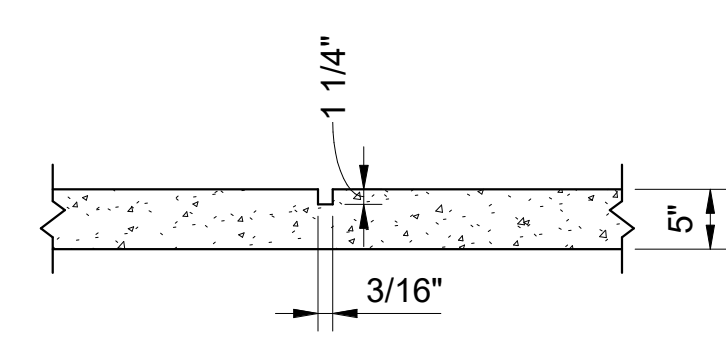
NOTES:  
 1. PLUS AND MINUS SIGNS DENOTE PRESSURE ACTING TOWARD AND AWAY FROM BUILDING SURFACES.  
 2. PRESSURE ZONE LOCATIONS ARE IN ACCORDANCE WITH ASCE 7-16.  
 3. PRESSURES INDICATED ARE BASED ON ULTIMATE WIND SPEEDS PER ASCE 7-16. TO CONVERT PRESSURES TO NOMINAL LOADS MULTIPLY VALUES IN CHART BY A FACTOR OF 0.6.  
 4. W = 20 FT



TYPICAL PILE CAP LAYOUT

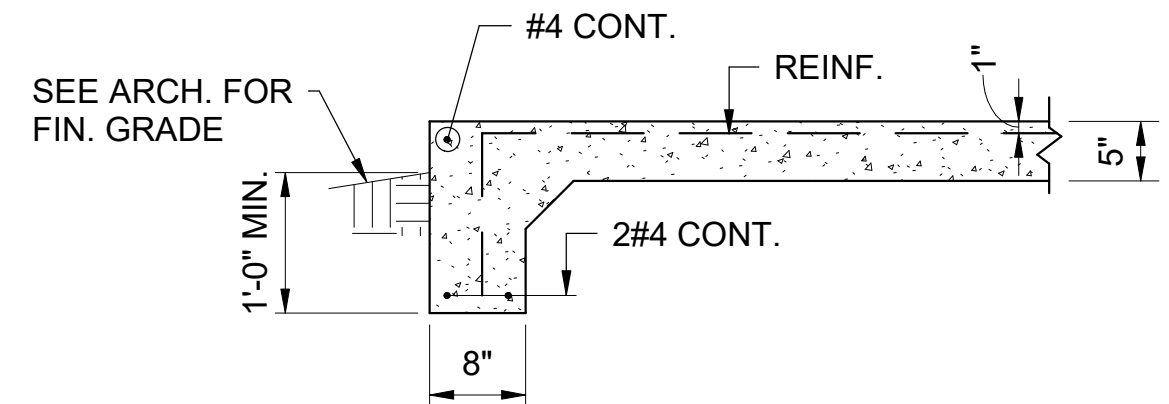


TYPICAL FOOTING STEP DETAIL

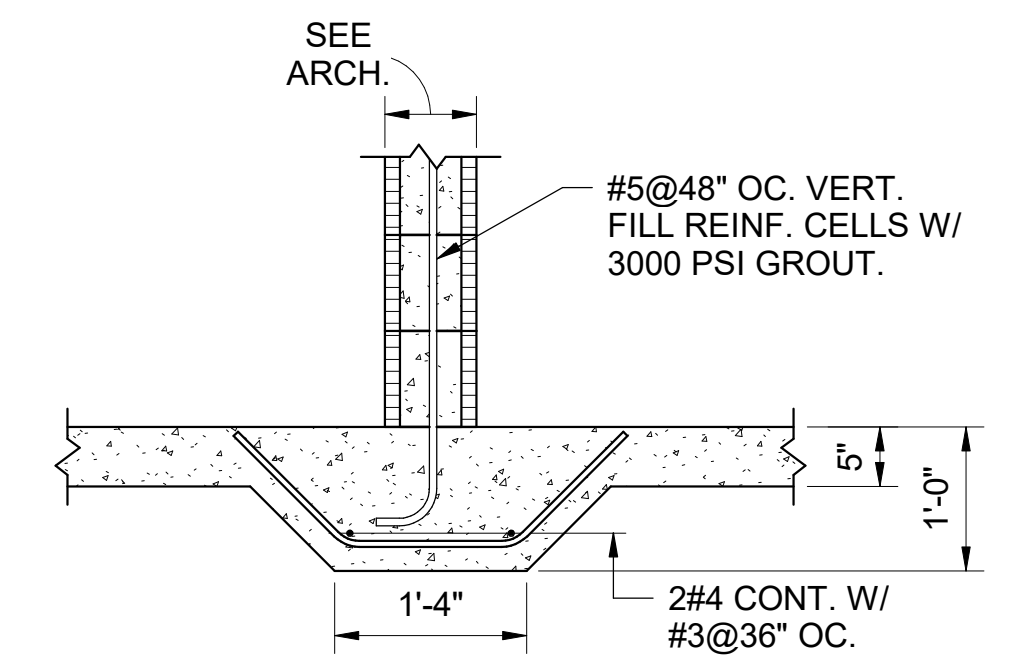


TYPICAL SAWED CONTROL JOINT

- NOTES:
- USE SAWS, BLADES, AND SKID PLATES BY SOFF-CUT INTERNATIONAL OR EQUAL.
  - SEE PLAN FOR JOINT LAYOUT.
  - START CUTTING SAWED JOINTS AS SOON AS CONCRETE HAS HARDENED SUFFICIENTLY TO PREVENT RAVELING OR DISLODGING OF AGGREGATES. THIS WILL TYPICALLY BE FROM 1 HOUR IN HOT WEATHER TO 4 HOURS IN COLD WEATHER AFTER COMPLETING FINISHING OF SLAB IN THAT JOINT LOCATION. EXTEND SAWED JOINT TO THE SLAB BOUNDARIES AND ABUTMENTS, INCLUDING COLUMNS, DRAINS, AND OTHER PENETRATIONS IN THE PATH OF A DEFINED JOINT. IMPLEMENT METHODS AND TIMING OF THE SAW CUT BEYOND THE LIMITS OF THE SOFF-CUT SAW REACH TO PROVIDE A CONSISTENT DEPTH OF CUT WITH MINIMAL RAVELING OF JOINT EDGES.

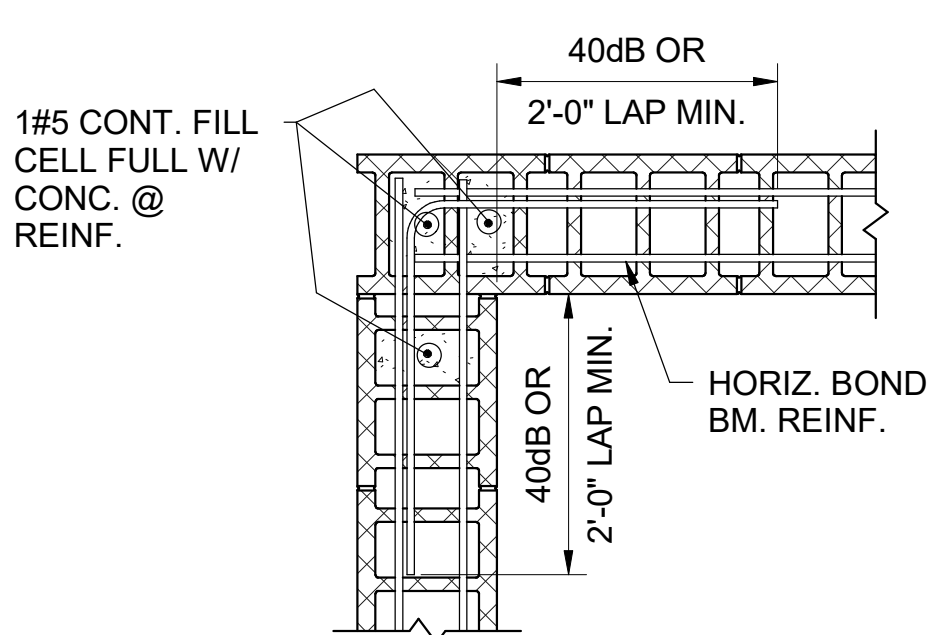


TYPICAL TURNDOWN SLAB DETAIL

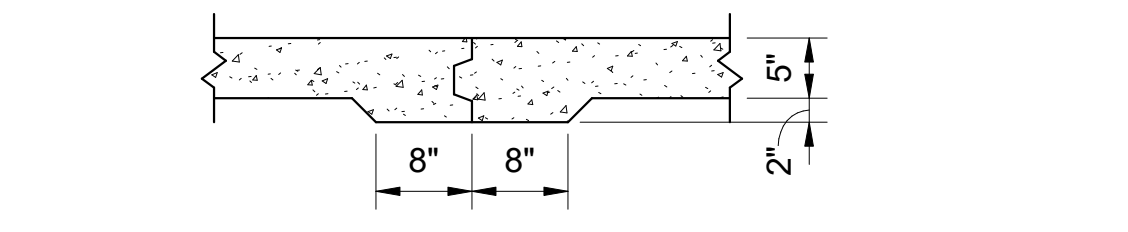


TYPICAL THICKENED SLAB @ NON-LOAD BEARING MASONRY PARTITIONS

- NOTES:
- COORDINATE LOCATION OF NON-LOAD BEARING MASONRY PARTITIONS WITH ARCH.

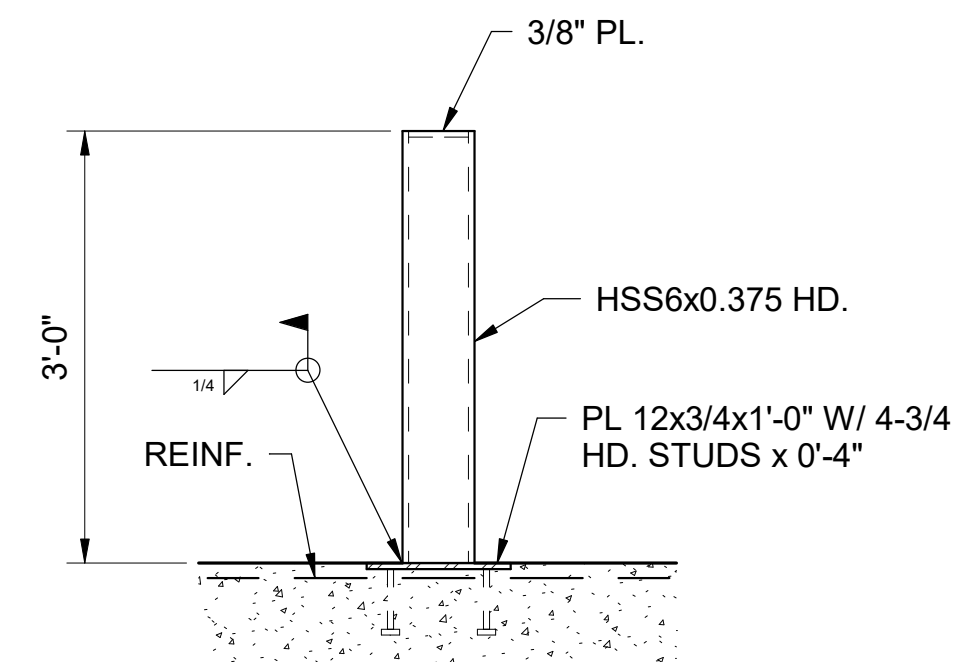


TYPICAL CORNER MASONRY WALL REINF. DETAIL



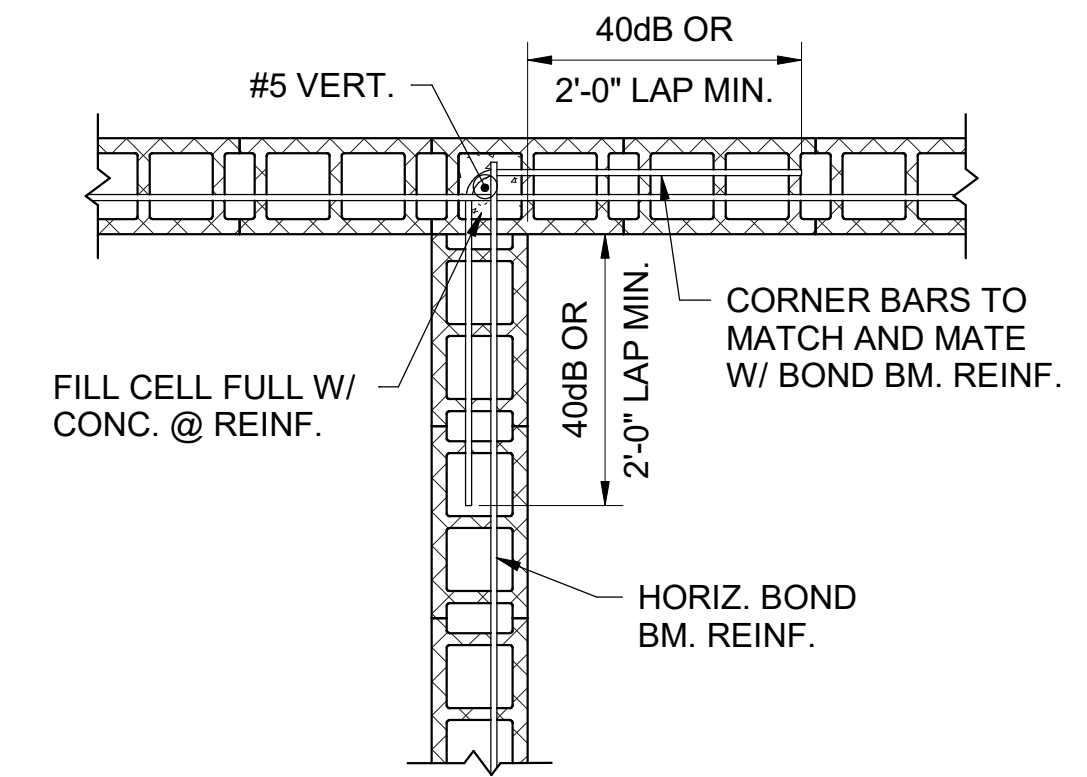
TYPICAL KEYED CONTROL JOINT

- NOTES:
- LOCATE AS REQUIRED.

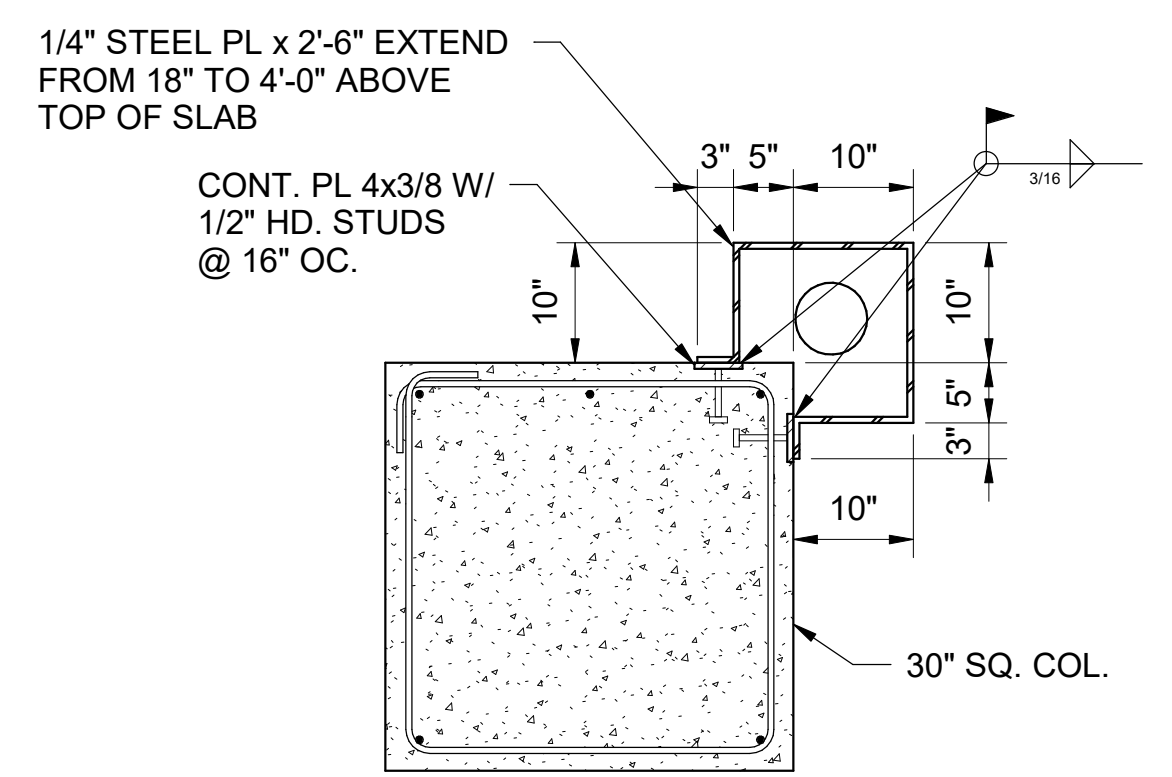


TYPICAL BOLLARD DETAIL

- NOTE:
- SEE ARCH. FOR LOCATION, QUANTITY, & PAINT FINISH

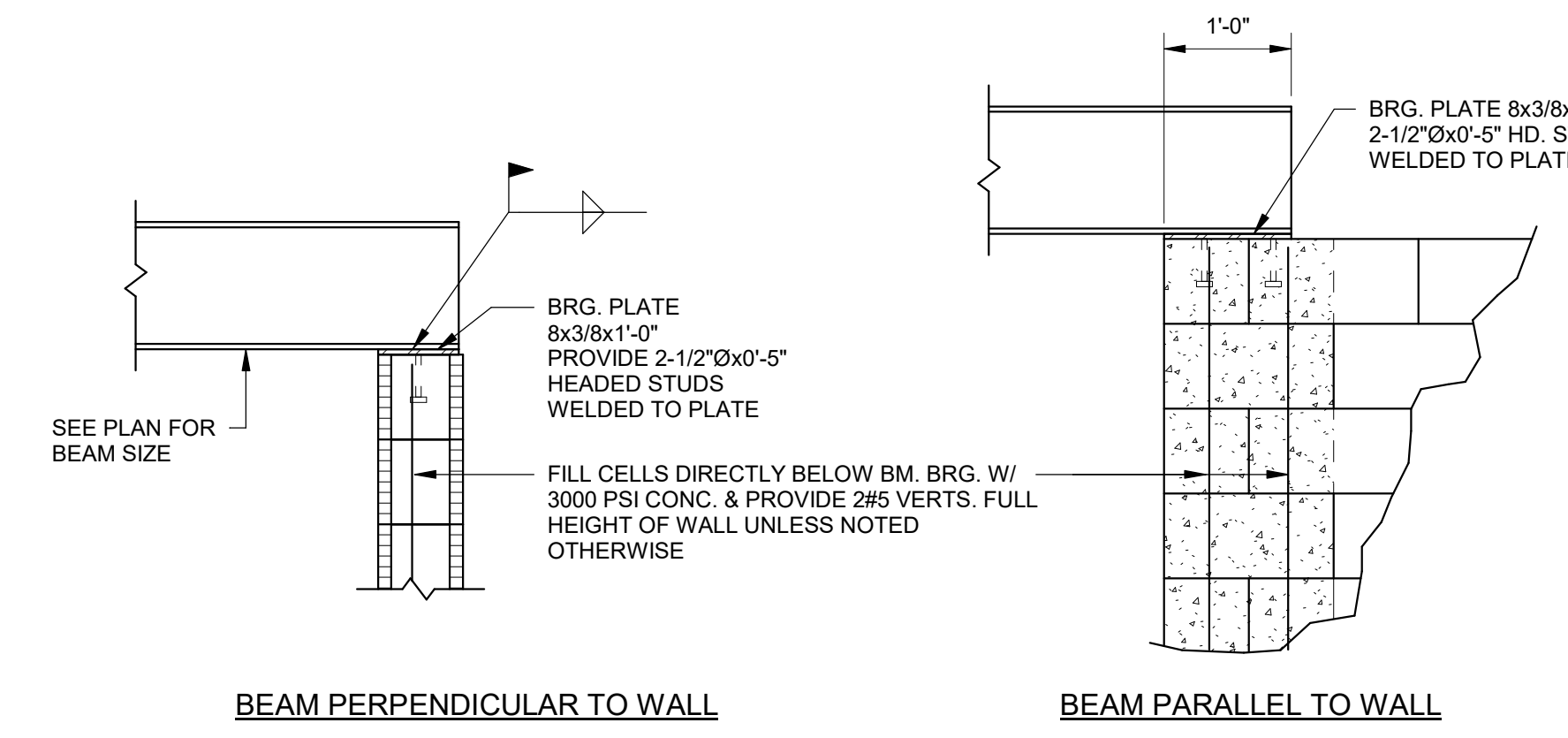


TYPICAL INTERSECTION MASONRY WALL REINF. DETAIL



TYPICAL PIPE PROTECTION DETAIL

- NOTE:
- OCCURS AT ALL EXPOSED VERTICAL PIPING ADJACENT TO COL.
  - SEE ARCH. FOR 1/4" STEEL PL. X 2'-6" PAINT FINISH.



TYPICAL STEEL BEAM BEARING ON MASONRY WALL DETAILS

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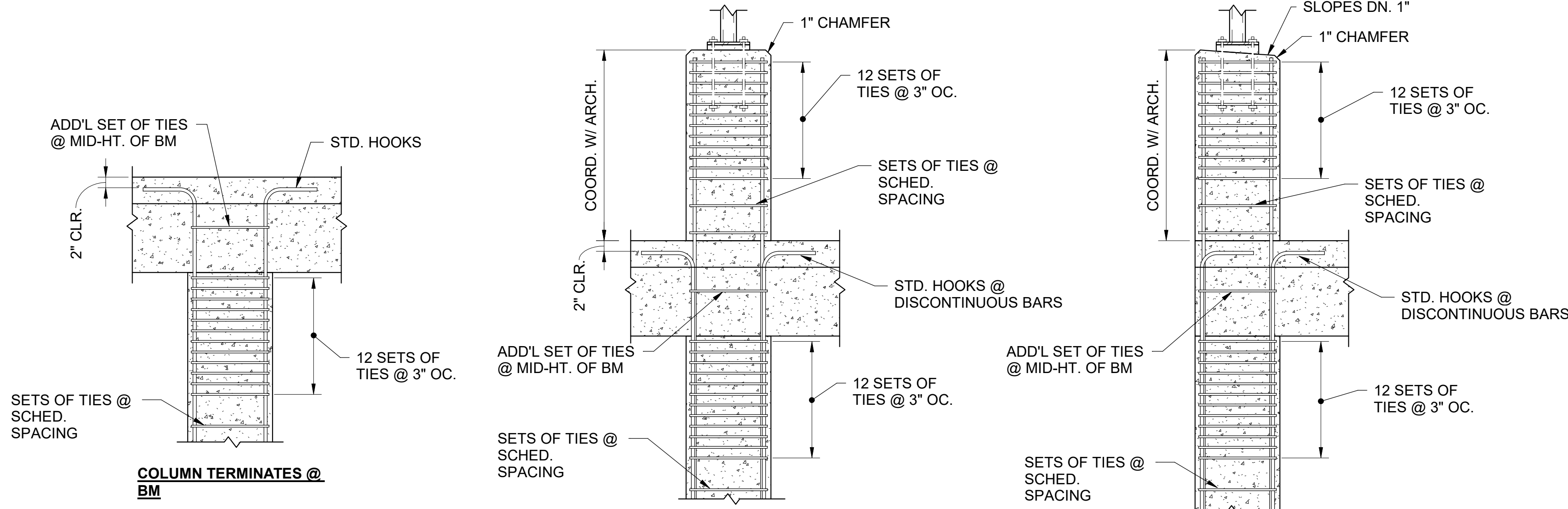
Revisions

sheet title	GENERAL NOTES & TYPICAL DETAILS
job no.	4308
date	ATM
code	ATM
date	AUGUST, 01 2023

sheet no. 011 of 156  
 date AUGUST, 01 2023  
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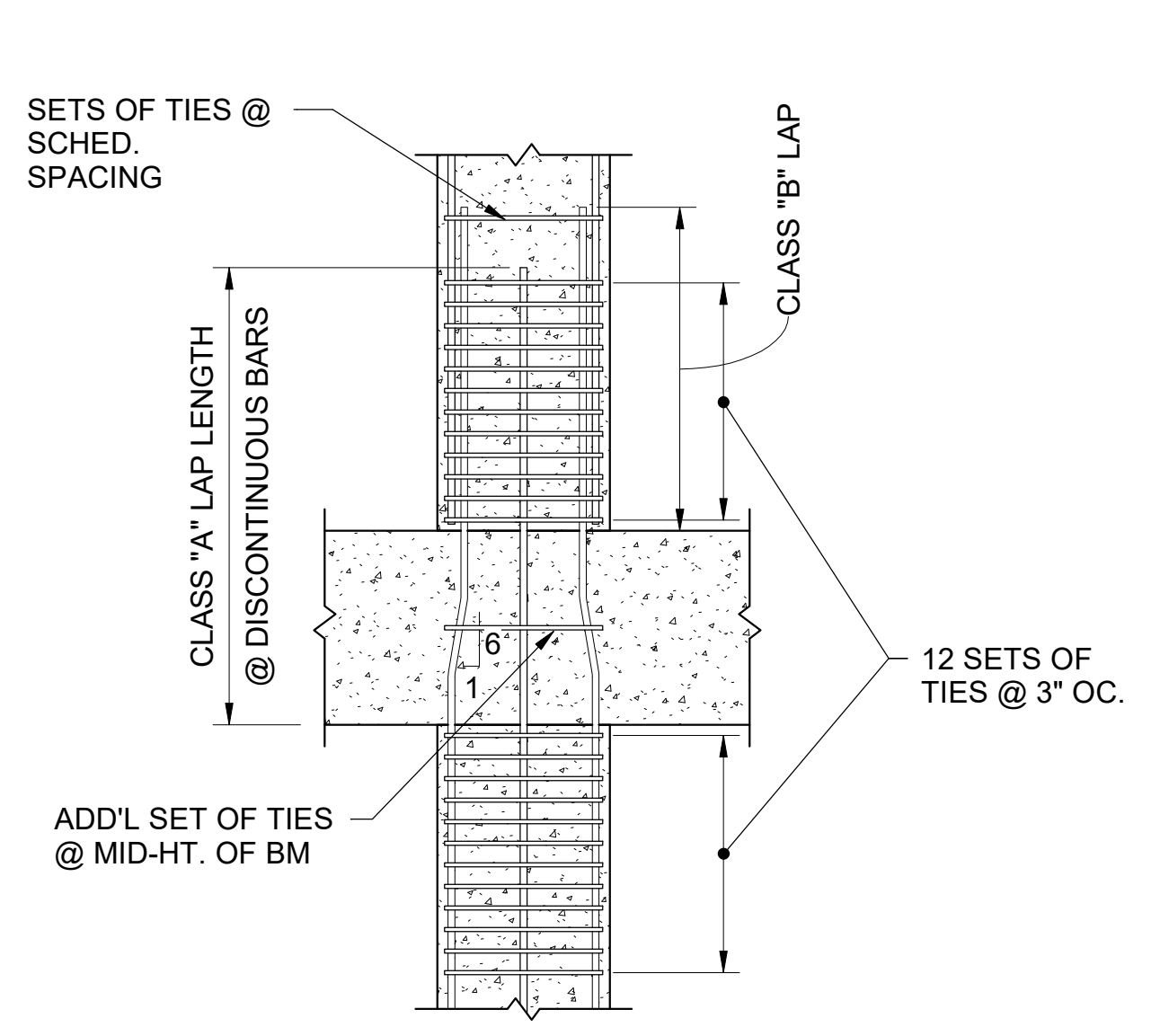


Revisions	sheet title
TYPICAL DETAILS	
job no.	4308
drawn by	ATM
checked by	ATM
date	012
of	156
date	11.02
of	3
date	AUGUST, 01 2023
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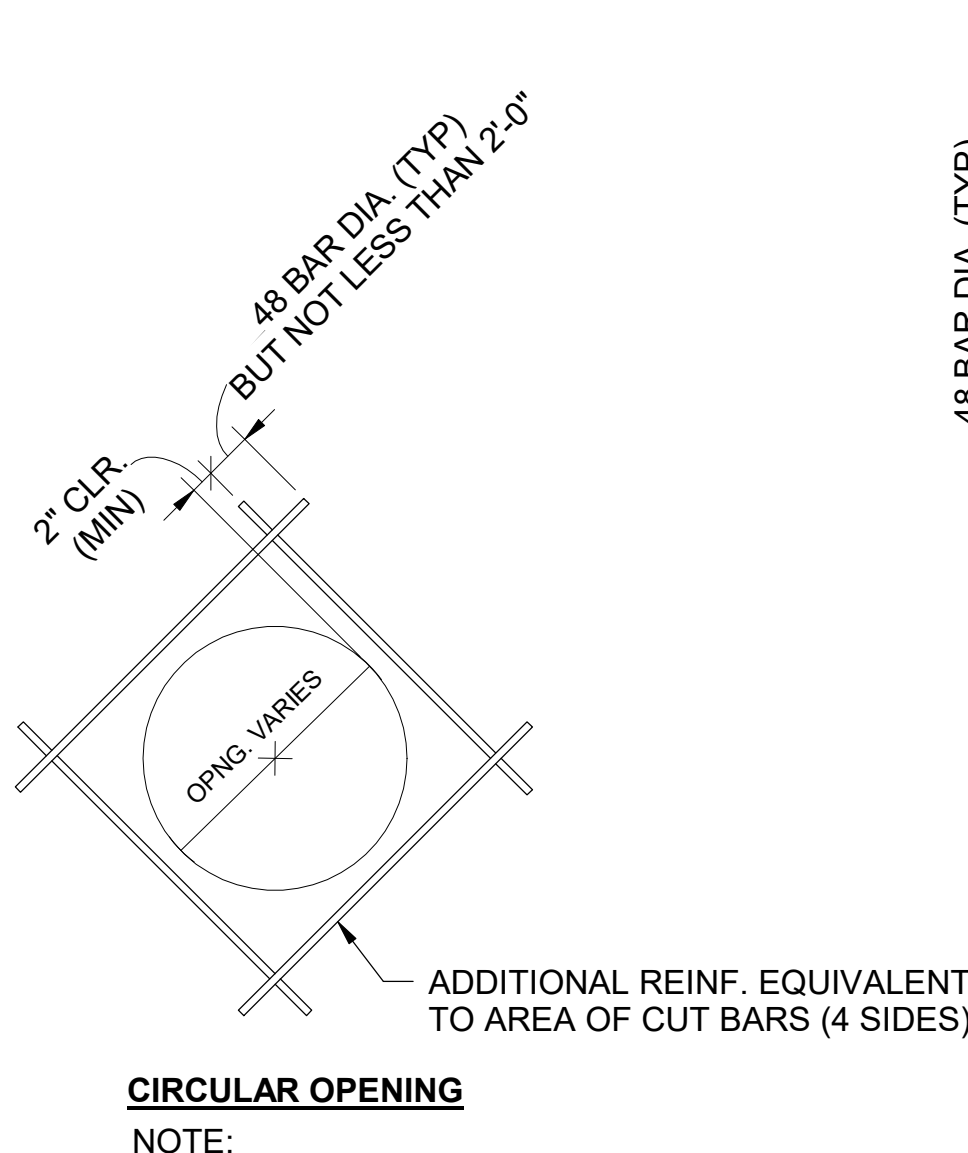


**TYPICAL TOP OF CONCRETE COLUMN DETAIL**

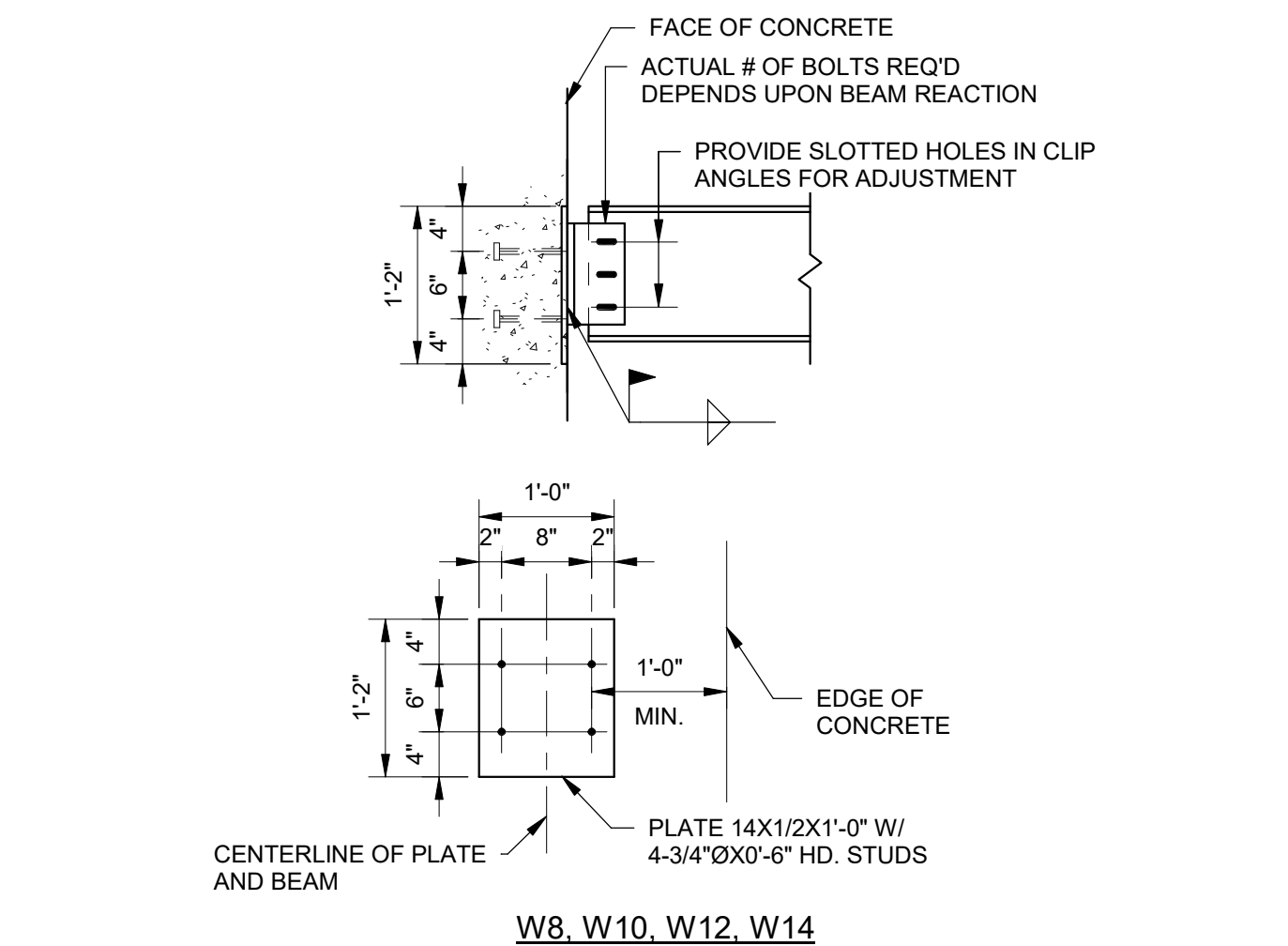
**NOTES:**  
1. COORD. W/ ARCH. FOR BARRIER CABLE LOCATIONS & W/ ELECT. DWGS. FOR LIGHT POLE LOCATIONS & ANCHORS  
2. EXTEND 8 BARS FROM COL. BELOW INTO COL. EXTENSION ABOVE W/ 2#4 TIES @ 12\"/>



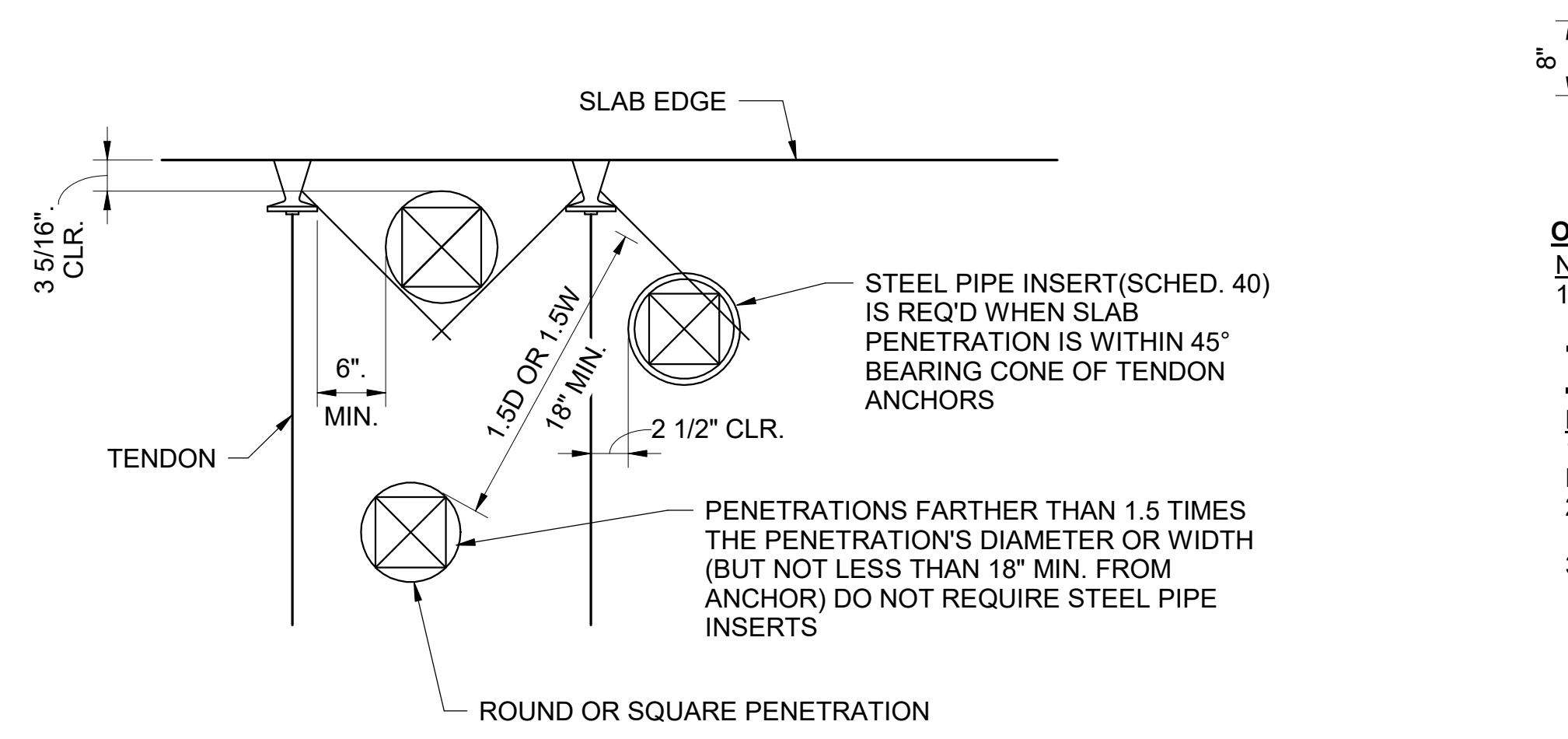
**TYPICAL CONCRETE COLUMN LAP SPLICE DETAIL**



**TYPICAL DETAILS OF ADDITIONAL REINFORCING AROUND OPENINGS IN CONC. SLAB**

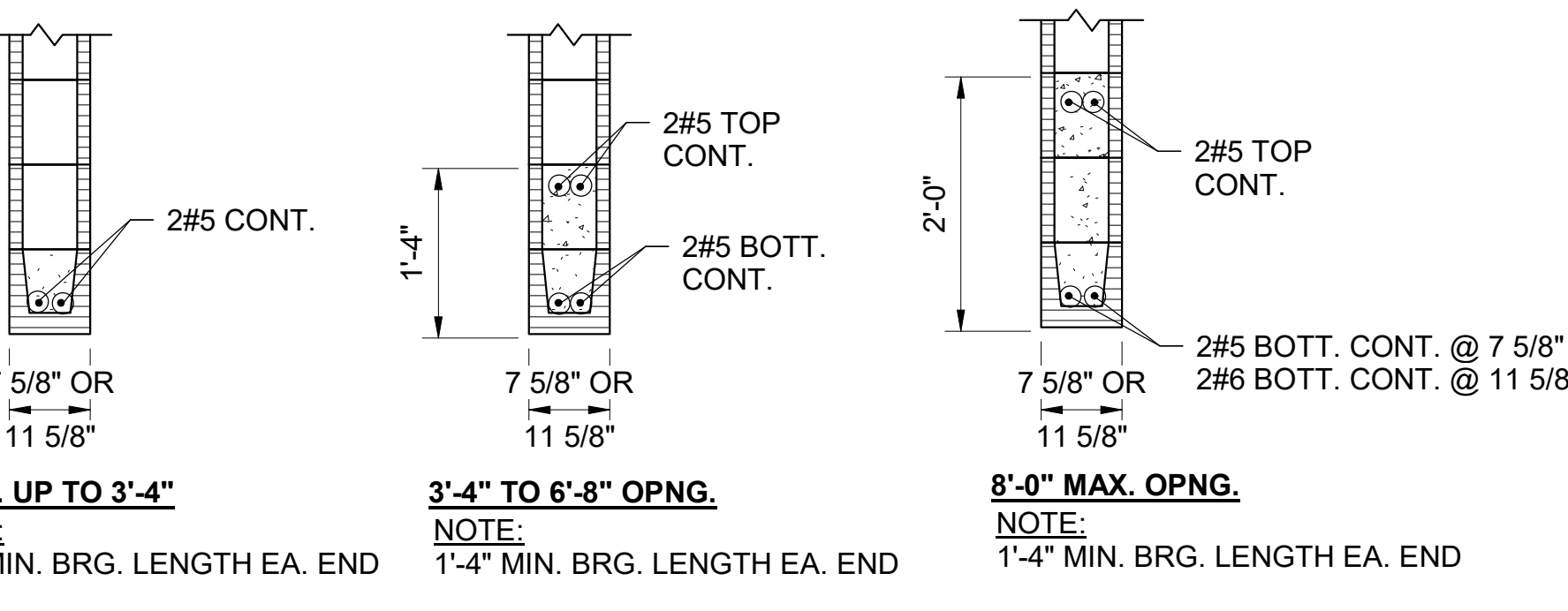


**TYPICAL STEEL BEAM TO CONCRETE CONNECTION DETAILS**



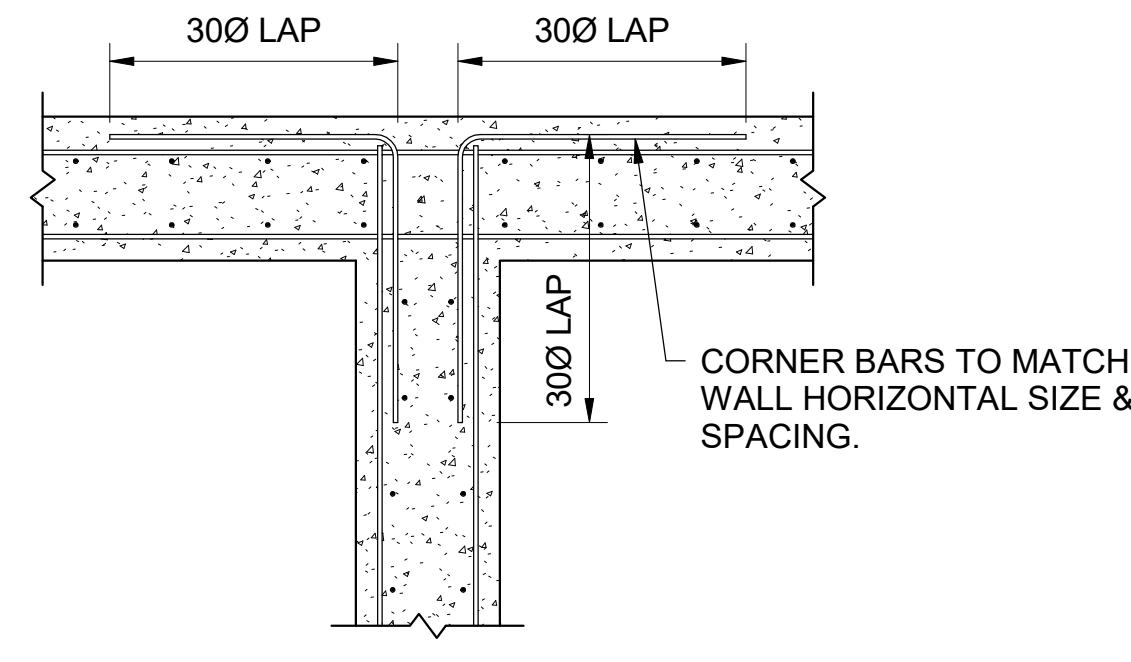
**SLAB PENETRATIONS AT TENDON ANCHORS**

**NOTES:**  
1. PENETRATIONS THRU BEAMS ARE NOT PERMITTED WITHOUT PRIOR WRITTEN APPROVAL OF MBA.  
2. ANY PENETRATION WITH DIMENSIONS GREATER THAN 12\"/>

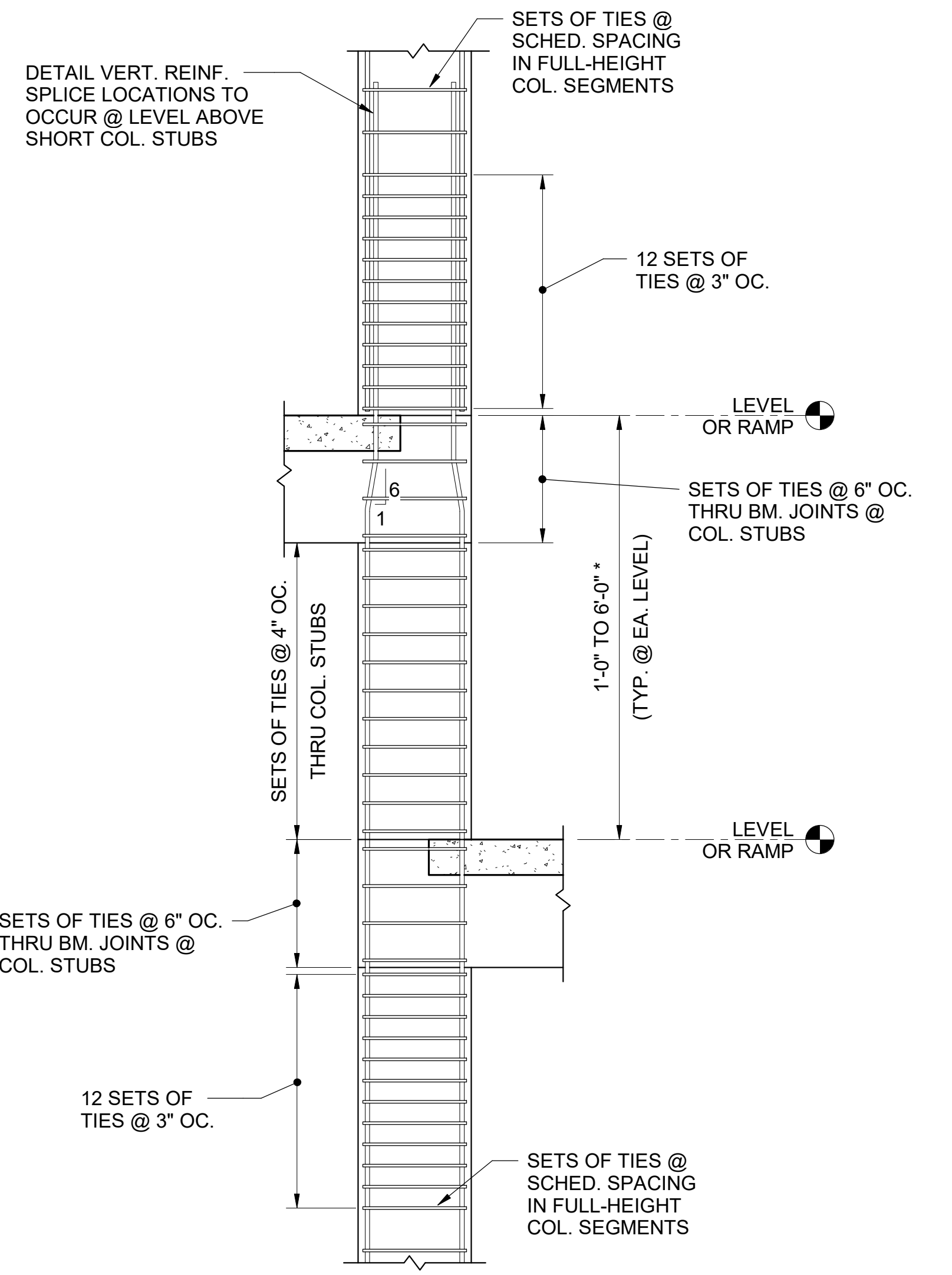


**TYPICAL MASONRY WALL LINTEL DETAILS (U.N.O.)**

**NOTES:**  
1. PROVIDE MIN. BEARING LENGTH = 24\"/>

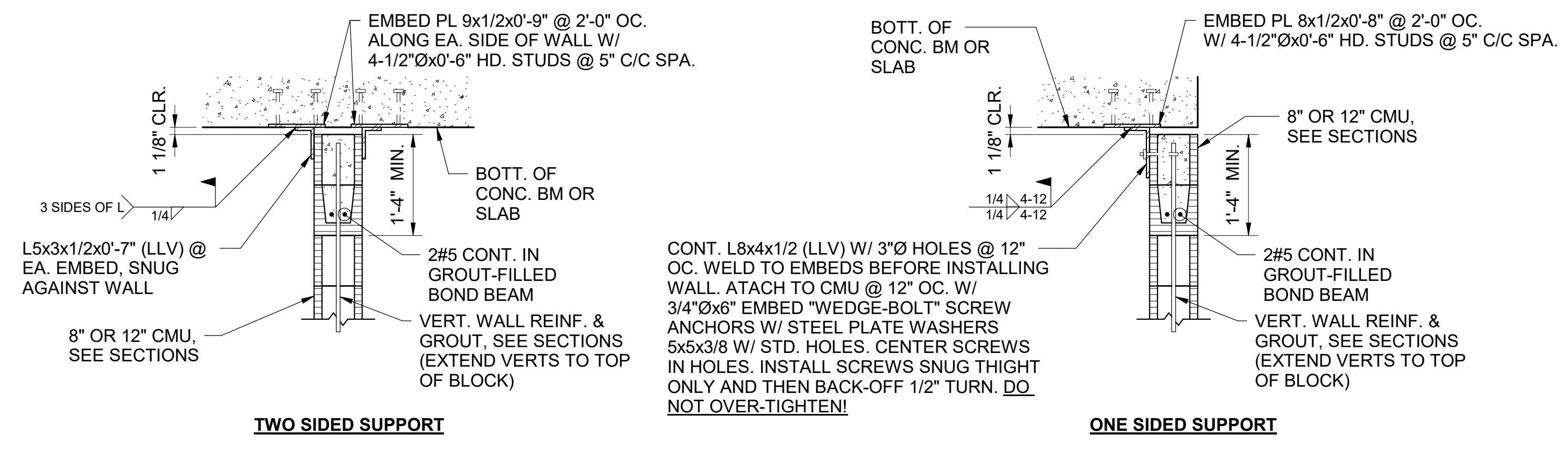


**TYPICAL INTERSECTION DETAIL @ CONCRETE WALL**



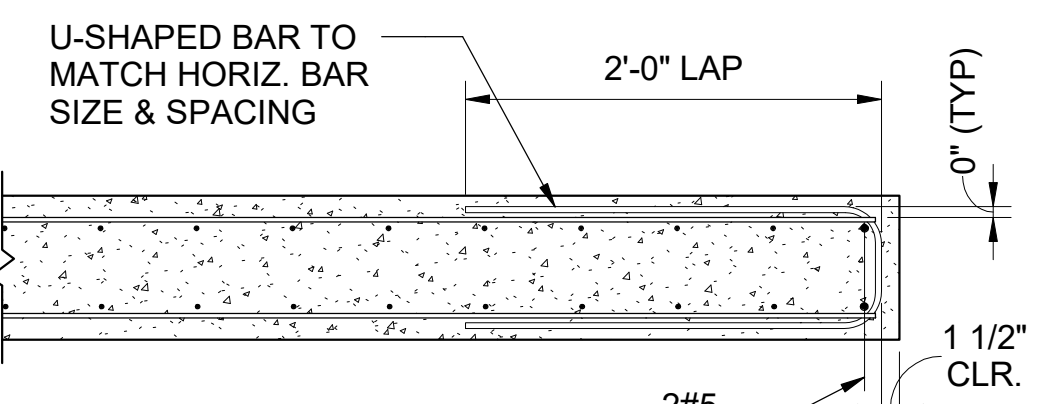
**TYPICAL COLUMN STUB DETAIL AT RAMP**

**NOTE:**  
WHERE THIS DISTANCE EXCEEDS 6 FT. OR WHERE BEAMS ALIGN, USE OTHER COL. DETAILS SHOWN & SPACE TIES AS SCHEDULED

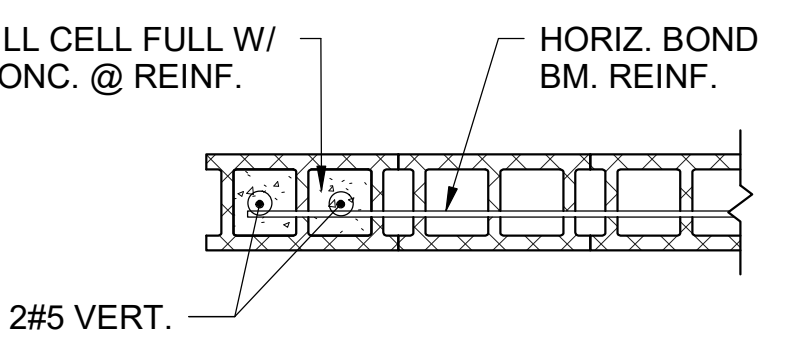


**TYPICAL TOP OF MASONRY WALL DETAILS**

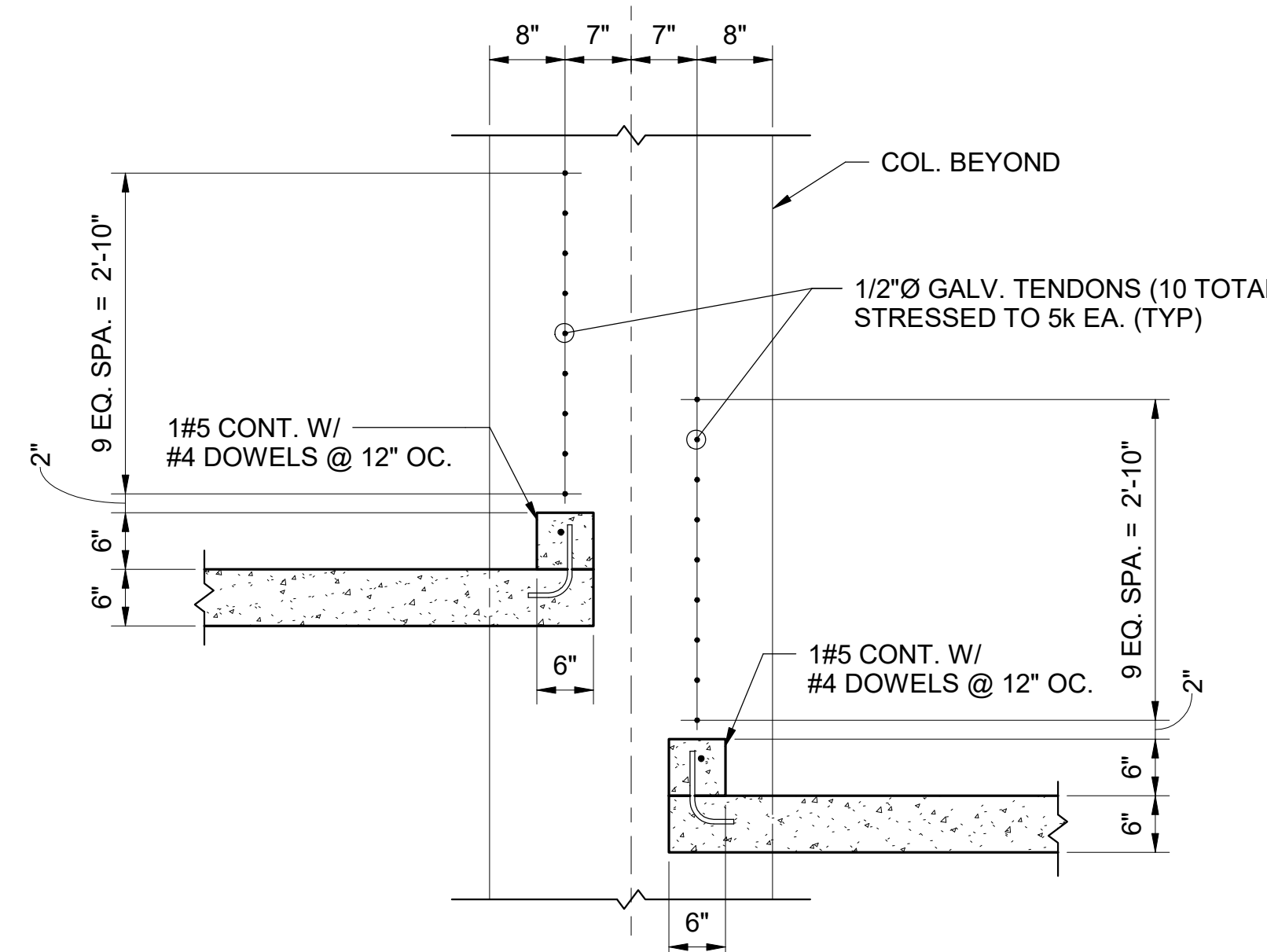
**NOTES:**  
1. FOR FIRE-PROOFING @ TOP, SEE ARCH. DWGS  
2. FOR WALL REINF. SEE GENERAL NOTES AND SECTIONS  
3. AT UNREINFORCED PARTITION WALLS, EMBED PLATE SPACING & ATTACHMENT SPACING CAN BE DOUBLED AT G.C.'S OPTION. BOND BEAMS ARE REQ'D AT TOP OF UNREINFORCED WALLS



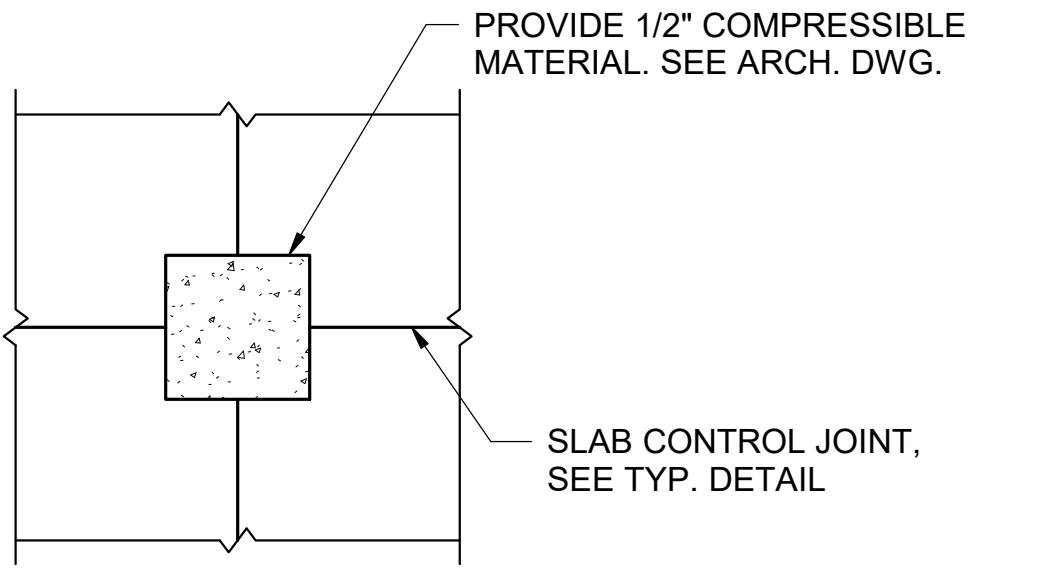
**TYPICAL EDGE DETAIL @ CONCRETE WALL**



**TYPICAL JAMB AND END OF MASONRY WALL REINF. DETAIL**



**TYPICAL INTERIOR BARRIER CABLE DETAIL**



**TYPICAL CONTROL JOINT AROUND COLUMN DETAIL @ SLAB ON GRADE**



# Mobile Civic Center Parking Facility

Mobile, Alabama



**Evan Terry Associates LLC**  
Architecture • Accessible Design  
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Birmingham, AL 35243 (205) 972-9100

Revisions


sheet title  
**LEVEL 1 PLAN - PART A**

job no. **4308**

dwg. by **ATM**      smd. by **ATM**

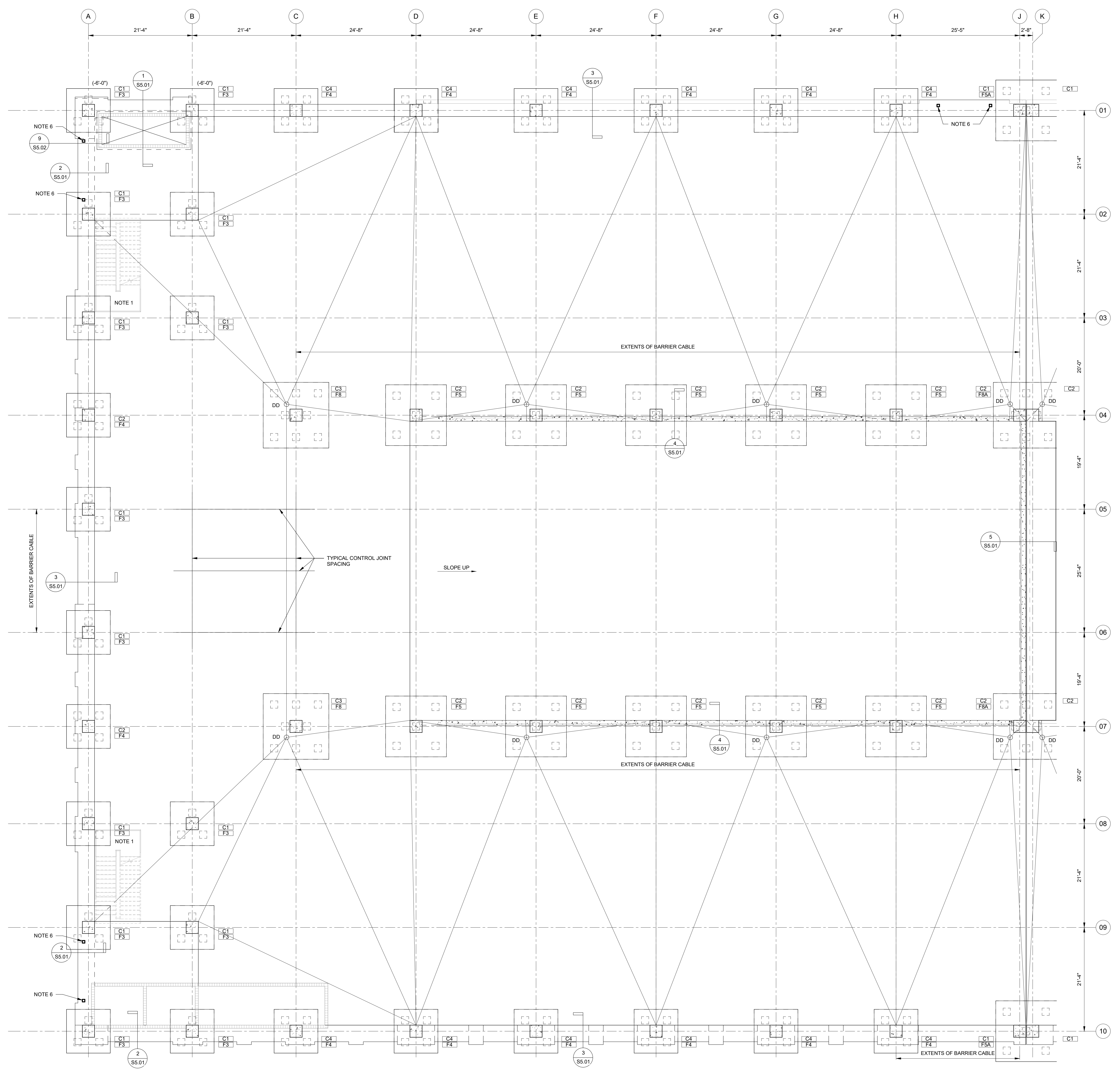
chkd. by **ATM**      of **156**

date **8/1/23**

**S2.11**

4 of 20

date **AUGUST, 01 2023**  
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**LEVEL 1 PLAN - PART A**  
1/8" = 1'-0"      TOP OF PILE CAP ELEV. = -2'-0" FROM T.O. SLAB U.N.O.

- FLOOR CONSTRUCTION:**  
5" CONC. SLAB ON DRAINAGE FILL, REINF. W/ 3 LBS. ABC POLYMER TUFMAX DOT PER CUBIC YD. OF CONC.
- NOTES:**  
1. METAL PAN STAIRS. SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.  
2. TOP OF SLAB ELEV @ RIDGE AND ABOVE THE PERIMETER 14.50 U.N.O.  
3. TOP OF SLAB @ DECK DRAINS (DD) 13.83.  
4. PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMPS.  
5. THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS. IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER PONDS ON THE DECK THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.  
6. HSS6X6X3/8 COLUMNS W/ 12X11'-0" BASE PLATES & 4'-1/2" STUDS

MARK	FOOTING SIZE			REINFORCING
	WIDTH	LENGTH	THICKNESS	
F3	9'-0"	9'-0"	3'-11"	8#9 EW.
F4	9'-0"	9'-0"	3'-6"	8#9 EW.
F5	12'-6"	12'-6"	3'-6"	12#9 EW.
F5A	12'-6"	12'-6"	3'-6"	12#9 EW.
F6	13'-6"	9'-0"	4'-2"	13#10 EW.
F8	13'-6"	13'-6"	4'-2"	13#10 EW.
F8A	13'-6"	13'-6"	4'-2"	13#10 EW.

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# Mobile Civic Center Parking Facility

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sheet title  
LEVEL 1 PLAN - PART B

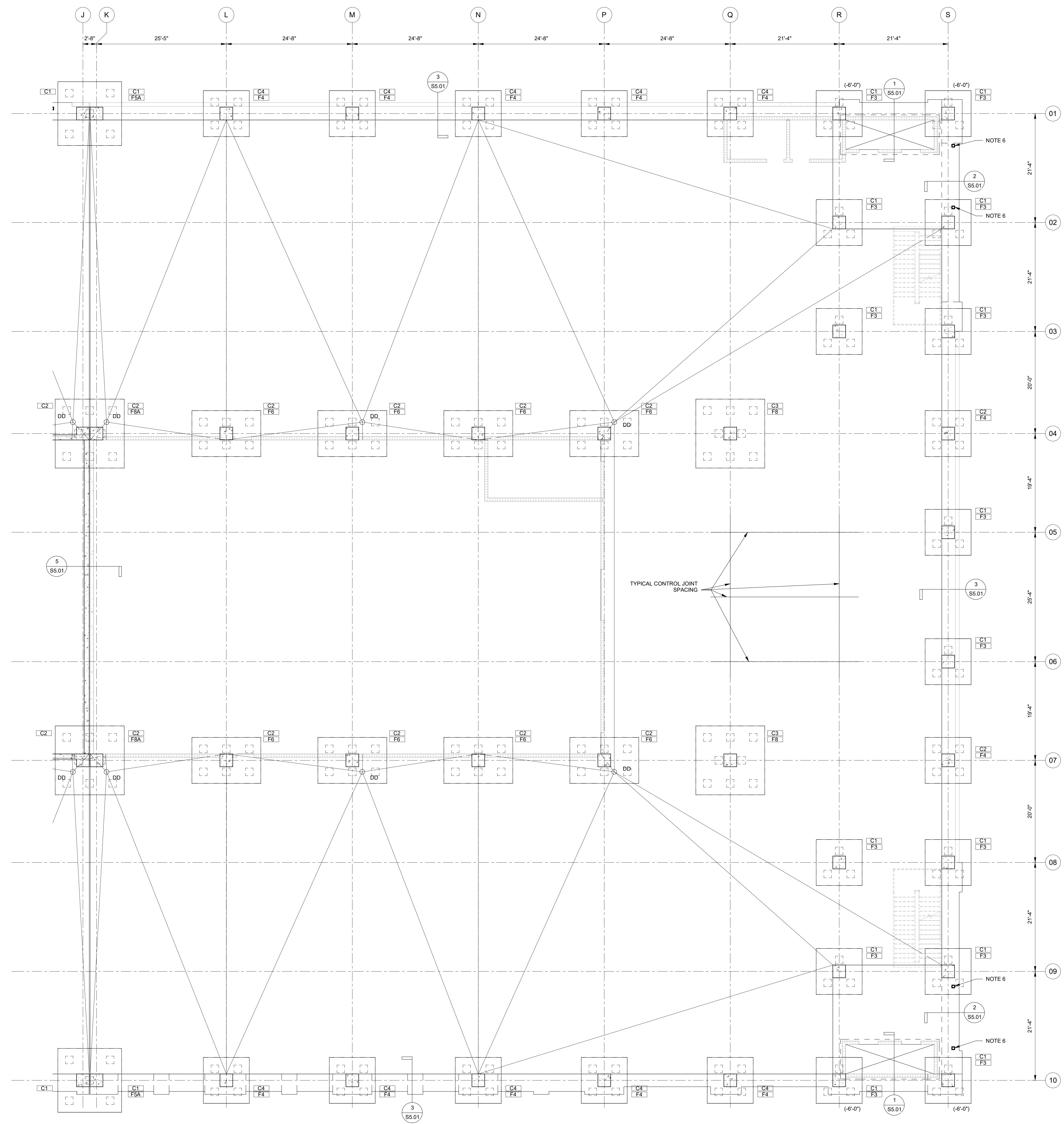
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dwg. by **ATM**      sm. no. **14**

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date: **5** of 20  
**S2.12**

date: AUGUST, 01 2023

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### LEVEL 1 PLAN - PART B

1/8" = 1'-0"      TOP OF PILE CAP ELEV. = -2'-0" FROM T.O. SLAB U.N.O.

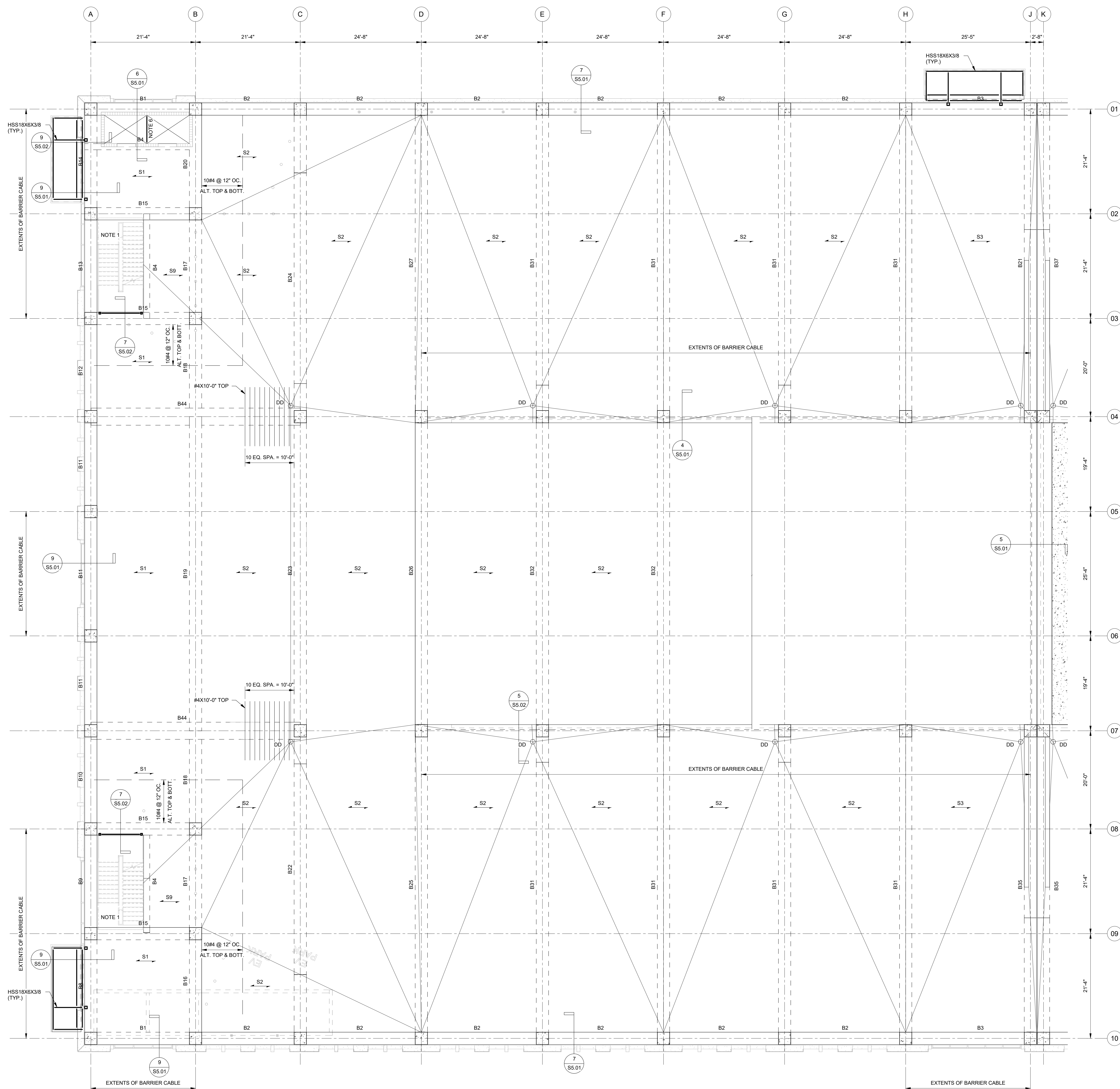
**FLOOR CONSTRUCTION:**  
5" CONC. SLAB ON DRAINAGE FILL. REINF. W/ 3 LBS.  
ABC POLYMER TUFMAX DOT PER CUBIC YD. OF CONC.

- NOTES:**
1. METAL PAN STAIRS. SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.
  2. TOP OF SLAB ELEV. @ RIDGE AND ABOVE THE PERIMETER 14.50 U.N.O.
  3. TOP OF SLAB @ DECK DRAINS (DD) 13.83
  4. PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMPS.
  5. THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS. IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER PONDS ON THE DECK THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.
  6. HSS6X3/8 COLUMNS W/ 12X11'-0" BASE PLATES & 4-3/4" Ø A. BOLTS.

PILE CAP SCHEDULE				
MARK	FOOTING SIZE			REINFORCING
	WIDTH	LENGTH	THICKNESS	
F3	9'-0"	9'-0"	3'-11"	8#6 EW.
F4	9'-0"	9'-0"	3'-6"	8#6 EW.
F5	12'-6"	12'-6"	3'-6"	12#9 EW.
F5A	12'-6"	12'-6"	3'-6"	12#9 EW.
F6	13'-6"	9'-0"	4'-2"	13#10 EW.
F8	13'-6"	13'-6"	4'-2"	13#10 EW.
F8A	13'-6"	13'-6"	4'-2"	13#10 EW.

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### LEVEL 2 FRAMING PLAN - PART A

1/8" = 1'-0"

#### NOTES:

- METAL PAN STAIRS. SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.
- TOP OF SLAB ELEV. @ RIDGE AND ABOVE THE PERIMETER 29.83 U.N.O.
- TOP OF SLAB @ DECK DRAINS (DD) 29.17.
- PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMPS.
- THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS. IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER POUNDS ON THE DECK THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.
- S8X18.4 SEPARATOR BEAM.

# Mobile Civic Center Parking Facility

Mobile, Alabama



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 Birmingham, AL 35243 (205) 972-9100

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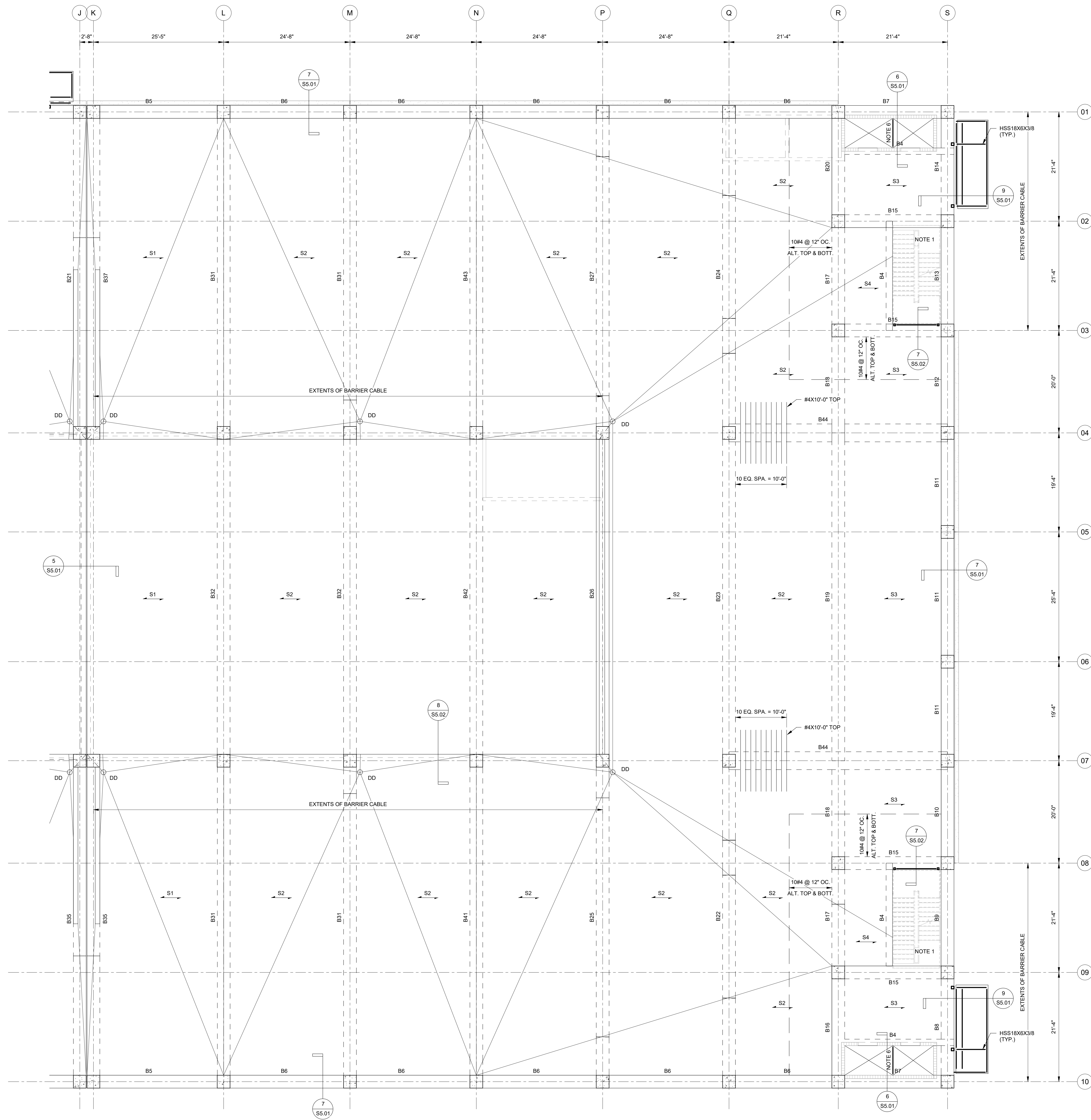
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job no. **4308**  
 dwn. by ATM  
 ckd. by ATM  
 date: AUGUST, 01 2023

draw. no. **S2.21**  
 6 of 20

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### LEVEL 2 FRAMING PLAN - PART B

1/8" = 1'-0"

#### NOTES:

1. METAL PAN STAIRS. SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.
2. TOP OF SLAB ELEV. @ RIDGE AND ABOVE THE PERIMETER 29.83 U.N.O.
3. TOP OF SLAB @ DECK DRAINS (DD) 29.17.
4. PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMPS.
5. THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS. IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER POUNDS ON THE DECK THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.
6. S8X18.4 SEPARATOR BEAM.

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Revisions

sheet title  
LEVEL 2 FRAMING PLAN - PART B

job no. **4308**

drawn by: ATM

chkd. by: ATM

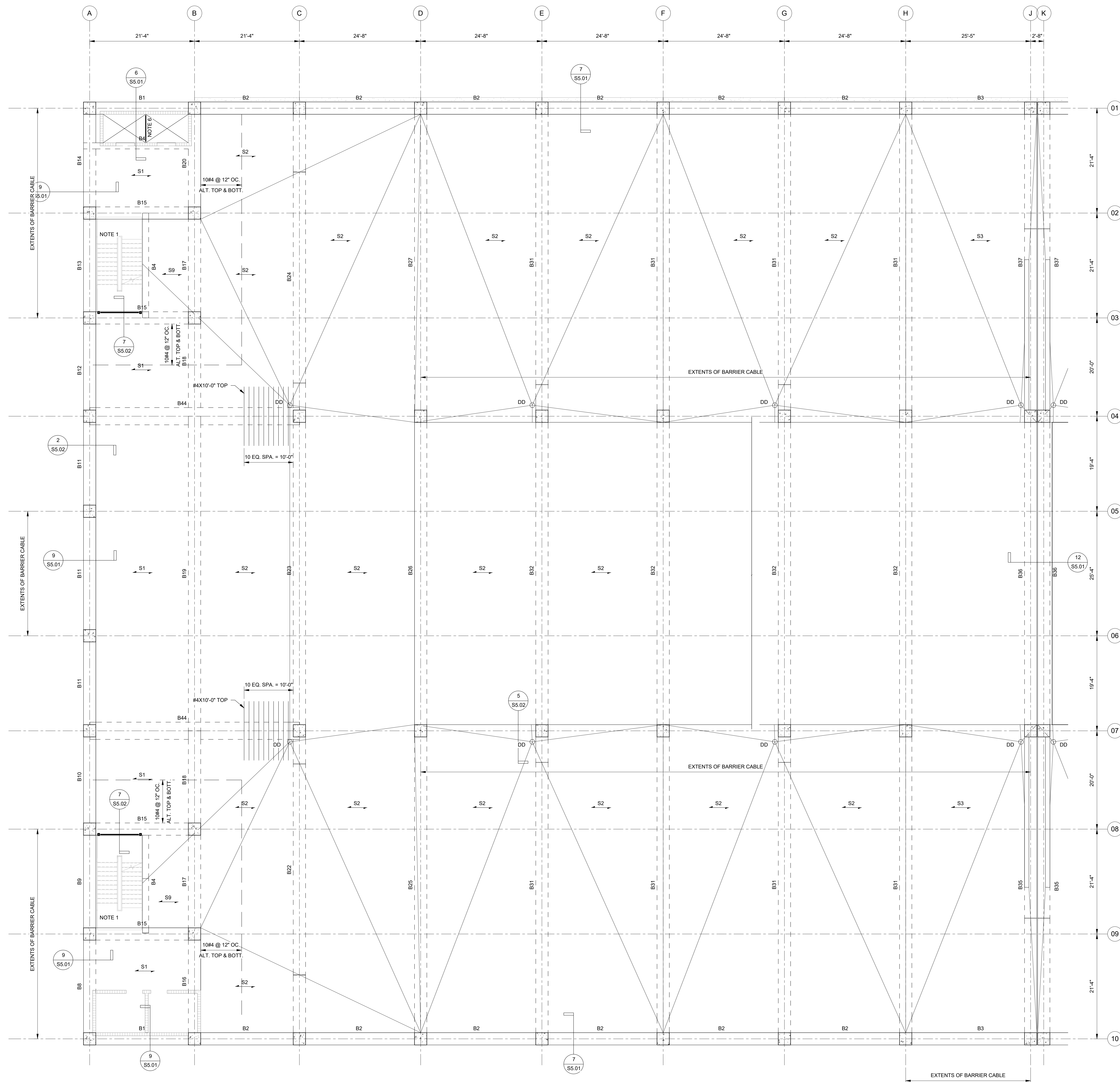
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7 of 20

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### LEVEL 3 FRAMING PLAN - PART A

1/8" = 1'-0"

- NOTES:
- METAL PAN STAIRS - SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.
  - TOP OF SLAB ELEV @ RIDGE AND ABOVE THE PERIMETER 41.17 U.N.O.
  - TOP OF SLAB @ DECK DRAINS (DD) 40.55.
  - PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMP.
  - THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS - IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER PONDS ON THE DECK THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.
  - S&X18.4 SEPARATOR BEAM.

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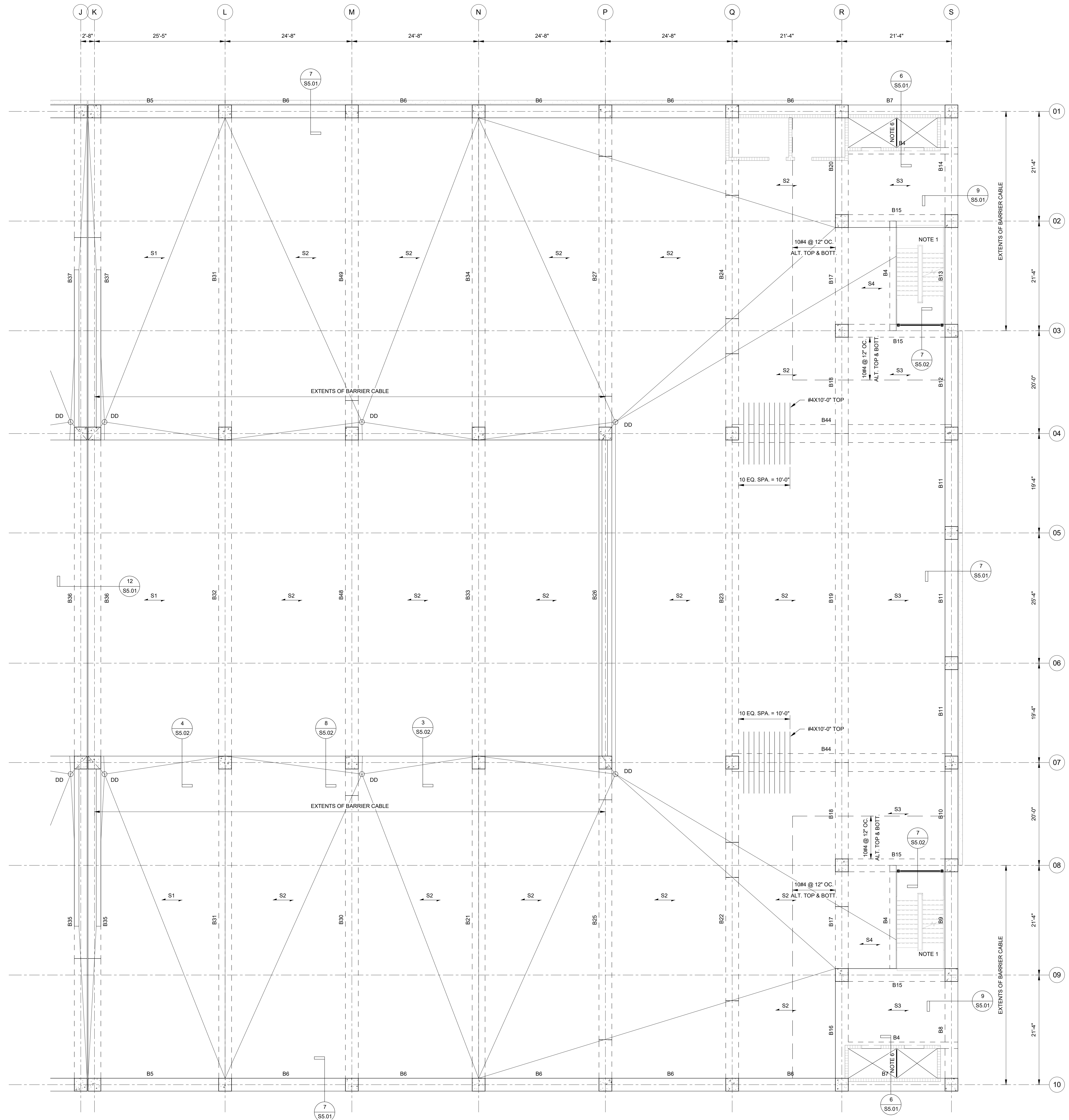
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LEVEL 3 FRAMING PLAN - PART A

job no. **4308**  
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 ckd. by **ATM** / **17**  
 of 156

date **8.2.21**  
 8 of 20

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### LEVEL 3 FRAMING PLAN - PART B

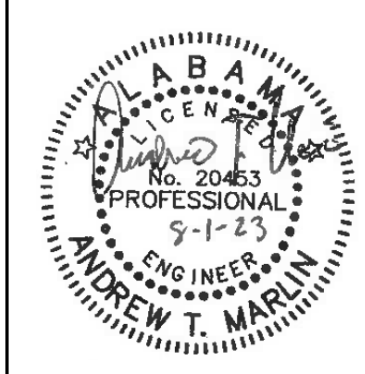
1/8" = 1'-0"

#### NOTES

- METAL PAN STAIRS. SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.
- TOP OF SLAB @ RIDGE AND ABOVE THE PERIMETER 41.17 U.O.
- TOP OF SLAB @ DECK DRAINS (DD) 40.50
- PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMP.
- THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS. IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER PONDS ON THE DECK THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.
- S8X18.4 SEPARATOR BEAM.

# Mobile Civic Center Parking Facility

Mobile, Alabama



**Evan Terry Associates LLC**  
 Architecture • Accessible Design  
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 Birmingham, AL 35243 (205) 972-9100

Revisions	

sheet title	LEVEL 3 FRAMING PLAN - PART B	
job no.	4308	
drawn by	ATM	checked by
date	18	of
	ATM	156
	<b>S2.32</b>	
	9 of 20	
date	AUGUST, 01 2023	
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# Mobile Civic Center Parking Facility

Mobile, Alabama

CONSTRUCTION DOCUMENTS



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## LEVEL 4 FRAMING PLAN - PART A

1/8" = 1'-0"

### NOTES:

1. METAL PAN STAIRS. SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.
2. TOP OF SLAB ELEV. @ RIDGE AND ABOVE THE PERIMETER S2.50 U.N.O.
3. TOP OF SLAB @ DECK DRAINS (DD) S1.83
4. PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMPS.
5. THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS. IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER PONDS ON THE DECK, THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.
6. SBX184 SEPARATOR BEAM.

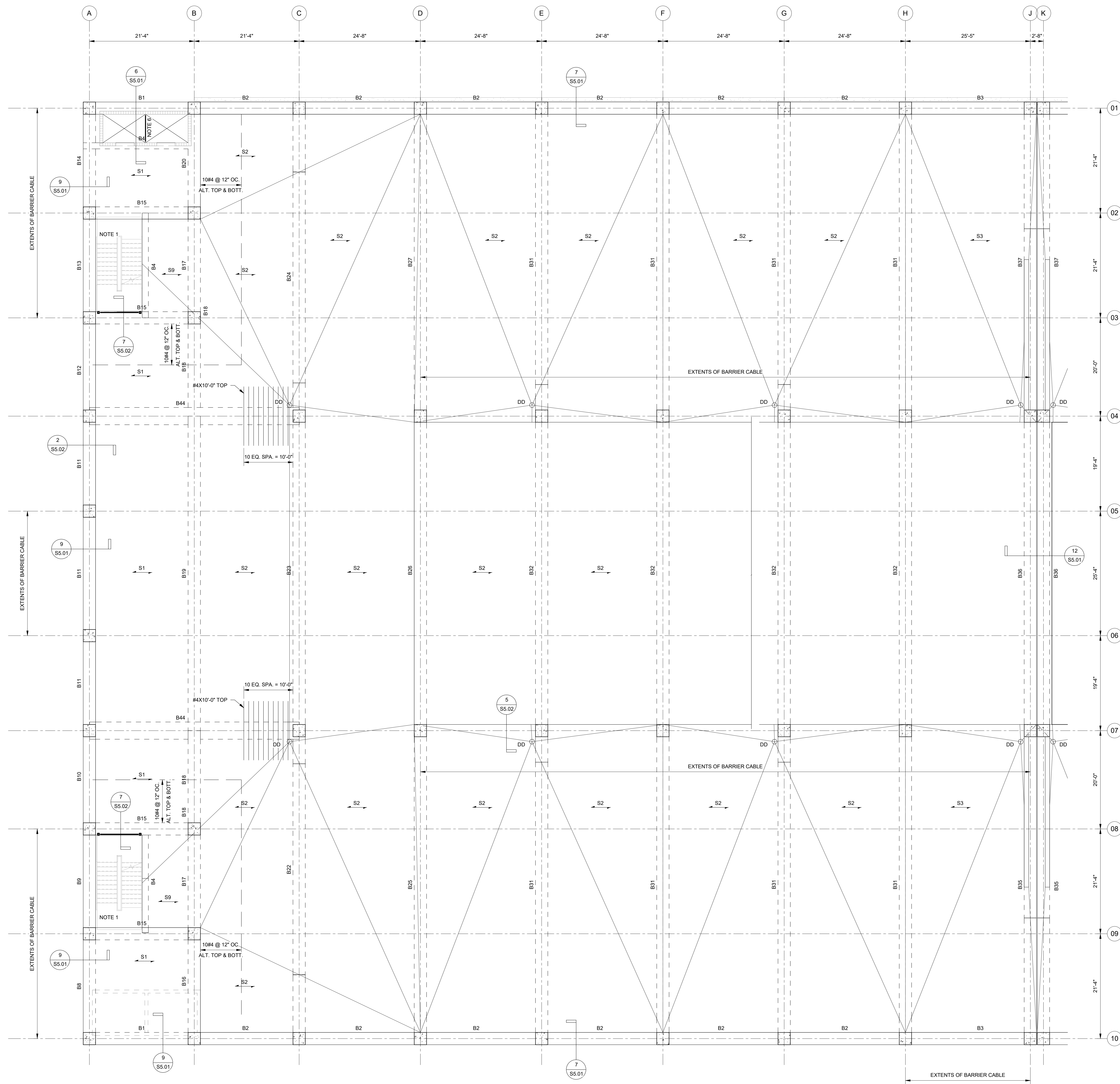
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sheet title  
LEVEL 4 FRAMING PLAN  
- PART A

job no. **4308**  
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 dcd. by: ATM  
 of 156

date: **S2.41**  
 10 of 20

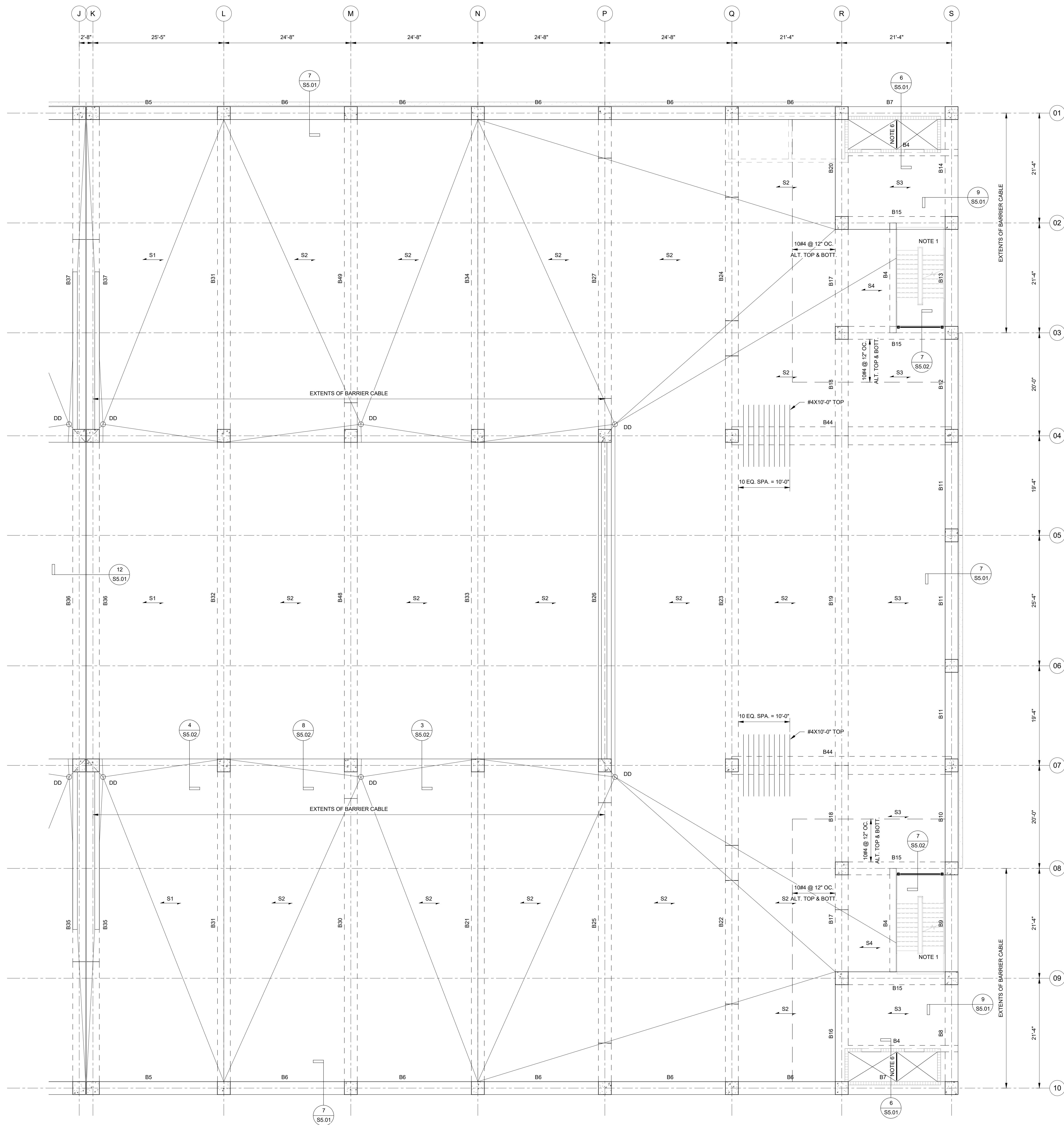
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### LEVEL 4 FRAMING PLAN - PART B

1/8" = 1'-0"

- NOTES:
1. METAL PAN STAIRS. SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.
  2. TOP OF SLAB ELEV. @ RIDGE AND ABOVE THE PERIMETER S2.50 U.N.O.
  3. TOP OF SLAB @ DECK DRAINS (DD) S1.83.
  4. PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMPS.
  5. THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS. IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER PONDS ON THE DECK THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.
  6. S8X16.4 SEPARATOR BEAM.

# Mobile Civic Center Parking Facility

Mobile, Alabama



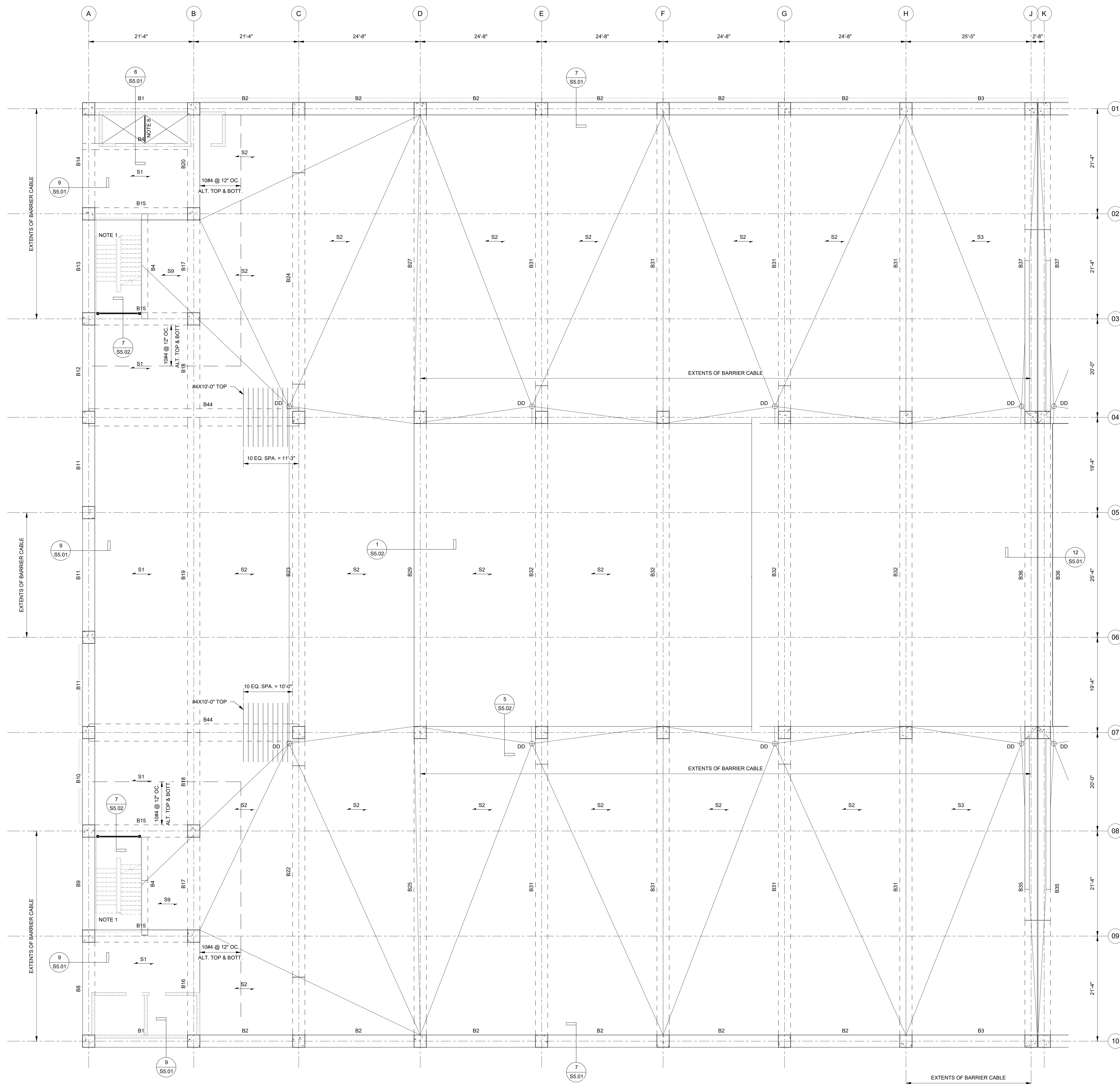
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job no.	4308
drawn by	ATM
checked by	ATM
date	AUGUST, 01 2023
drawn by	ATM
checked by	ATM
date	AUGUST, 01 2023
drawn by	ATM
checked by	ATM
date	AUGUST, 01 2023
drawn by	ATM
checked by	ATM
date	AUGUST, 01 2023



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### LEVEL 5 FRAMING PLAN - PART A

1/8" = 1'-0"

- NOTES:**
1. METAL PAN STAIRS. SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.
  2. TOP OF SLAB ELEV. @ RIDGE AND ABOVE THE PERIMETER 63.83 U.L.O.
  3. TOP OF SLAB @ DECK DRAINS (DD) 63.17.
  4. PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMPS.
  5. THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS. IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER POND ON THE DECK THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.
  6. 6X18-4 SEPARATOR BEAM.

**Mobile Civic Center  
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Mobile, Alabama

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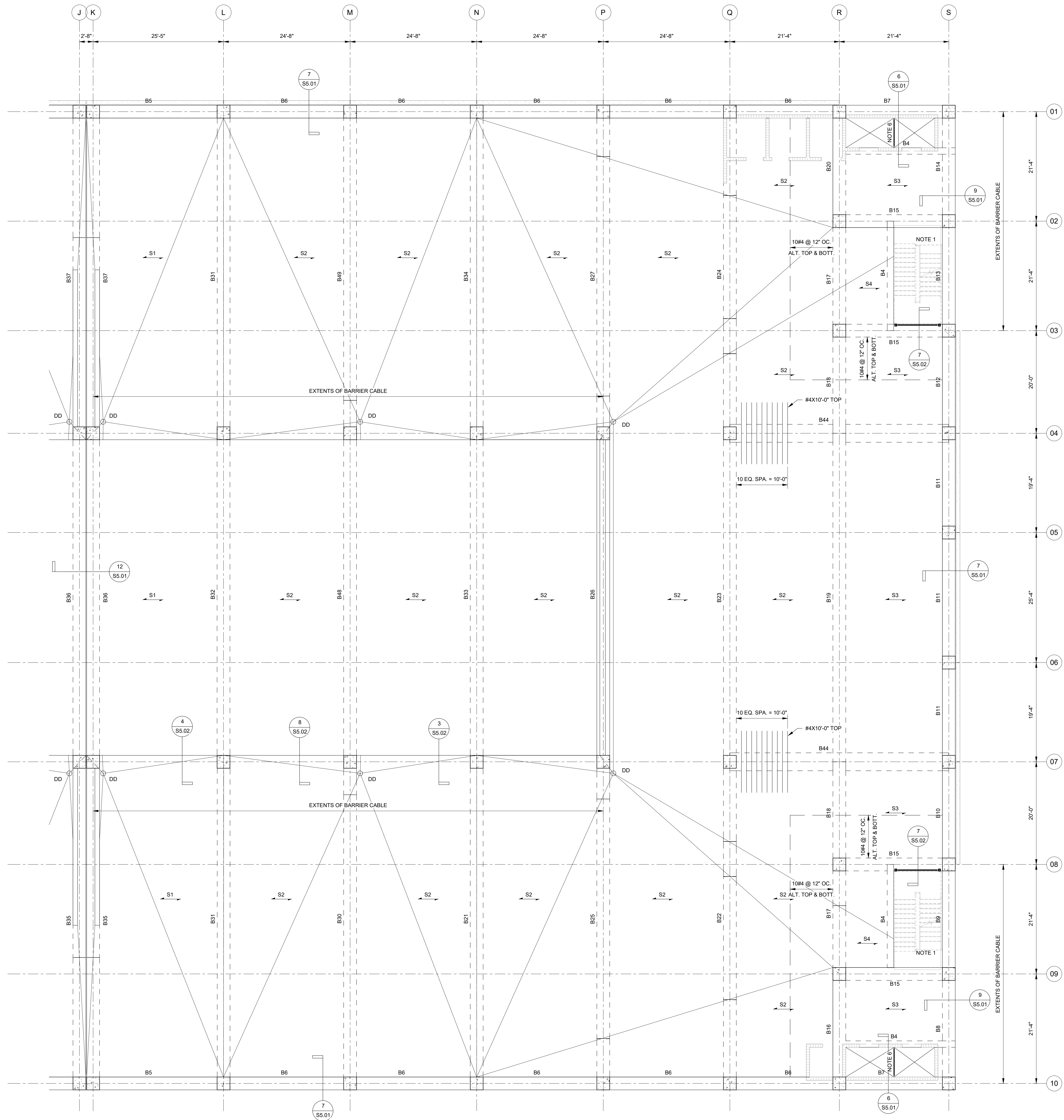
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ENGINEER  
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STATE OF ALABAMA  
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Revisions

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checked by	ATM
date	AUGUST, 01 2023
scale	12 of 20
revision	S2.51
date	AUGUST, 01 2023
author	Evan Terry Associates, LLC 2023

CONSTRUCTION DOCUMENTS

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### LEVEL 5 FRAMING PLAN - PART B

1/8" = 1'-0"

#### NOTES:

- METAL PAN STAIRS. SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.
- TOP OF SLAB ELEV. @ RIDGE AND ABOVE THE PERIMETER 63.83 U.N.O.
- TOP OF SLAB @ DECK DRAINS (DD) 63.17
- PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMPS.
- THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS. IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER PONDS ON THE DECK THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.
- S8X18.4 SEPARATOR BEAM.

# Mobile Civic Center Parking Facility

Mobile, Alabama



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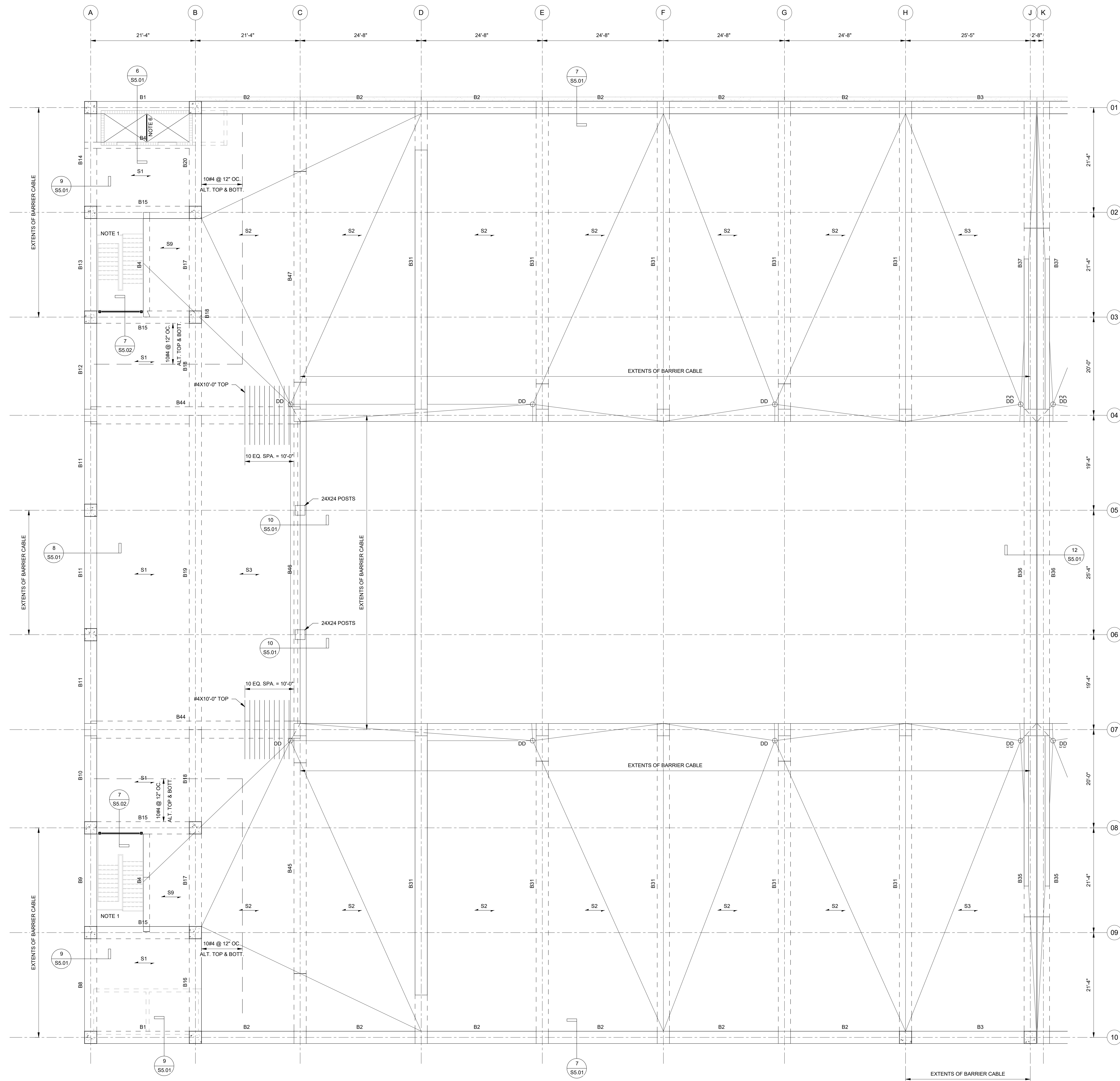
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job no. **4308**  
 dwg. by **ATM** sheet no. **22**  
 ckd. by **ATM** of **156**

**\$2.52**  
 13 of 20

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### LEVEL 6 FRAMING PLAN - PART A

1/8" = 1'-0"

#### NOTES:

1. METAL PAN STAIRS. SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.
2. TOP OF SLAB ELEV. @ RIDGE AND ABOVE THE PERIMETER IS 17' U.N.G.
3. TOP OF SLAB @ DECK DRAINS (DD) 74.50.
4. PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMP.
5. THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS. IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER PONDS ON THE DECK THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.
6. S&S 18.4 SEPARATOR BEAM.

# Mobile Civic Center Parking Facility

Mobile, Alabama



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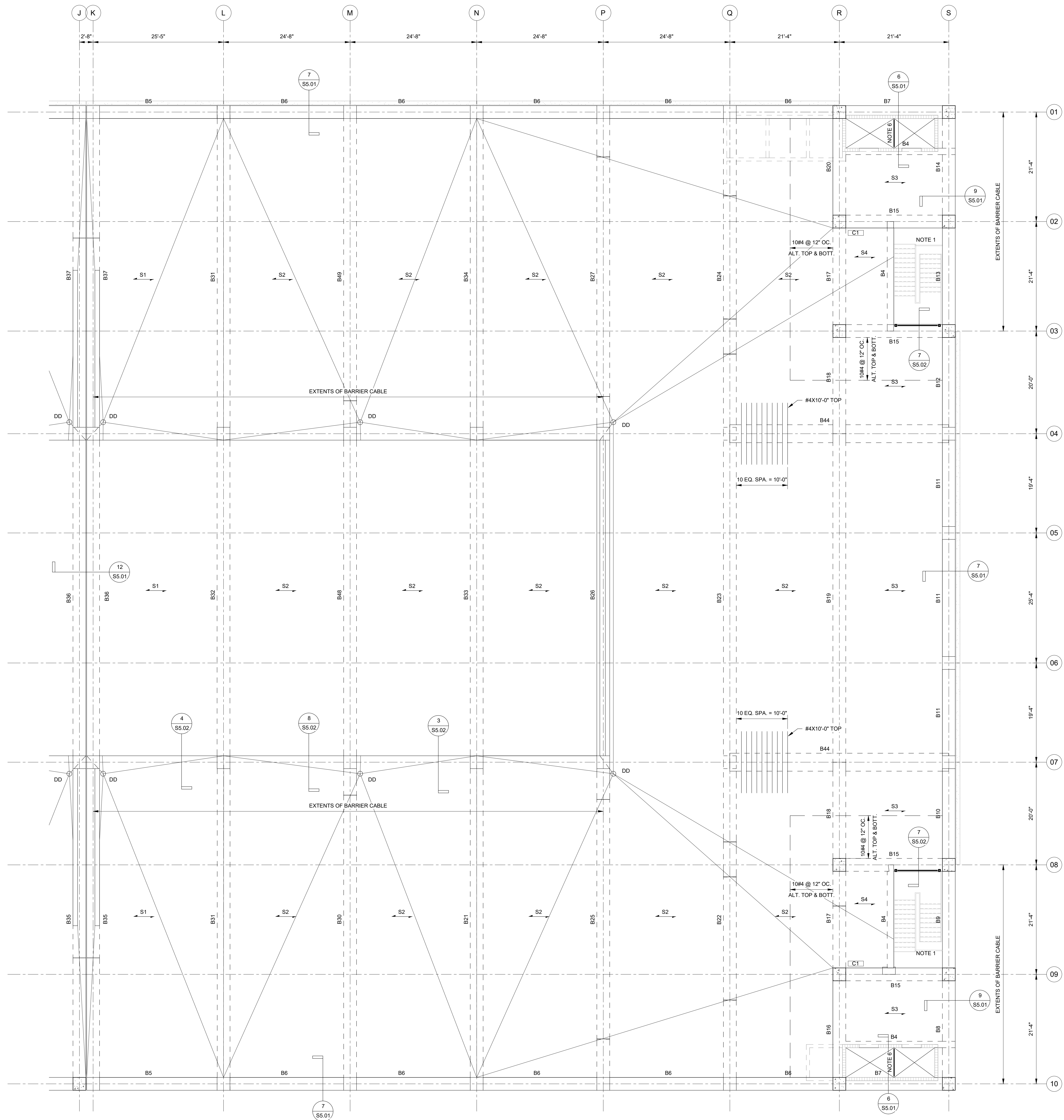
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 - PART A

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**S2.61**  
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### LEVEL 6 FRAMING PLAN - PART B

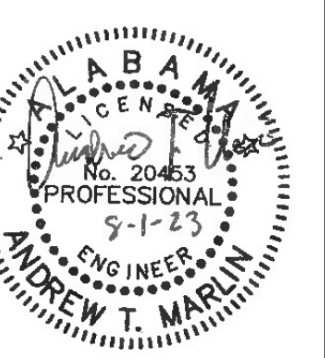
1/8" = 1'-0"

#### NOTES:

1. METAL PAN STAIRS - SEE ARCH. FOR DIMENSIONS, DETAILS, AND PAINT FINISH.
2. TOP OF SLAB @ DECK DRAINS (DD) 74.50.
3. TOP OF SLAB ELEV. @ RIDGE AND ABOVE THE PERIMETER 75.17 U.N.C.
4. PROVIDE CRICKETS ADJACENT TO COLUMNS AND AT THE BOTTOM OF ALL RAMPS.
5. THE CONCRETE STRUCTURE SHALL DRAIN TO THE DECK DRAINS. IF SLOPES ARE NOT INSTALLED CORRECTLY AND WATER PONDS ON THE DECK THE GENERAL CONTRACTOR WILL BE REQUIRED TO RECTIFY THE DRAINAGE ISSUE AT THEIR EXPENSE.
6. SIX'x'4' SEPARATOR BEAM.

# Mobile Civic Center Parking Facility

Mobile, Alabama



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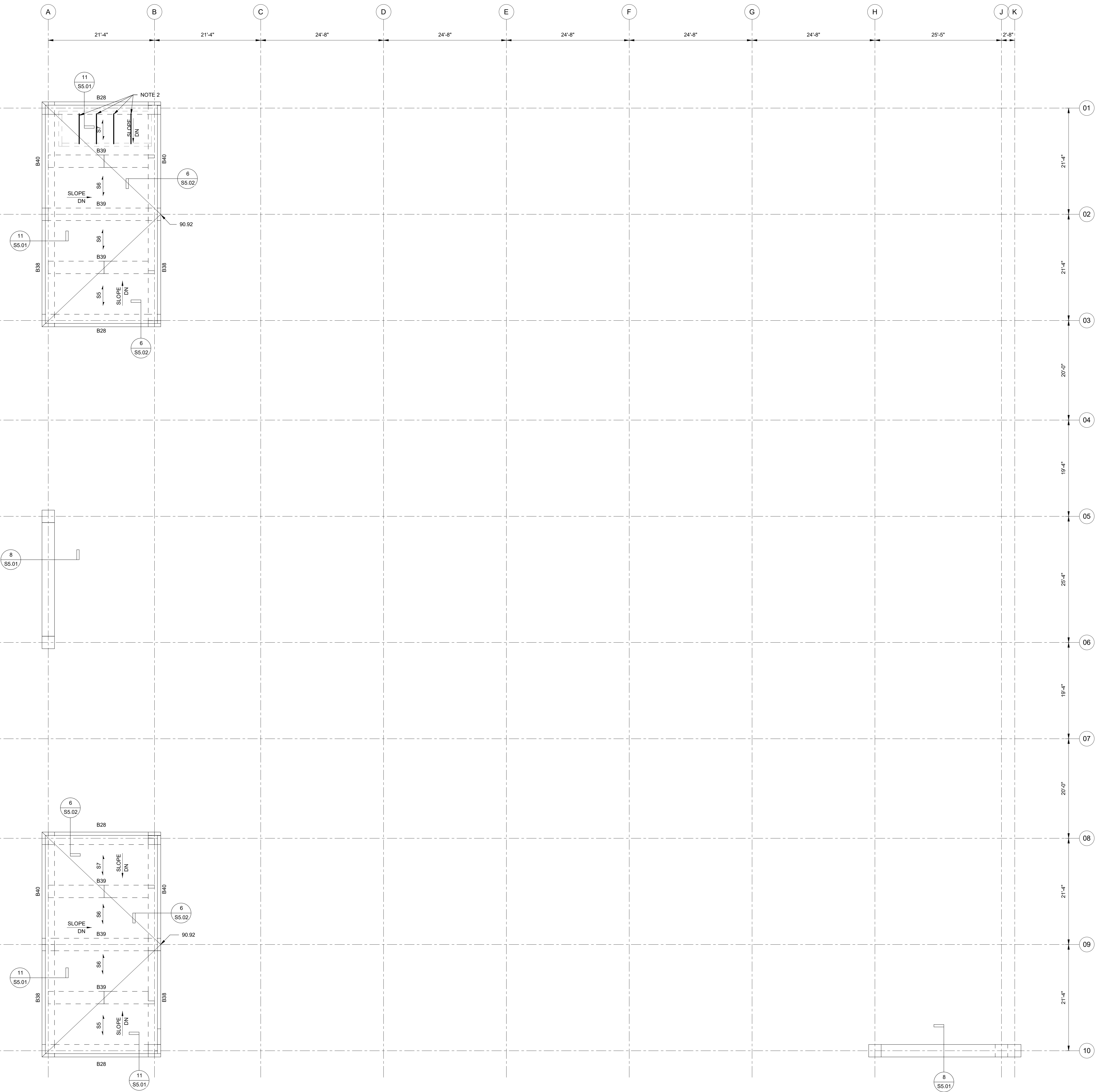
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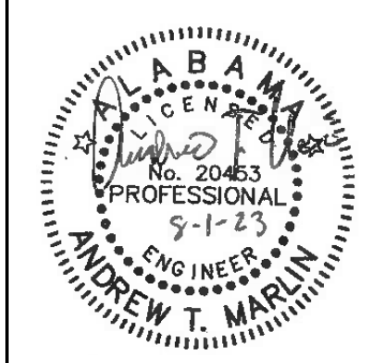
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**ROOF FRAMING PLAN - PART A**

1/8" = 1'-0"

- NOTES:**  
 1. TOP OF SLAB ELEV. 91.58 U.N.O.  
 2. W8x18 HOIST BEAM COORDINATE LOCATION AND ELEVATION W/ ELEVATOR MANUFACTURER.



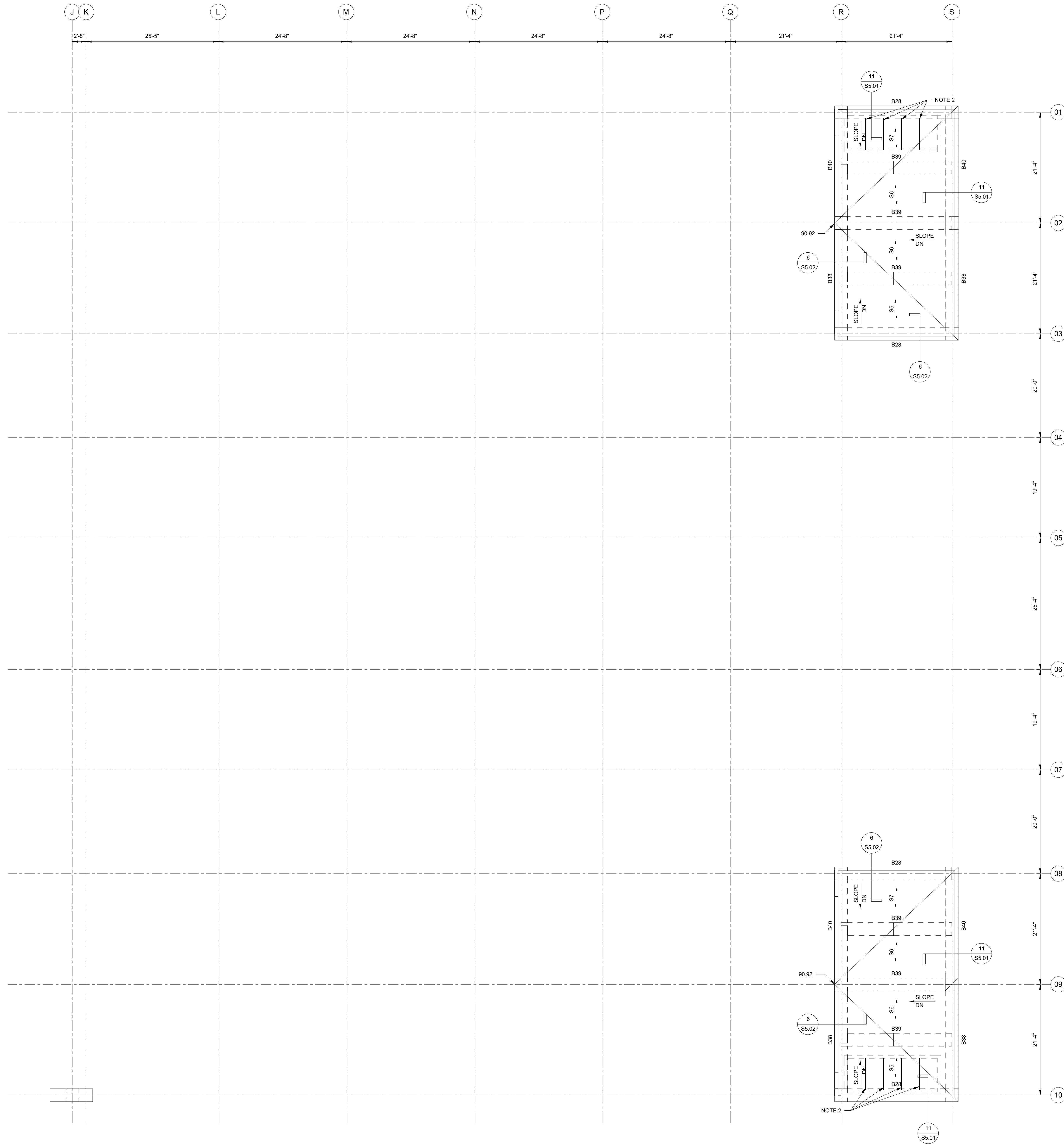
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checked by	ATM
date	<b>25</b>
drawn by	ATM
sheet no.	<b>S2.71</b>
of	16 of 20
date AUGUST, 01 2023	
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### ROOF FRAMING PLAN - PART B

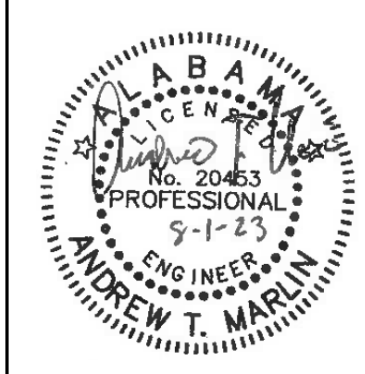
1/8" = 1'-0"

NOTES:

1. TOP OF SLAB ELEV. 91.58 U.N.O.
2. W8X18 HOIST BEAM COORDINATE LOCATION AND ELEVATION W/ ELEVATOR MANUFACTURER.

# Mobile Civic Center Parking Facility

Mobile, Alabama

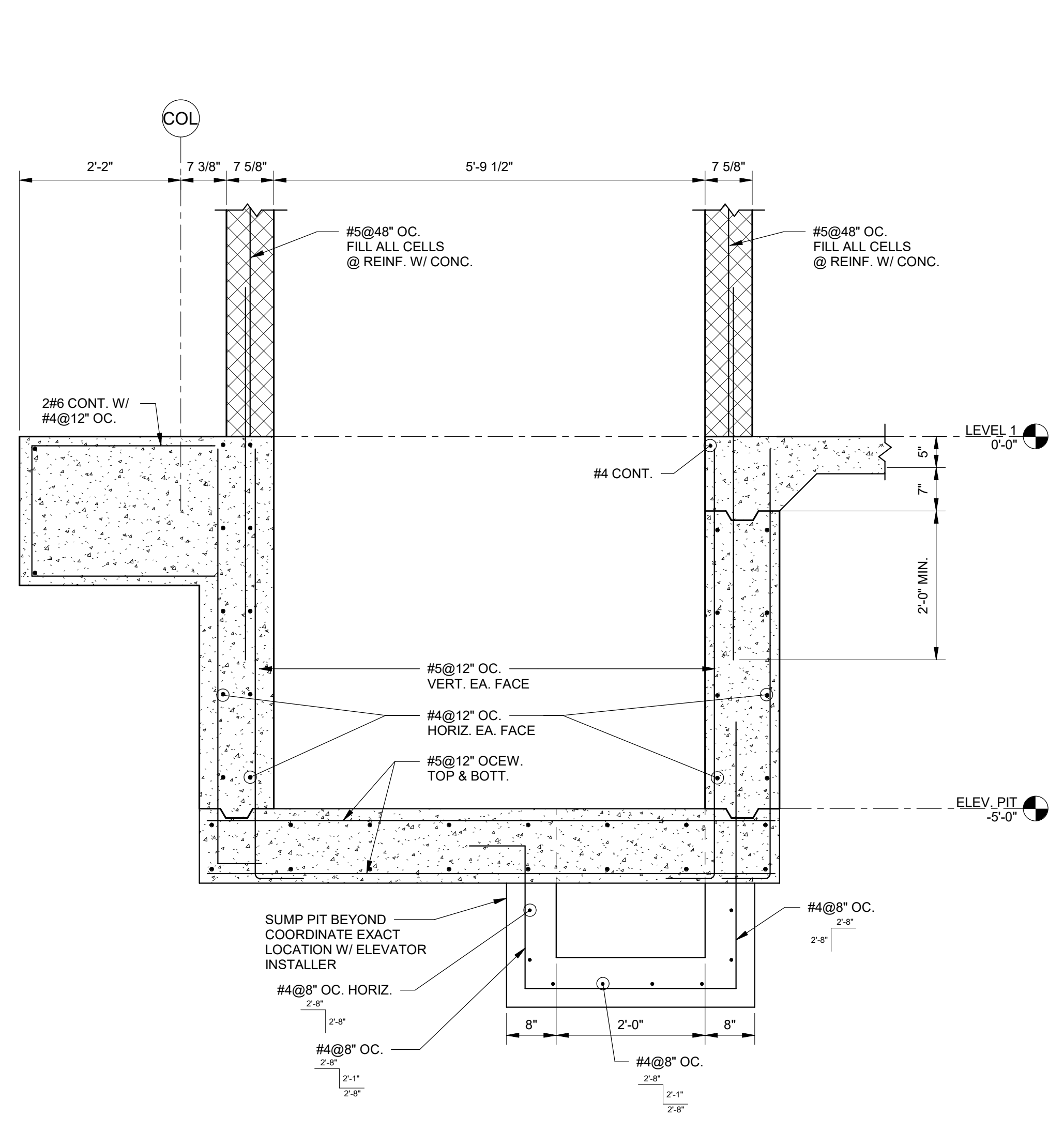


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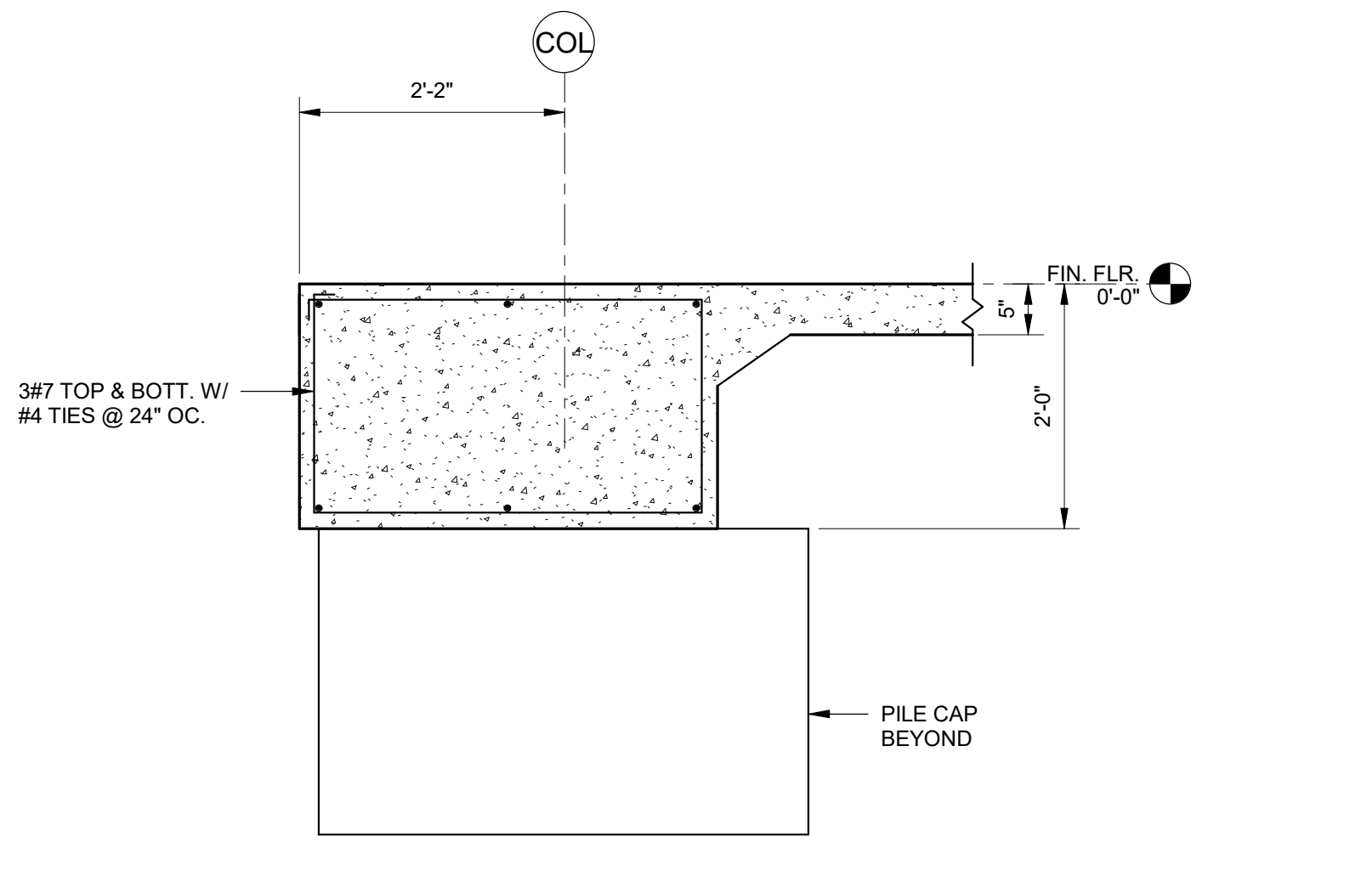
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draw. no.	S2.72
	17 of 20
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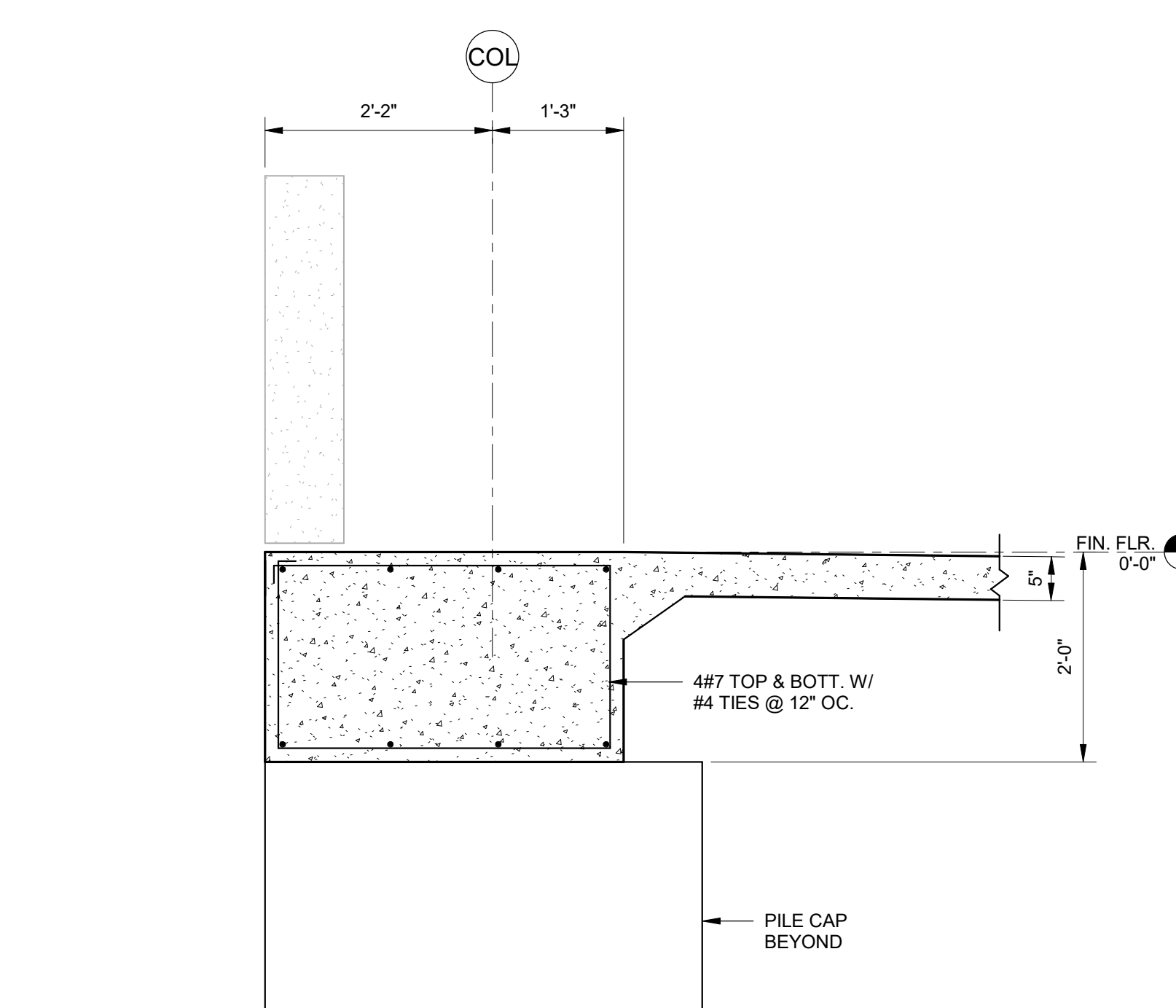
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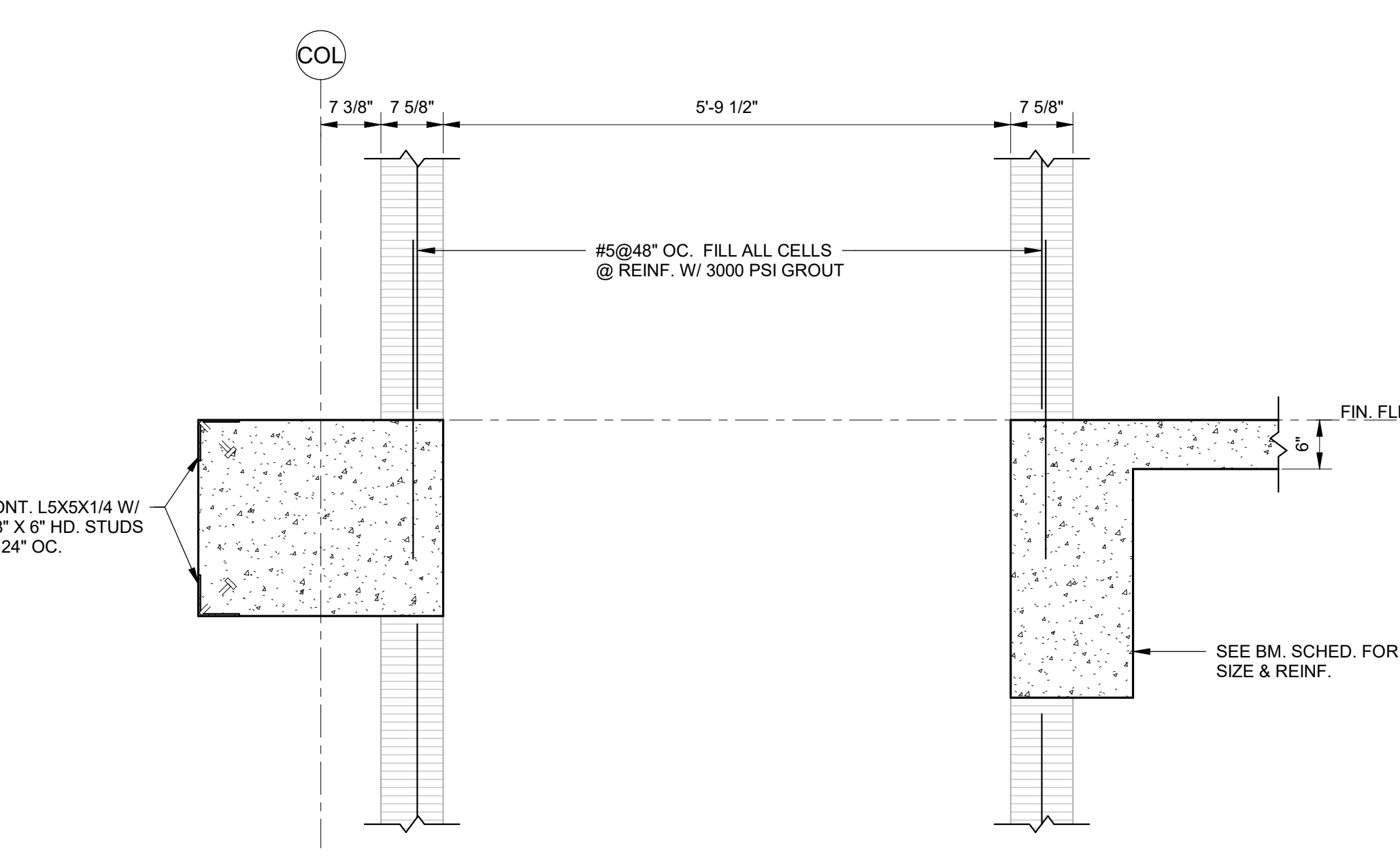
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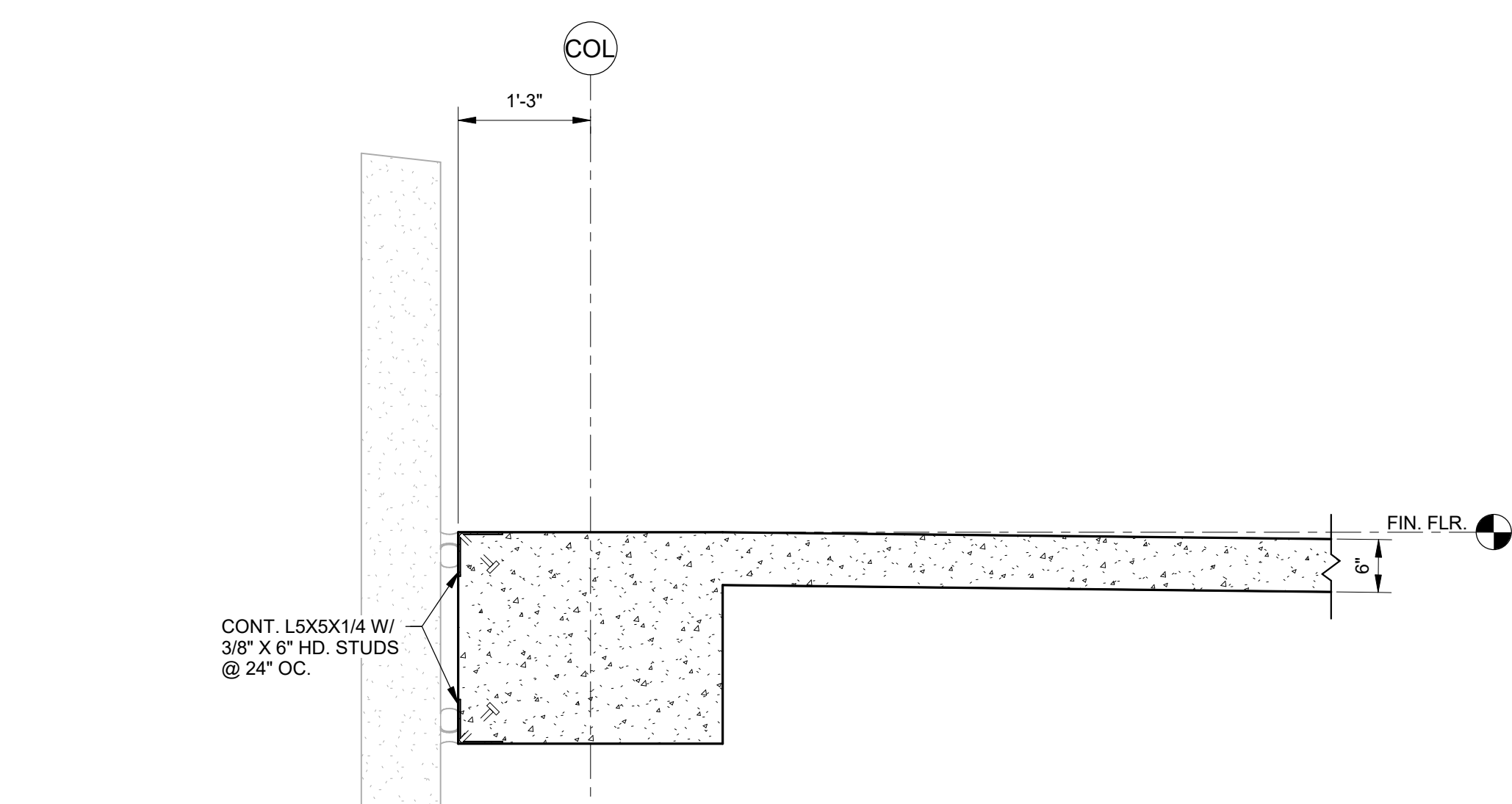
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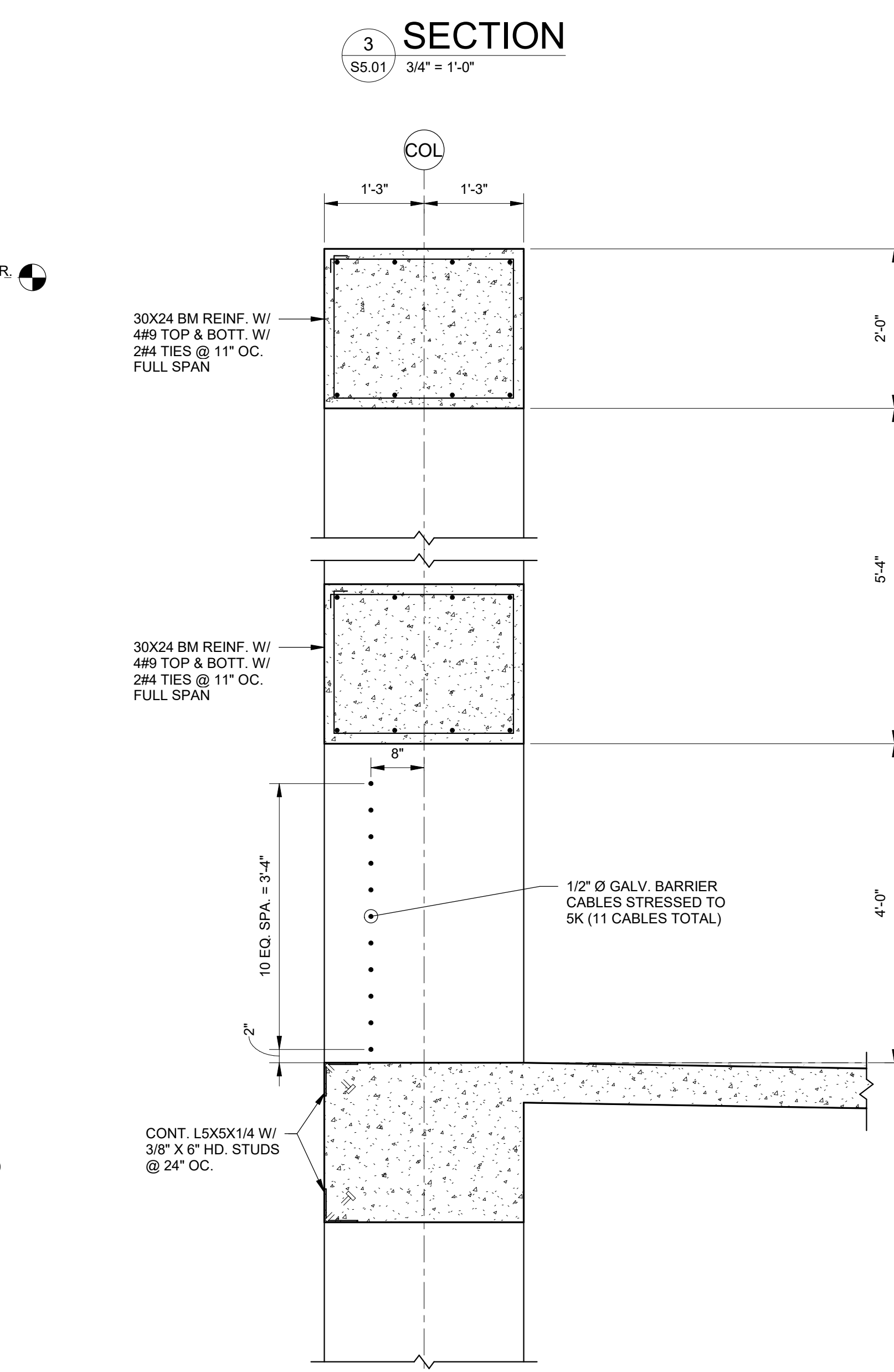
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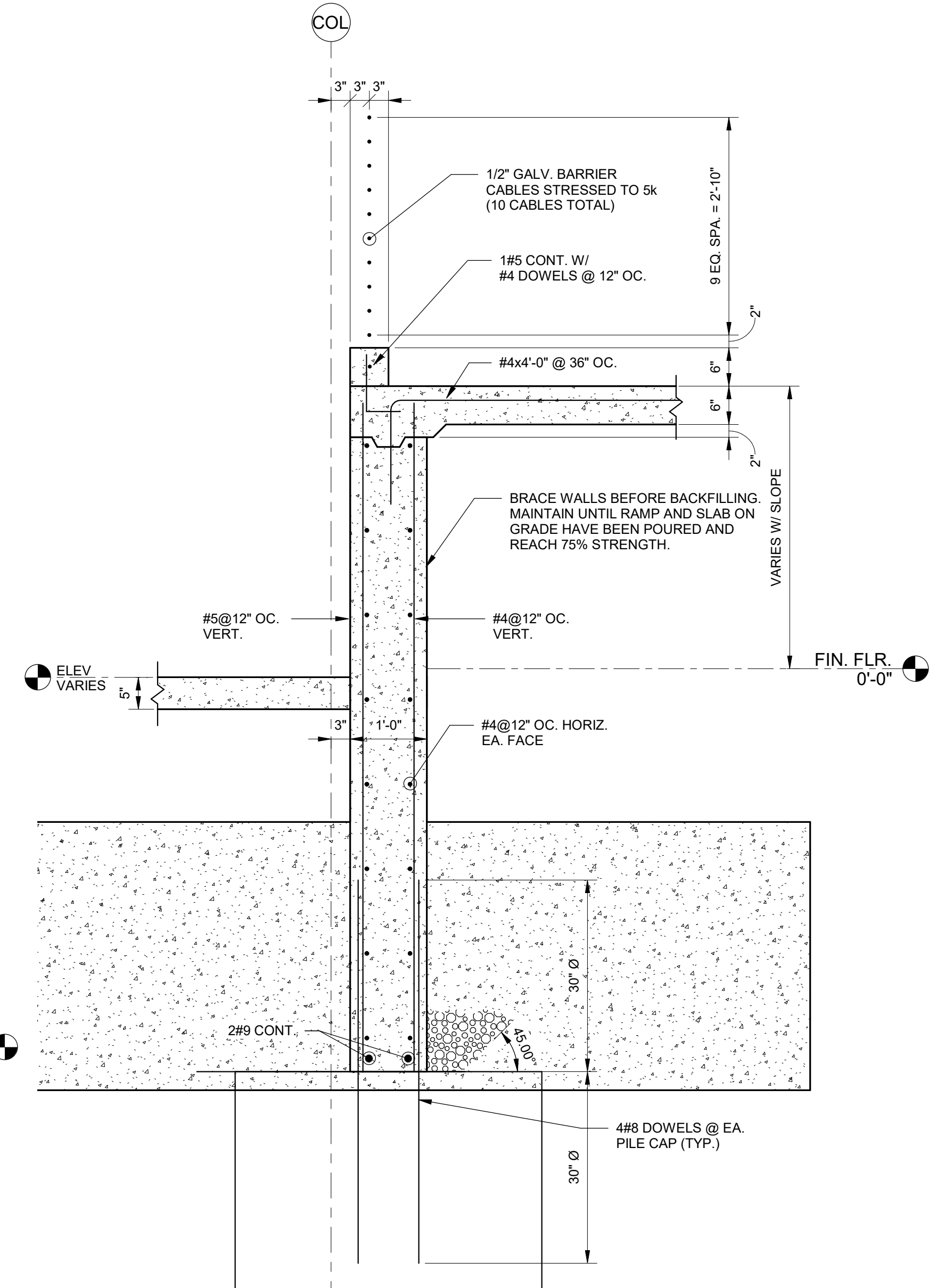
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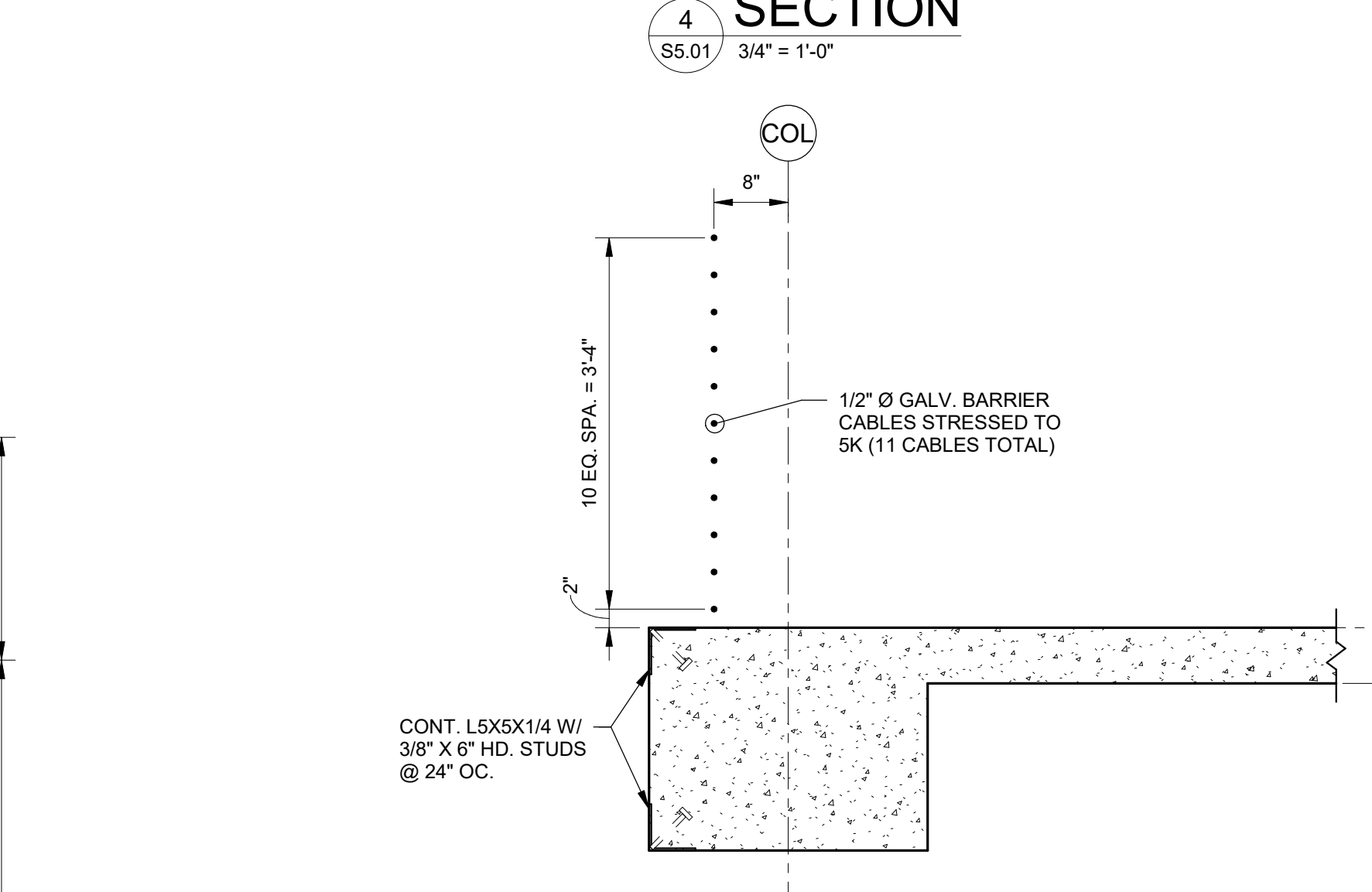
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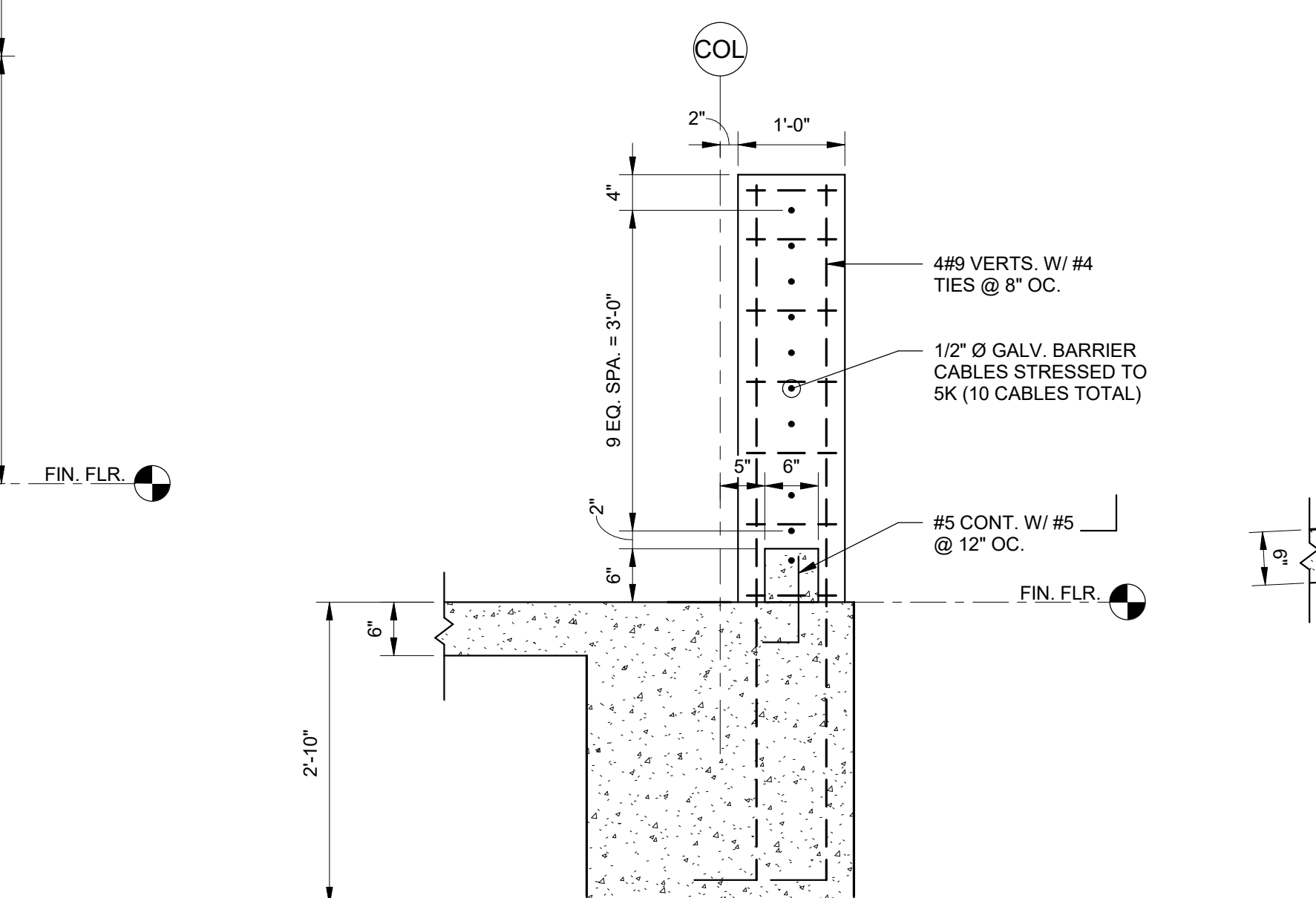
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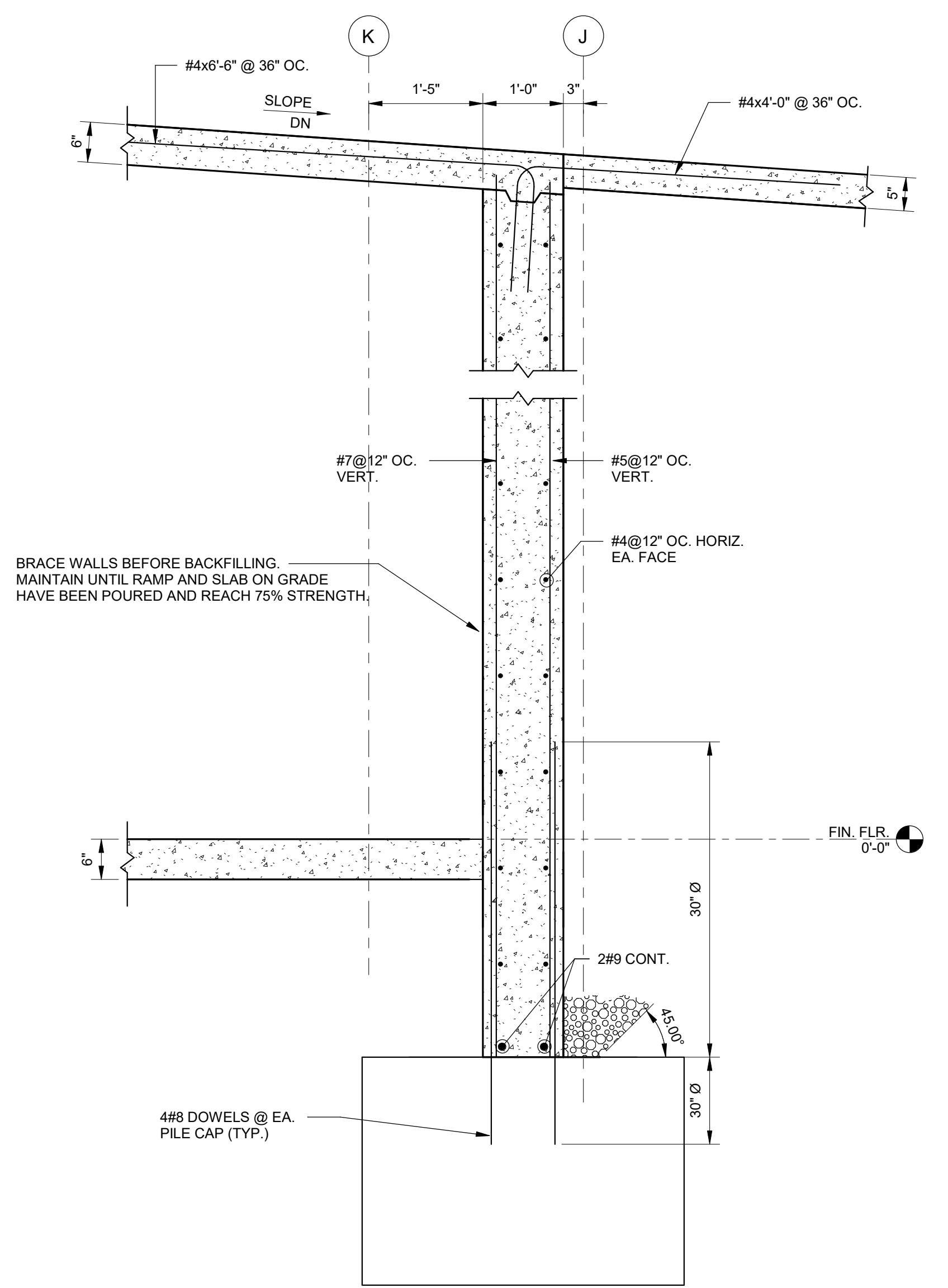
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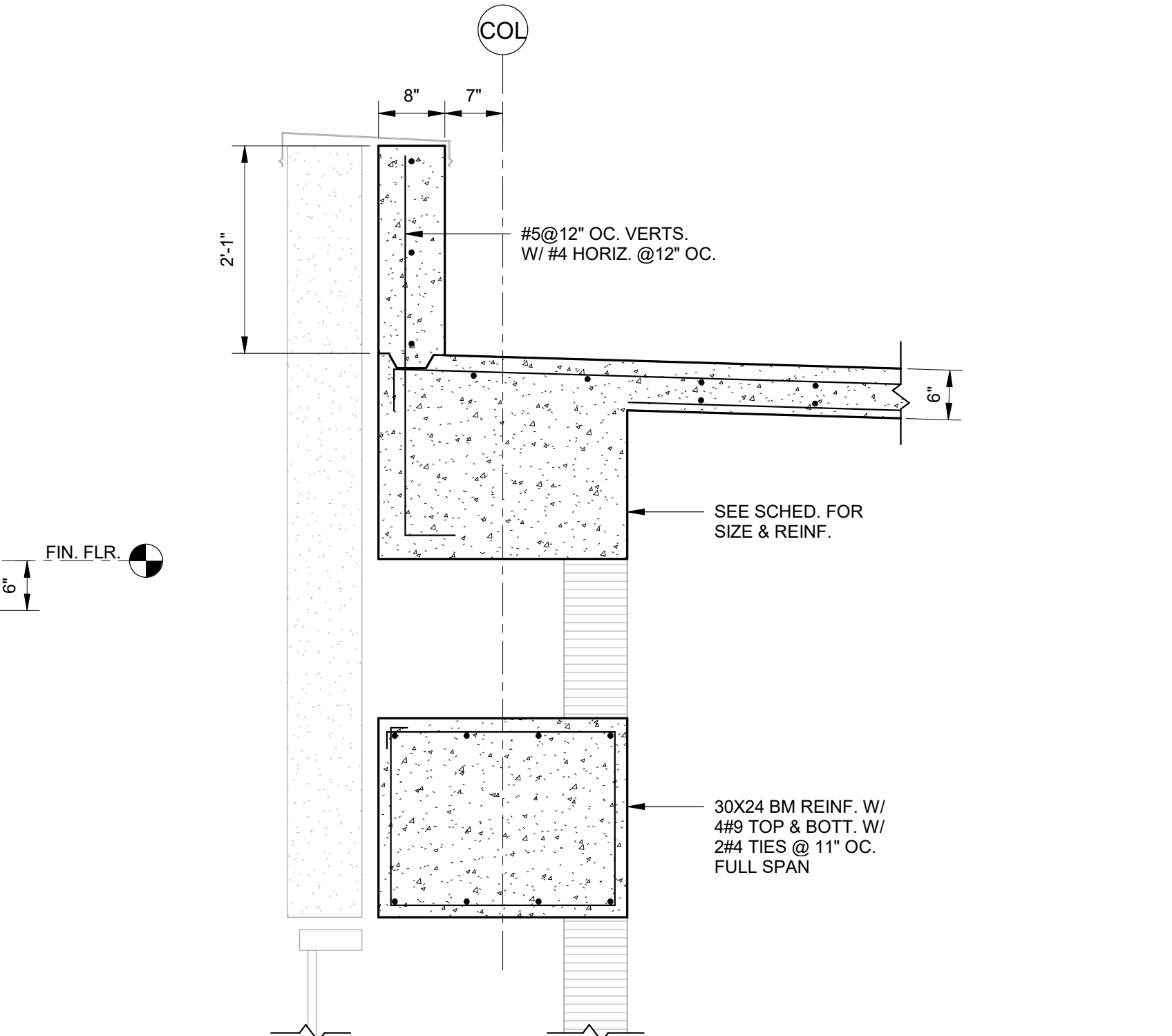
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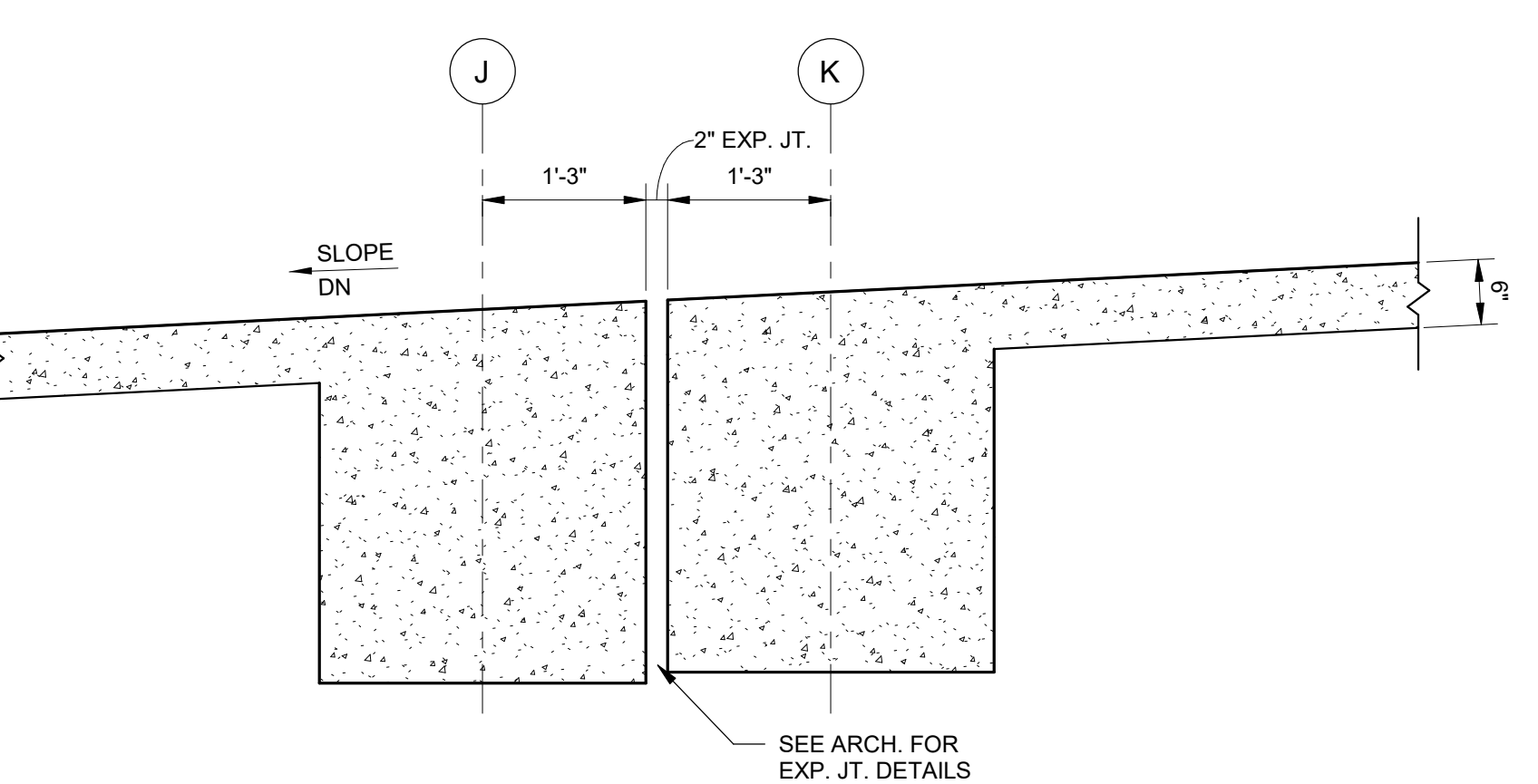
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# Mobile Civic Center Parking Facility

Mobile, Alabama



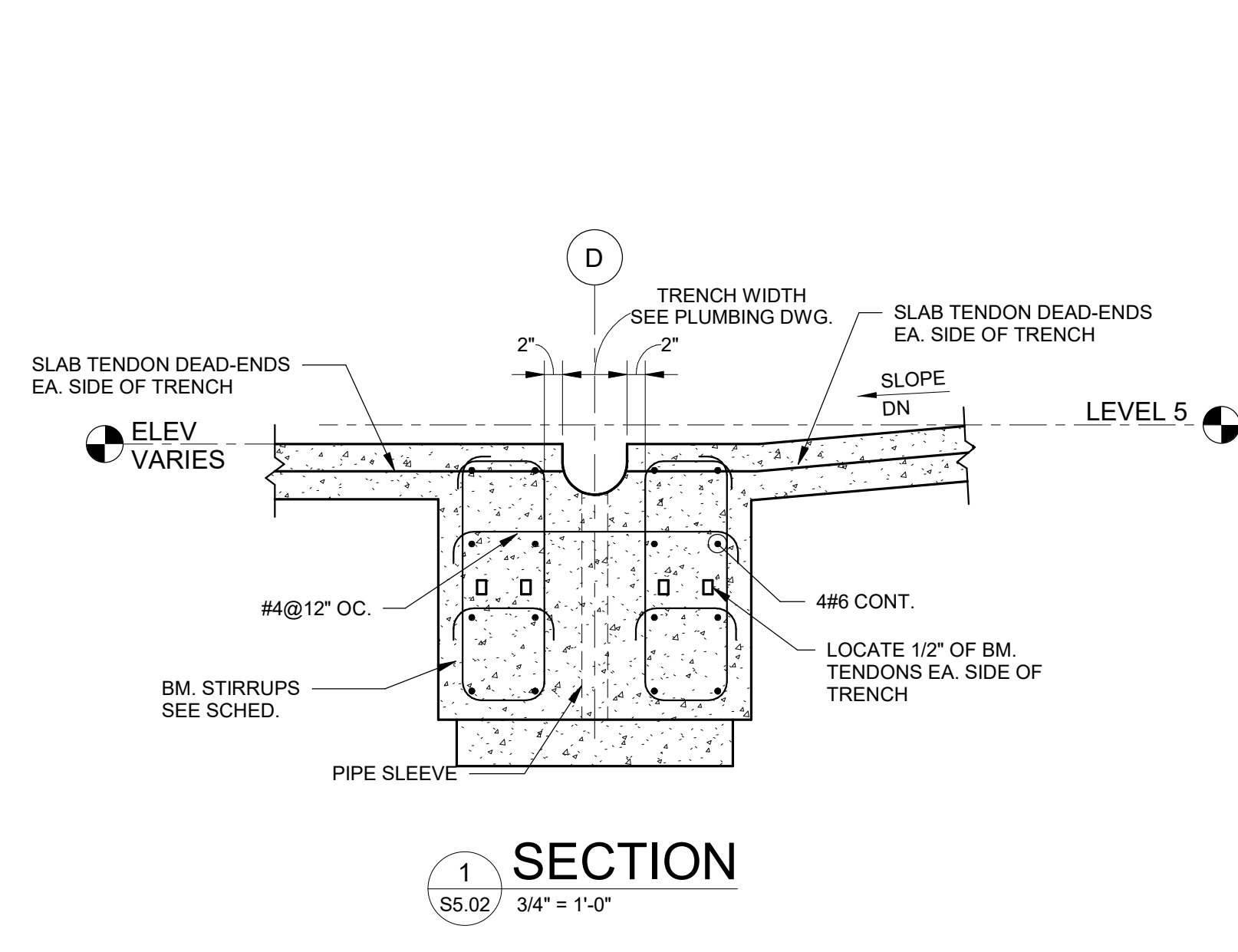
**Evan Terry Associates LLC**  
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One Perimeter Park South Suite 2005  
Birmingham, AL 35243 (205) 972-9100

Revisions	
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drawn no.	19 of 20
of	156
<b>S5.01</b>	
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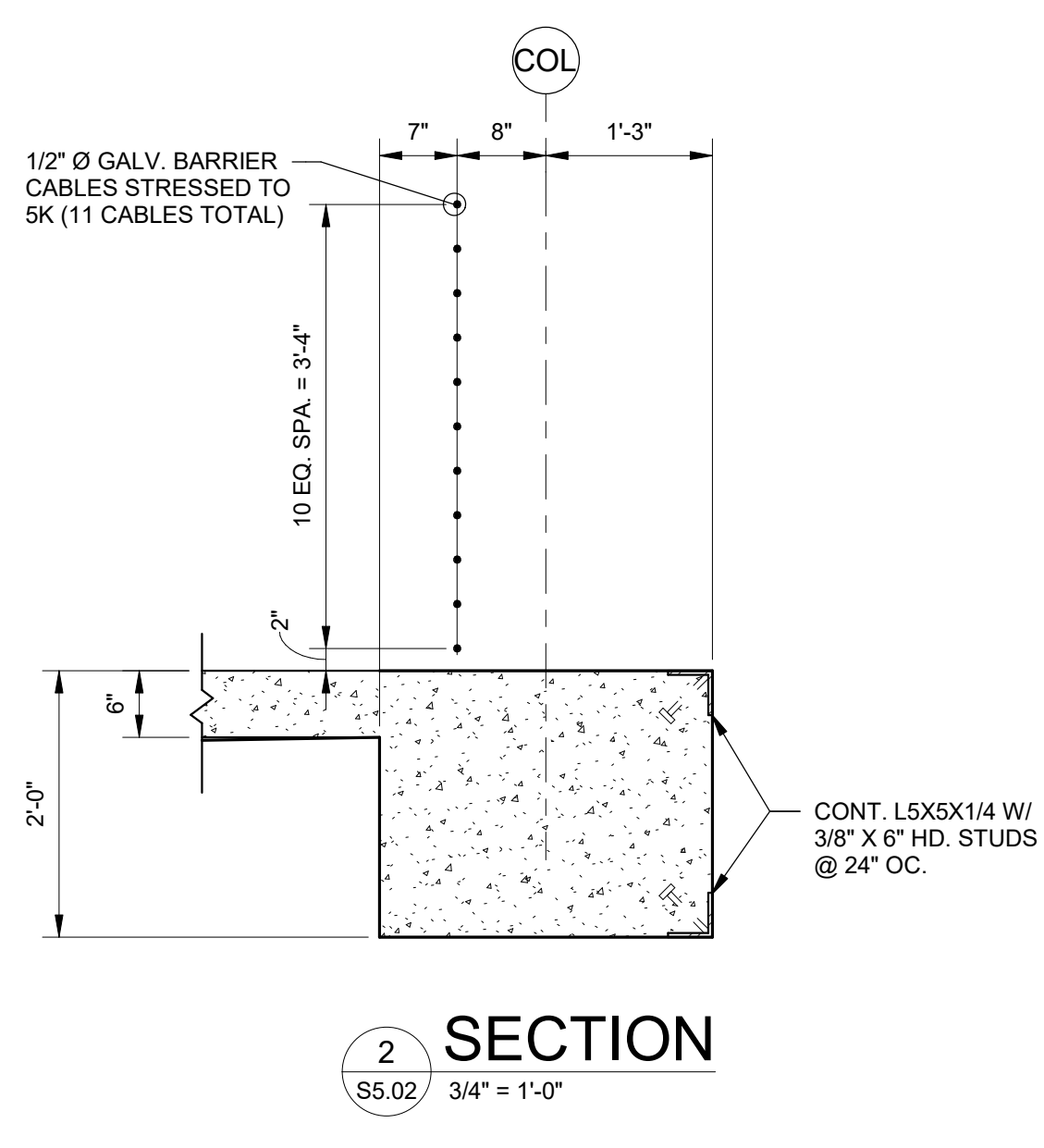


# Mobile Civic Center Parking Facility

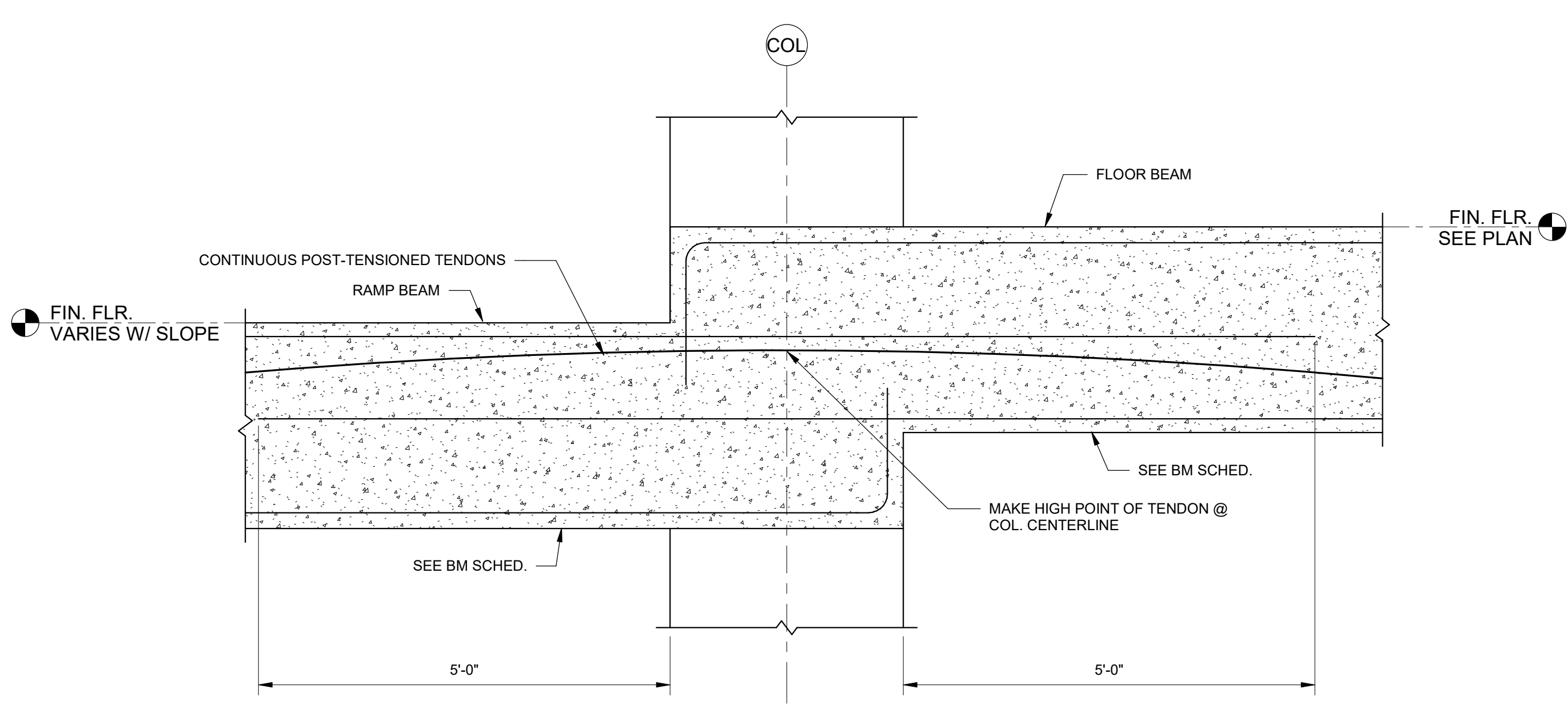
Mobile, Alabama



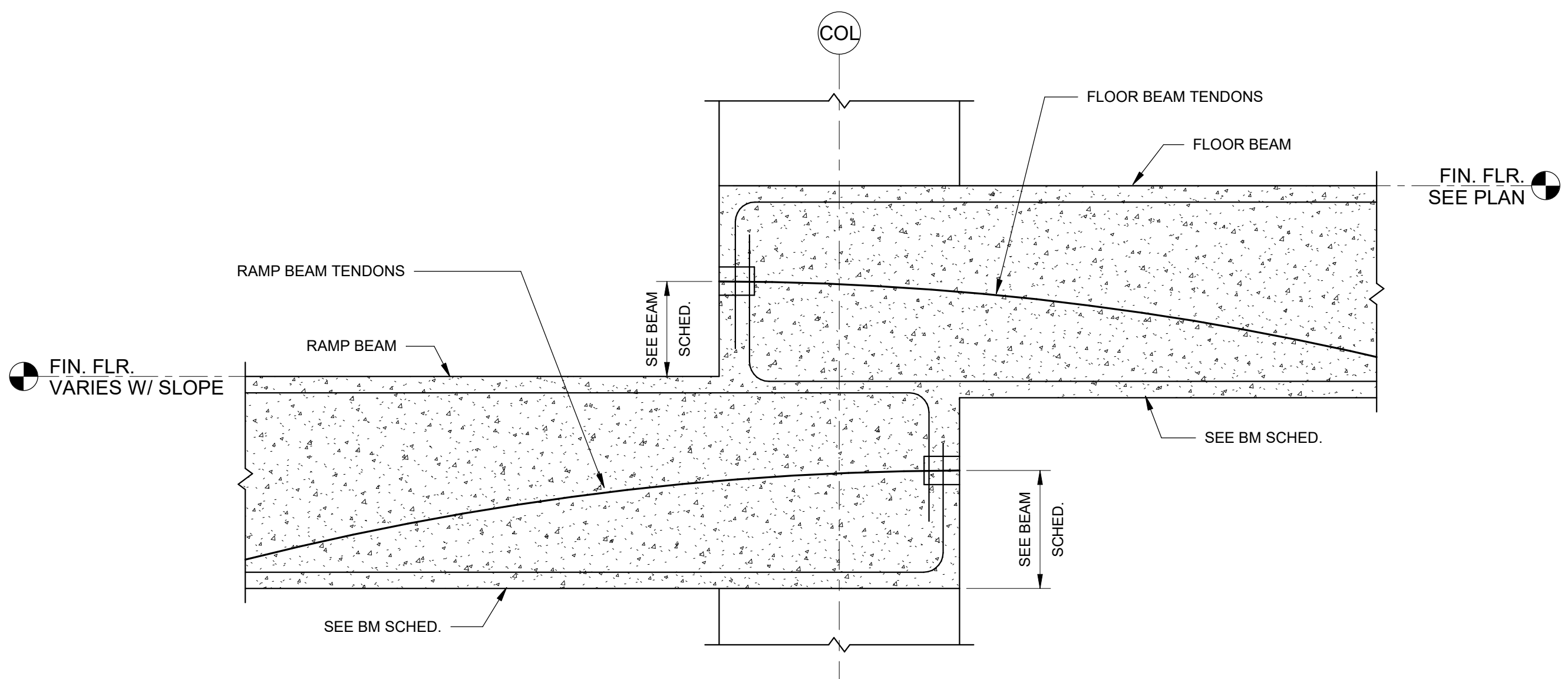
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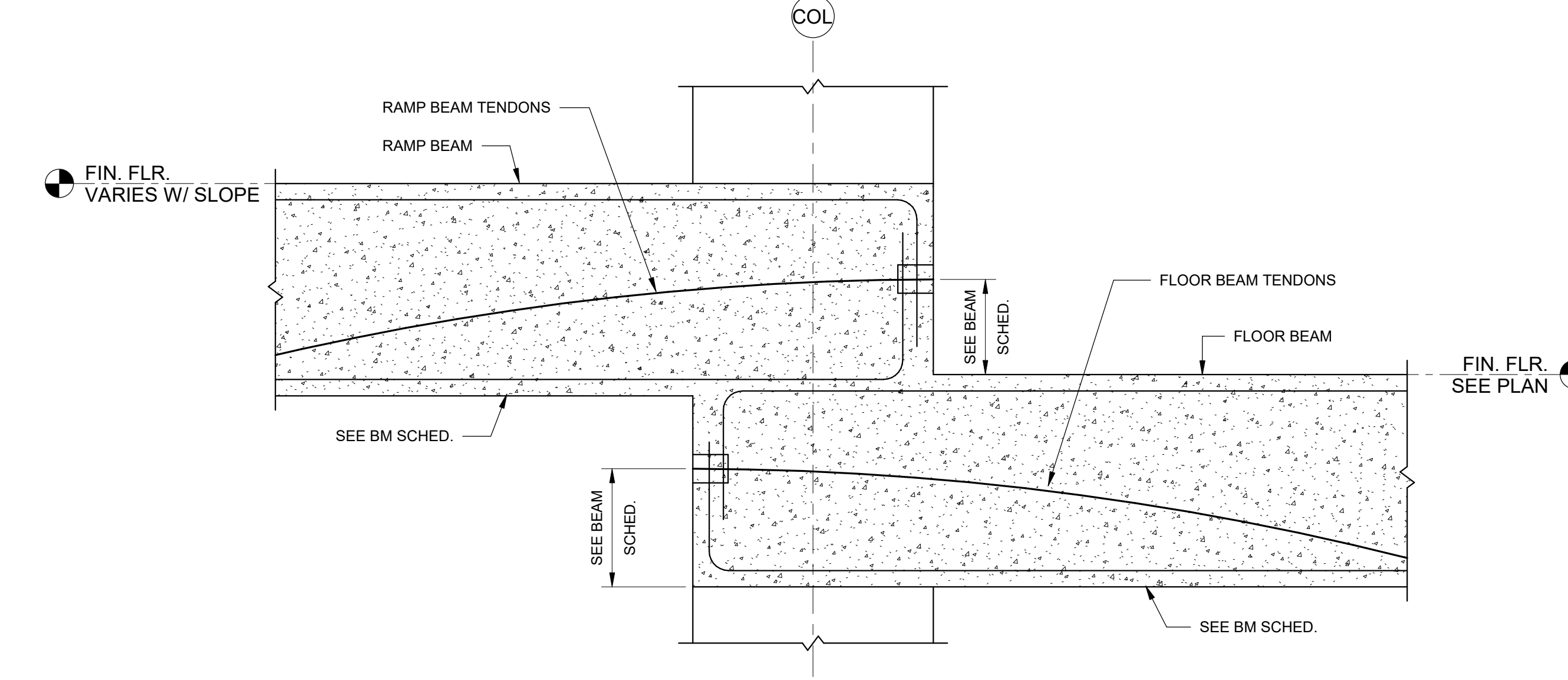
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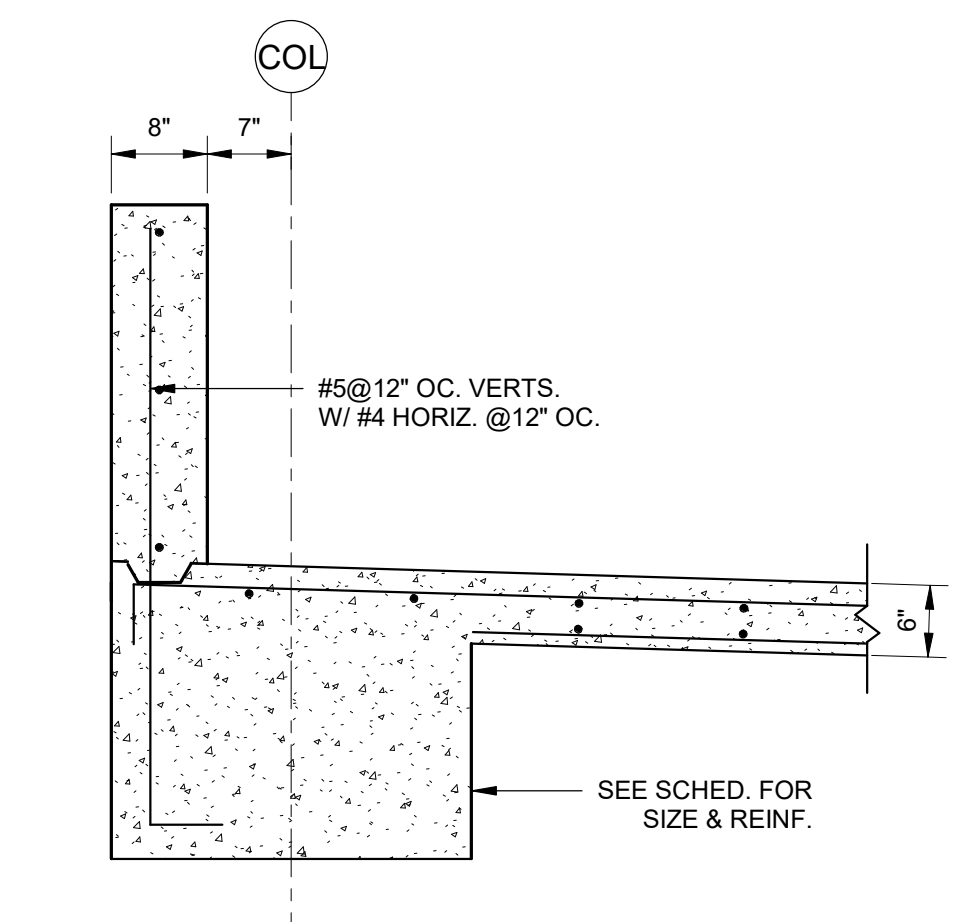
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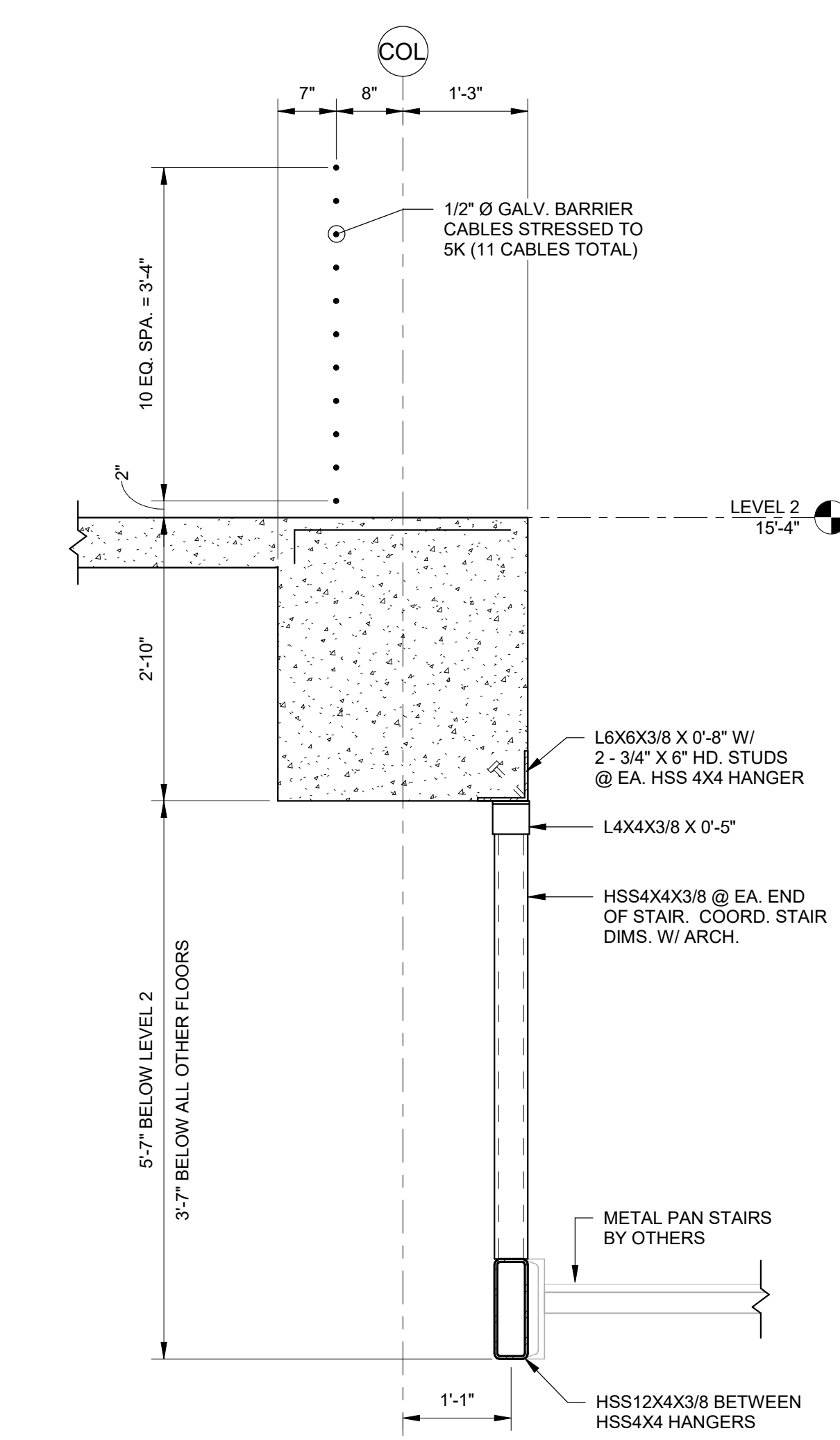
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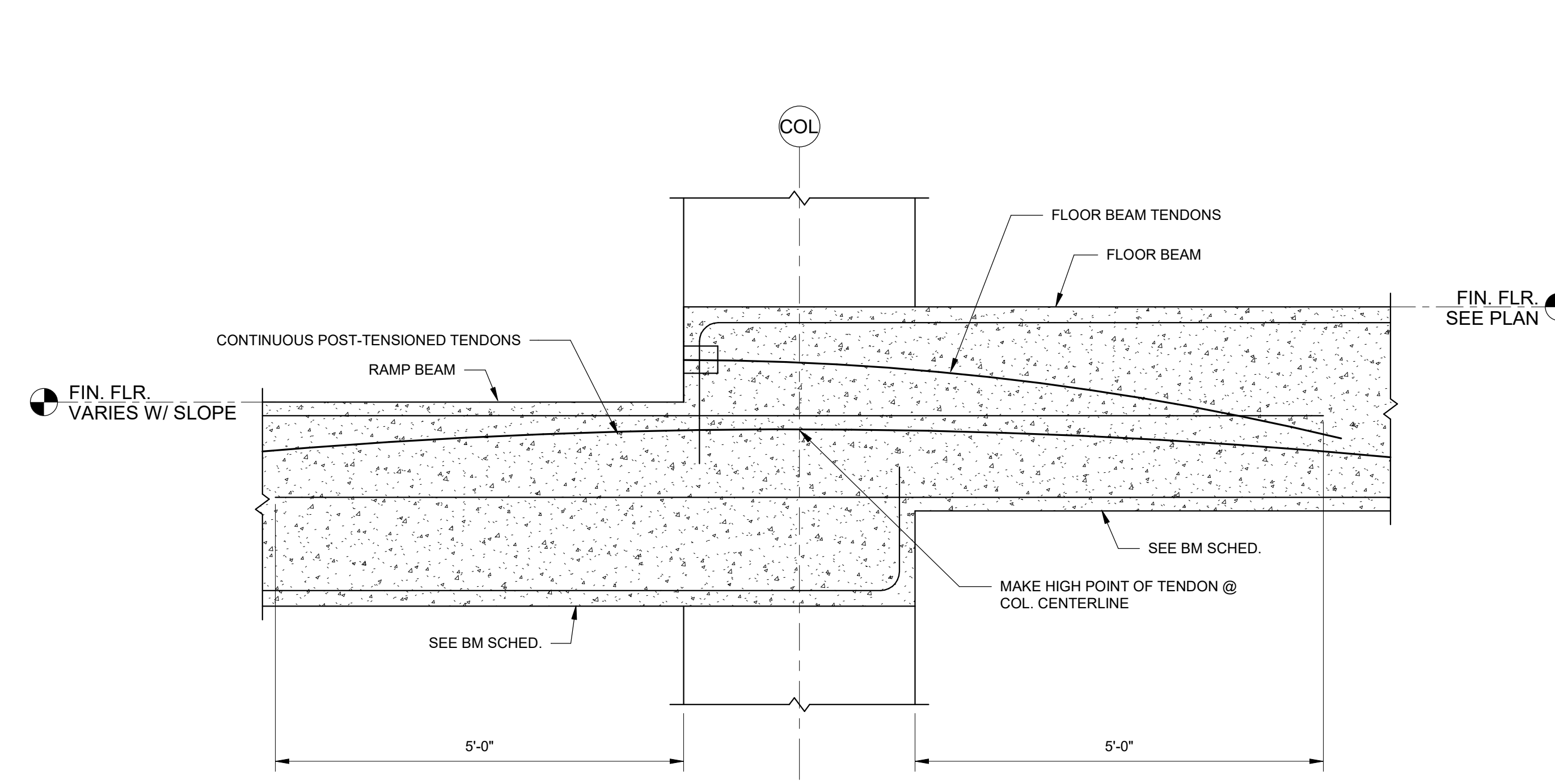
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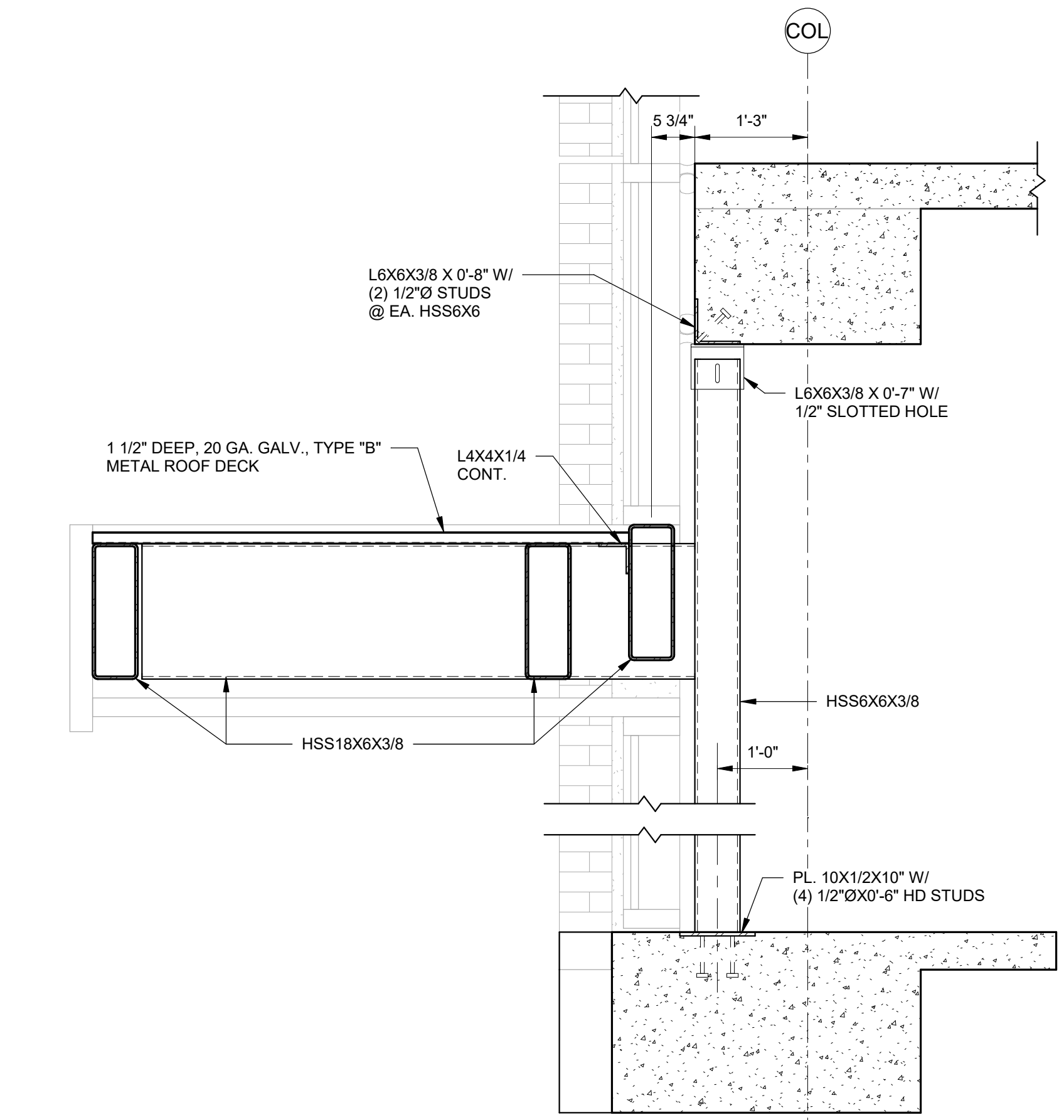
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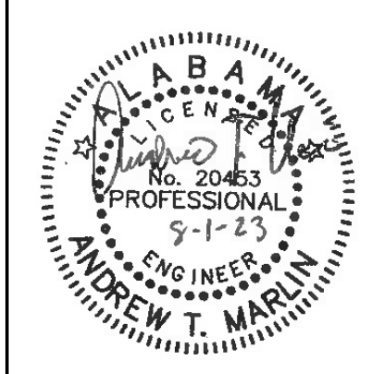
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SECTION 8  
S5.02 3/4" = 1'-0"



SECTION 9  
S5.02 3/4" = 1'-0"



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Revisions	

sheet title	SECTIONS
job no.	4308
des. by	ATM
chkd. by	ATM
date	29
of	156
<b>S5.02</b>	
20 of 20	
date: AUGUST, 01 2023	
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## Code Review Data - City of Mobile

**APPLICABLE CODES:**  
 2021 International Mechanical Code (with local amendments)  
 2021 International Plumbing Code (with local amendments)  
 2021 International Energy Conservation Code (with local amendments)  
 2020 National Electrical Code (with local amendments)  
 2021 International Building Code (with local amendments)  
 2021 International Fire Code  
 2017 ICC/ANSI A117.1

**PARKING STRUCTURE**

**OCCUPANCY TYPE:** OCCUPANCY: LOW-HAZARD STORAGE, GROUP S-2  
 [2021 IBC; 311.3.1]

**CONSTRUCTION TYPE:** TYPE IB SPRINKLERED, UNPROTECTED  
 [2021 IBC; TABLE 406.5.4]

**OCCUPANT LOAD:** 200 GSF PER OCCUPANT  
 [2021 IBC; TABLE 1004.5]

**OCCUPANT LOAD: (CALCULATED GROSS FLAT FLOOR AREA + RAMP TO NEXT LEVEL)**  
 LEVEL ONE: 76,478 GSF / 200 GSF PER OCCUPANT = 383 OCCUPANTS  
 LEVEL TWO: 69,700 GSF / 200 GSF PER OCCUPANT = 349 OCCUPANTS  
 LEVEL THREE: 69,700 GSF / 200 GSF PER OCCUPANT = 349 OCCUPANTS  
 LEVEL FOUR: 69,700 GSF / 200 GSF PER OCCUPANT = 349 OCCUPANTS  
 LEVEL FIVE: 69,700 GSF / 200 GSF PER OCCUPANT = 349 OCCUPANTS  
 LEVEL SIX: 51,340 GSF / 200 GSF PER OCCUPANT = 257 OCCUPANTS  
 TOTAL = 2,036 OCCUPANTS

**EGRESS WIDTH REQUIRED:** 349 OCCUPANTS @ .30 INCHES PER OCCUPANT (LARGEST FLOOR SERVED BY STAIR)  
 = 105' REQUIRED TOTAL EXIT WIDTH AT LARGEST FLOOR. 4 EXITS PER FLOOR = 31' INCHES REQUIRED EXIT WIDTH AT EACH  
 4 EXITS ARE PROVIDED AT EACH FLOOR, EACH 4'-0" WIDE (48')

**MINIMUM NUMBER OF EXITS:** 2 PER STORY  
 [2021 IBC; TABLE 1006.3.3]  
 4 EXITS PER STORY PROVIDED

**MAXIMUM TRAVEL DISTANCE TO EXIT:** 400 FEET With Sprinkler  
 [2021 IBC; TABLE 1017.2]

**HEIGHT LIMIT:** 160 FEET 18 TIERS  
 [2021 IBC; TABLE 406.5.4 AND TABLE 504.3]

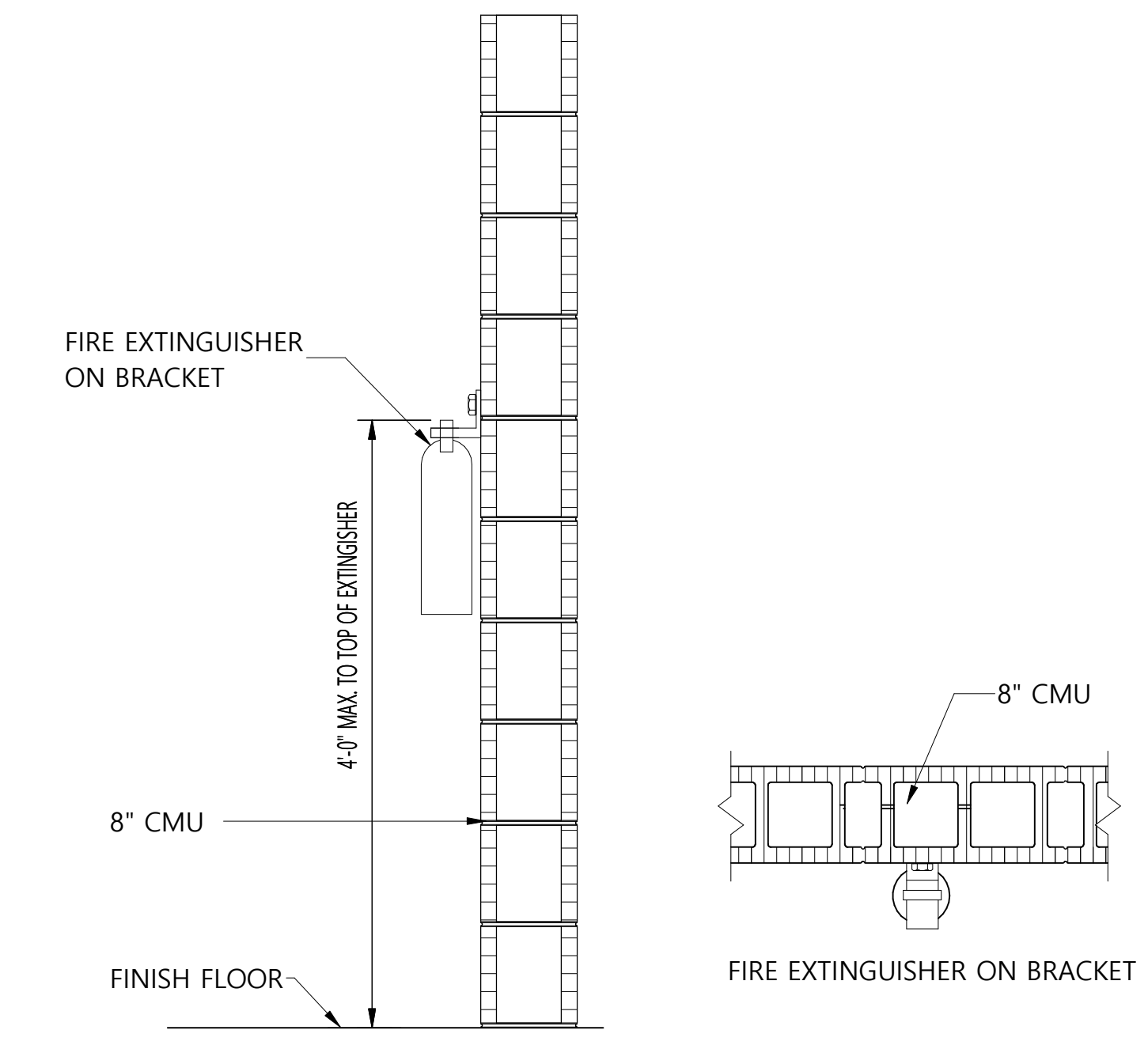
**AREA LIMIT PER TIER:** UNLIMITED  
 [2021 IBC; TABLE 406.5.4]

**ENCLOSURE OF VERTICAL OPENINGS:** NOT REQUIRED  
 [2021 IBC; TABLE 406.5.9]

**BUILDING SIZE:** (CALCULATED GROSS FLAT FLOOR AREA + RAMP TO NEXT LEVEL)  
 LEVEL ONE: 76,478 GSF (INCLUDES AREA BELOW RAMP)  
 LEVEL TWO: 69,700 GSF  
 LEVEL THREE: 69,700 GSF  
 LEVEL FOUR: 69,700 GSF  
 LEVEL FIVE: 69,700 GSF  
 LEVEL SIX: 51,340 GSF  
 TOTAL: 406,618 GSF

**PARKING SUMMARY:**  
 LEVEL ONE: 152  
 LEVEL TWO: 183  
 LEVEL THREE: 183  
 LEVEL FOUR: 186  
 LEVEL FIVE: 183  
 LEVEL SIX: 151  
 TOTAL = 1,038

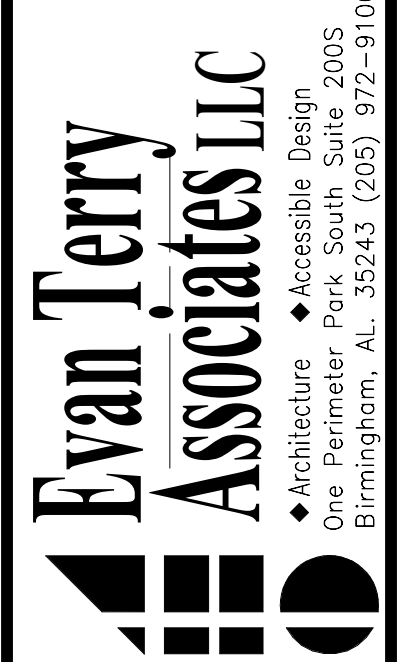
ACCESSIBLE SPACES REQUIRED = 2% OF TOTAL SPACES  
 21 SPACES REQUIRED  
 36 SPACES PROVIDED  
 12 VAN SPACES PROVIDED



**Typ. F.E.B. Detail**  
 SCALE: 1"=1'-0" IN A NON-RATED WALL

# Mobile Civic Center Parking Facility

Mobile, Alabama



Revisions	

sheet title	
CODE INFORMATION	
job no.	<b>4308</b>
desn. by	ETA
chkd. by	<b>030</b>
KING	of 154
sheet no.	<b>A0.01</b>
of 75	
date August 5, 2023	
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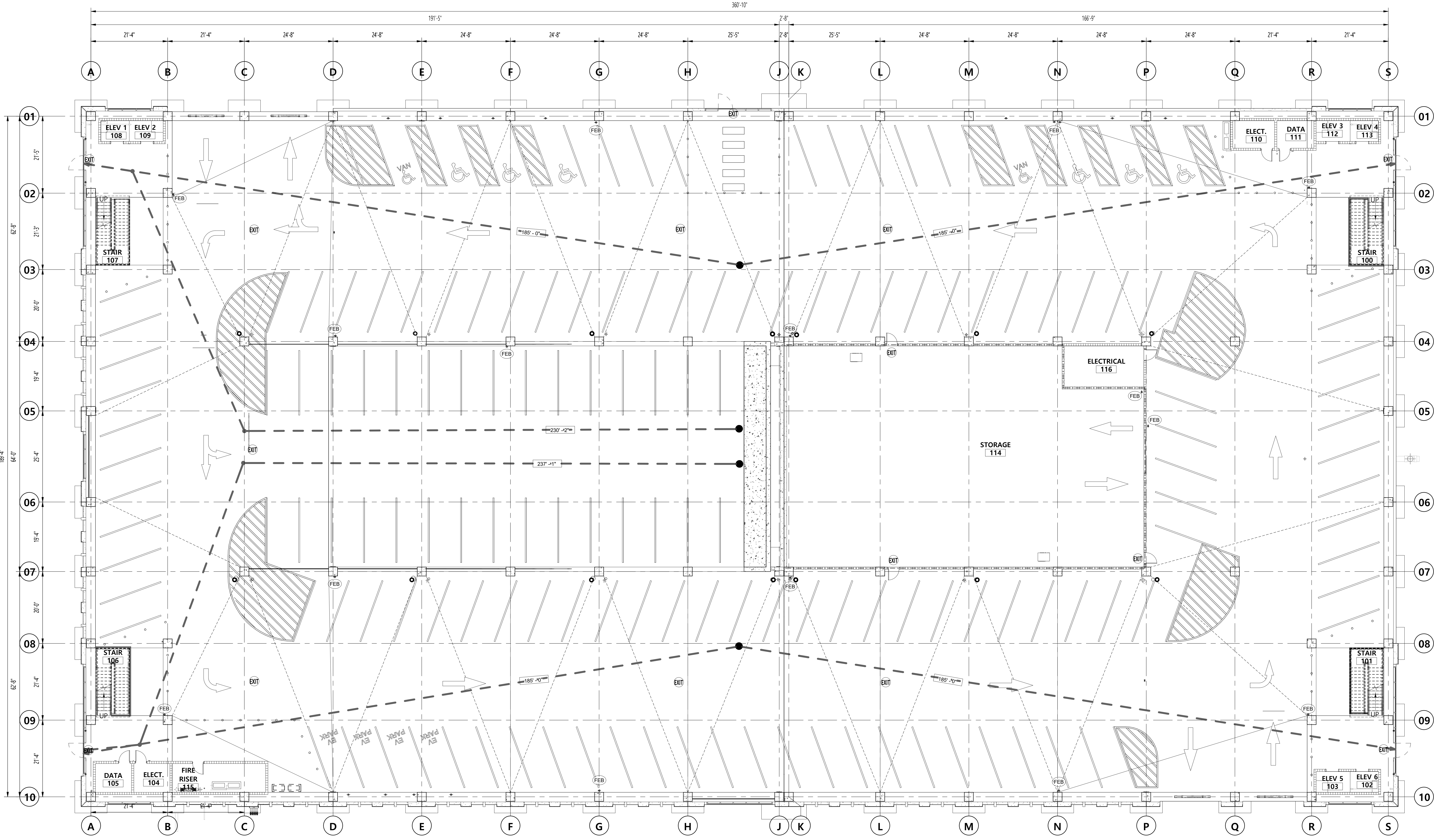
# Mobile Civic Center Parking Facility

Mobile, Alabama



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Birmingham, AL 35243 (205) 972-9100

sheet title	LIFE SAFETY PLAN - OVERALL
JOB no.	4308
Drawn by	ETA
Checked by	KING
Date	August 5, 2023
Scale	1/8" = 1'-0"
Sheet no.	A1.10
Total sheets	75



## Life Safety Plan - Level 1

SCALE: 3/32" = 1'-0"

Life Safety Legend	
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	ONE HOUR RATED
	FIRE EXTINGUISHER ON BRACKET
	EXIT SIGN
	81'-5" TRAVEL DISTANCE
	EXIT ROUTE

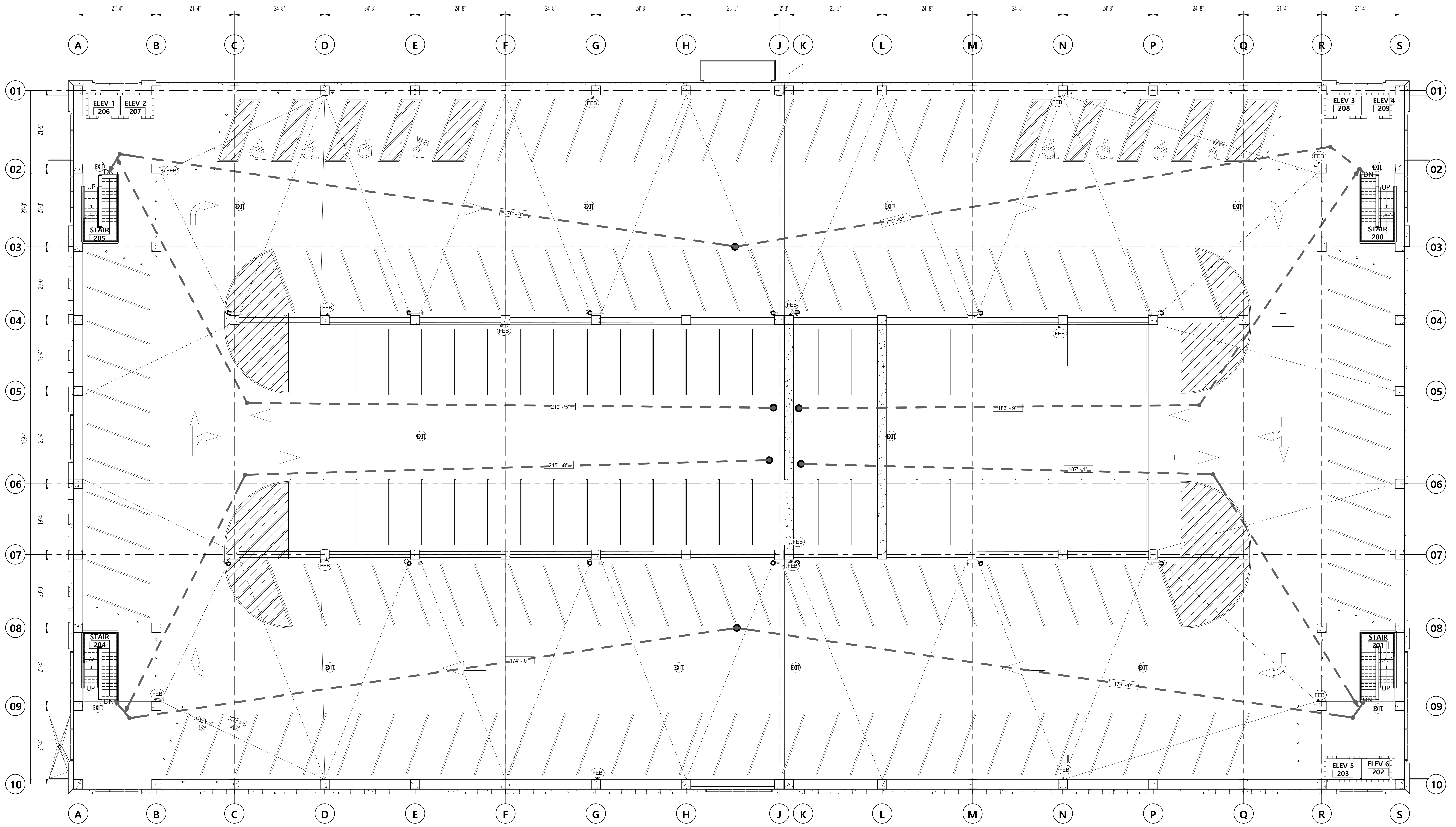
# Mobile Civic Center Parking Facility

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Revisions	
sheet title	LIFE SAFETY PLAN - LEVEL 2 - OVERALL
job no.	4308
des. by	ETA
chk. by	KING
date	August 5, 2023
sheet no.	A1.20
of	75



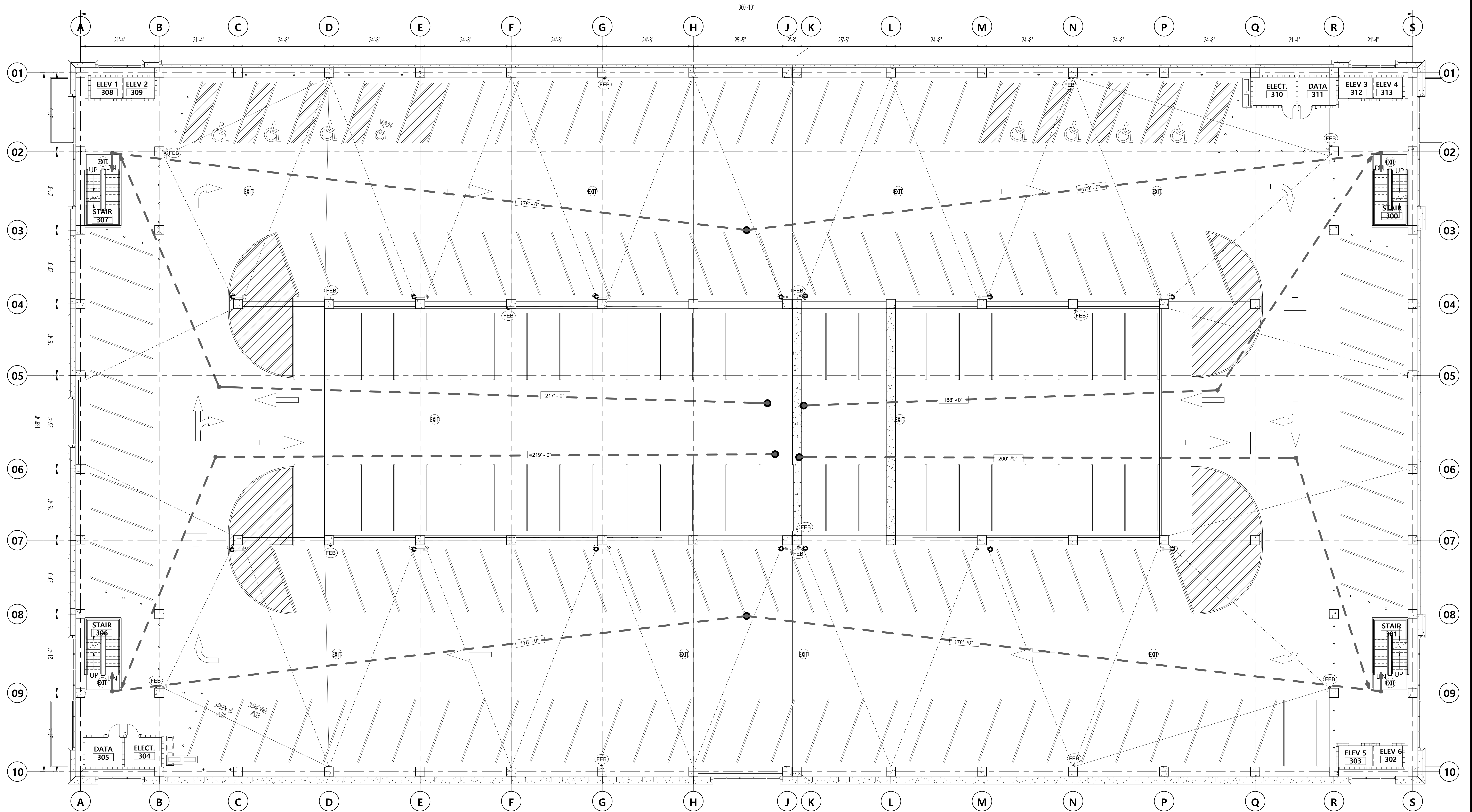
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	ONE HOUR RATED
	FIRE EXTINGUISHER ON BRACKET
	EXIT SIGN
	TRAVEL DISTANCE
	EXIT ROUTE

## Life Safety Plan - Level 2

SCALE: 3/32" = 1'-0"

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**Life Safety Plan - Level 3**  
 SCALE: 3/32" = 1'-0"

Life Safety Legend	
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	ONE HOUR RATED
	FIRE EXTINGUISHER ON BRACKET
	EXIT SIGN
	TRAVEL DISTANCE
	EXIT ROUTE

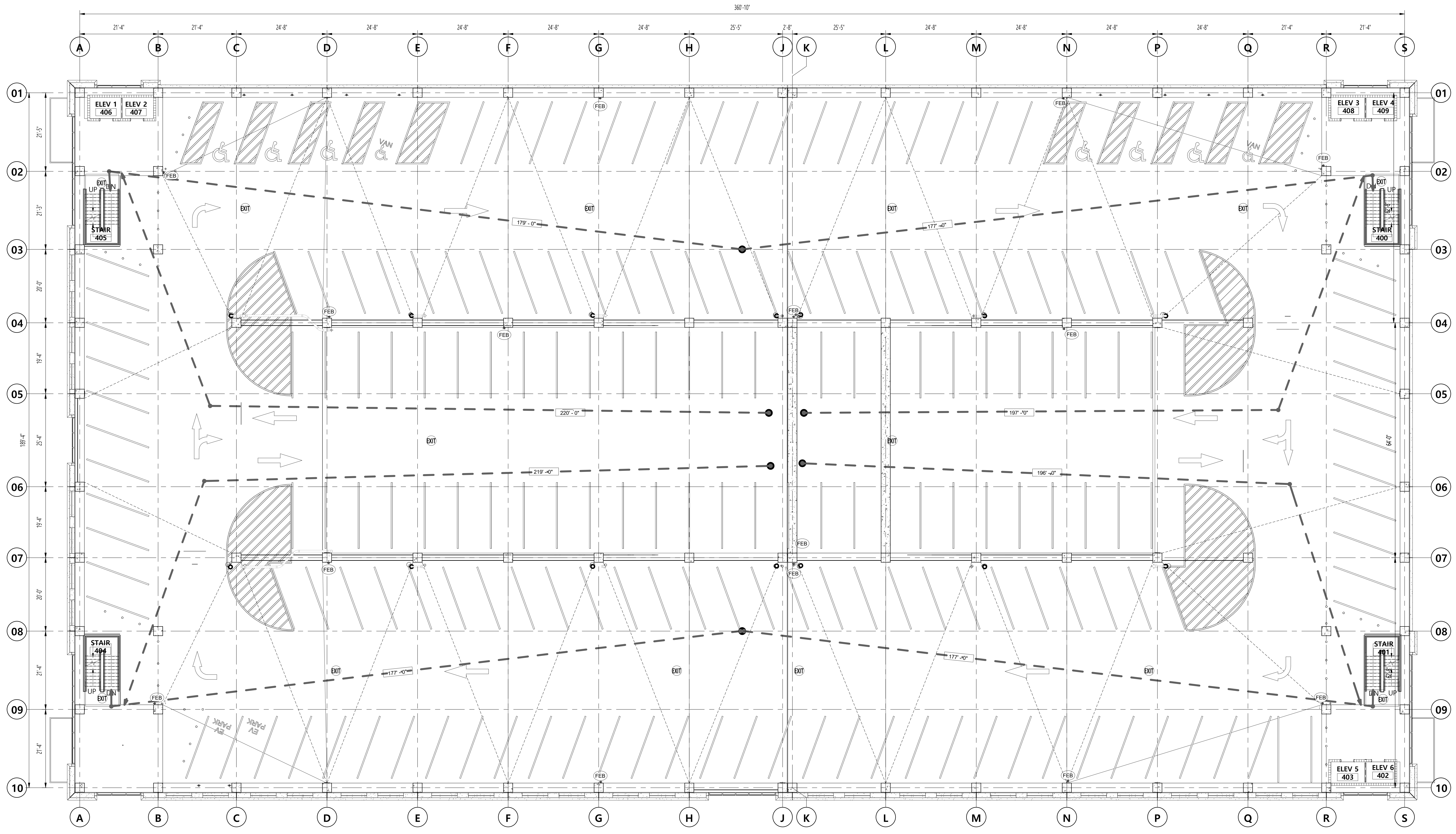
**Mobile Civic Center  
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Revisions	
sheet title	LIFE SAFETY PLAN - LEVEL 3 - OVERALL
job no.	4308
des. by	ETA
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date	August 5, 2023
draw. no.	A1.30
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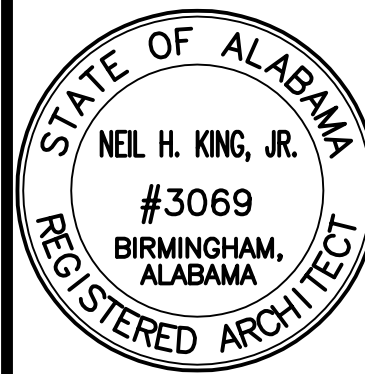
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SCALE: 3/32" = 1'-0"

Life Safety Legend	
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	TRAVEL DISTANCE
	EXIT ROUTE

## Mobile Civic Center Parking Facility

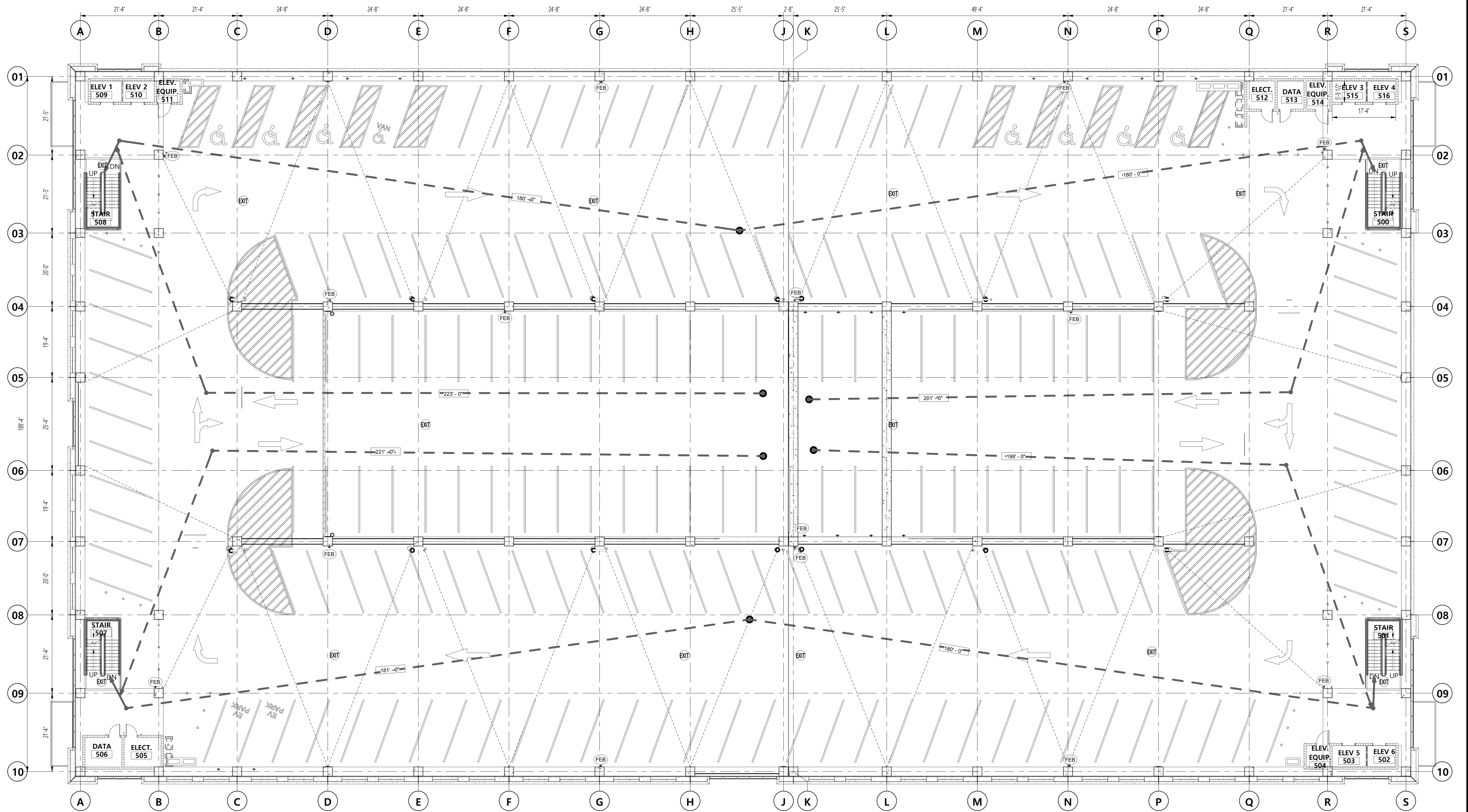
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Revisions	sheet title
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JOB no. <b>4308</b>	DATE
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Checked by KING	of 75
<b>A1.40</b>	DATE August 5, 2023
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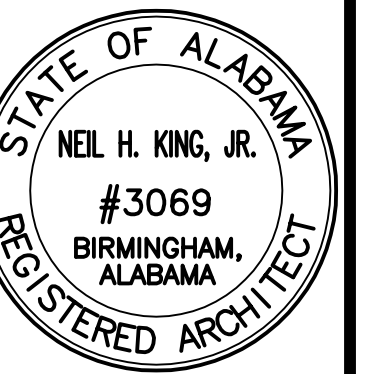
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SCALE: 3/32" = 1'-0"

Life Safety Legend	
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	TRAVEL DISTANCE
	EXIT ROUTE

## Mobile Civic Center Parking Facility

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Checked by	<b>035</b>
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	of 75
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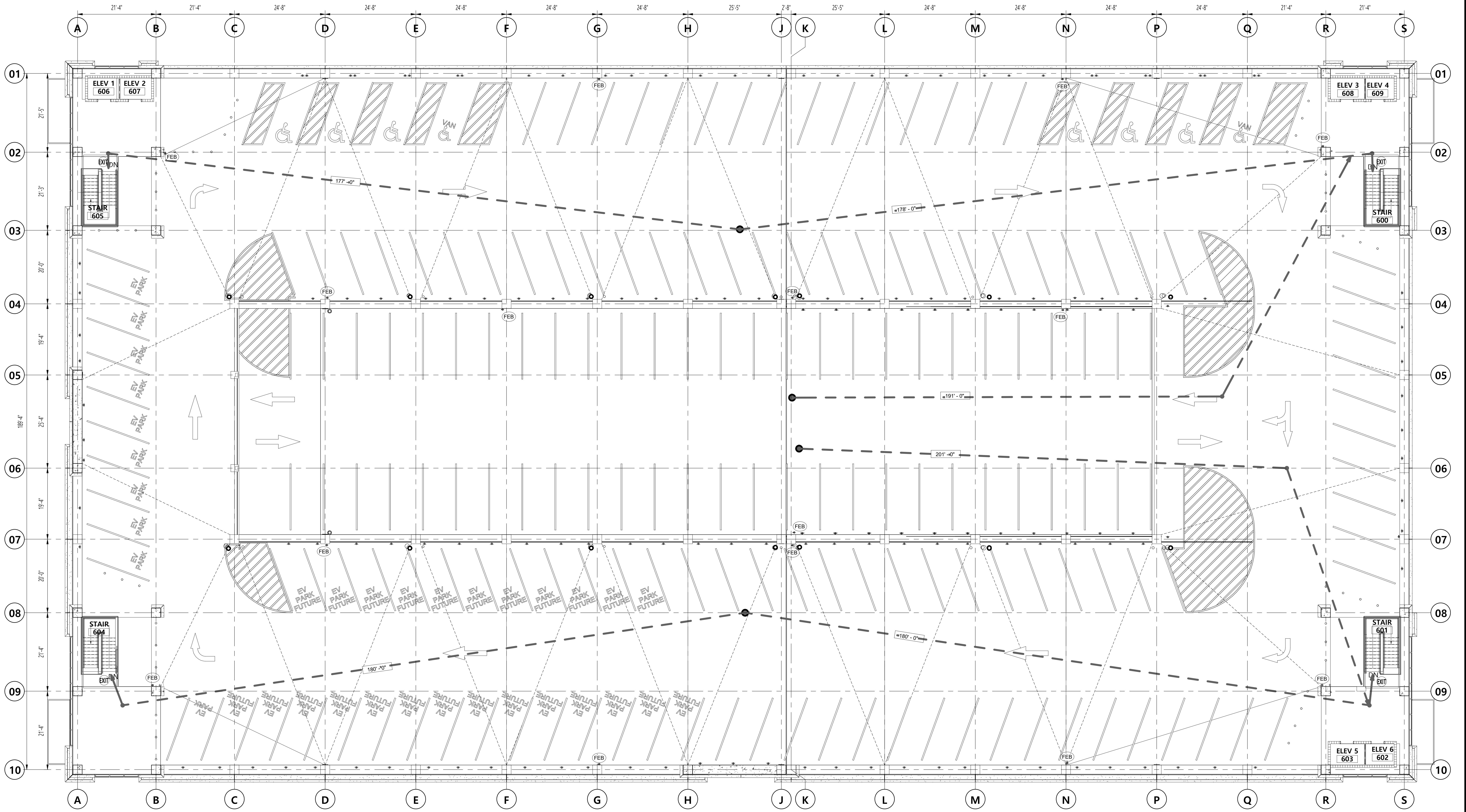
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Revisions	
sheet title	LIFE SAFETY PLAN - LEVEL 6 - OVERALL
JOB no.	4308
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Scale	036 of 154
Sheet no.	A1.60 of 75
Date	August 5, 2023
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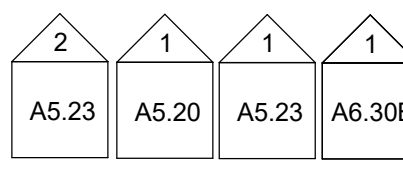
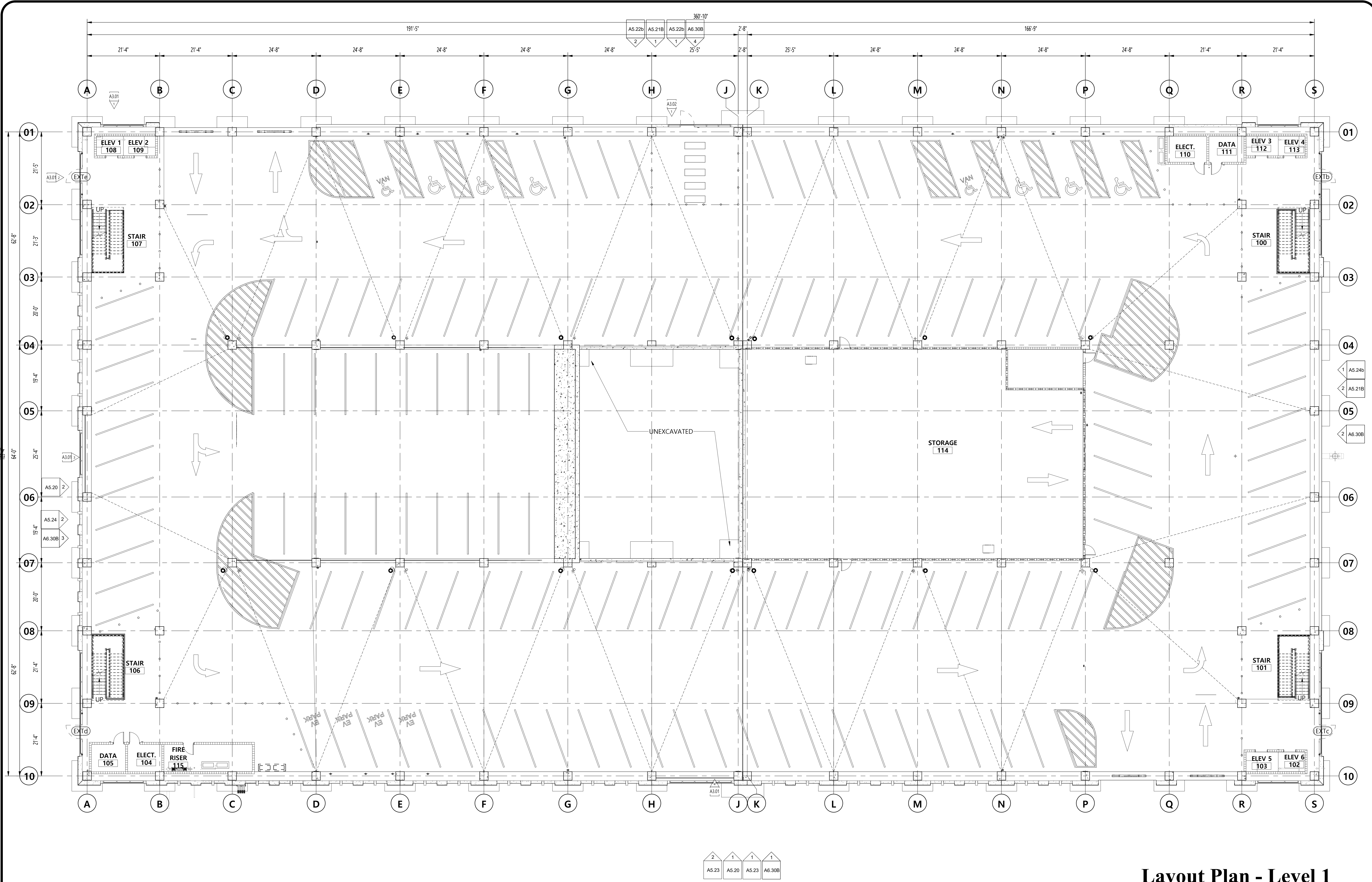
## Life Safety Plan - Level 6

SCALE: 3/32" = 1'-0"

### Life Safety Legend

- NON RATED
- ONE HOUR RATED
- FIRE EXTINGUISHER ON BRACKET
- EXIT SIGN
- TRAVEL DISTANCE
- EXIT ROUTE

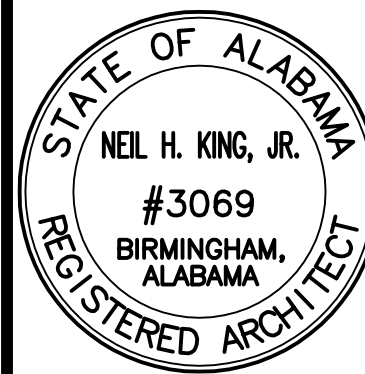




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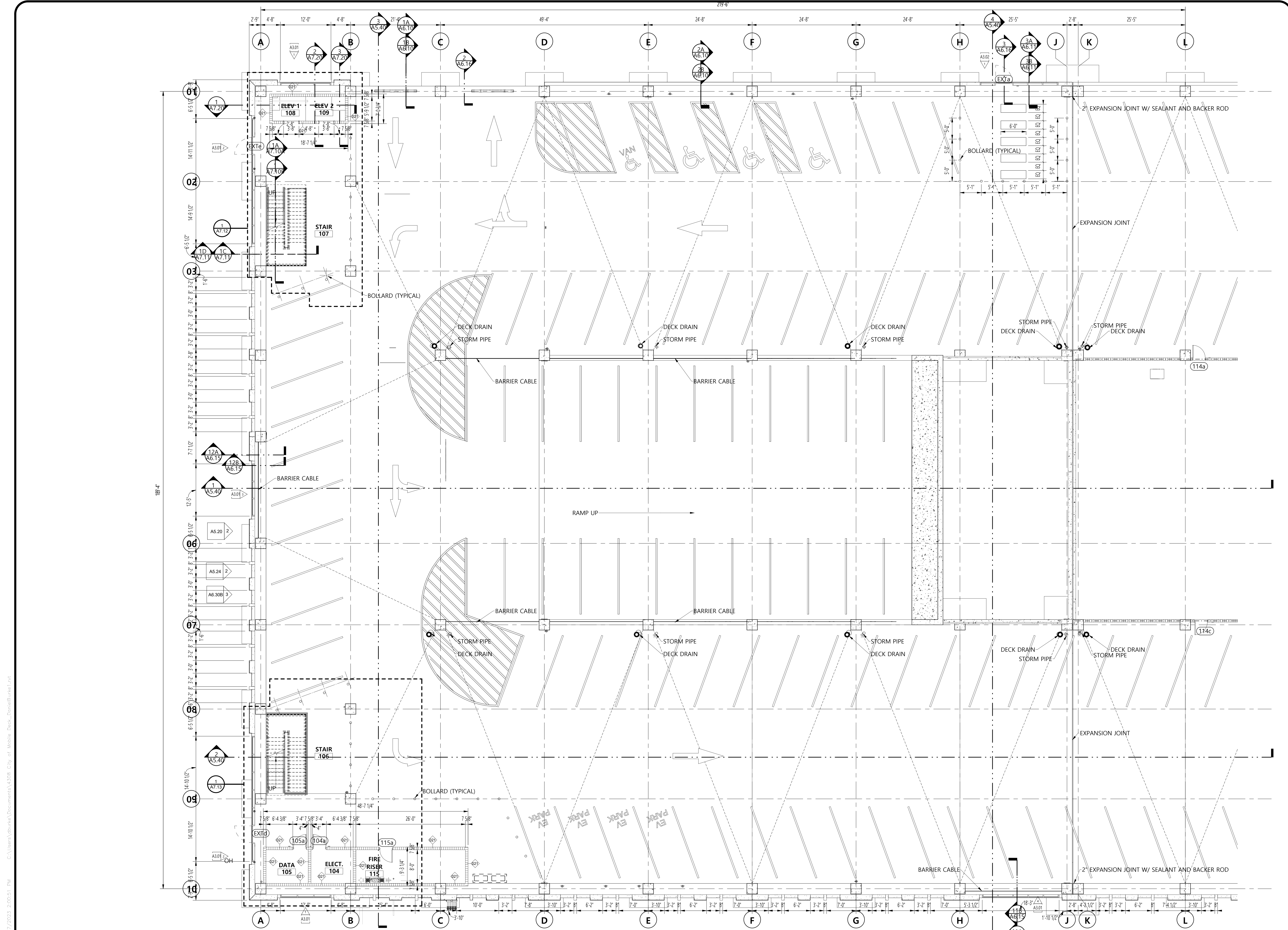
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sheet title	LAYOUT PLAN - LEVEL 1 - OVERALL
job no.	4308
des. by	ETA
chk. by	KING
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sheet no.	A2.10
of	75
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**Layout Plan - Level 1 - Part A**  
 SCALE: 1/8" = 1'-0"

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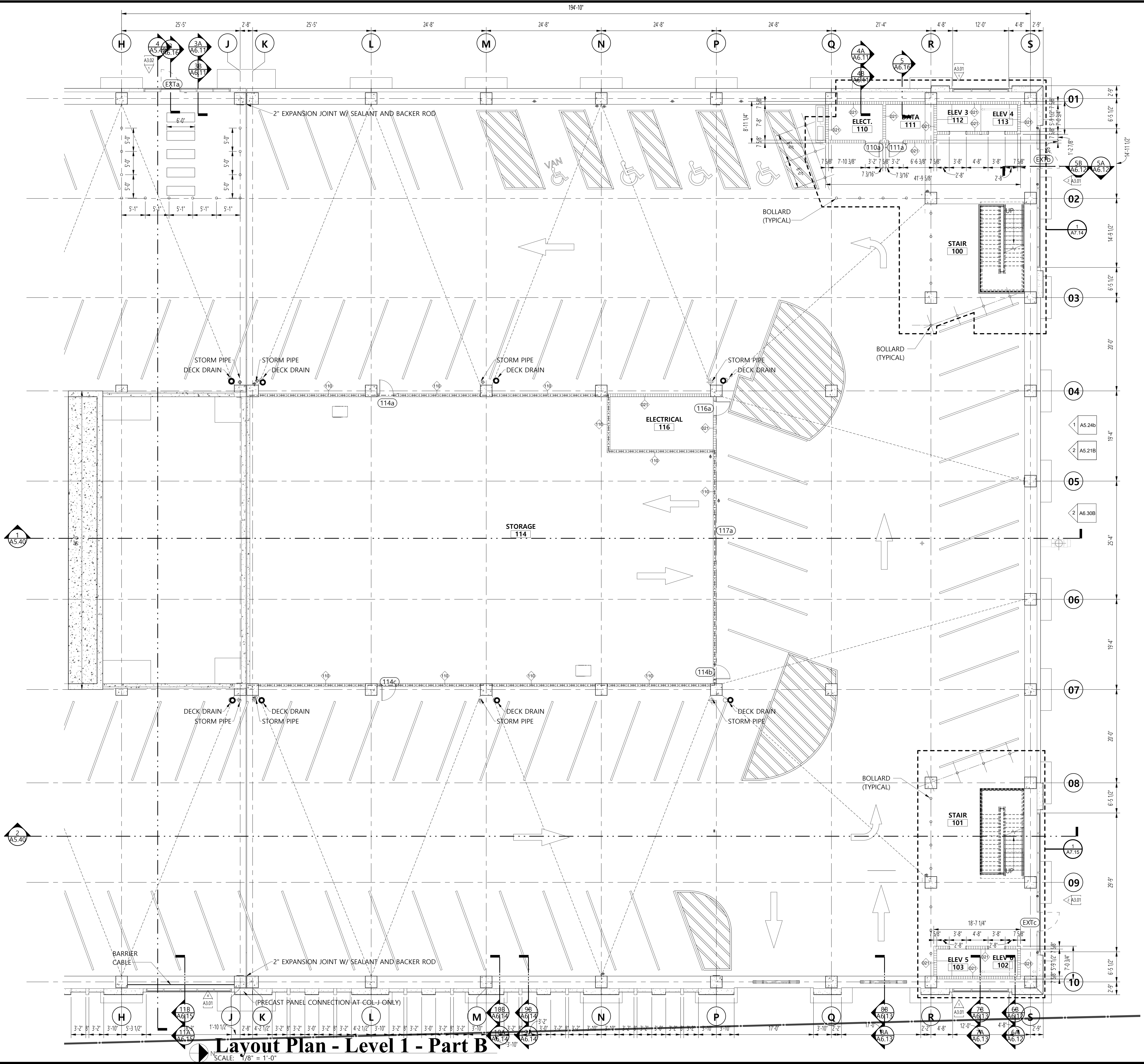


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Revisions	sheet title
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proj. no.	4308
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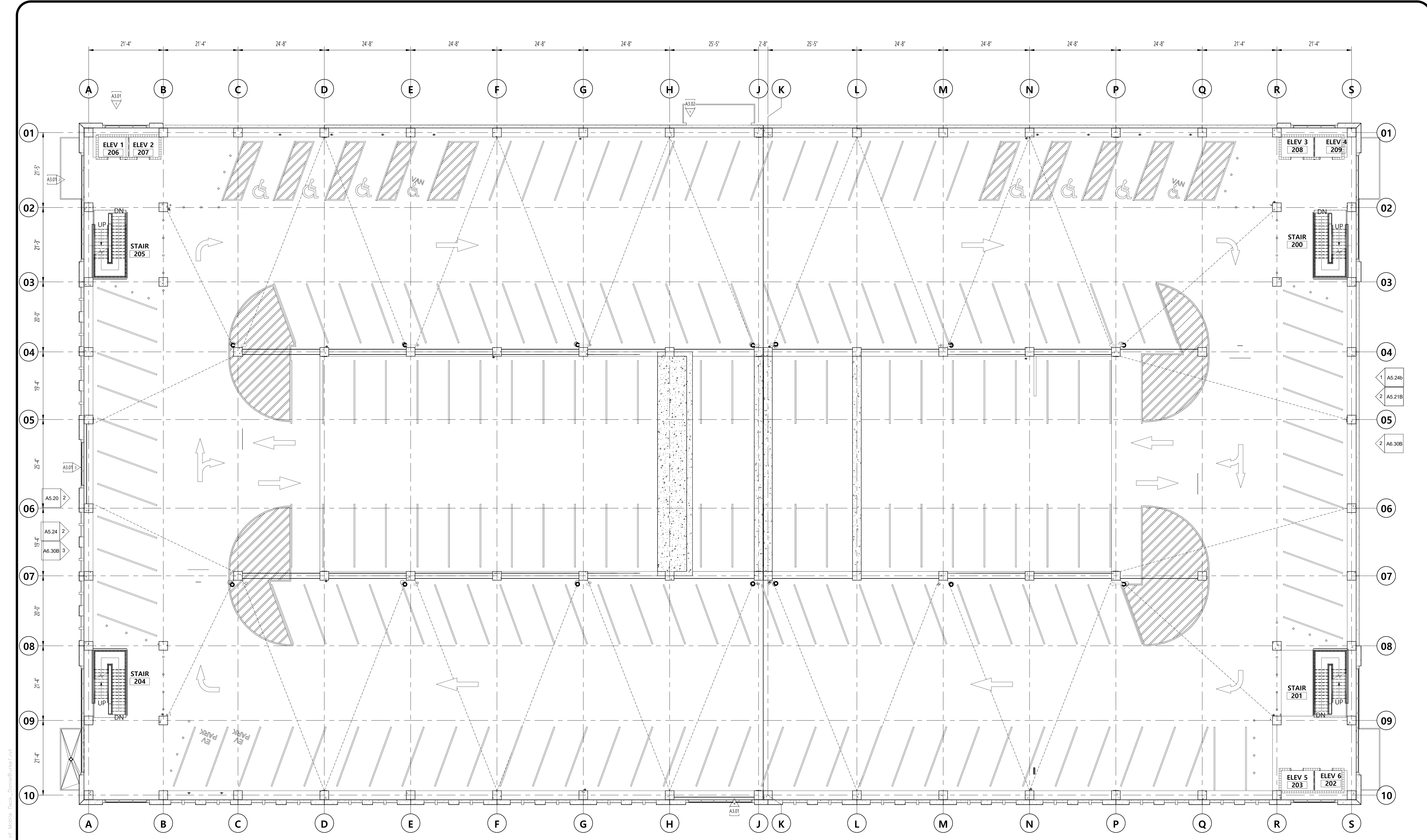
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	Date	August 5, 2023
	Project No.	A2.12
	Sheet No.	of 75
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**Layout Plan - Level 2**  
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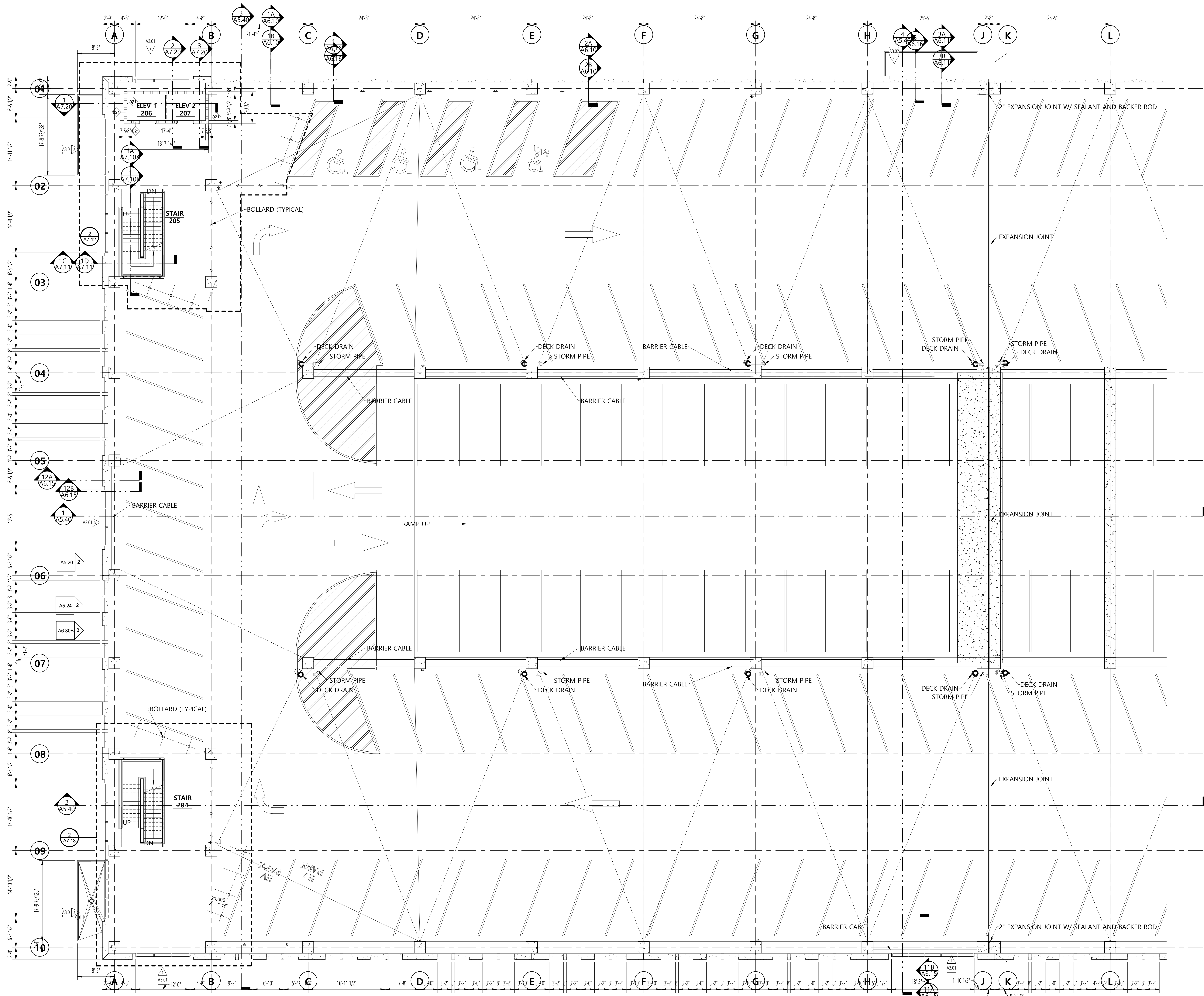
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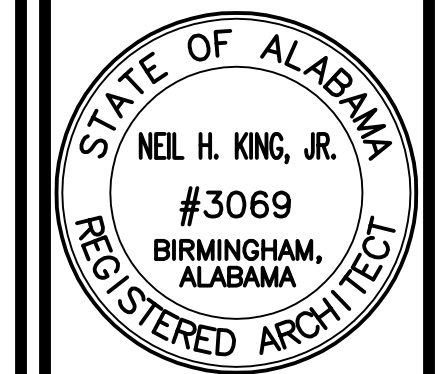
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of	75
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**Layout Plan - Level 2 - Part A**  
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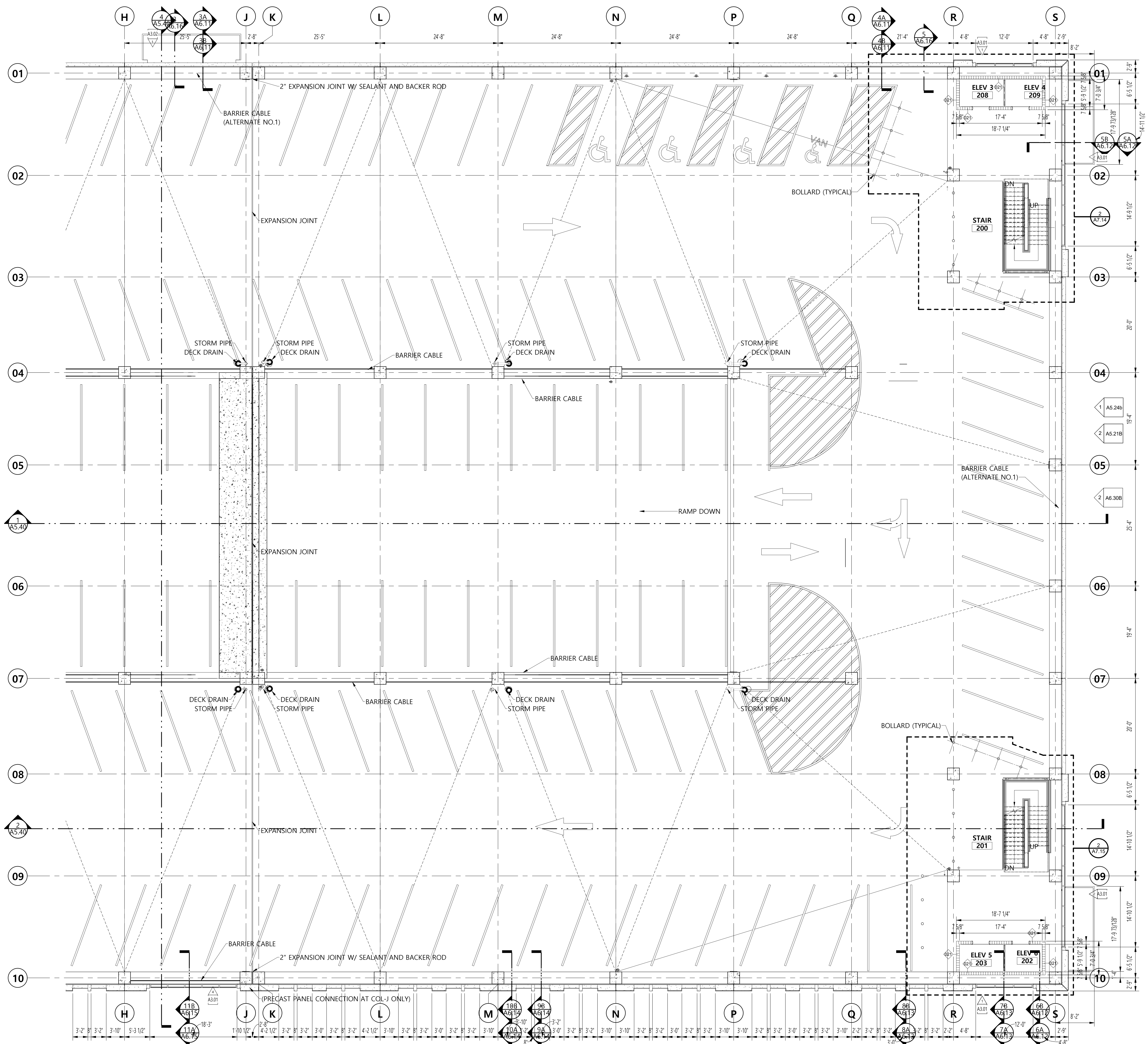
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Revisions	sheet title
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sheet no.	<b>A2.21</b> of 75
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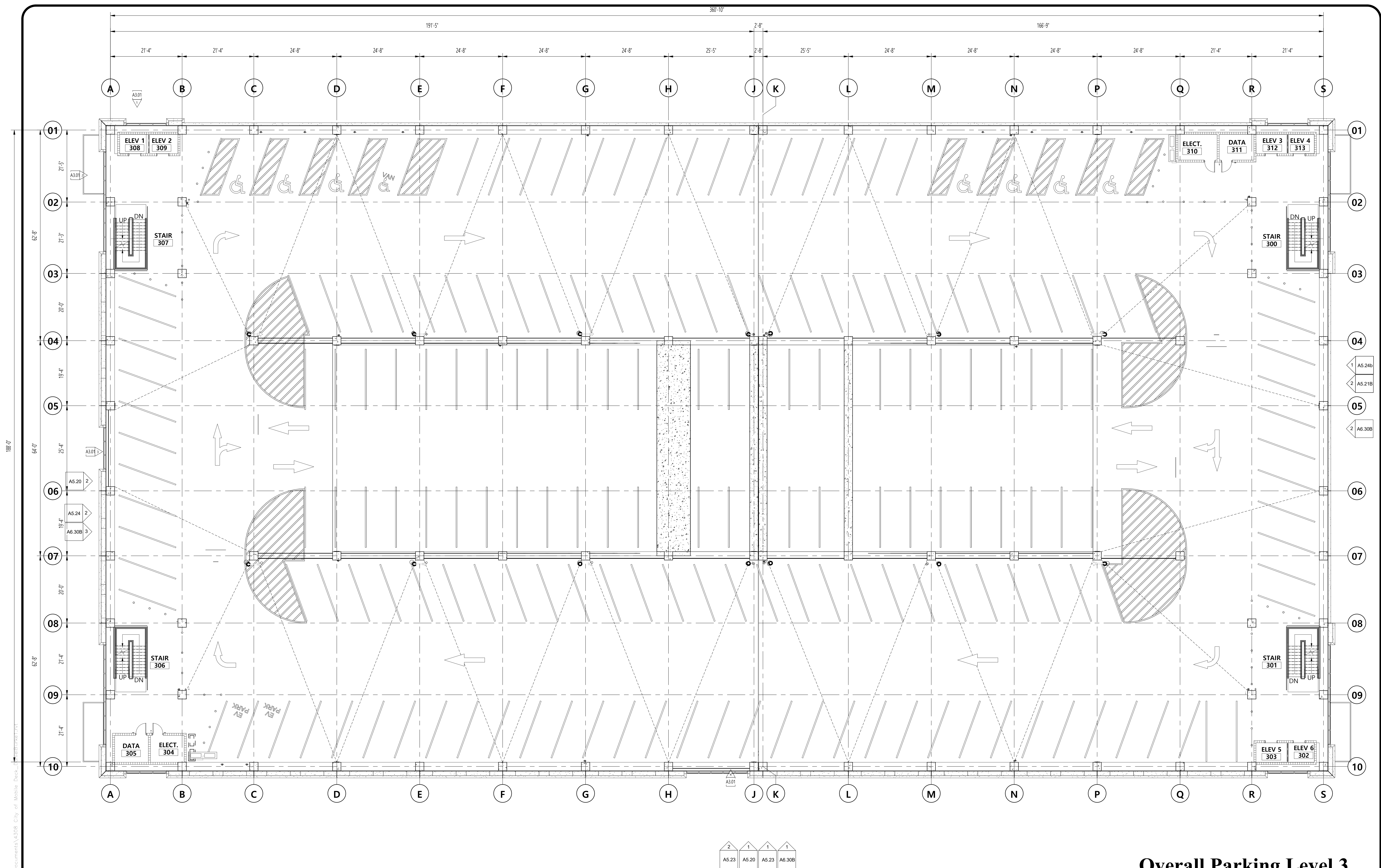
**Layout Plan - Level 2 - Part B**  
 SCALE: 1/8" = 1'-0"

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Revisions	Sheet Title
	LAYOUT PLAN - LEVEL 2 - PART B
Job No.	4308
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Date	042
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	of 75
Date	August 5, 2023
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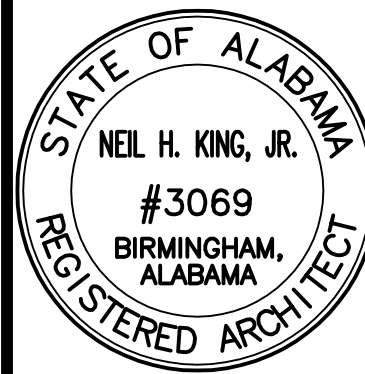


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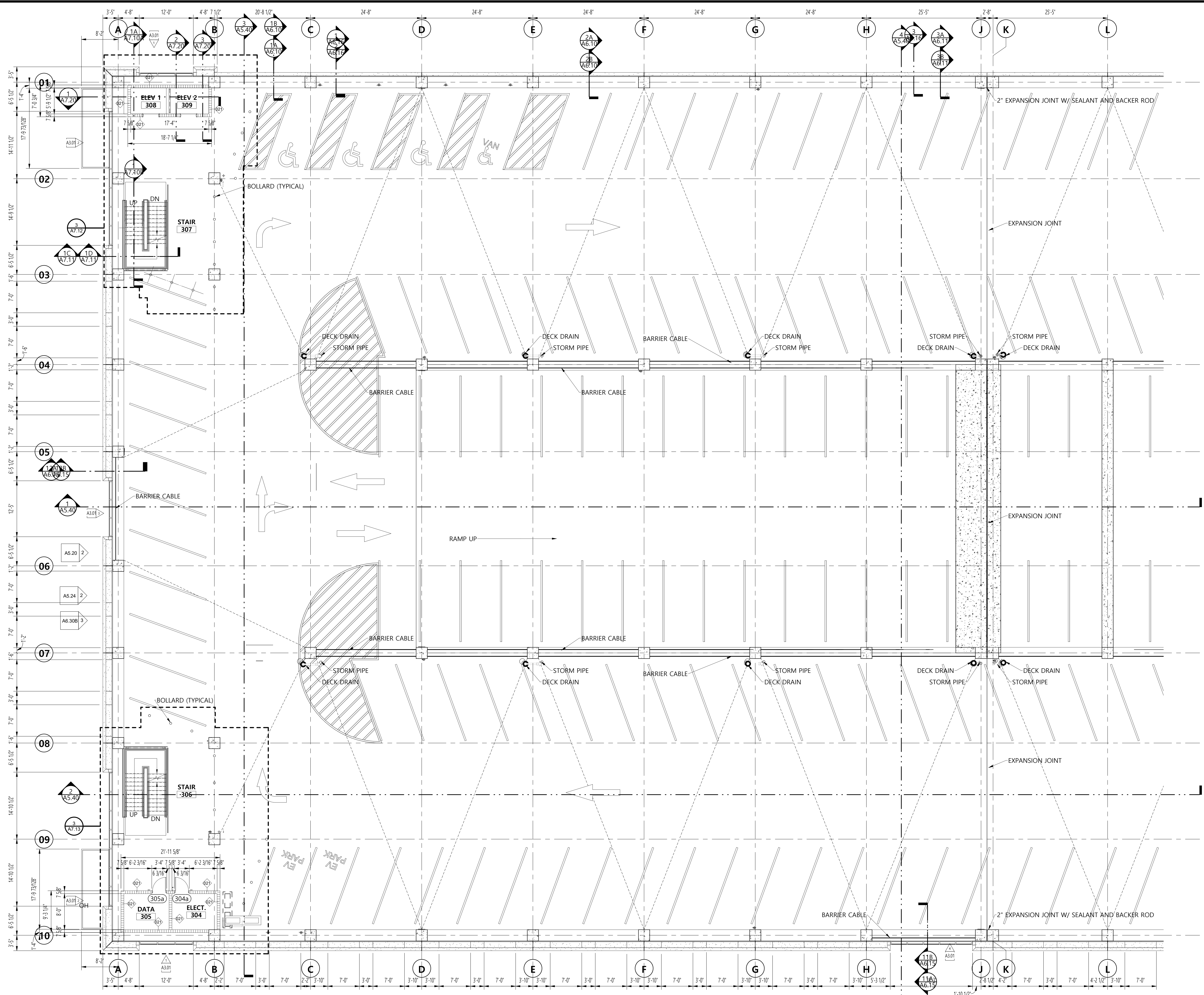
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sheet title	LAYOUT PLAN - LEVEL 3 - OVERALL
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**Layout Plan - Level 3 - Part A**  
 SCALE: 1/8" = 1'-0"

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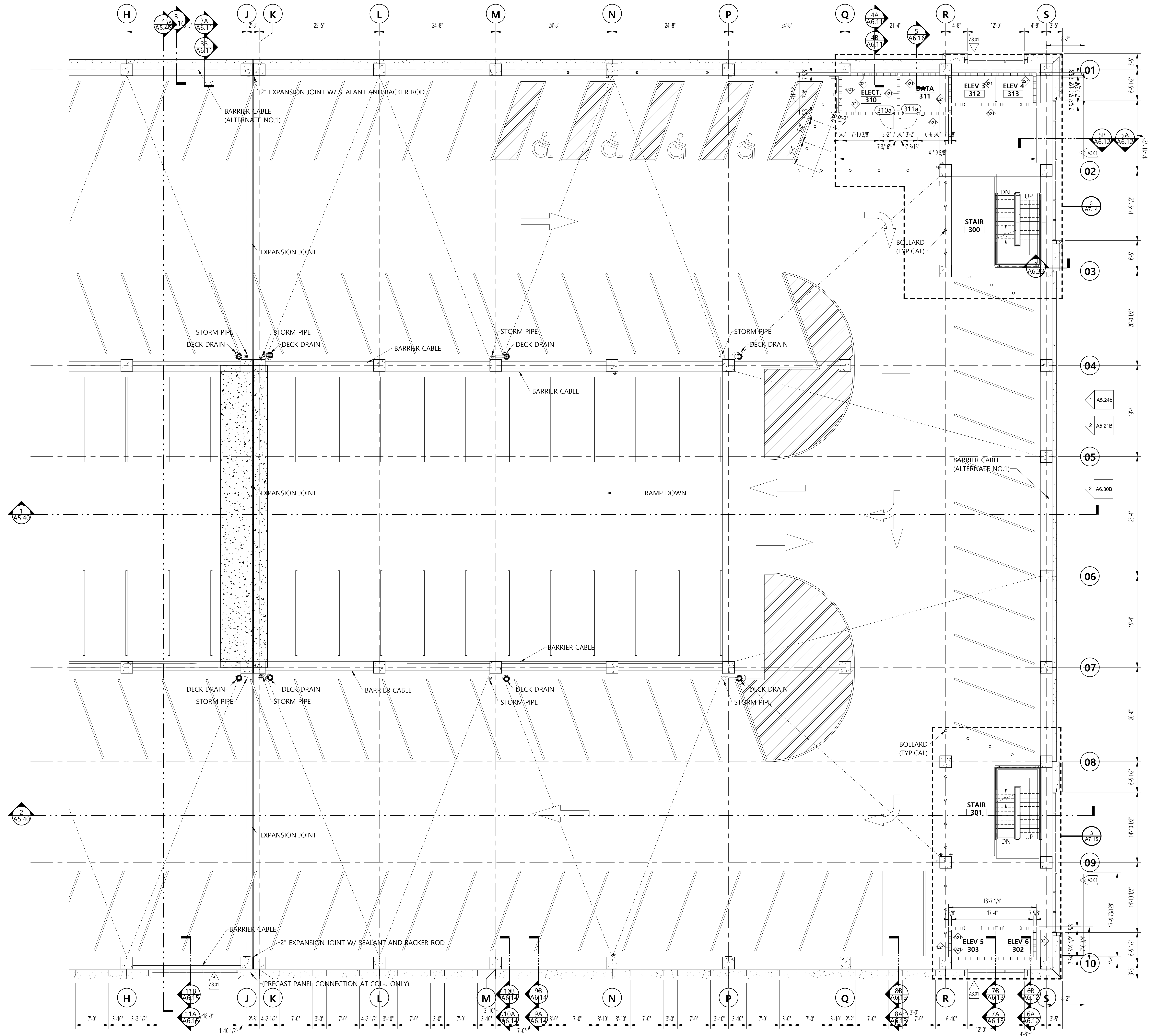


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Revisions	
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of	75
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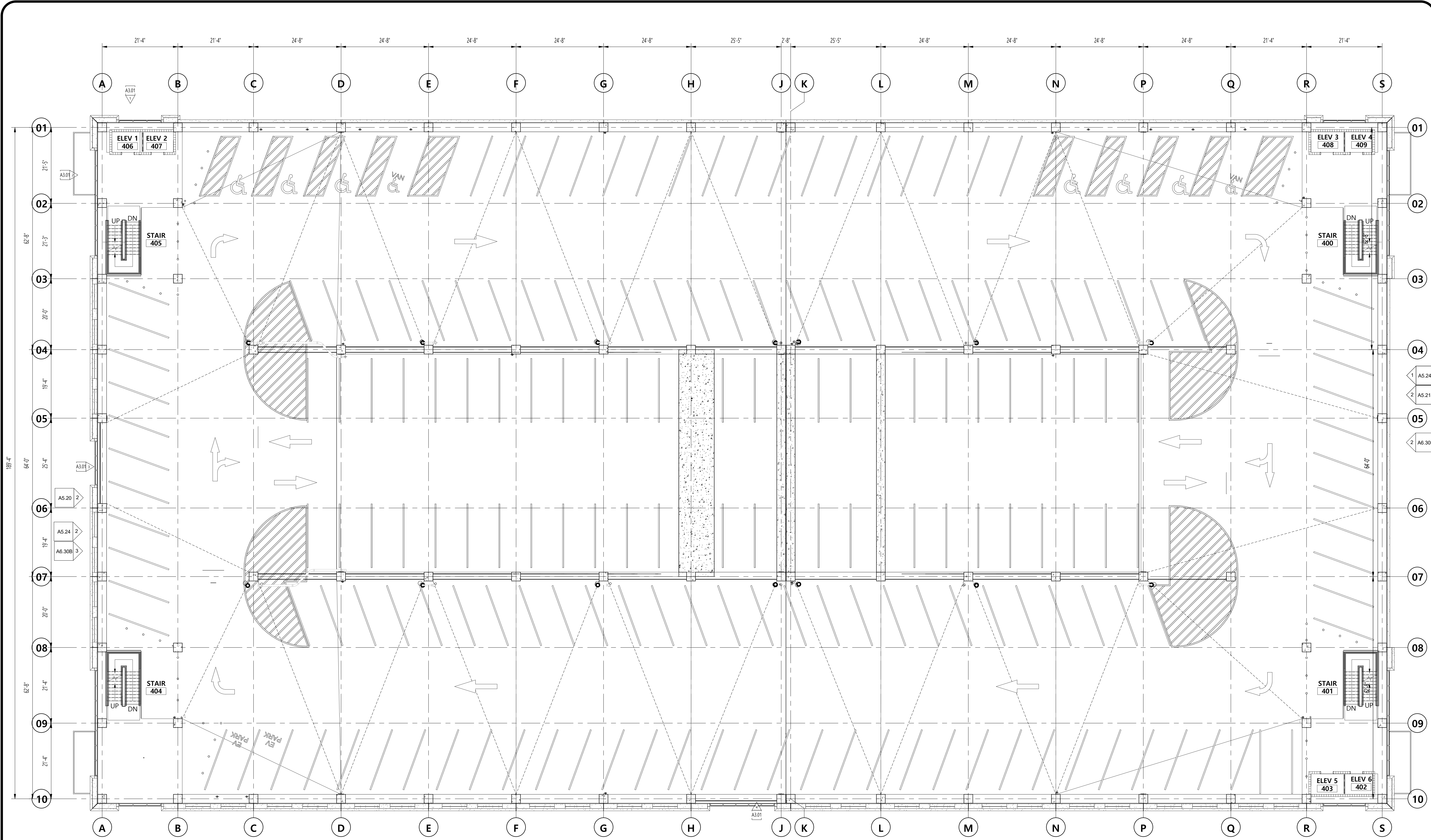
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	LAYOUT PLAN - LEVEL 3 - PART B

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Date	August 5, 2023
Sheet No.	A2.32
of	75

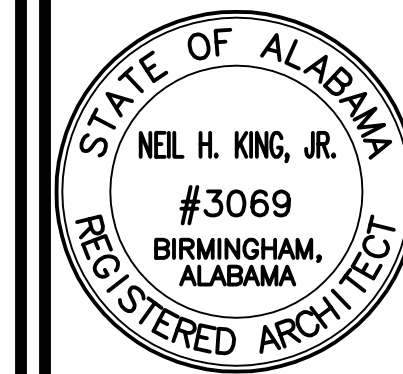


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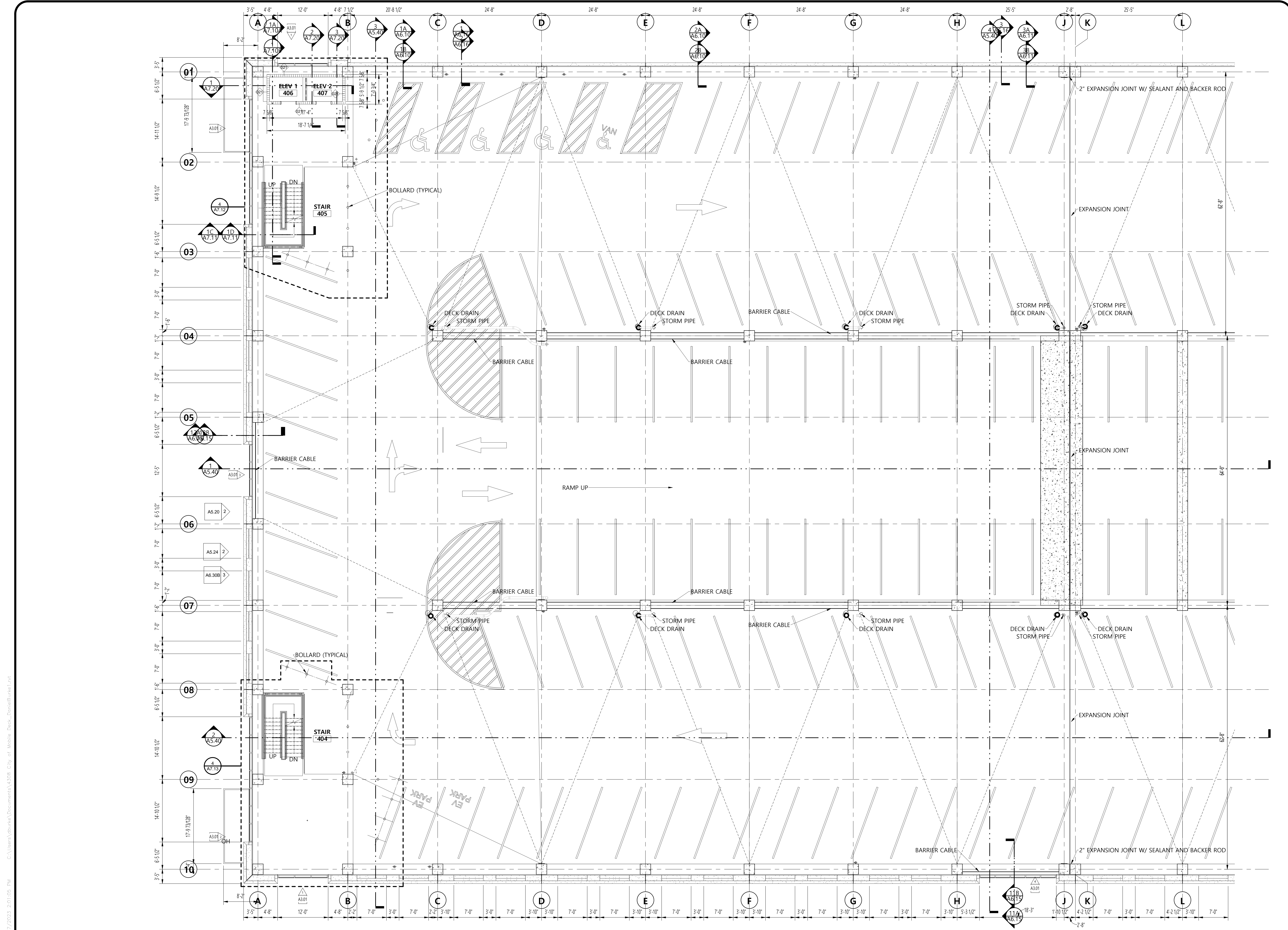
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sheet title	LAYOUT PLAN - LEVEL 4 - OVERALL
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date	August 5, 2023
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**Layout Plan - Level 4 - Part A**  
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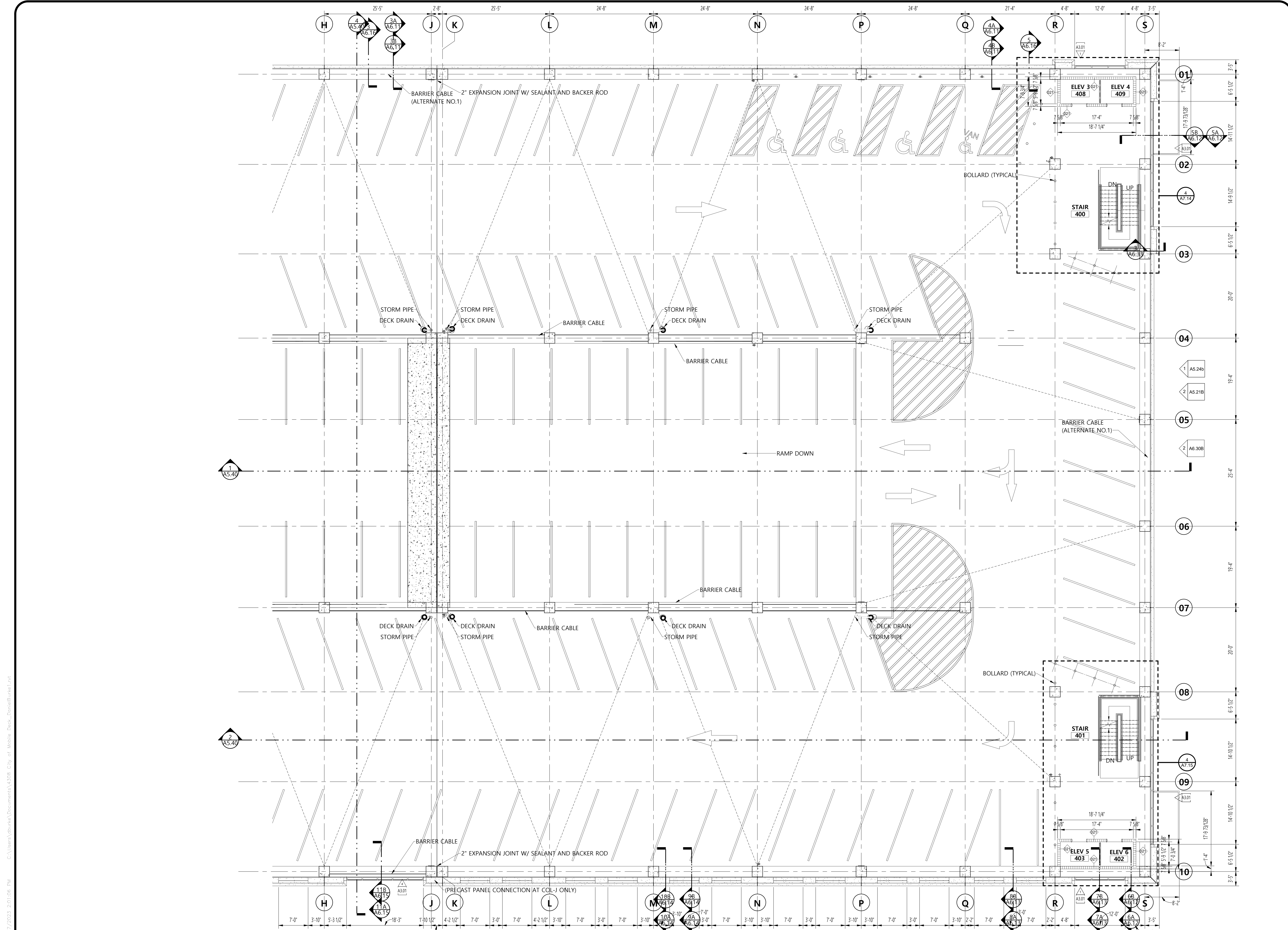
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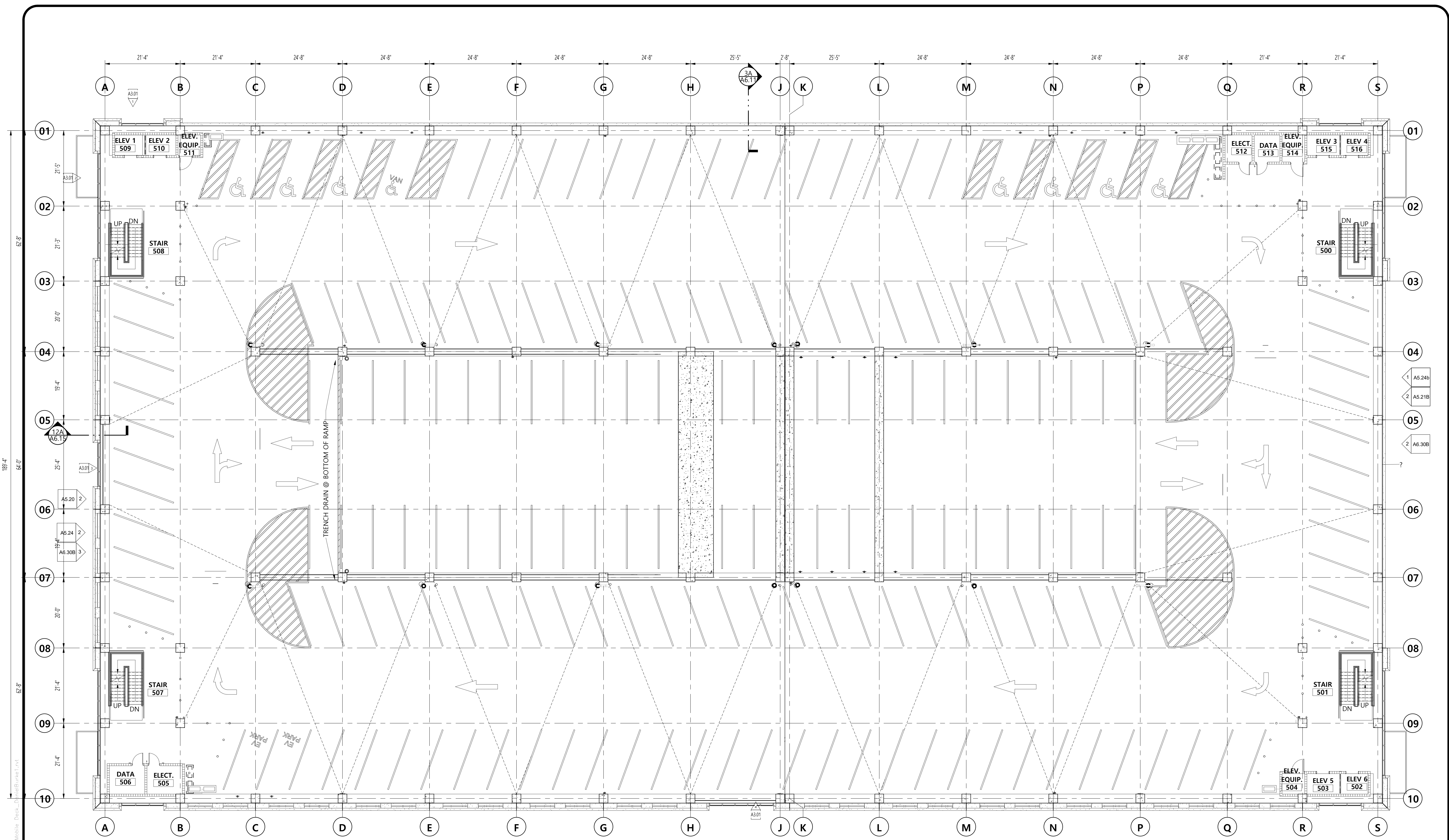
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Revisions	Sheet Title
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Job No.	4308
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Sheet No.	<b>A2.42</b> of 75
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**Overall Parking Level 5**

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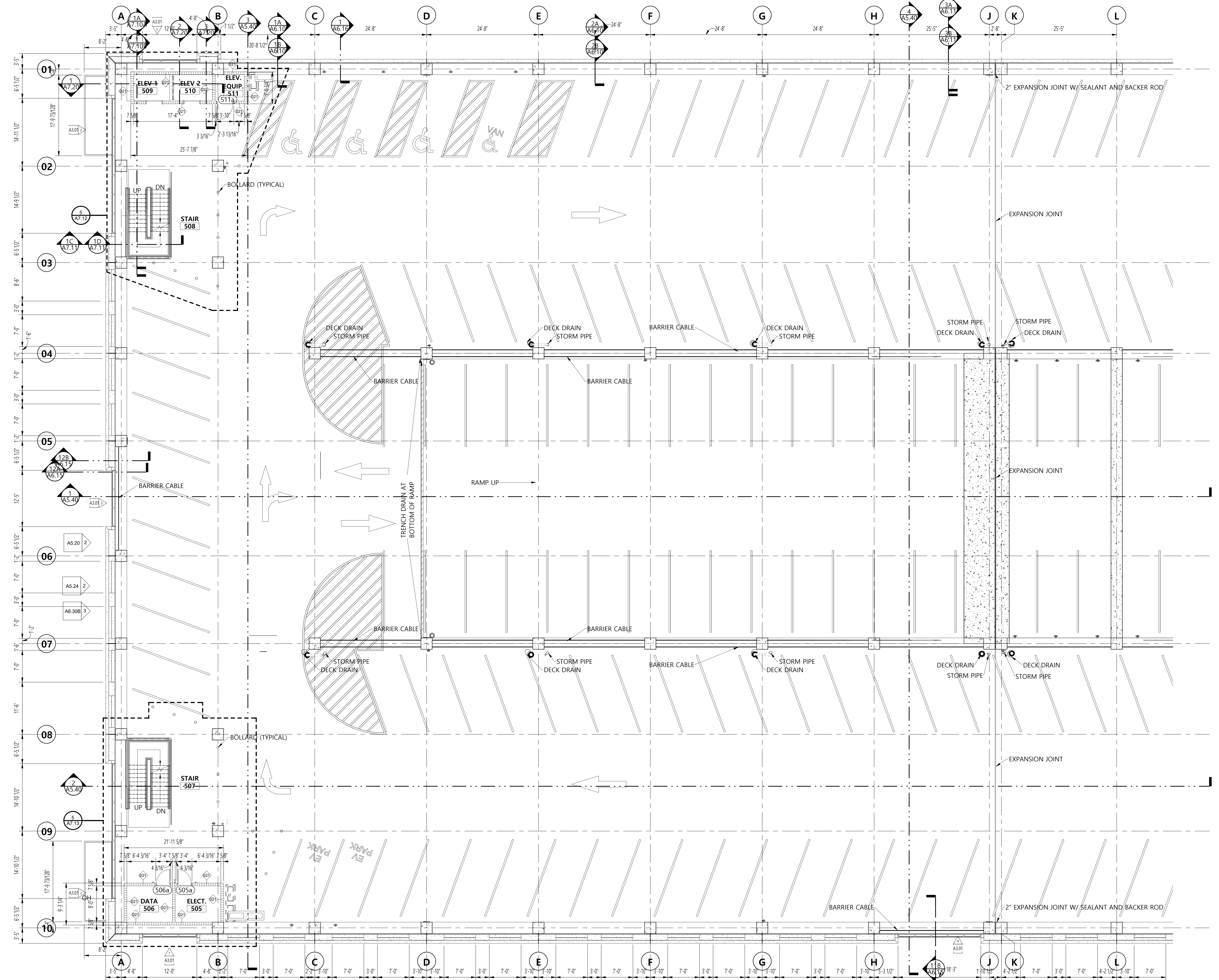
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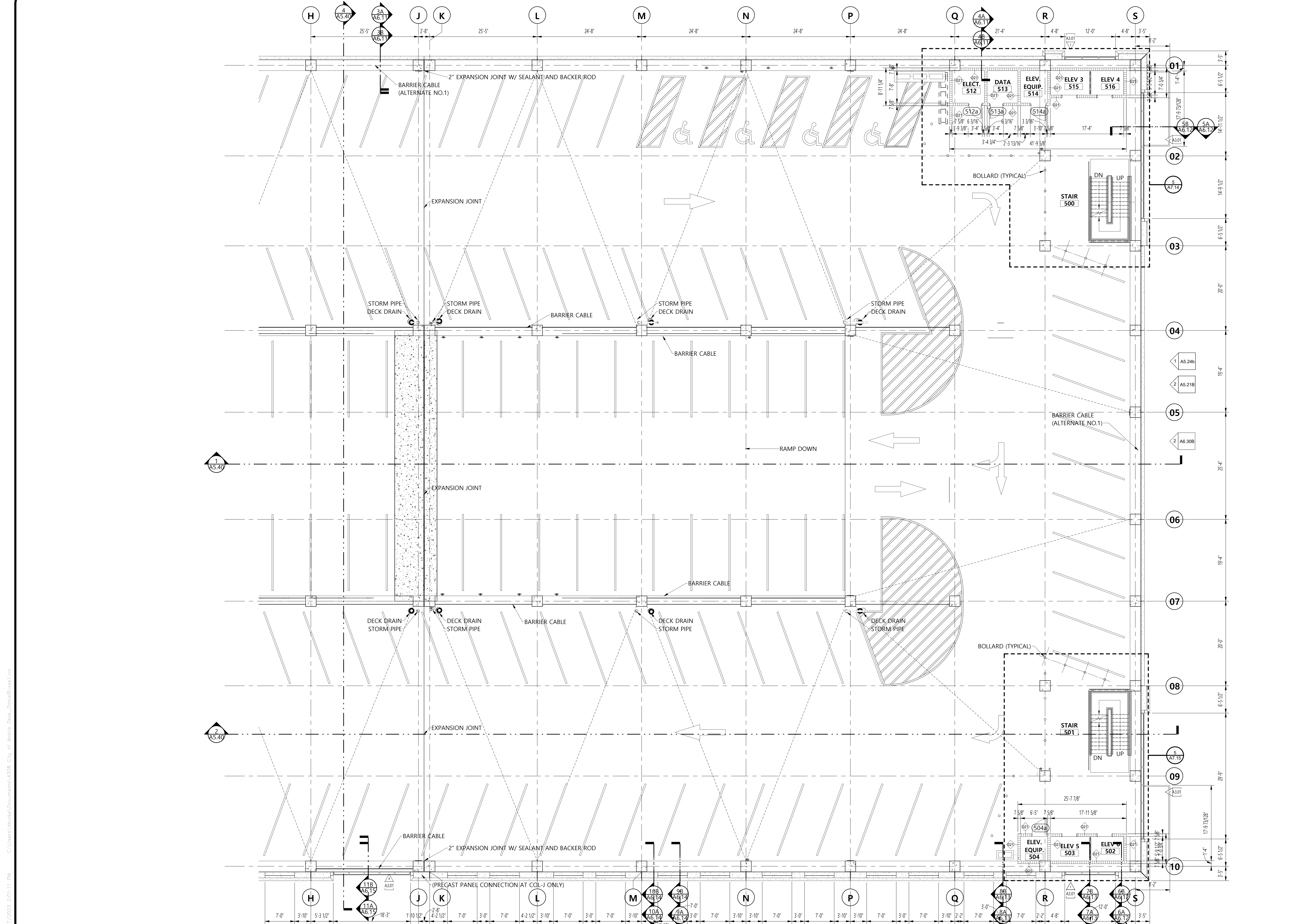
**Layout Plan - Level 5 - Part A**  
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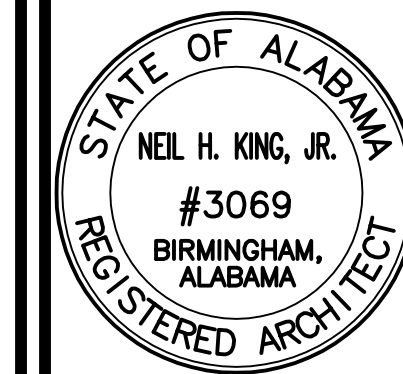
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Total Sheets	75



**Layout Plan - Level 5 - Part B**  
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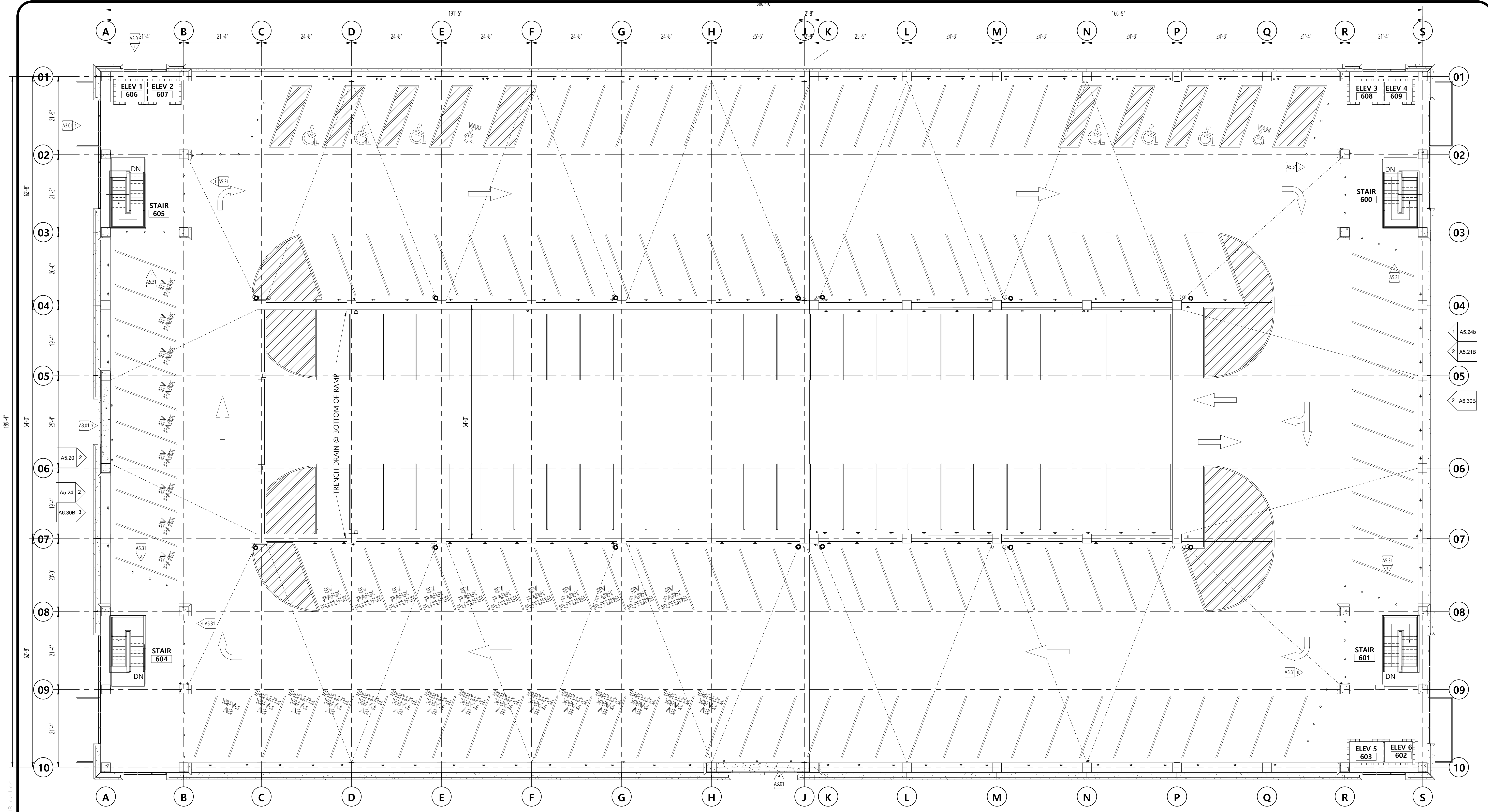
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Revisions	Sheet Title
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Job No.	4308
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Scale	051 of 154
Drawn by	<b>A2.52</b>
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**Overall Parking Level 6**

SCALE: 3/32" = 1'-0"

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Construction Documents

**Mobile Civic Center  
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STATE OF ALABAMA  
NOL H. KING, JR.  
#3069  
BIRMINGHAM, ALABAMA  
REGISTERED ARCHITECT

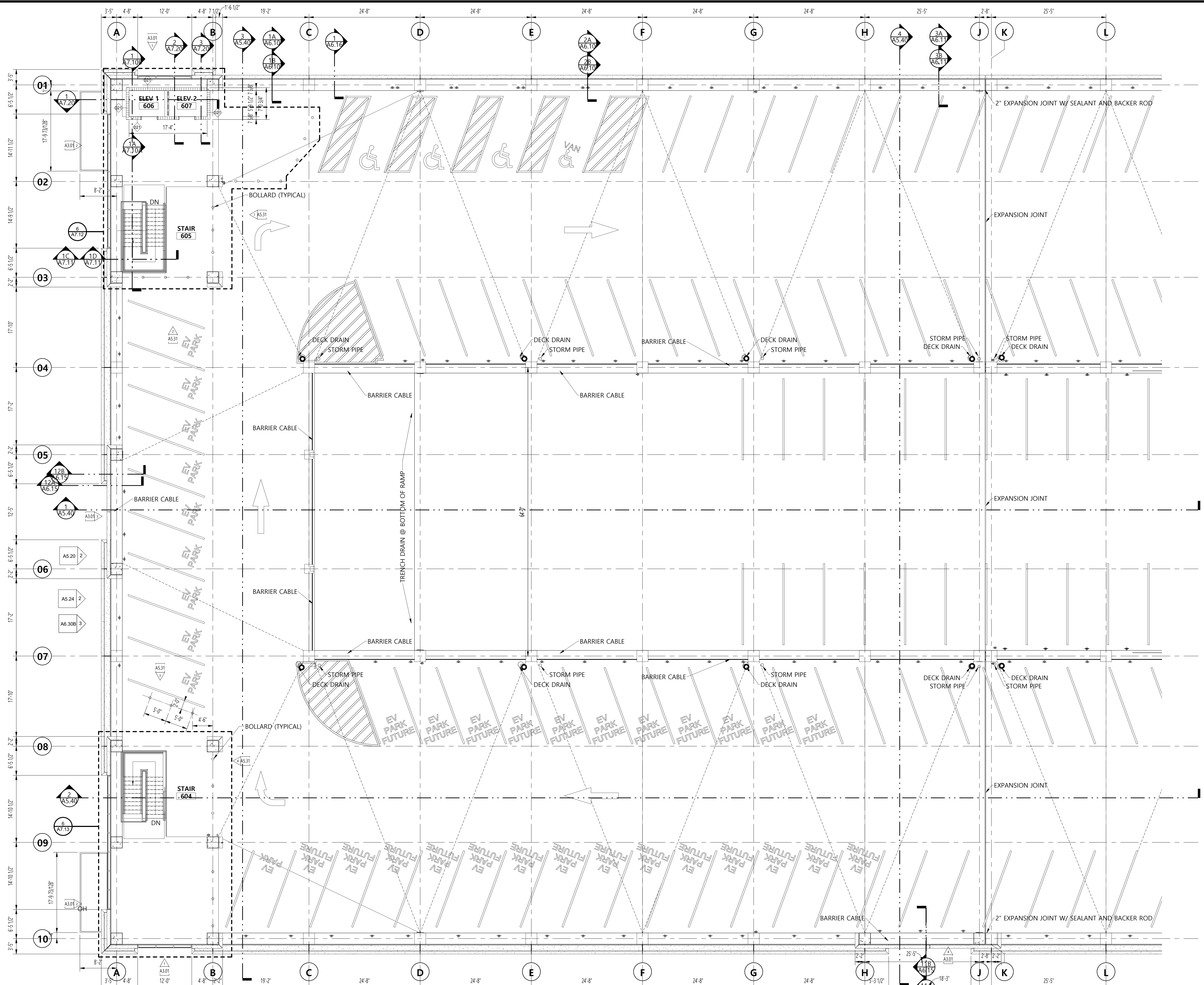
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Revisions	
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checked by	KING
drawn by	ETA
date	August 5, 2023
of 75	
<b>A2.60</b>	
of 154	

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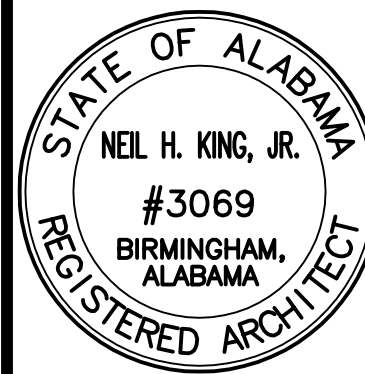


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**Layout Plan - Level 6 - Part A**  
 SCALE: 1/8" = 1'-0"

**Mobile Civic Center  
 Parking Facility**  
 Mobile, Alabama

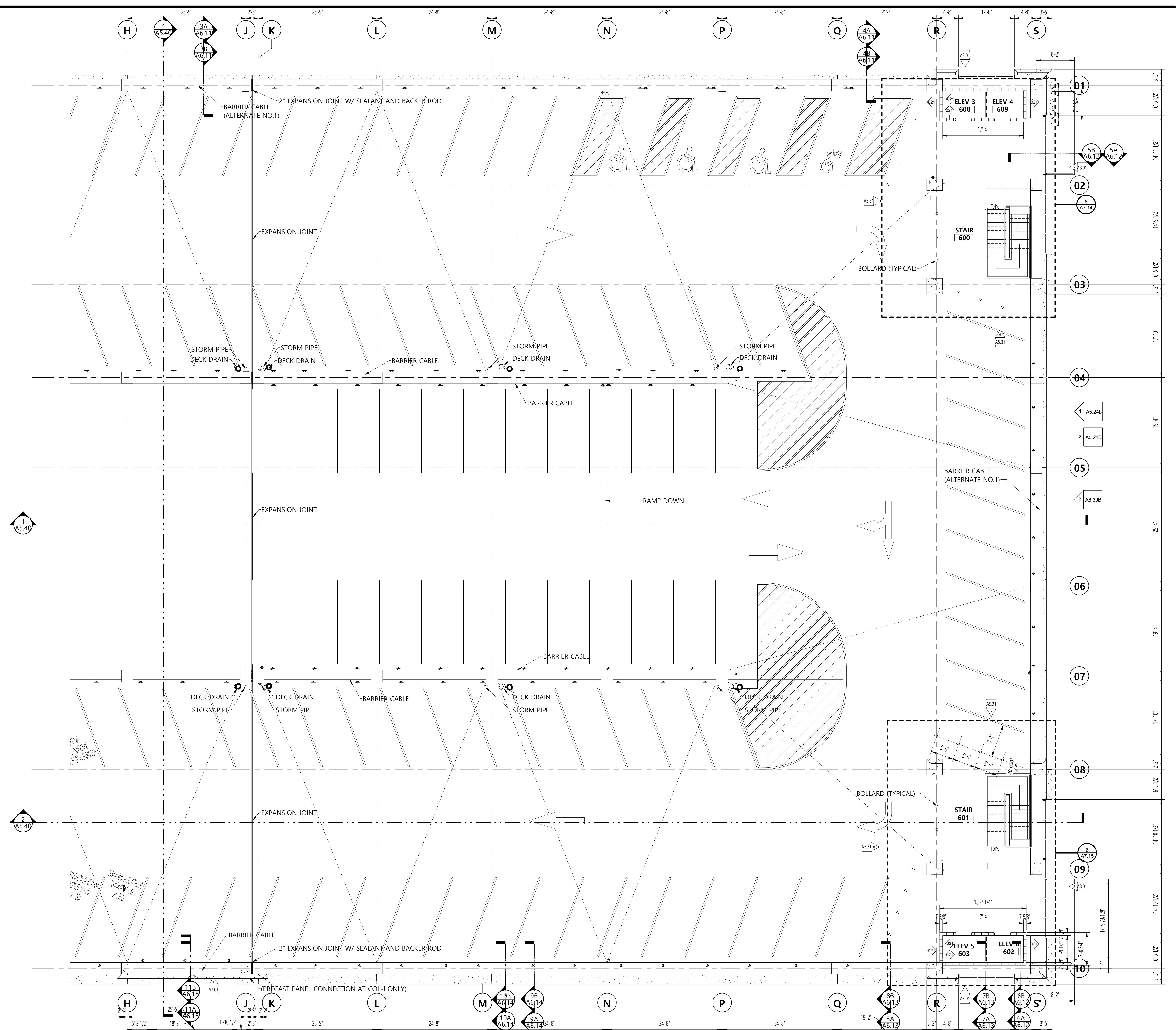


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Revisions

sheet title	LAYOUT PLAN - LEVEL 6 - PART A
job no.	4308
drawn by	ETA
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date	August 5, 2023
sheet no.	A2.61
of	75
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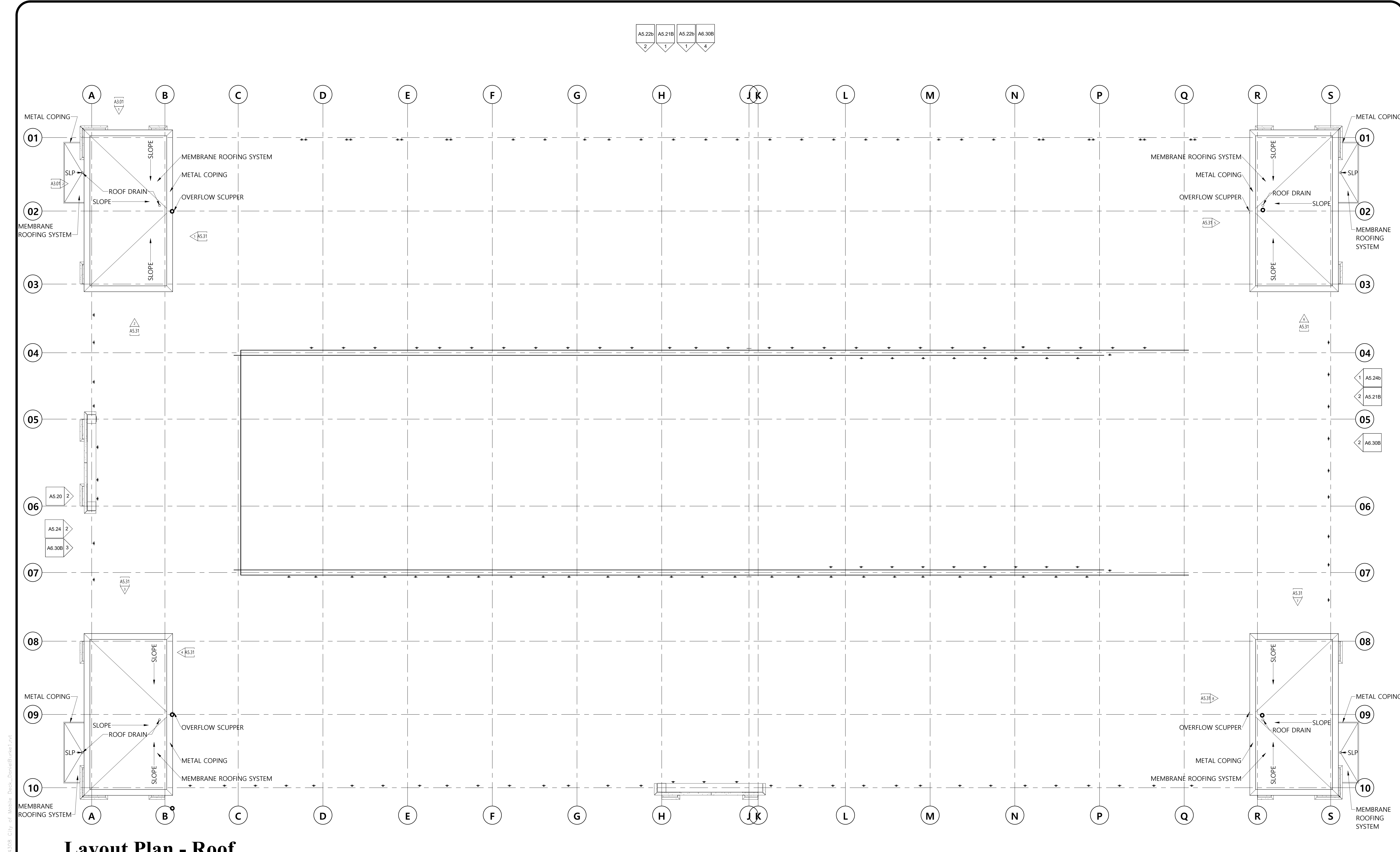
**Layout Plan - Level 6 - Part B**  
 SCALE: 1/8" = 1'-0"

**Mobile Civic Center  
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 Mobile, Alabama



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Revisions	Sheet Title
	LAYOUT PLAN - LEVEL 6 - PART B
Job No.	4308
Drawn by	ETA
Checked by	KING
Scale	054 of 154
Sheet No.	A2.62 of 75
Date	August 5, 2023
By	Evan Terry Associates, LLC 2023



**Layout Plan - Roof**  
 SCALE: 3/32" = 1'-0"

Construction Documents

**Mobile Civic Center  
Parking Facility**  
Mobile, Alabama

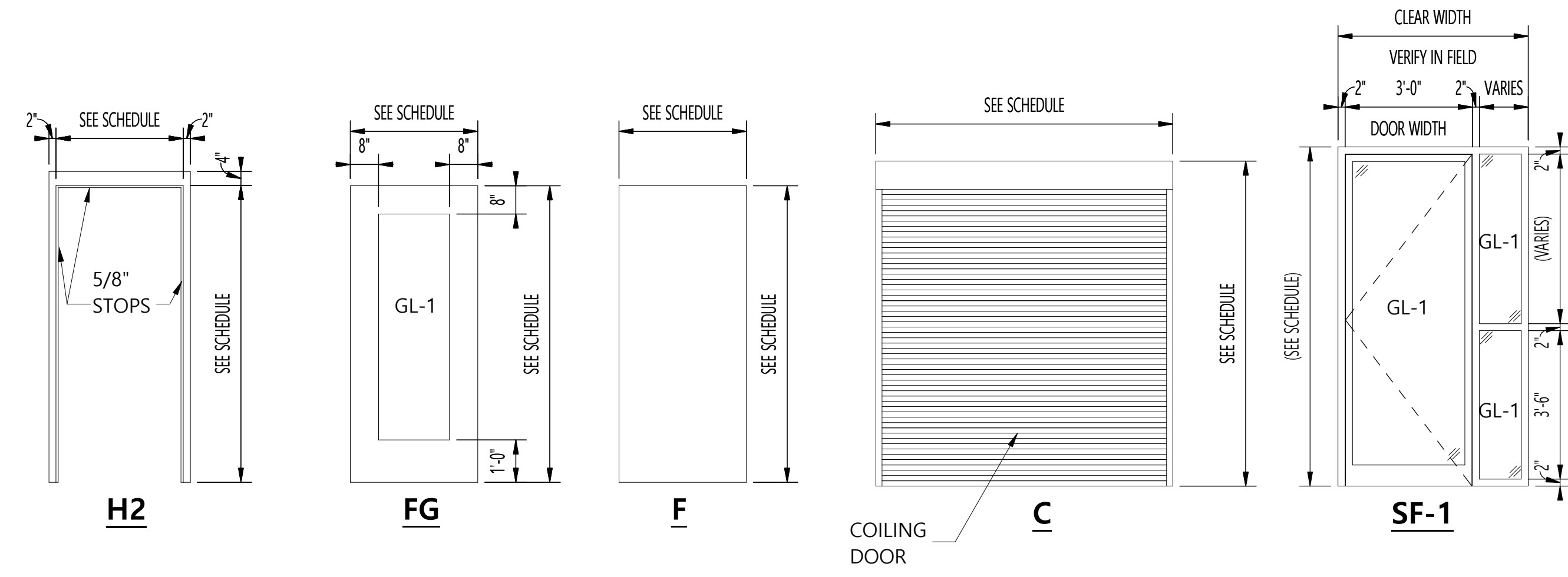
STATE OF ALABAMA  
NEIL H. KING, JR.  
#3069  
BIRMINGHAM, ALABAMA  
REGISTERED ARCHITECT

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Revisions	
sheet title	ROOF PLAN - OVERALL
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chkd. by	KING
date	August 5, 2023
dwg. no.	A2.70
	of 75

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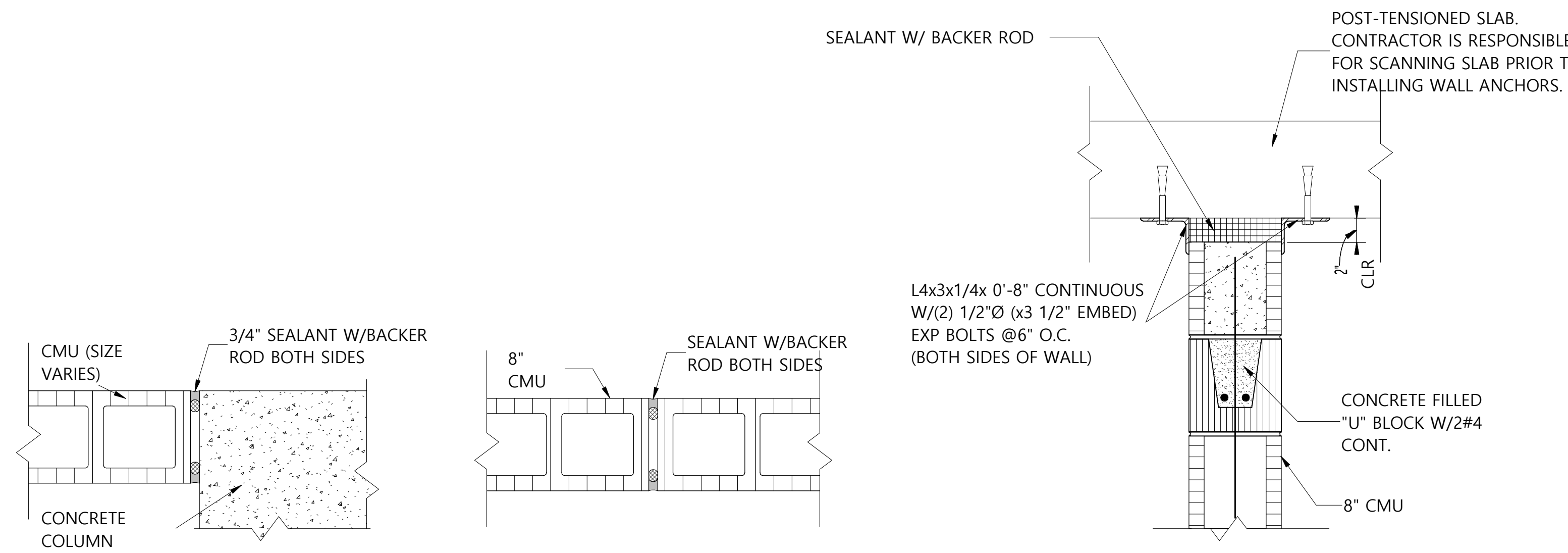
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### Door Types/ Door Frames

SCALE: 3/8" = 1'-0"

DOOR SCHEDULE								
NO.	WIDTH	HEIGHT	THICKNESS	DOOR MATERIAL TYPE	TYPE	LABEL	FRAME	REMARKS
104a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
105a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
110a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
111a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
114a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F	20 minutes		H2
114b	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F	20 minutes		H2
114c	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F	20 minutes		H2
115a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F	20 minutes		H2
116a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F	20 minutes		H2
117a	10'-0"	10'-0"	1"	ROLLING COILING DOOR	C			
304a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
305a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
310a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
311a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
504a	3'-6"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
505a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
506a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
511a	3'-6"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
512a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
513a	3'-0"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
514a	3'-6"	7'-0"	1 3/4"	HOLLOW METAL	F			H2
EXTa	4'-0"	9'-0"		ALUMINIUM STOREFRONT	FG		SF-1	
EXTb	4'-0"	9'-0"		ALUMINIUM STOREFRONT	FG		SF-1	
EXTc	4'-0"	9'-0"		ALUMINIUM STOREFRONT	FG		SF-1	
EXTd	4'-0"	9'-0"		ALUMINIUM STOREFRONT	FG		SF-1	
EXTe	4'-0"	9'-0"		ALUMINIUM STOREFRONT	FG		SF-1	



#### Column Control Joint Detail

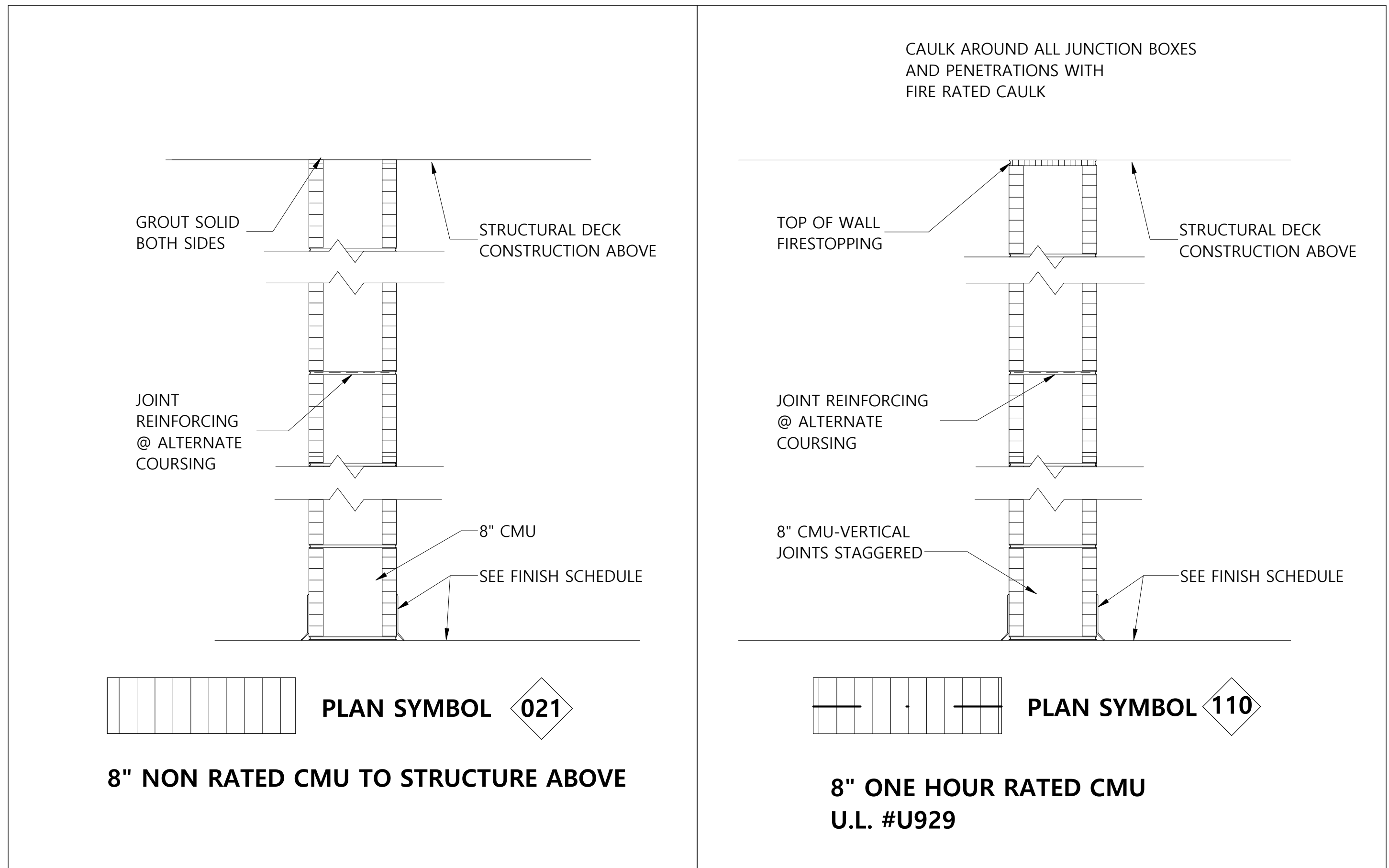
1 1/2"=1'-0"

#### Block Control Joint Detail

1 1/2"=1'-0"  
20' O.C. MAX

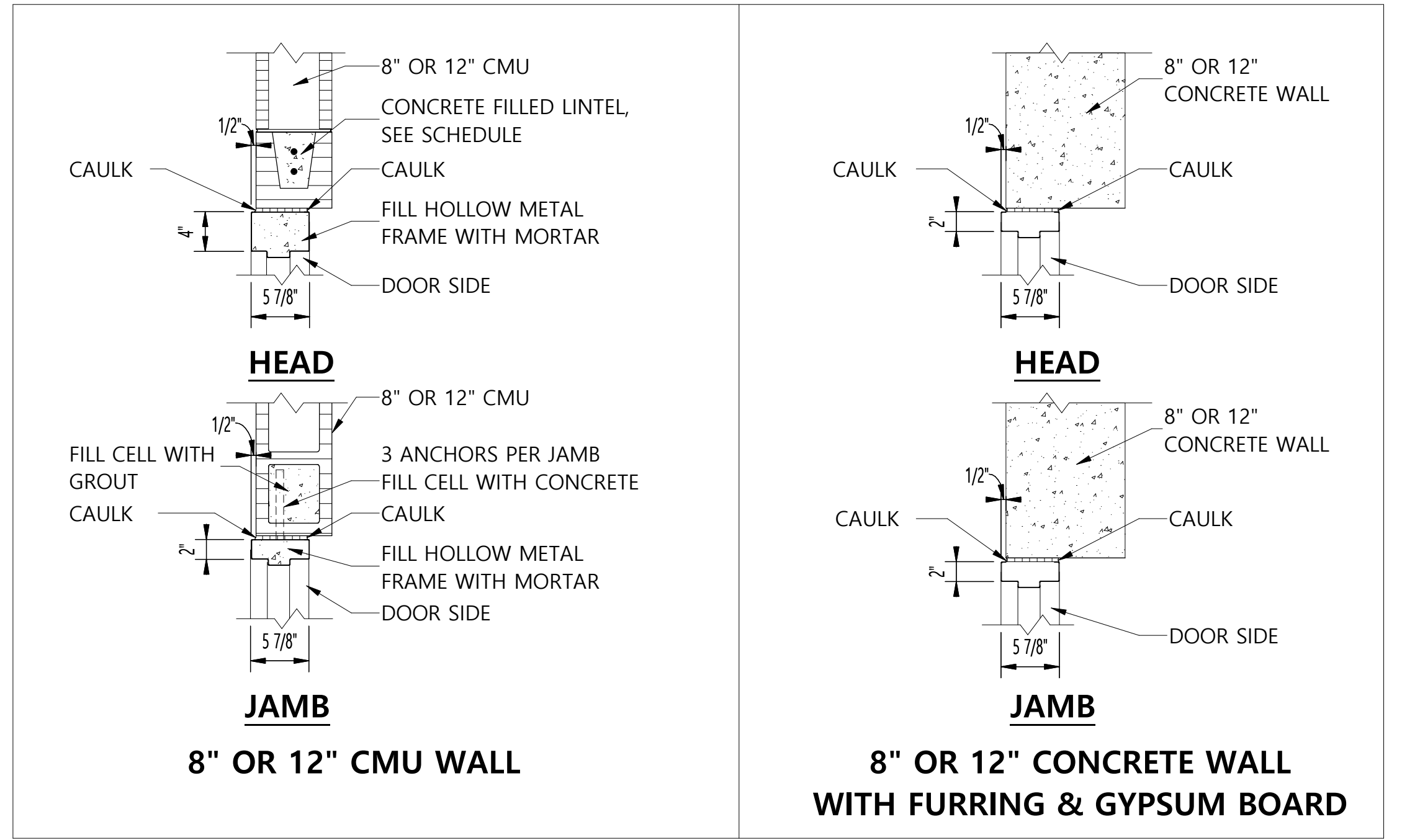
#### CMU Wall Head Detail

1 1/2"=1'-0"



### Partition Details

SCALE: 1 1/2" = 1'-0"



### Door Details

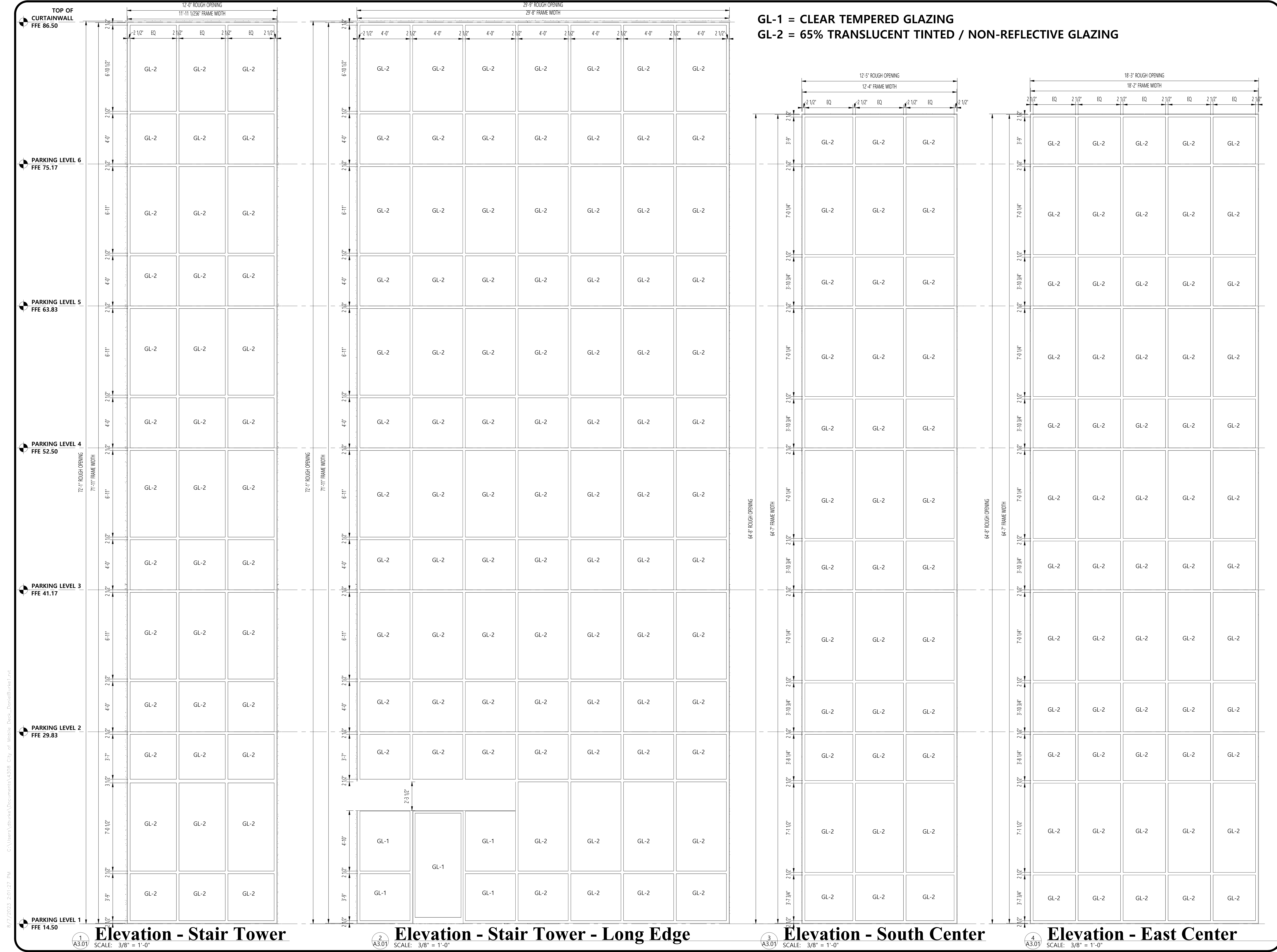
SCALE: 1" = 1'-0"

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Revisions	
sheet title	DOOR SCHEDULE
JOB no.	4308
Drawn by	ETA
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Scale	056 of 154
Drawn by	A3.00
Date	August 5, 2023
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Construction Documents

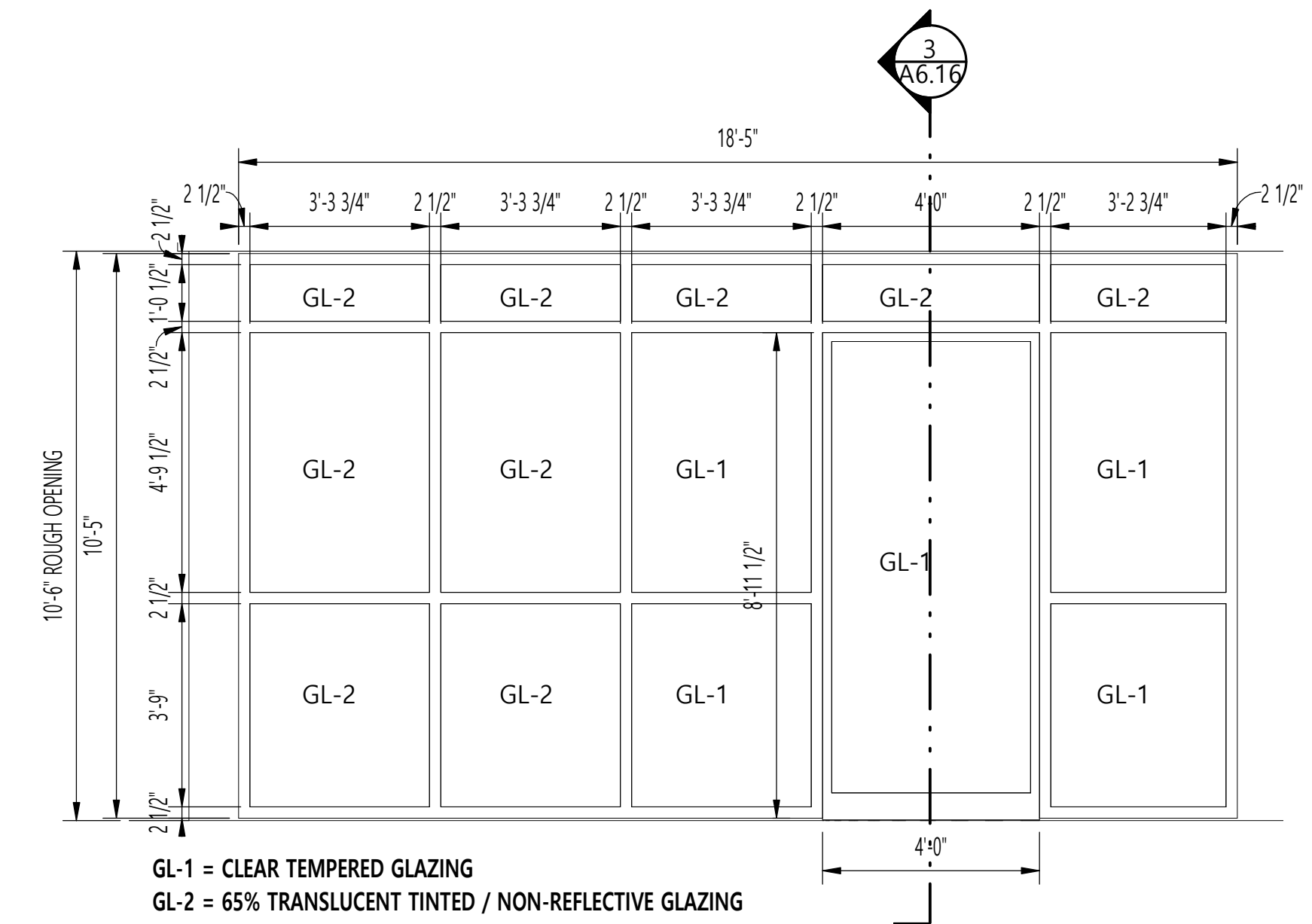
**Mobile Civic Center  
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Mobile, Alabama

STATE OF ALABAMA  
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Revisions	
sheet title	CURTAIN WALL ELEVATIONS
job no.	4308
designed by	ETA
checked by	KING
date	August 5, 2023
scale	3/8" = 1'-0"
sheet no.	A3.01
total sheets	75

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**WEST CENTER PANEL CURTAIN WALL ELEVATION**

**Elevation**

1  
A3.02 3/8" = 1'-0"

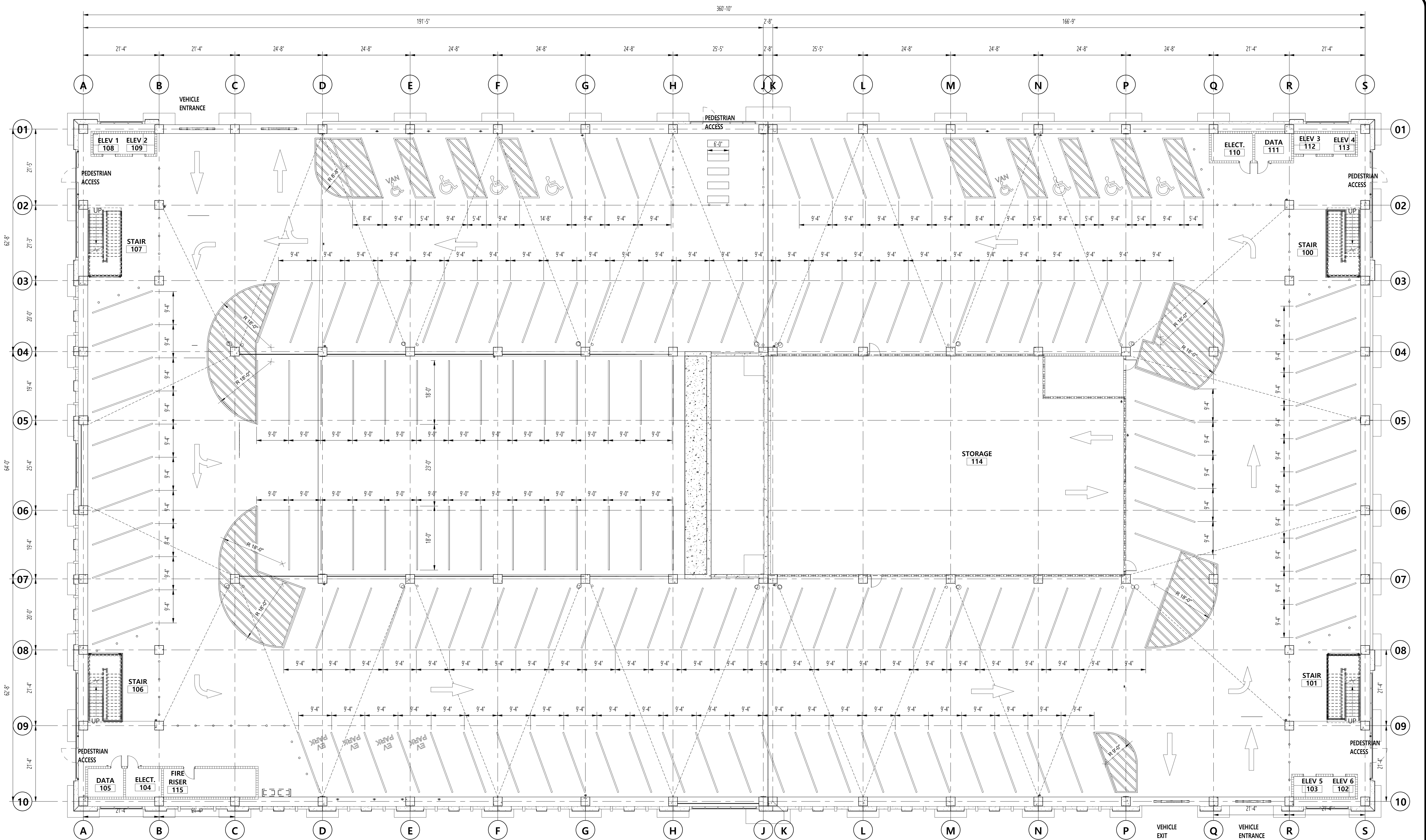
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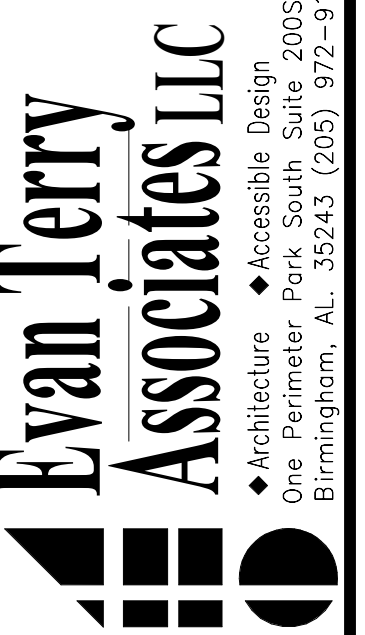
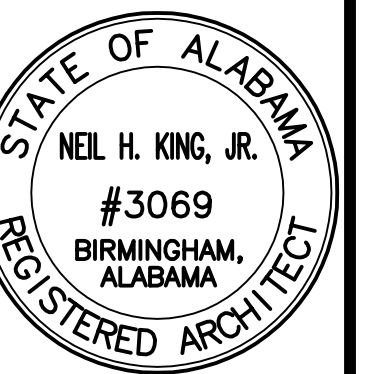
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JOB no.	4308	
Desn. by	ETA	058
Chd. by	KING	of 154
Draw. no.	A3.02	
of	75	
Date	August 5, 2023	
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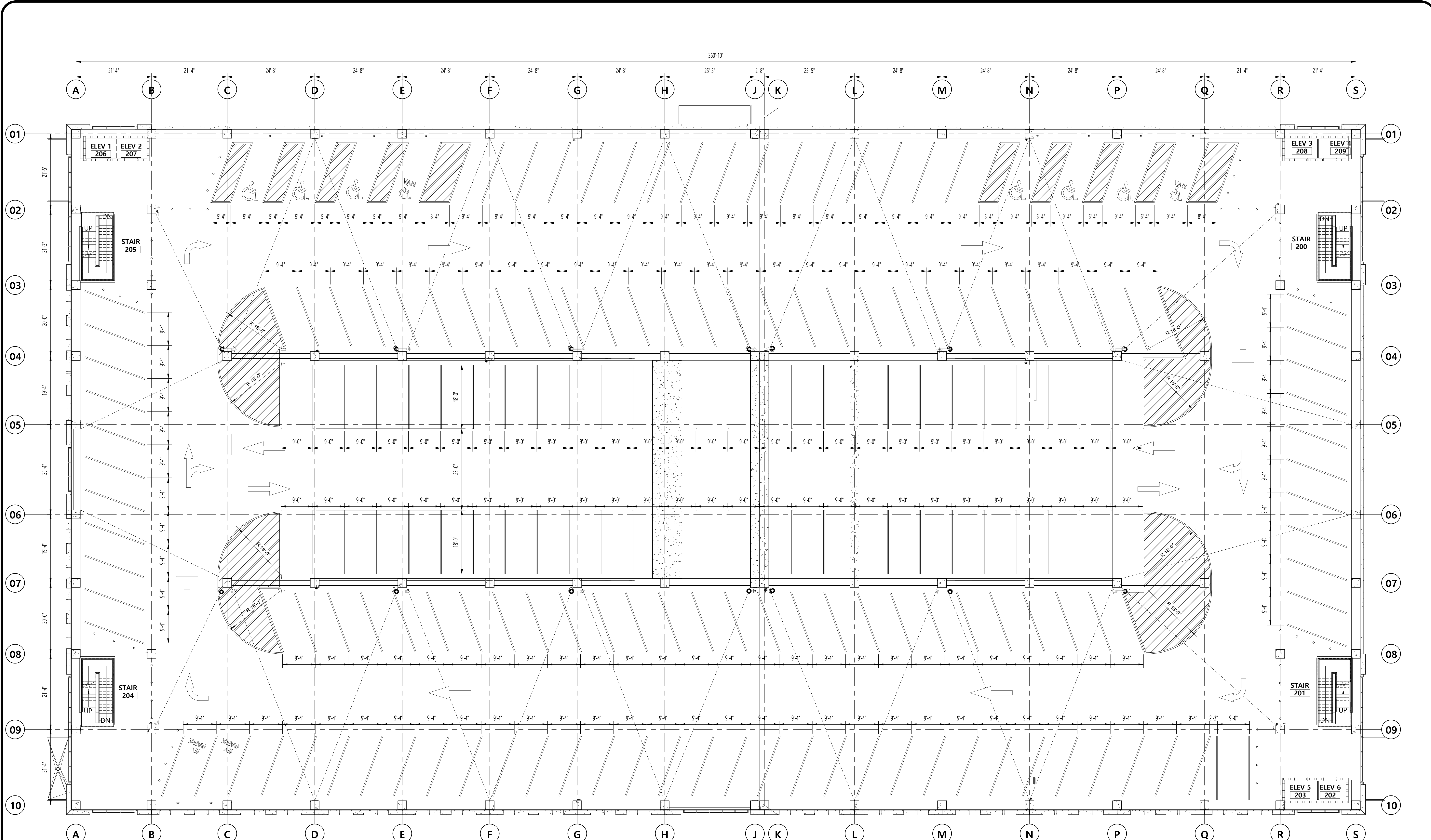
**Striping Plan - Level 1**  
SCALE: 3/32" = 1'-0"

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job no.	<b>4308</b>
designed by	ETA
checked by	<b>059</b>
drawn by	KING
sheet no.	<b>A3.10</b>
of	75
date	August 5, 2023
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**Striping Plan - Level 2**  
SCALE: 3/32" = 1'-0"

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#3069  
BIRMINGHAM,  
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Revisions

sheet title  
STRIPING PLAN LEVEL 2

job no. **4308**

date by  
ETK

job no. **060**

date by  
KING

sheet no. **A3.20**

of 75

date August 5, 2023

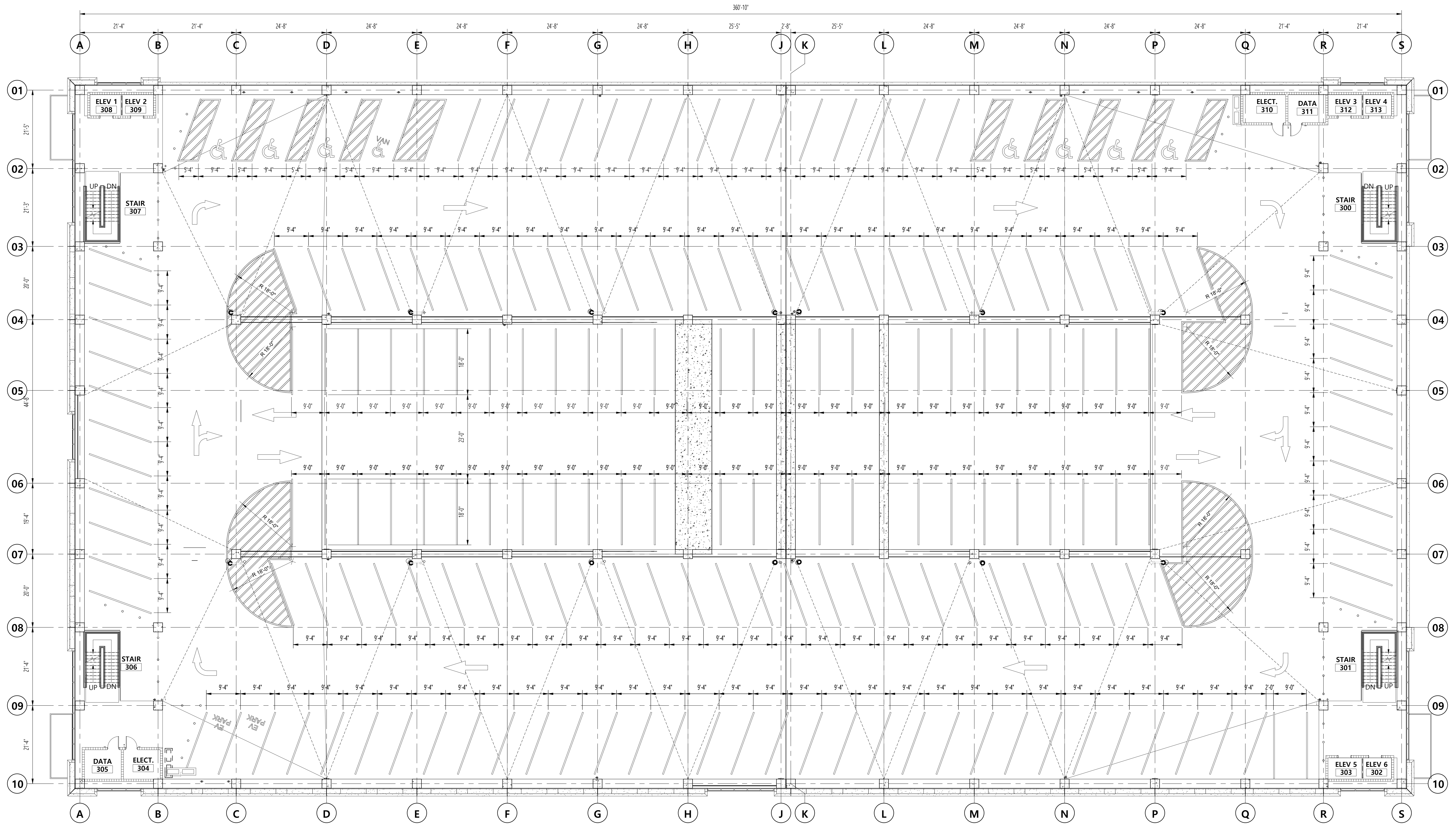
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Construction Documents

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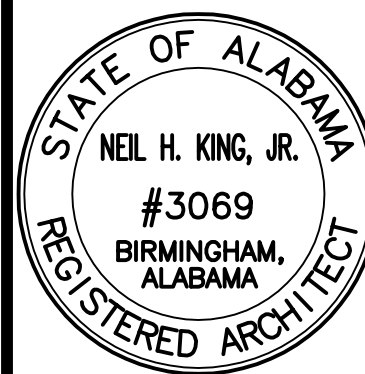


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**Striping Plan - Level 3**  
SCALE: 3/32" = 1'-0"

**Mobile Civic Center  
Parking Facility**  
Mobile, Alabama



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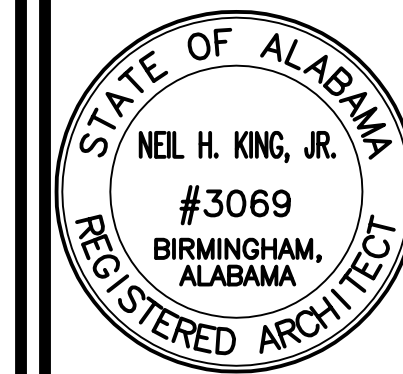
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date	061 of 154
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of	75
date	August 5, 2023
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**Striping Plan - Level 4**  
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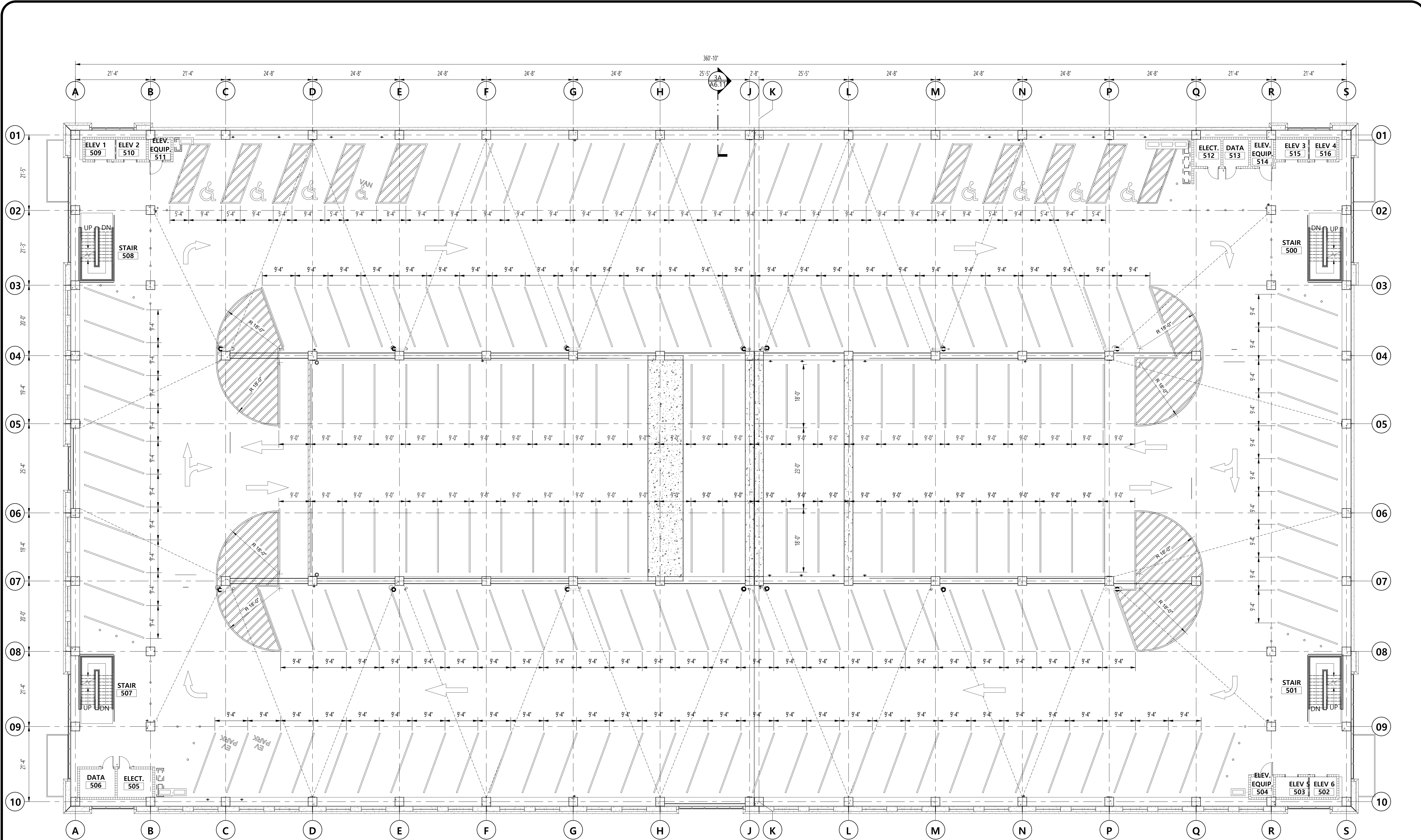
**Mobile Civic Center  
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Mobile, Alabama



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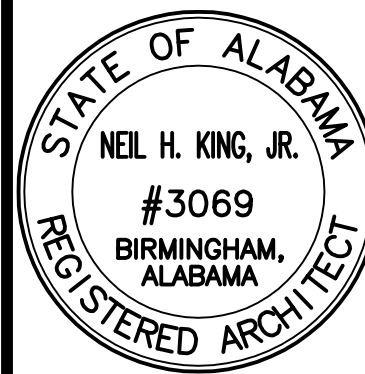
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checked by	KING
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date	August 5, 2023
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of	75
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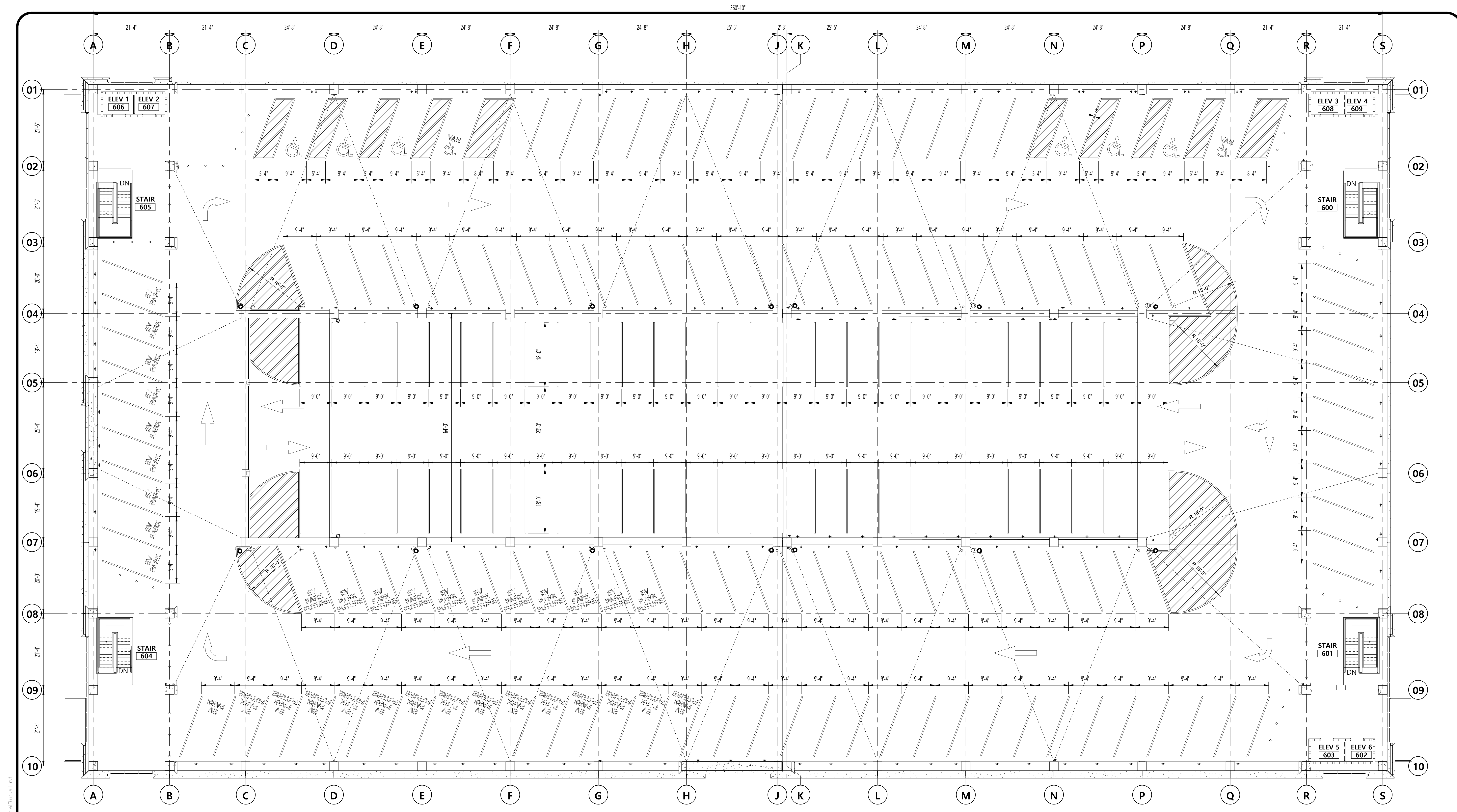
**Striping Plan - Level 5**  
 SCALE: 3/32" = 1'-0"

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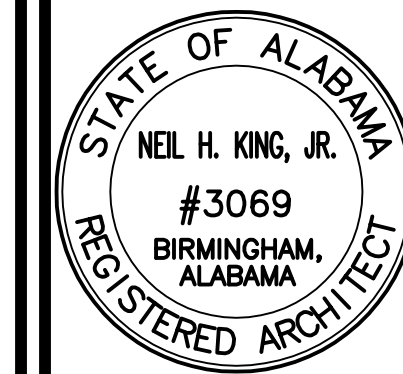
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date	August 5, 2023
sheet no.	A3.50
of	75
date	August 5, 2023
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**Striping Plan - Level 6**  
SCALE: 3/32" = 1'-0"

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**Mobile Civic Center  
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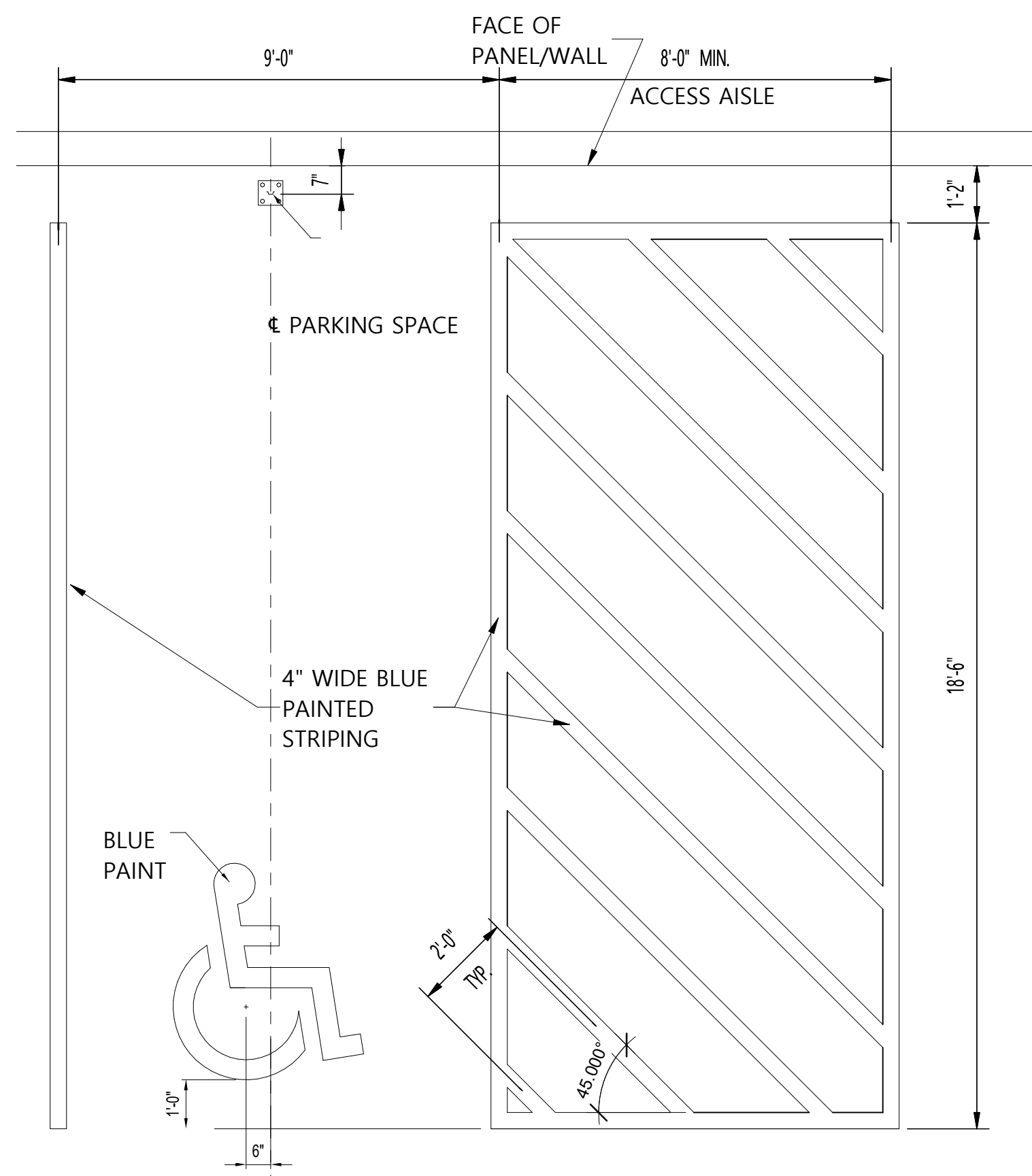


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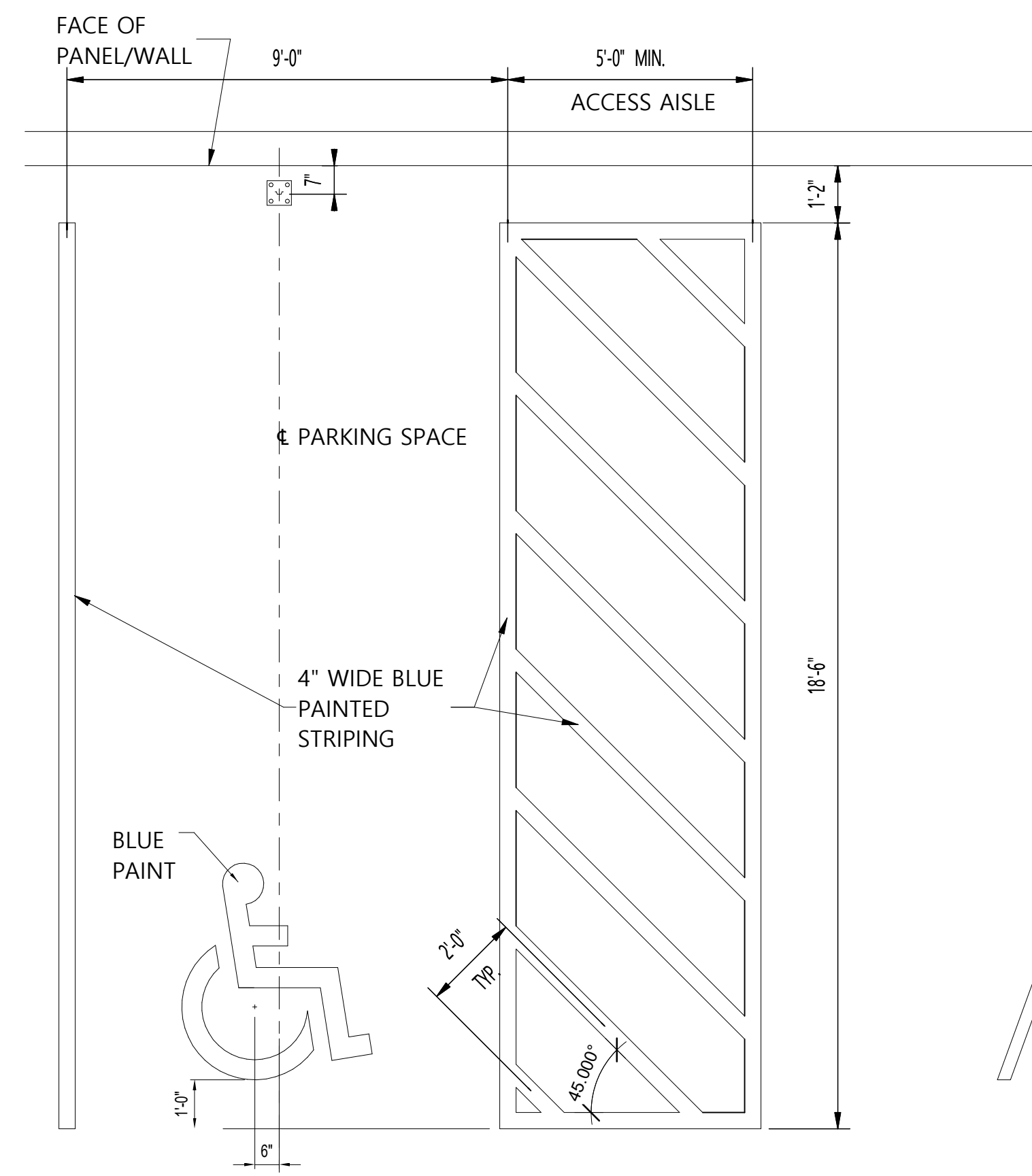
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of 75	
date	August 5, 2023
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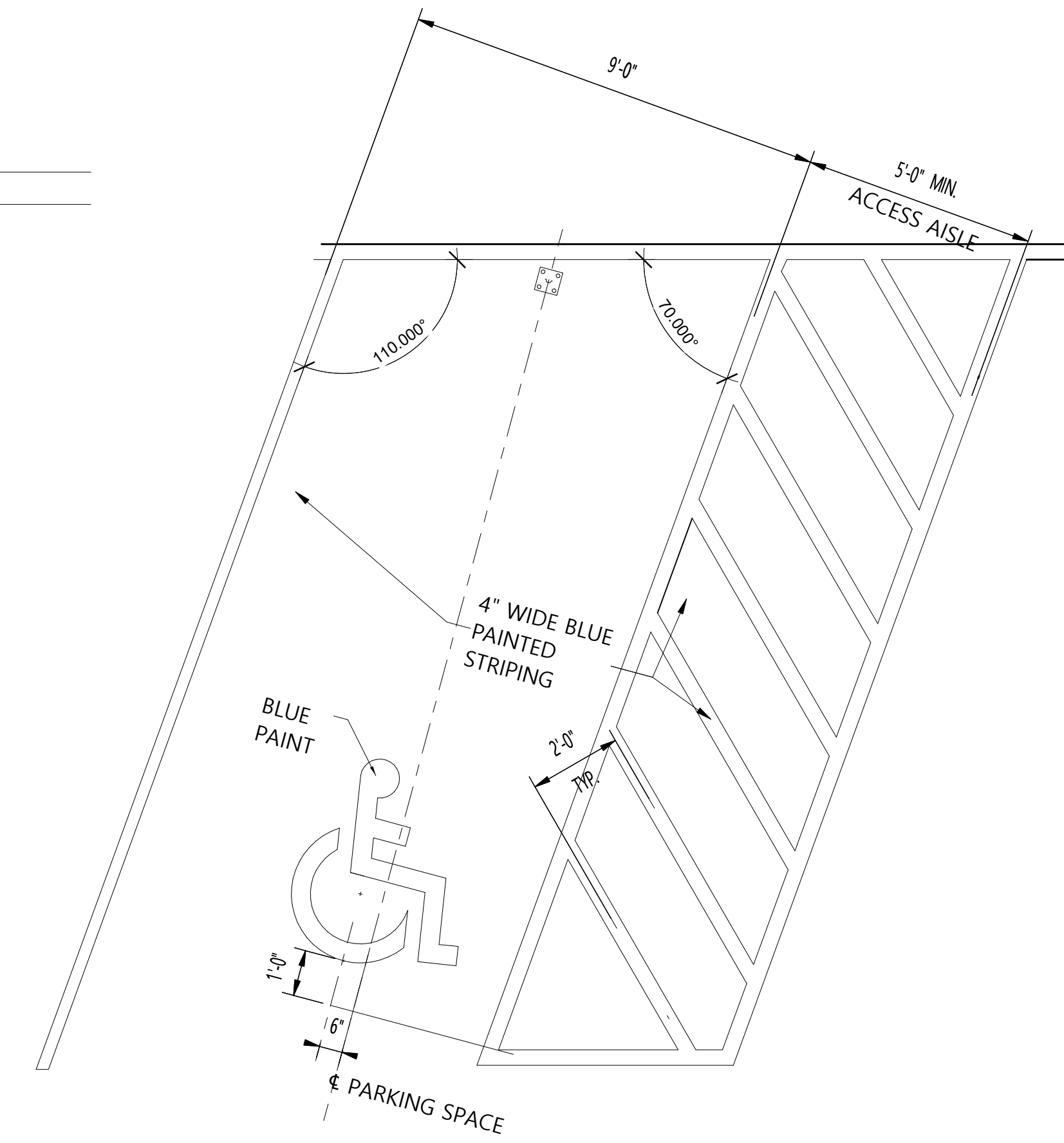
**Van Accessible Parking Plan**

SCALE: 3/8"=1'-0"



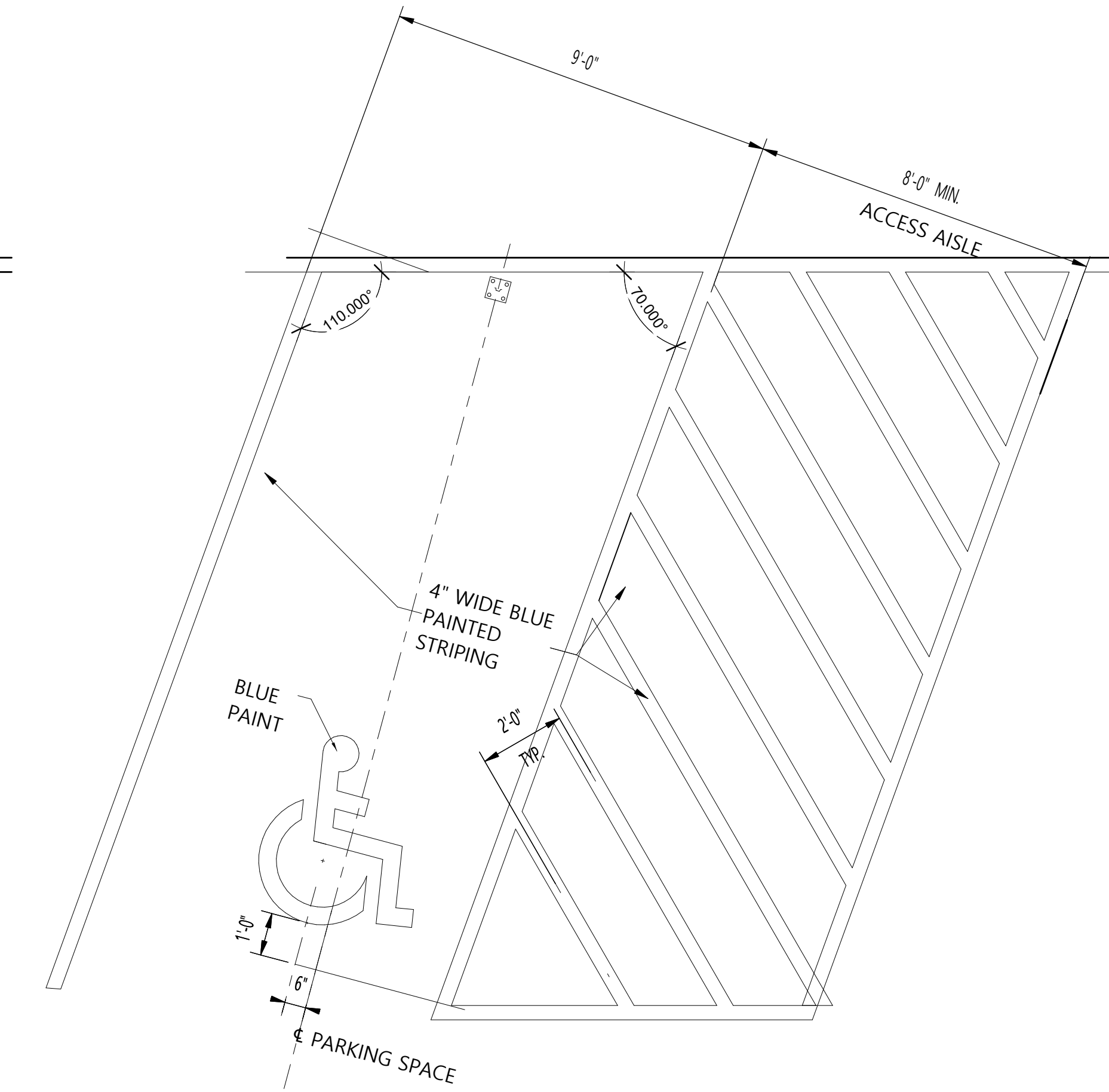
**Accessible Parking Plan**

SCALE: 3/8"=1'-0"



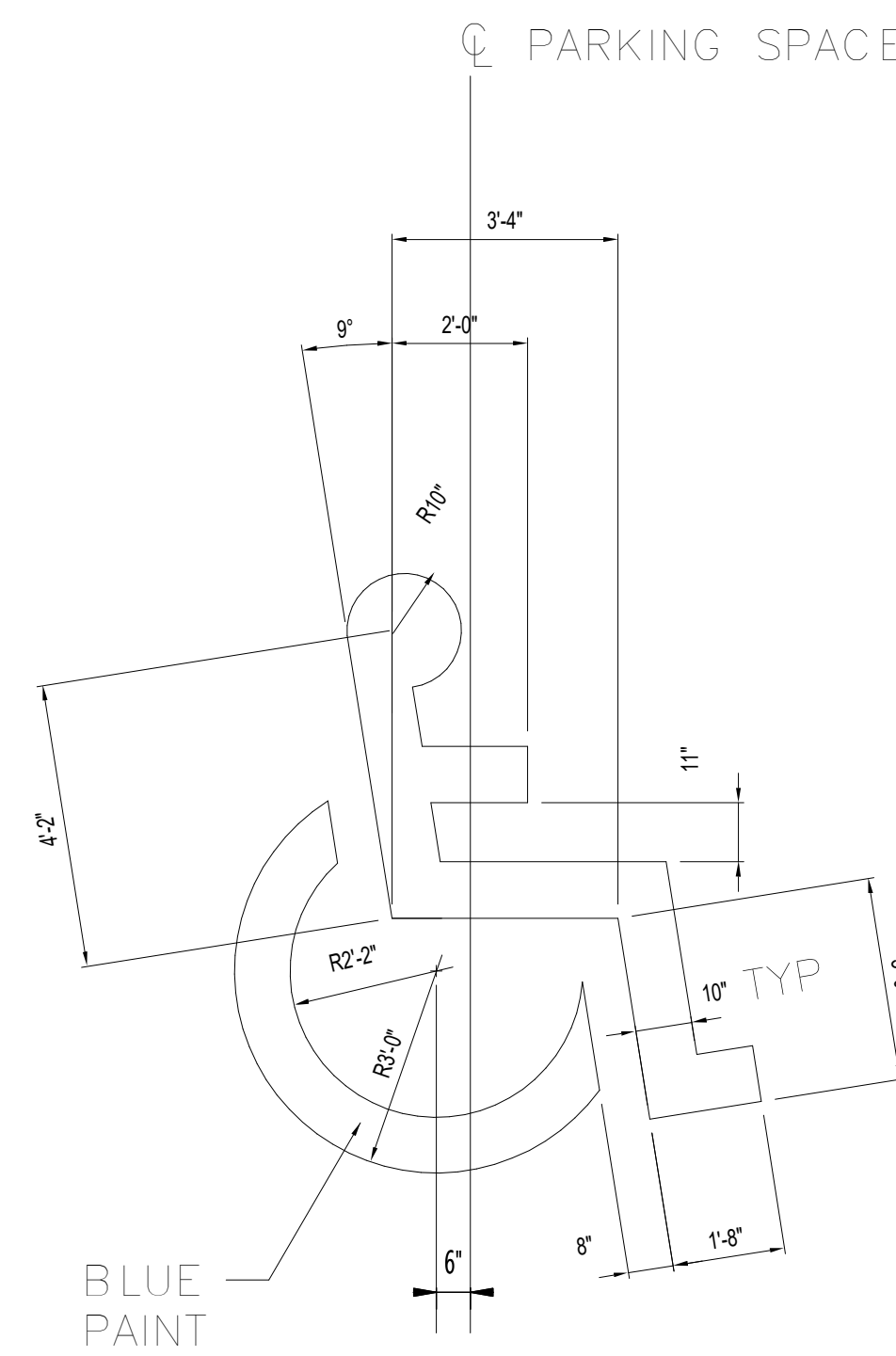
**Accessible Parking Plan**

SCALE: 3/8"=1'-0"

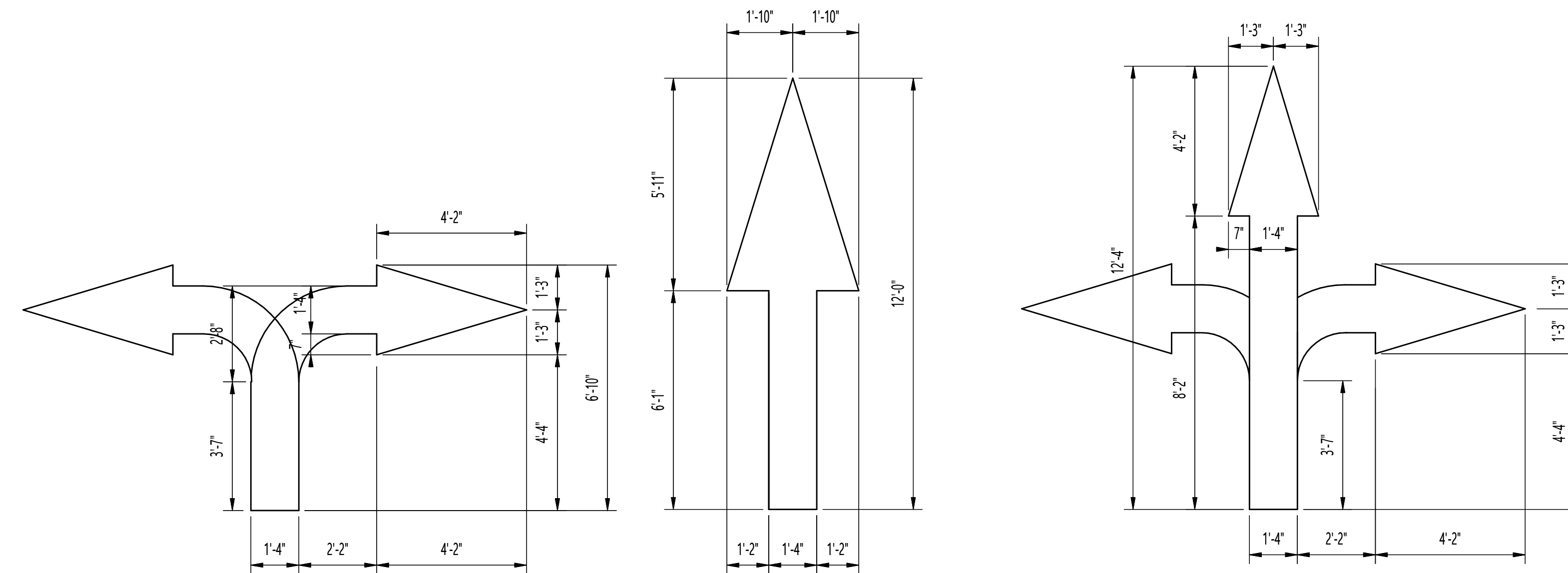


**Van Accessible Parking Plan**

SCALE: 3/8"=1'-0"



**International Symbol for Accessibility**



**Typical Arrow Striping Details**

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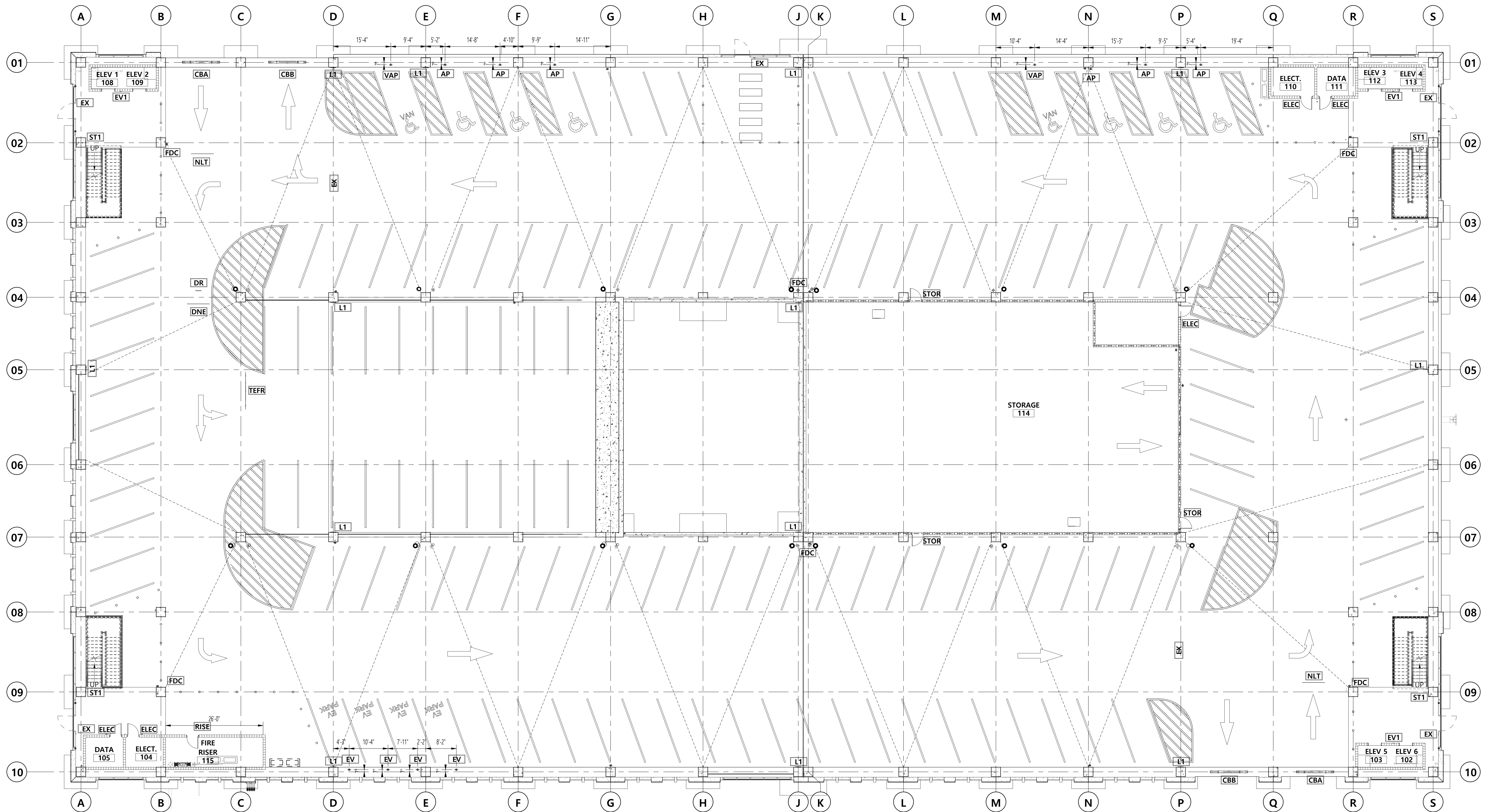
**Mobile Civic Center  
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Mobile, Alabama



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of	75
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**Signage Plan - Level 1**

SCALE: 3/32" = 1'-0"

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Revisions	
sheet title	SIGNAGE PLAN - LEVEL 1
job no.	4308
des. by	ETA
chk. by	KING
date	August 5, 2023
dwg. no.	A4.10
of	75

# Mobile Civic Center Parking Facility

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Revisions	

sheet title  
SIGNAGE PLAN - LEVEL 2

job no. **4308**

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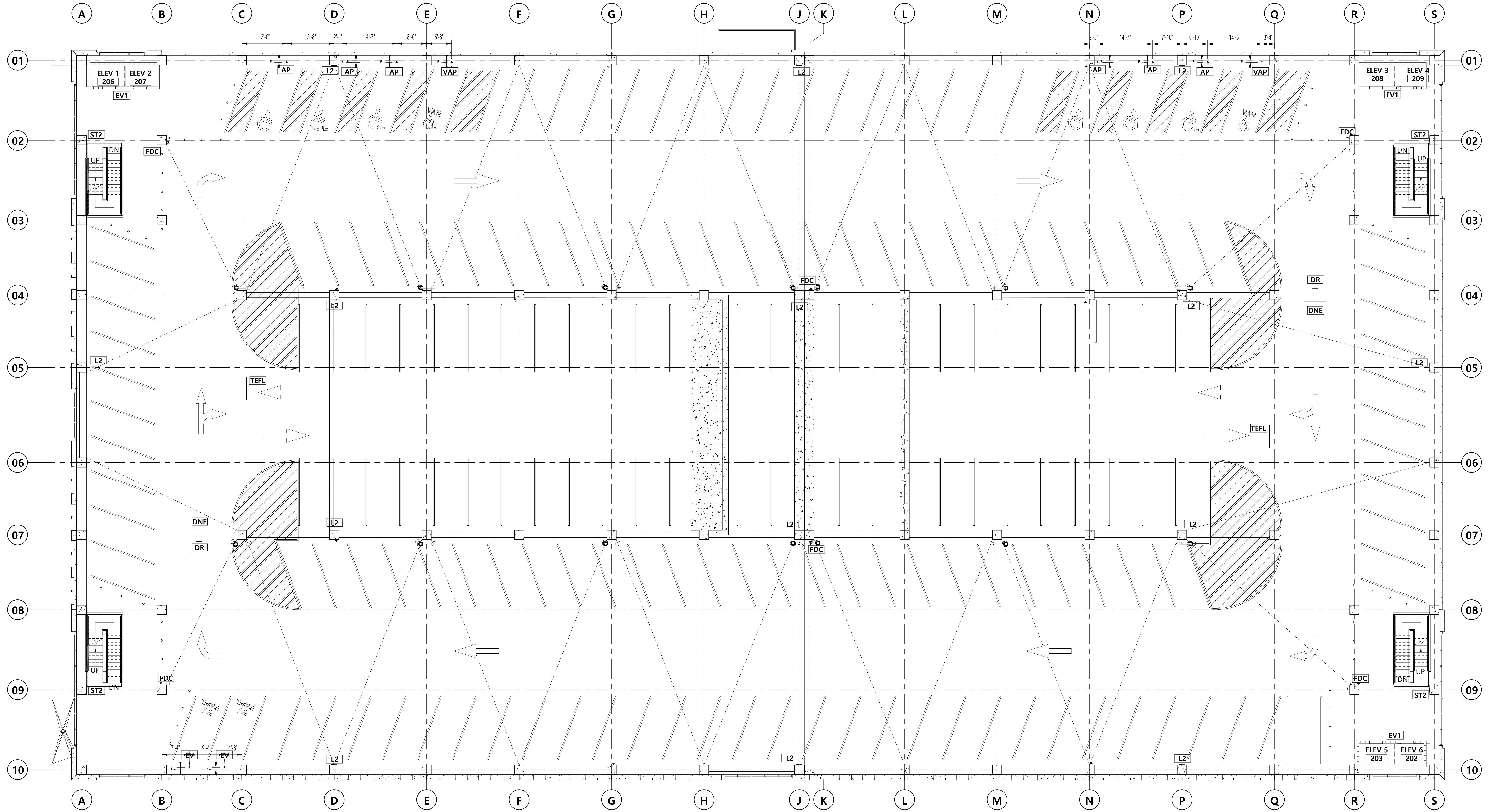
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date August 5, 2023

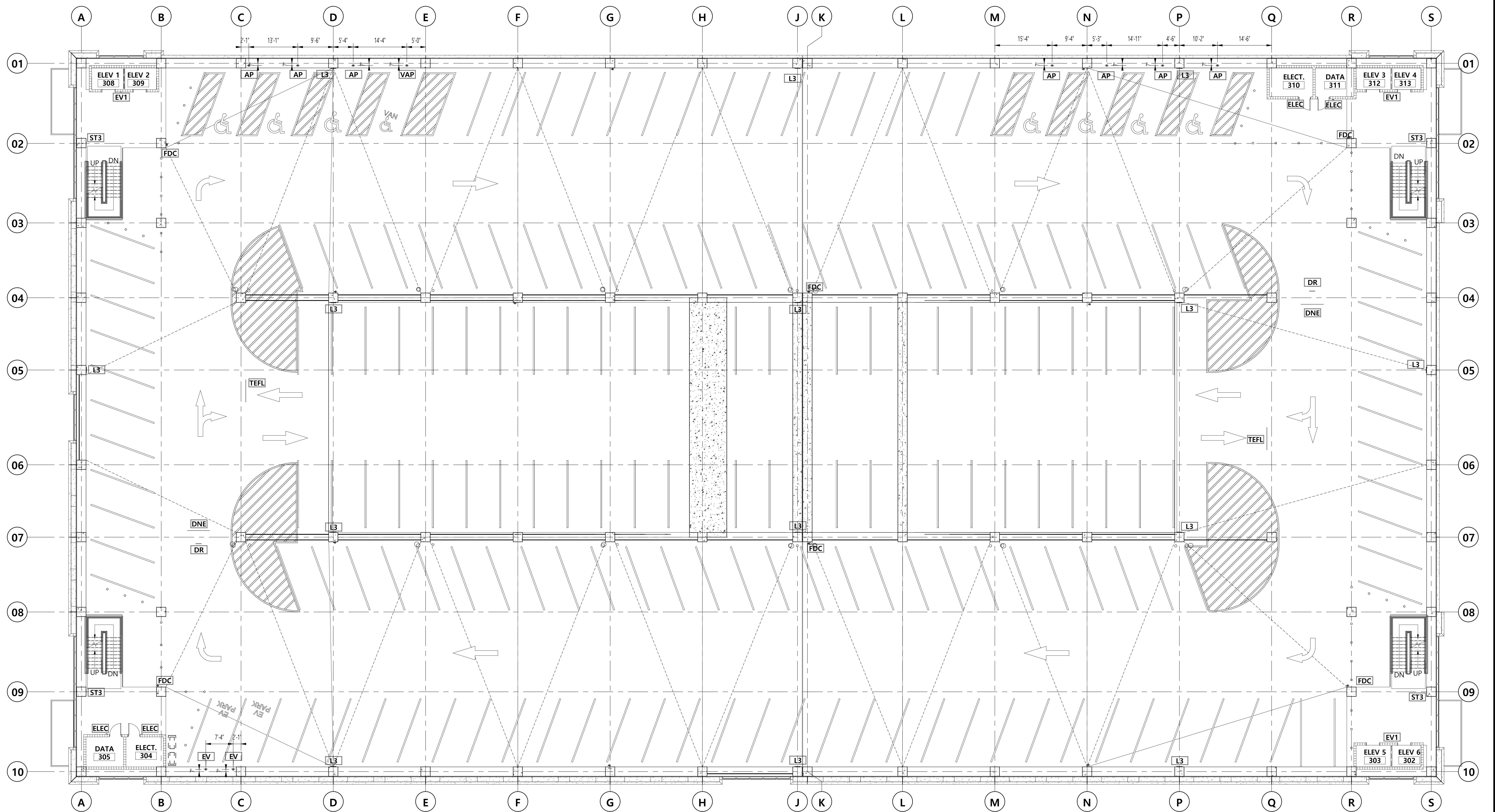
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**1 Signage Plan - Level 2**  
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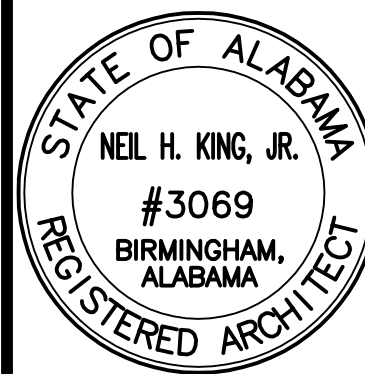
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**Signage Plan - Level 3**  
 SCALE: 3/32" = 1'-0"

**Mobile Civic Center  
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Revisions	
sheet title	SIGNAGE PLAN - LEVEL 3
job no.	4308
des. by	ETA
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date	August 5, 2023
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# Mobile Civic Center Parking Facility

Mobile, Alabama



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sheet title  
SIGNAGE PLAN - LEVEL 4

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of 154

date: **A4.40**

of 75

date: August 5, 2023

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**Signage Plan - Level 4**  
SCALE: 3/32" = 1'-0"

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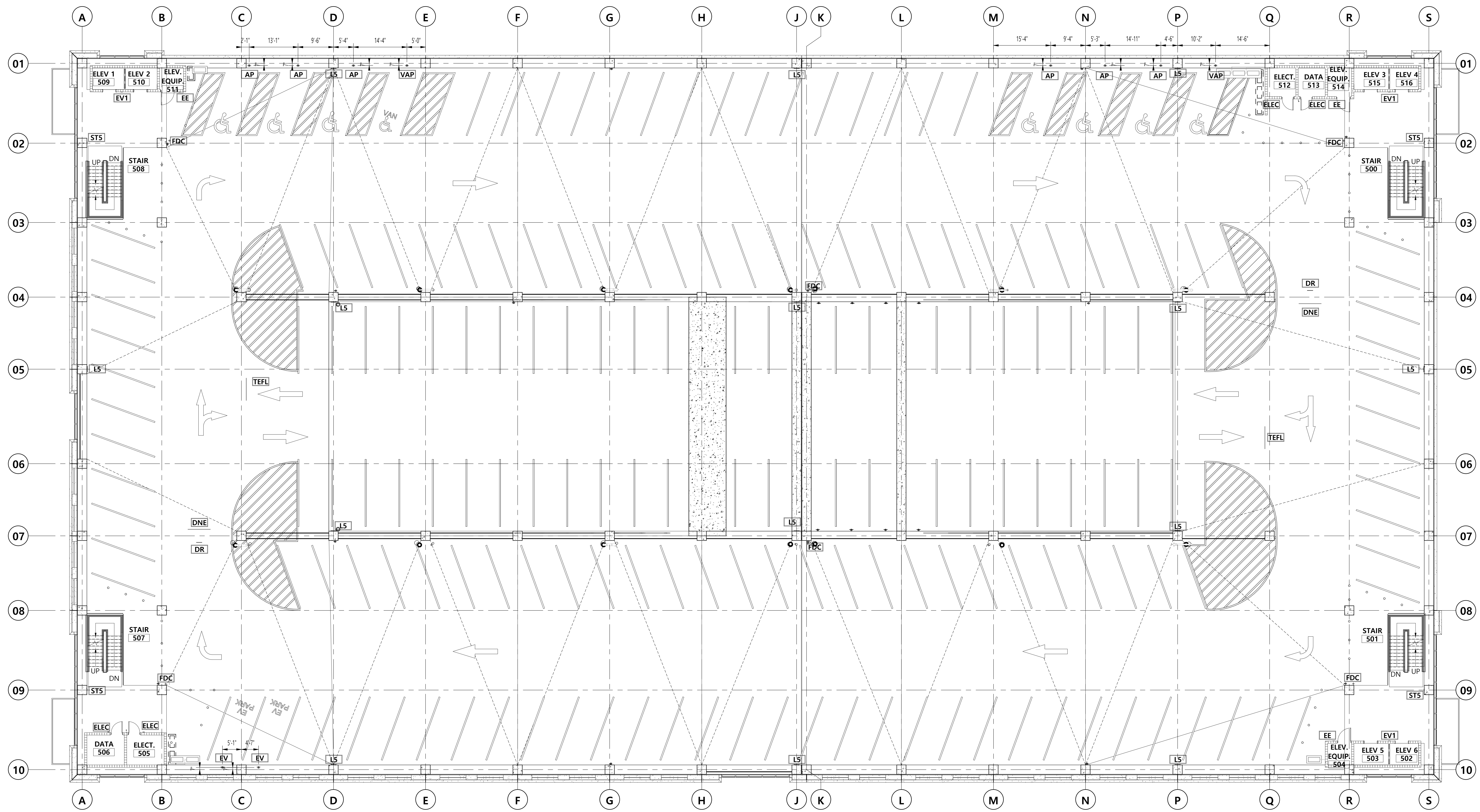
# Mobile Civic Center Parking Facility

Mobile, Alabama



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date	August 5, 2023
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of	75



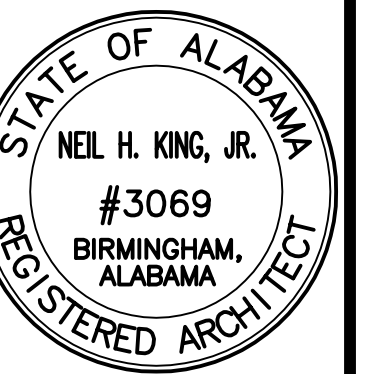
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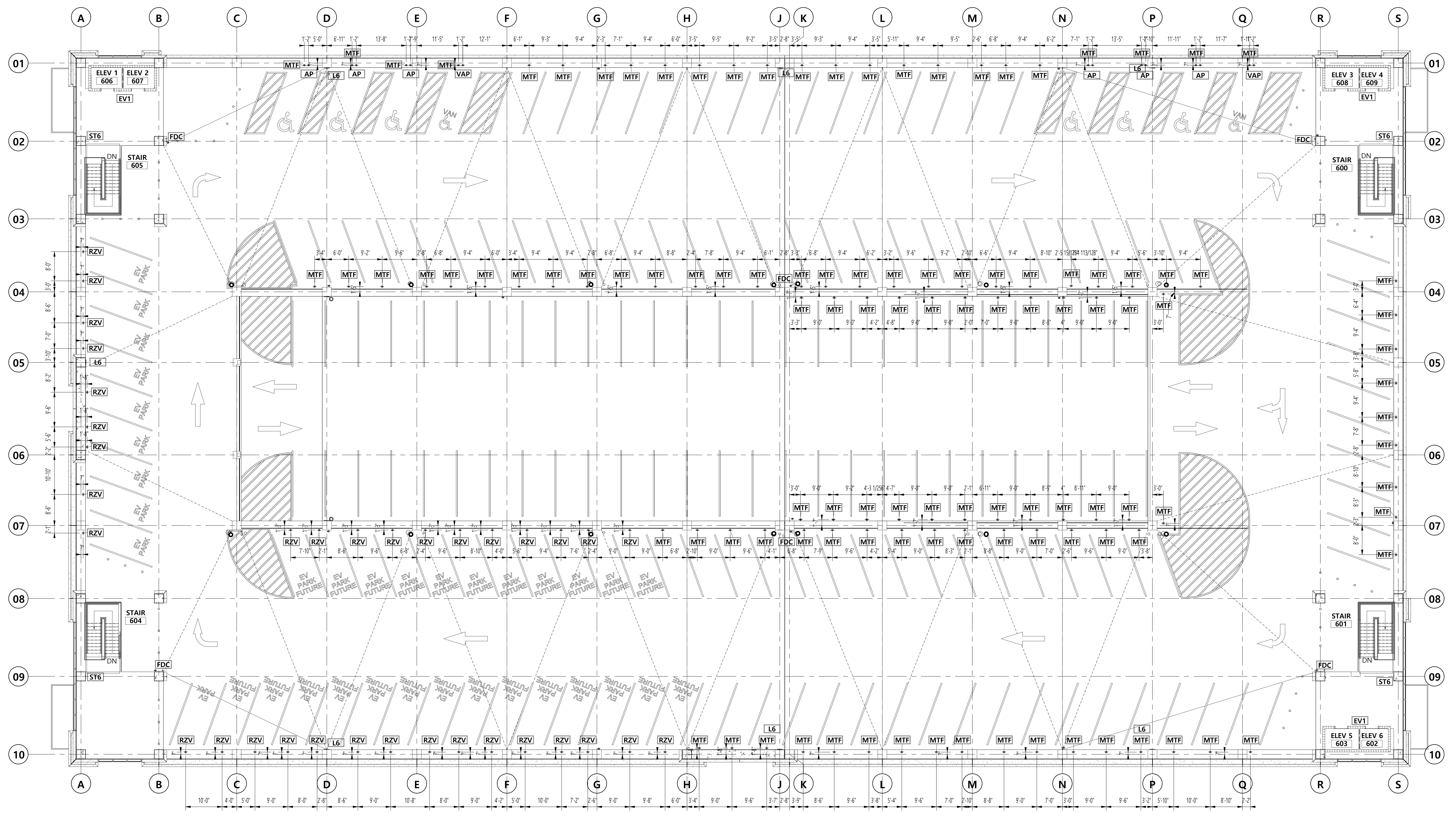
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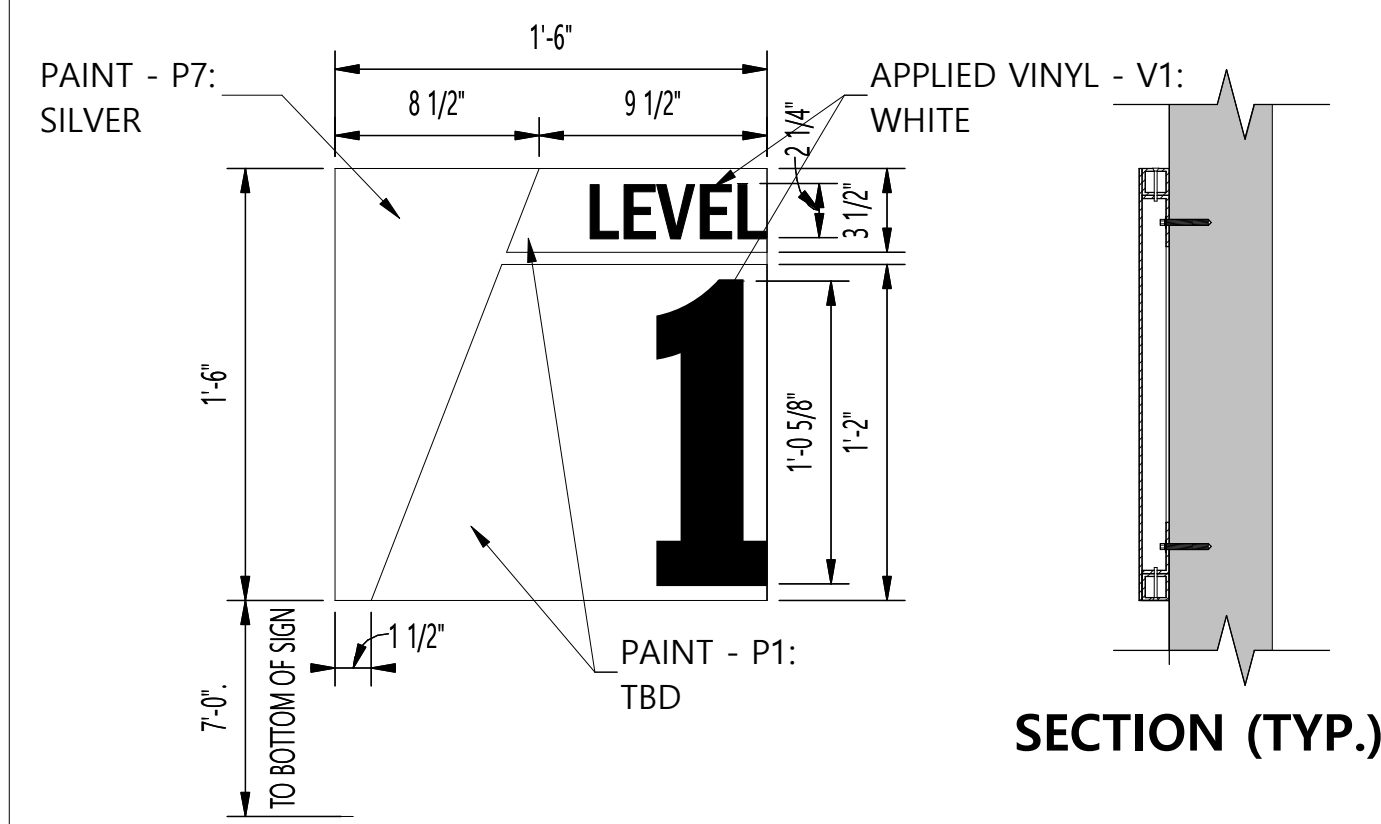
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DATE	August 5, 2023
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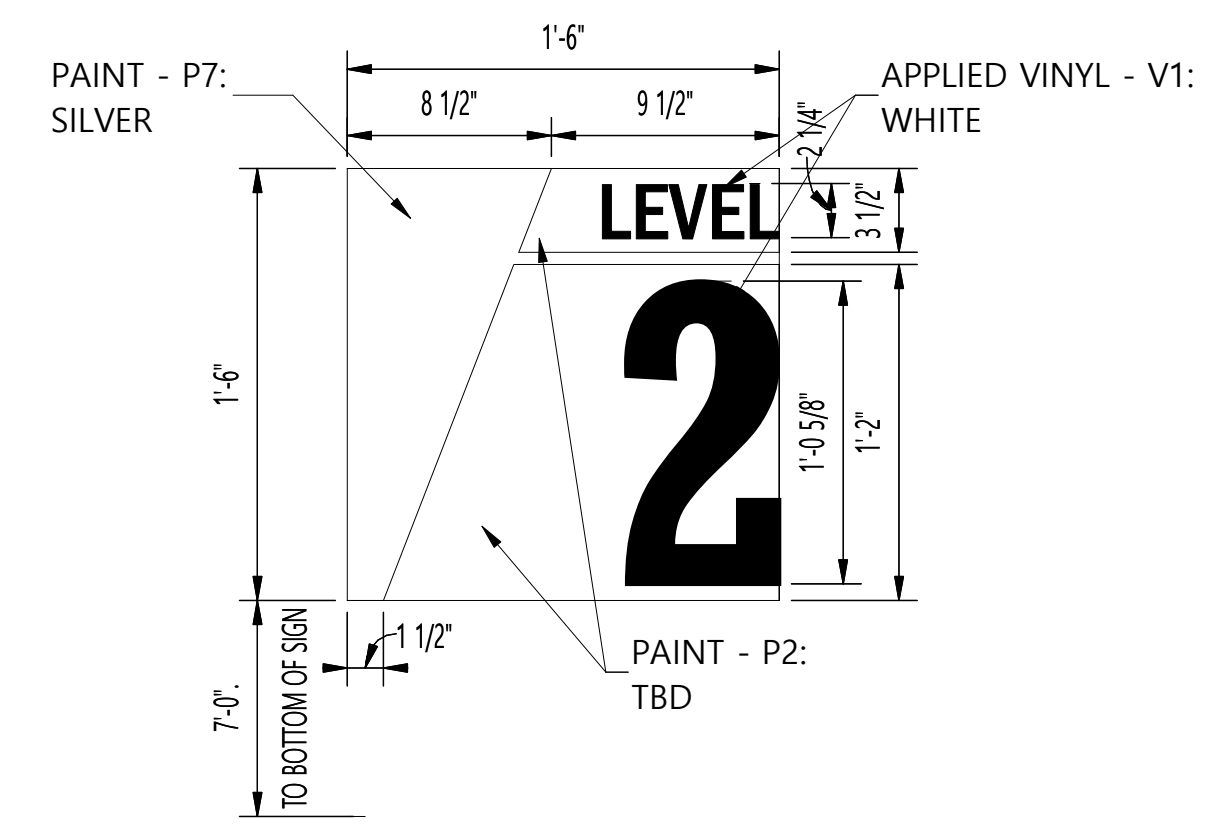
### Signage Plan - Level 6

SCALE: 3/32" = 1'-0"

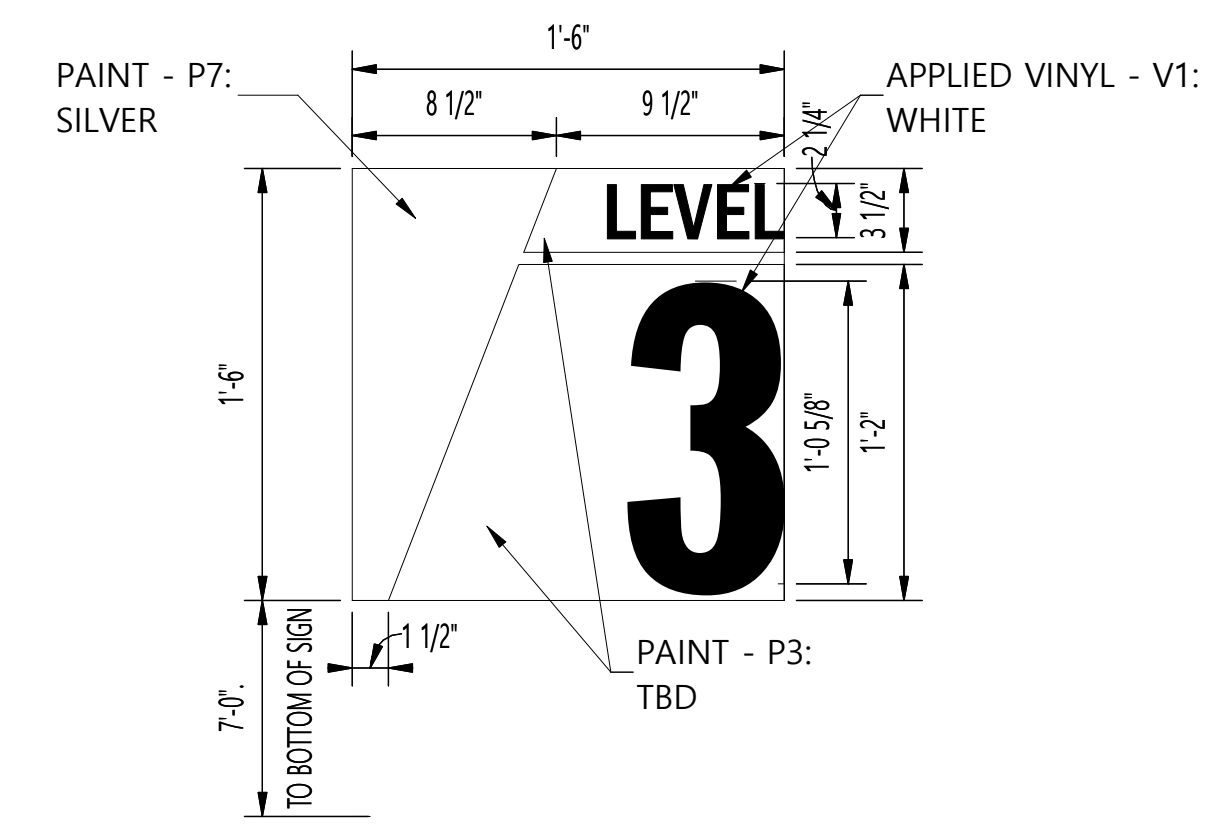
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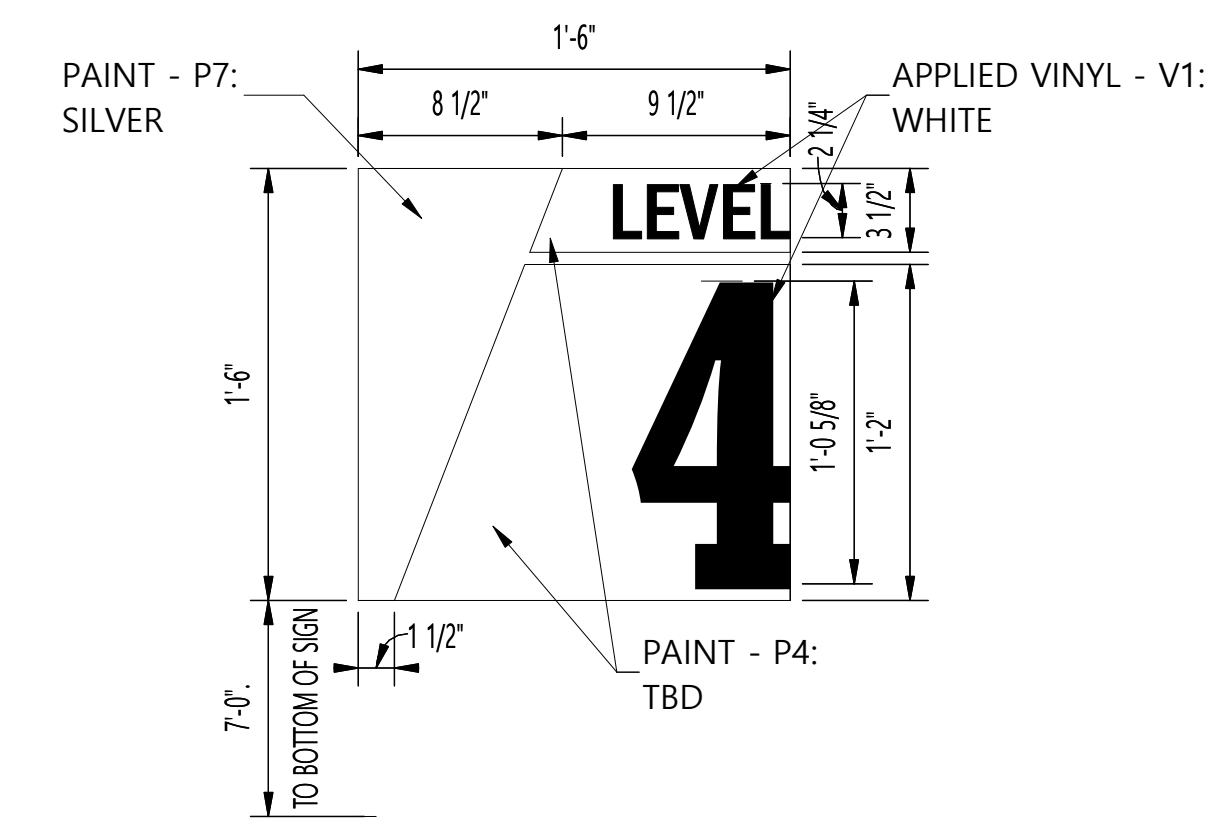
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MOUNT DETAIL A



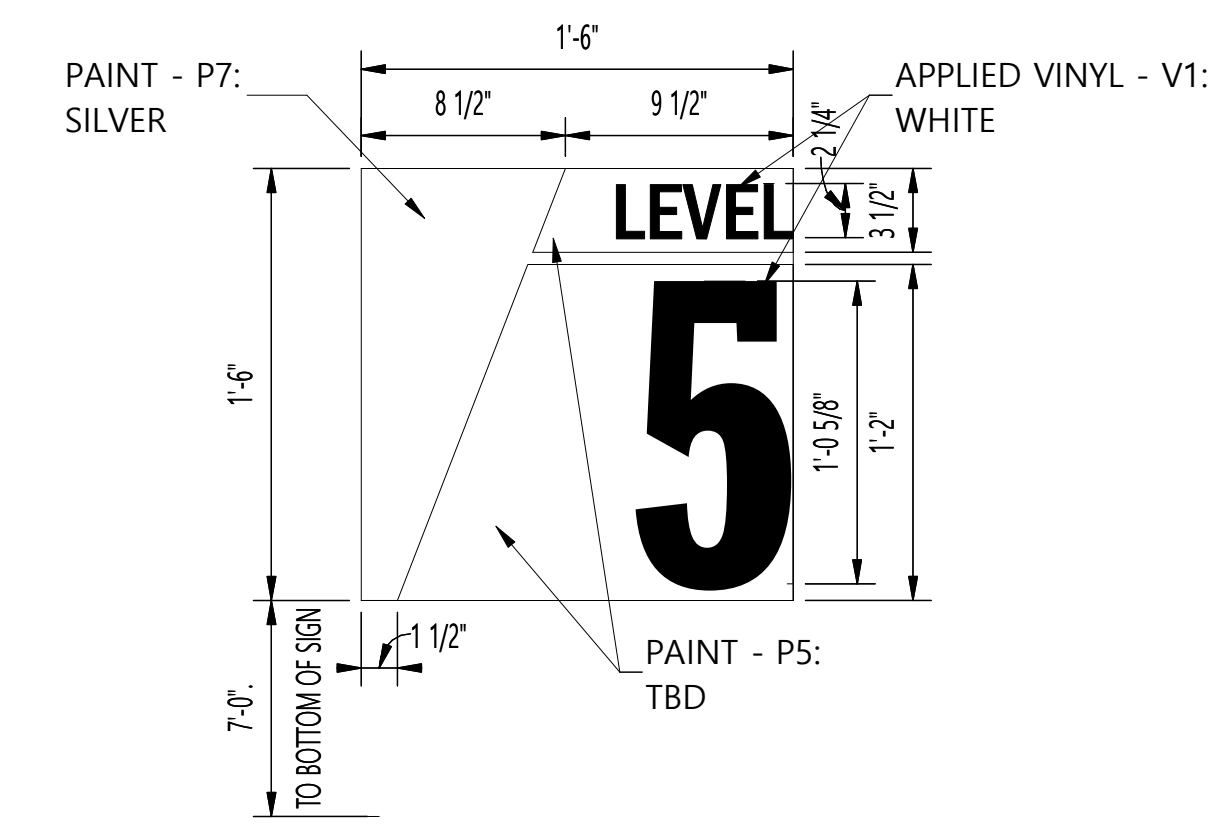
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MOUNT DETAIL A



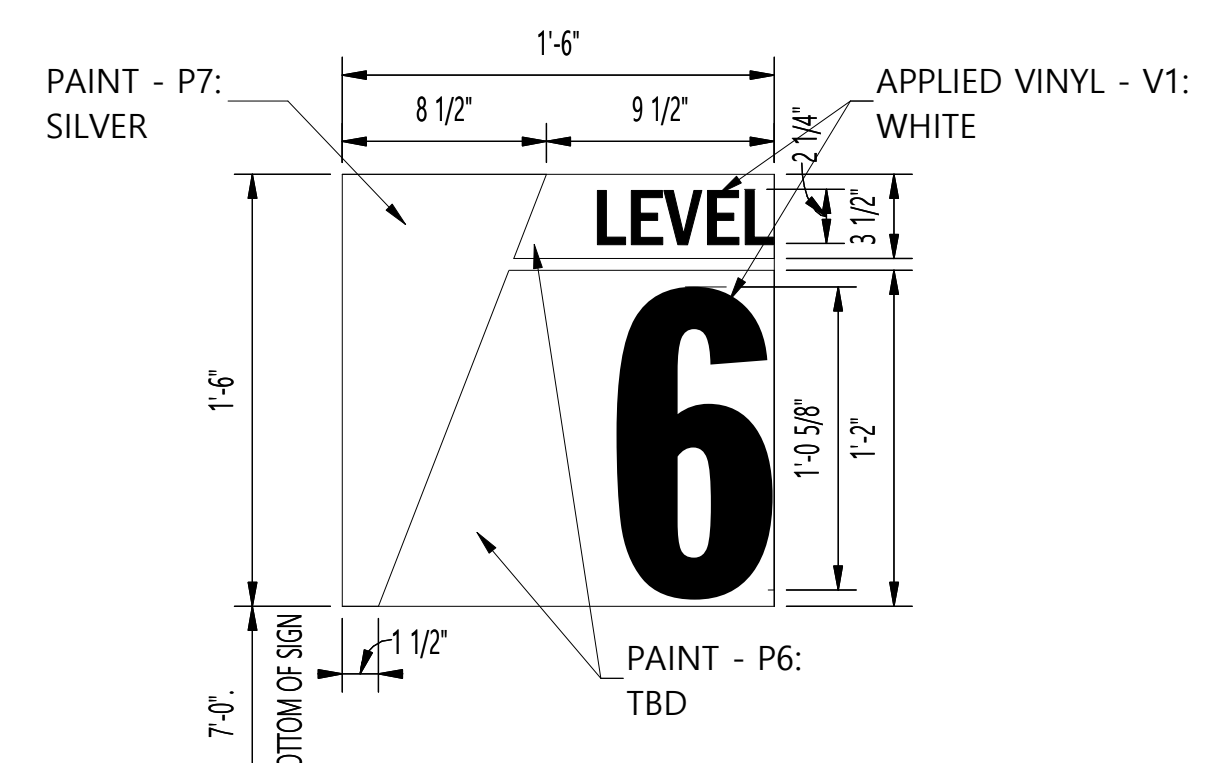
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MOUNT DETAIL A



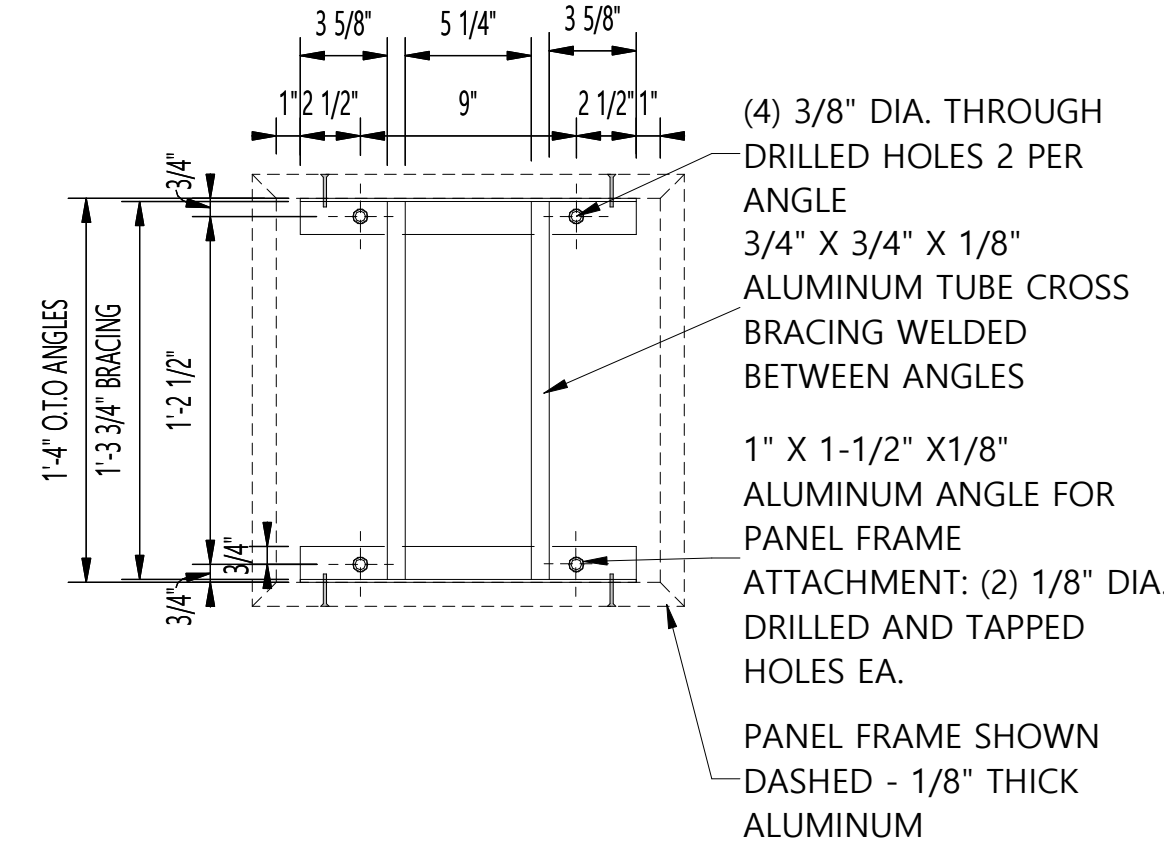
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MOUNT DETAIL A



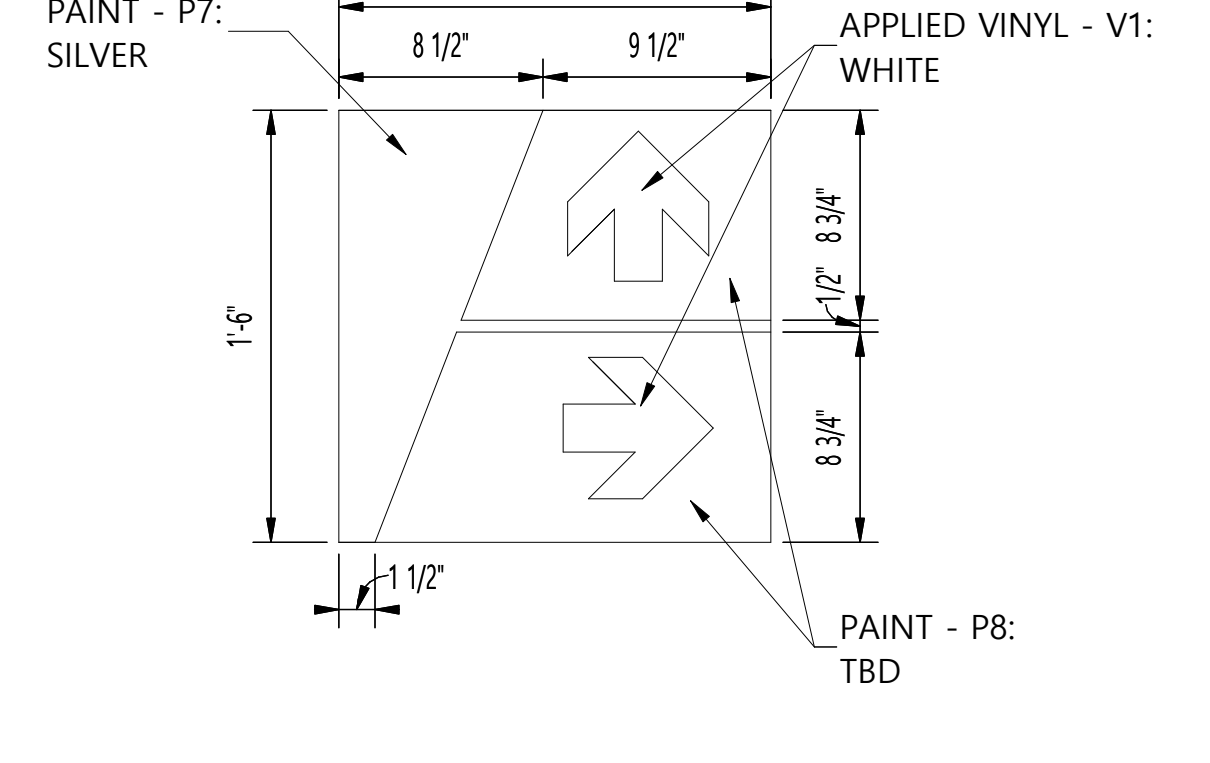
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MOUNT DETAIL A



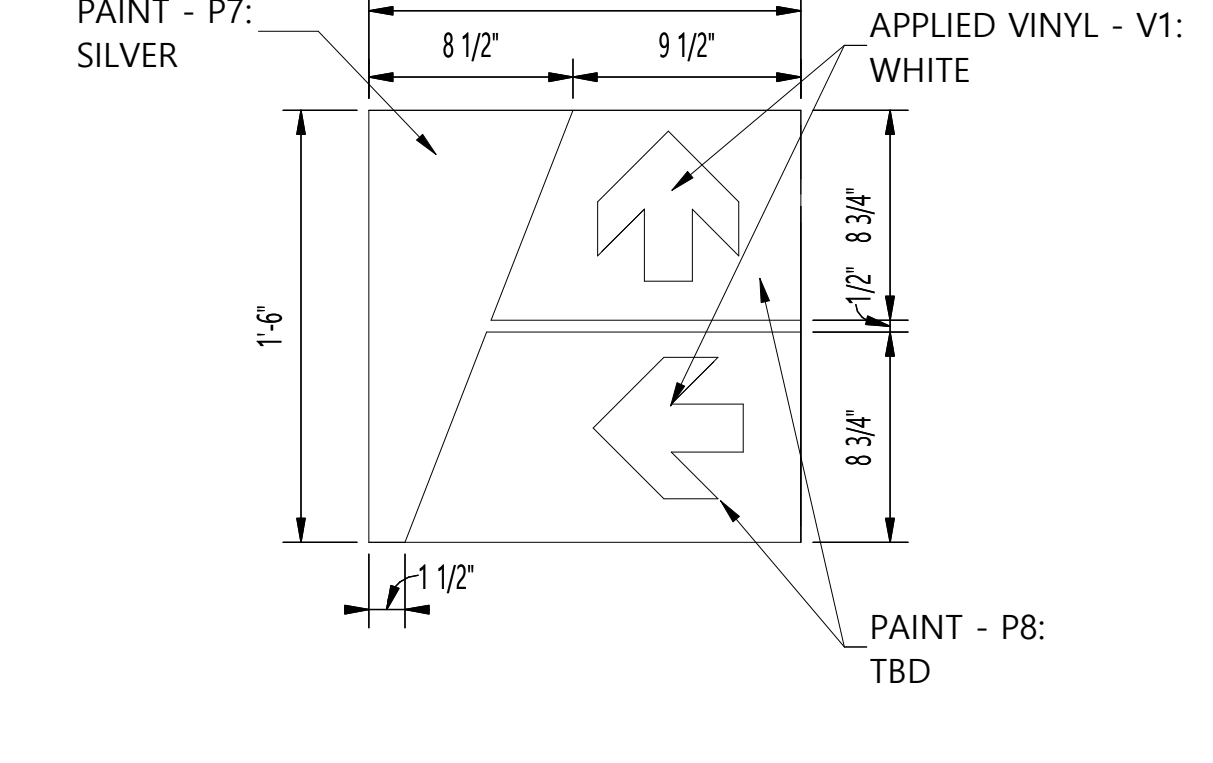
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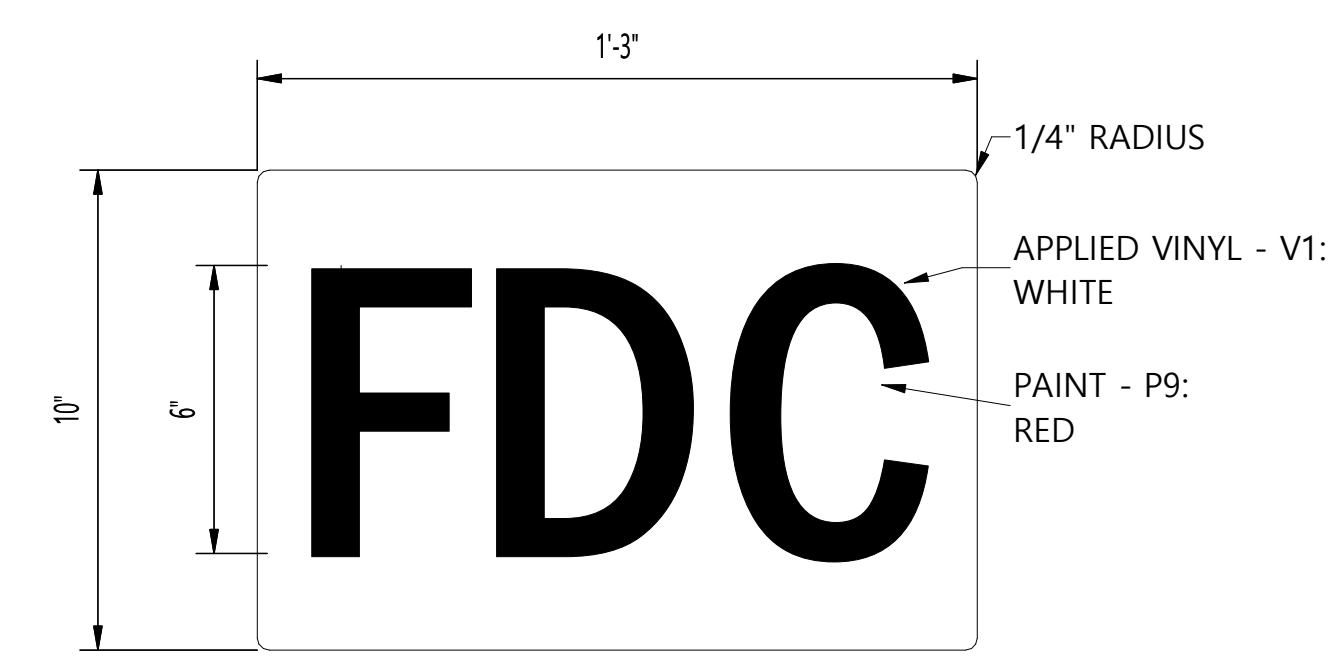
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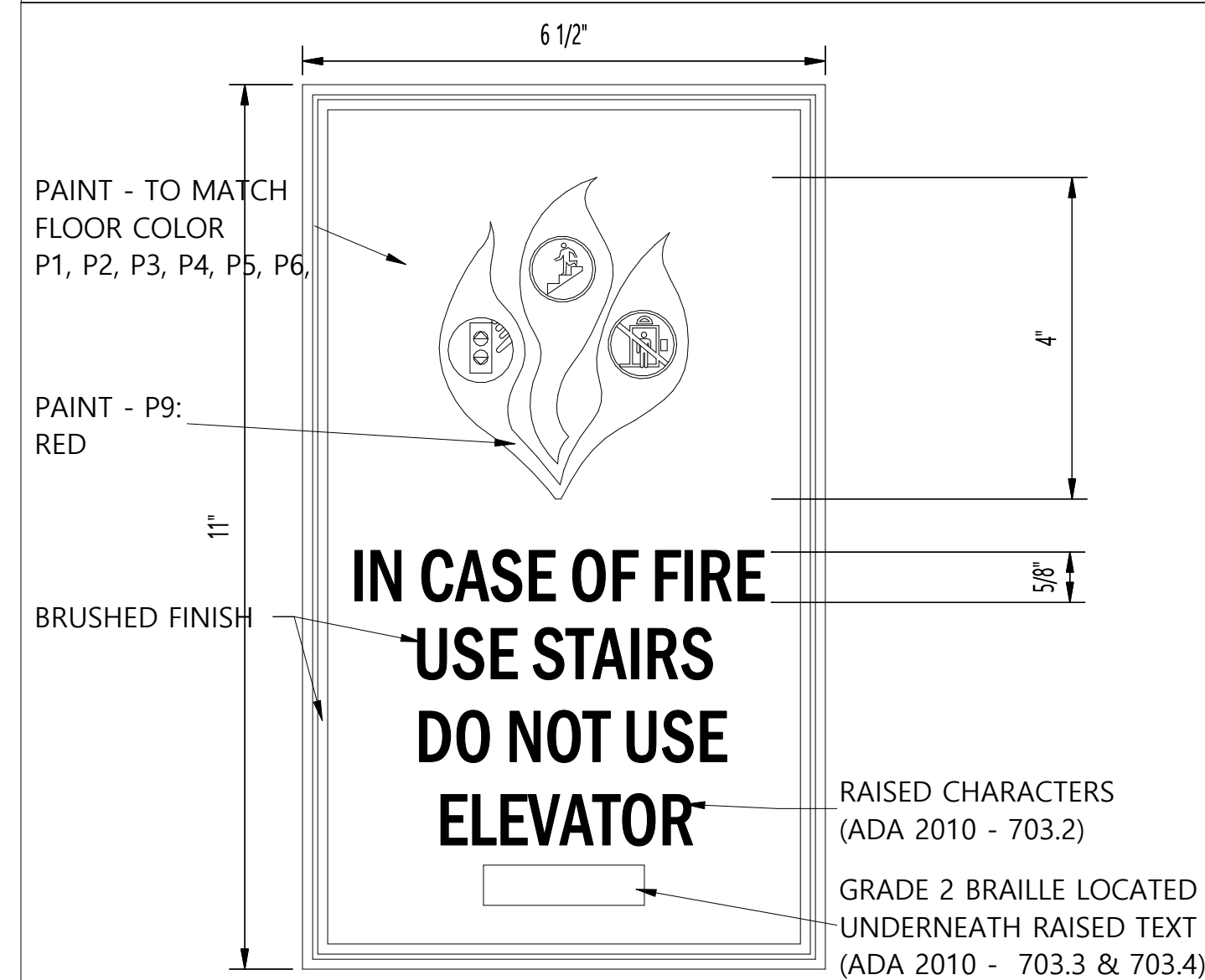
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MOUNT DETAIL B



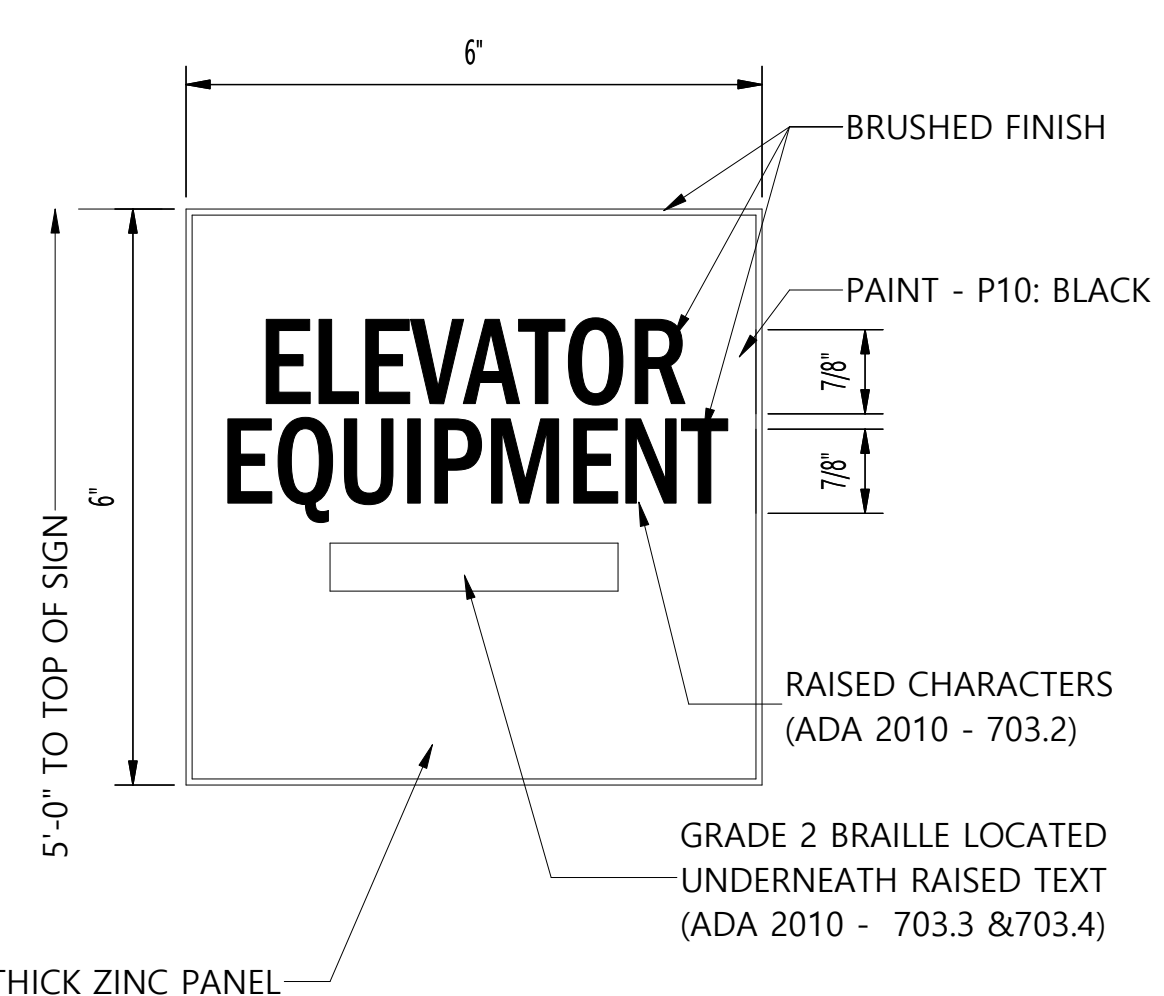
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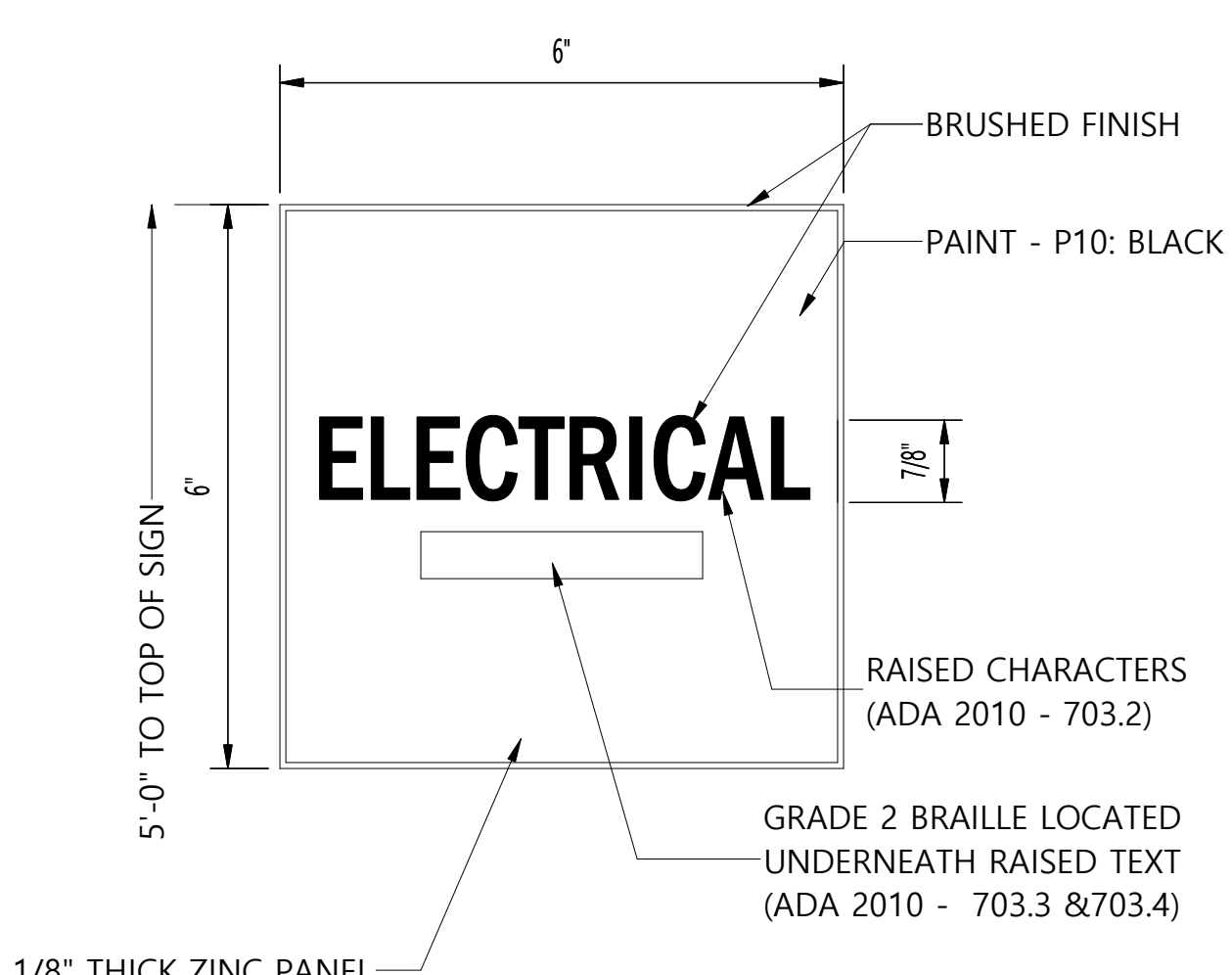
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MOUNT DETAIL B



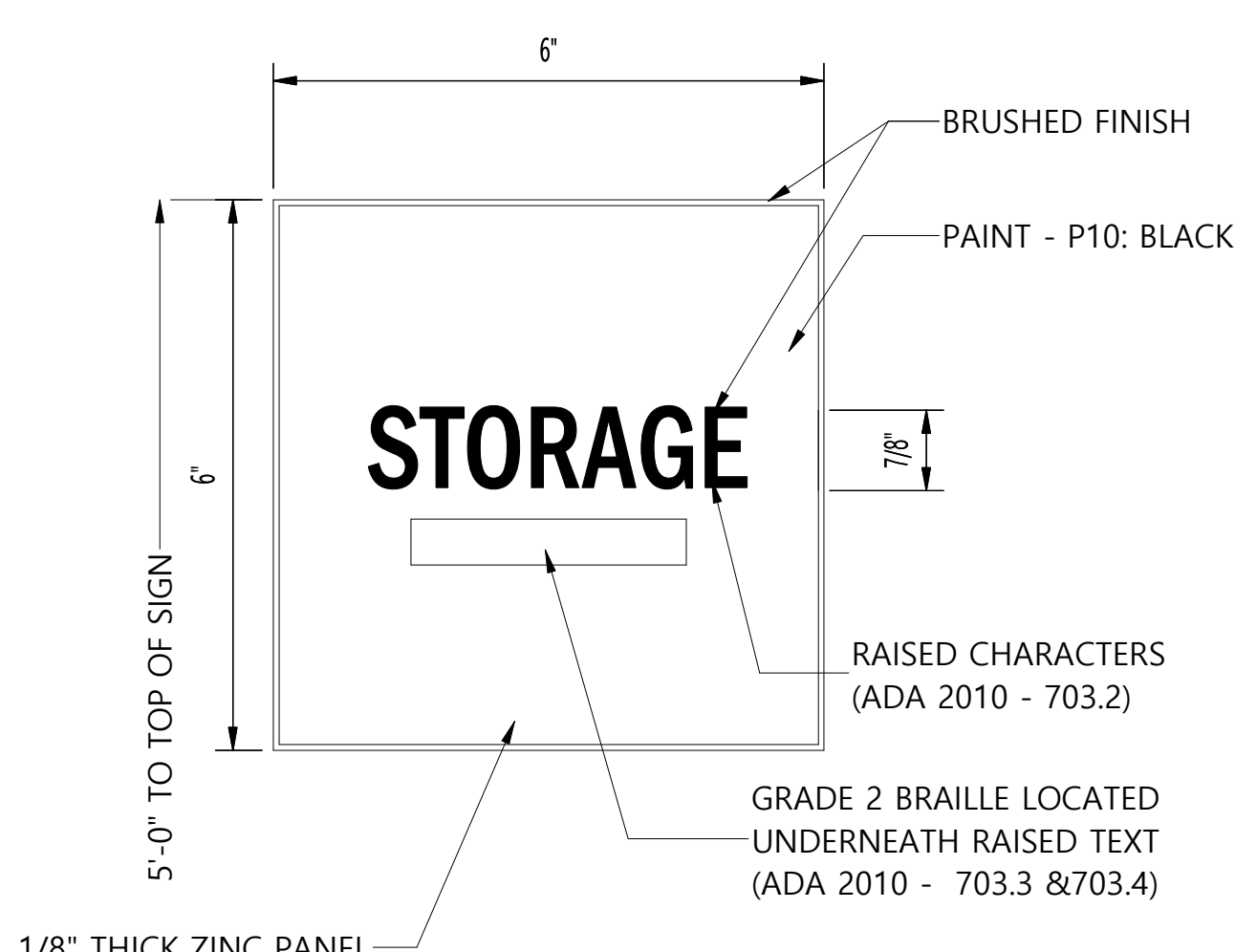
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MOUNT DETAIL B



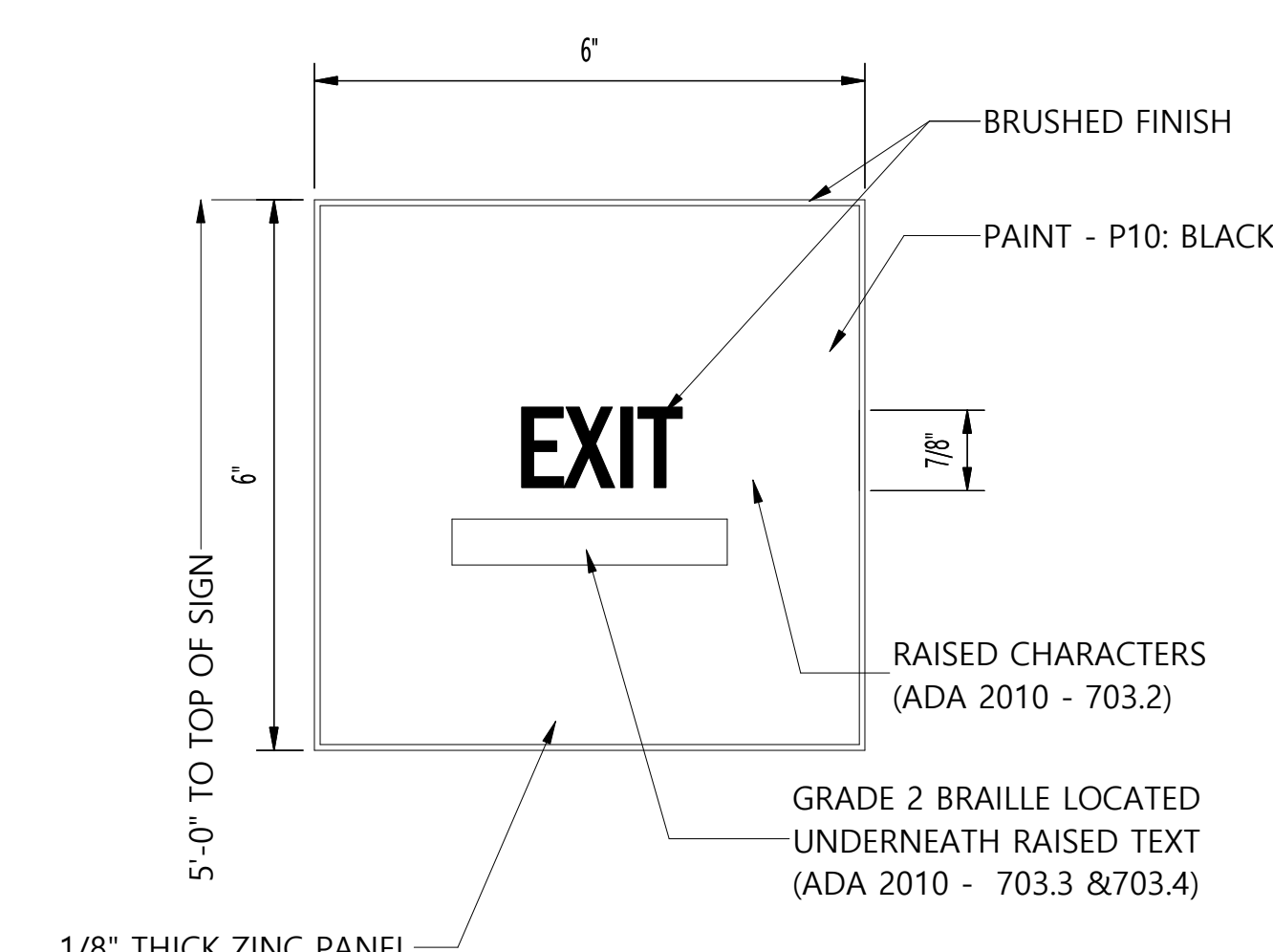
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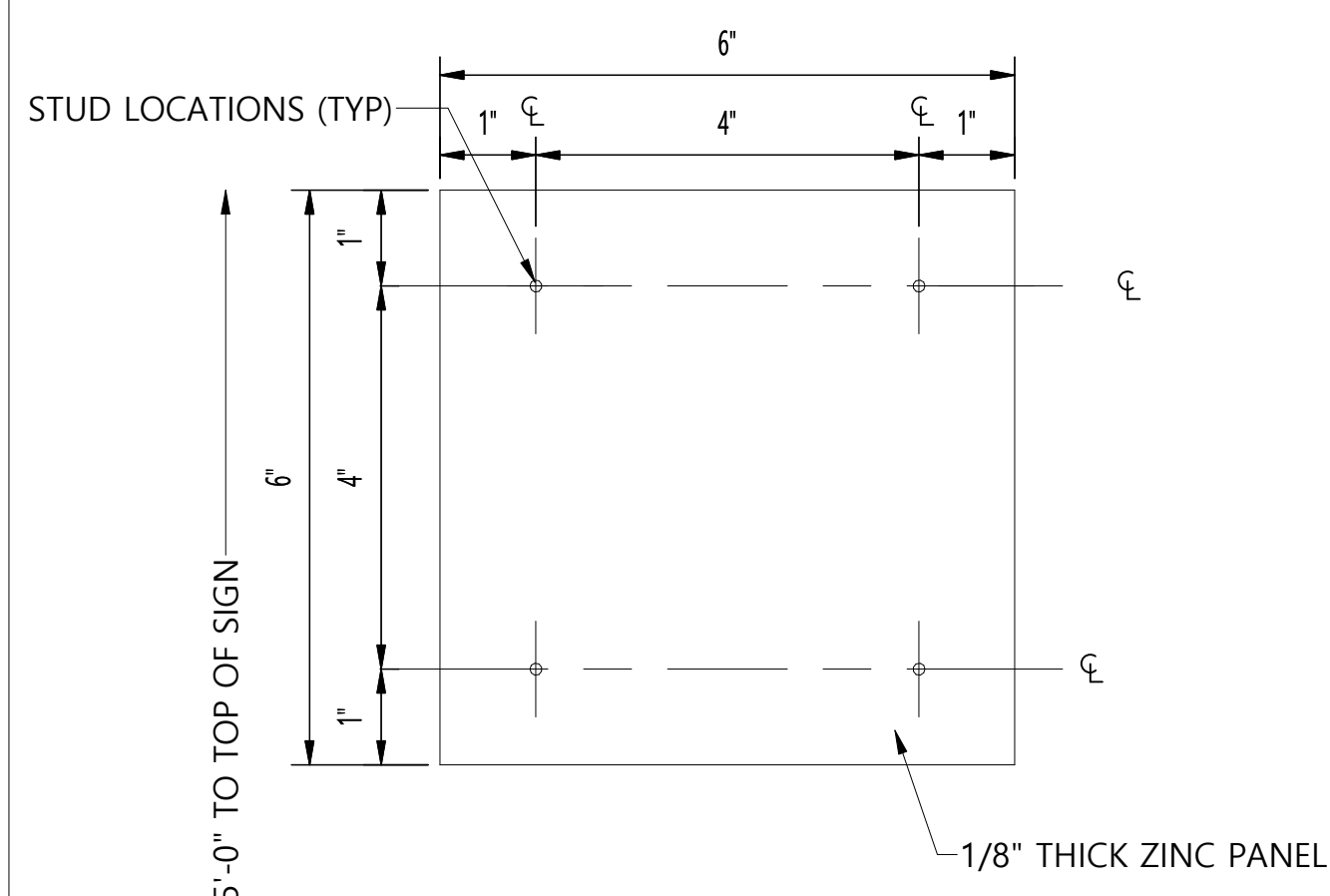
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SCALE: 6" = 1'-0"  
MOUNT DETAIL B



**SIGNAGE TYPE: STOR** PLAN SYMBOL **STOR**  
SCALE: 6" = 1'-0"  
MOUNT DETAIL B



**SIGNAGE TYPE: EXIT** PLAN SYMBOL **EX**  
SCALE: 6" = 1'-0"  
MOUNT DETAIL B



**MOUNT DETAIL B**

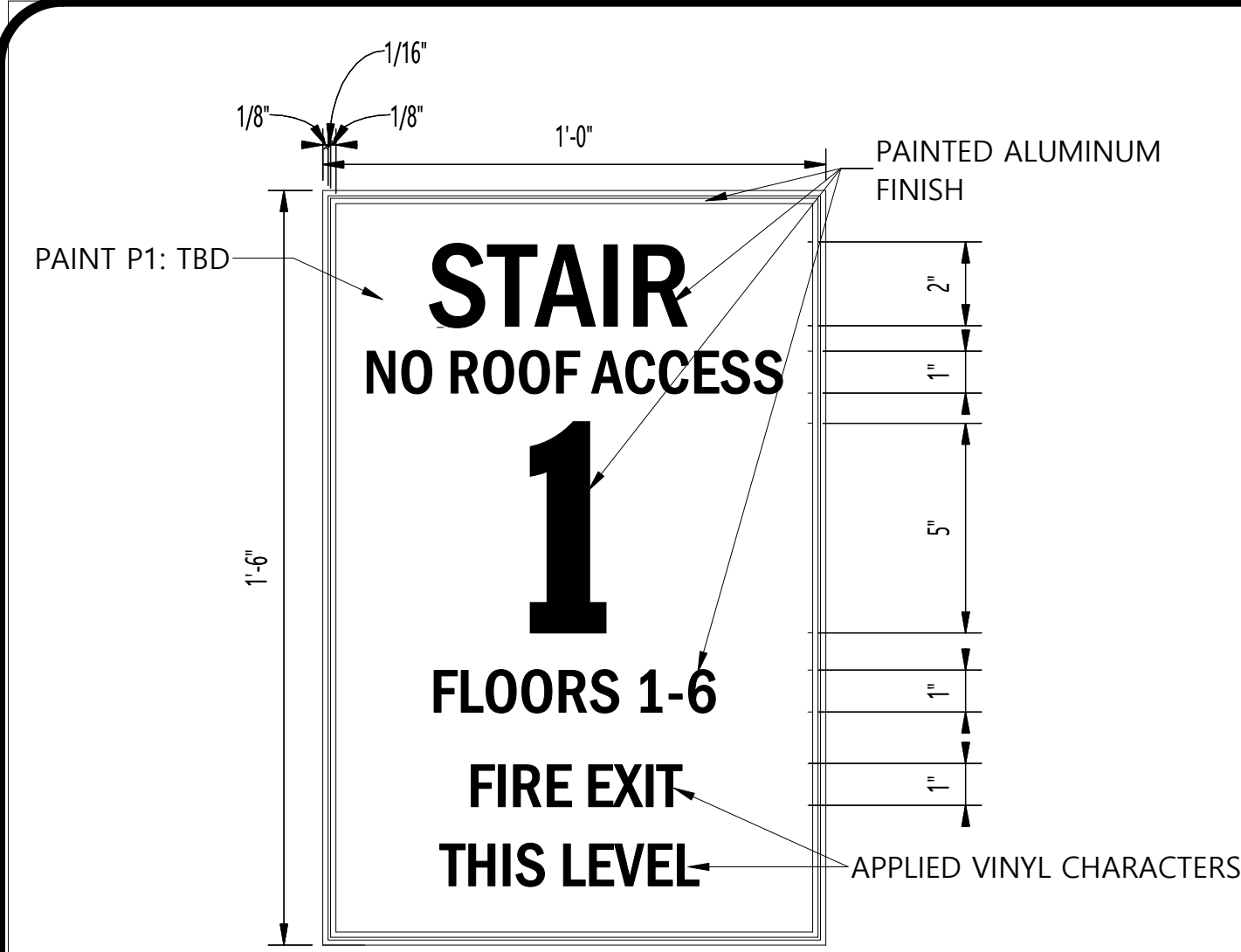
**GENERAL SIGNAGE NOTES**

1. PROVIDE HIGH PERFORMANCE EXTERIOR GRADE VINYL WITH 8-10 YEAR WARRANTY.
2. PROVIDE EXTERIOR SIGN GRADE PAINT SYSTEM BY MATTHEWS, AKZO-NOBEL OR EQUAL.
3. ZINC SIGN TO HAVE ETCHED ADA COMPLIANT RAISED TEXT AND BRAILLE.
4. PREPARE CONCRETE SMOOTH AND FLAT ACCEPT STUD MOUNTED SIGNS

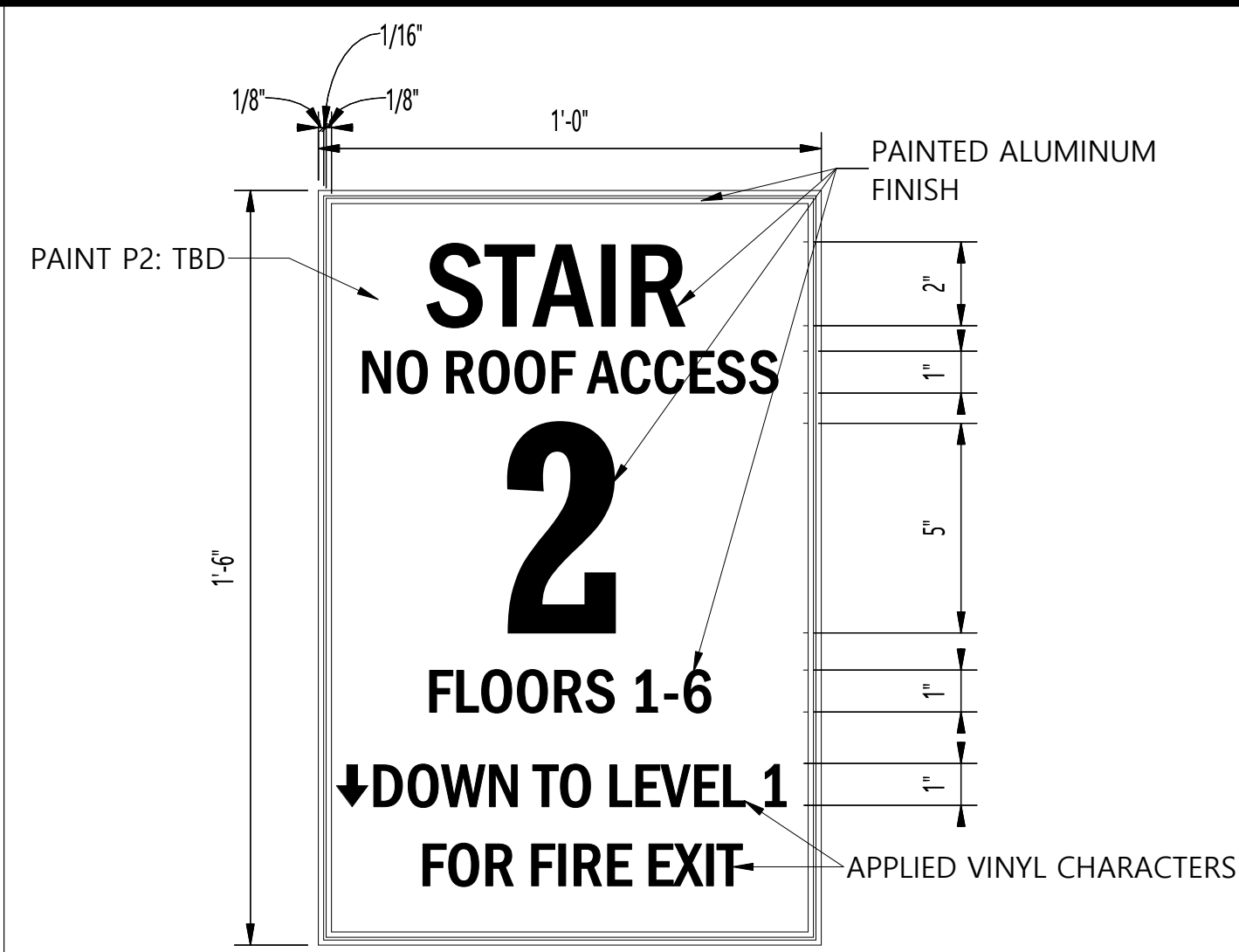


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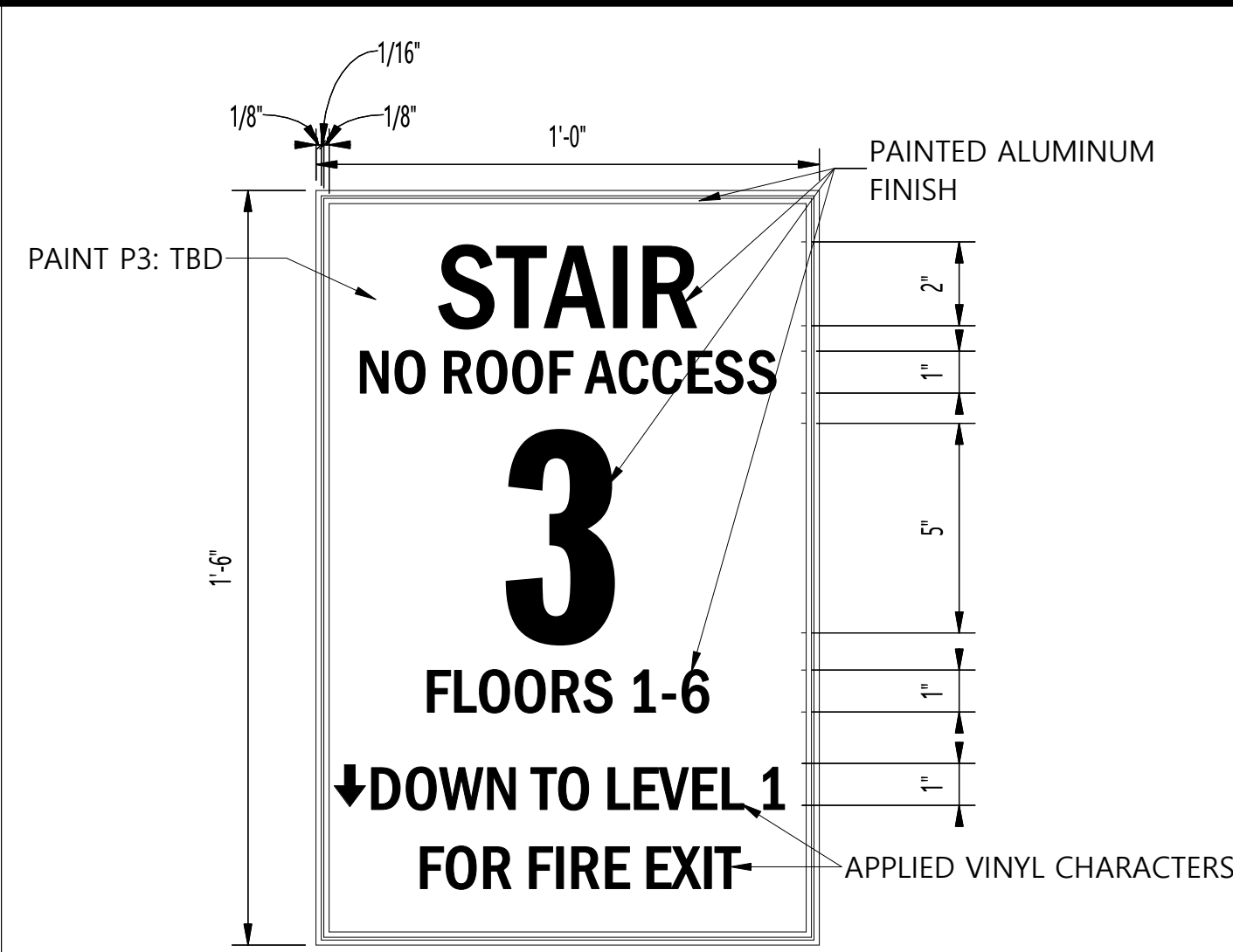
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des. by	ETA	date	072
chk. by	KING	of	154
date	August 5, 2023		
title	A4.70		
of	75		
date	August 5, 2023		
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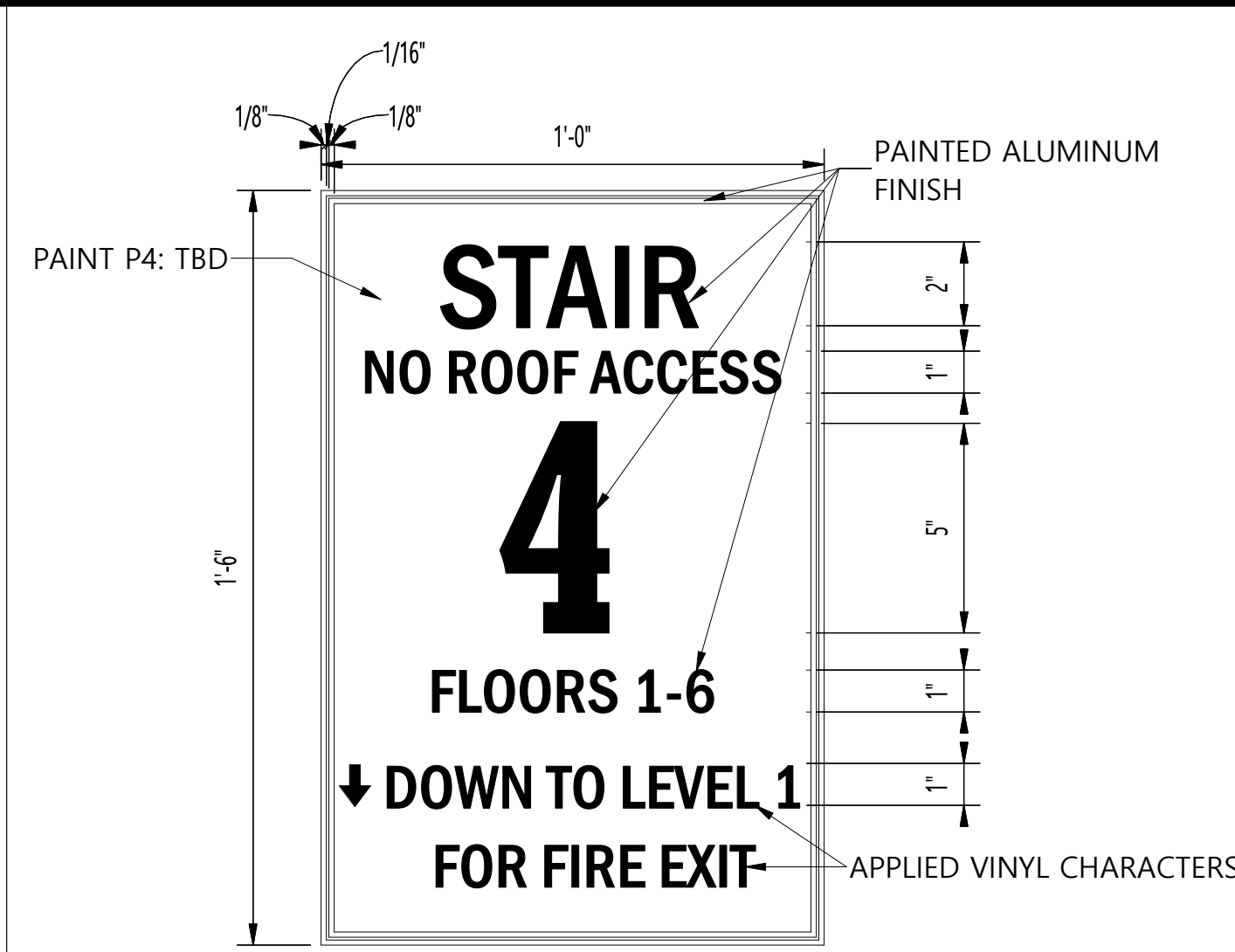
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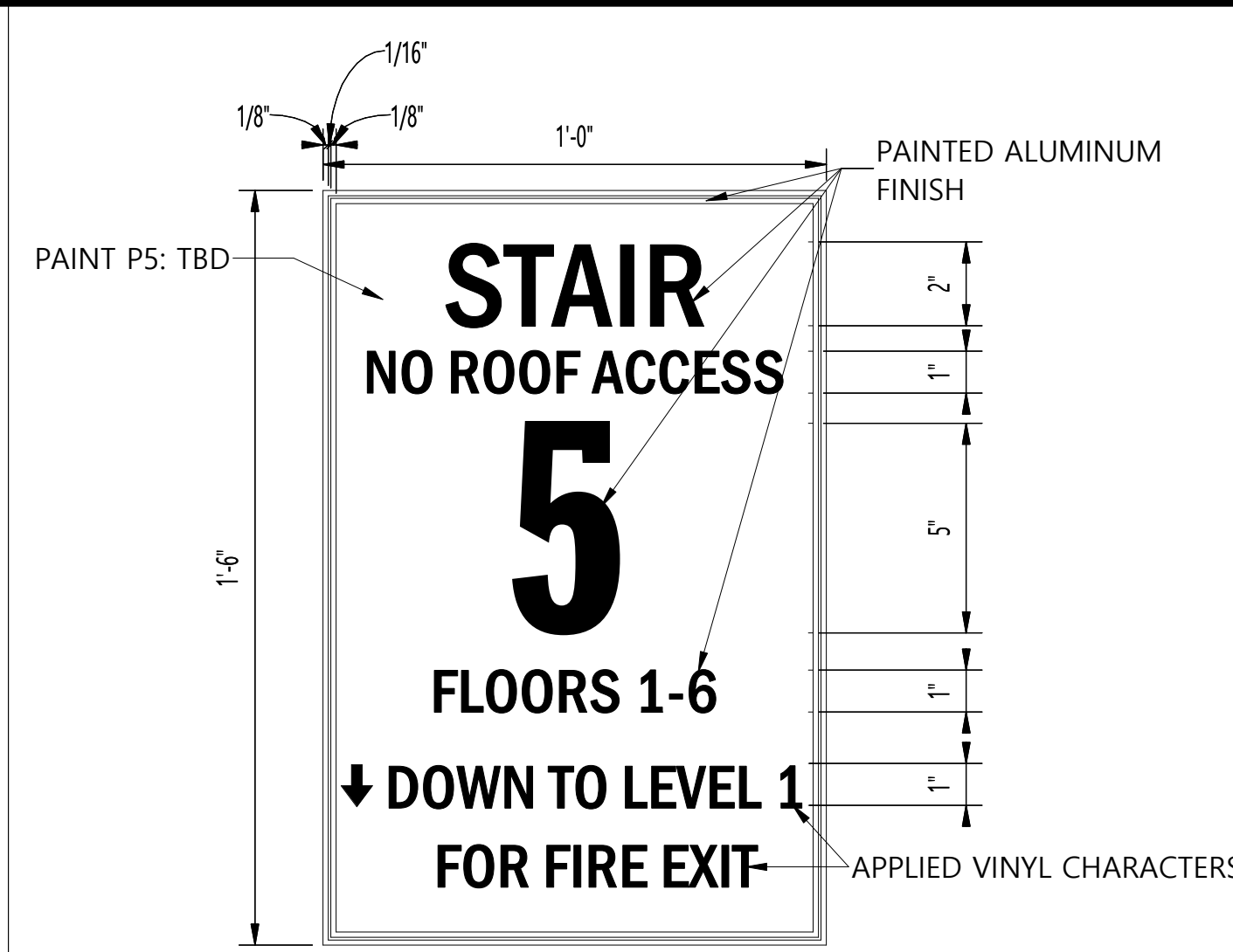
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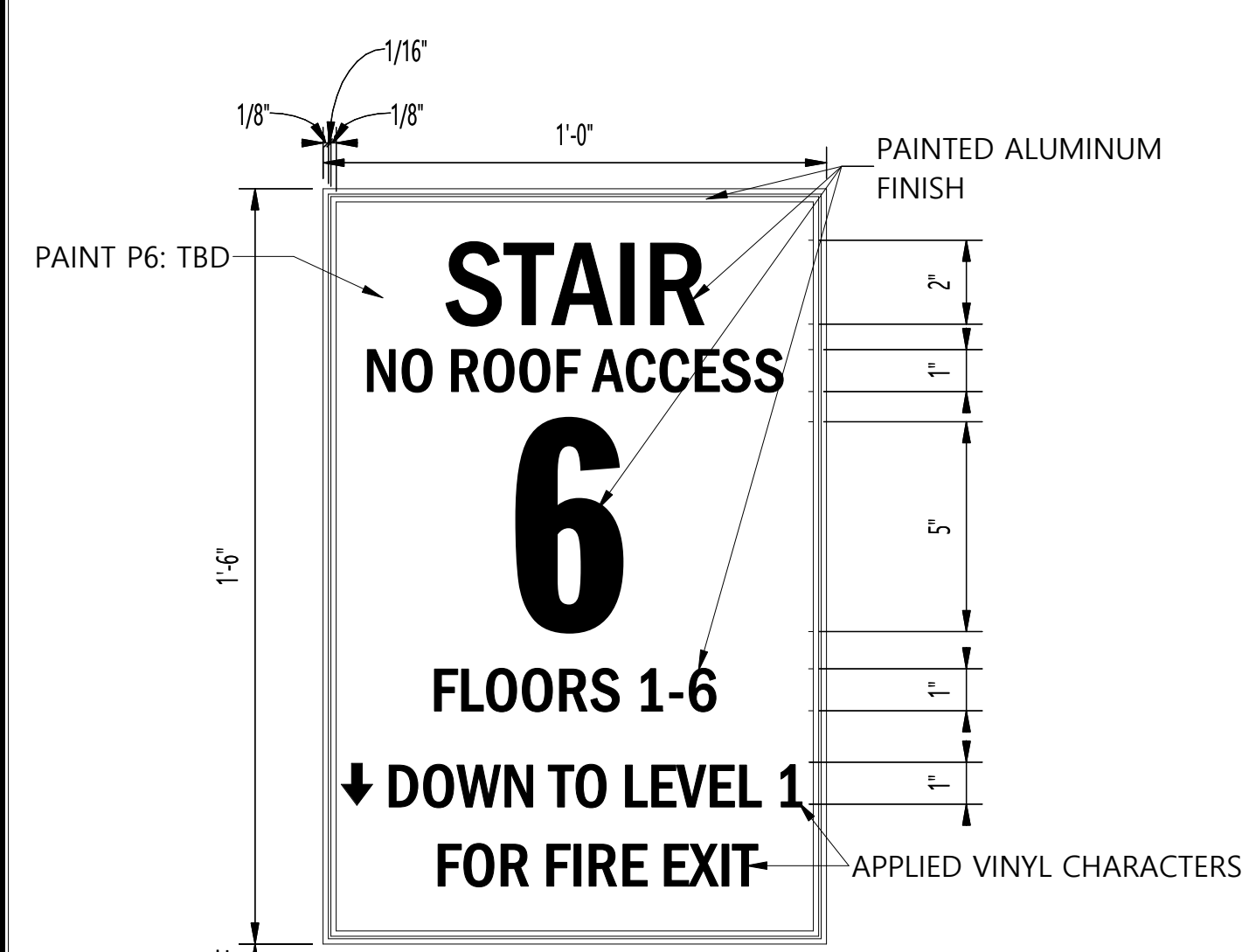
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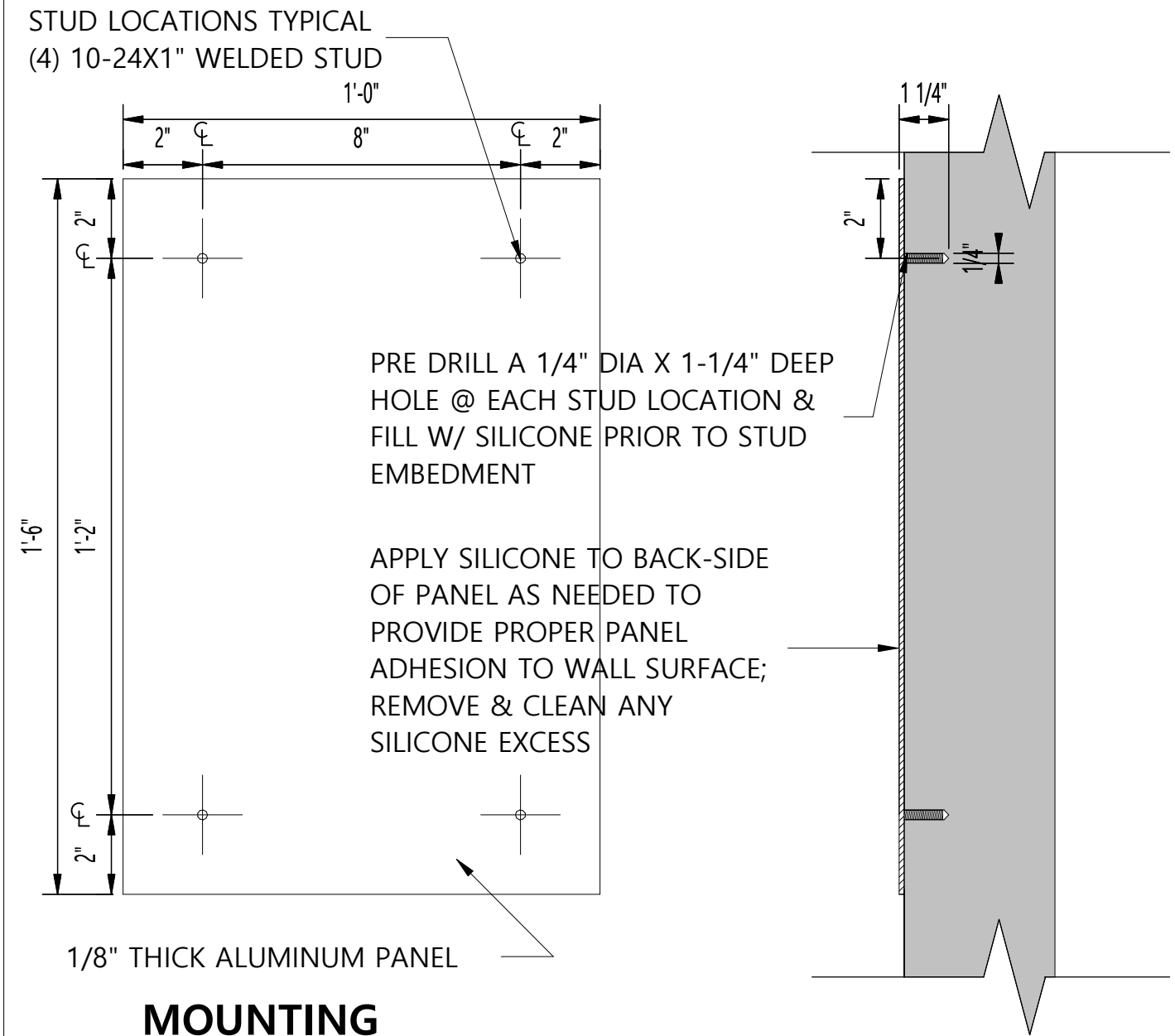
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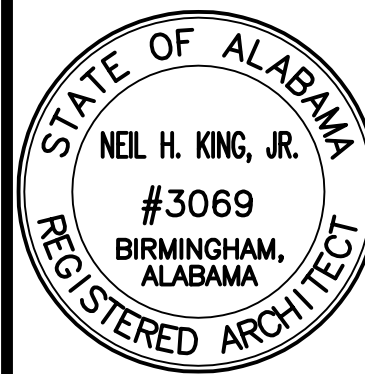


SIGNAGE TYPE: ST6 PLAN SYMBOL **ST6**  
SCALE: 3" = 1'-0"



MOUNTING  
SCALE: 3" = 1'-0"

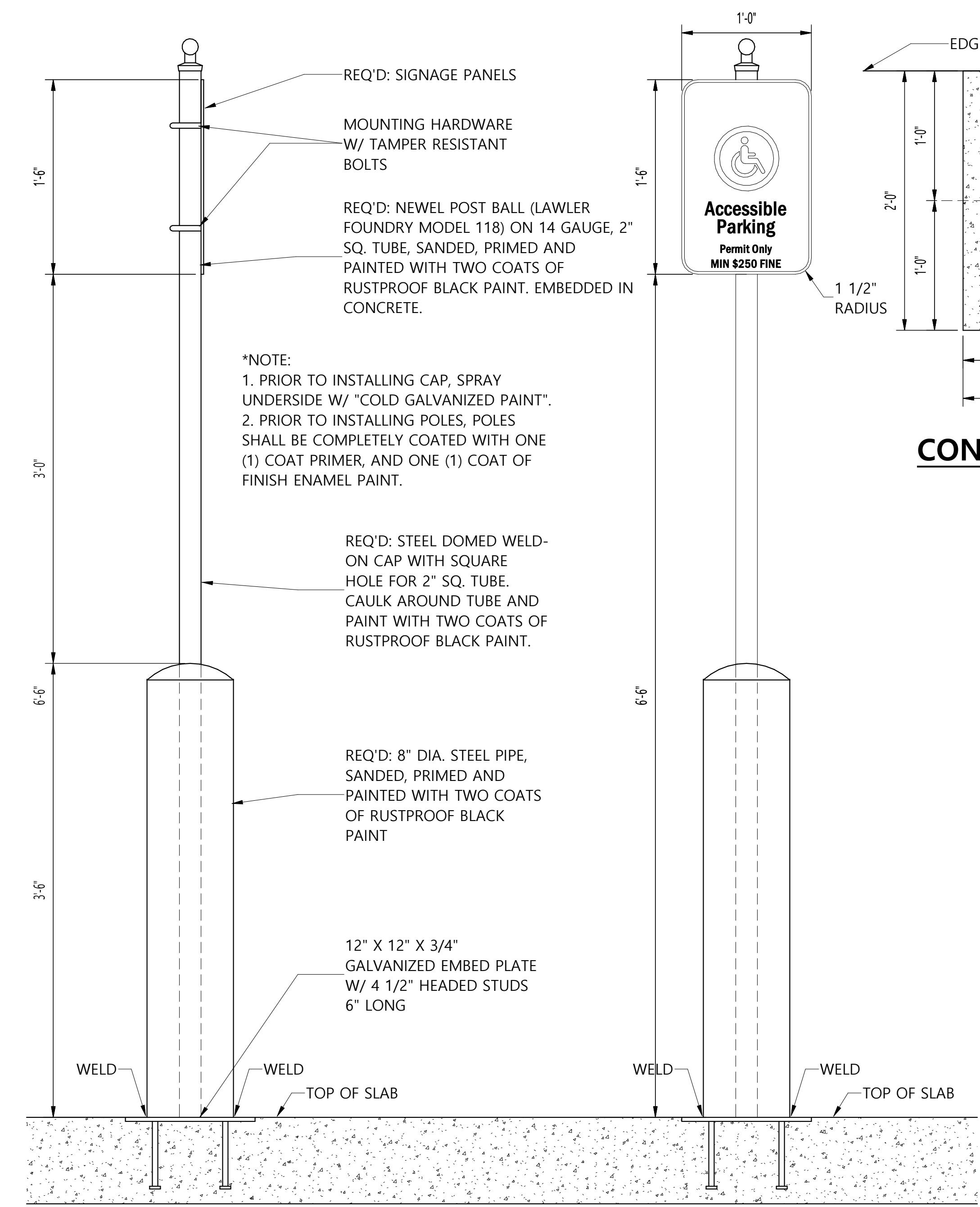
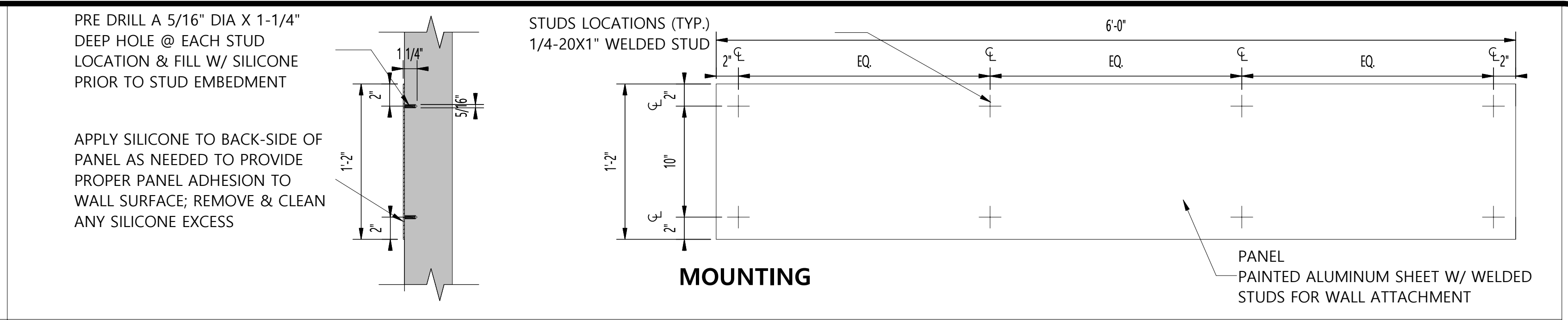
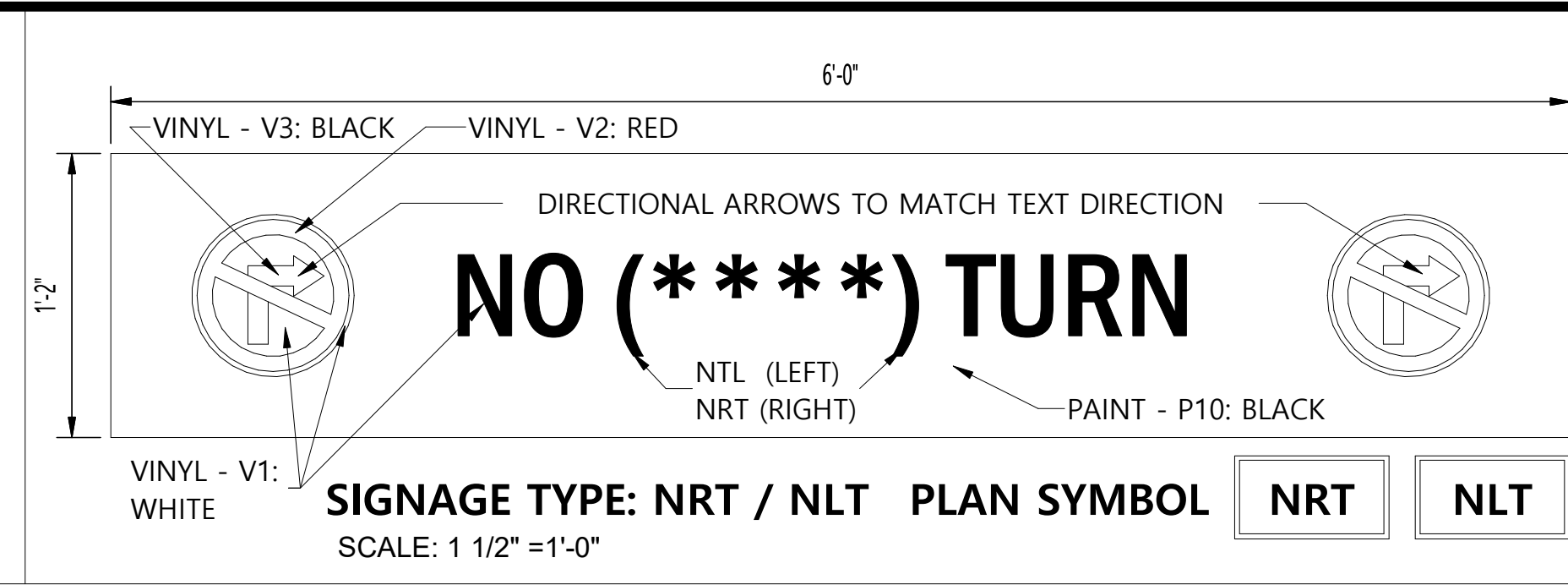
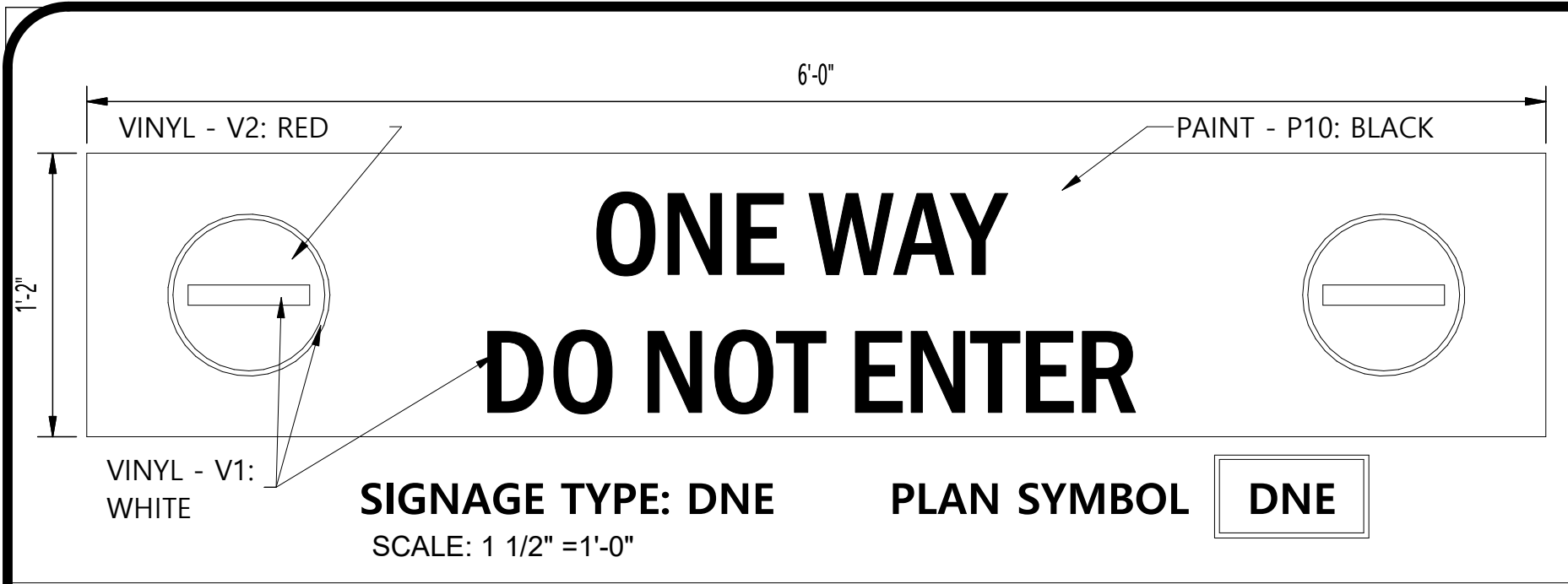
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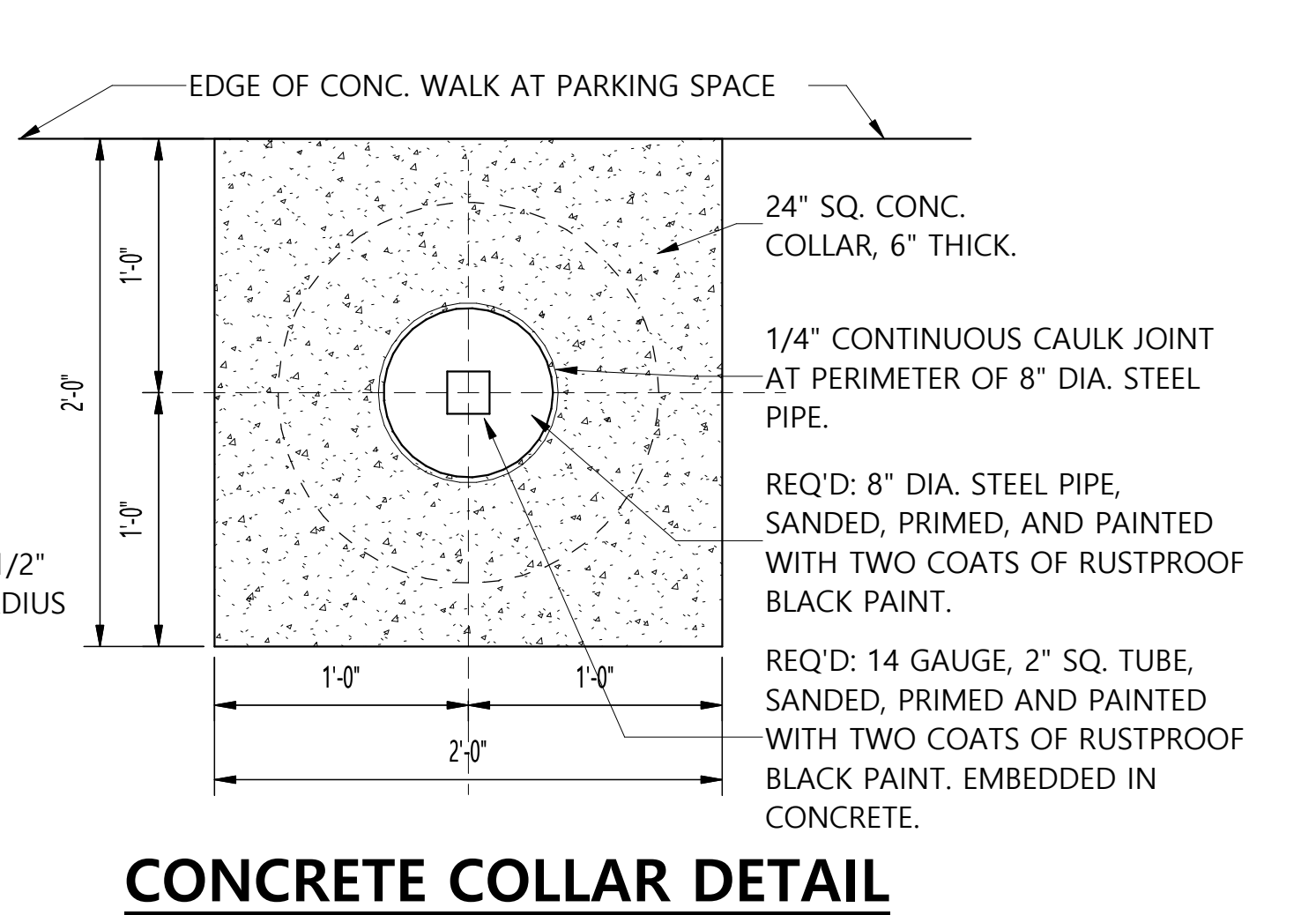
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Revisions	sheet title
	SIGNAGE DETAILS

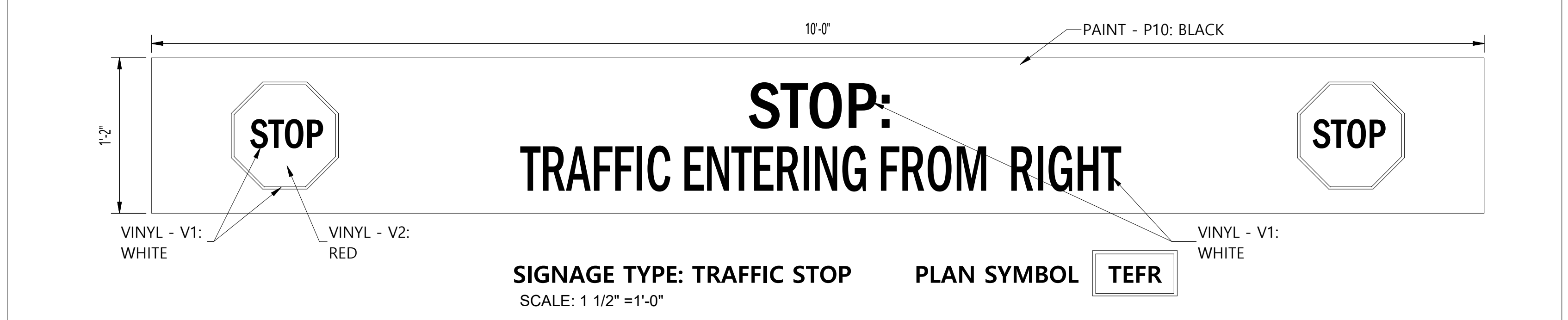
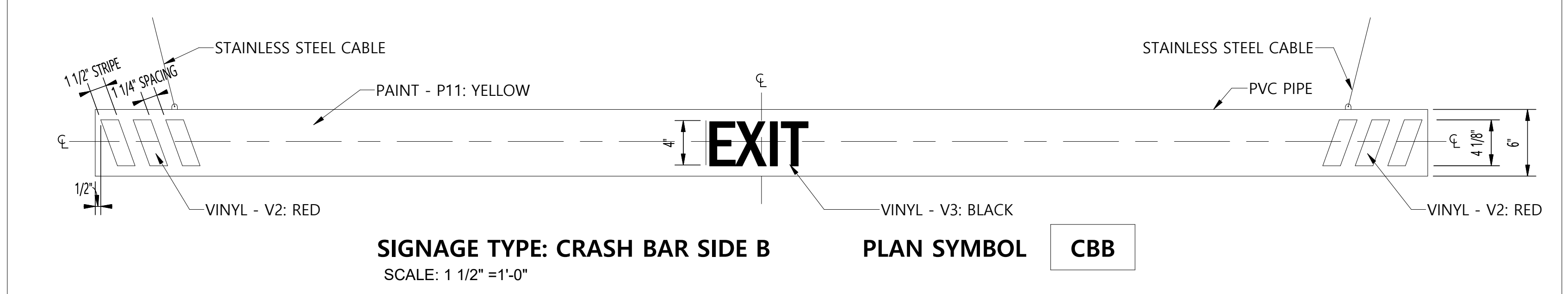
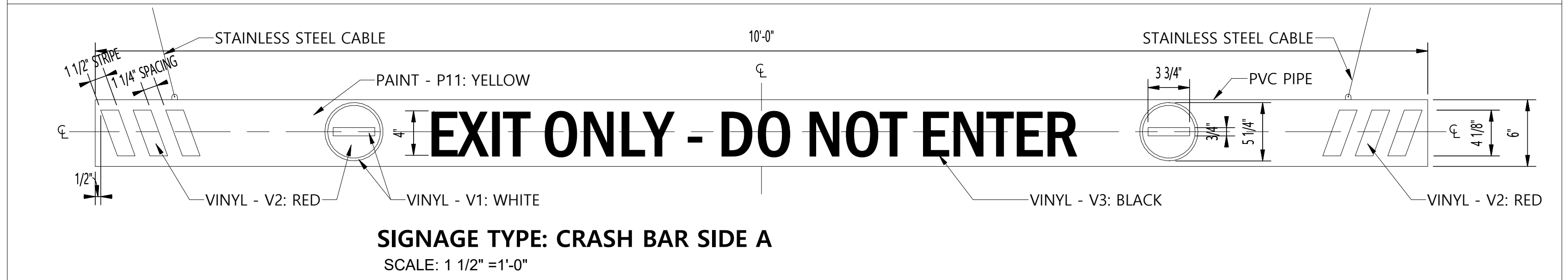
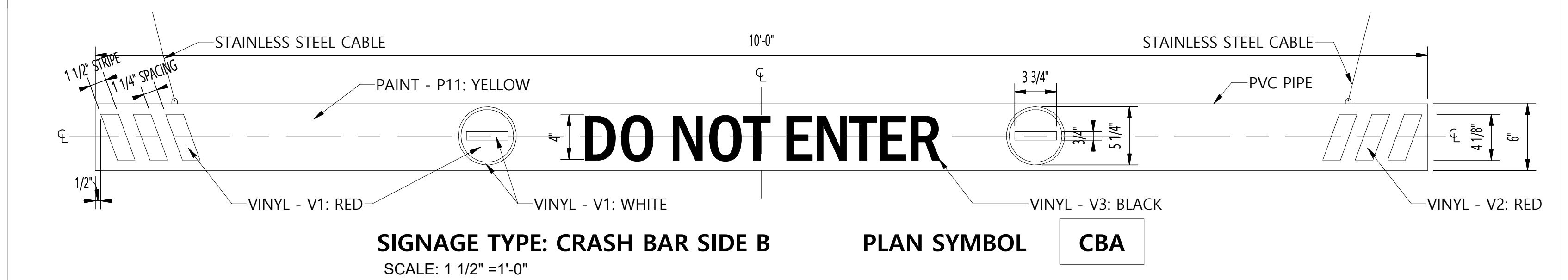
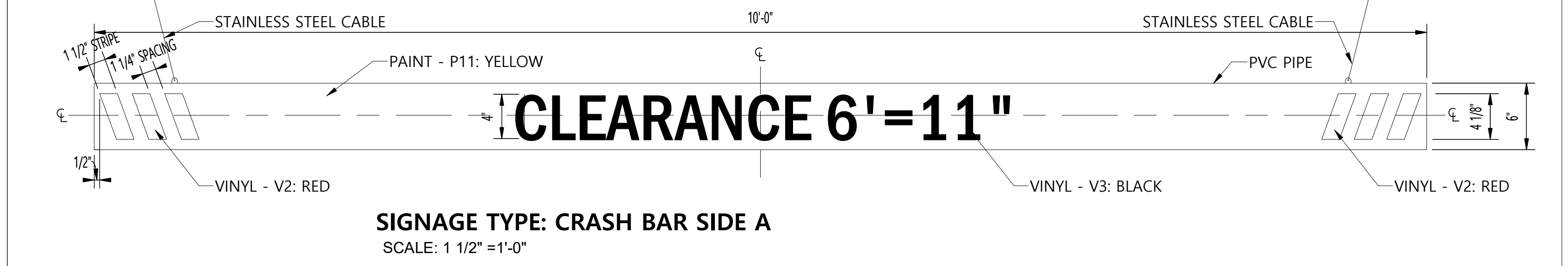
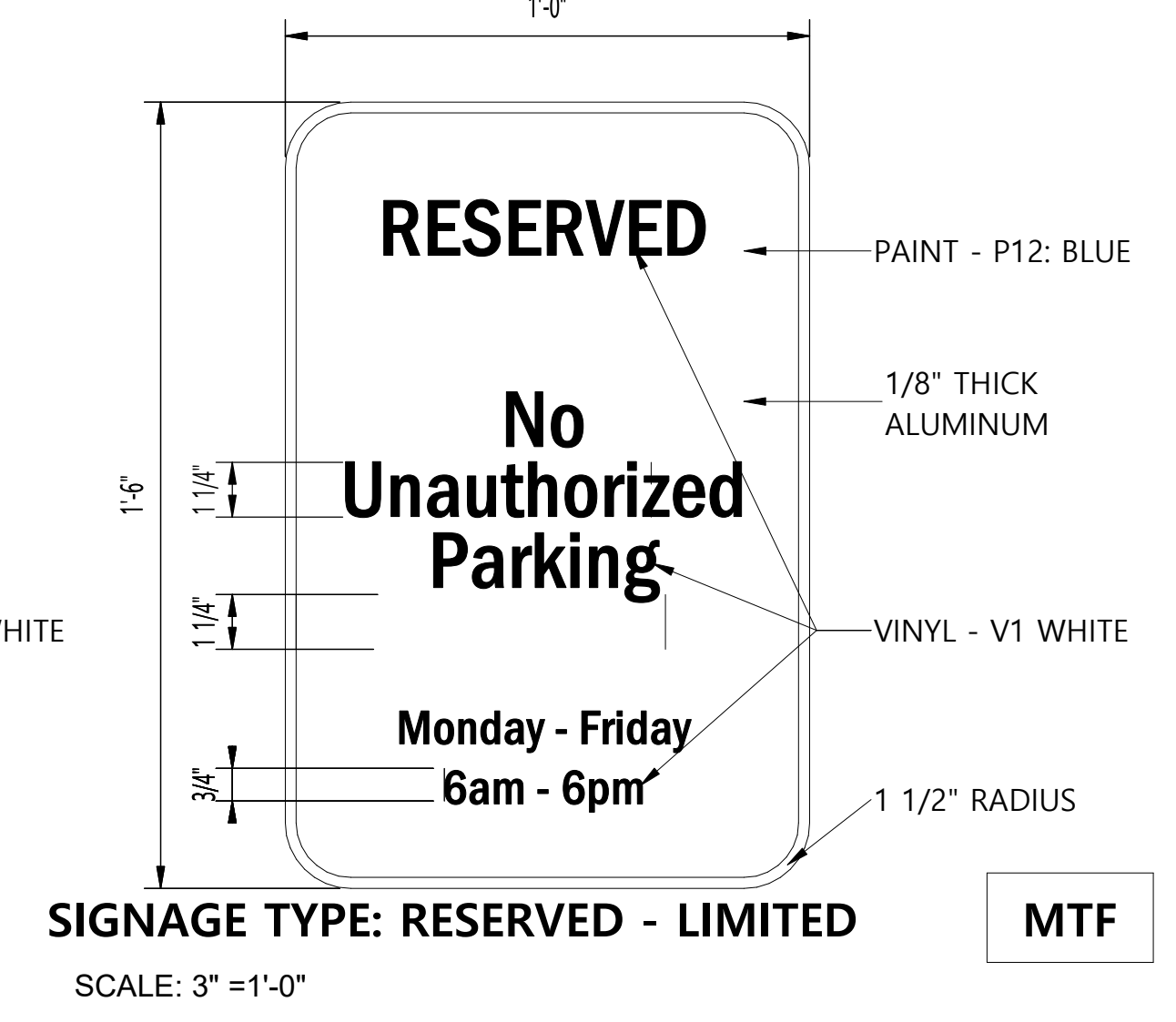
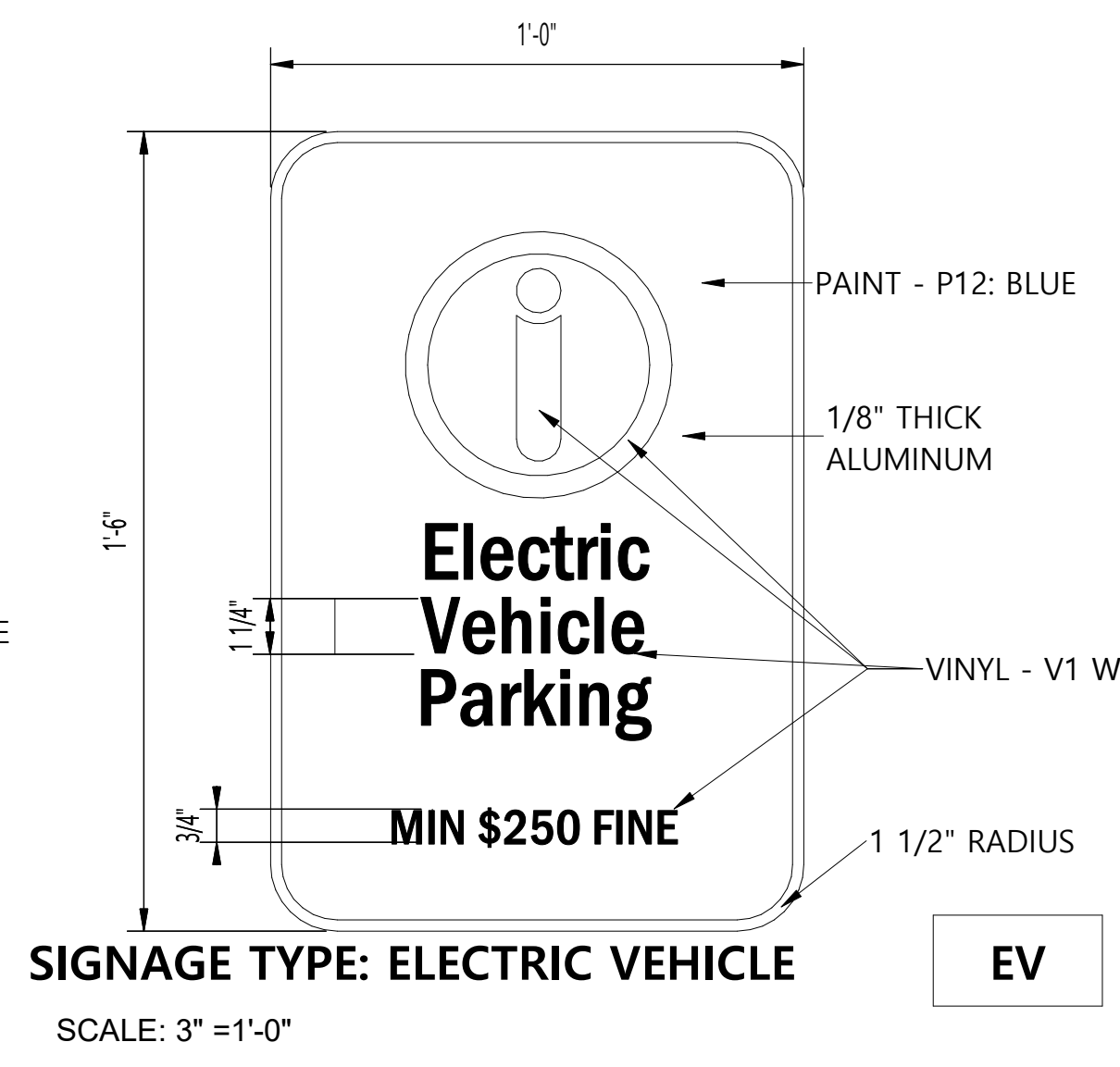
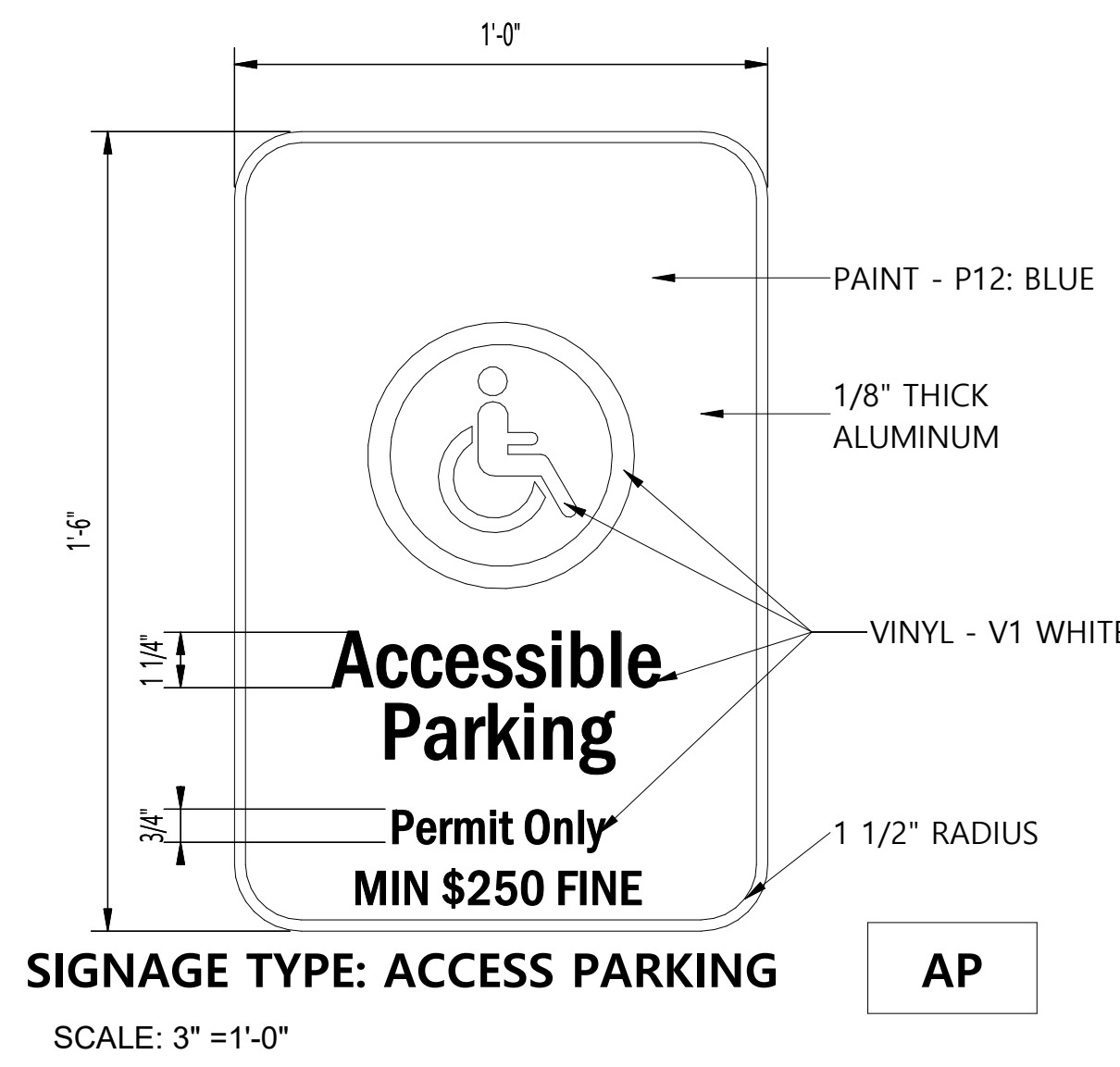
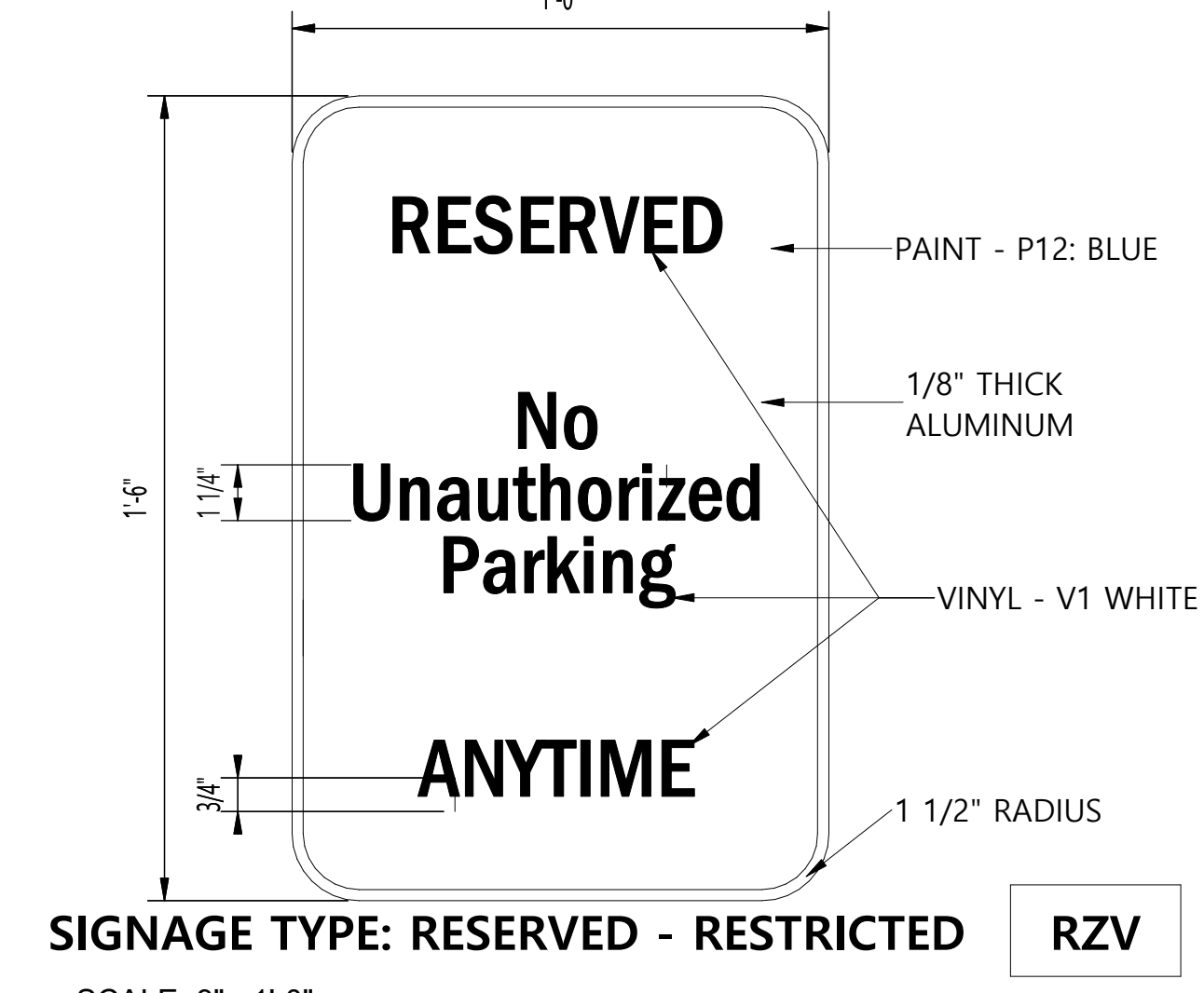
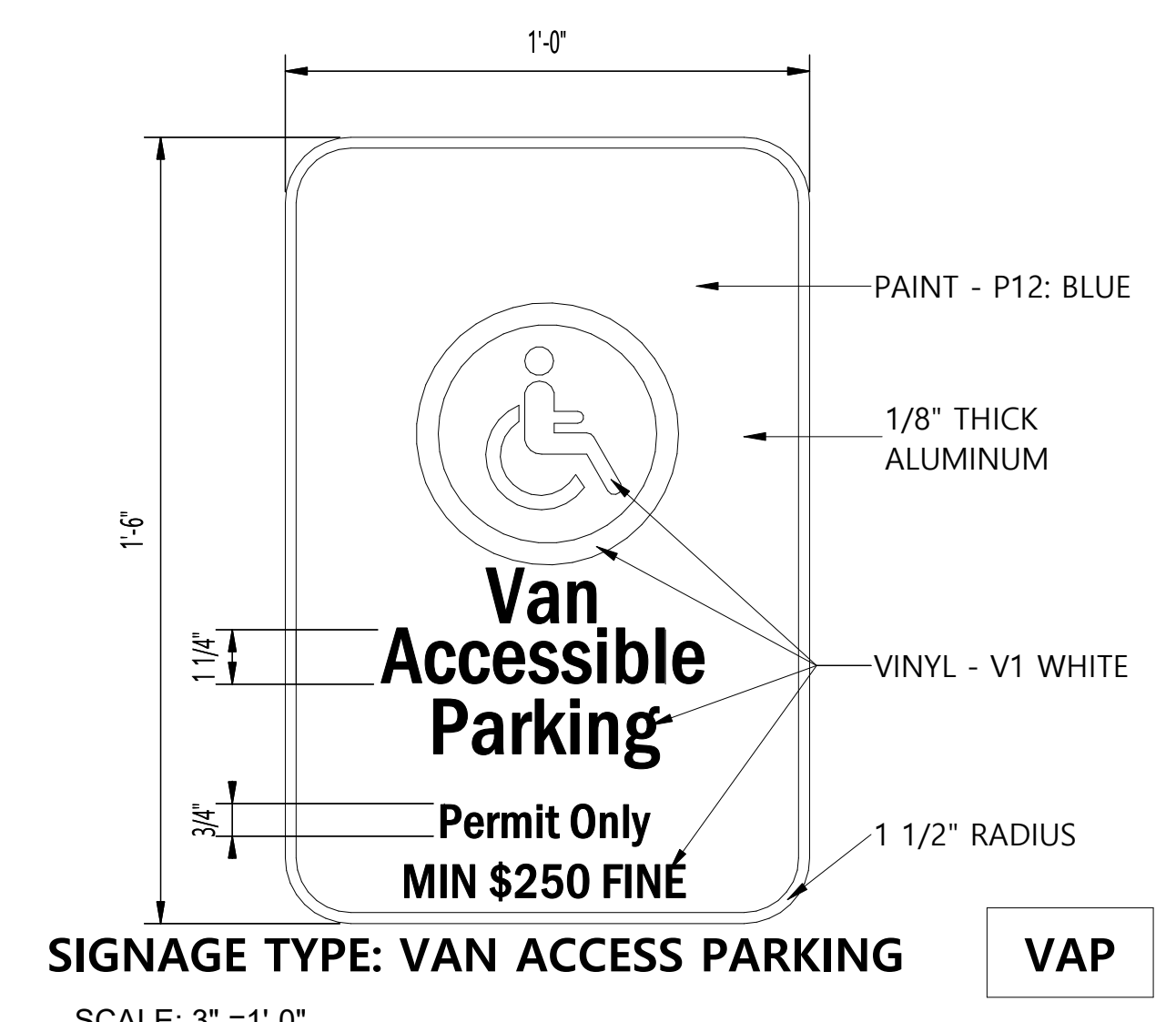
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des. by	ETA
chk. by	KING
date	August 5, 2023
sheet no.	<b>A4.71</b>
of	75



**SLAB MOUNTED SIGNAGE DETAIL**  
\*NOTE: SEE PLAN SHEET FOR BOLLARD PLACEMENT.



**CONCRETE COLLAR DETAIL**



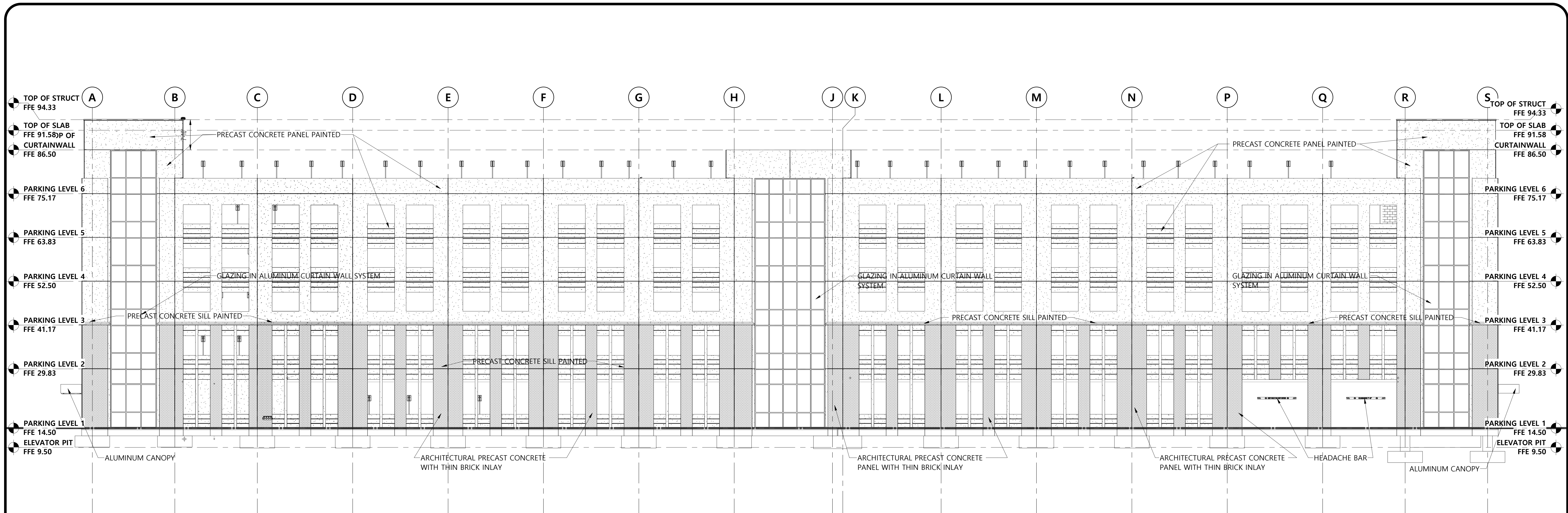
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Mobile, Alabama



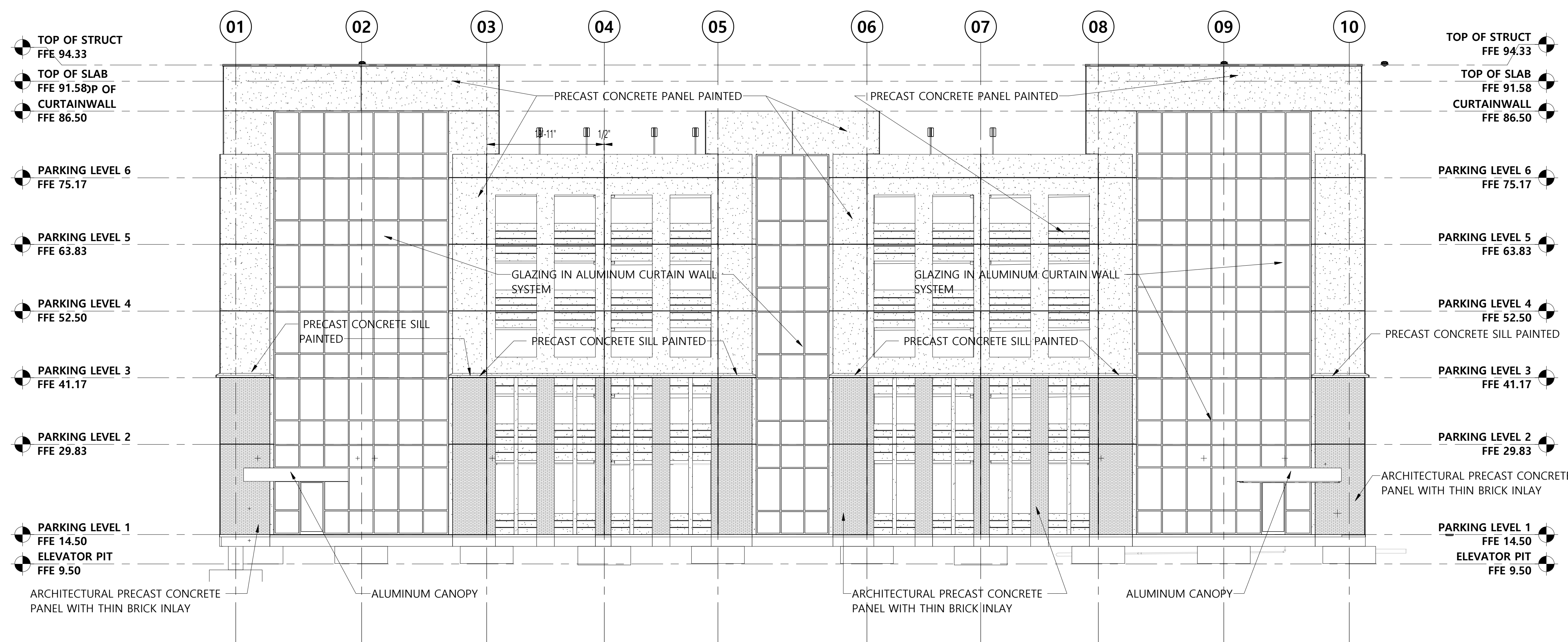
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Revisions	sheet title
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job no.	4308
designed by	ETA
checked by	KING
date	074
	of 154
drawn by	A4.72
	of 75
date	August 5, 2023
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**Elevation - East** SEE A5.23 FOR LARGE SCALE ELEVATIONS

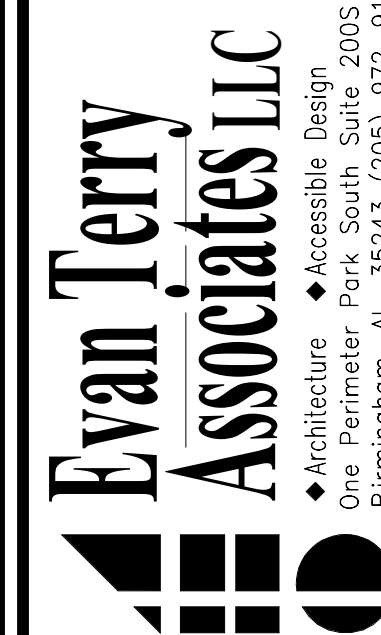
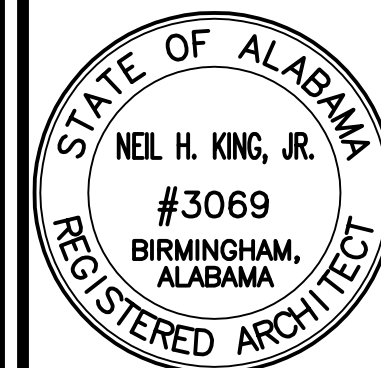
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A5.20 SCALE: 3/32" = 1'-0"



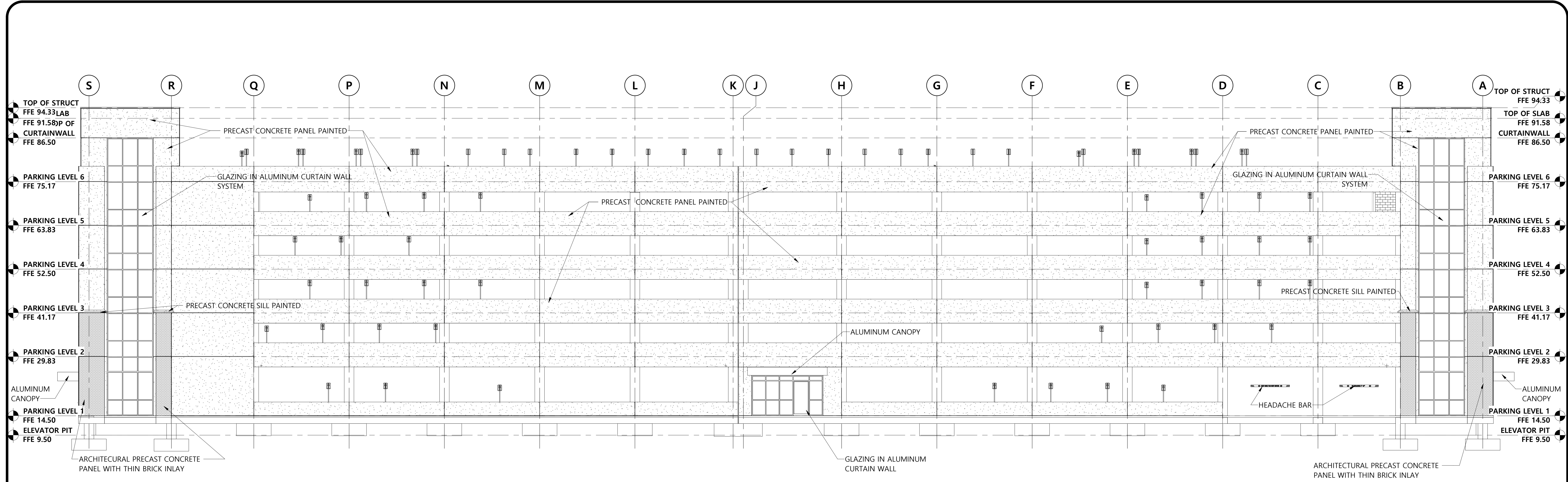
**Elevation - South** SEE A5.24 FOR LARGE SCALE ELEVATIONS

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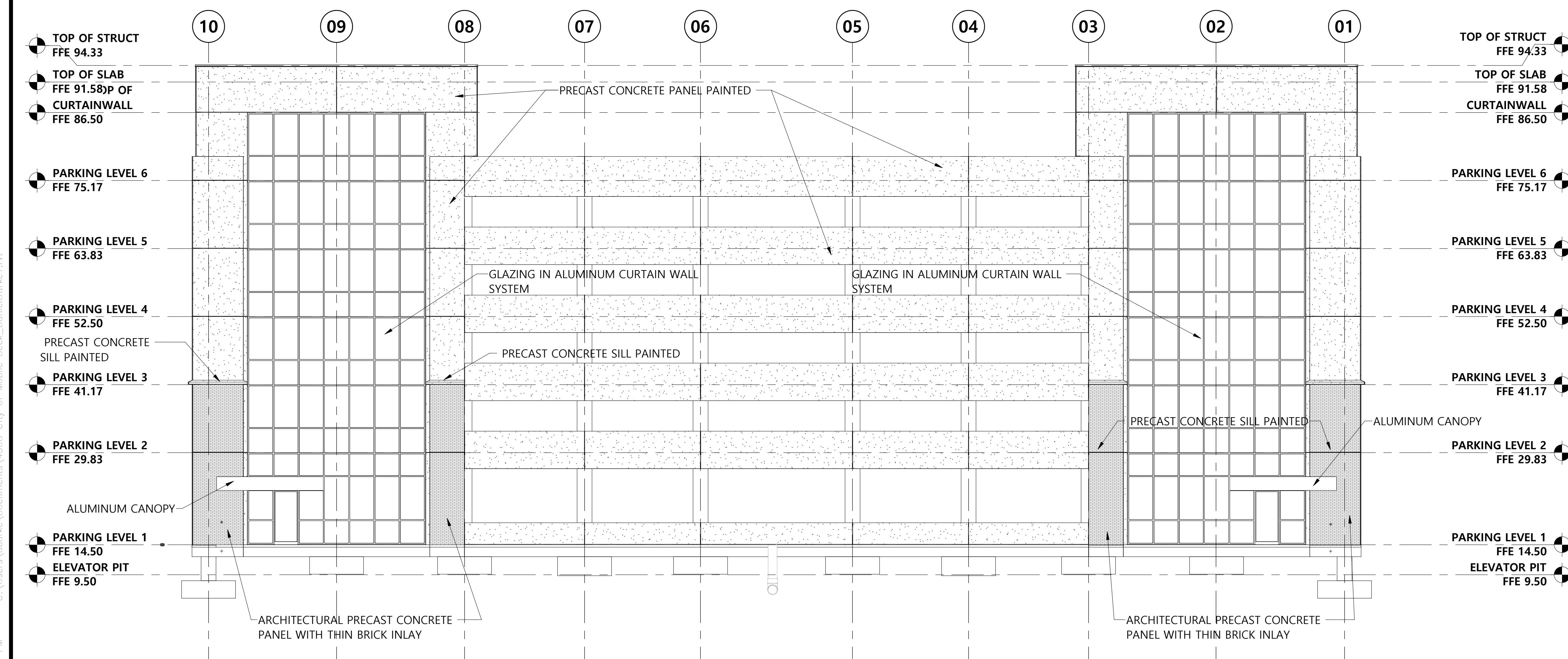
**Mobile Civic Center  
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Revisions	
Sheet Title	OVERALL BUILDING ELEVATIONS - SOUTH / EAST
Job No.	4308
Drawn by	ETA
Checked by	KING
Scale	075 of 154
Sheet No.	A5.20 of 75
Date	August 5, 2023
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**Elevation - West** SEE A5.22 FOR LARGE SCALE ELEVATIONS  
SCALE: 3/32" = 1'-0"



**Elevation - North** SEE A5.24 FOR LARGE SCALE ELEVATIONS  
SCALE: 3/32" = 1'-0"

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Revisions	

sheet title  
OVERALL BUILDING ELEVATIONS - NORTH / WEST

job no. **4308**

date by **076**

drawn by **KING** of 154

date **A5.21** of 75

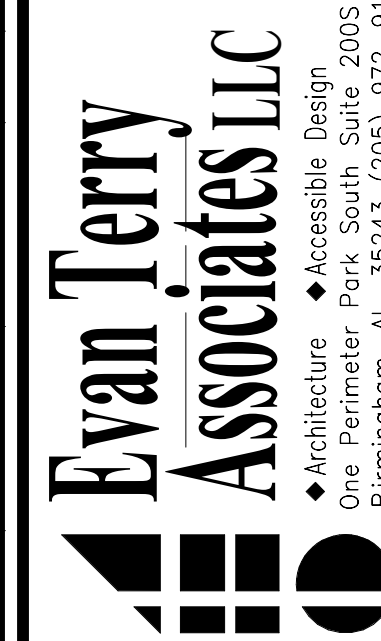
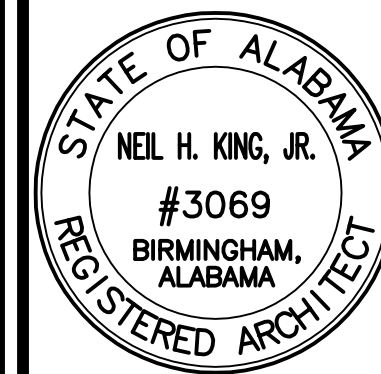
date August 5, 2023

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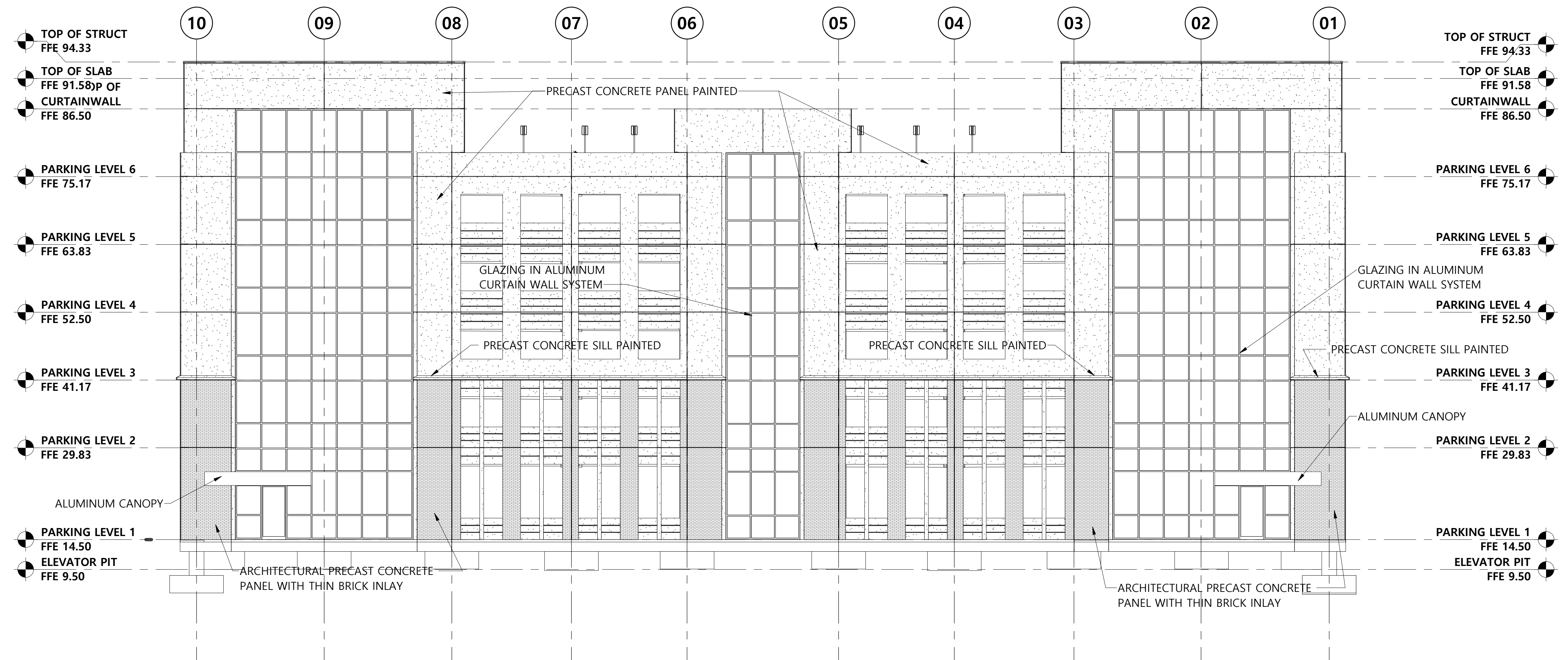


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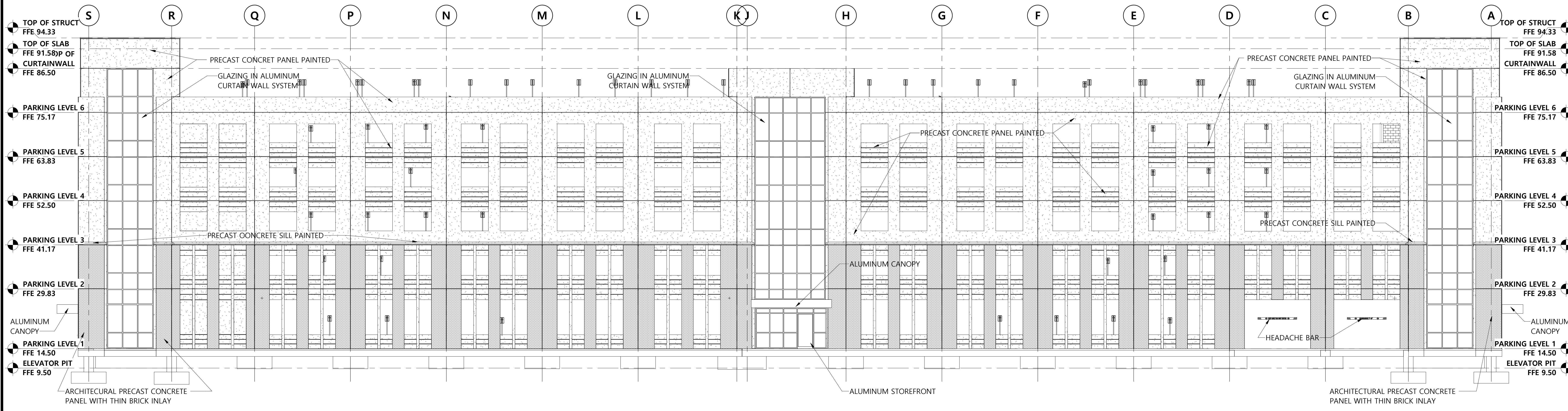
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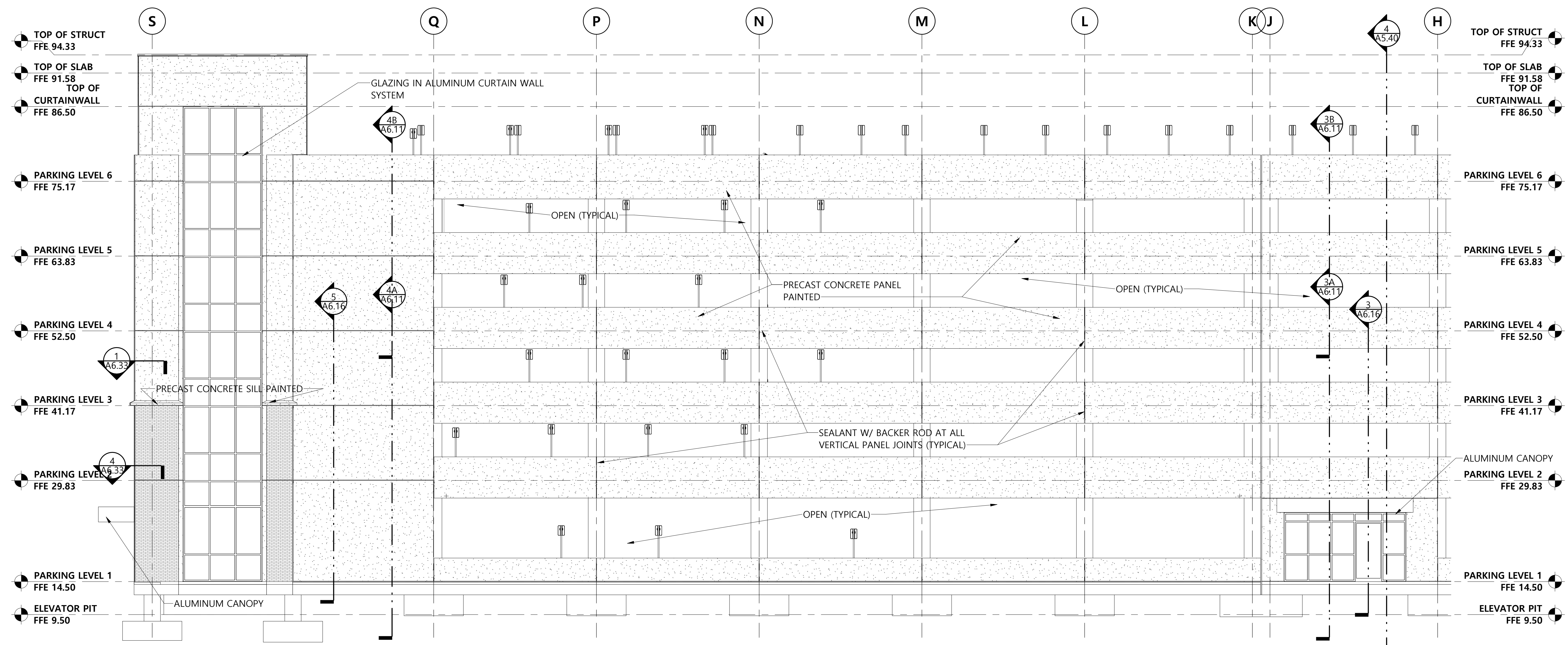
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Overall Building Elevations - North West - Alternate No. 1
Job No. 4308
Drawn by: ETK
Checked by: KING
Scale: 077 of 154
Sheet No. <b>A5.21B</b> of 75
Date: August 5, 2023
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**Elevation - North - Alternate No.1** SEE A5.24 FOR LARGE SCALE ELEVATIONS  
SCALE: 3/32" = 1'-0"

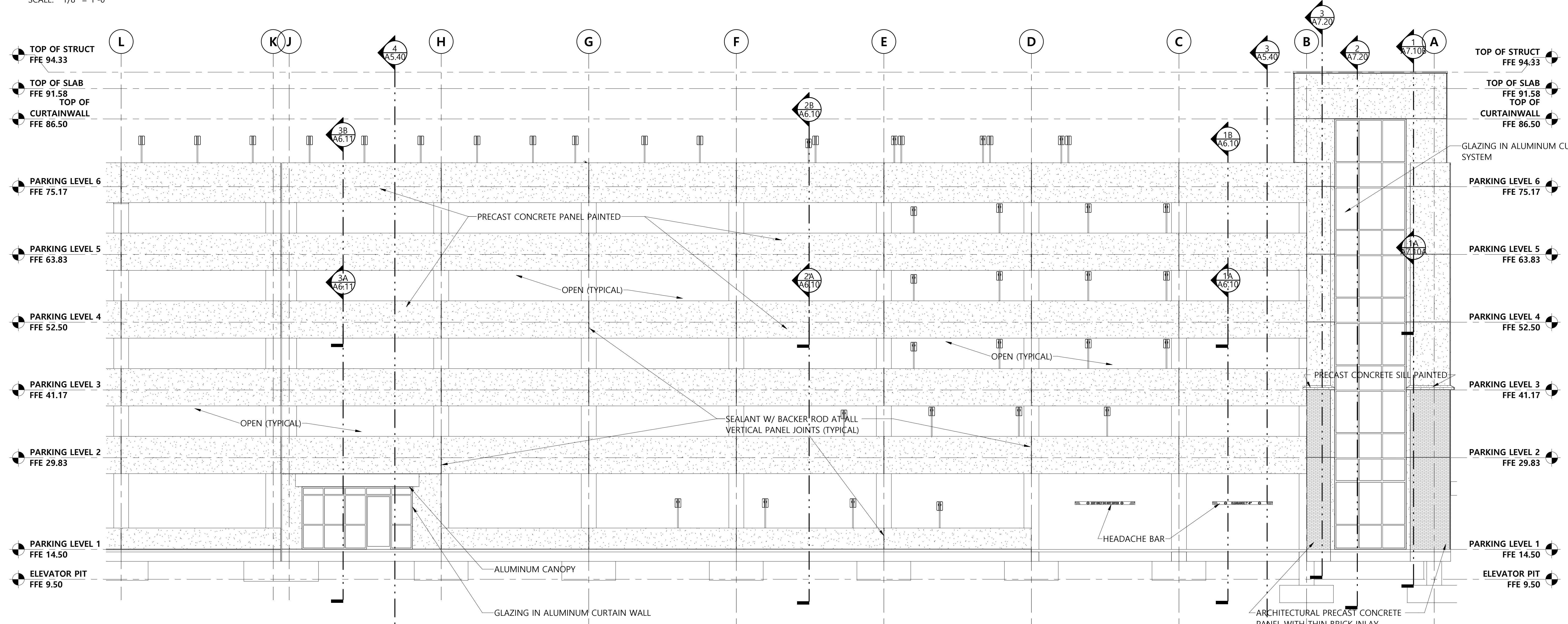


**Elevation - West - Alternate No. 1** SEE A5.22 FOR LARGE SCALE ELEVATIONS  
SCALE: 3/32" = 1'-0"



**Elevation - Large Scale - West - Part A**

SCALE: 1/8" = 1'-0"



**Elevation - Large Scale - West - Part B**

SCALE: 1/8" = 1'-0"

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Revisions	Sheet Title
	EXTERIOR ELEVATIONS - LARGE SCALE - WEST
Job No.	4308
Drawn by	ETA
Checked by	KING
Scale	078 of 154
Sheet No.	A5.22 of 75
Date	August 5, 2023
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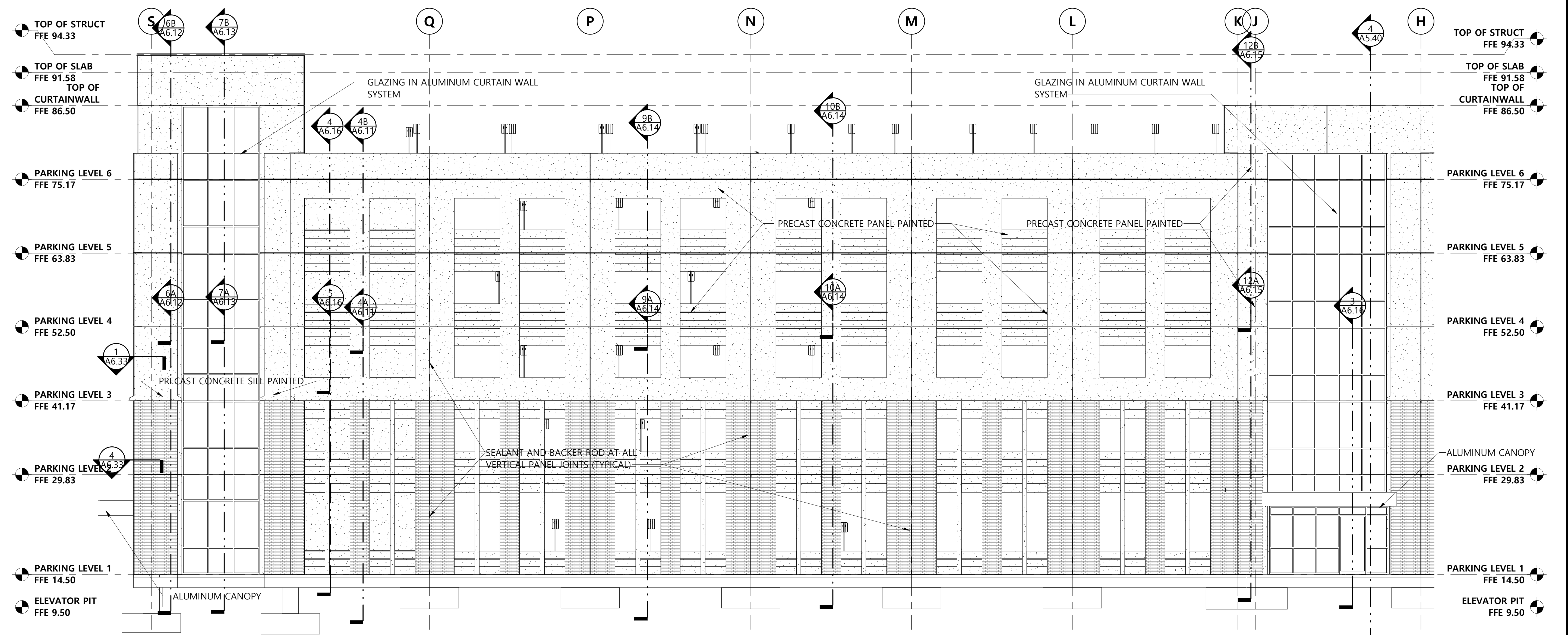
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LARGE SCALE - WEST  
- ALTERNATE NO.1

job no. **4308**  
des. by  
ETK  
chkd. by  
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date  
August 5, 2023

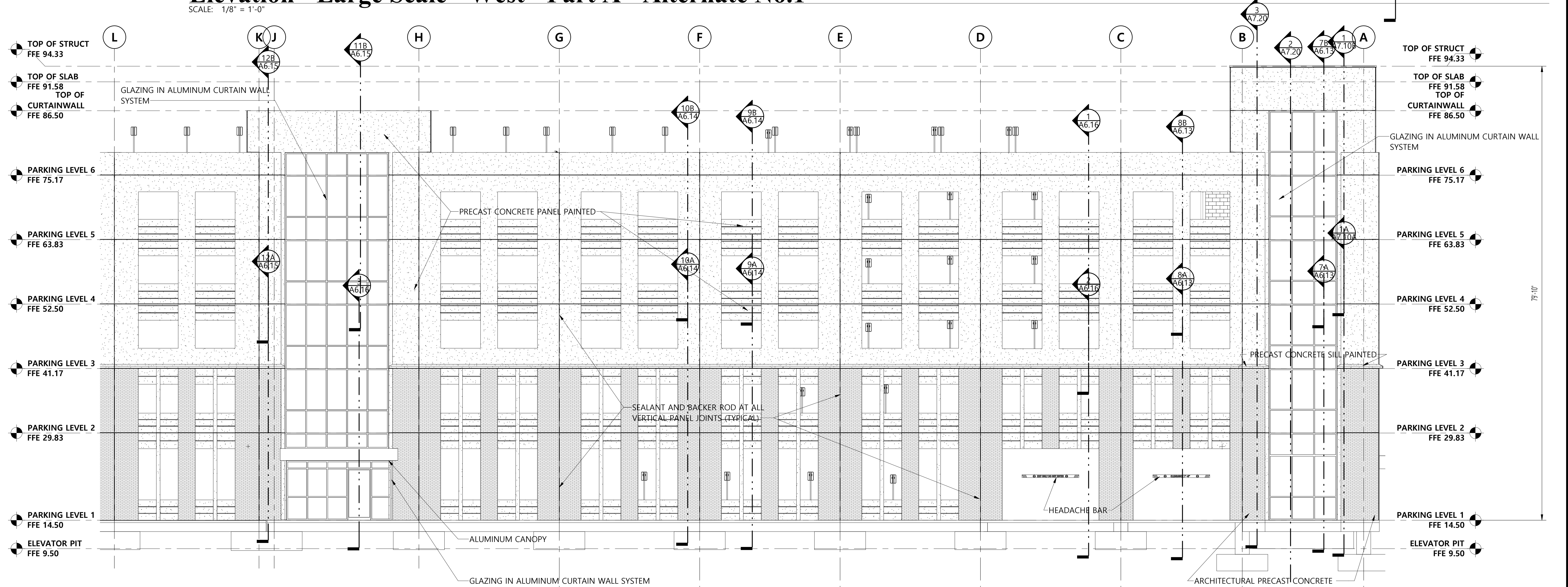
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**A5.22b**  
of 75

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### Elevation - Large Scale - West - Part A - Alternate No.1

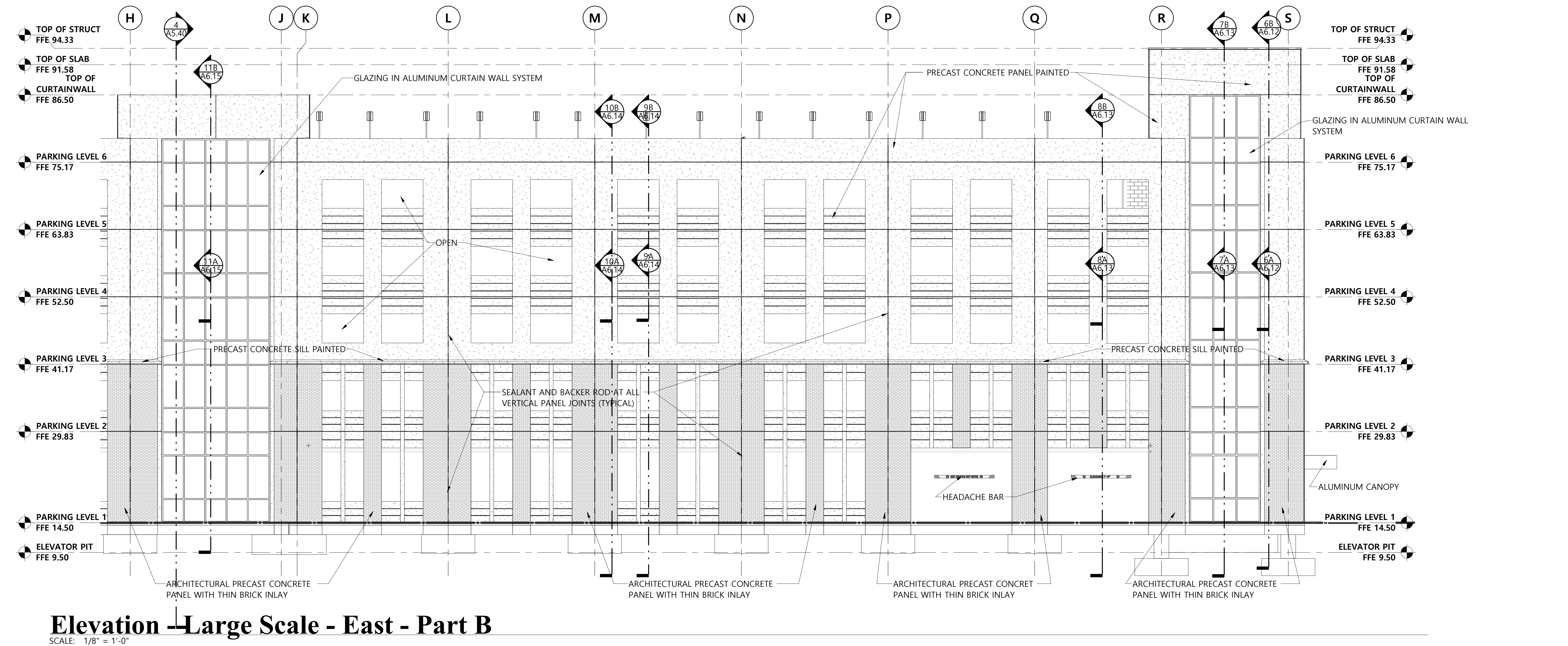
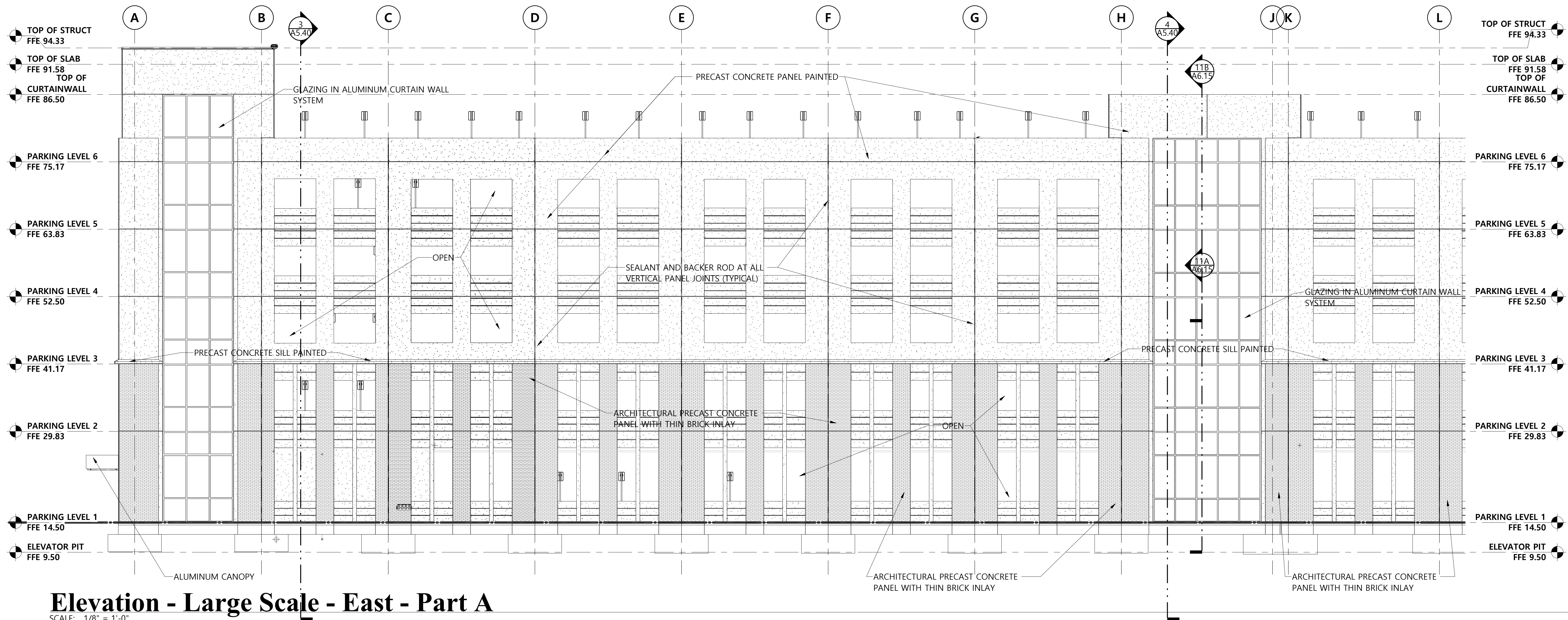
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### Elevation - Large Scale - West - Part B - Alternate No.1

SCALE: 1/8" = 1'-0"

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Revisions	
Sheet Title	EXTERIOR ELEVATIONS - LARGE SCALE - EAST
Job No.	4308
Drawn by	ETA
Checked by	KING
Scale	080 of 154
Sheet No.	A5.23 of 75
Date	August 5, 2023
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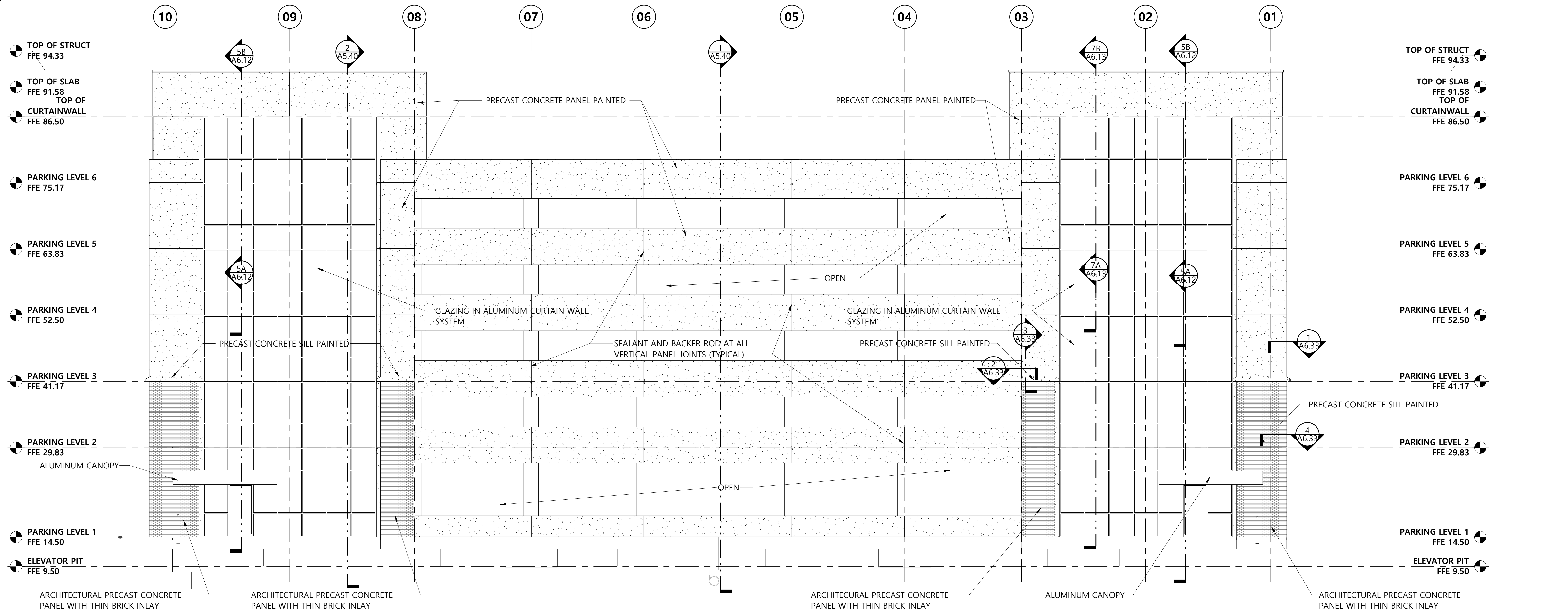
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Birmingham, AL 35243 (205) 972-9100

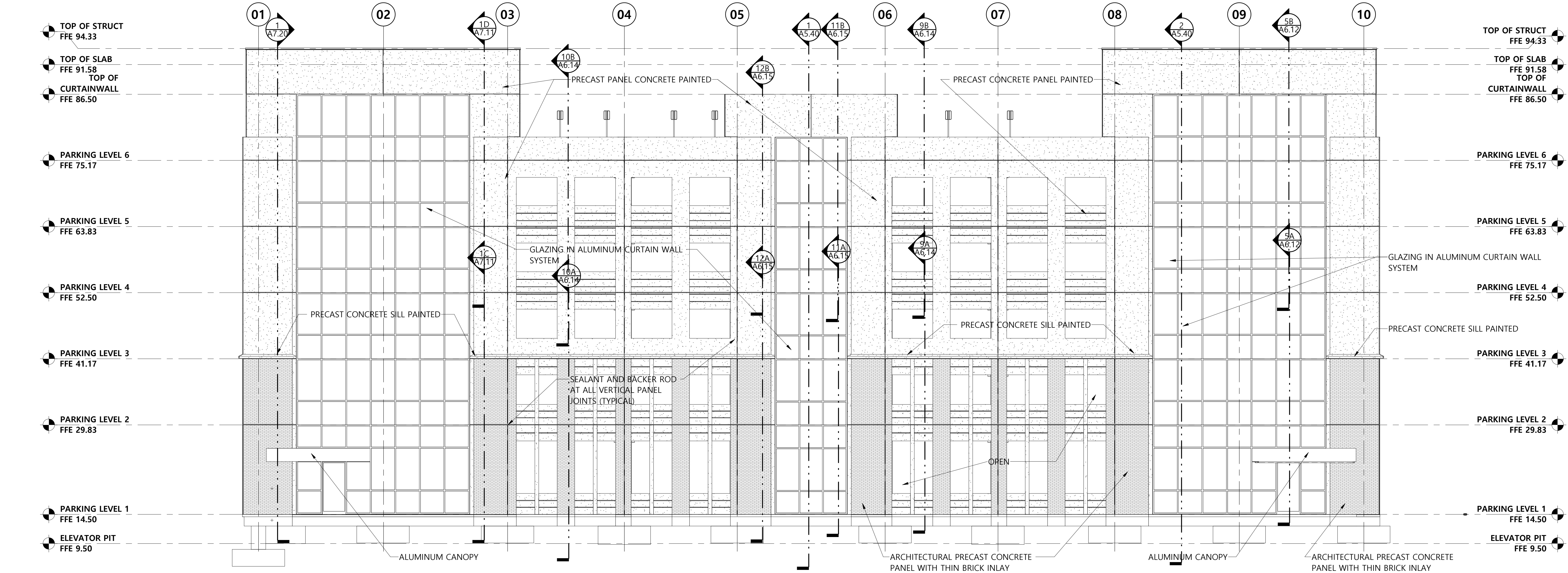
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JOB NO.	4308		
DATE	081		
DATE	A5.24		
DATE	August 5, 2023		
DATE	© Evan Terry Associates, LLC 2023		



### Elevation - Large Scale - North

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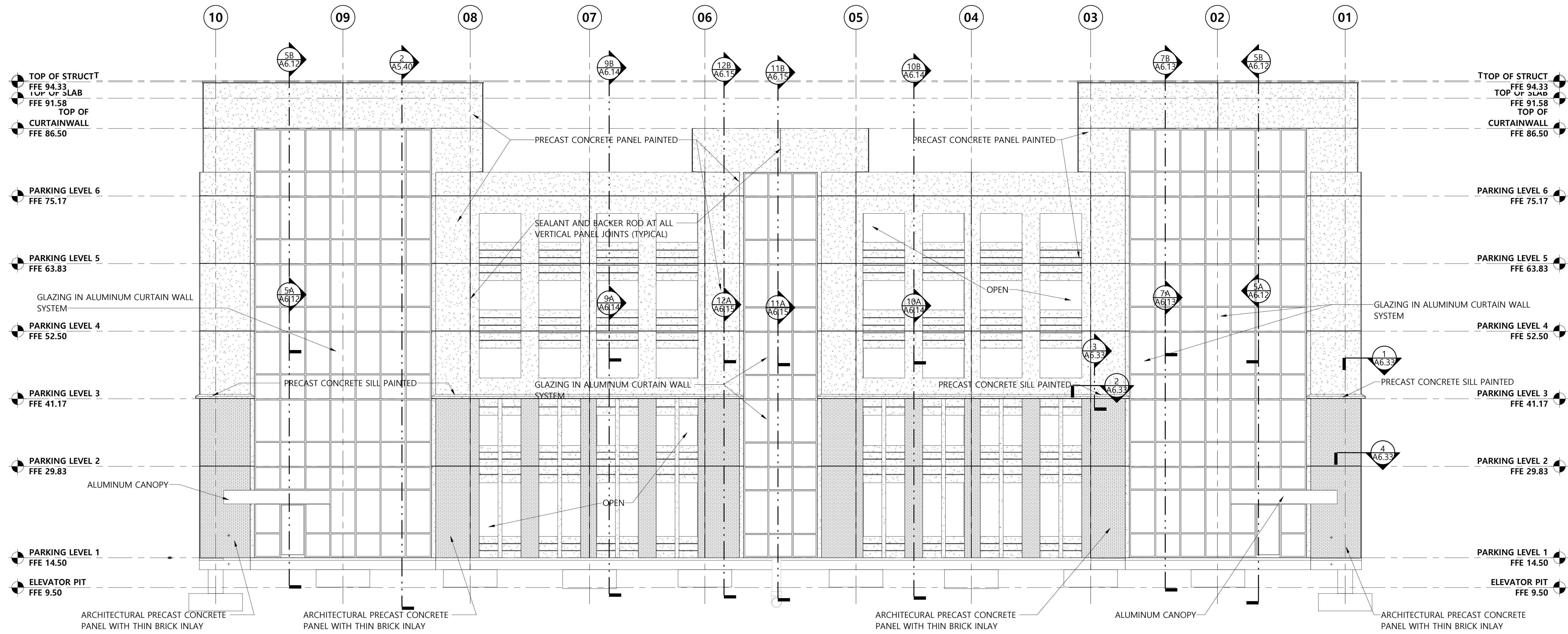


### Elevation - Large Scale - South

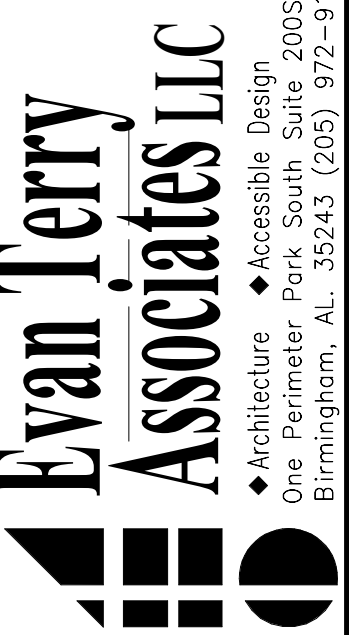
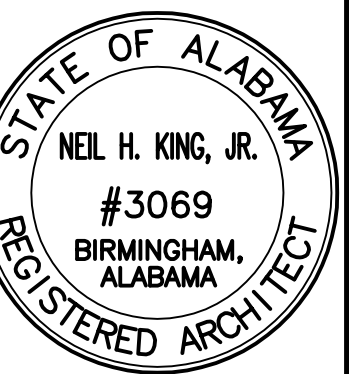
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# Mobile Civic Center Parking Facility

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**Elevation - Large Scale - North - Alternate No.1**  
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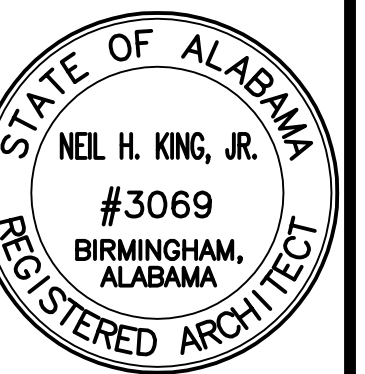


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desn. by	ETA
chkd. by	KING
date	August 5, 2023
sheet no.	082 of 154
sheet title	A5.24b
date	August 5, 2023
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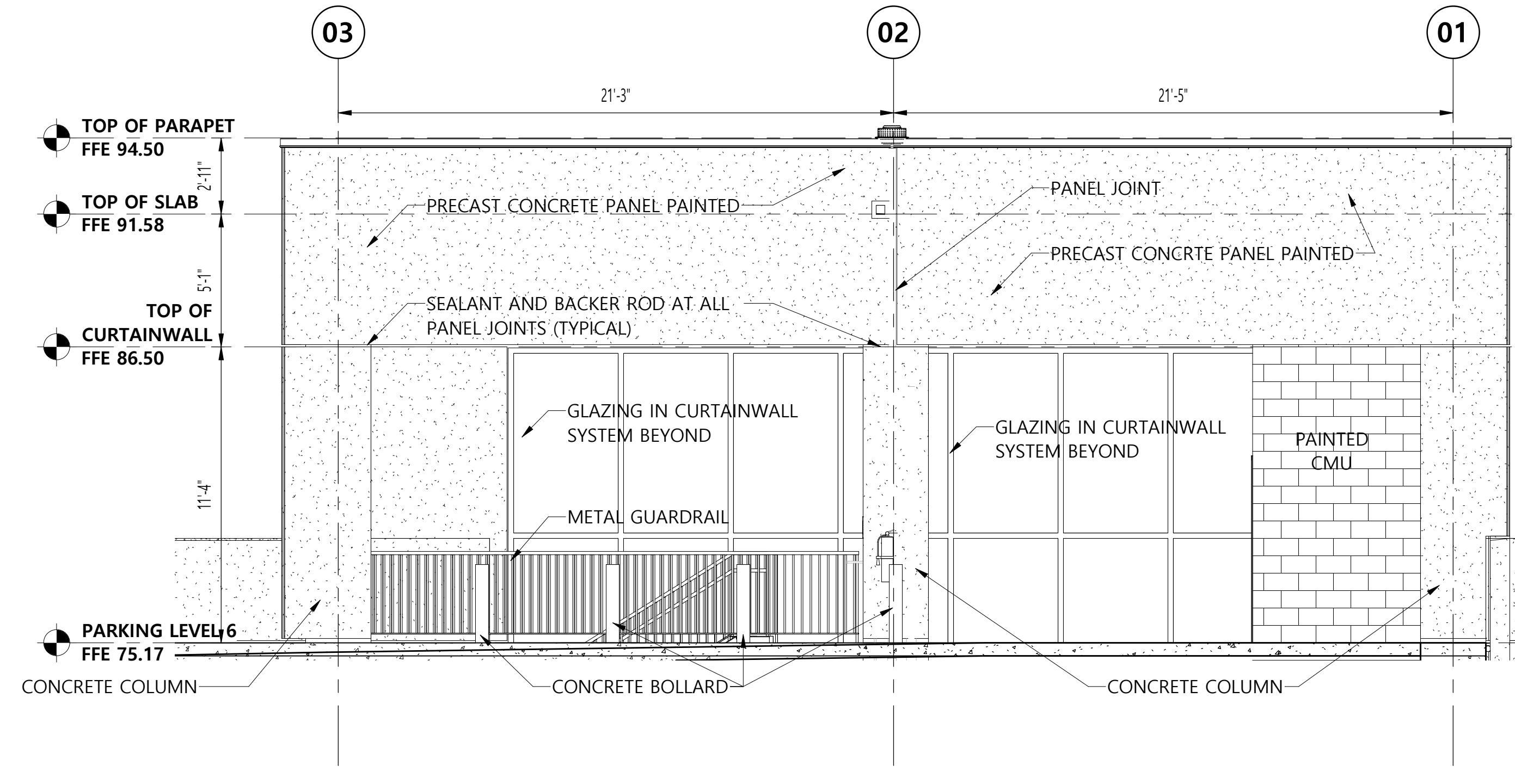
# Mobile Civic Center Parking Facility

Mobile, Alabama

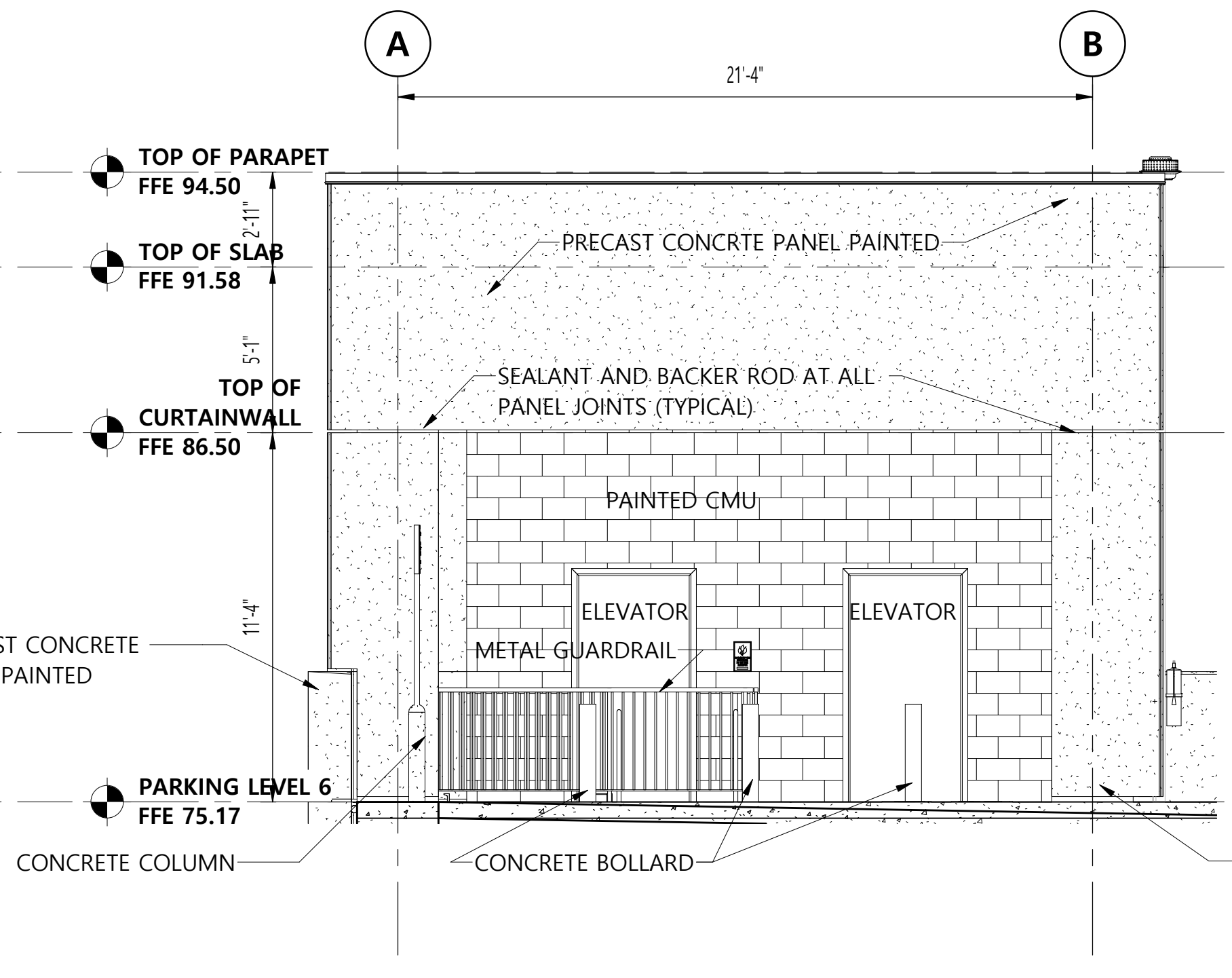


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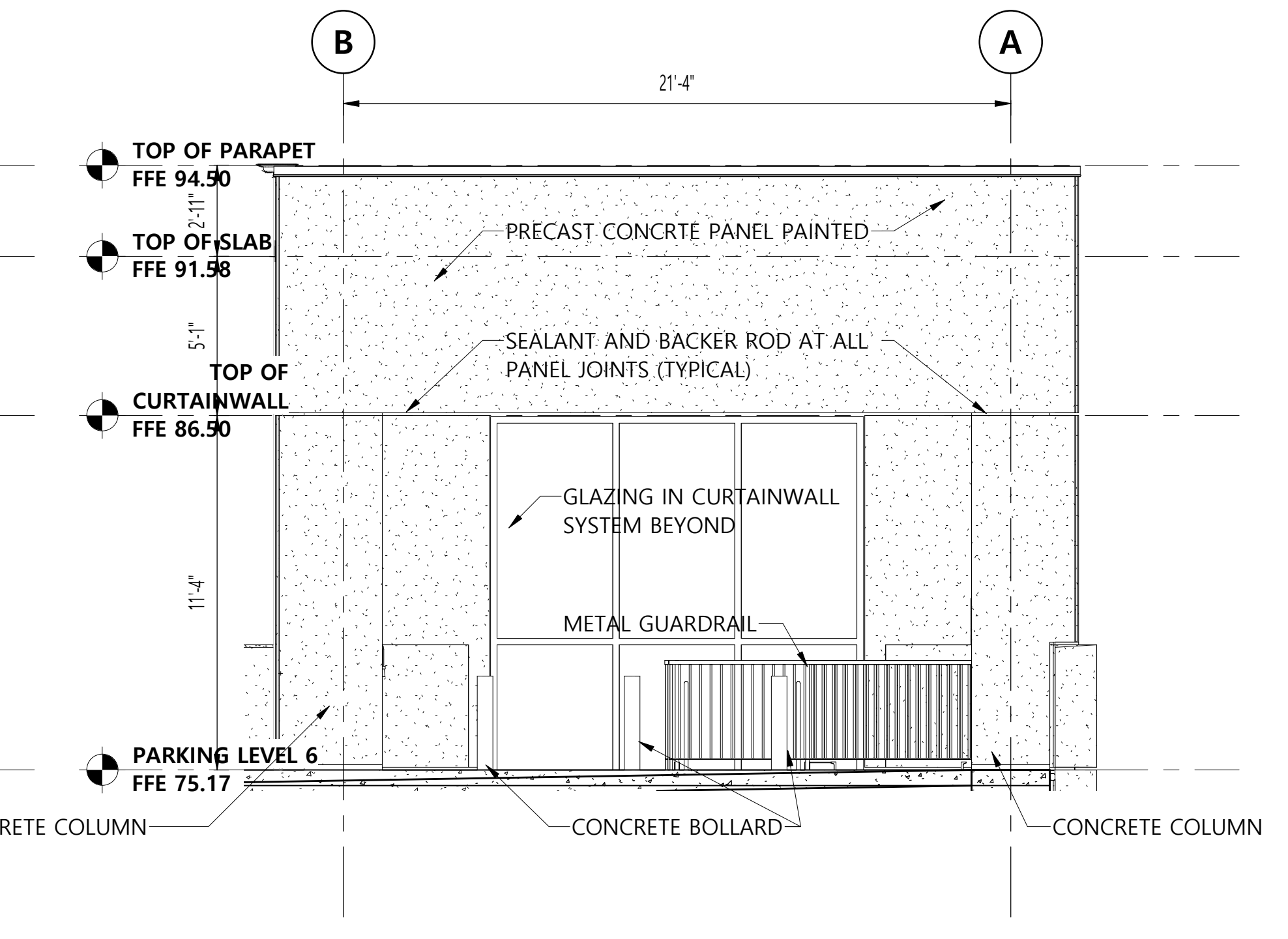
Sheet Title	TOP OF STAIR ELEVATIONS
Proj. No.	4308
Rev. by	ETA
Rev. No.	083
Rev. of	154
Scale	A5.31
Date	August 5, 2023
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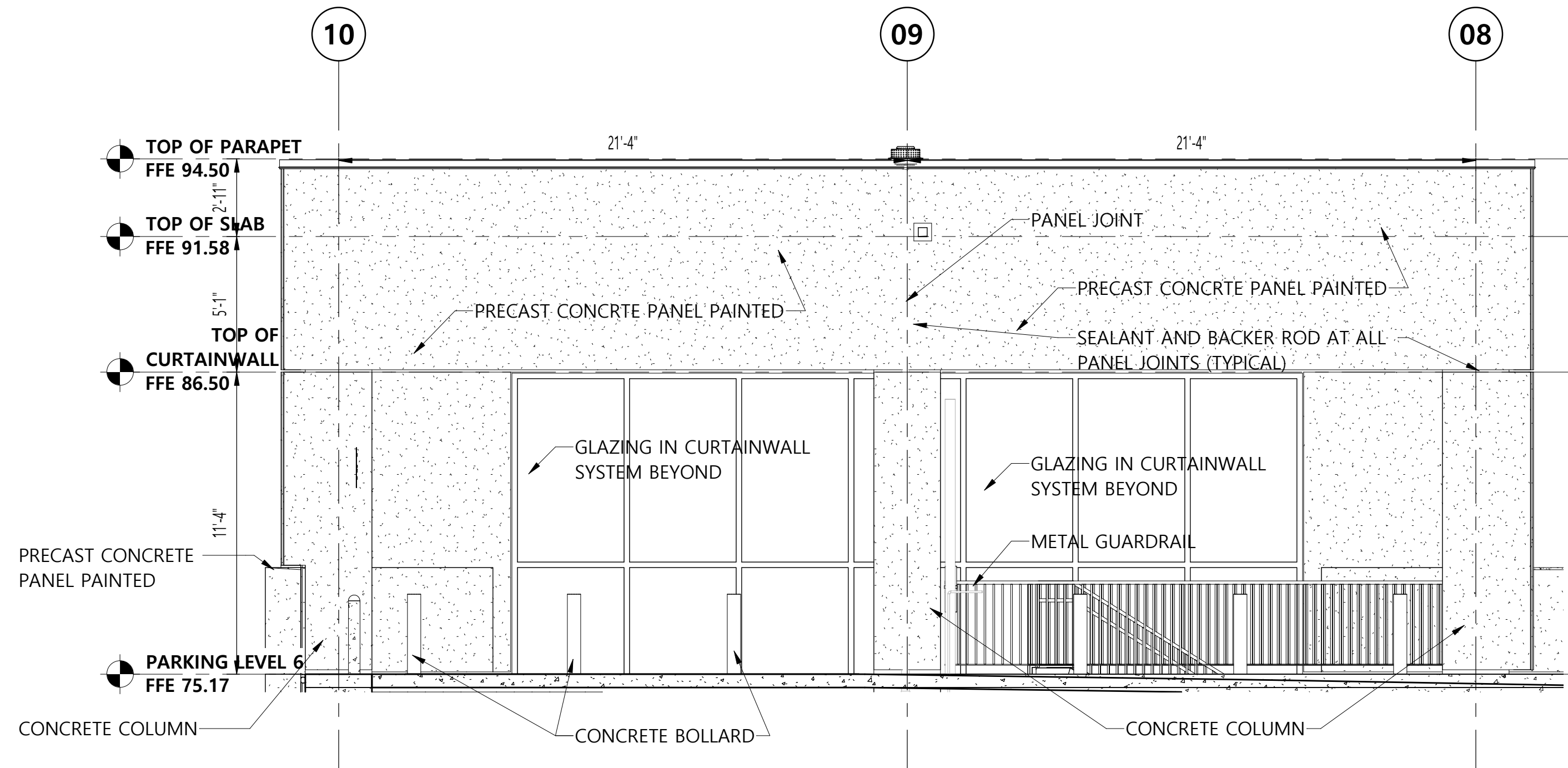
**1 Elevation** @ SOUTHWEST STAIR  
A5.31 1/4" = 1'-0"



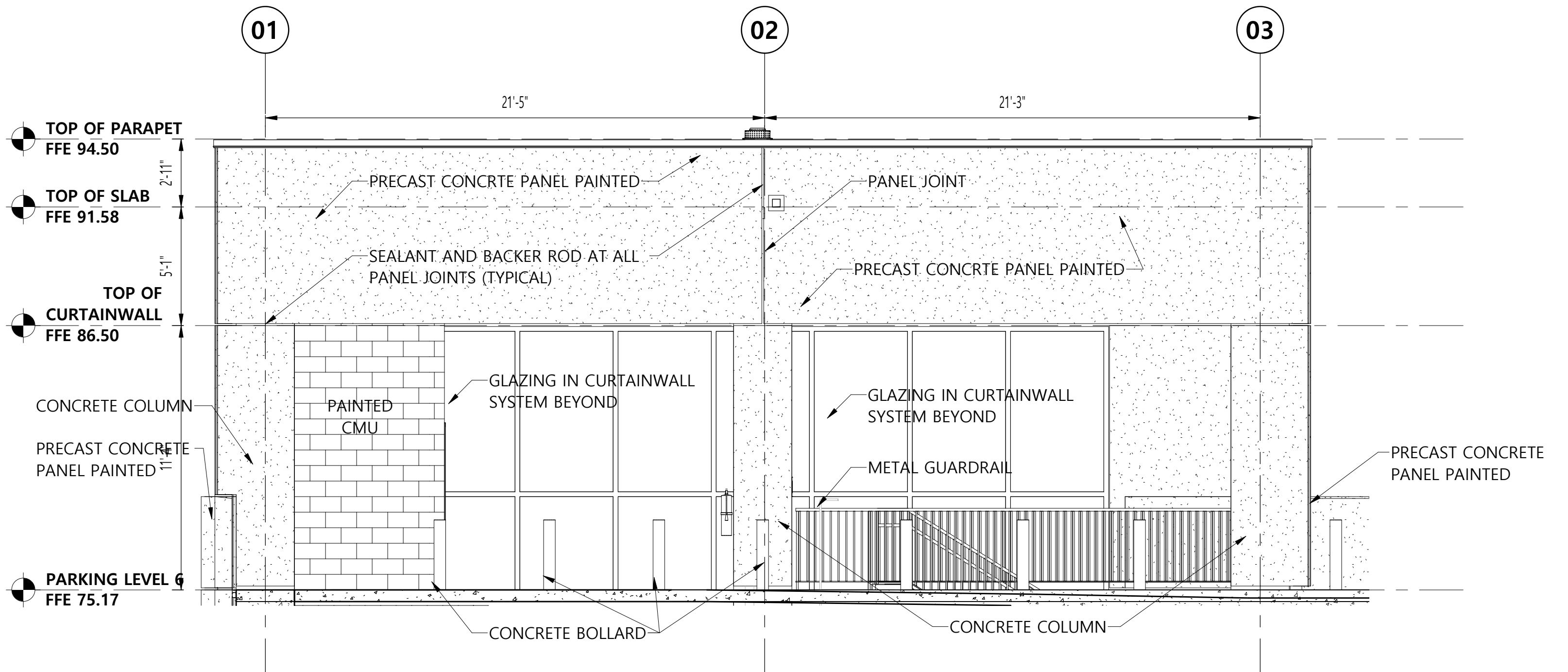
**2 Elevation** @ SOUTHWEST STAIR  
A5.31 1/4" = 1'-0"



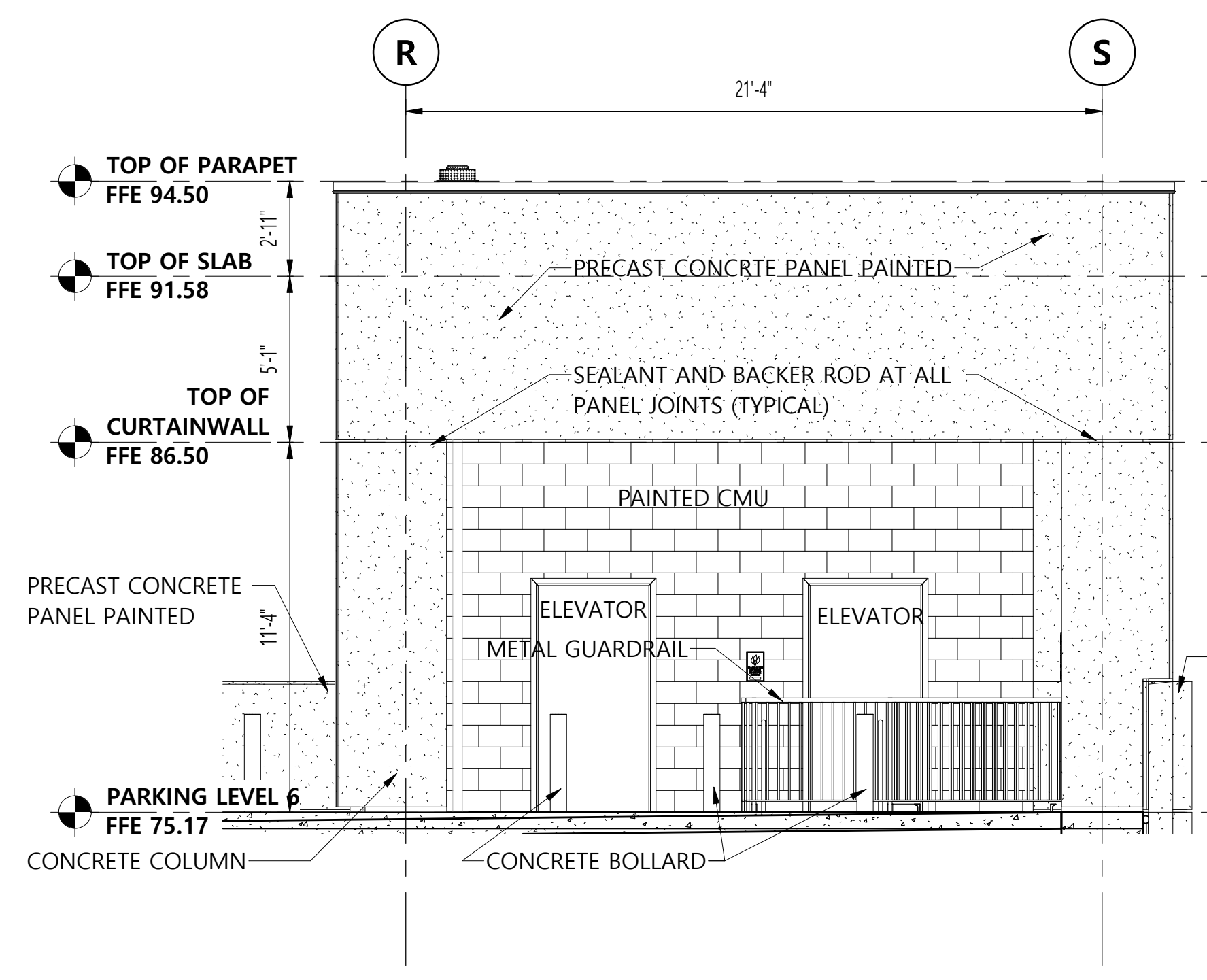
**3 Elevation** @ SOUTHWEST STAIR  
A5.31 1/4" = 1'-0"



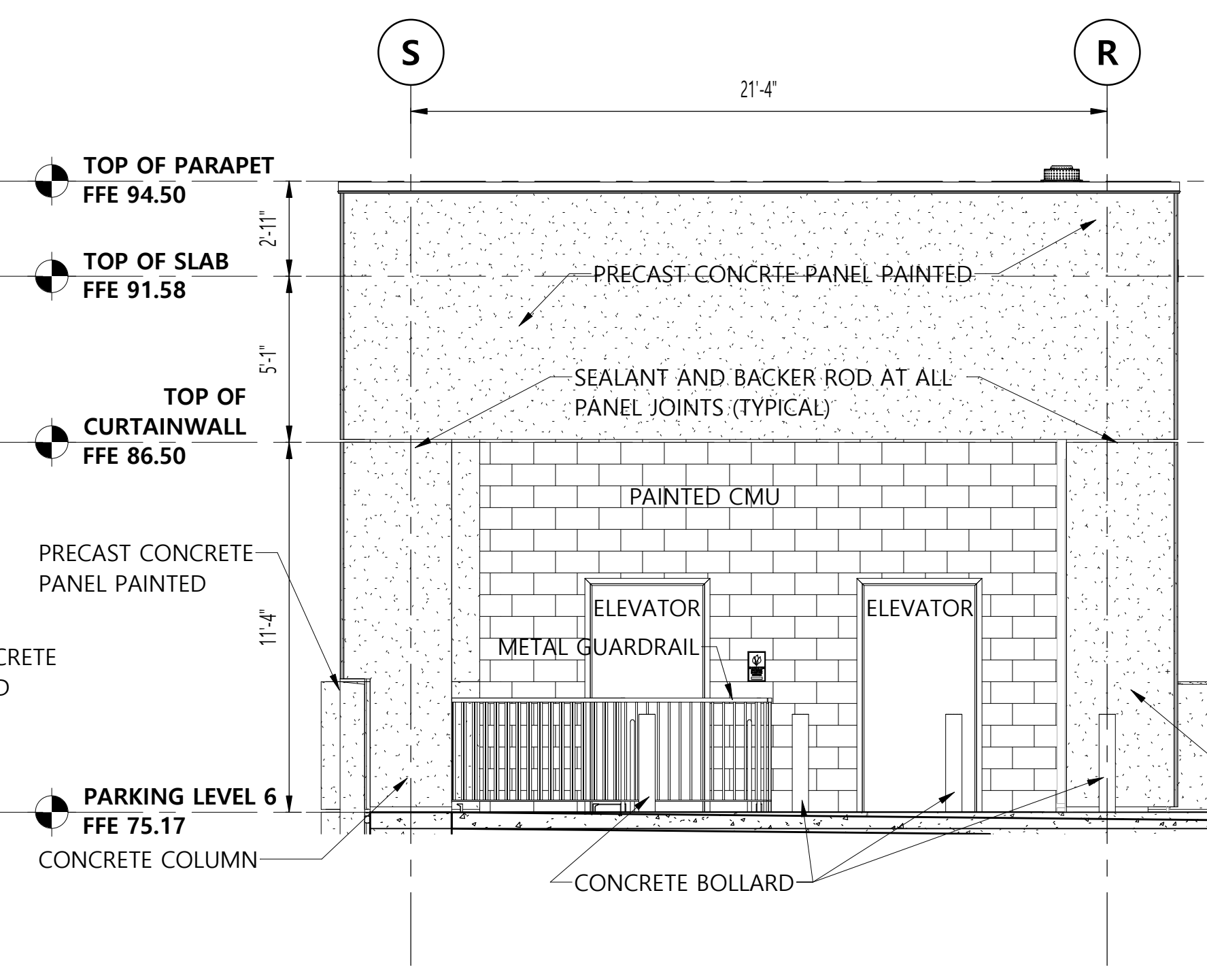
**4 Elevation** @ SOUTHWEST STAIR  
A5.31 1/4" = 1'-0"



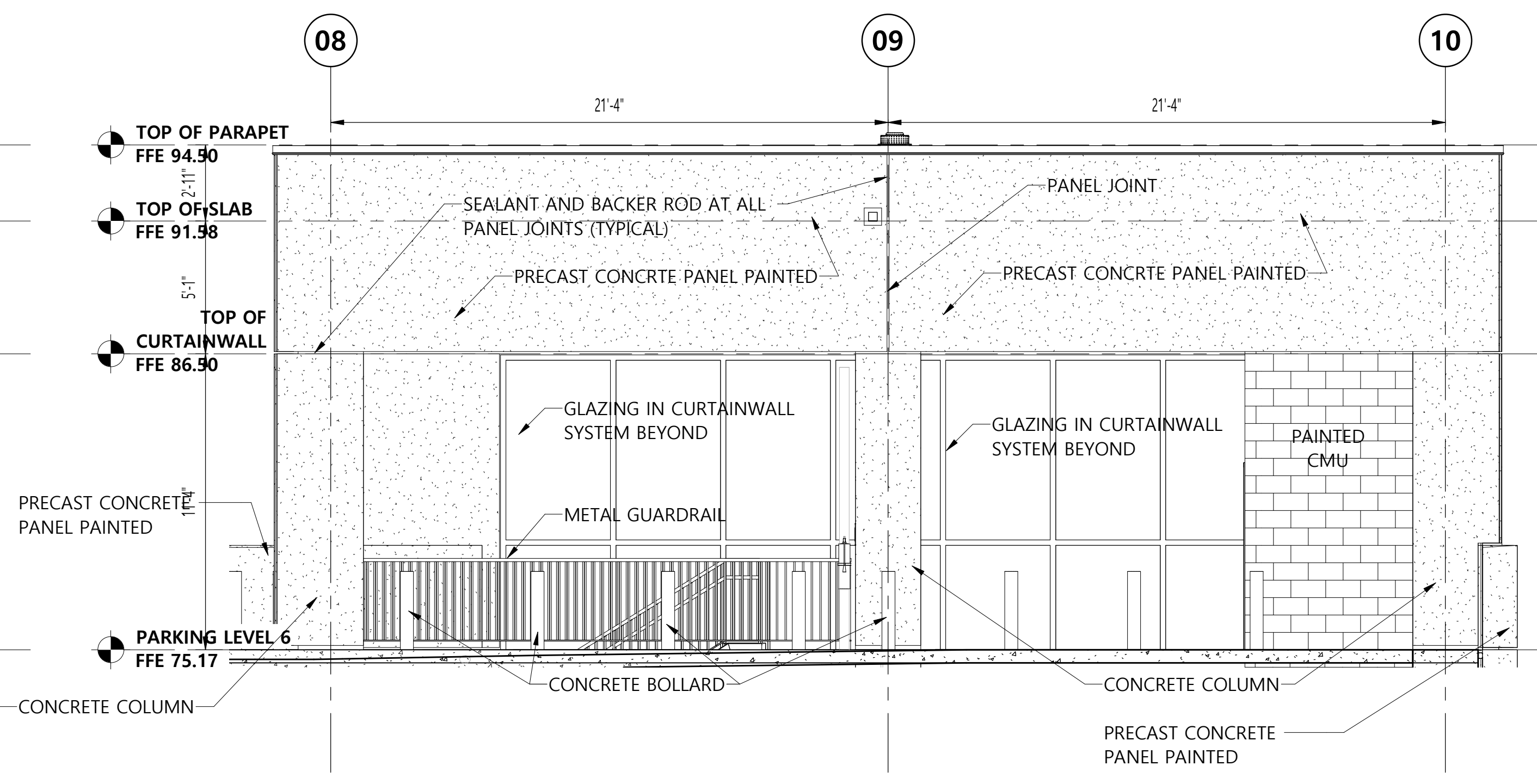
**5 Elevation** @ NORTHWEST STAIR  
A5.31 1/4" = 1'-0"



**6 Elevation** @ NORTHWEST STAIR  
A5.31 1/4" = 1'-0"

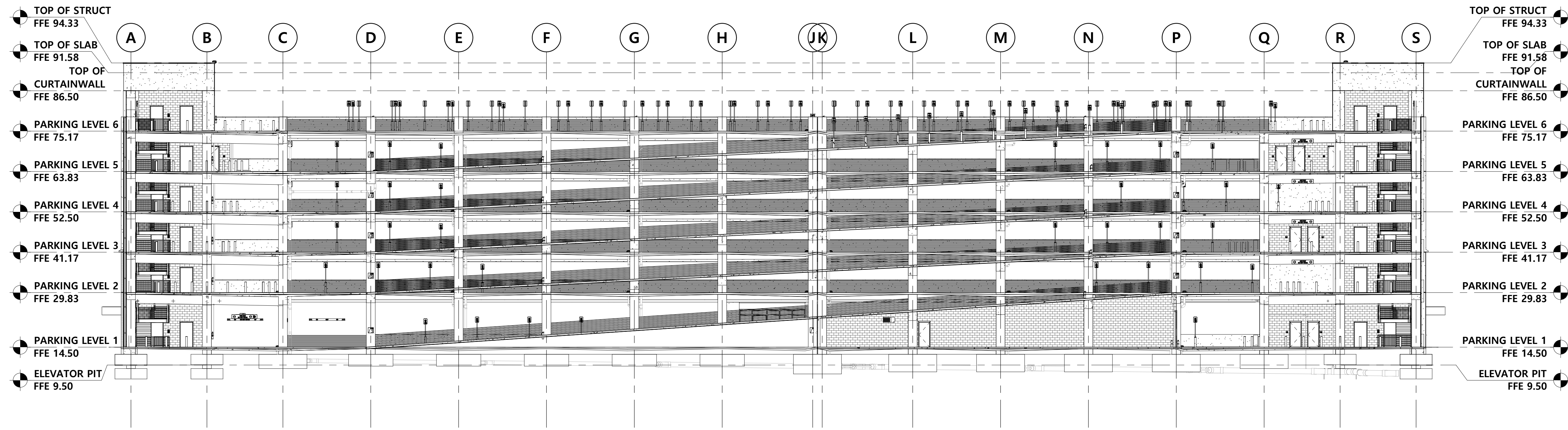


**7 Elevation** @ NORTHEAST STAIR  
A5.31 1/4" = 1'-0"

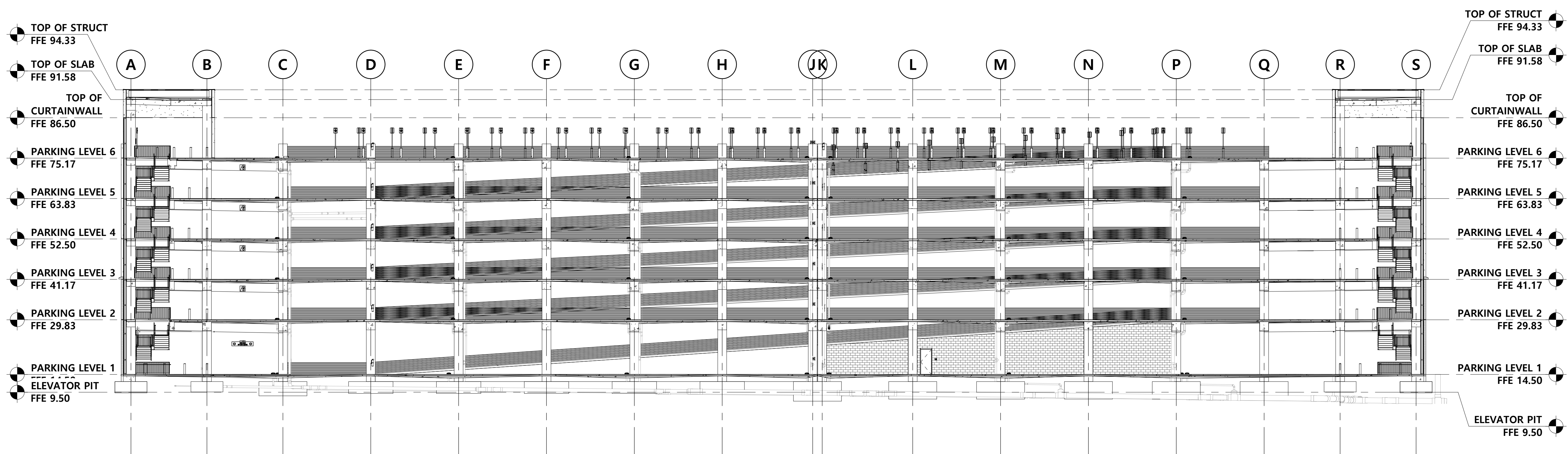


**8 Elevation** @ NORTHEAST STAIR  
A5.31 1/4" = 1'-0"

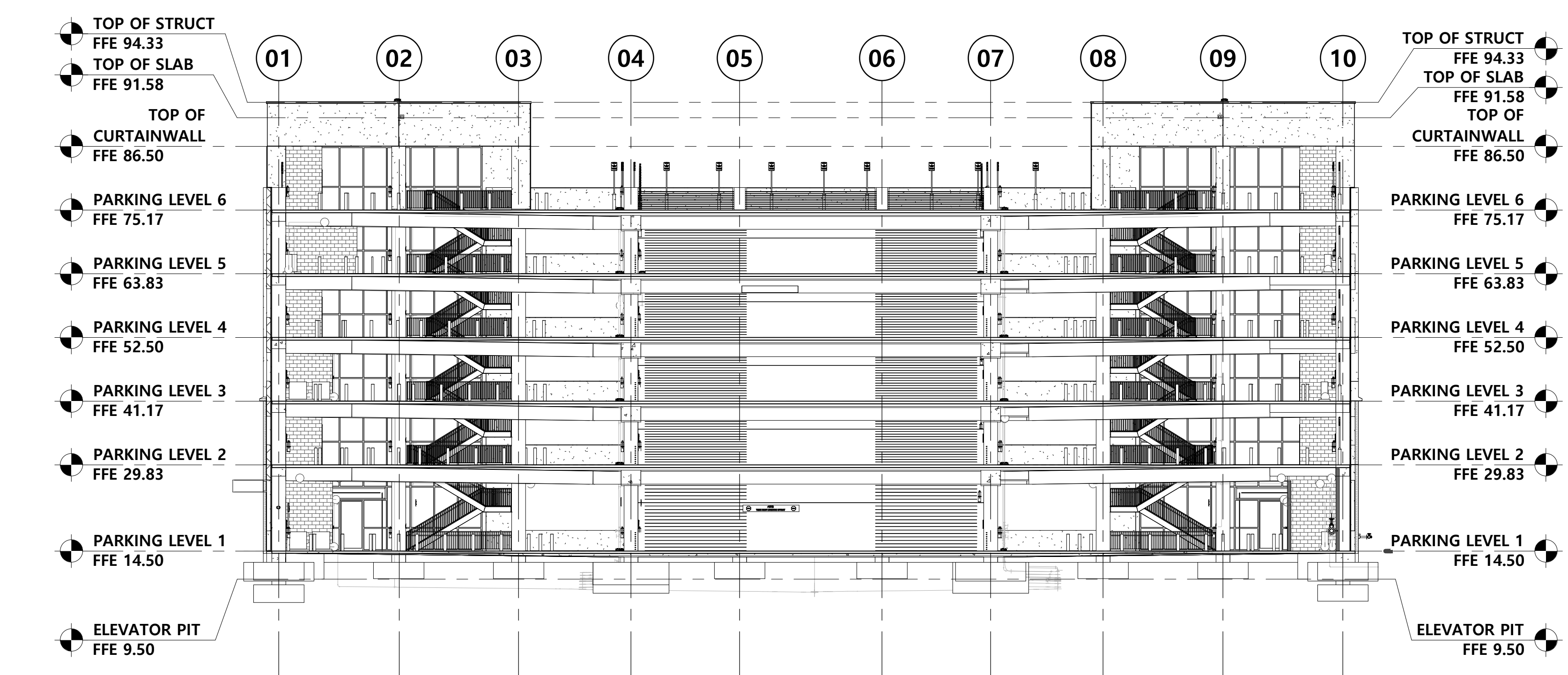
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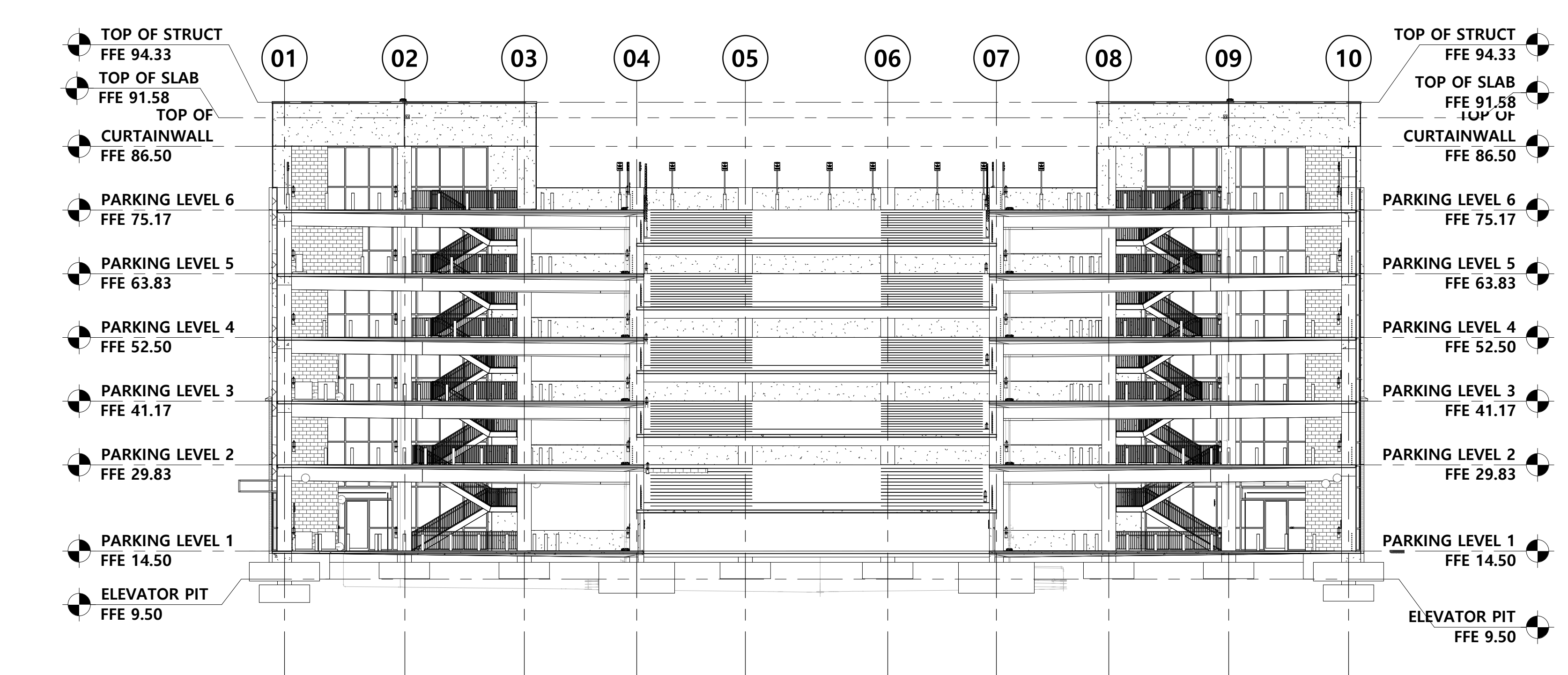
**1**  
A5.40 **Building Section - 1**  
SCALE: 1/16" = 1'-0"



**2**  
A5.40 **Building Section - 2**  
SCALE: 1/16" = 1'-0"



**3**  
A5.40 **Building Section - 3**  
SCALE: 1/16" = 1'-0"



**4**  
A5.40 **Building Section - 4**  
SCALE: 1/16" = 1'-0"

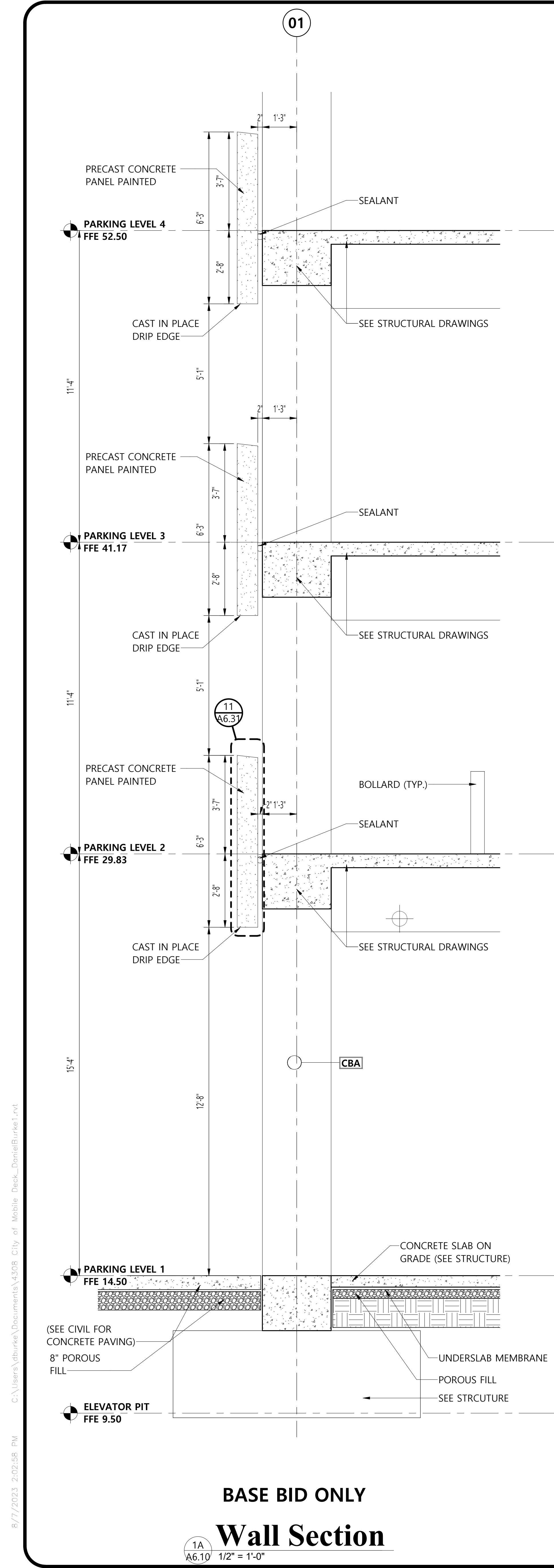
**Mobile Civic Center  
Parking Facility**  
Mobile, Alabama



**Evan Terry  
Associates LLC**  
Architecture • Accessible Design  
One Perimeter Park South Suite 2005  
Birmingham, AL 35243 (205) 972-9100

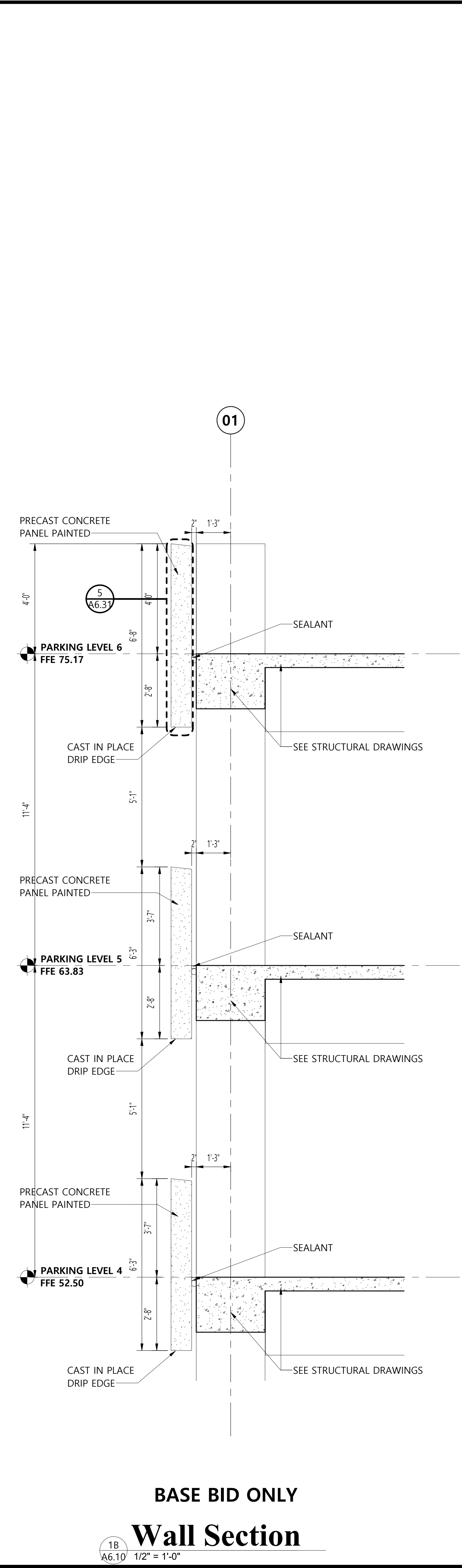
Revisions	
Sheet Title	BUILDING SECTIONS
Job No.	4308
Drawn by	ETA
Checked by	KING
Scale	084 of 154
Sheet No.	A5.40
Date	August 5, 2023
By	Evan Terry Associates, LLC 2023





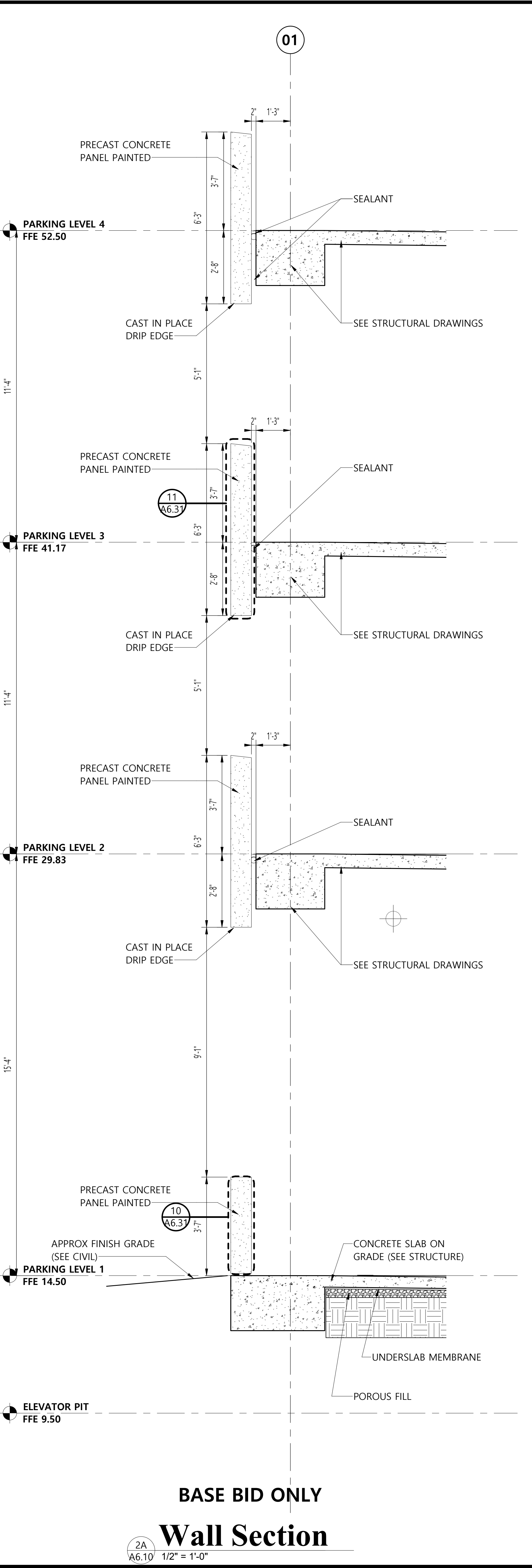
**BASE BID ONLY**  
**Wall Section**

1A  
A6.10 1/2" = 1'-0"



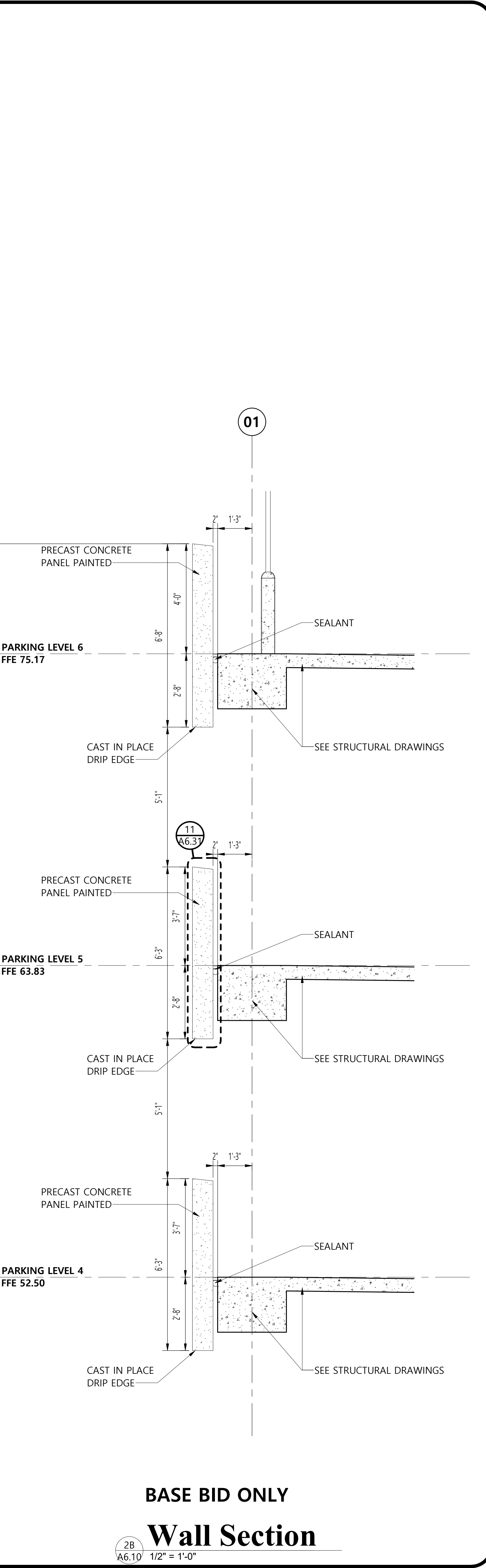
**BASE BID ONLY**  
**Wall Section**

1B  
A6.10 1/2" = 1'-0"



**BASE BID ONLY**  
**Wall Section**

2A  
A6.10 1/2" = 1'-0"



**BASE BID ONLY**  
**Wall Section**

2B  
A6.10 1/2" = 1'-0"

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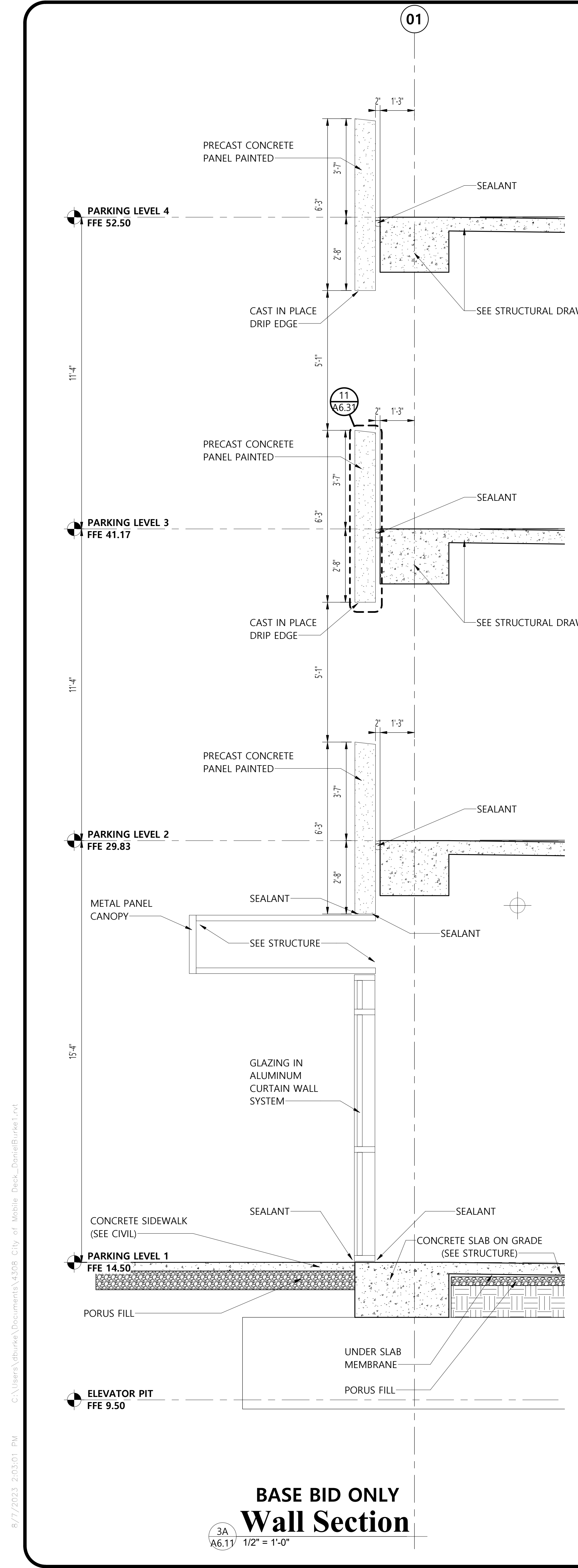
**Mobile Civic Center  
Parking Facility**  
Mobile, Alabama



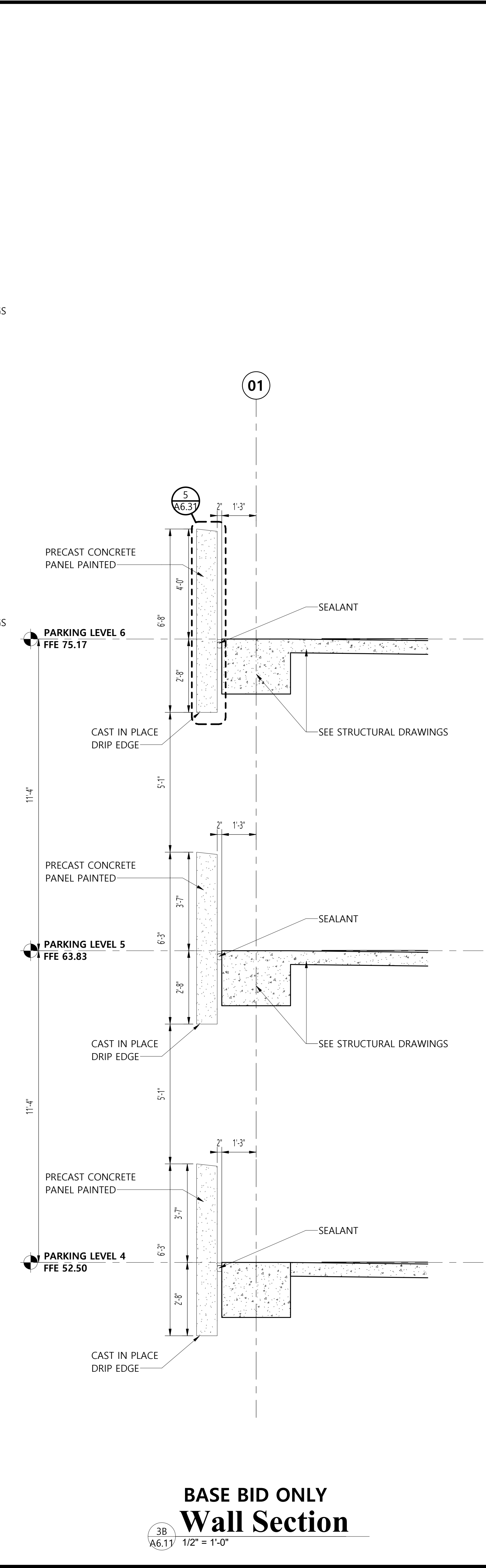
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Birmingham, AL 35243 (205) 972-9100

Revisions	

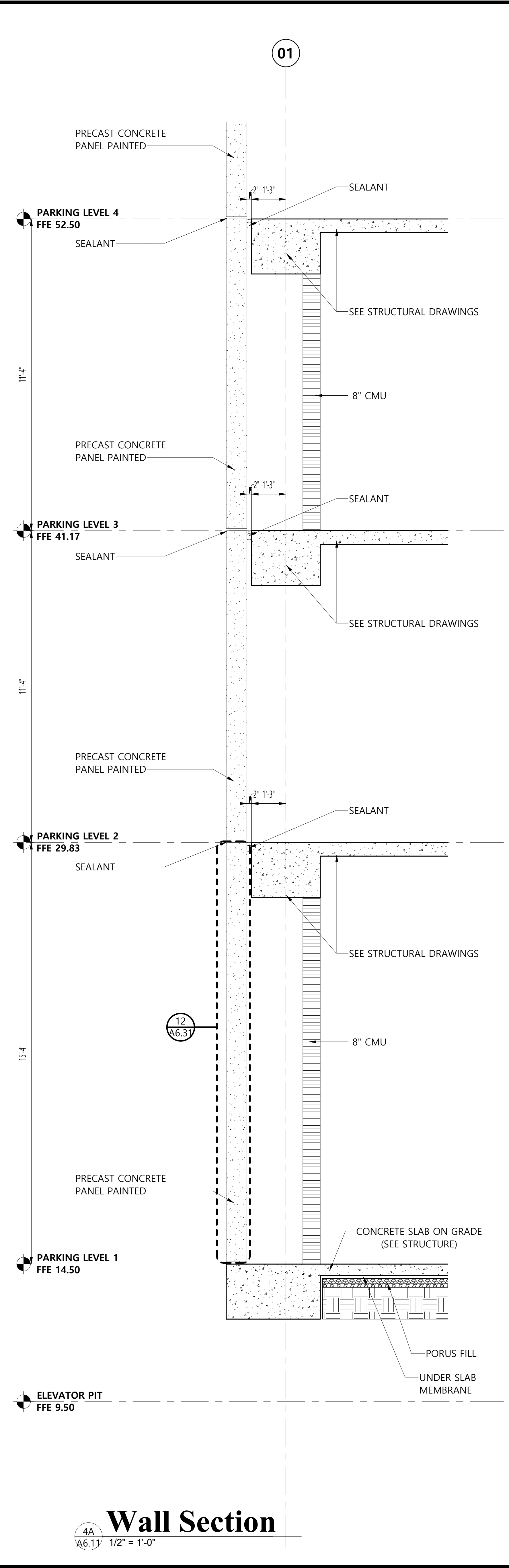
Sheet Title	WALL SECTIONS
Proj. No.	4308
Rev. by	ETA
Des. by	KING
Drawn by	
Date	August 5, 2023
Scale	1/2" = 1'-0"
Sheet No.	A6.10
Total Sheets	75



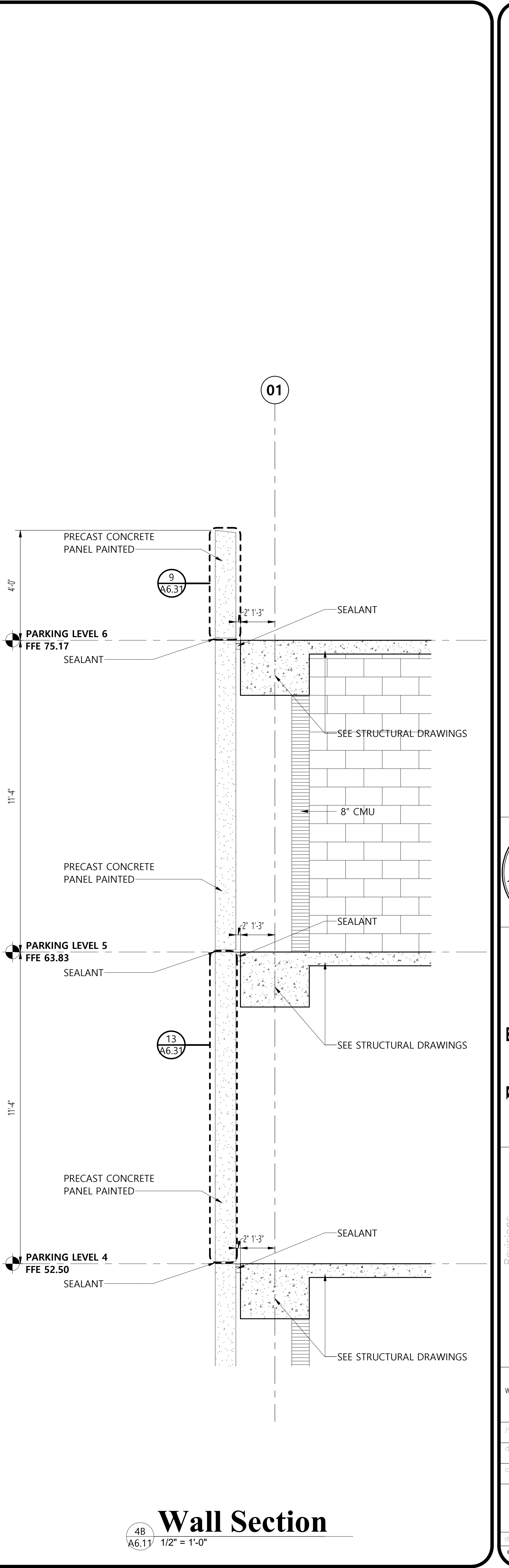
**BASE BID ONLY**  
**Wall Section**  
3A  
A6.11 1/2" = 1'-0"



**BASE BID ONLY**  
**Wall Section**  
3B  
A6.11 1/2" = 1'-0"



**Wall Section**  
4A  
A6.11 1/2" = 1'-0"



**Wall Section**  
4B  
A6.11 1/2" = 1'-0"

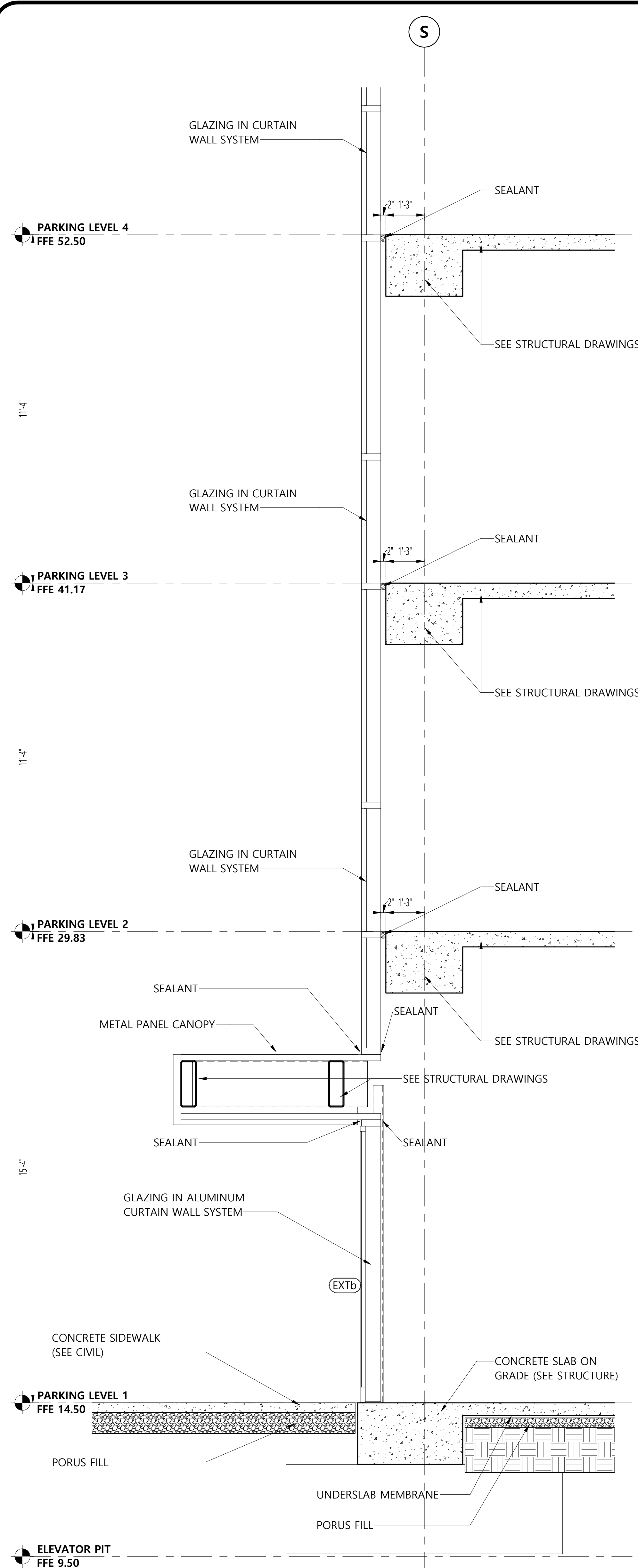
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**Mobile Civic Center  
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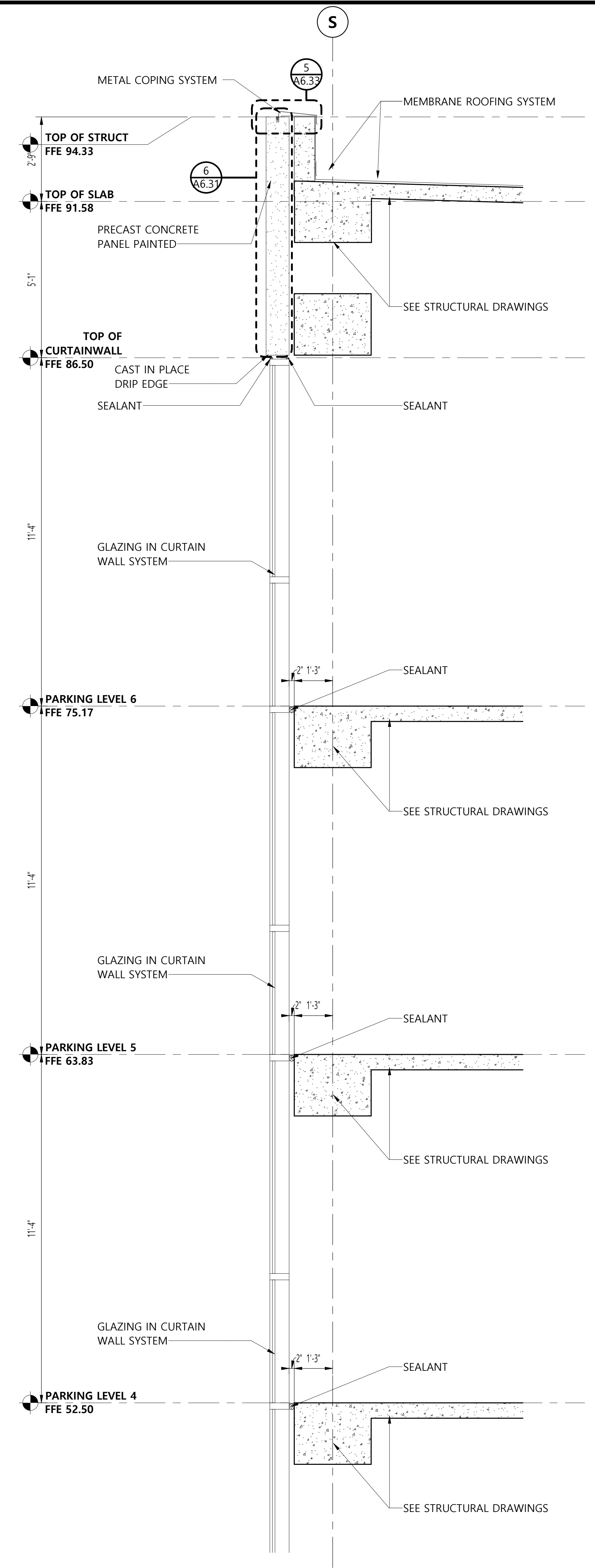


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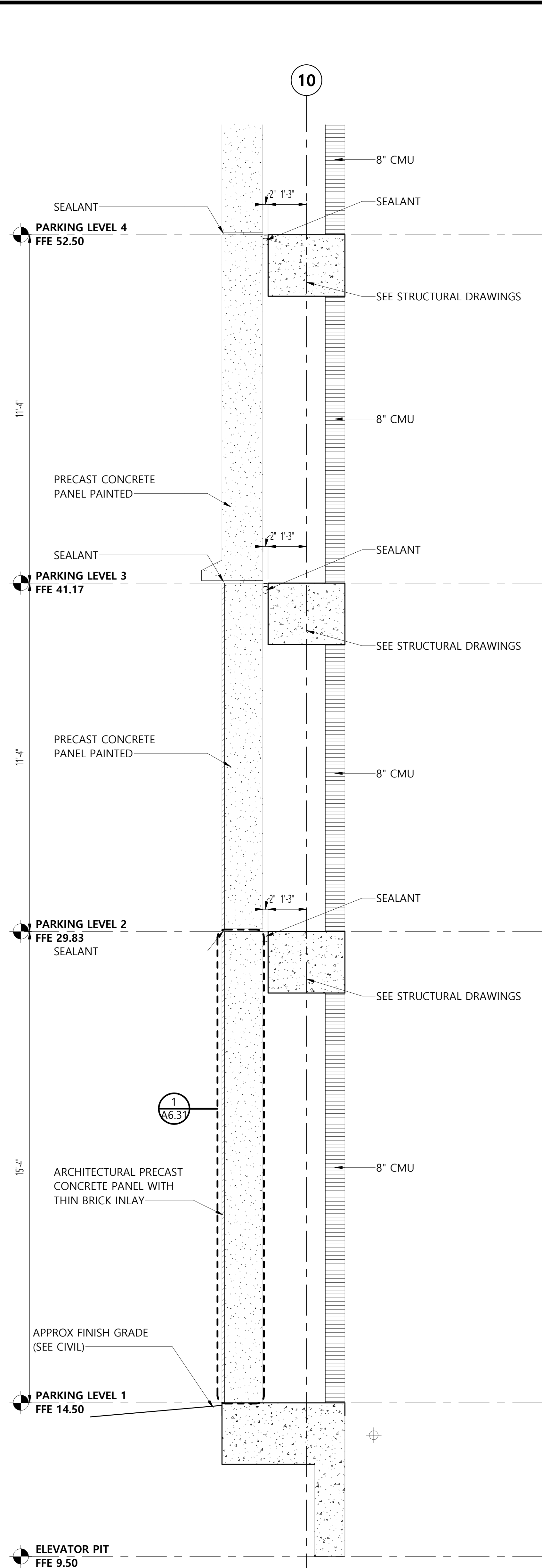
Revisions	Sheet Title
	WALL SECTIONS
Job No.	4308
Drawn by	ETA
Checked by	KING
Scale	086 of 154
Drawn by	A6.11
Date	August 5, 2023
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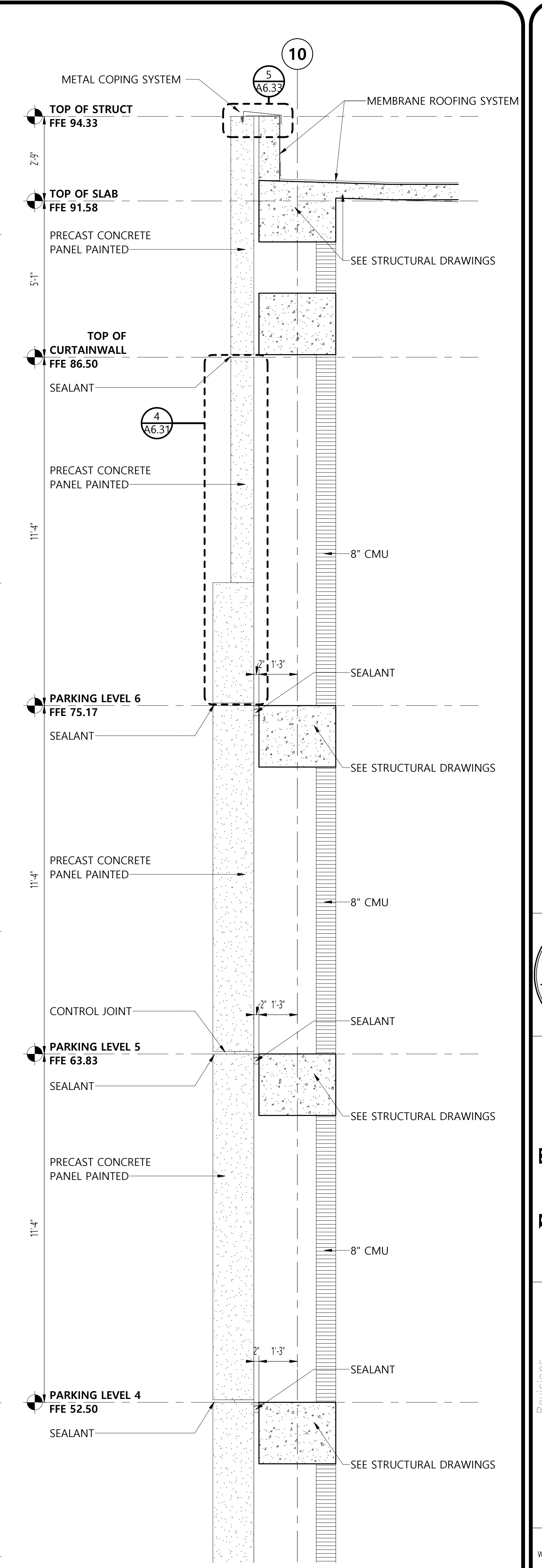
**Wall Section**  
5A  
A6.12 1/2" = 1'-0"



**Wall Section**  
5B  
A6.12 1/2" = 1'-0"



**Wall Section**  
6A  
A6.12 1/2" = 1'-0"



**Wall Section**  
6B  
A6.12 1/2" = 1'-0"

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**Mobile Civic Center  
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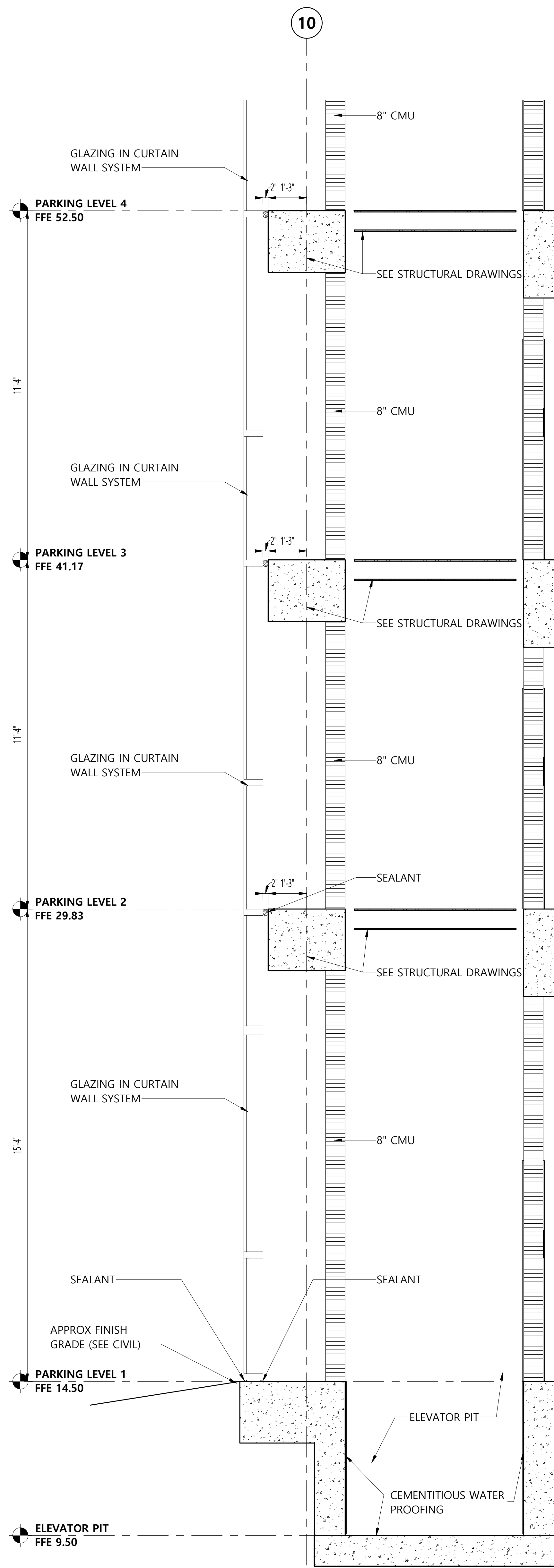


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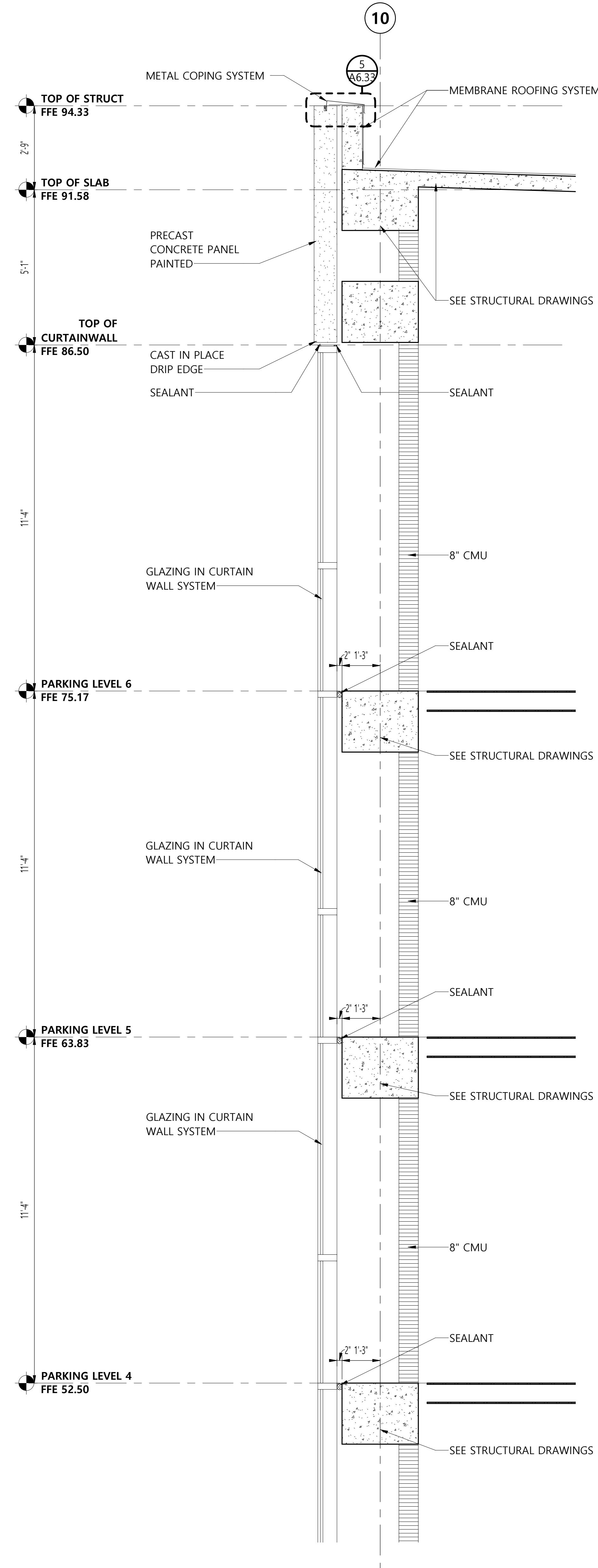
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job no.	4308
des. by	ETA
chk. by	087
	of 154
dwg. no.	A6.12
	of 75
date	August 5, 2023
© Evan Terry Associates, LLC 2023	

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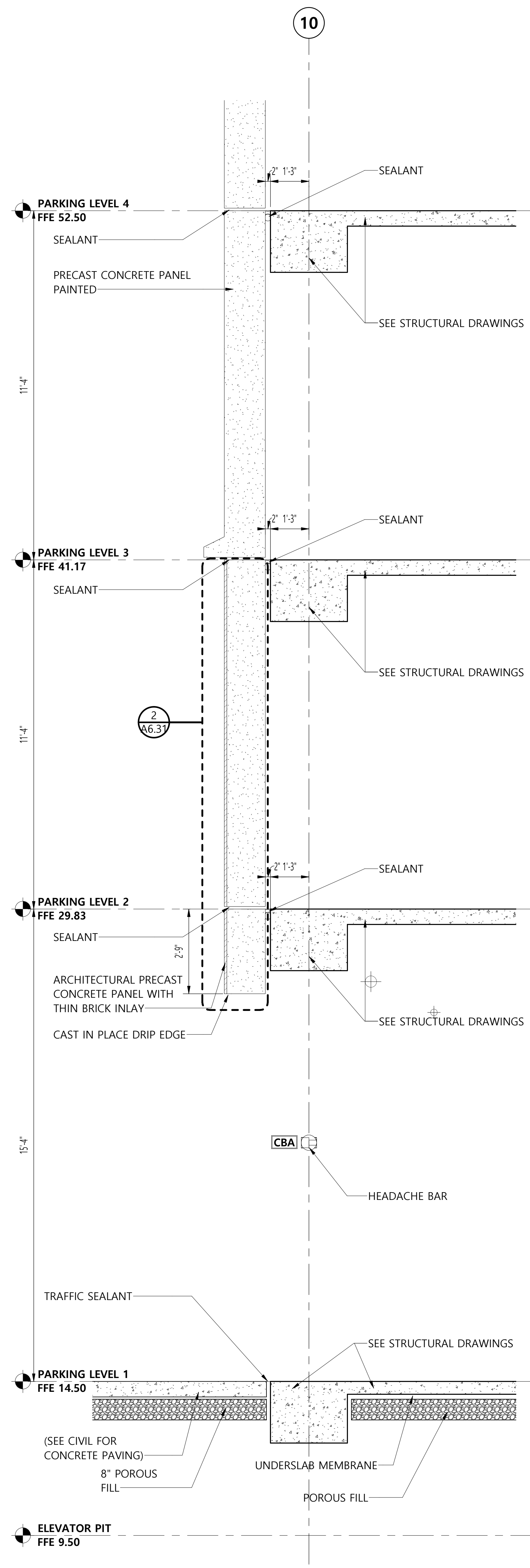
7A  
A6.13 1/2" = 1'-0"

### Wall Section



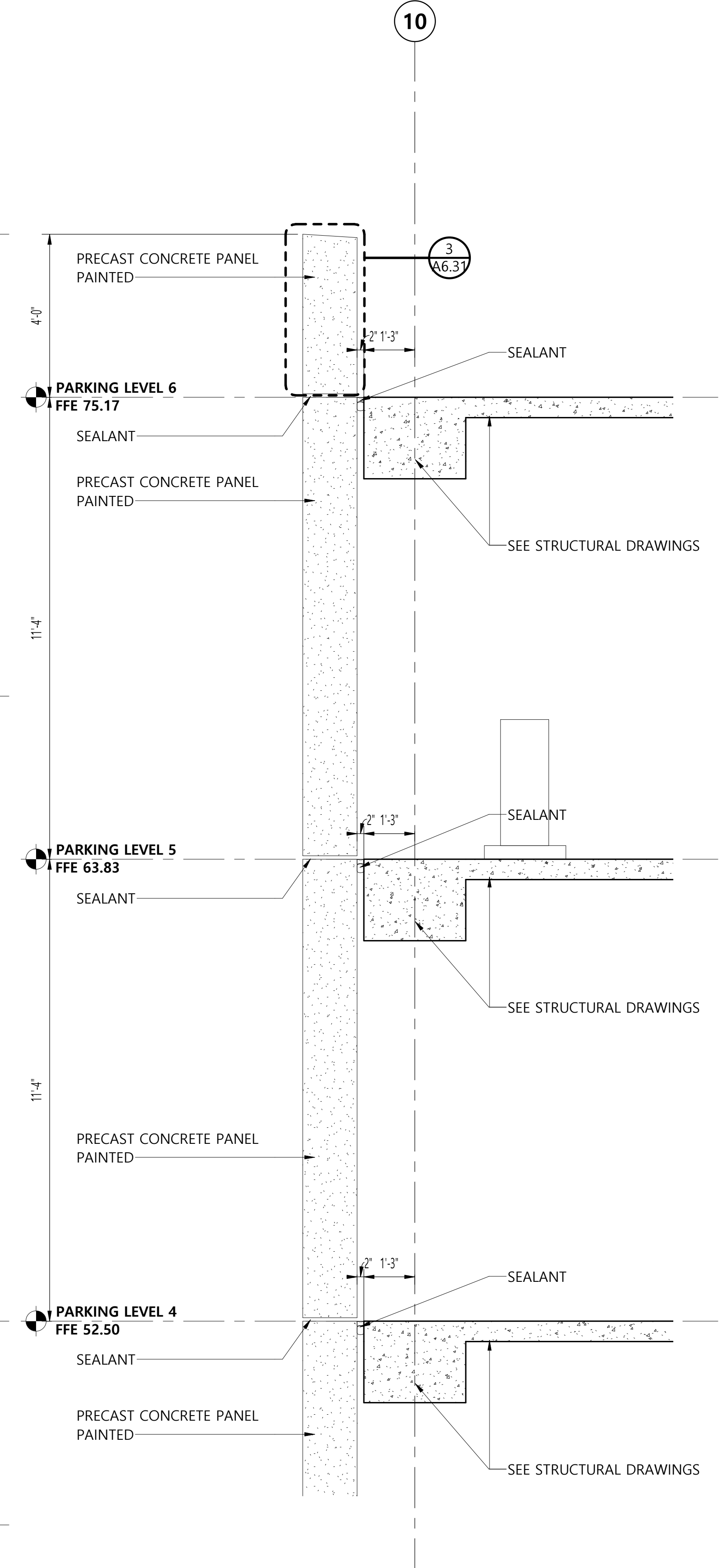
7B  
A6.13 1/2" = 1'-0"

### Wall Section



8A  
A6.13 1/2" = 1'-0"

### Wall Section



8B  
A6.13 1/2" = 1'-0"

### Wall Section

# Mobile Civic Center Parking Facility

Mobile, Alabama

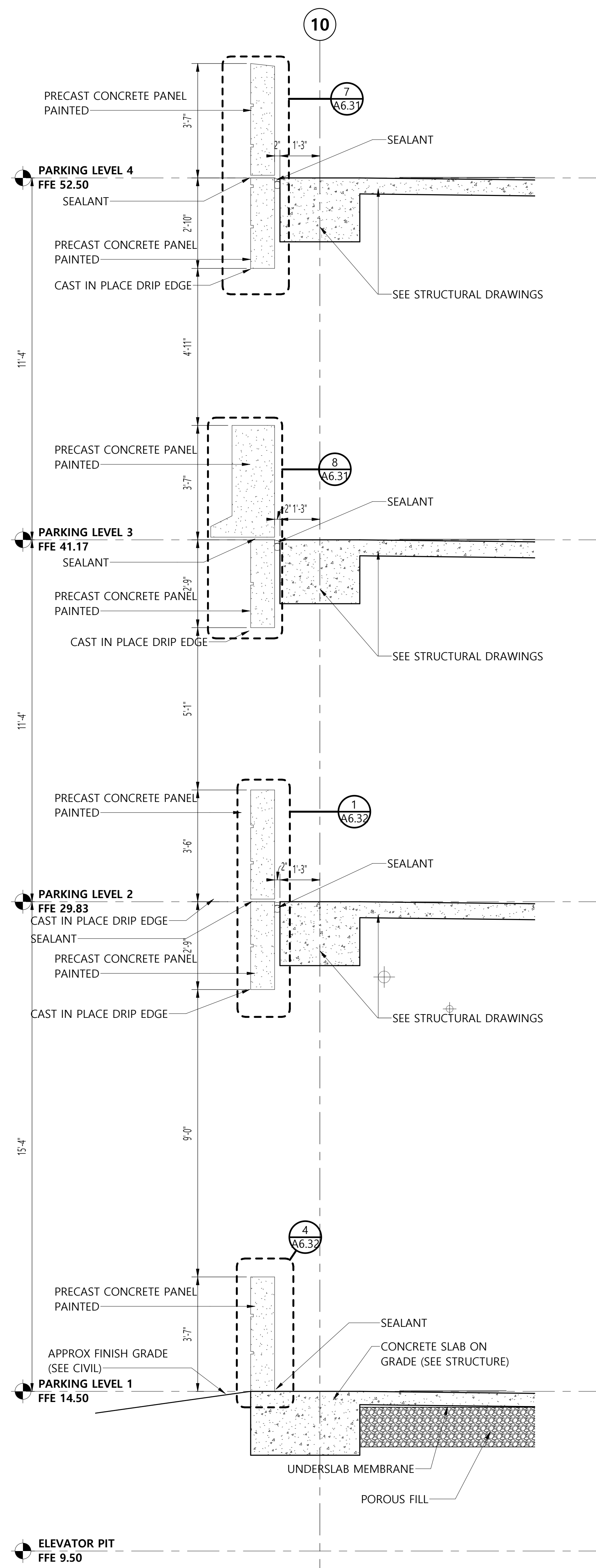


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Revisions	
No.	Description

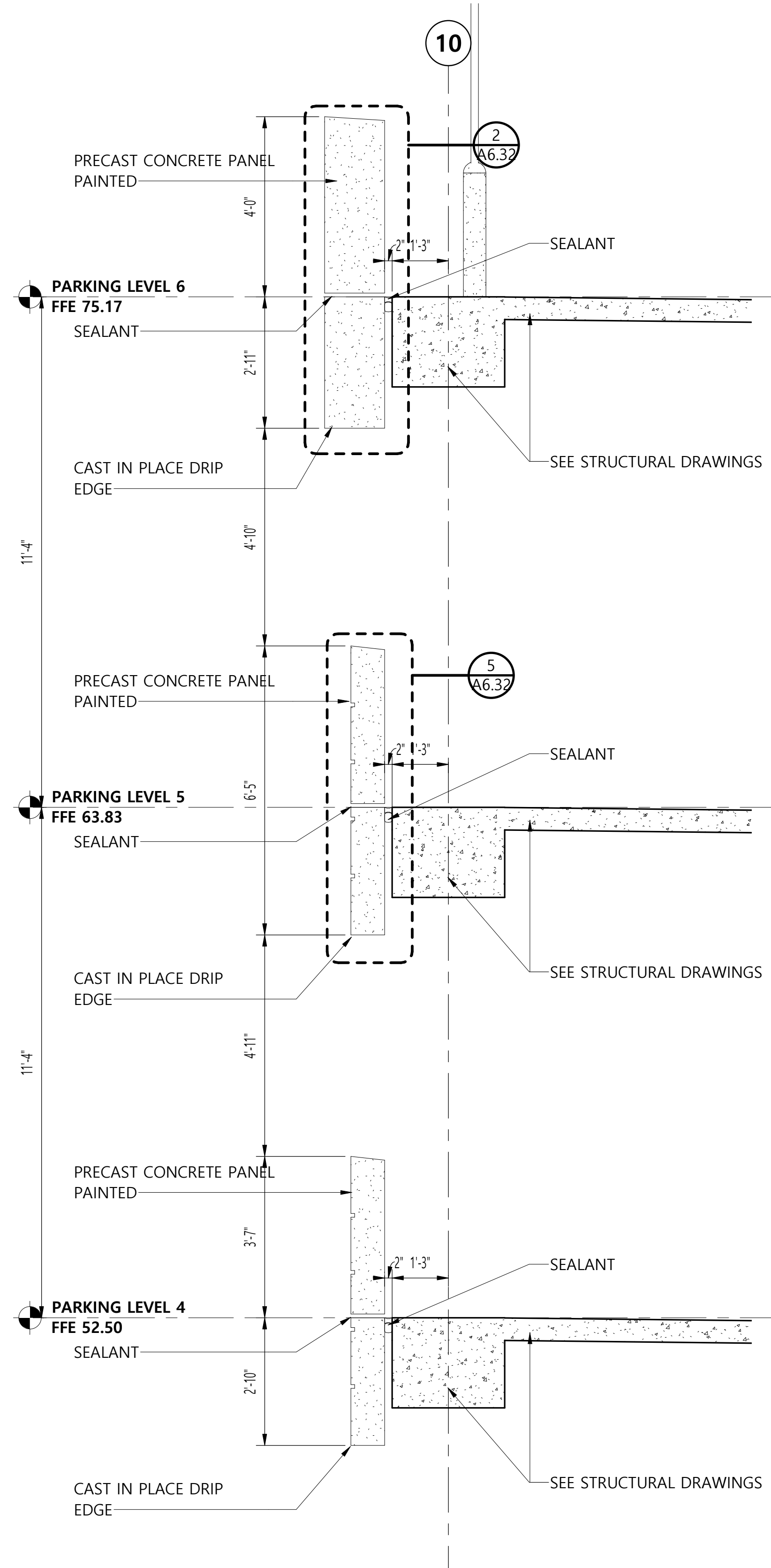
sheet title	WALL SECTIONS
job no.	4308
des. by	ETA
chk. by	KING
dwg. no.	A6.13
of	75
date	August 5, 2023
© Evan Terry Associates, LLC 2023	

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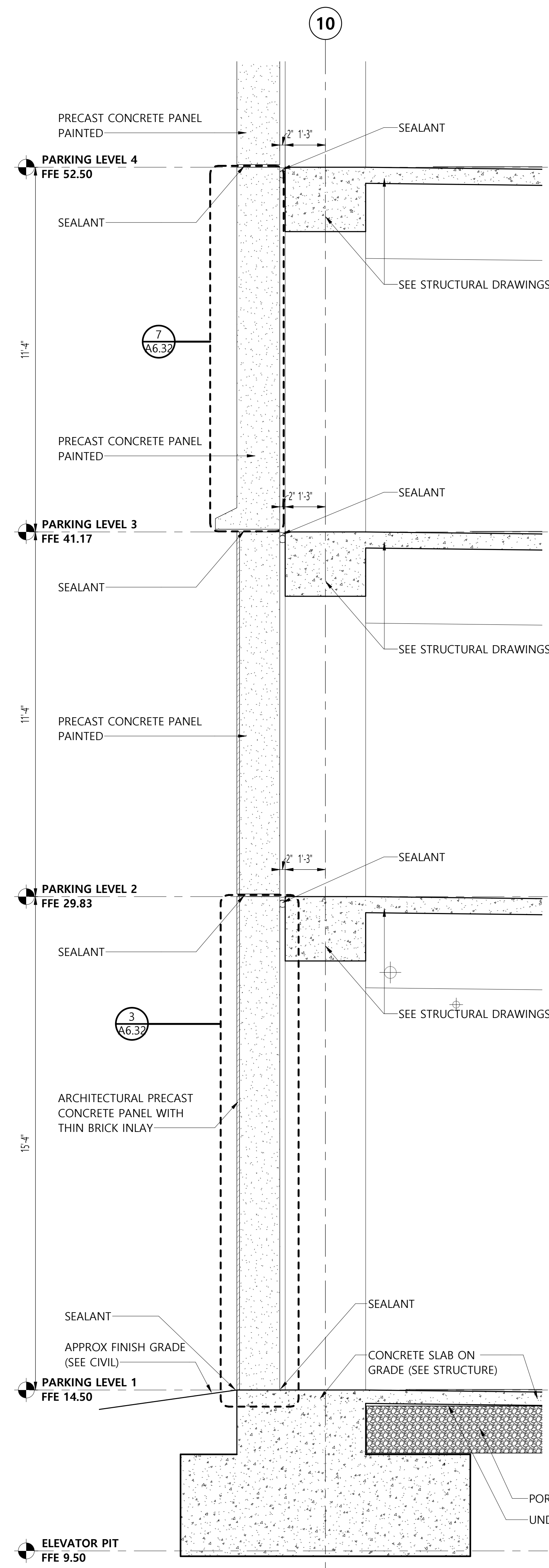
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**Wall Section**

9A  
A6.14 1/2" = 1'-0"



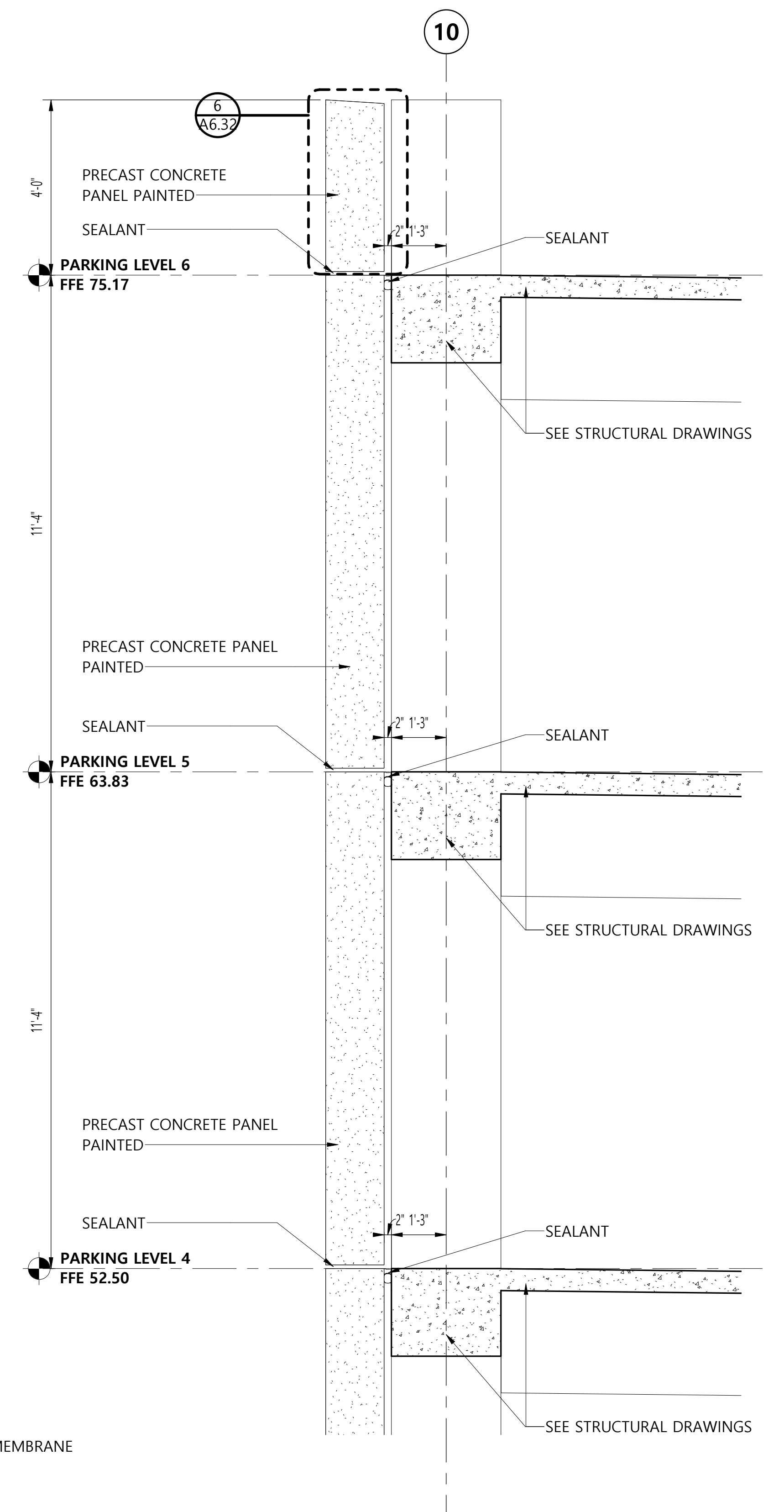
**BASE BID ONLY**  
**Wall Section**

9B  
A6.14 1/2" = 1'-0"



**BASE BID ONLY**  
**Wall Section**

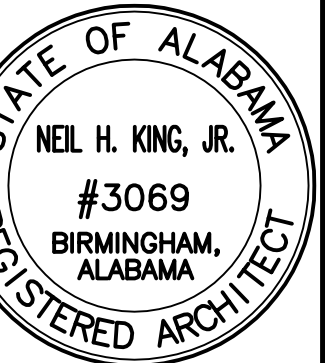
10A  
A6.14 1/2" = 1'-0"



**BASE BID ONLY**  
**Wall Section**

10B  
A6.14 1/2" = 1'-0"

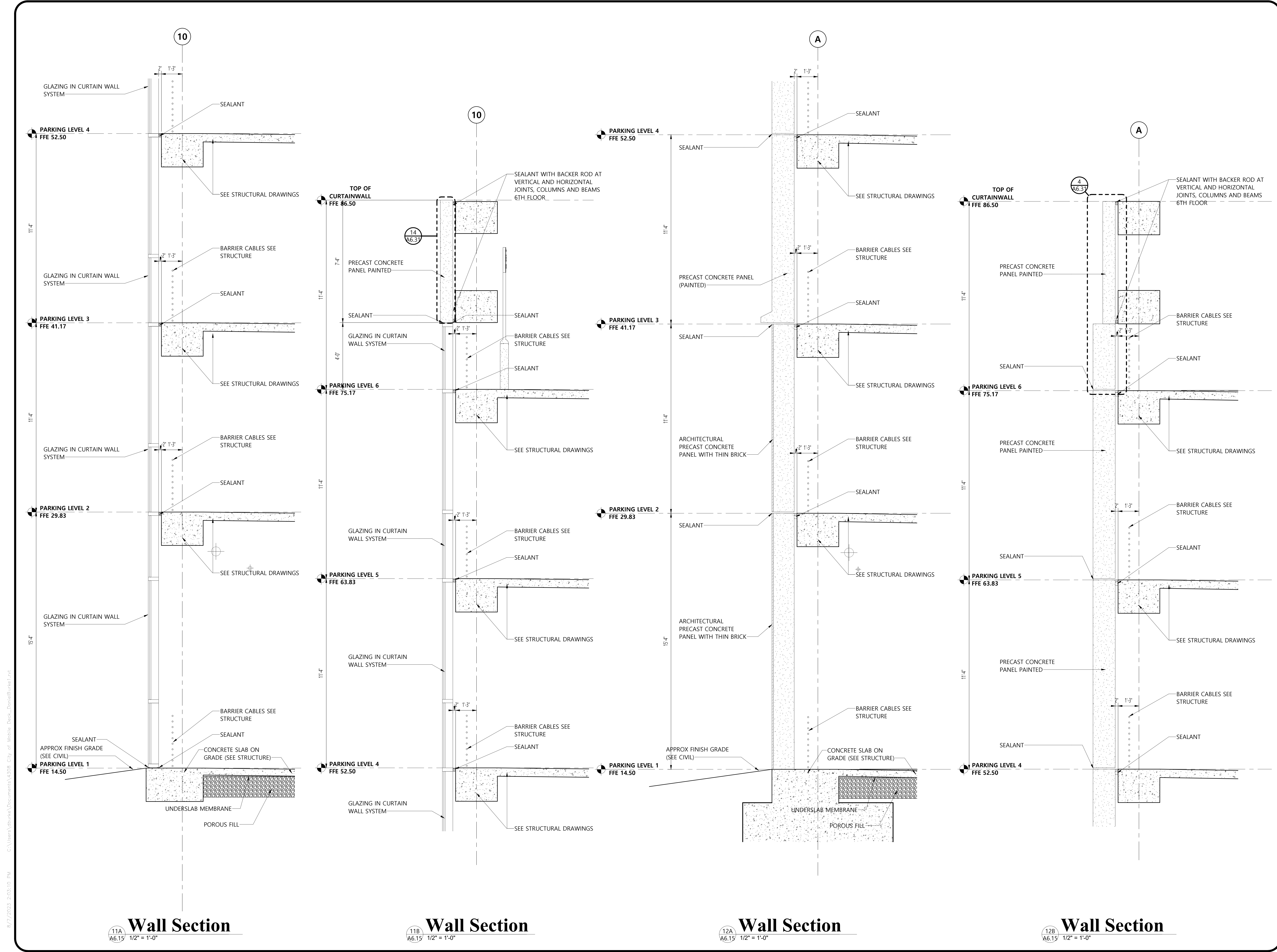
**Mobile Civic Center  
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Revisions	

Sheet Title	WALL SECTIONS
Job No.	4308
Drawn by	ETA
Checked by	KING
Date	August 5, 2023
Scale	1/2" = 1'-0"



**11A**  
A6.15 1/2" = 1'-0"  
**Wall Section**

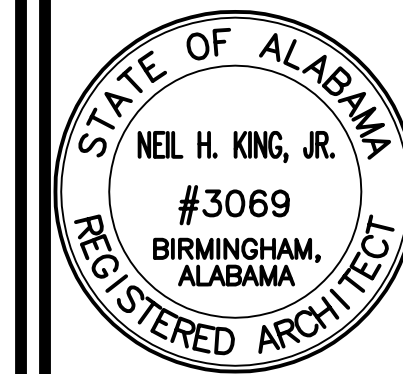
**11B**  
A6.15 1/2" = 1'-0"  
**Wall Section**

**12A**  
A6.15 1/2" = 1'-0"  
**Wall Section**

**12B**  
A6.15 1/2" = 1'-0"  
**Wall Section**

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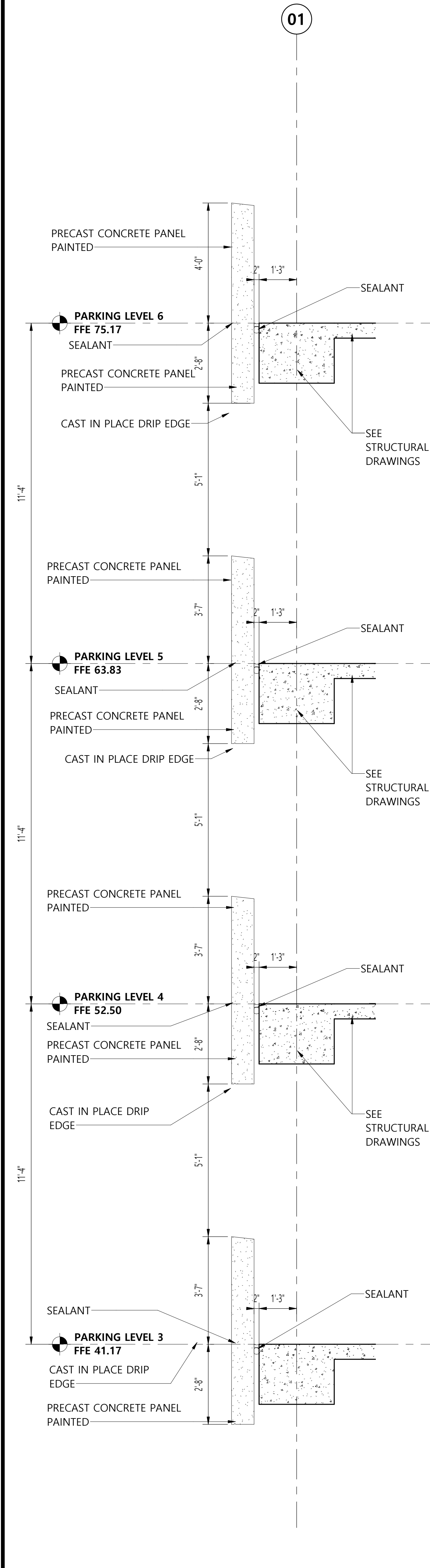
**Mobile Civic Center  
Parking Facility**  
Mobile, Alabama



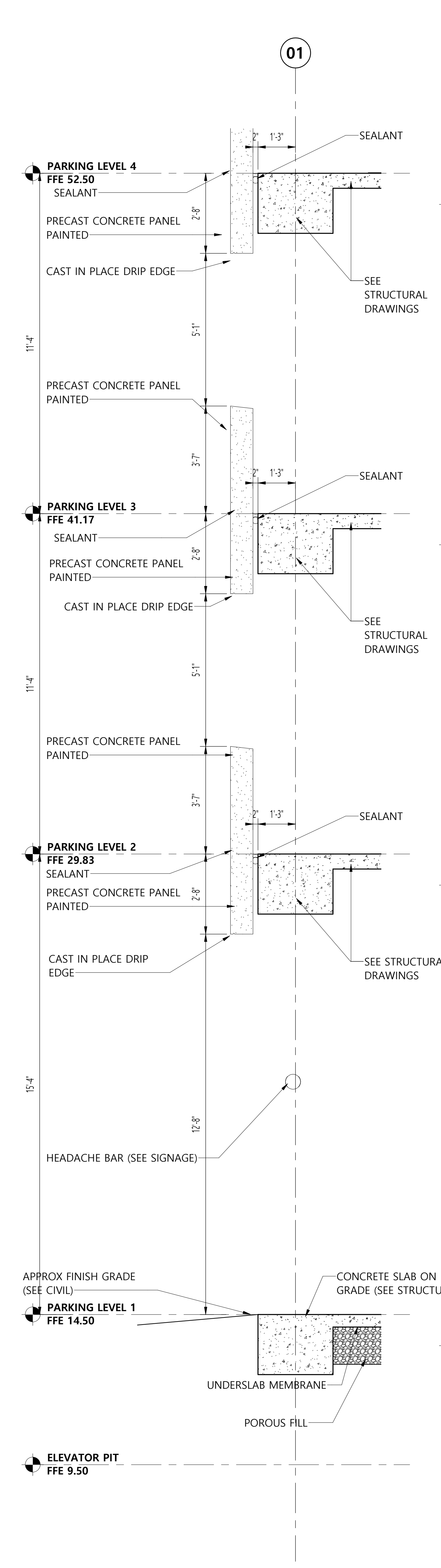
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Birmingham, AL 35243 (205) 972-9700

Revisions	1	07/29/22	NET (TBB)
Sheet Title	WALL SECTIONS		
JOB no.	4308		
Drawn by	ETA		
Checked by	KING		
Scale	090 of 154		
Sheet no.	A6.15 of 75		
Date	August 5, 2023		
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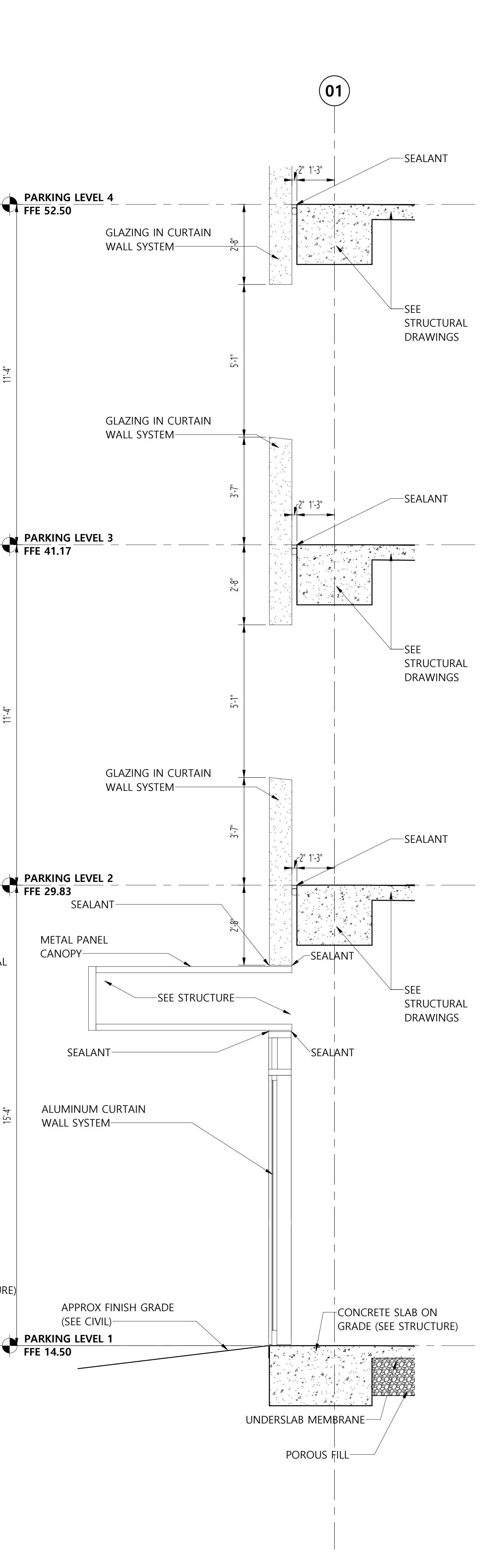
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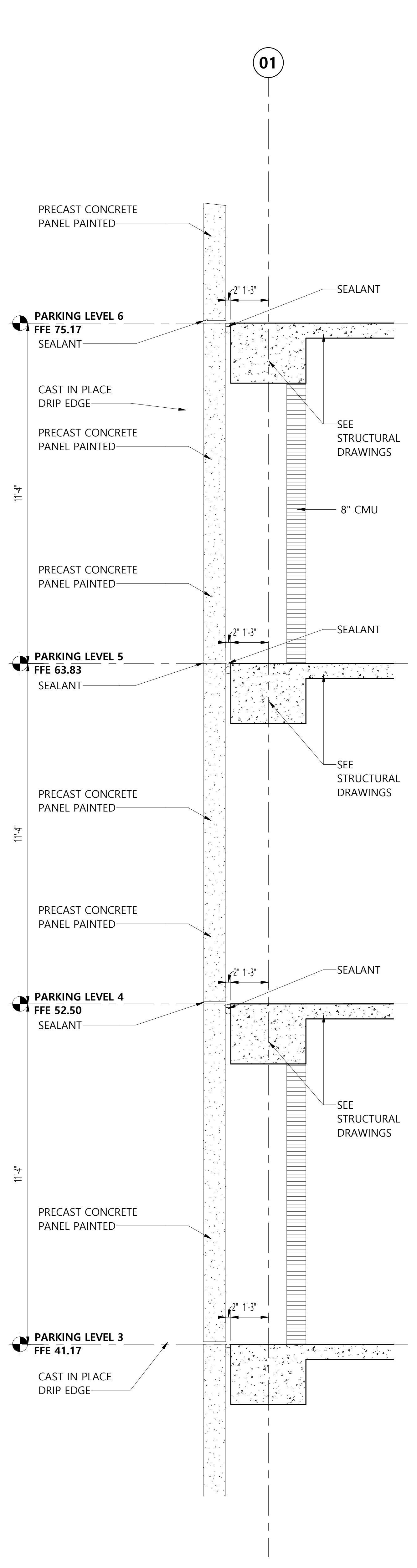
1  
A6.16 1/2" = 1'-0"  
**Wall Section**



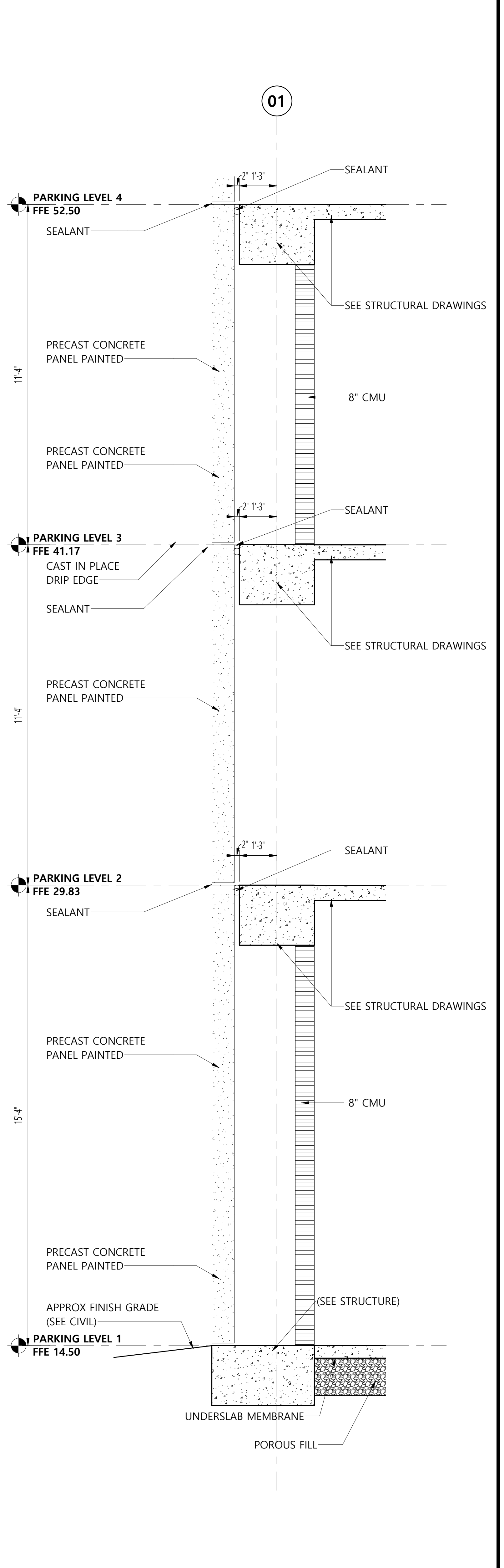
2  
A6.16 1/2" = 1'-0"  
**Wall Section**



3  
A6.16 1/2" = 1'-0"  
**Wall Section**

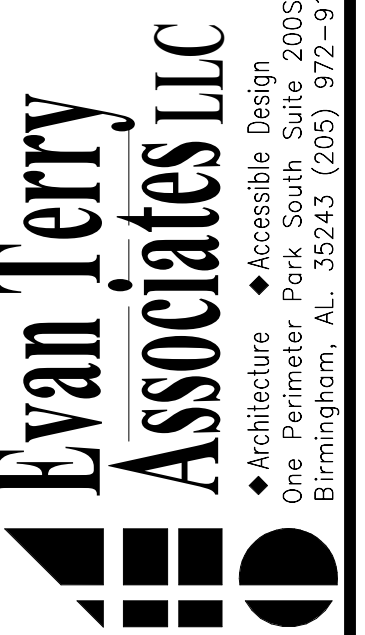
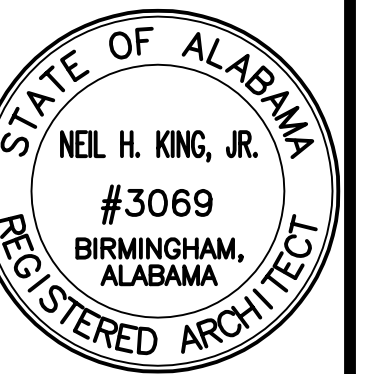


4  
A6.16 1/2" = 1'-0"  
**Wall Section**



5  
A6.16 1/2" = 1'-0"  
**Wall Section**

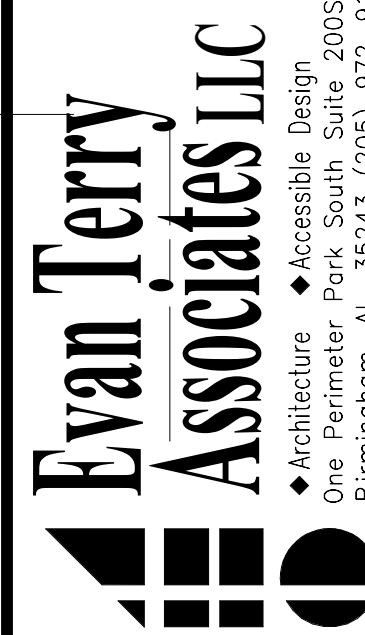
**Mobile Civic Center  
Parking Facility**  
Mobile, Alabama



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JOB NO.	4308
DATE	ETD
DESIGNED BY	KING
CHECKED BY	KING
DRAWN BY	ETD
DATE	August 5, 2023
SCALE	1/2" = 1'-0"
SHEET NO.	091 of 154
PROJECT NO.	A6.16 of 75
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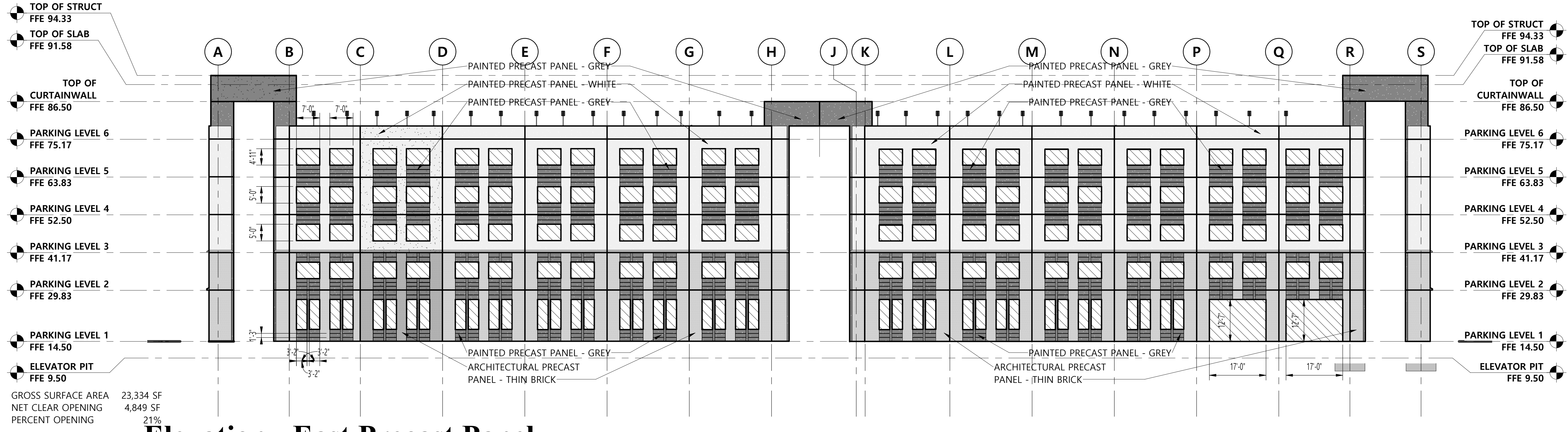
# Mobile Civic Center Parking Facility

Mobile, Alabama



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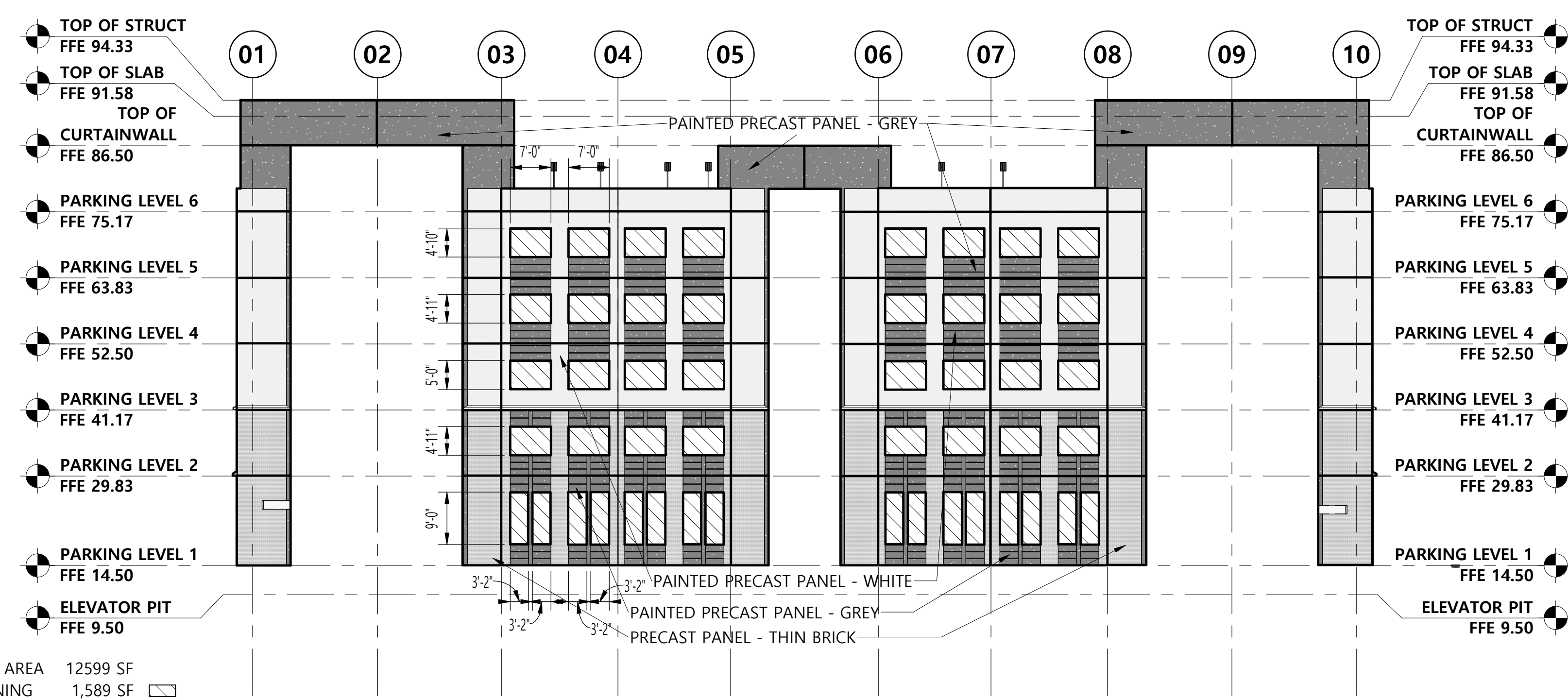
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job no.	4308
des. by	ETA
chk. by	KING
of	154
dwg. no.	A6.30
of	75
date	August 5, 2023
©	Evan Terry Associates, LLC, 2023



### Elevation - East Precast Panel

SCALE: 1/16" = 1'-0"

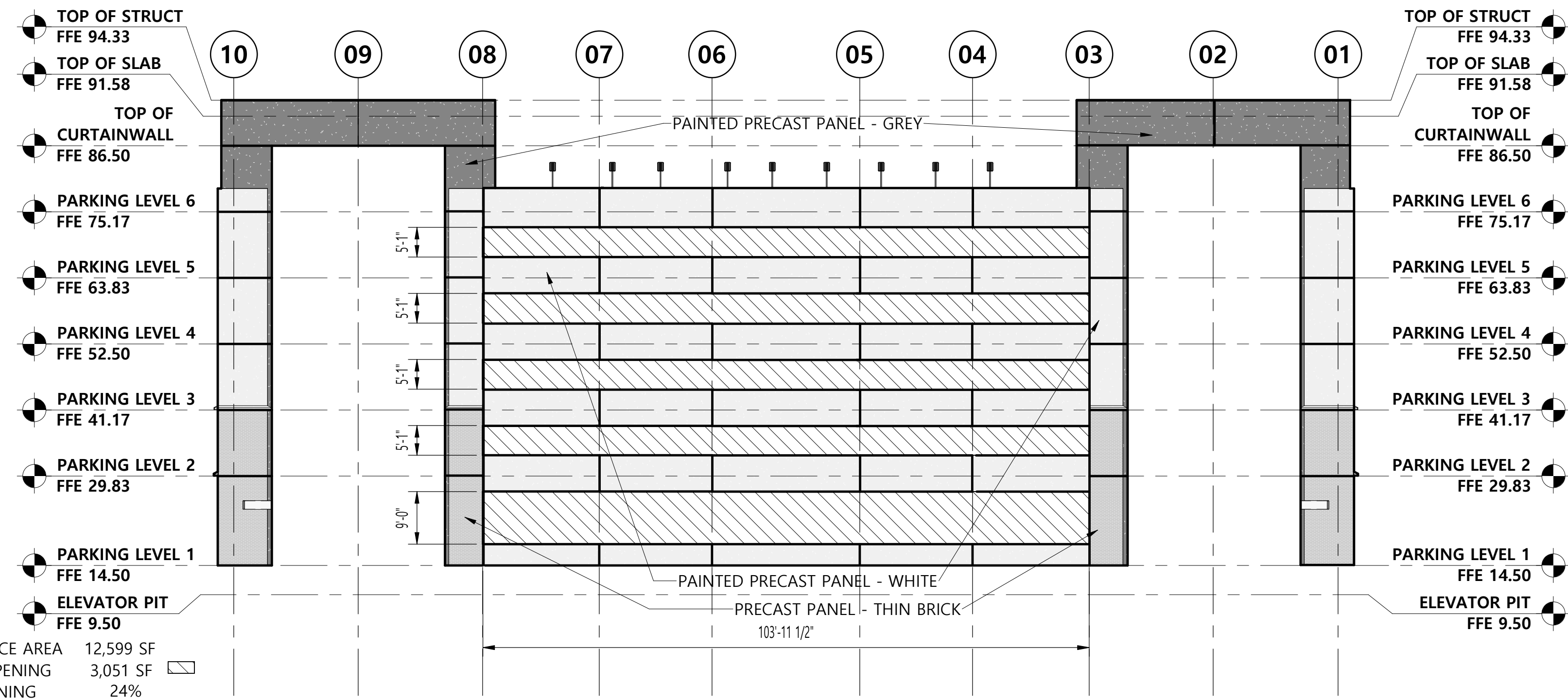
GROSS SURFACE AREA 23,334 SF  
NET CLEAR OPENING 4,849 SF  
PERCENT OPENING 21%



### Elevation - South Precast Panel

SCALE: 1/16" = 1'-0"

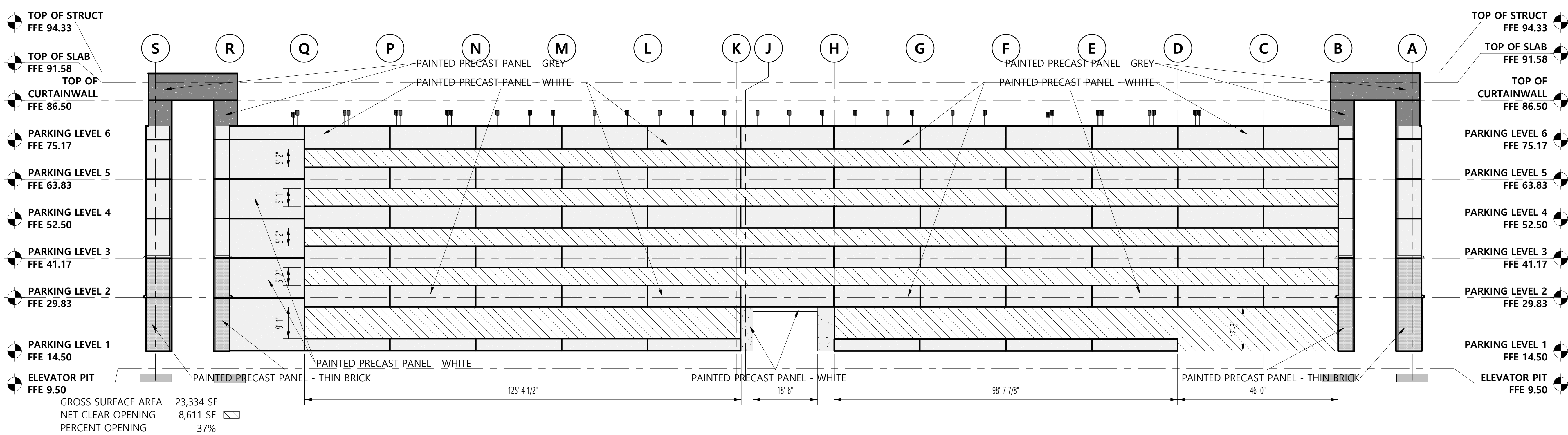
GROSS SURFACE AREA 12,599 SF  
NET CLEAR OPENING 1,589 SF  
PERCENT OPENING 13%



### Elevation - North Precast Panel

SCALE: 1/16" = 1'-0"

GROSS SURFACE AREA 12,599 SF  
NET CLEAR OPENING 3,051 SF  
PERCENT OPENING 24%



### Elevation - West Precast Panel

SCALE: 1/16" = 1'-0"

GROSS SURFACE AREA 23,334 SF  
NET CLEAR OPENING 8,611 SF  
PERCENT OPENING 37%

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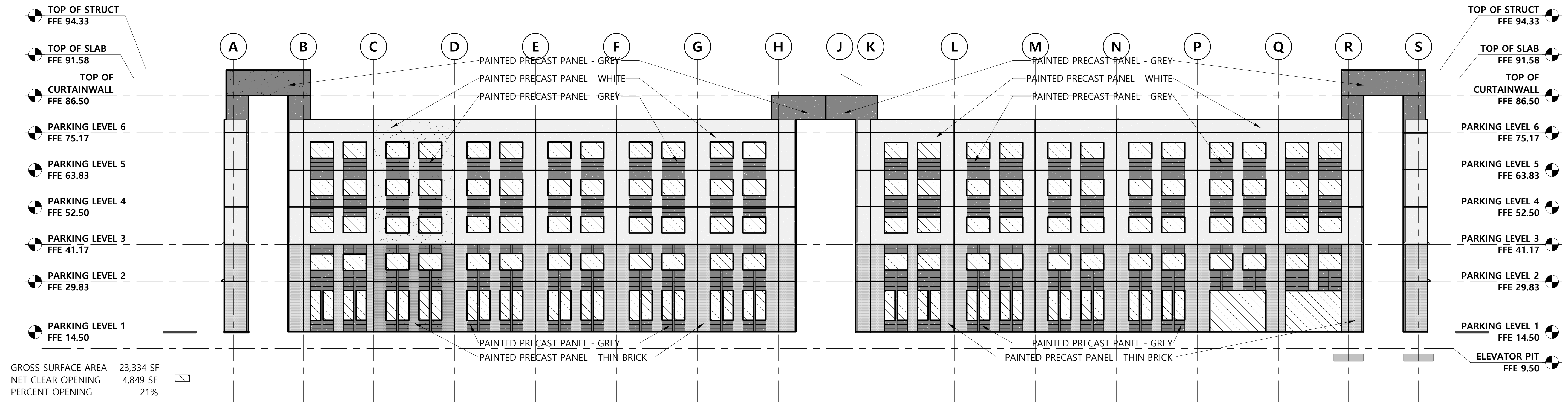
Mobile, Alabama



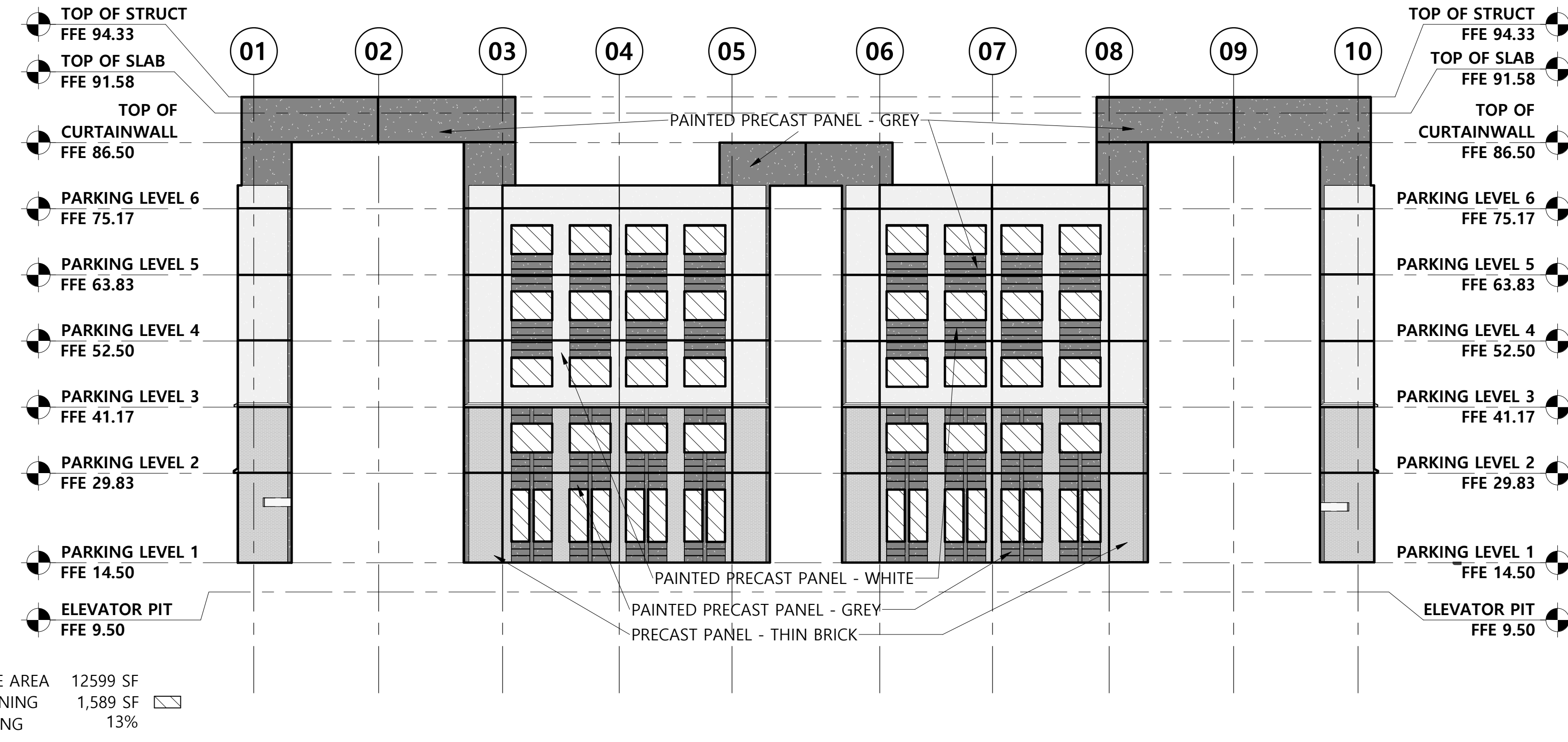
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Birmingham, AL 35243 (205) 972-9100

Revisions

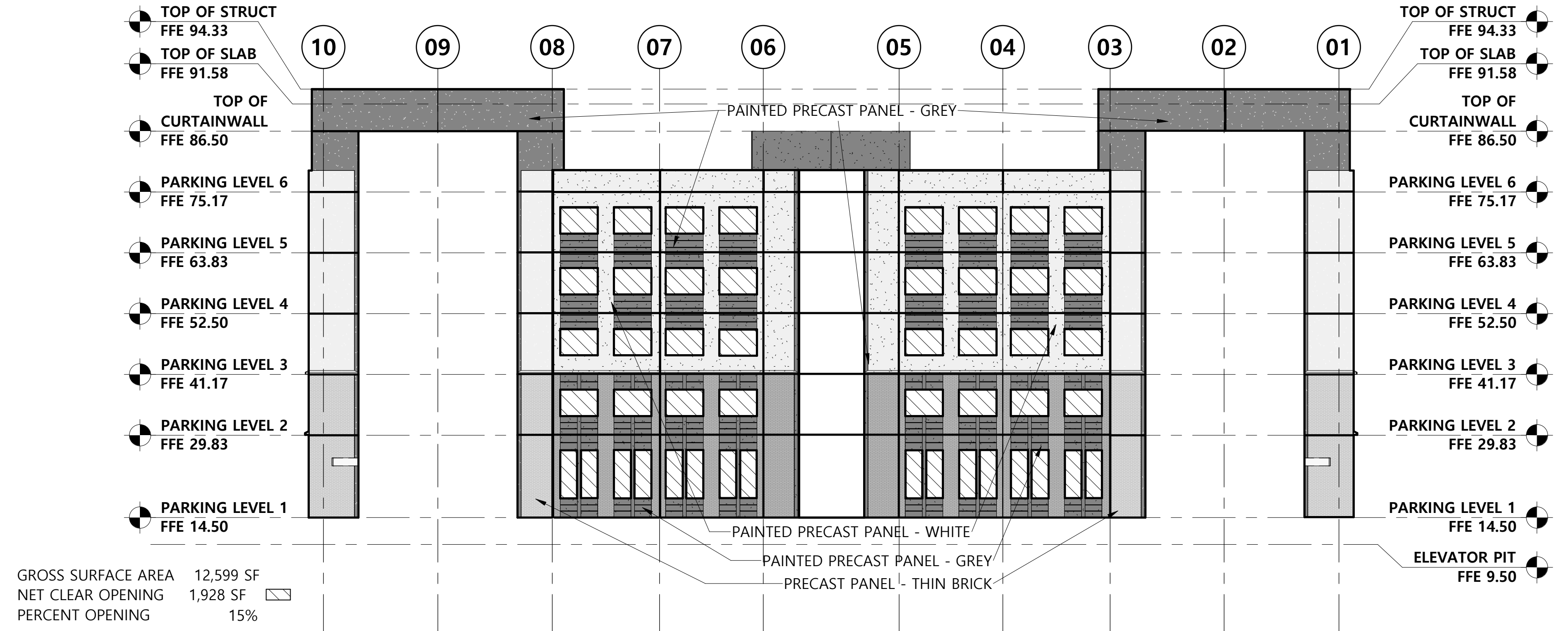
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job no.	4308
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of	154
sheet no.	<b>A6.30B</b>
of	75
date	August 5, 2023
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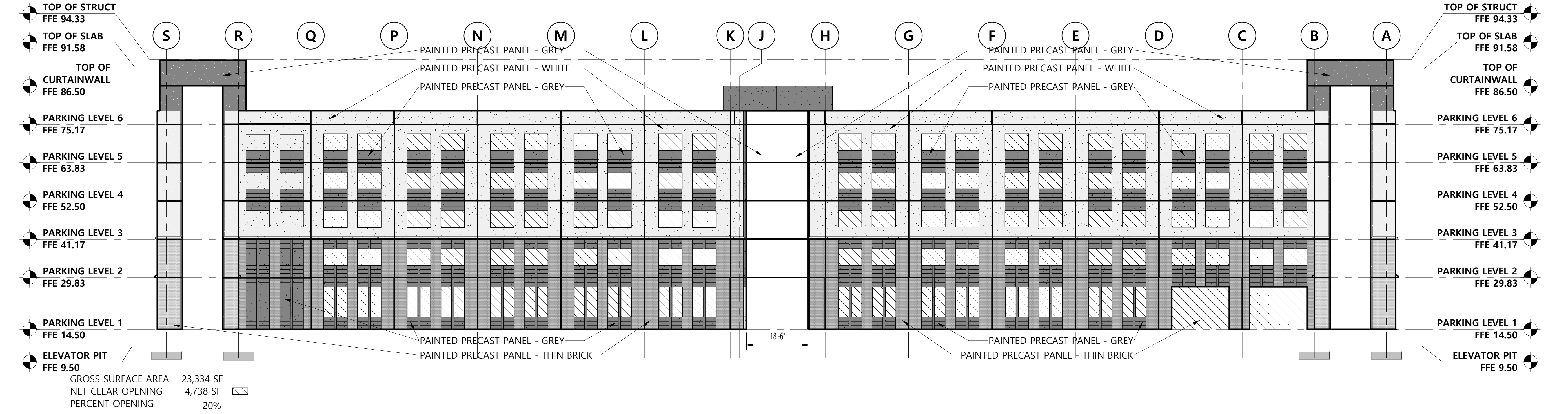
**1 Elevation - East Precast Panel - Alternate No.1**  
SCALE: 1/16" = 1'-0"



**3 Elevation - South Precast Panel - Alternate No.1**  
SCALE: 1/16" = 1'-0"

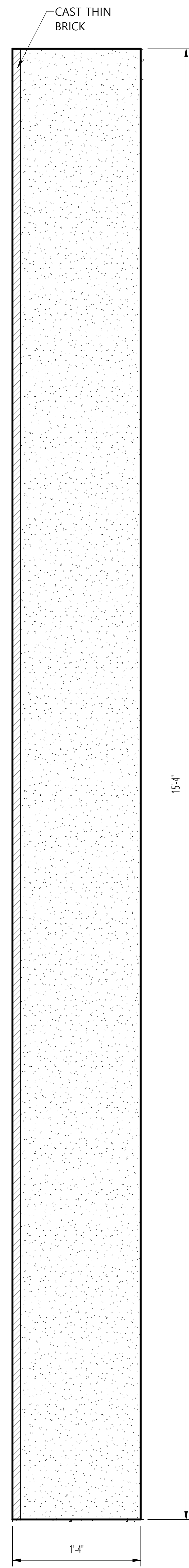


**2 Elevation - North Precast Panel - Alternate No.1**  
SCALE: 1/16" = 1'-0"

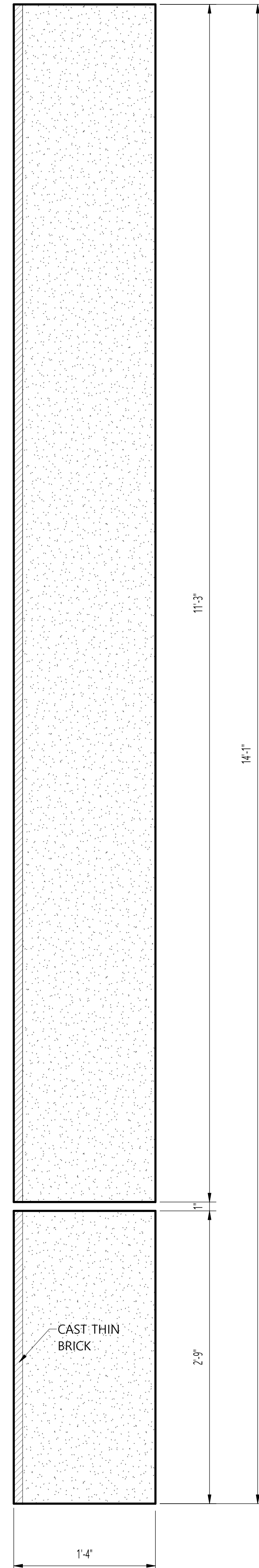


**4 Elevation - West Precast Panel - Alternate No.1**  
SCALE: 1/16" = 1'-0"

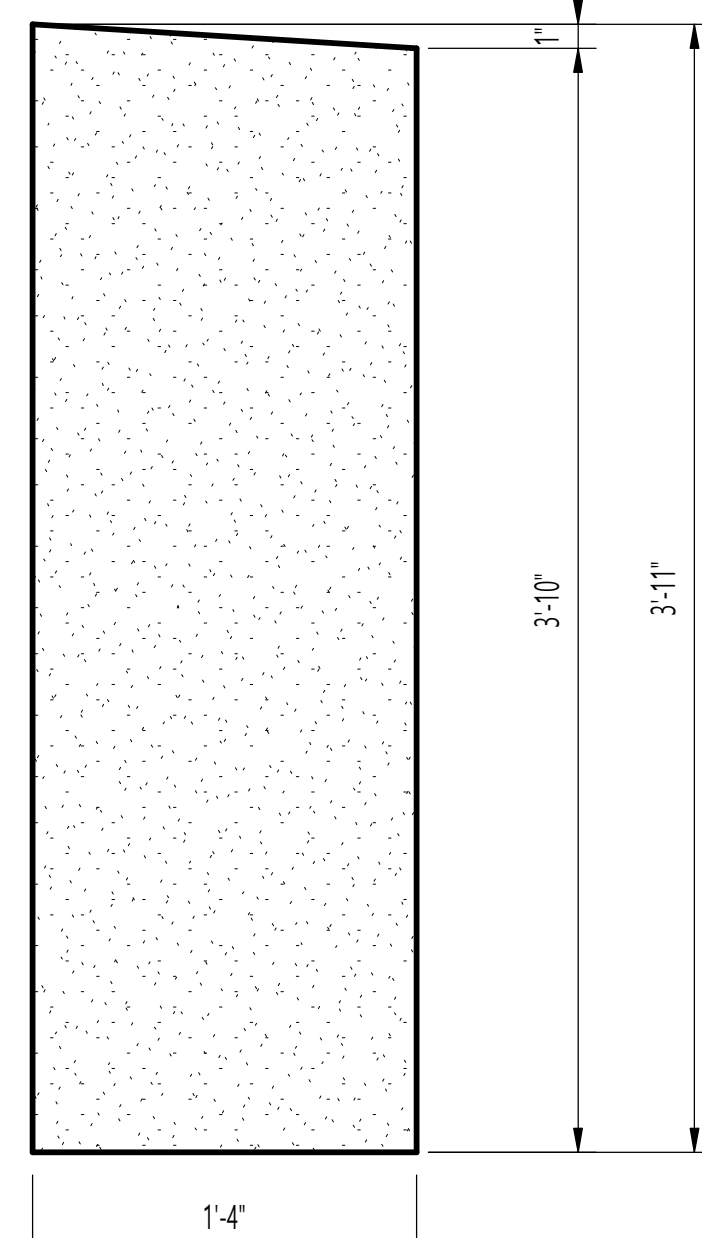
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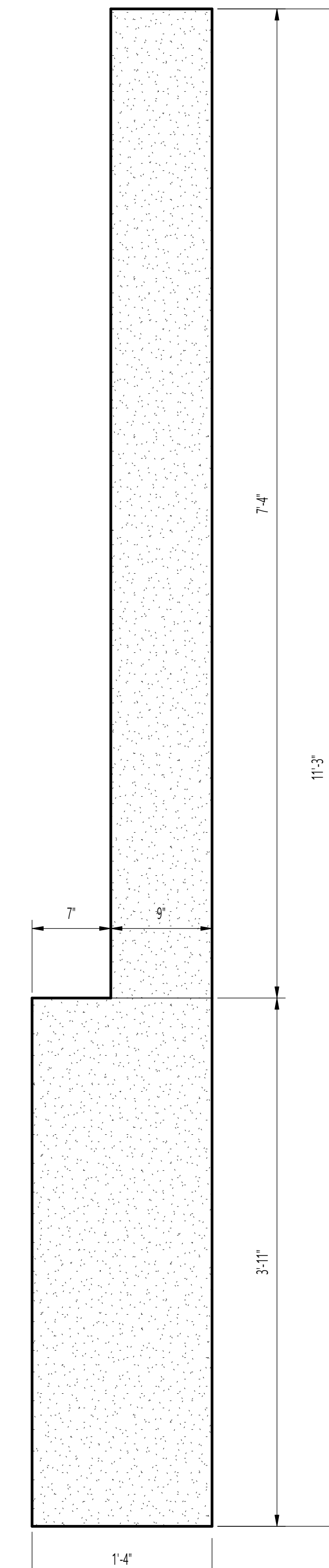
1  
A6.31 1 1/2" = 1'-0"



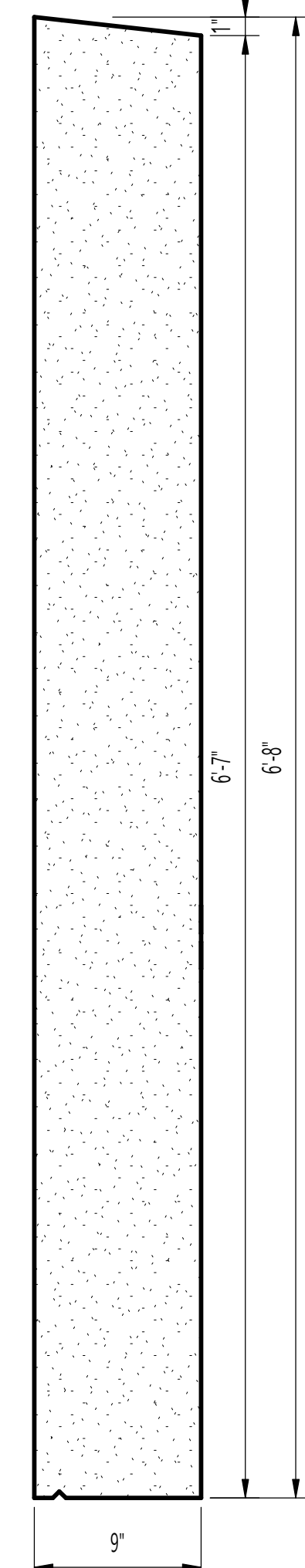
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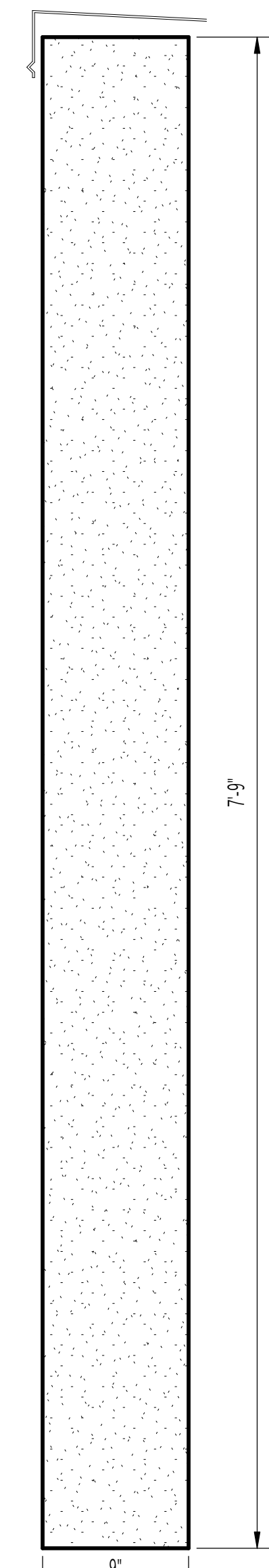
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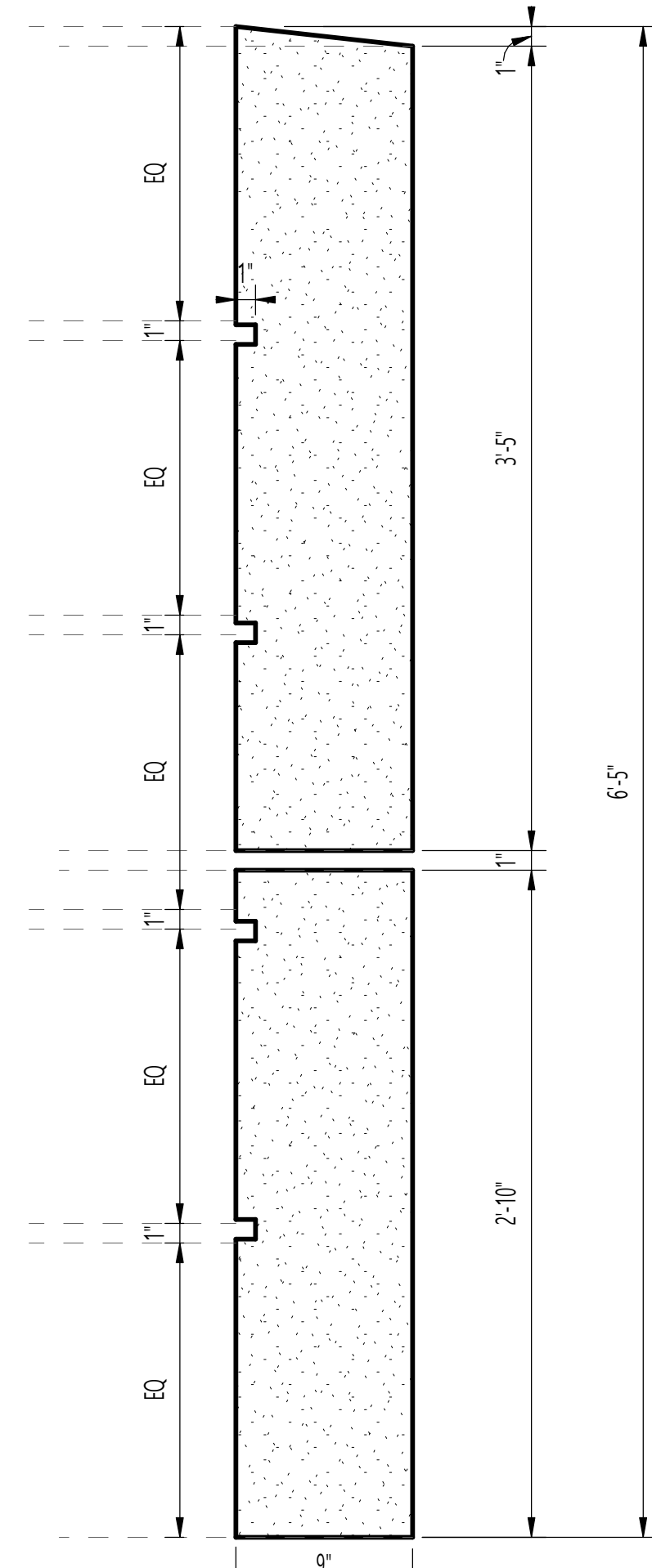
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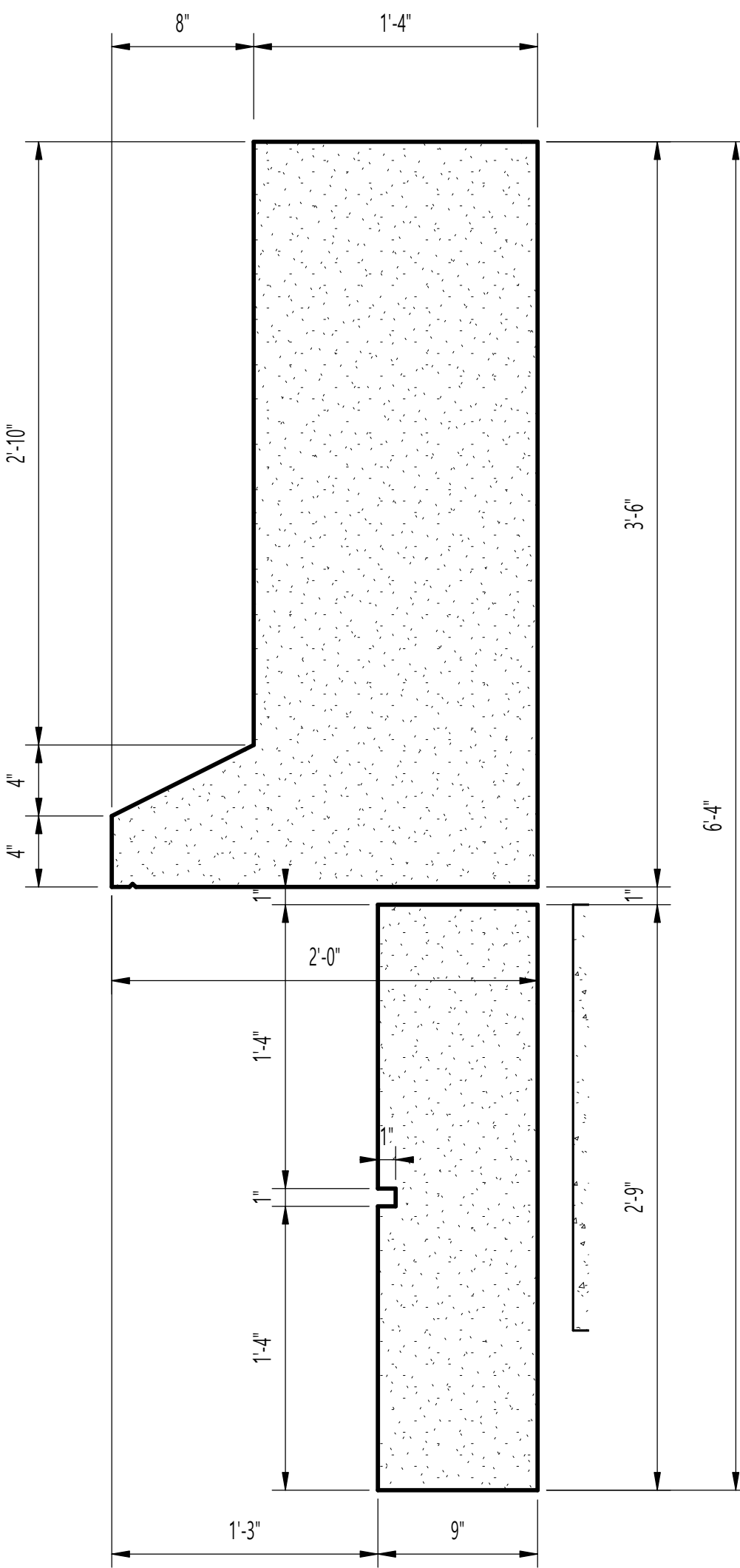
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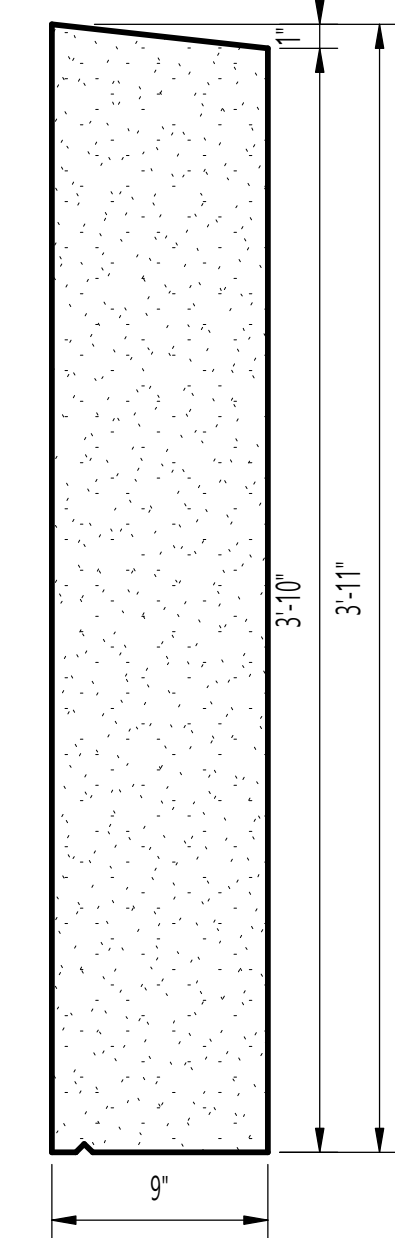
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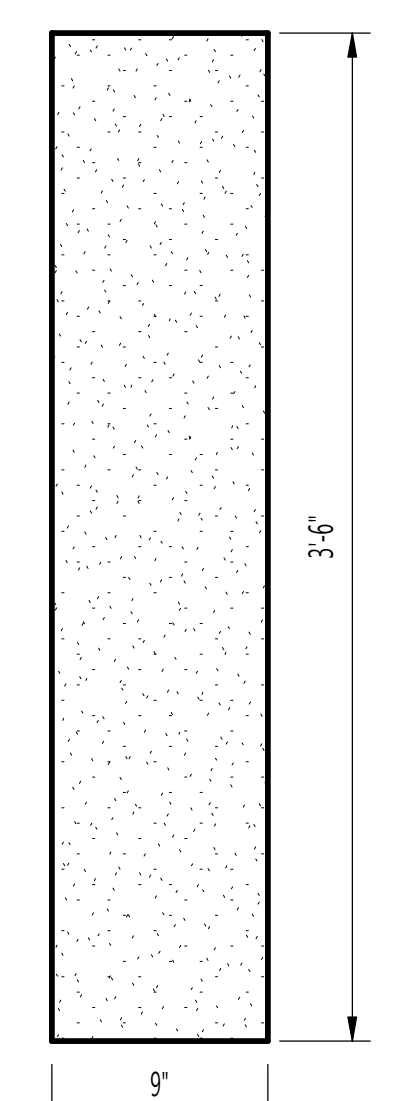
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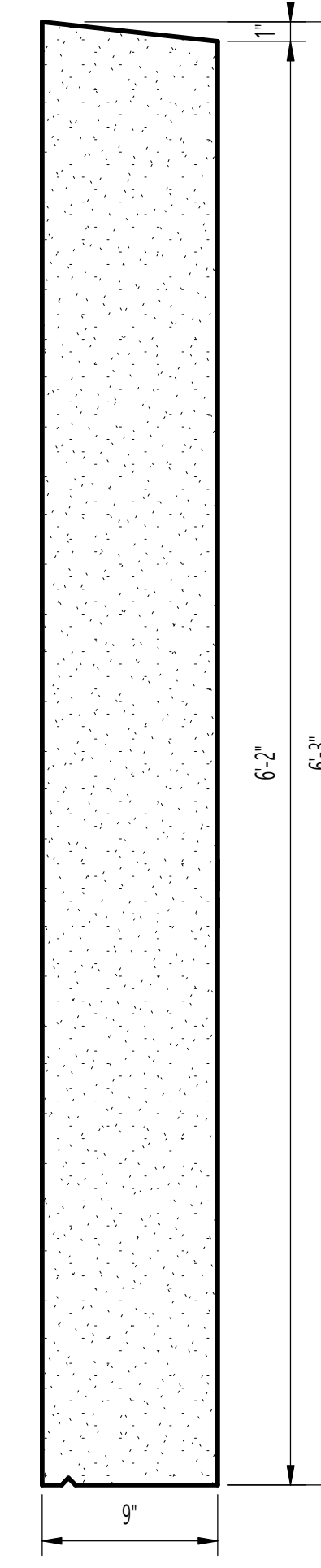
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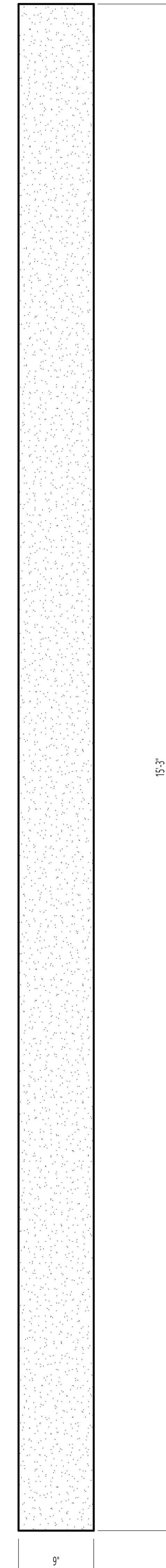
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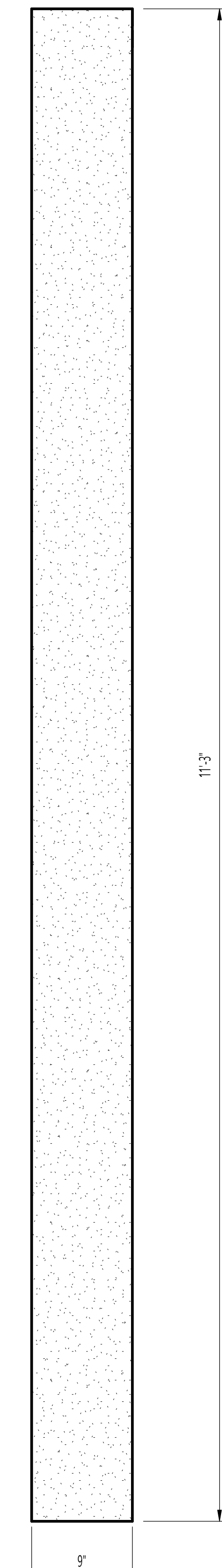
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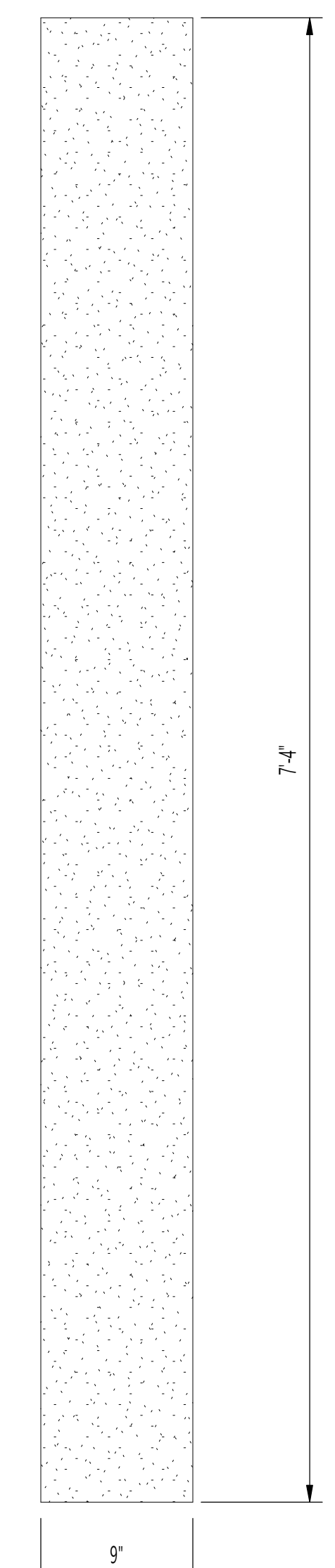
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12  
A6.31 1 1/2" = 1'-0"



13  
A6.31 1 1/2" = 1'-0"



14  
A6.31 1 1/2" = 1'-0"

NOTE:  
1) PANEL JOINTS SHOW AS 1"  
2) PAINT ALL EXPOSED SURFACES OF PRECAST PANELS INCLUDING EXTERIORS, TOP, BOTTOM AND INTERIOR

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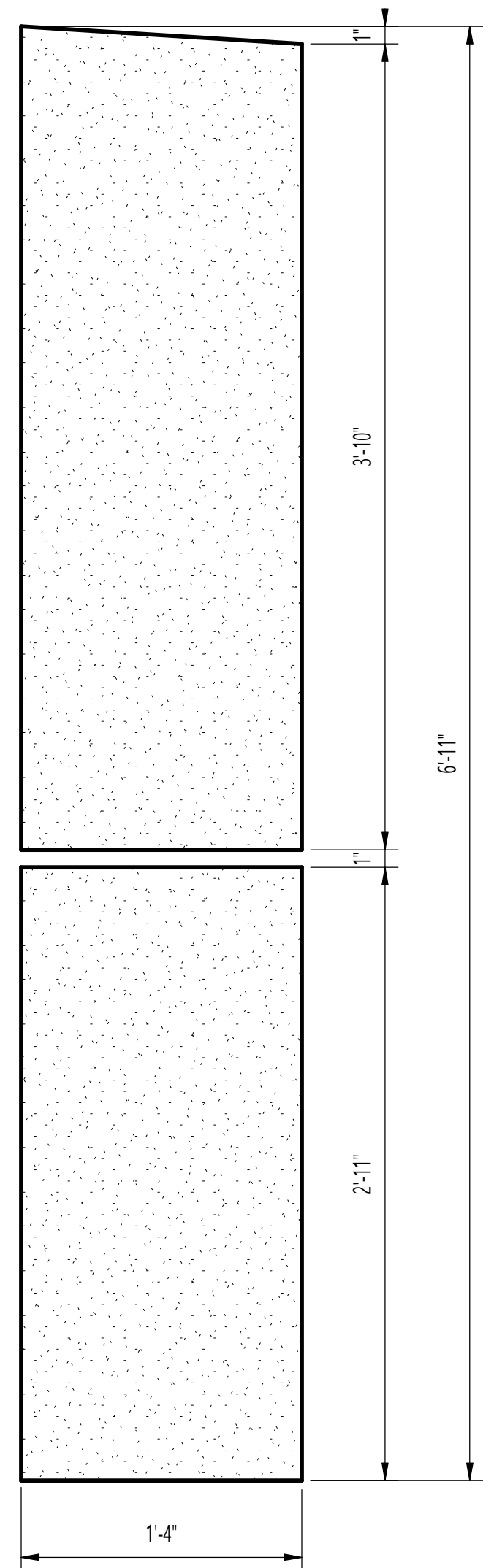
Mobile, Alabama



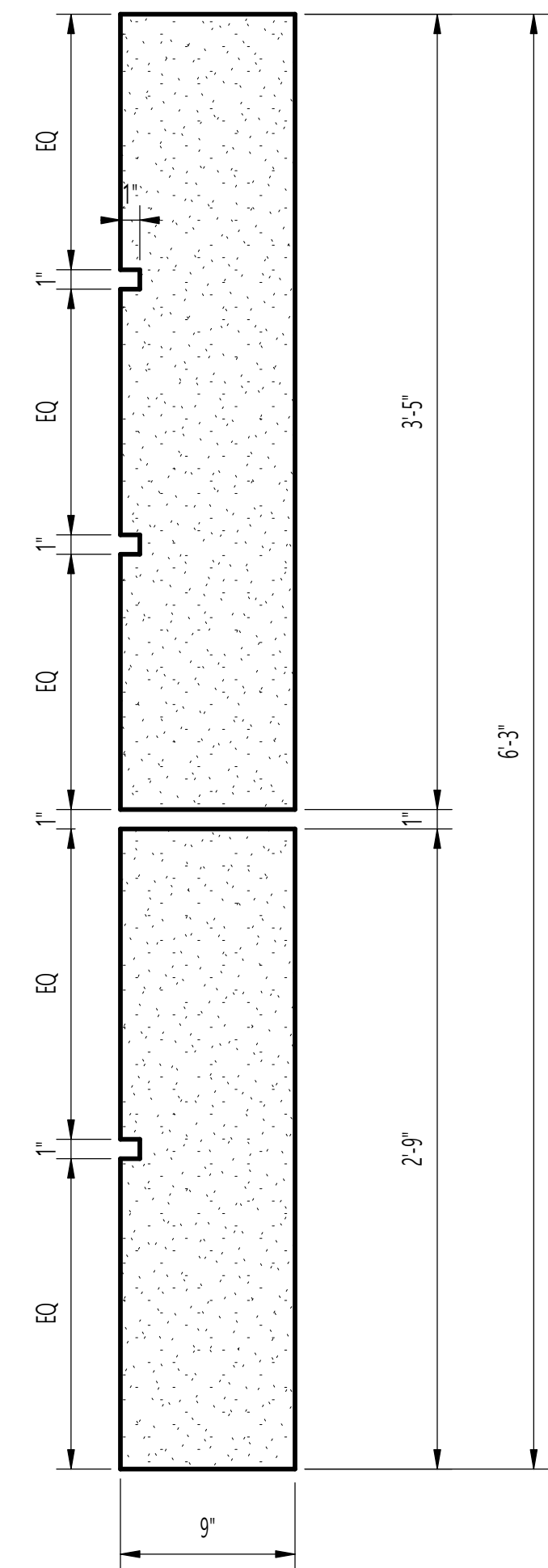
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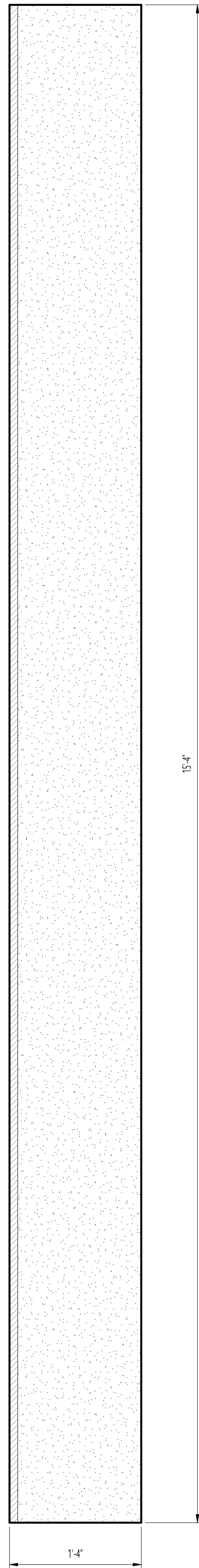
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checked by	KING
date	August 5, 2023
dwg. no.	A6.31
of	75
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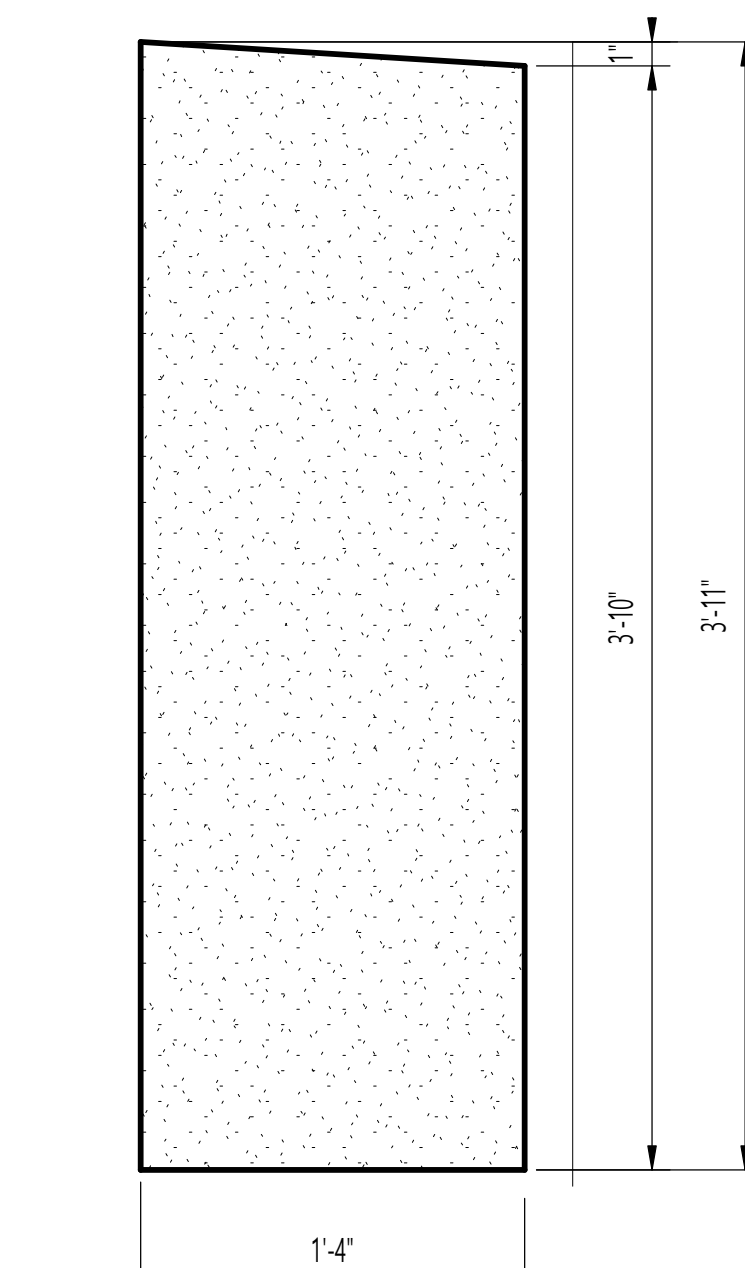
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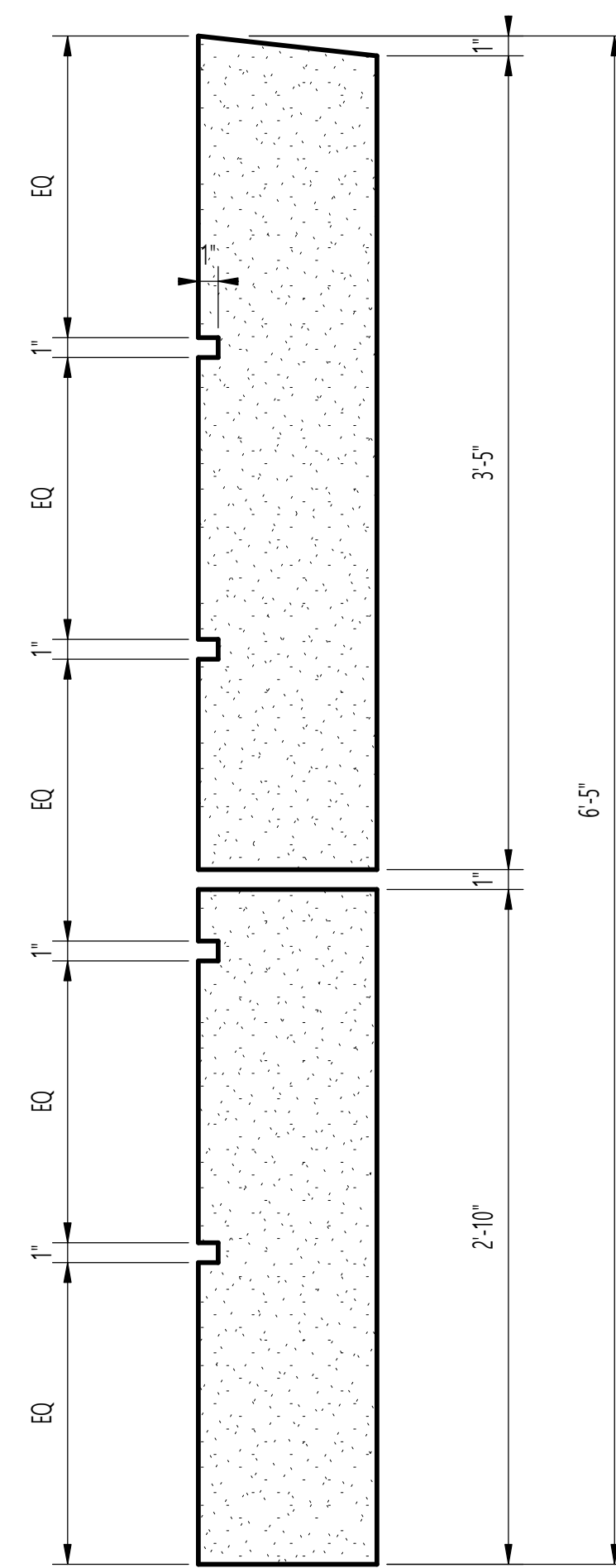
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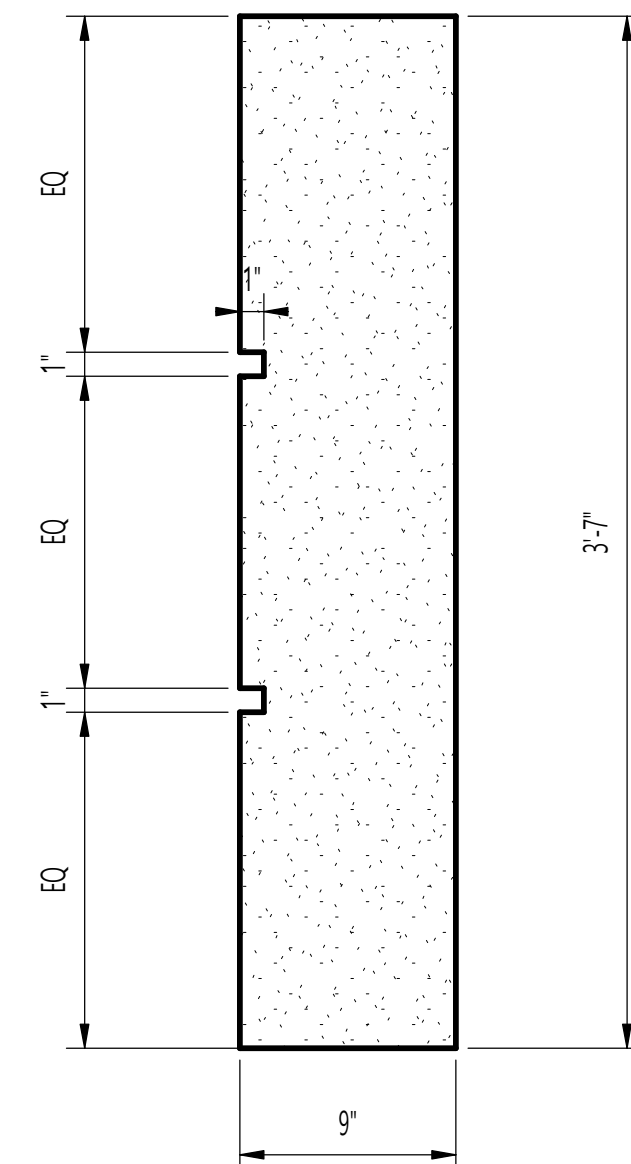
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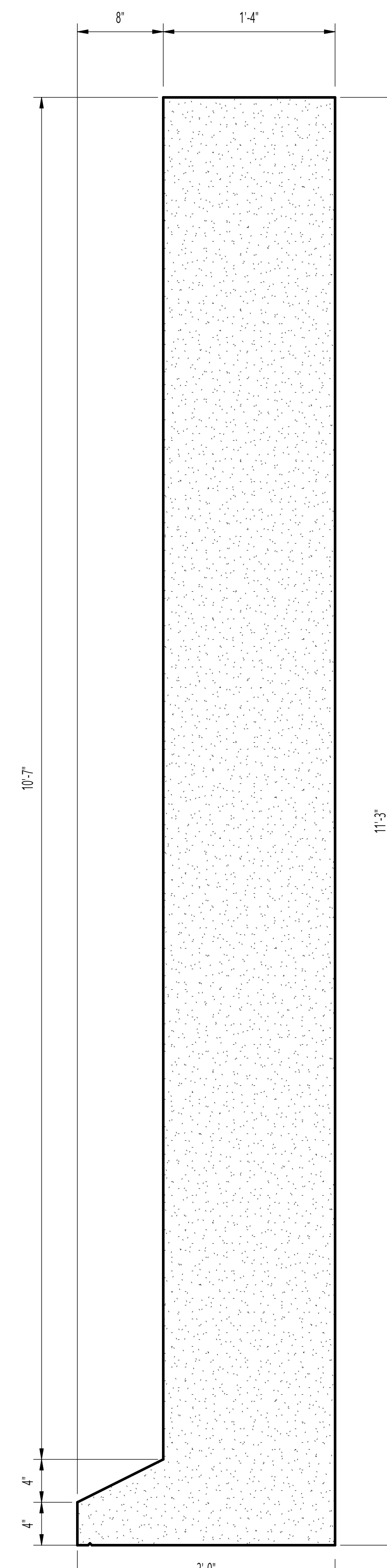
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A6.32 1 1/2" = 1'-0"



**5**  
A6.32 1 1/2" = 1'-0"



**4**  
A6.32 1 1/2" = 1'-0"



**7**  
A6.32 1 1/2" = 1'-0"

NOTE:  
1) PANEL JOINTS SHOW AS 1"  
2) PAINT ALL EXPOSED SURFACES OF PRECAST PANELS INCLUDING EXTERIORS, TOP, BOTTOM AND INTERIOR



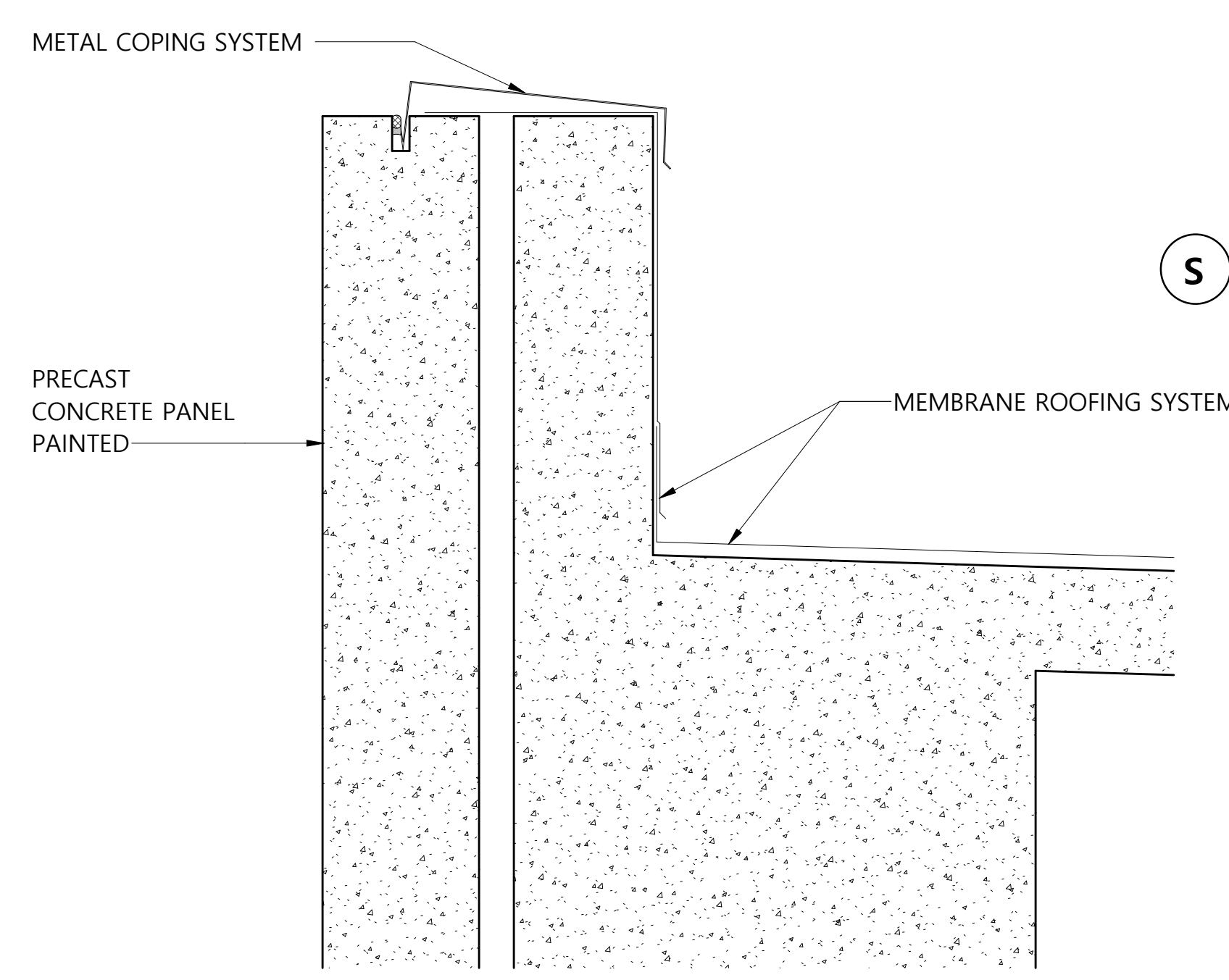
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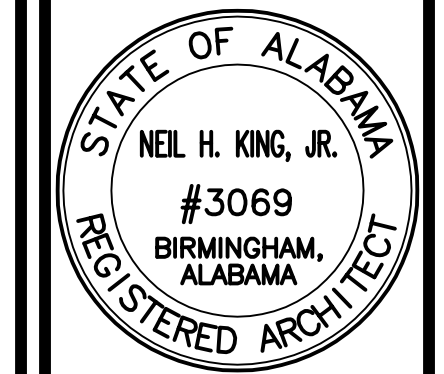
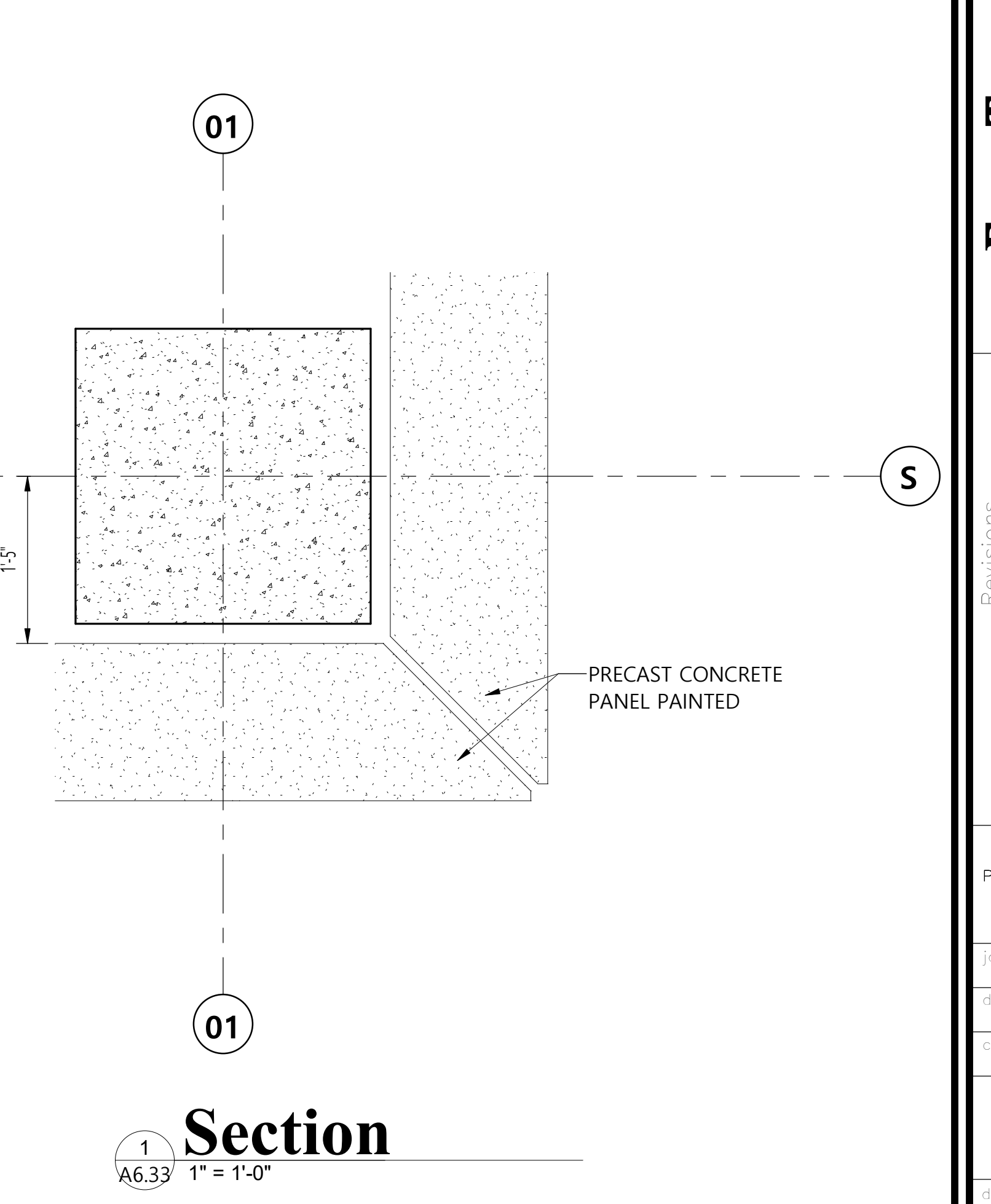
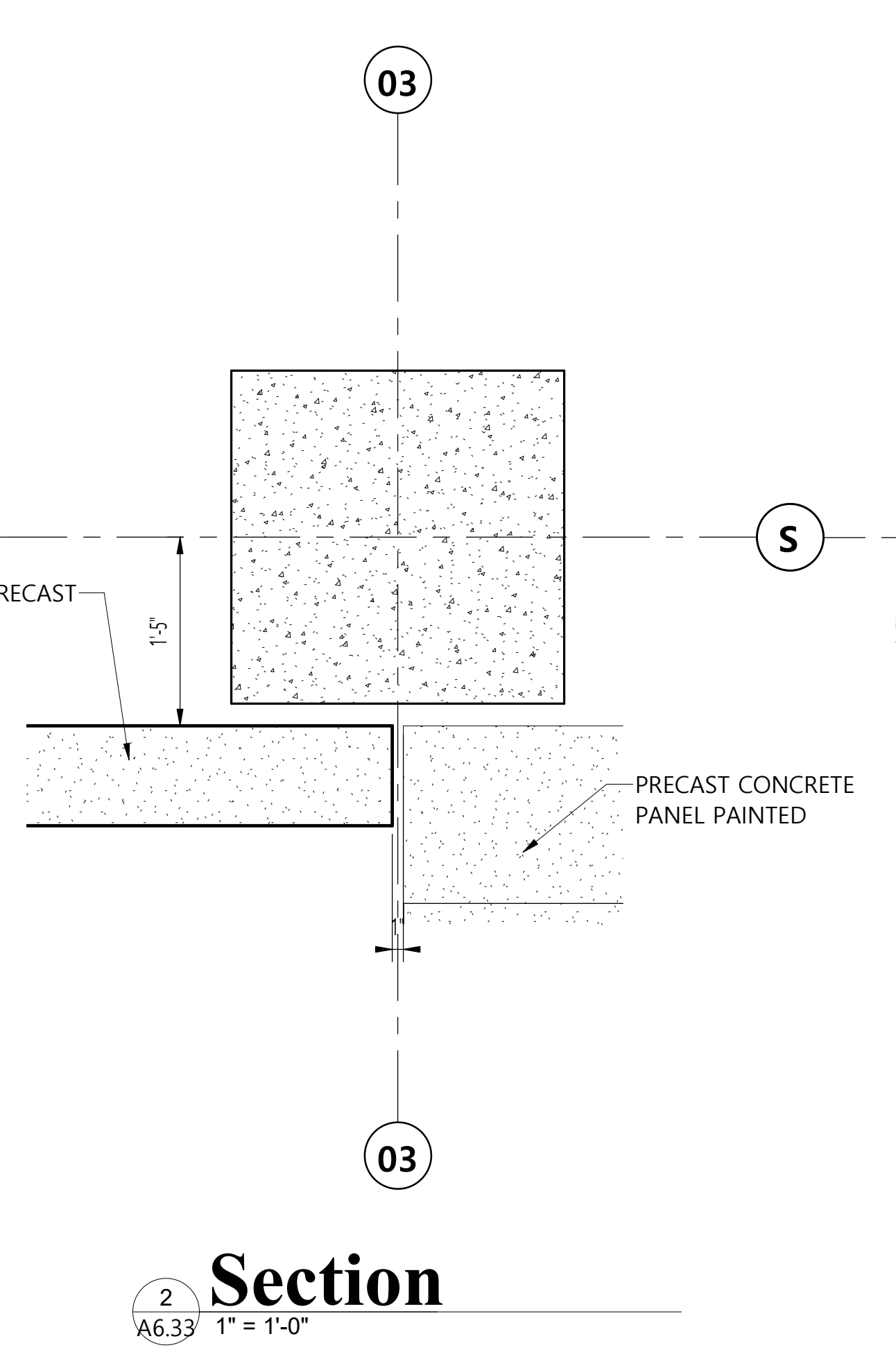
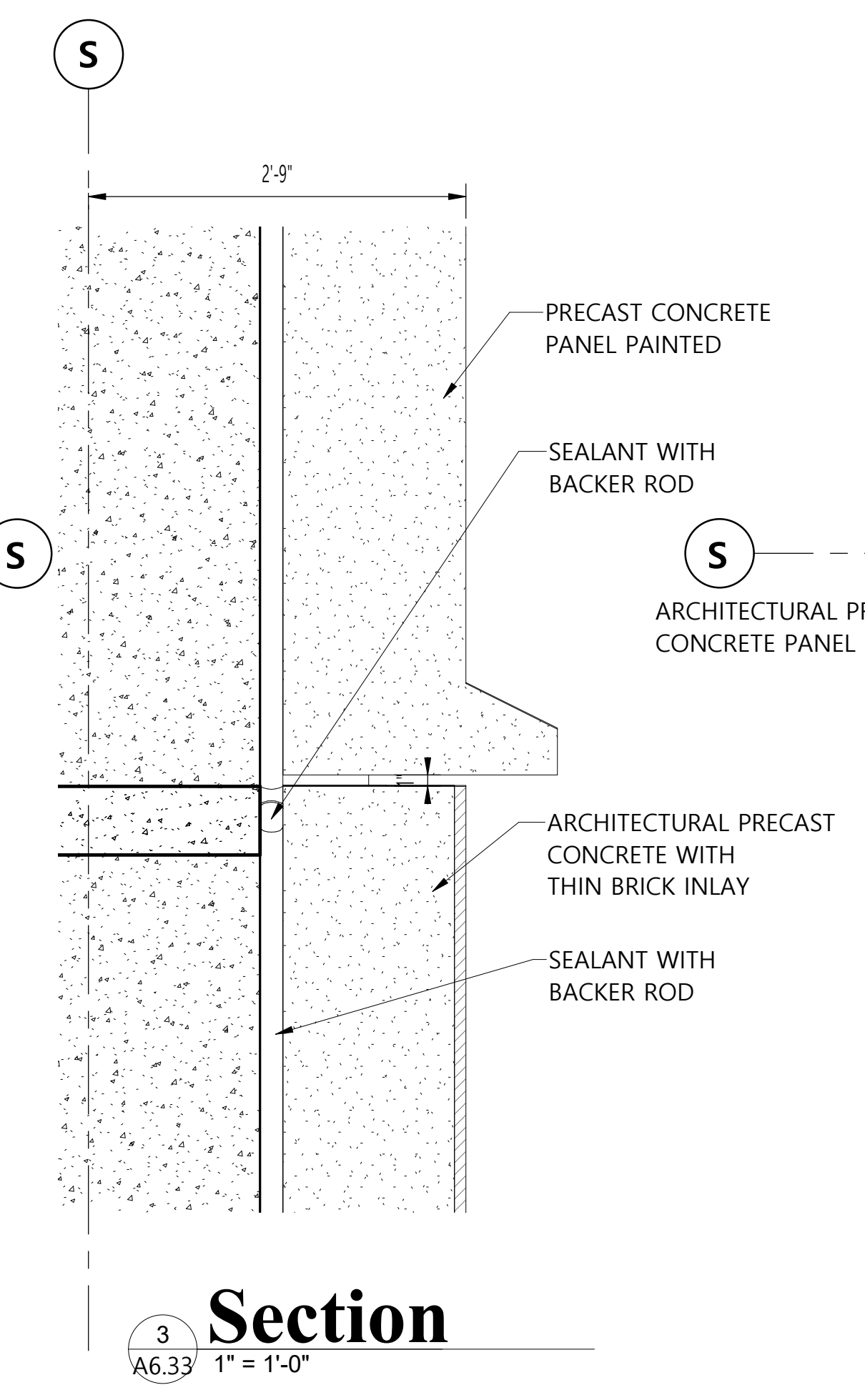
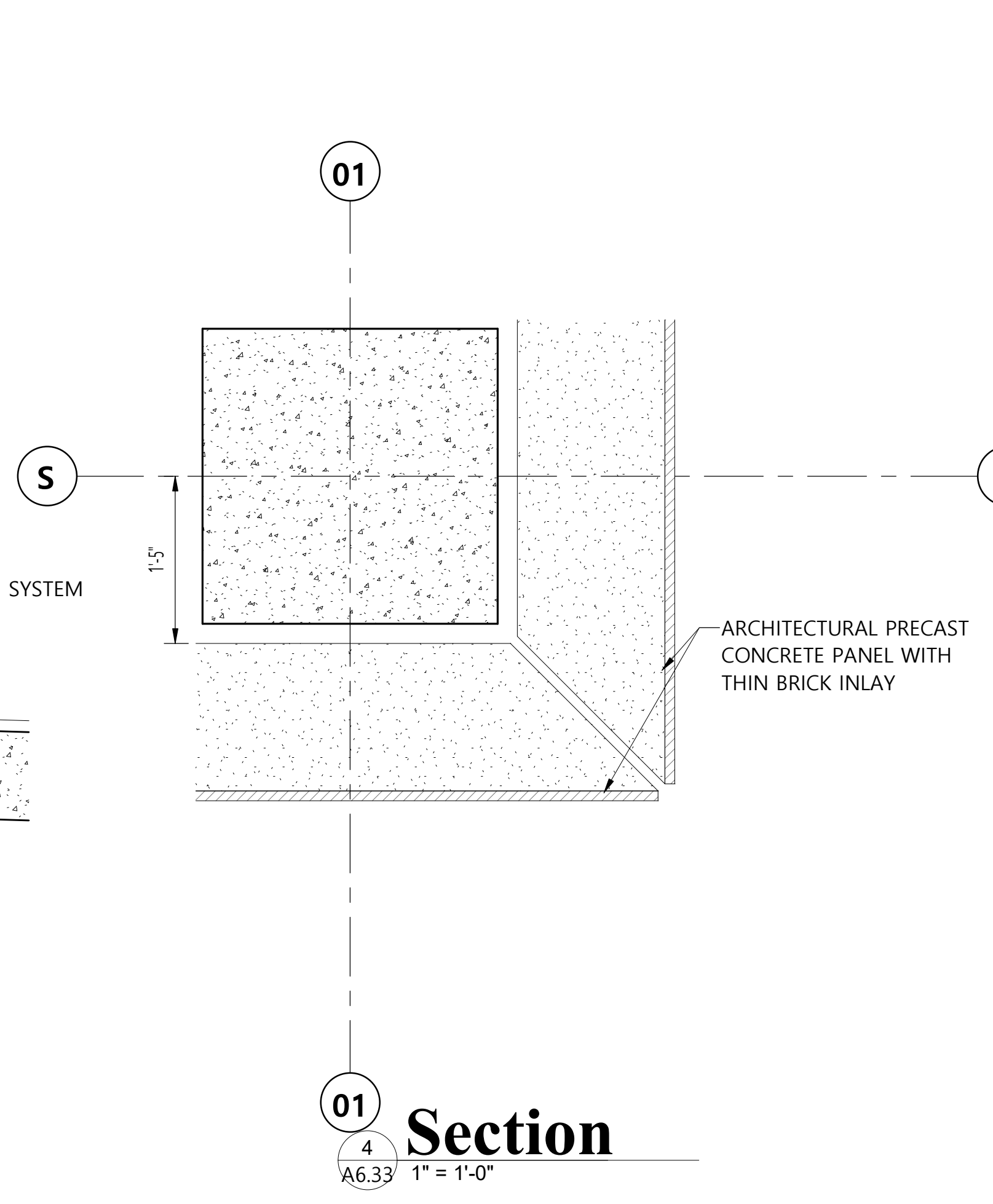
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job no.	4308
desn. by	ETA
chkd. by	KING
of	154
<b>A6.32</b>	
of	75
date August 5, 2023	
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**Metal Coping System**  
SCALE: 1 1/2" = 1'-0"

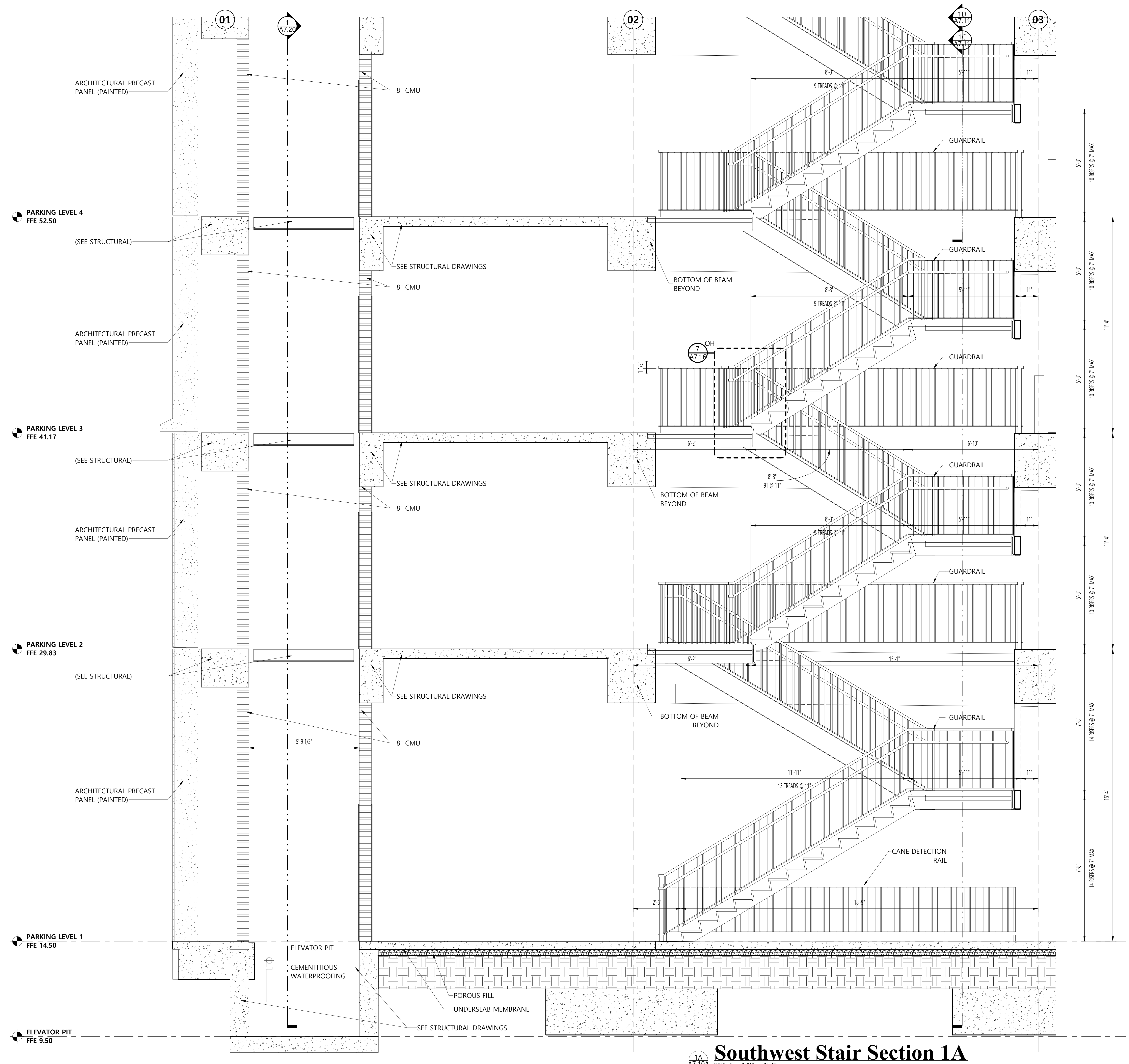


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checked by	<b>096</b>
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of	154
<b>A6.33</b>	
of 75	
date August 5, 2023	
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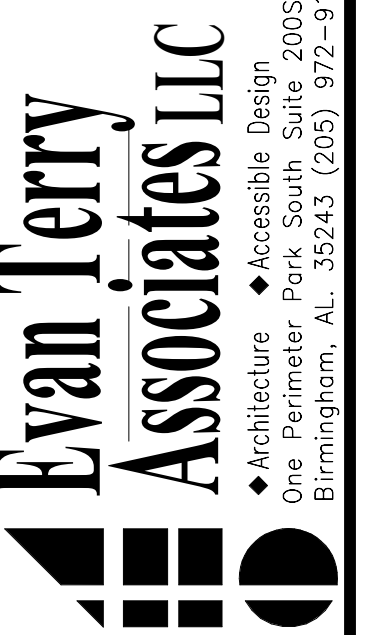
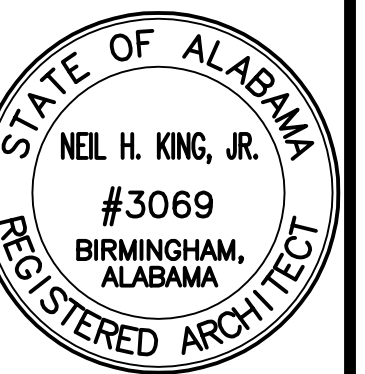
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**Southwest Stair Section 1A**  
 SCALE: 1/2" = 1'-0"

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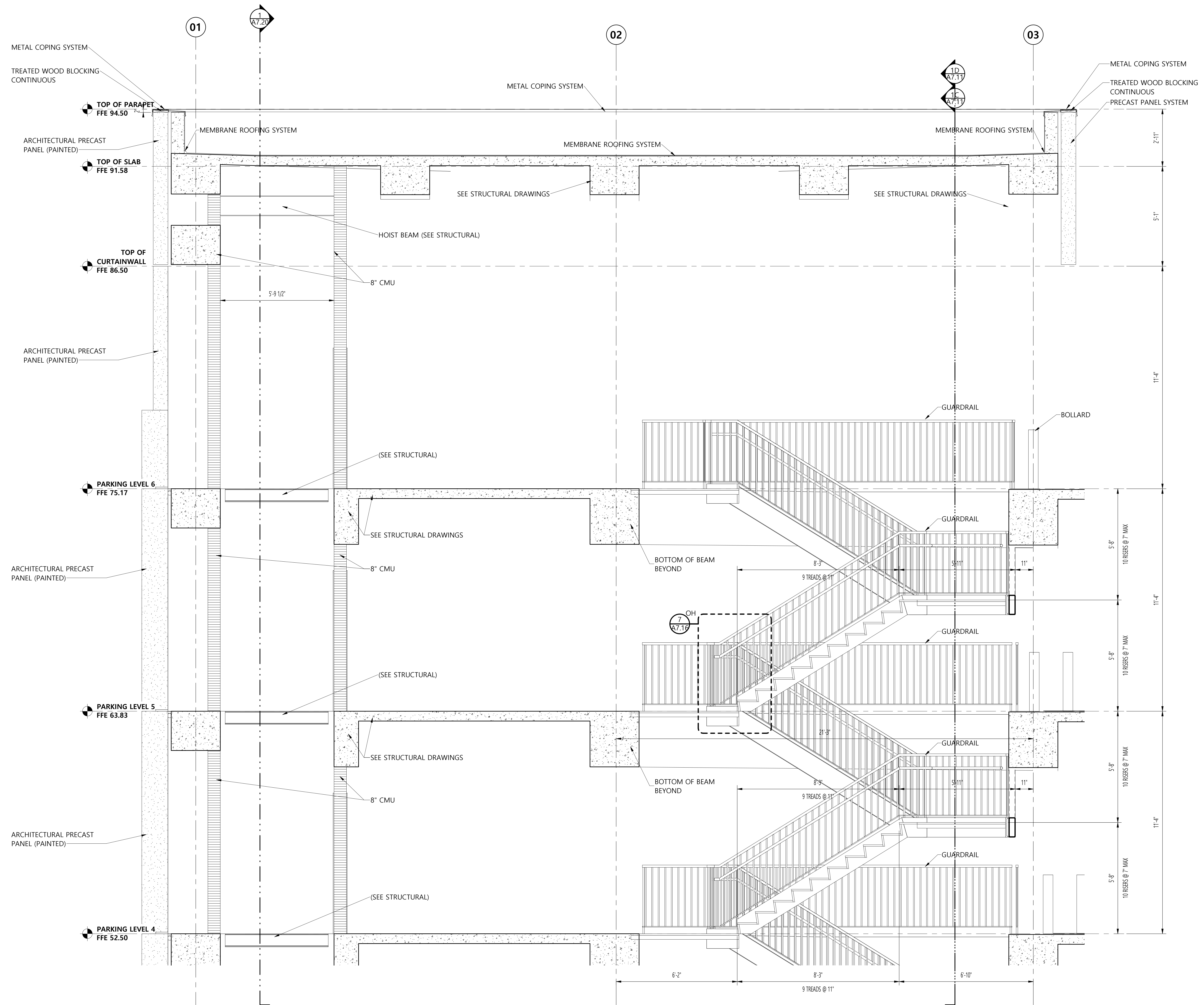
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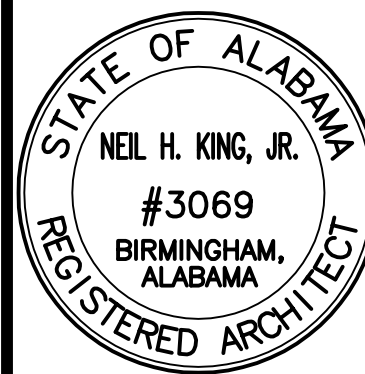
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 of 75  
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**Southwest Stair Section 1B**  
 SCALE: 1/2" = 1'-0"

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Job No. **4308**

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Checked by  
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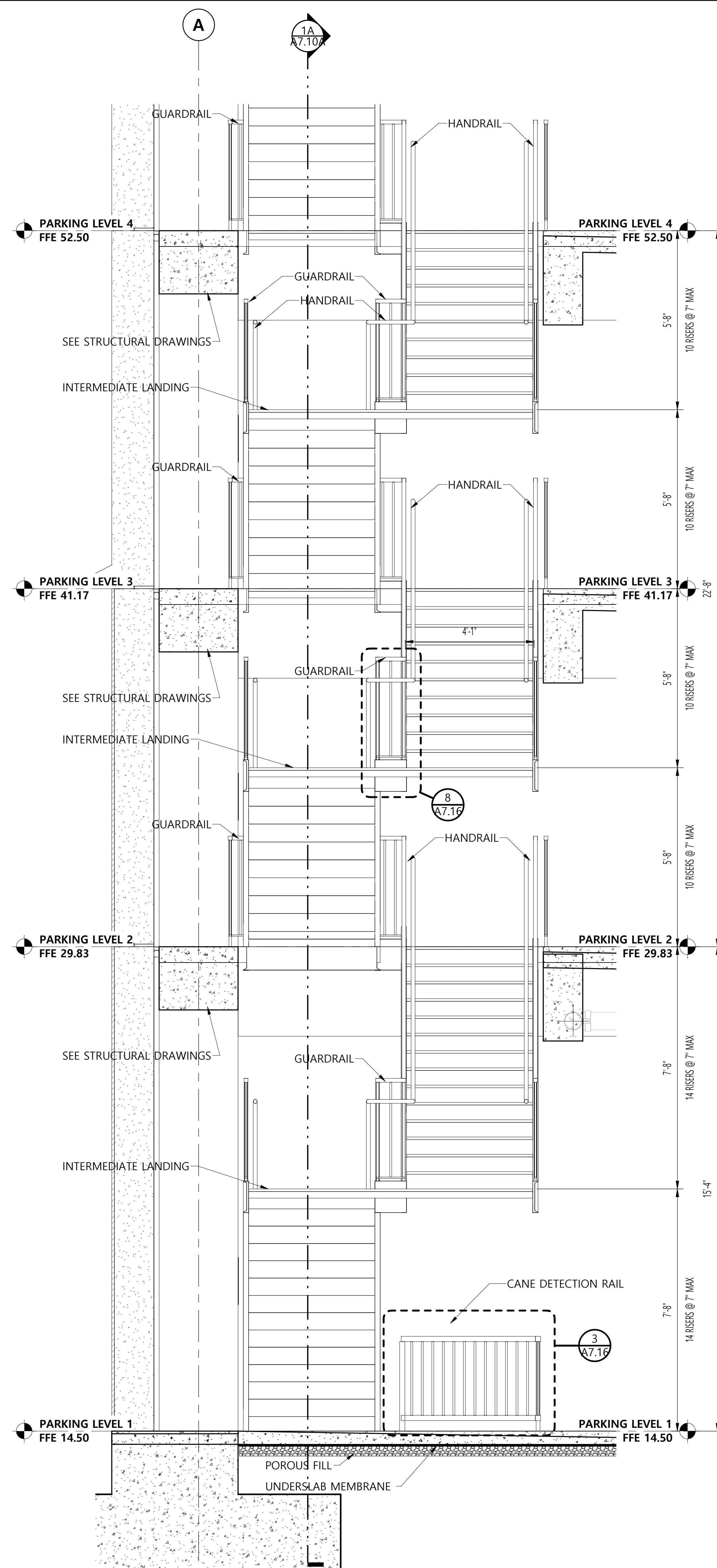
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 of 75

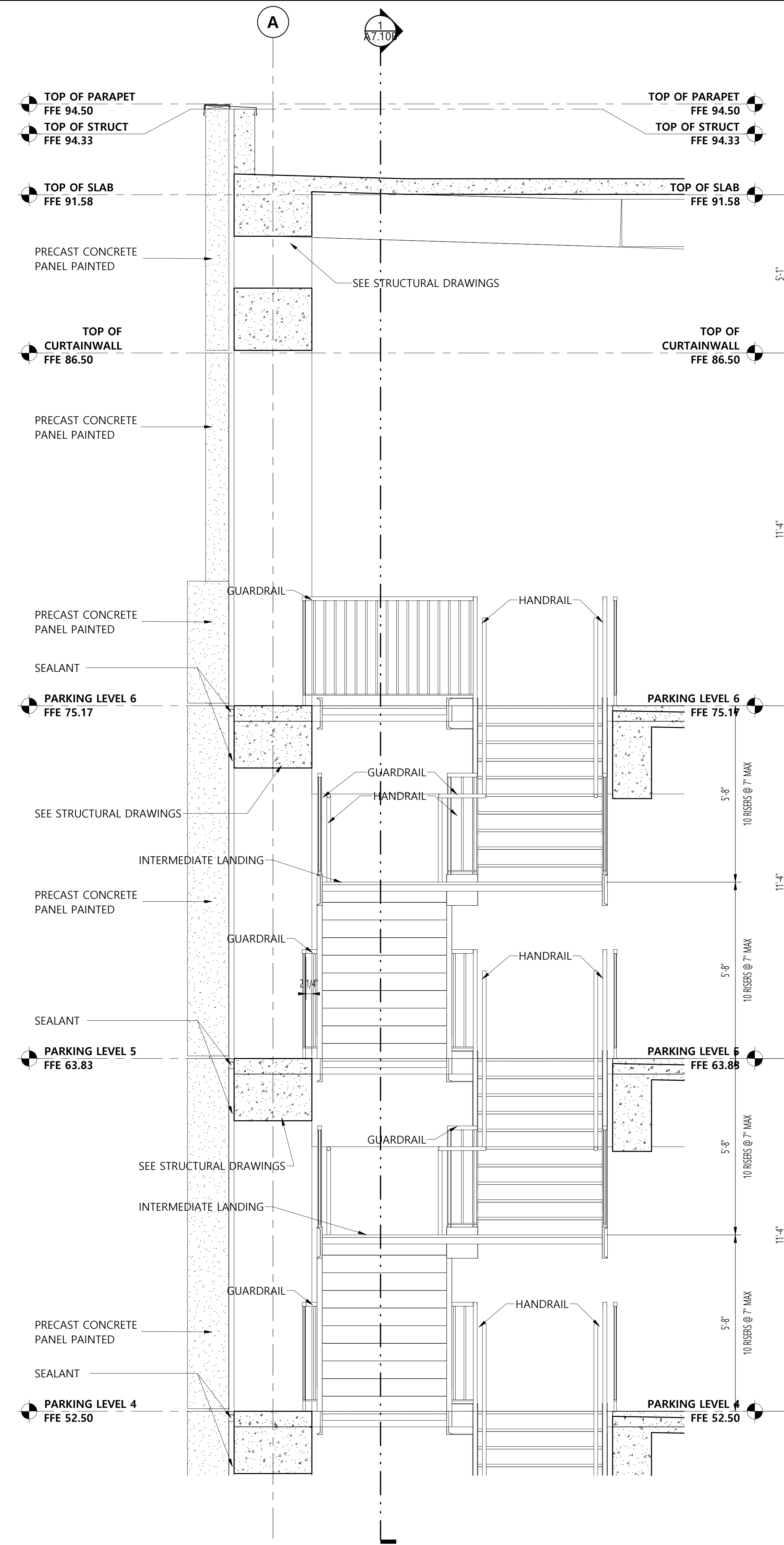
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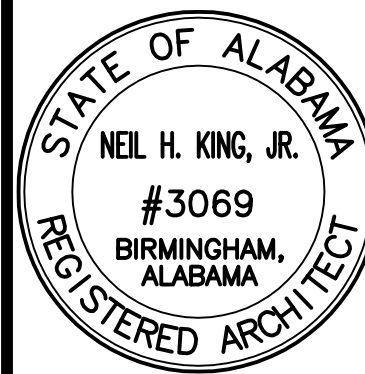


**Southwest Stair Section 1C**  
 SCALE: 1/2" = 1'-0"



**Southwest Stair Section 1D**  
 SCALE: 1/2" = 1'-0"

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 Parking Facility**  
 Mobile, Alabama

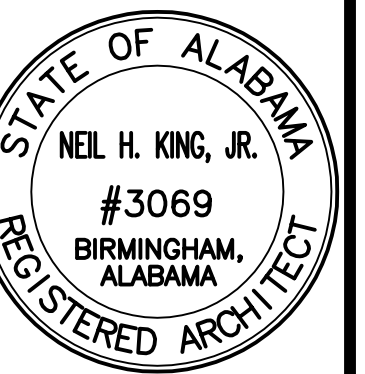


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JOB no.	4308
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Sheet no.	A7.11
of	75

# Mobile Civic Center Parking Facility

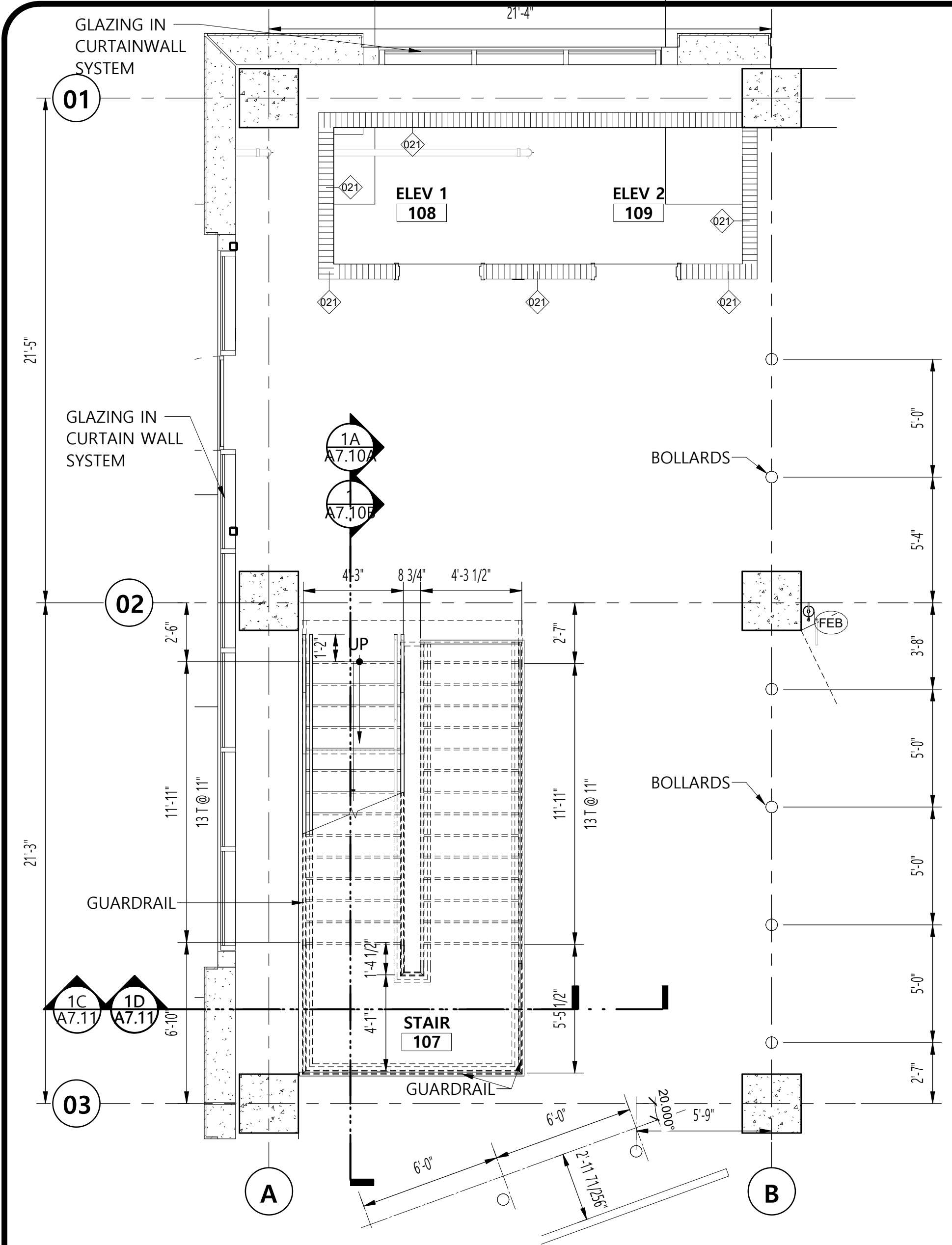
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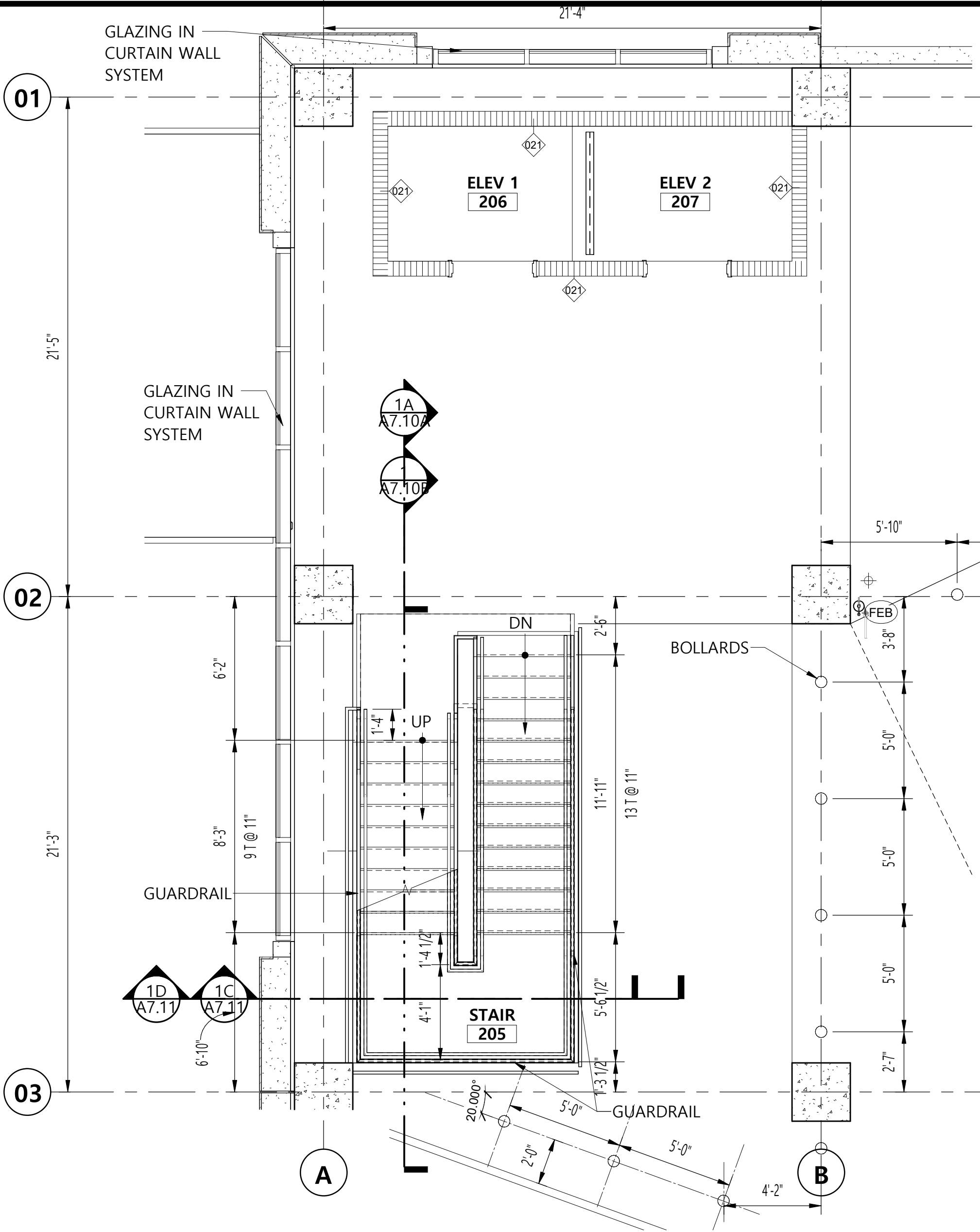
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Des. by	KING	of 154
Rev. No.	A7.12	
Rev. of	75	
Date	August 5, 2023	
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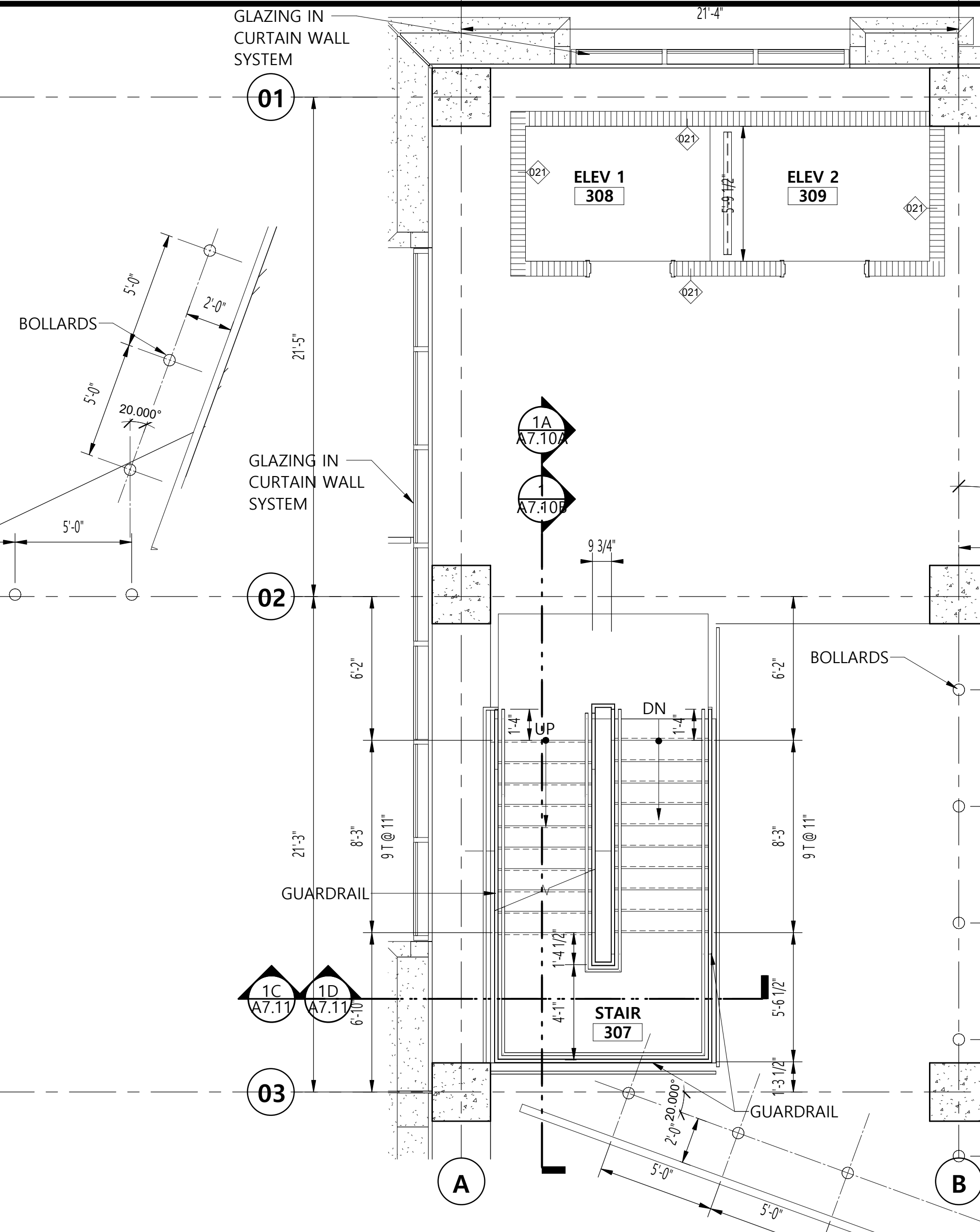
### Southwest Stair Plan - Level 1

SCALE: 1/4" = 1'-0"



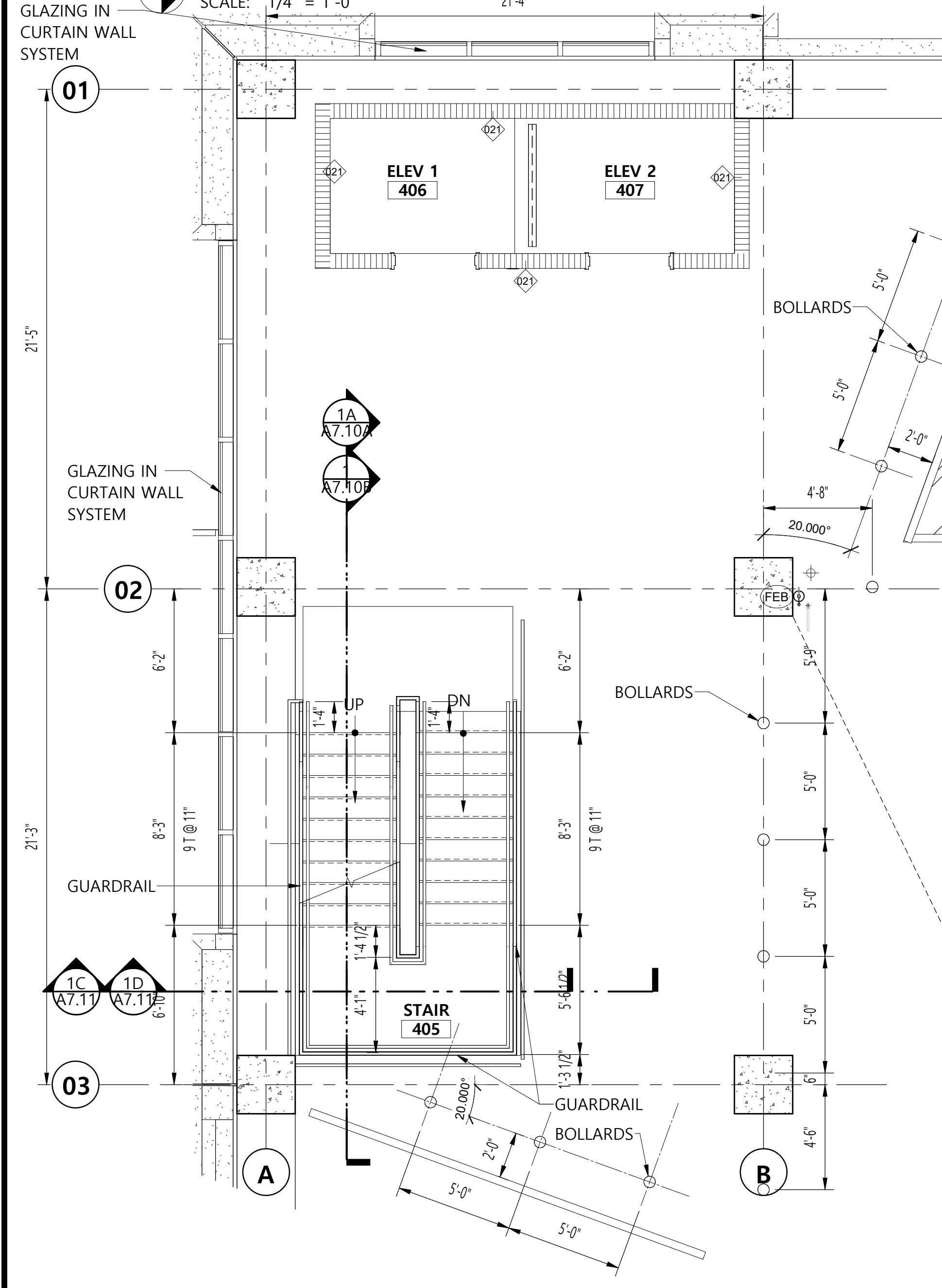
### Southwest Stair Plan - Level 2

SCALE: 1/4" = 1'-0"



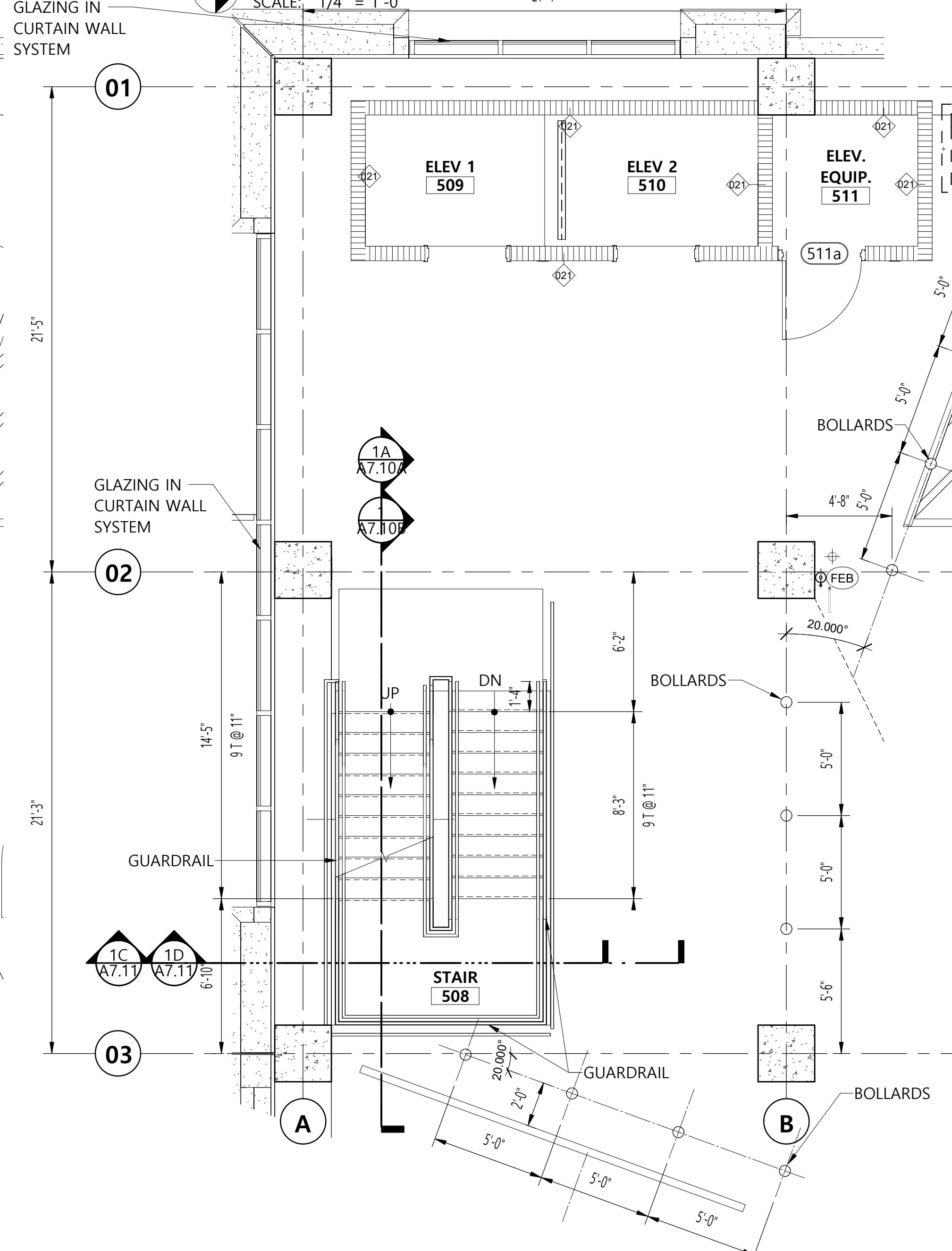
### Southwest Stair Plan - Level 3

SCALE: 1/4" = 1'-0"



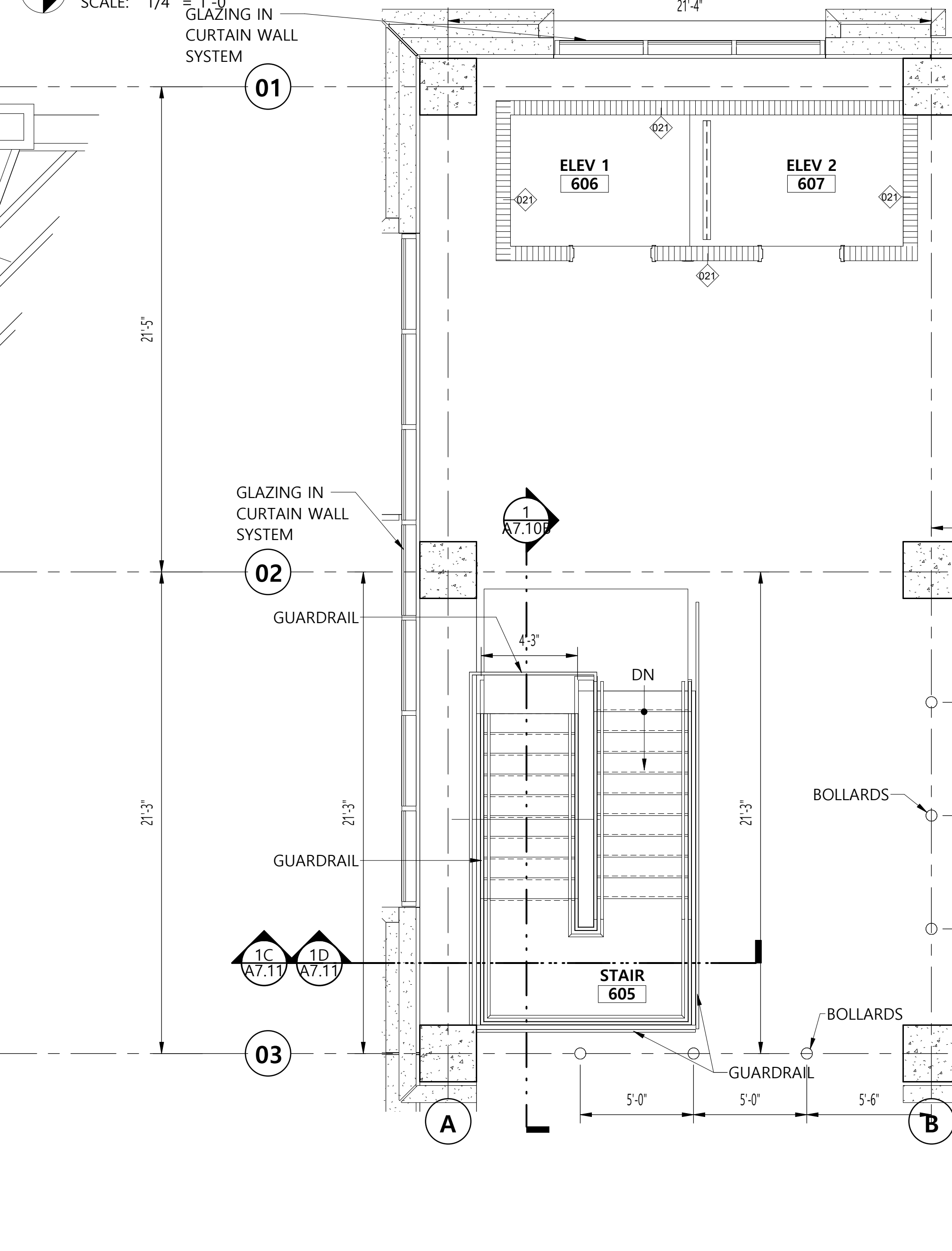
### Southwest Stair Plan - Level 4

SCALE: 1/4" = 1'-0"



### Southwest Stair Plan - Level 5

SCALE: 1/4" = 1'-0"

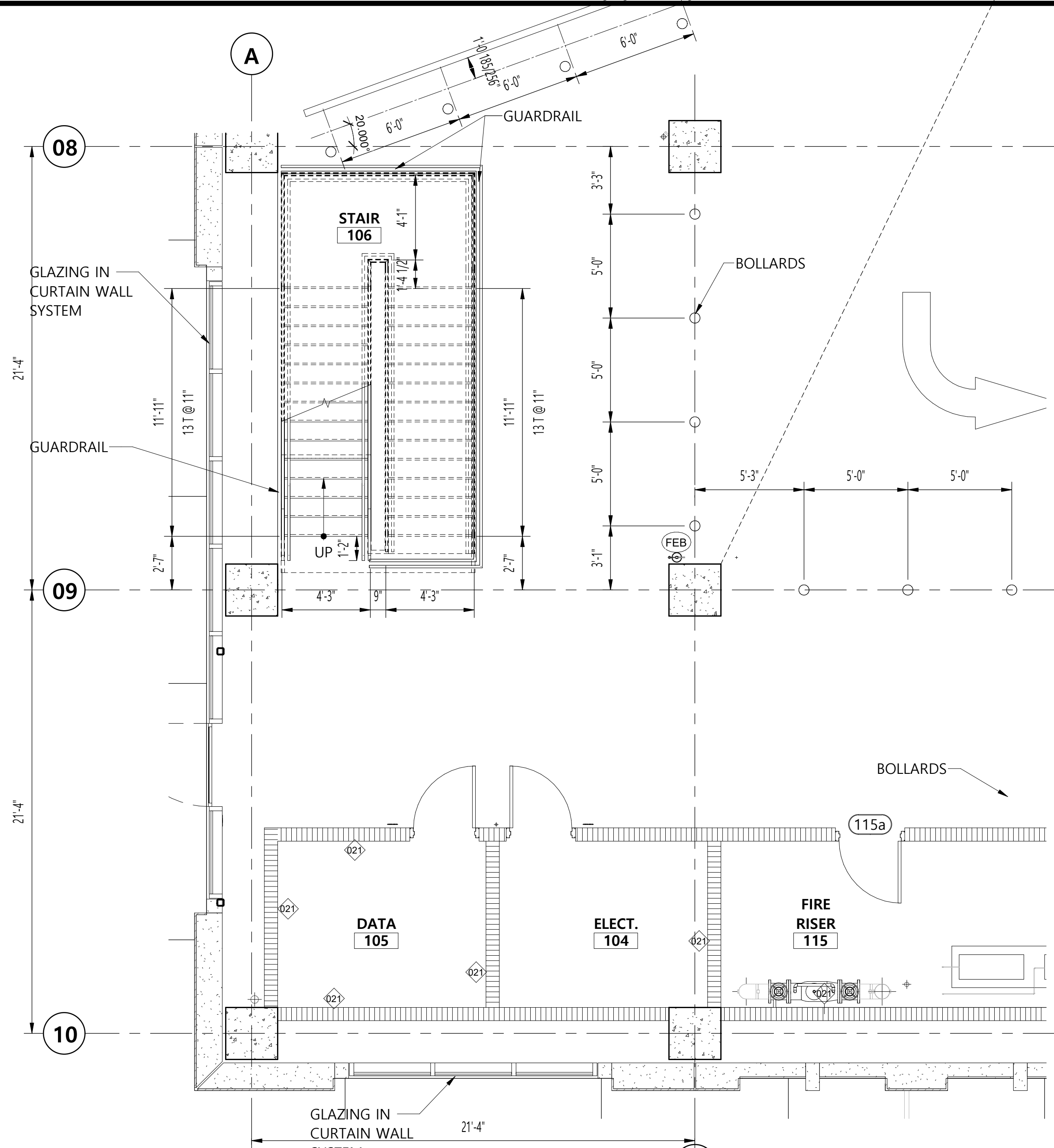


### Southwest Stair Plan - Level 6

SCALE: 1/4" = 1'-0"

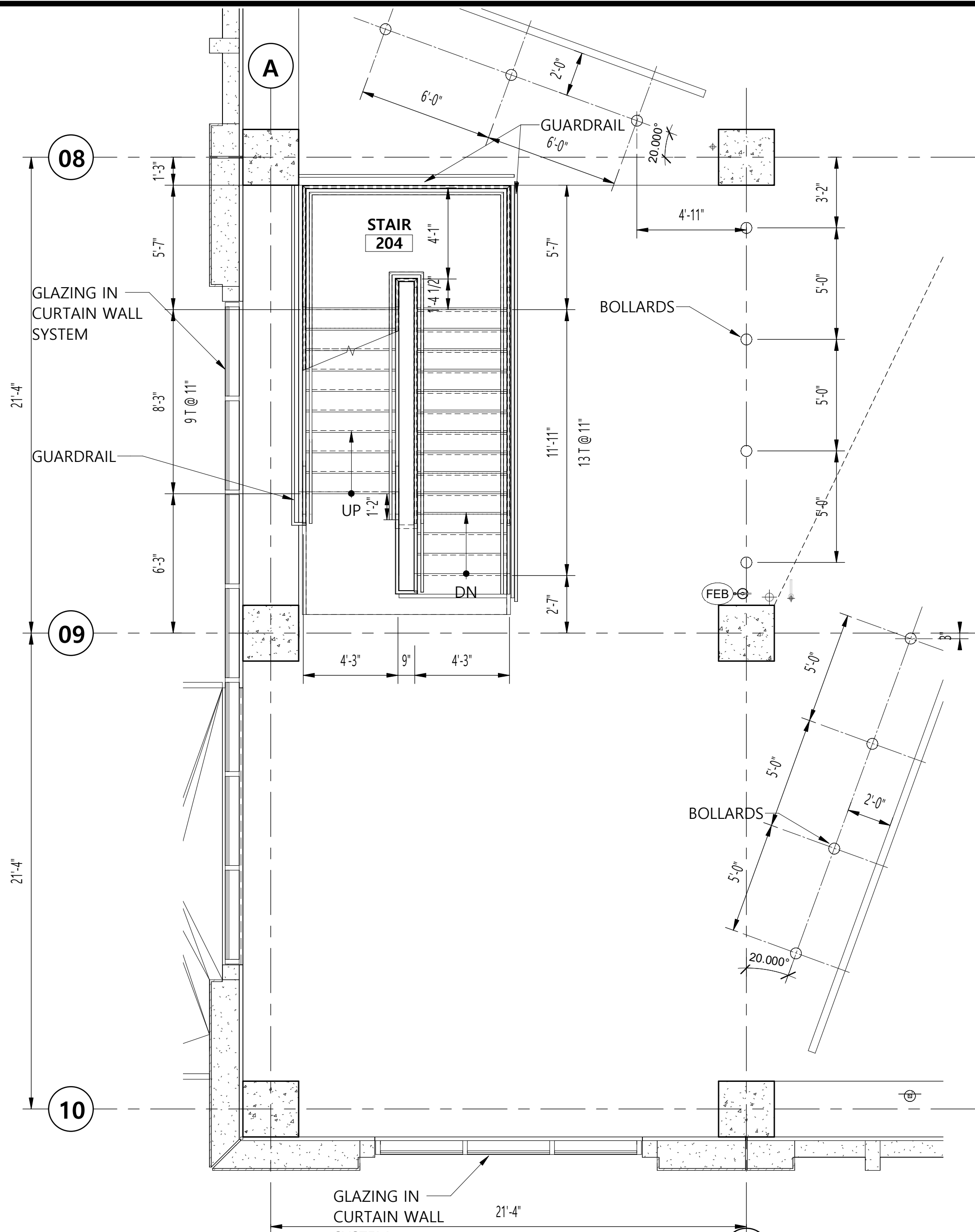
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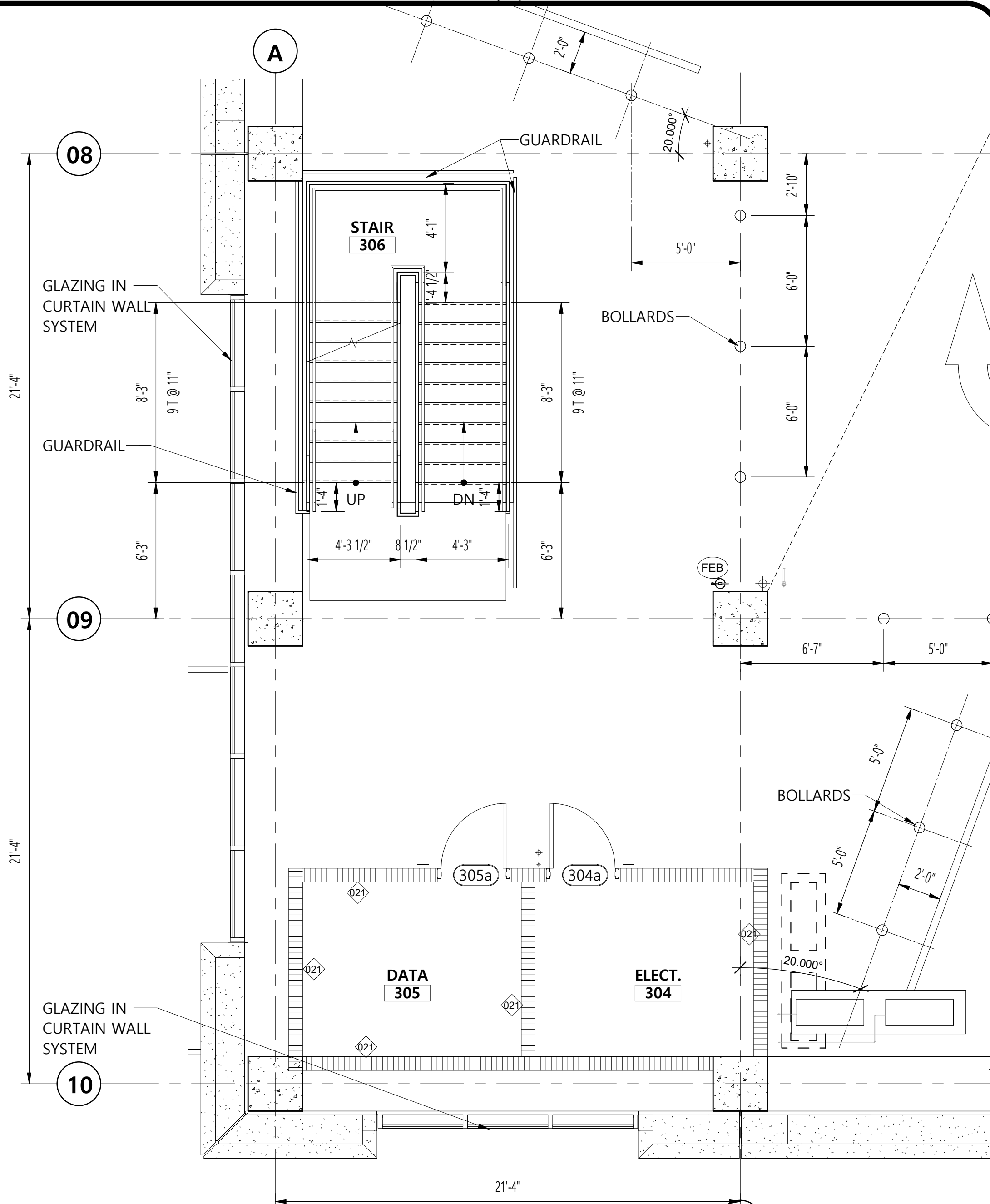
**Southeast Stair Plan - Level 1**

SCALE: 1/4" = 1'-0"



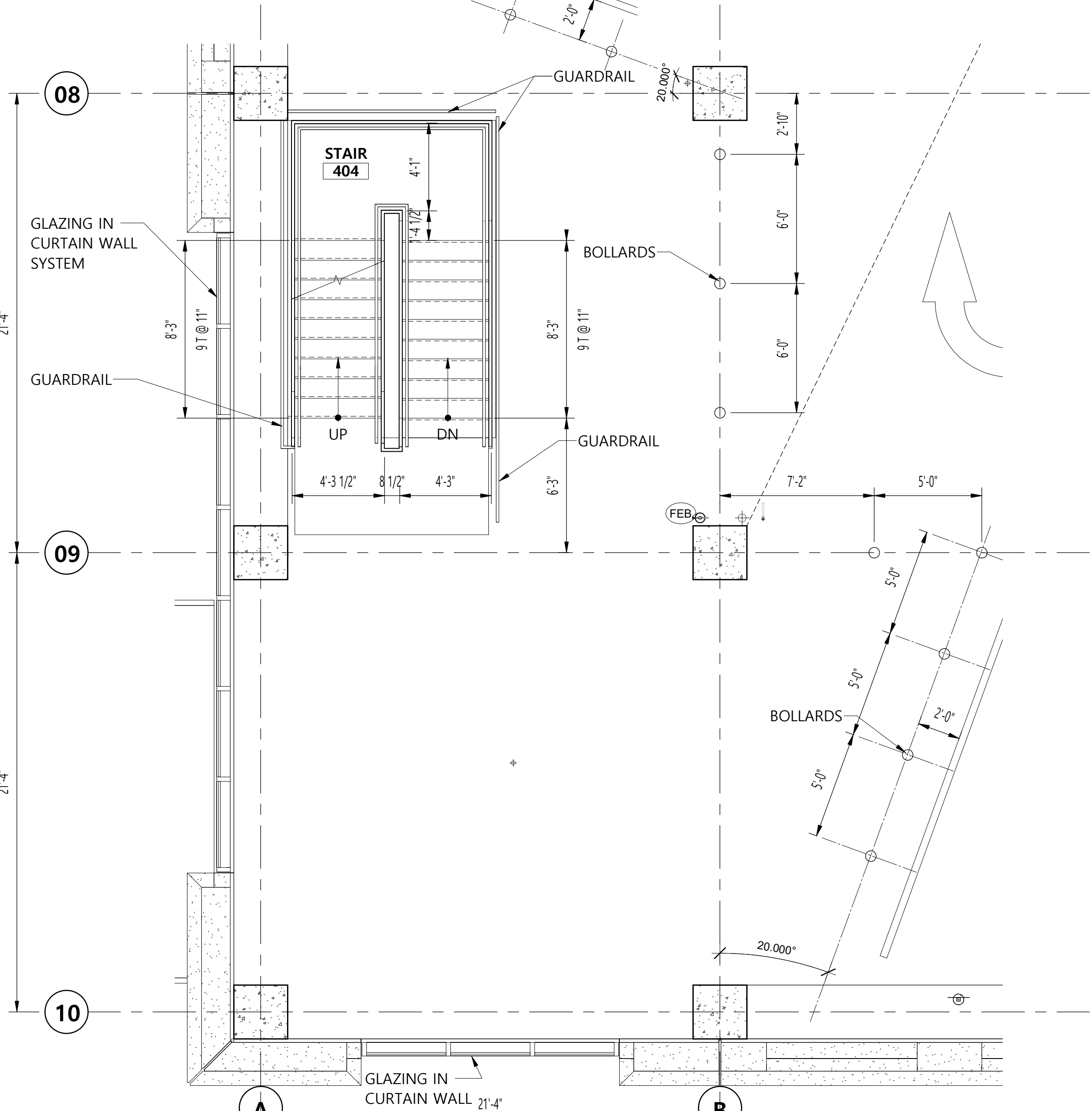
**Southeast Stair Plan - Level 2**

SCALE: 1/4" = 1'-0"



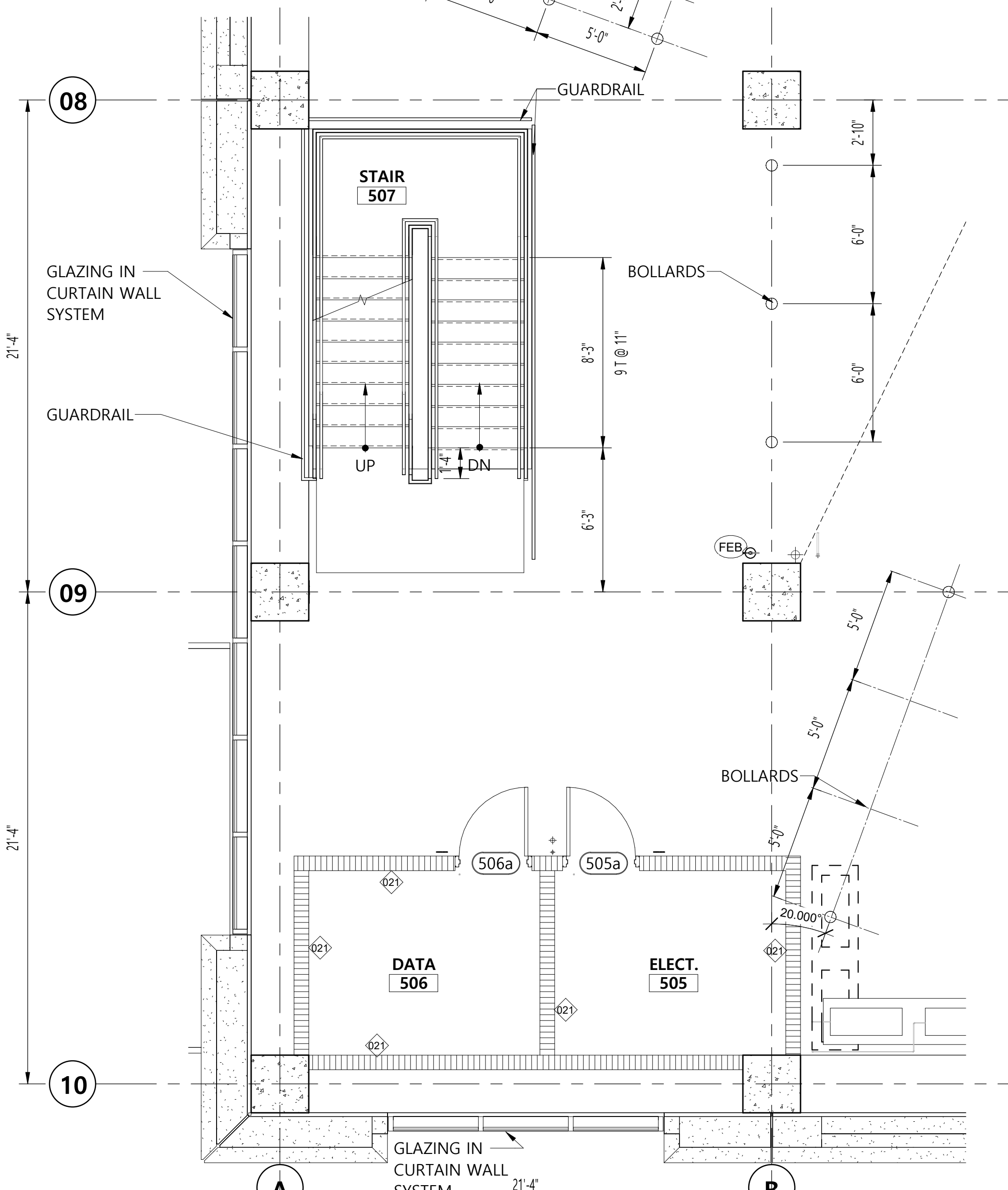
**Southeast Stair Plan - Level 3**

SCALE: 1/4" = 1'-0"



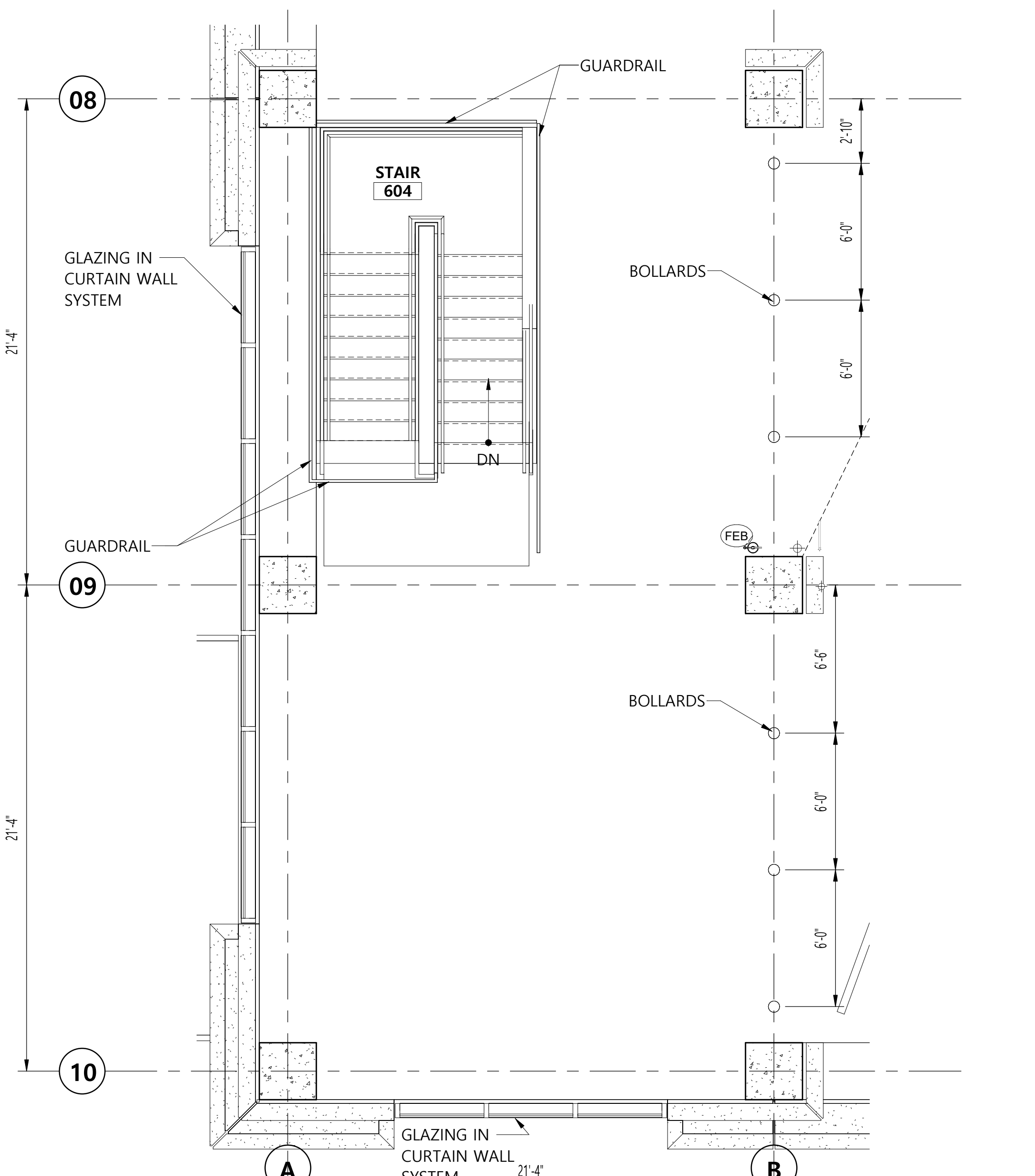
**Southeast Stair Plan - Level 4**

SCALE: 1/4" = 1'-0"



**Southeast Stair Plan - Level 5**

SCALE: 1/4" = 1'-0"



**Southeast Stair Plan - Level 6**

SCALE: 1/4" = 1'-0"

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Sheet Title	SOUTHEAST STAIR PLANS
Job No.	4308
Drawn by	ETK
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Sheet No.	101 of 154
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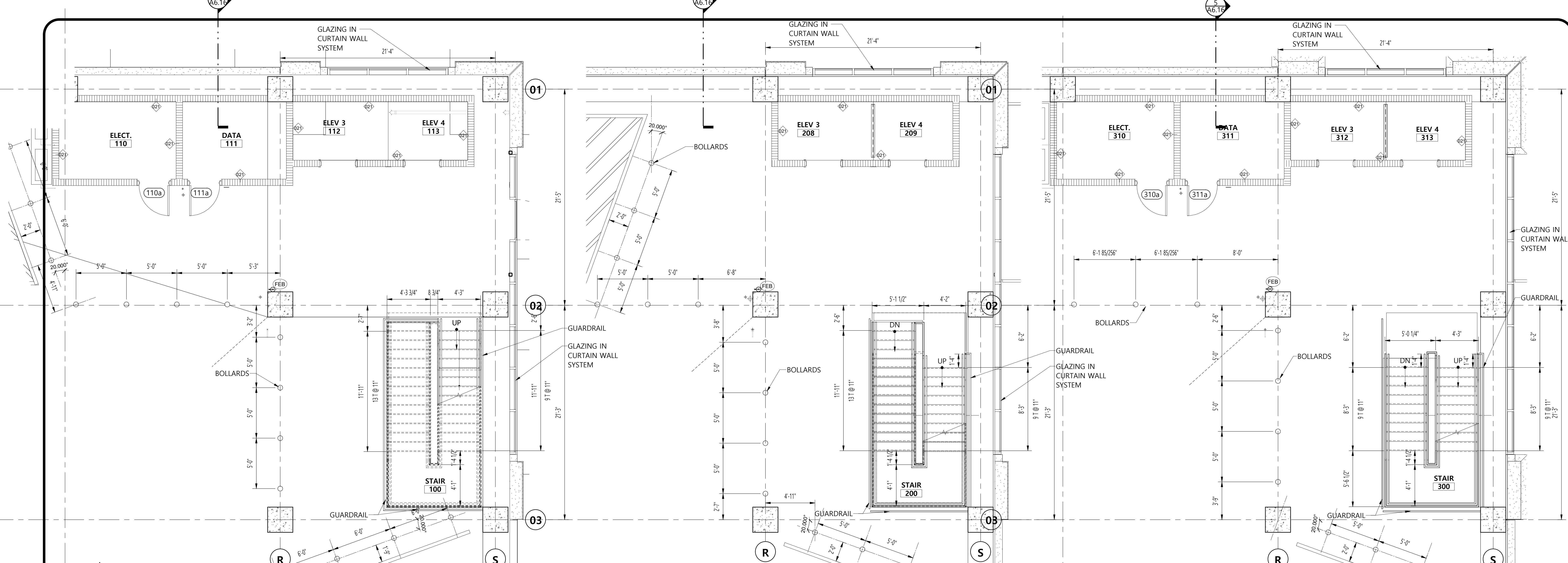
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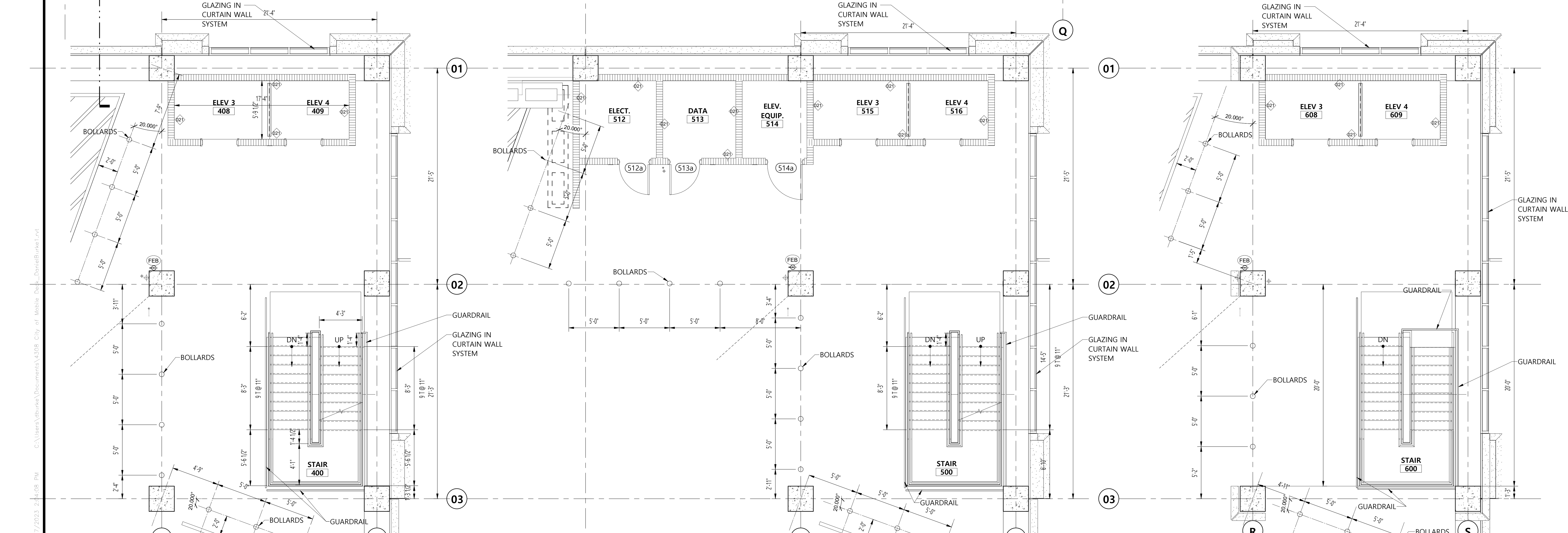
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Job No.	4308
Arch. By	E.T.A.
Chd. by	KING
Drawn by	102
Date	August 5, 2023
Scale	A7.14
of	75
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**Northwest Stair Plan - Level 1**  
SCALE: 1/4" = 1'-0"

**Northwest Stair Plan - Level 2**  
SCALE: 1/4" = 1'-0"

**Northwest Stair Plan - Level 3**  
SCALE: 1/4" = 1'-0"

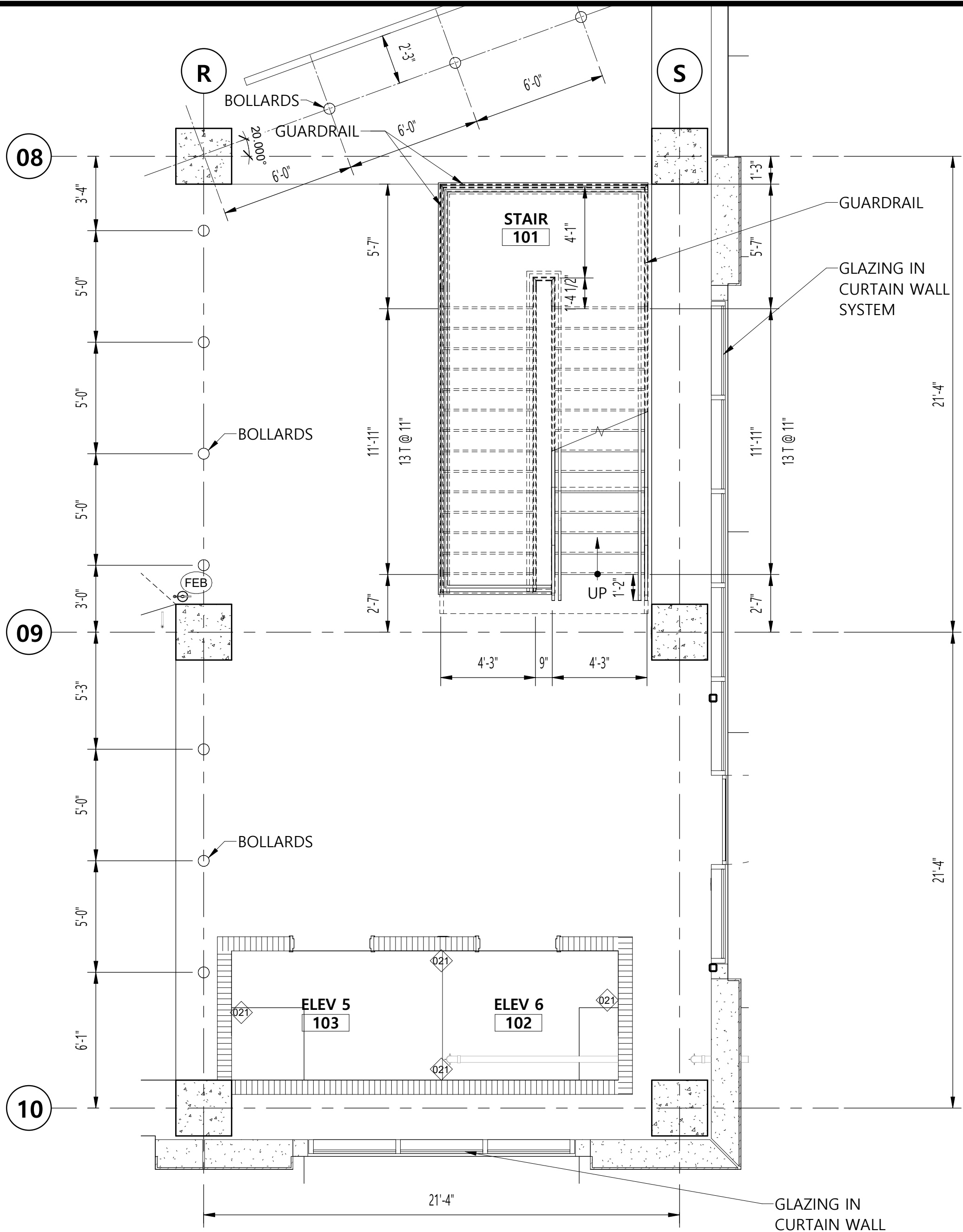


**Northwest Stair Plan - Level 4**  
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**Northwest Stair Plan - Level 5**  
SCALE: 1/4" = 1'-0"

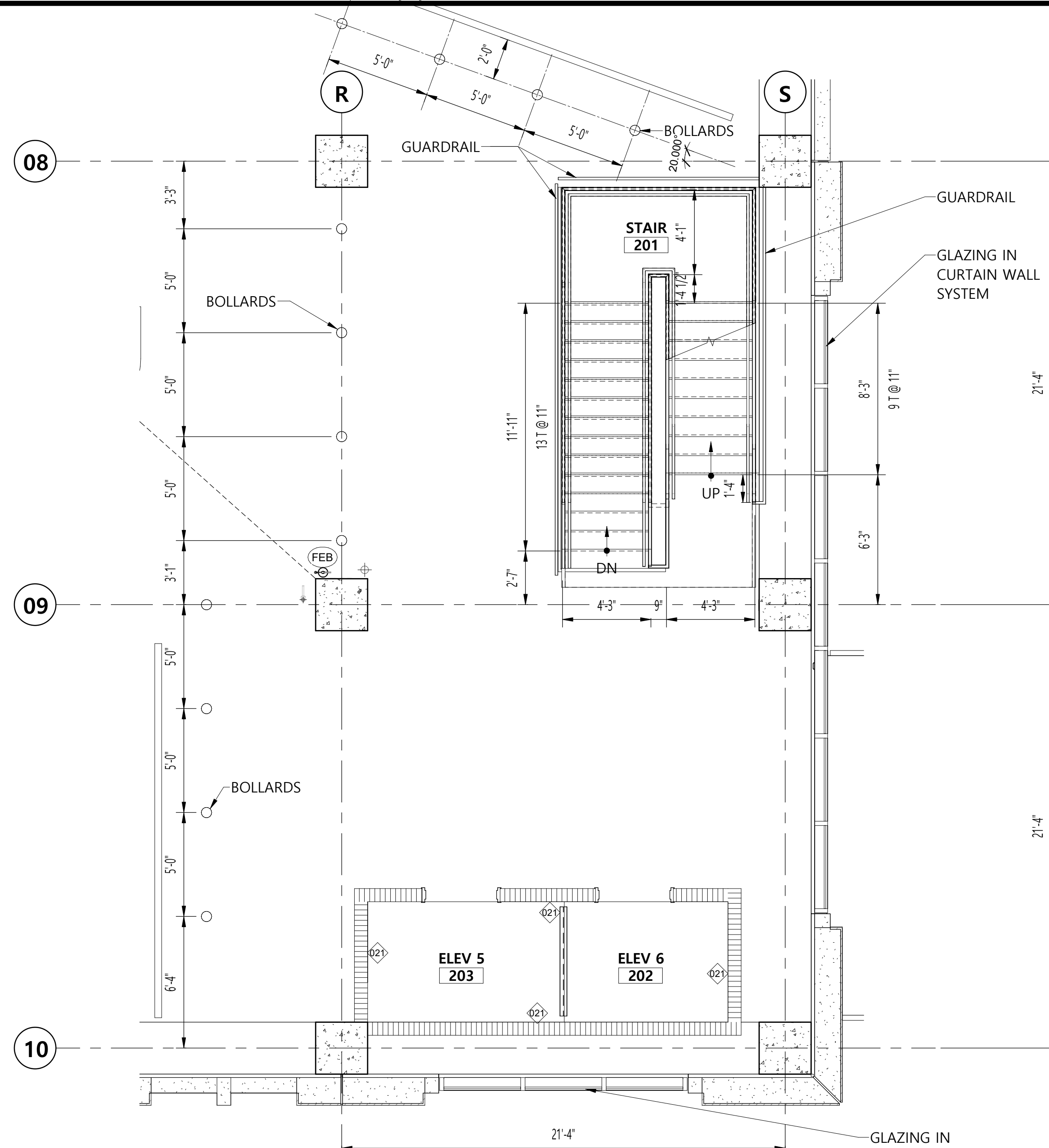
**Northwest Stair Plan - Level 6**  
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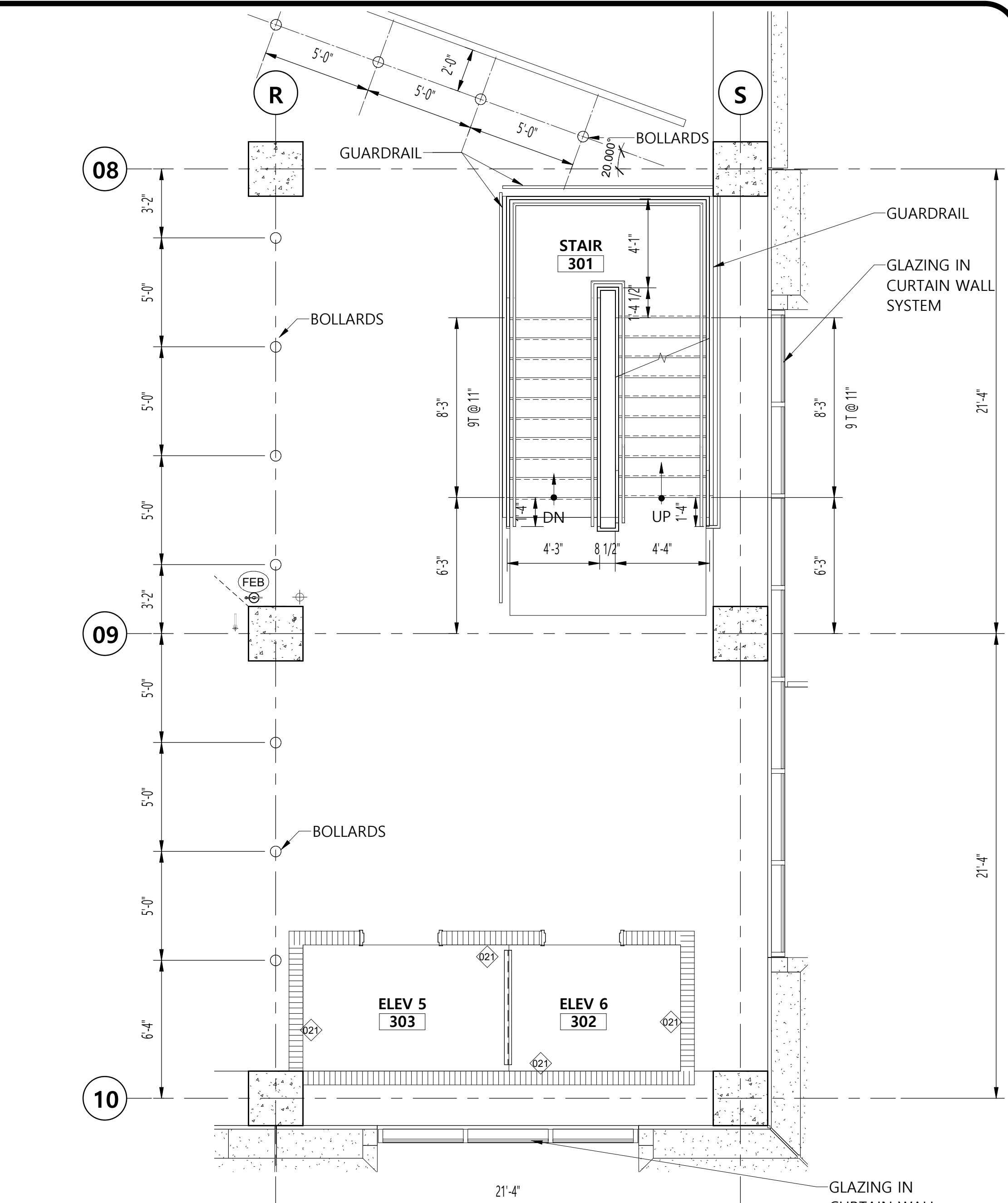
**Northeast Stair Plan - Level 1**

SCALE: 1/4" = 1'-0"



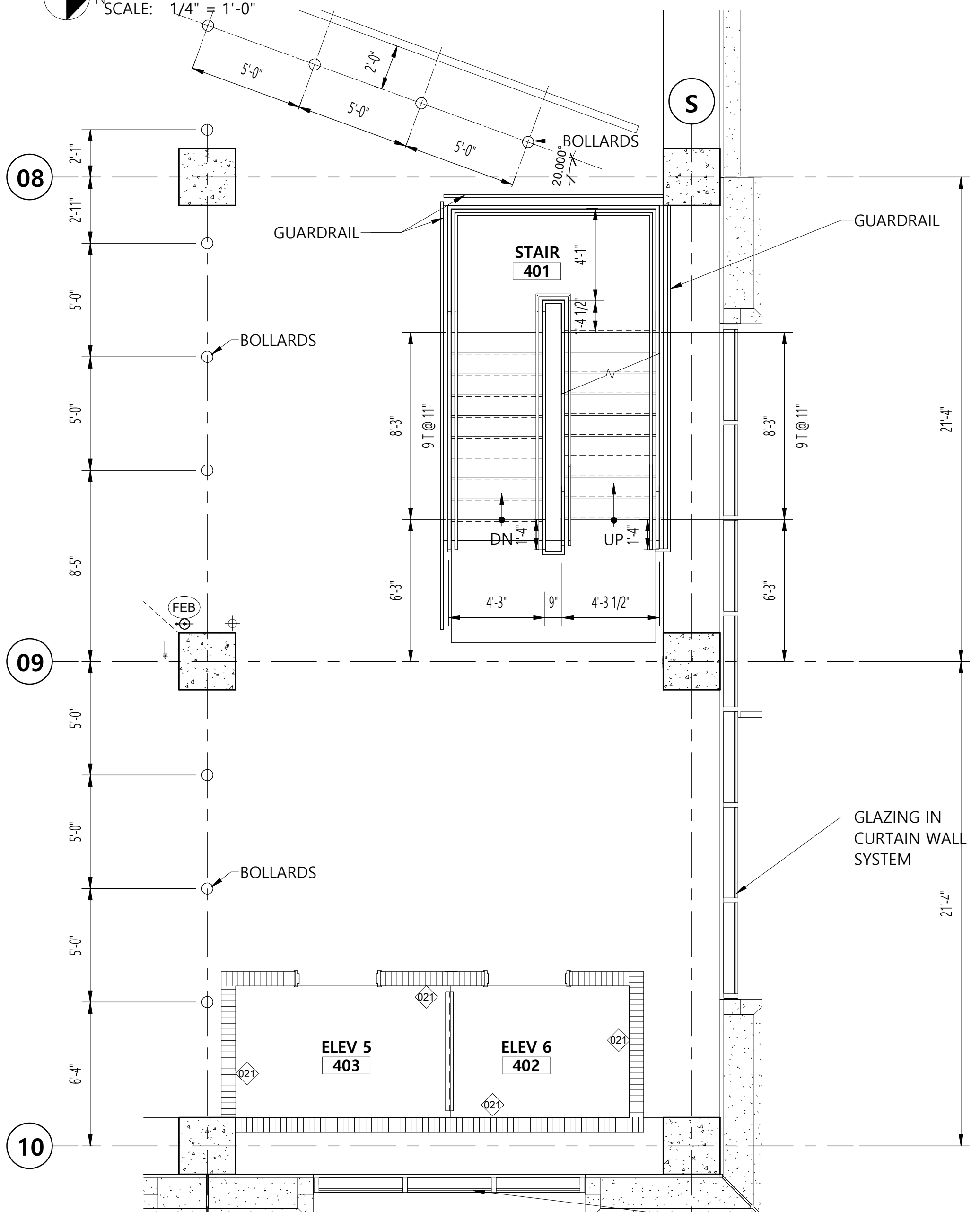
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SCALE: 1/4" = 1'-0"



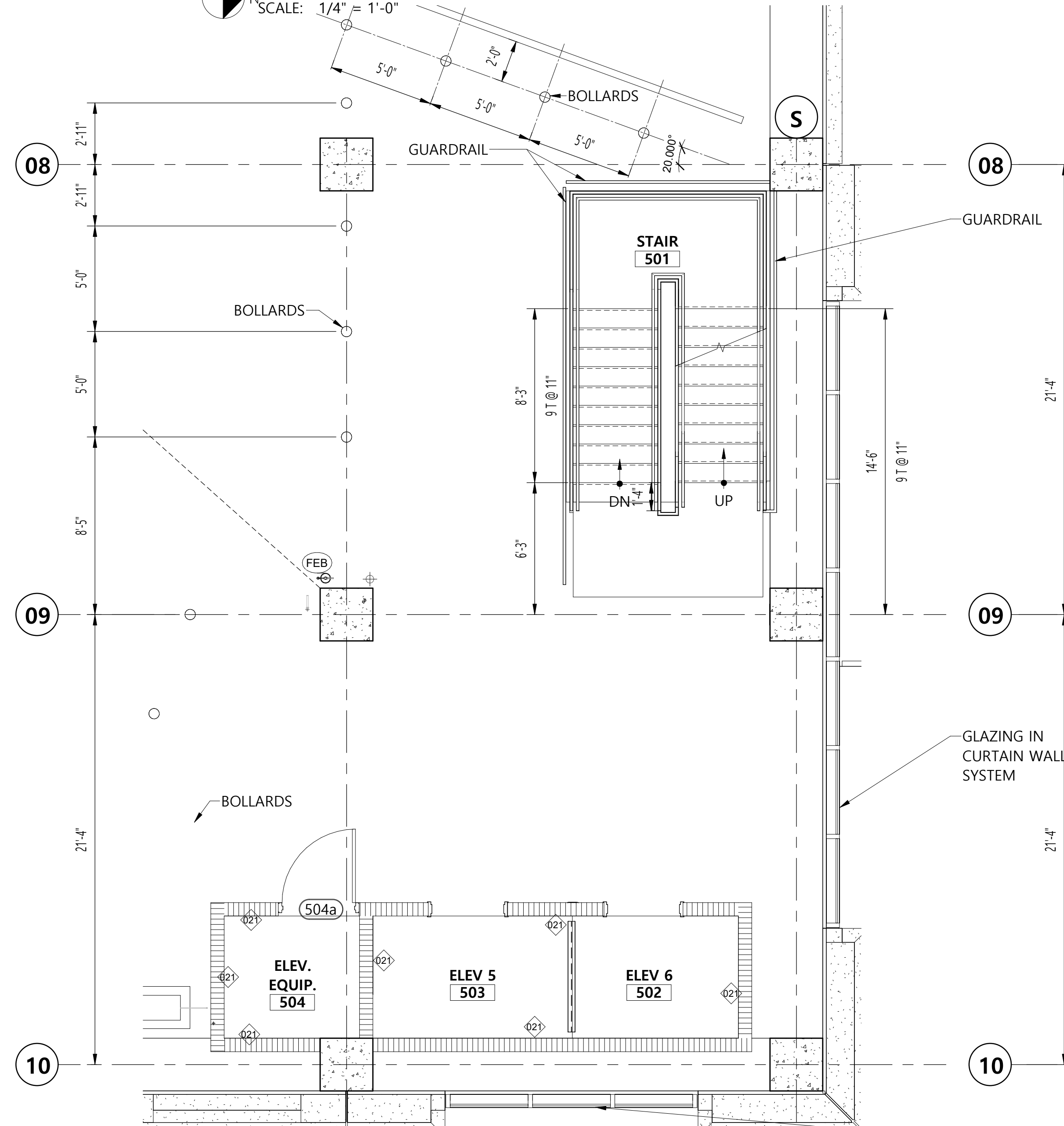
**Northeast Stair Plan - Level 3**

SCALE: 1/4" = 1'-0"



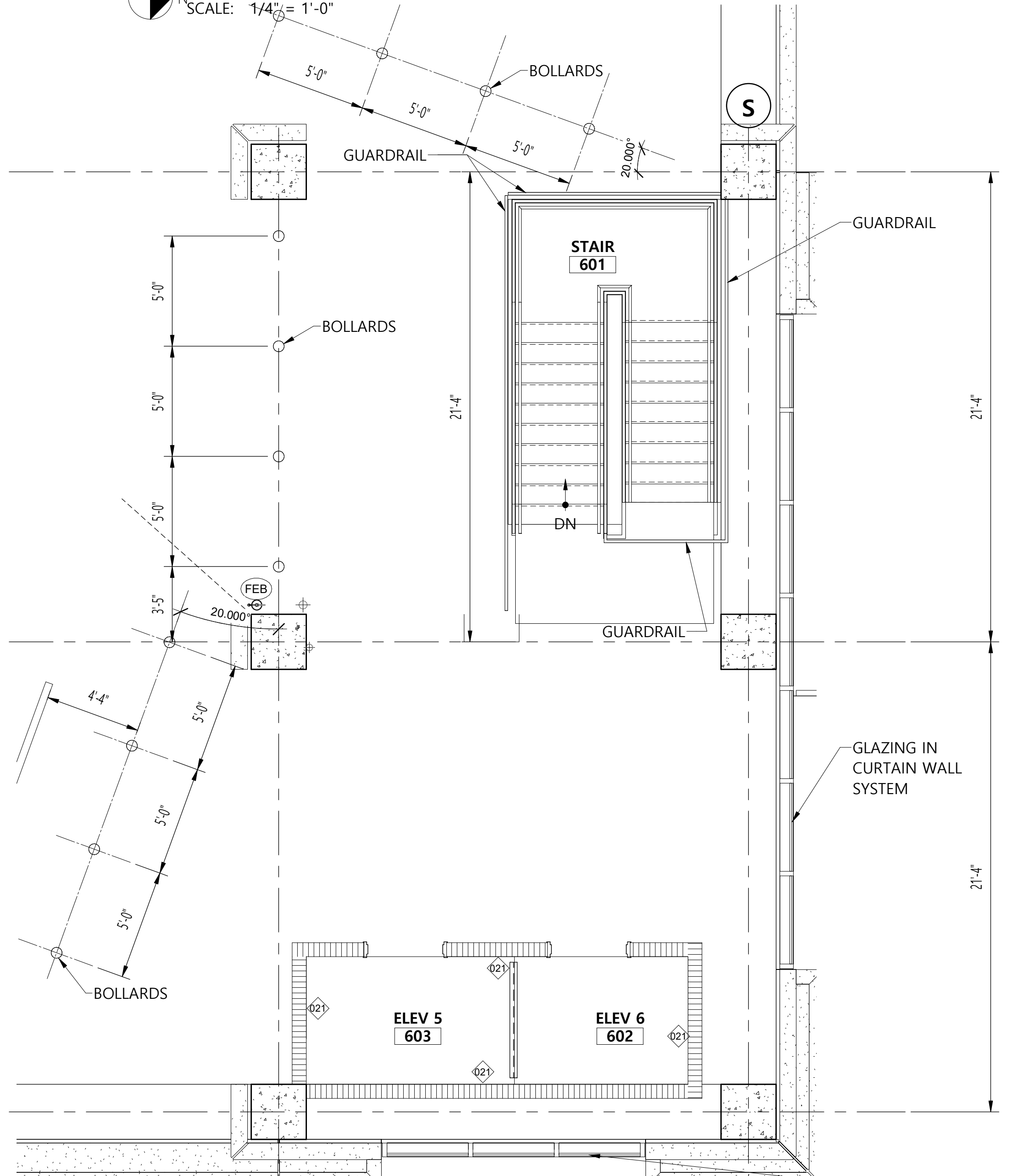
**Northeast Stair Plan - Level 4**

SCALE: 1/4" = 1'-0"



**Northeast Stair Plan - Level 5**

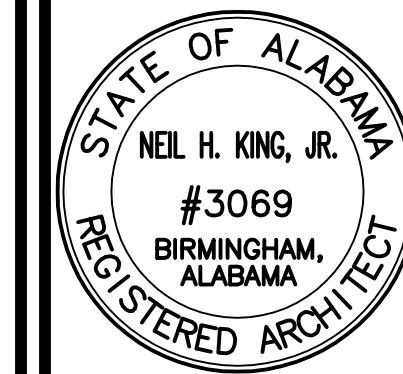
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**Northeast Stair Plan - Level 6**

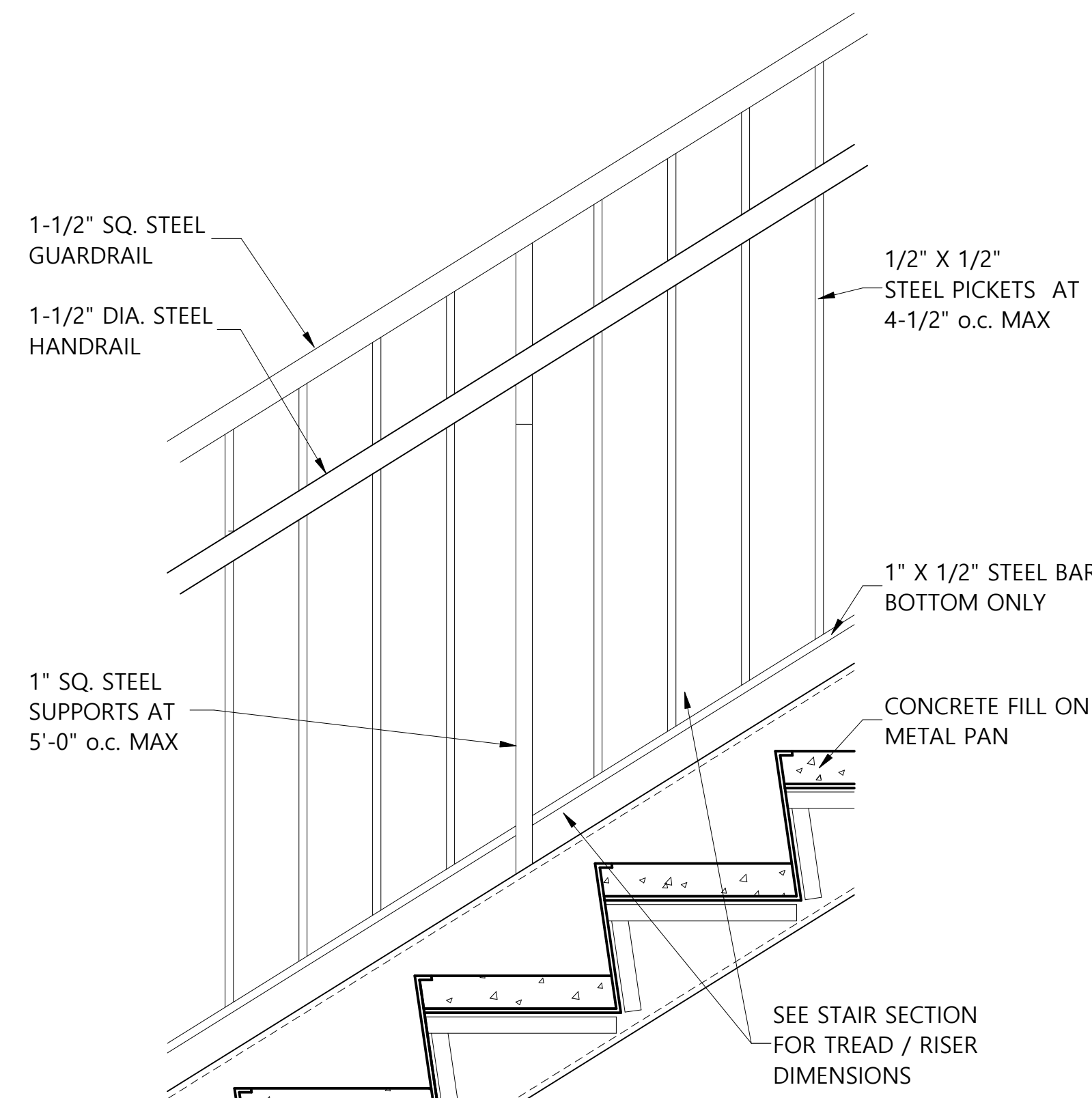
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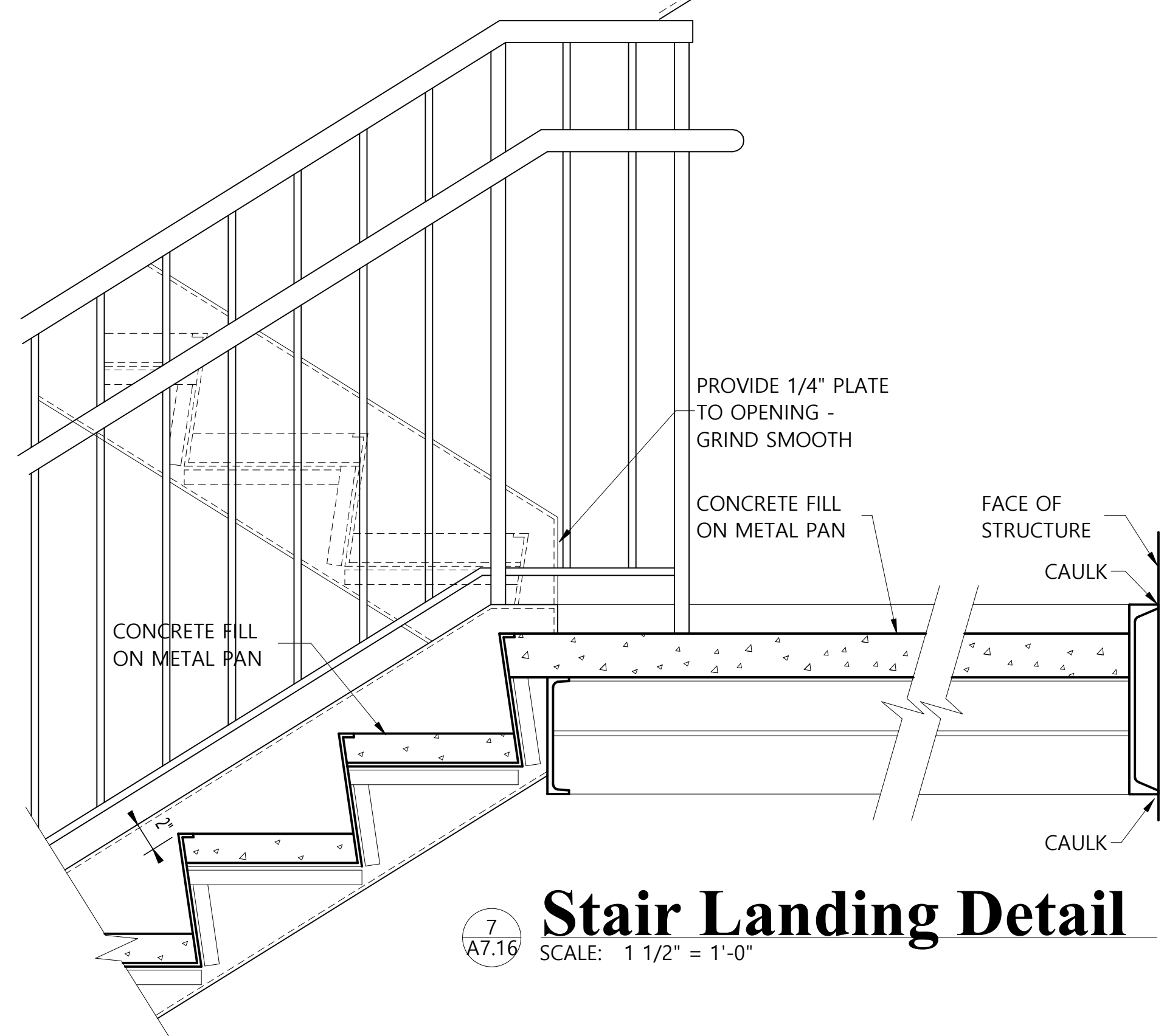


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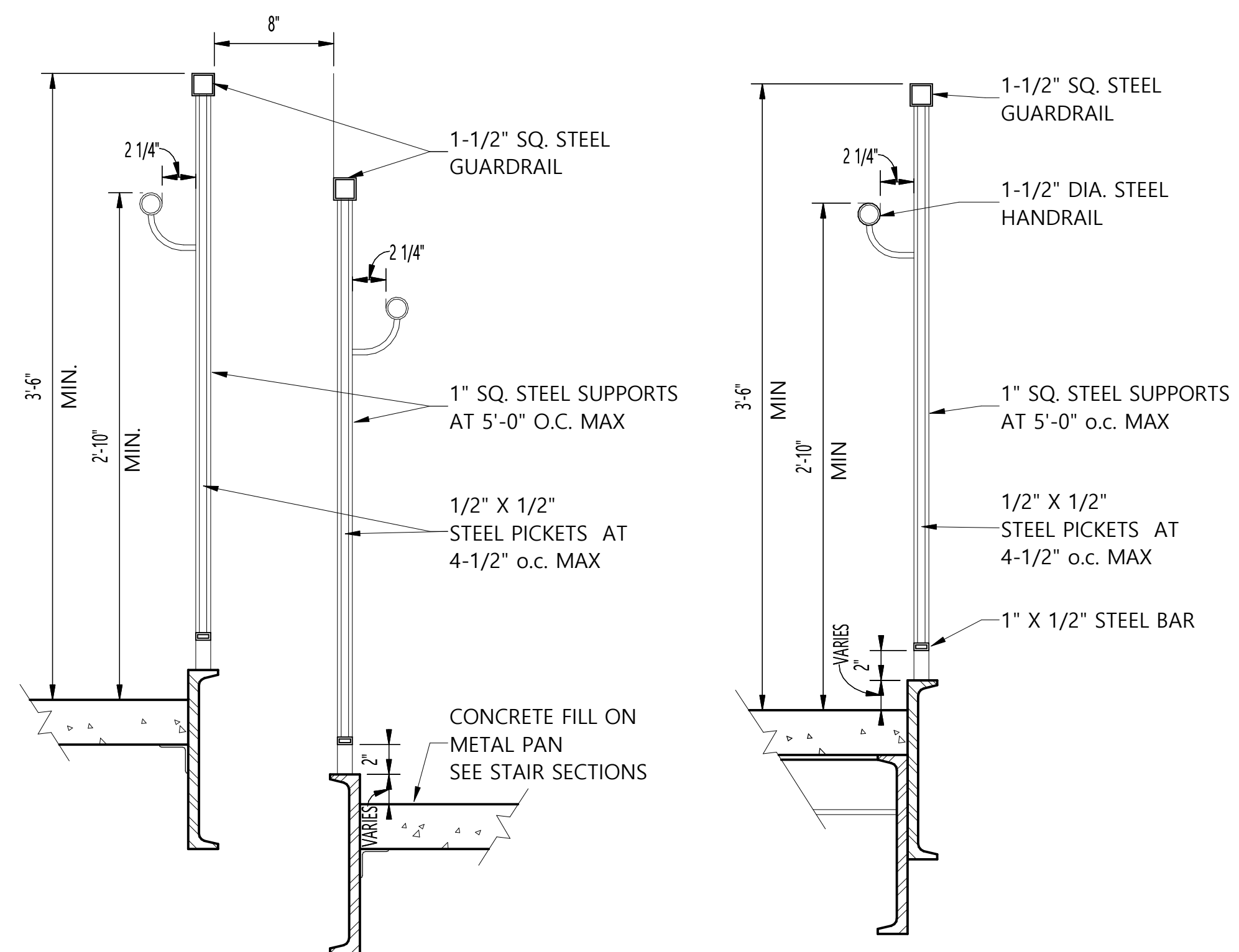
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Job No.	4308
Rev. by	ETK
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Rev. No.	103 of 154
Rev. Title	<b>A7.15</b>
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**6 Typical Stair Detail**  
SCALE: 1/2" = 1'-0"

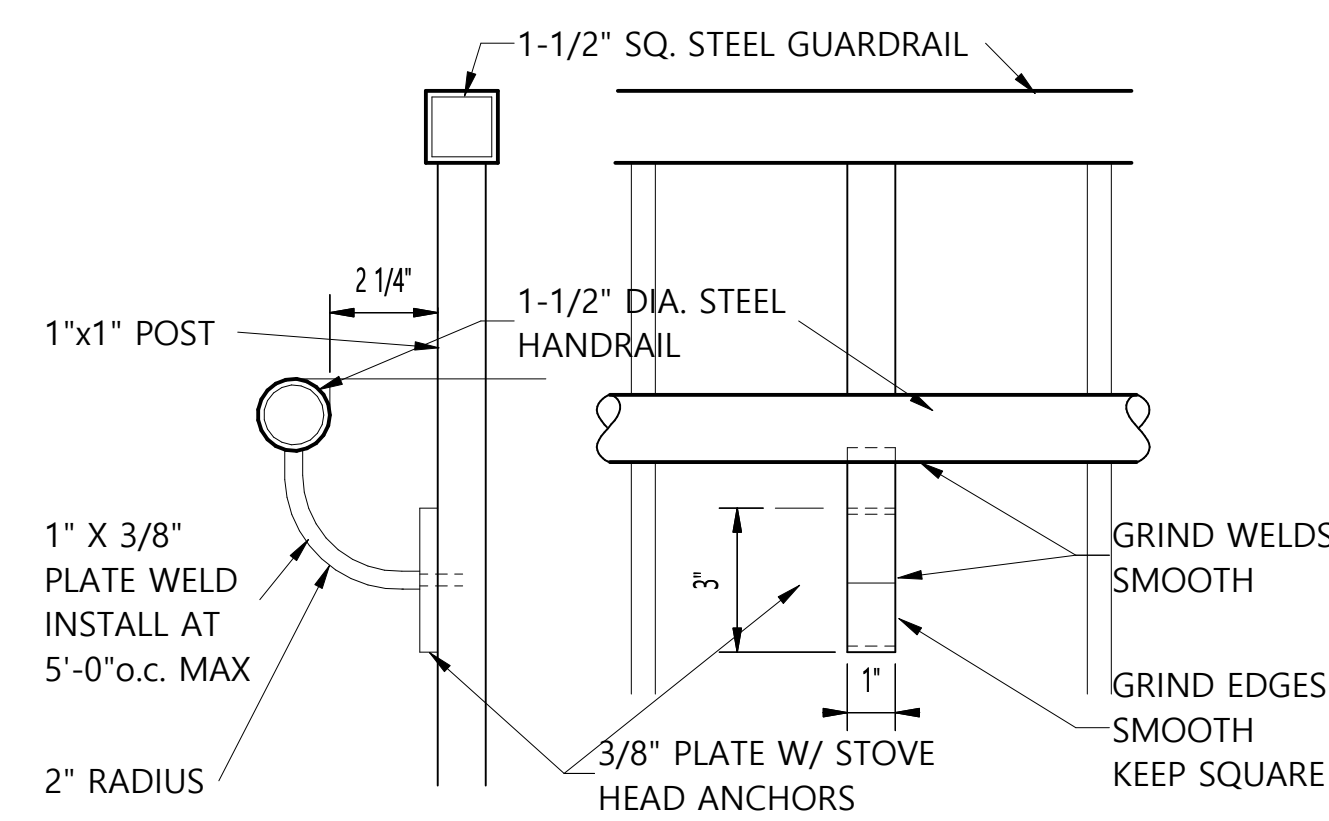


**7 Stair Landing Detail**  
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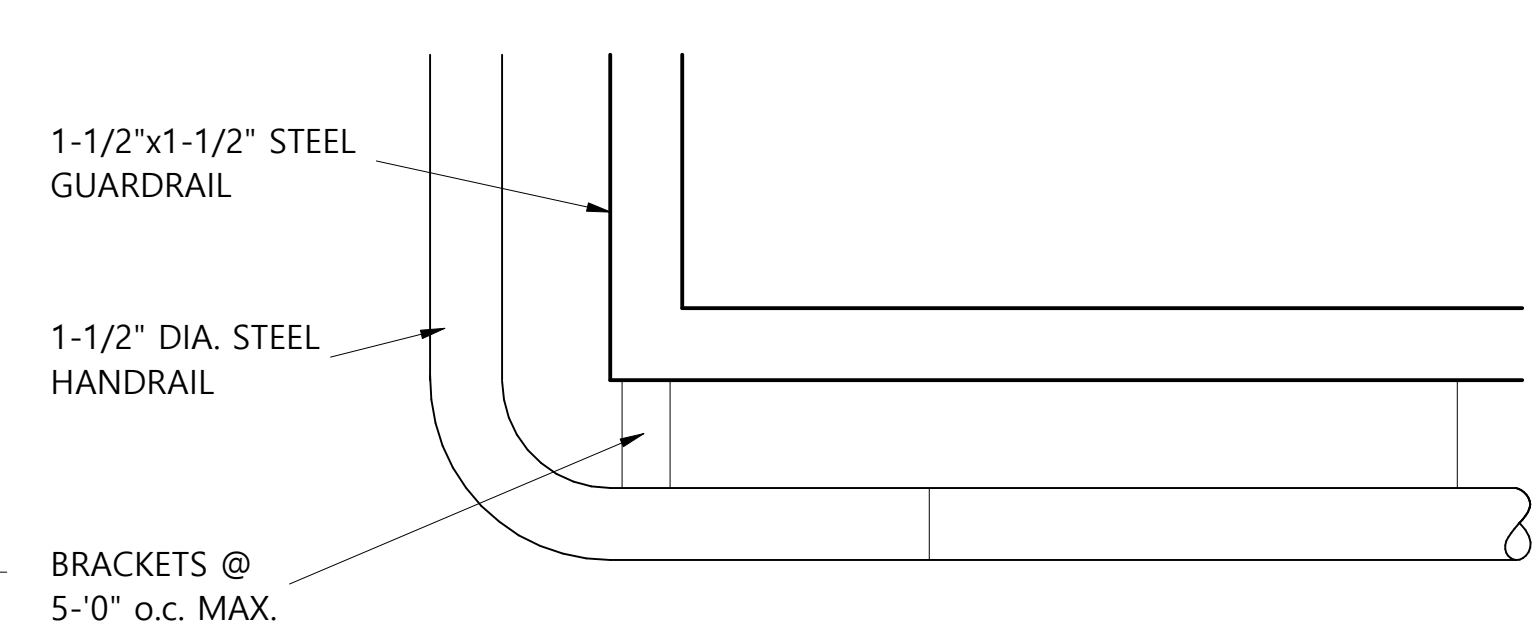


**8 Handrail Detail**  
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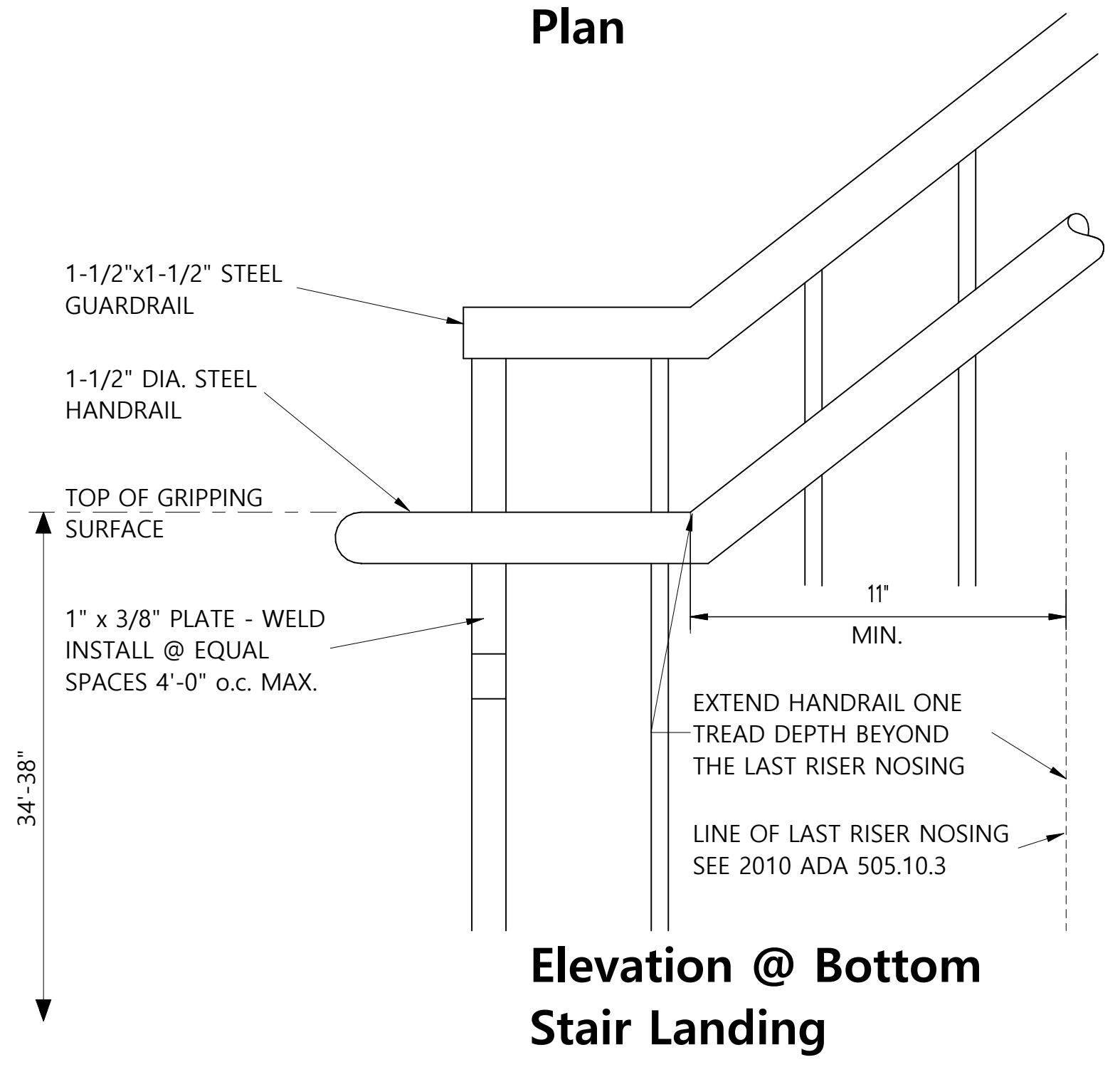
**9 Guardrail Detail**  
SCALE: 1 1/2" = 1'-0"



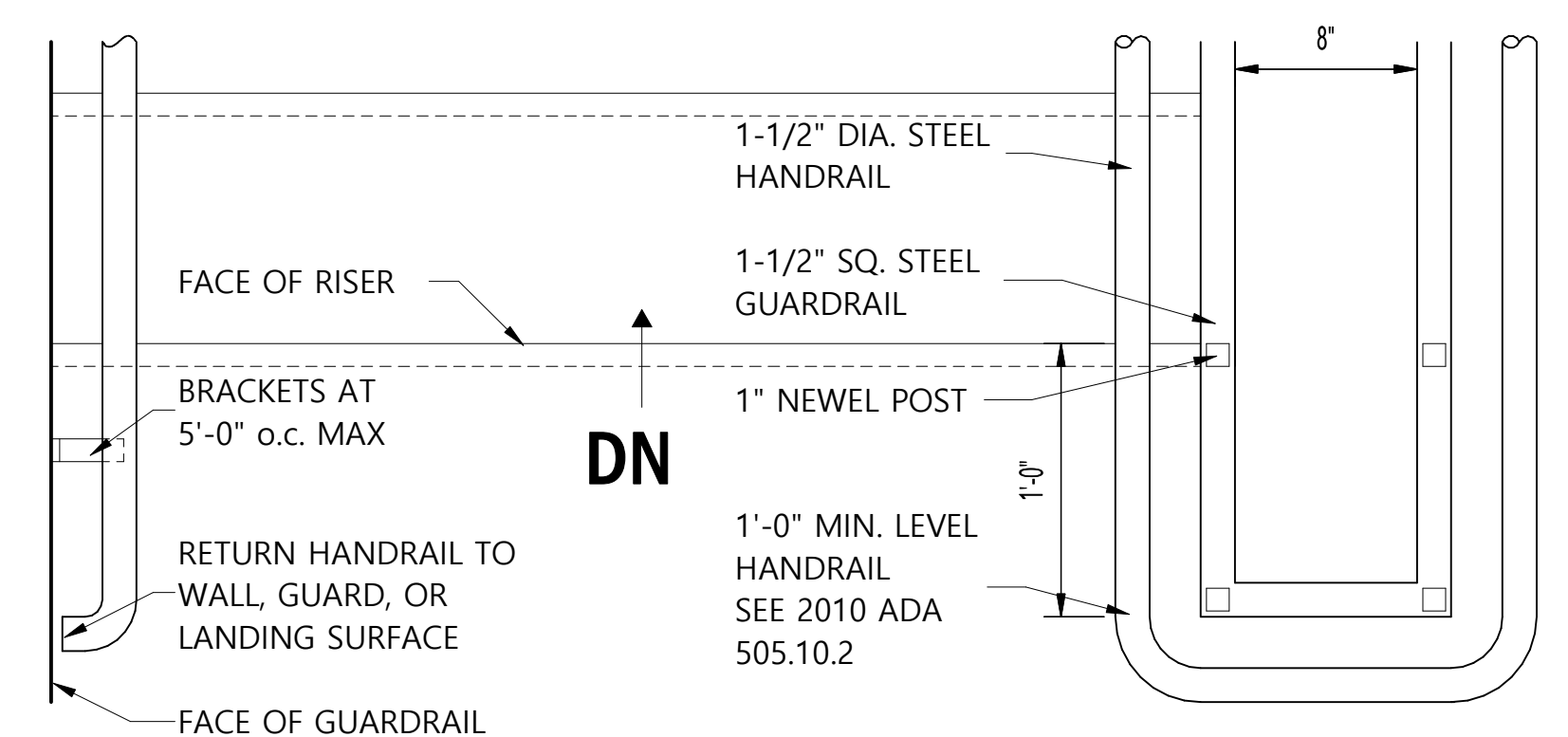
**4 Handrail Bracket Detail**  
SCALE: 3" = 1'-0"



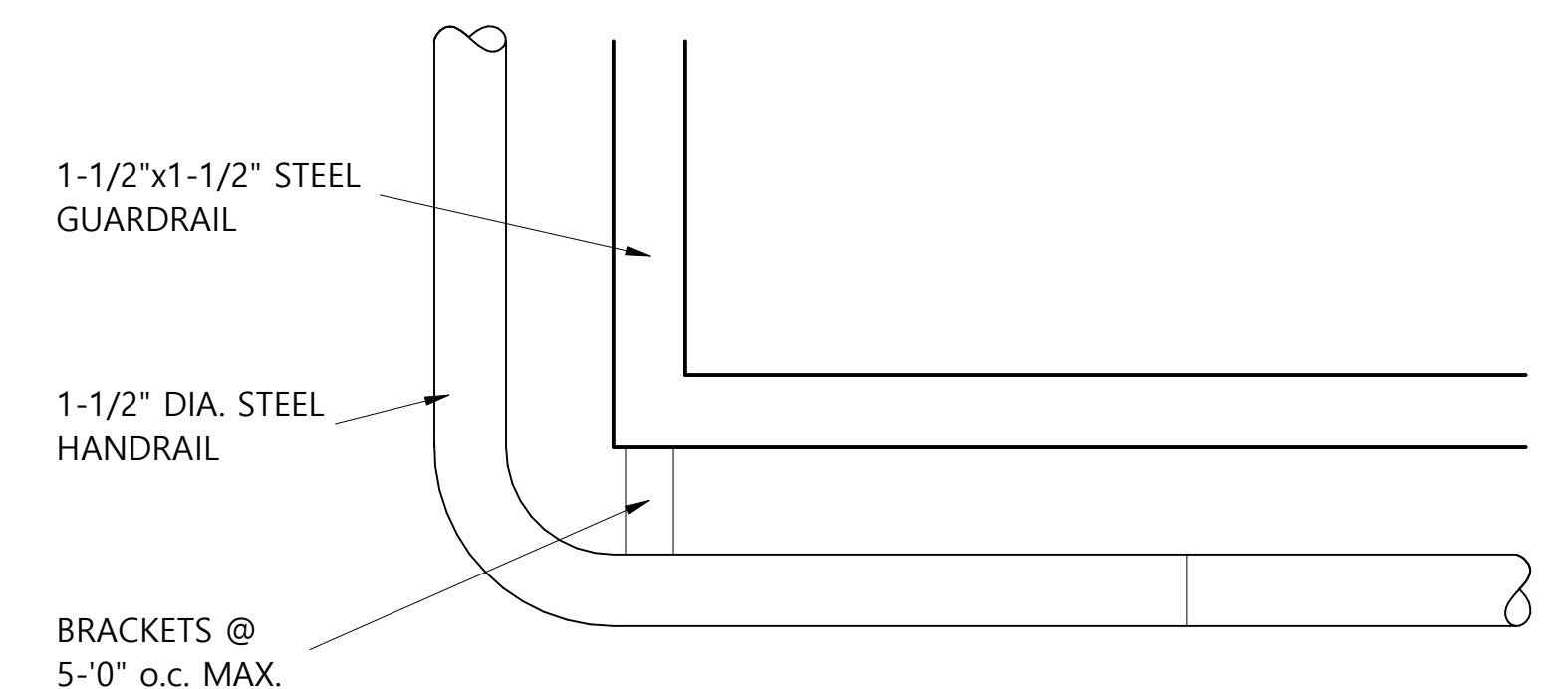
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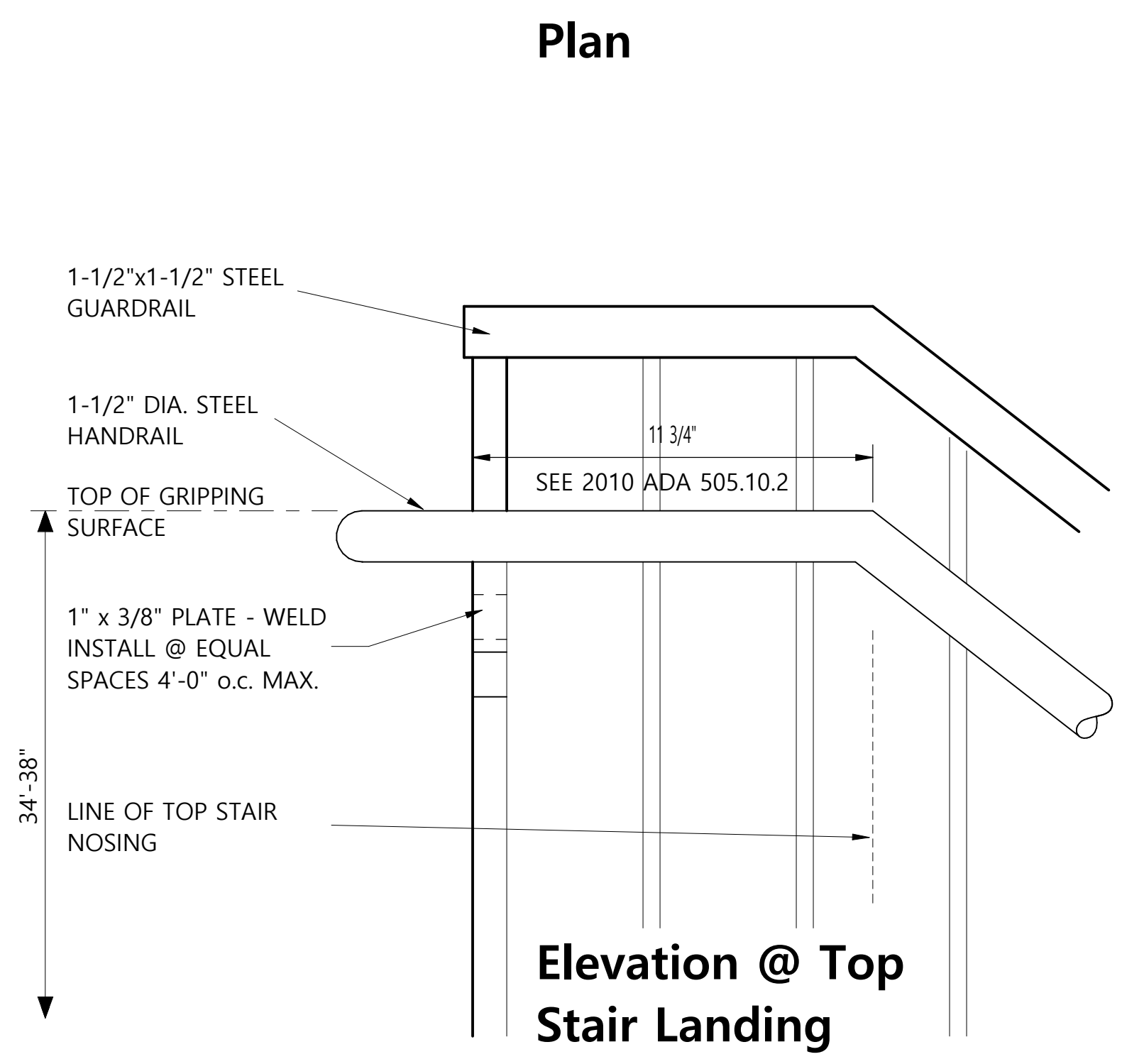
**Elevation @ Bottom Stair Landing**



**1 Hand Rail at Landing**  
SCALE: 1 1/2" = 1'-0"



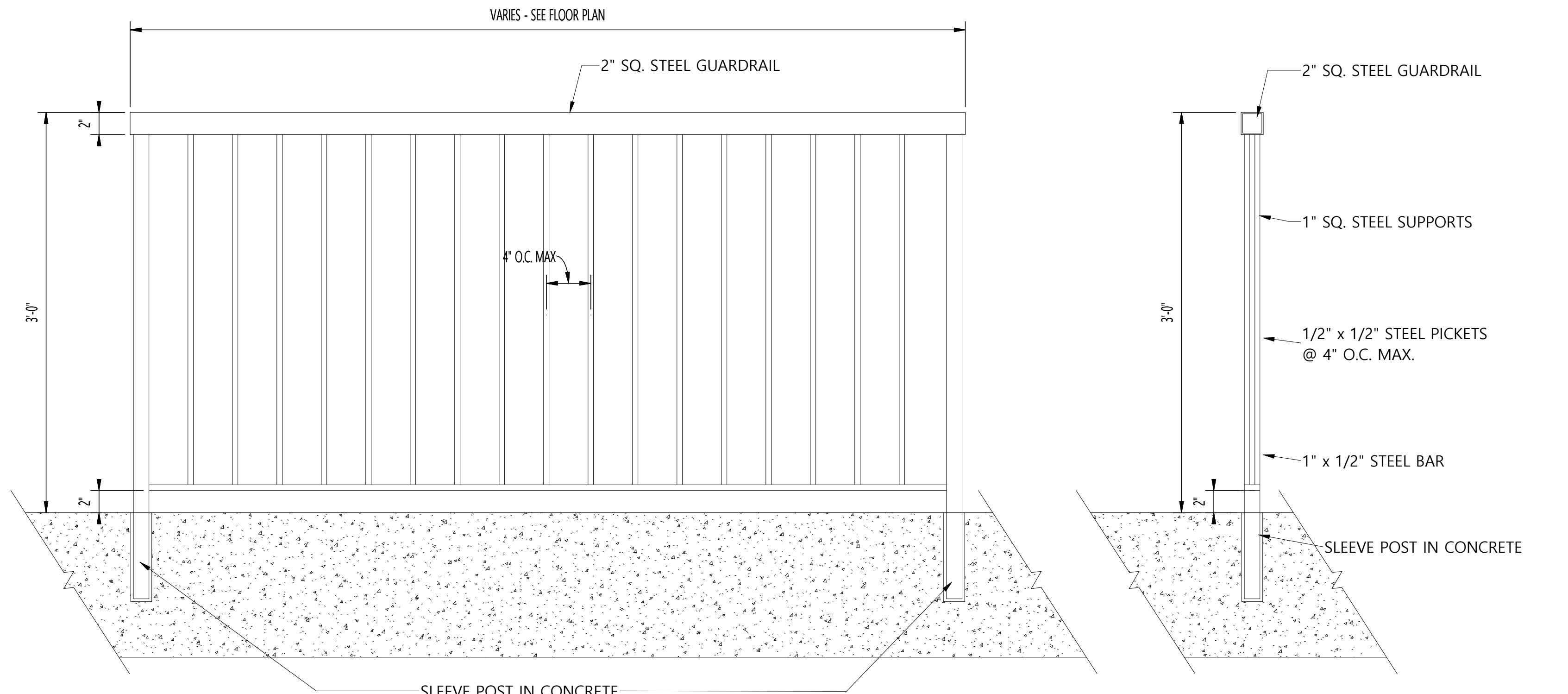
**Plan**



**Elevation @ Top Stair Landing**

**5 Bottom of Landing Rail Detail**  
SCALE: 3" = 1'-0"

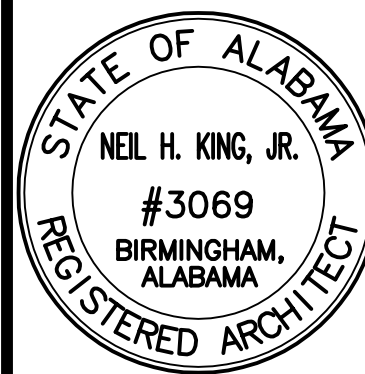
**2 Top of Landing Rail Detail**  
SCALE: 3" = 1'-0"



**3 Cane Detection Rail Detail**  
SCALE: 1 1/2" = 1'-0"

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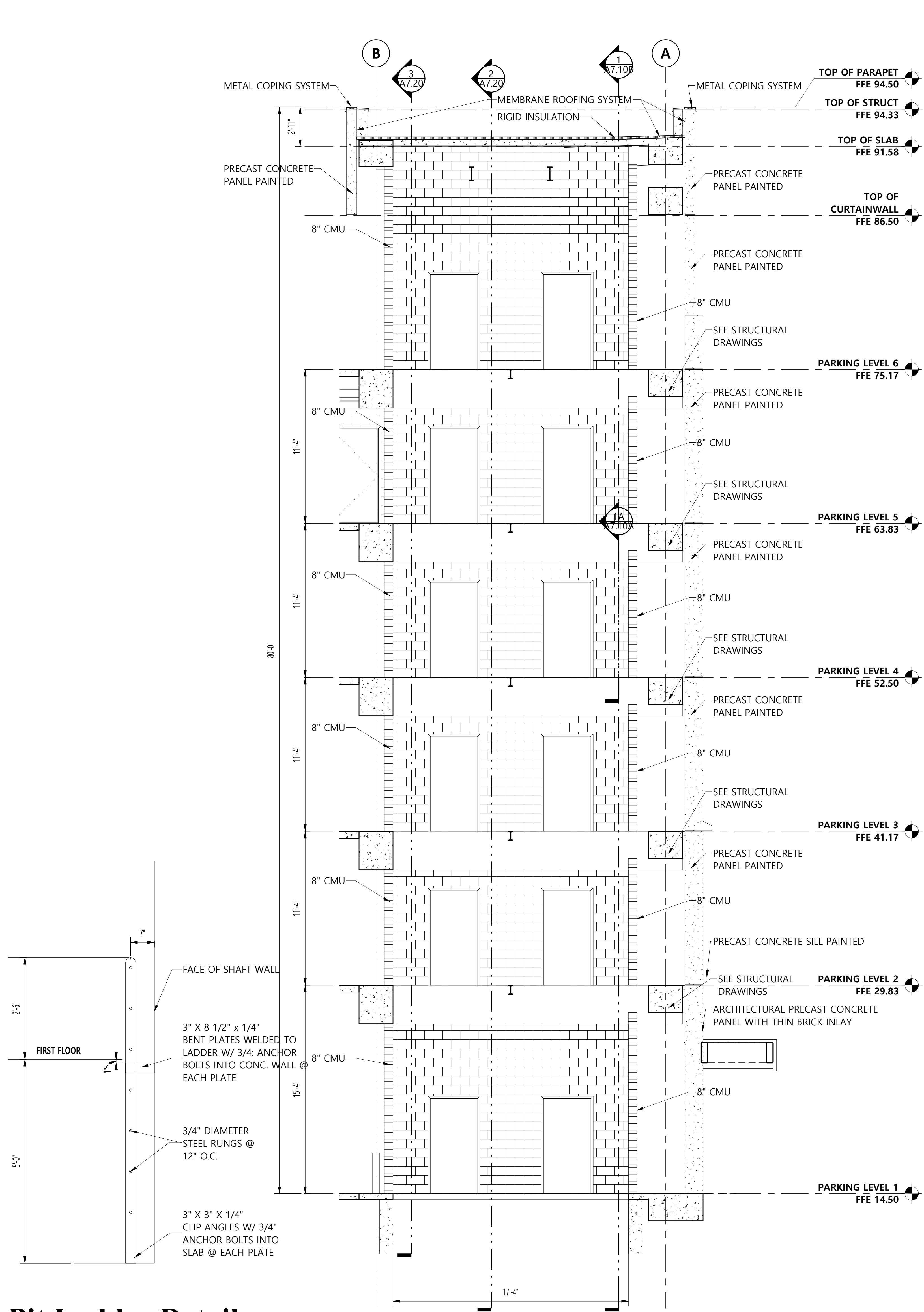
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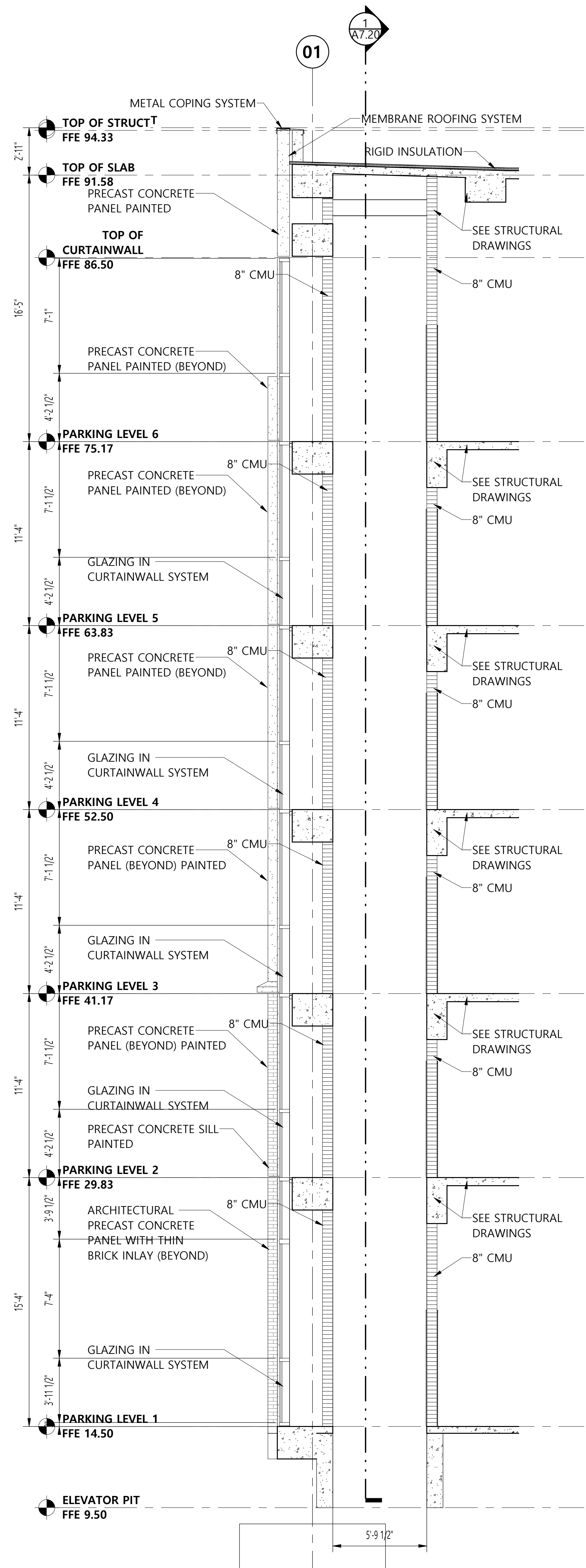
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Job No.	4308
Drawn by	ETA
Checked by	KING
Date	August 5, 2023
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Page	of 75

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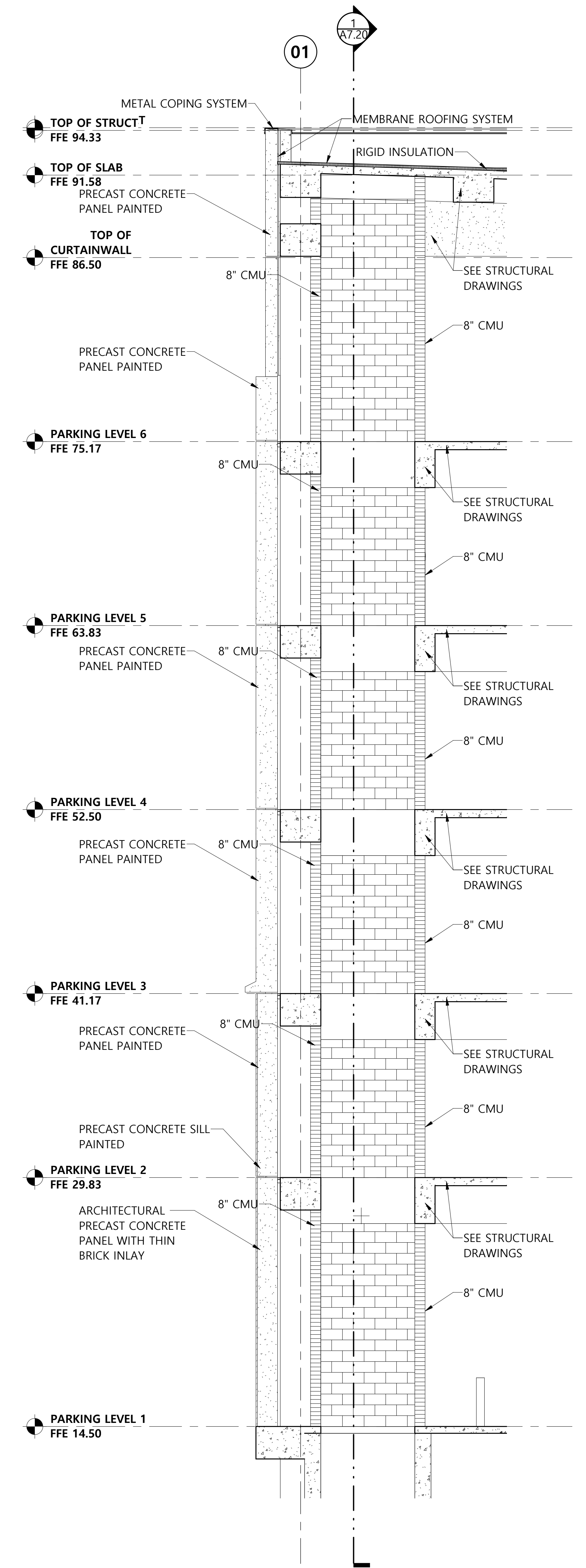


**Pit Ladder Detail**  
SCALE: 3/4" = 1'-0"

**Elevator Section 1**  
SCALE: 1/4" = 1'-0"

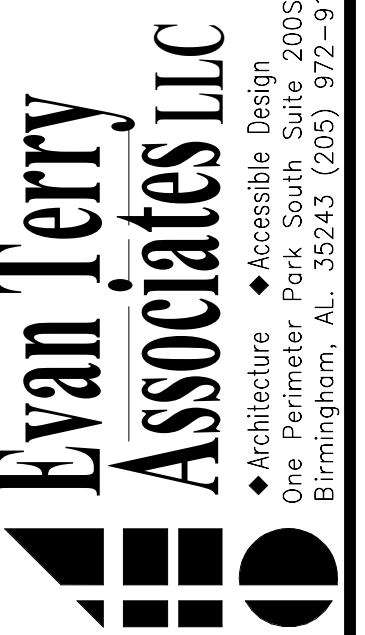
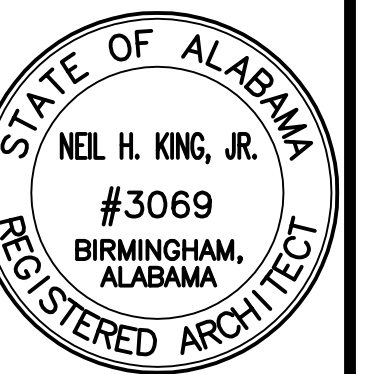


**Elevator Section 2**  
SCALE: 1/4" = 1'-0"



**Elevator Section 3**  
SCALE: 1/4" = 1'-0"

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sheet title	ELEVATOR SECTIONS
job no.	4308
des. by	ETA
chk. by	KING
date	August 5, 2023
sheet no.	A7.20
of	75
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**SPRINKLER NOTES:**

1. PROVIDE A NFPA 13 COMPLIANT SYSTEM TO PROVIDE TOTAL COVERAGE FOR THE BUILDING.
2. ALL PIPING 1-1/2" AND SMALLER SHALL BE SCHEDULE 40 STEEL WITH THREADED JOINTS AND CAST IRON OR MALLEABLE IRON FITTINGS. PROVIDE HANGERS PER NFPA 13 SPACING.
3. PIPING 2" AND LARGER MAY BE SCHEDULE 10 PIPE WITH ROLL GROOVED JOINTS. HANGER SPACING TO BE PER NFPA 13 REQUIREMENTS.
4. SPRINKLER HEADS SHALL BE QUICK RESPONSE, GLASS BULB EQUAL TO VIKING MODEL M.
5. PIPING IS TO BE INSTALLED IN A MANNER AS TO HIDE PIPING AS MUCH AS POSSIBLE.
6. PROVIDE A PIPING PLAN SHOWING COORDINATION OF SPRINKLER PIPING WITH ALL ITEMS ABOVE CEILING.
7. PROVIDE SHOP DRAWINGS INCLUDING A REFLECTED CEILING PLAN INDICATING SPRINKLER HEADS, LIGHTS, AND HVAC CEILING DEVICES.
8. PER STATE BUILDING COMMISSION REQUIREMENTS, HYDRAULIC CALCULATIONS AND SPRINKLER SHOP DRAWINGS FOR BUILDING FIRE PROTECTION SYSTEMS MUST BE PREPARED UNDER THE SUPERVISION OF AN ENGINEER LICENSED IN THE STATE OF ALABAMA AND BEAR THEIR LICENSURE SEAL WITH SIGNATURE AND DATE.
9. SPRINKLER CONTRACTOR SHALL BE LICENSED THROUGH THE STATE OF ALABAMA FIRE MARSHALL OFFICE.

**DRY SPRINKLER SYSTEM NOTES:**

- A. WET SPRINKLER SYSTEM DESIGN AND INSTALLATION. BASE SYSTEM DESIGN HYDRAULIC CALCULATIONS USING THE AREADENSITY METHOD ON THE FOLLOWING CRITERIA AND IN ACCORDANCE WITH NFPA 13 LATEST EDITION.
1. SPRINKLER PROTECTION
    - a. MECHANICAL EQUIPMENT ROOMS, ELECTRICAL CLOSETS, ELEVATOR SHAFTS, ELEVATOR MACHINE ROOMS, AND STORAGE BETWEEN 100 AND 150 SQ. FT. : ORDINARY HAZARD GROUP 1, 0.15GPM/SQ. FT. OVER THE HYDRAULICALLY MOST REMOTE 1500SQ. FT.
    - b. STORAGE ROOMS OVER 250 SQ. FT. : ORDINARY GROUP 2, 0.20GPM/SQ. FT. OVER THE HYDRAULICALLY MOST REMOTE 1500SQ. FT.
    - c. WHERE AREAS ARE NOT PHYSICALLY SEPARATED BY A BARRIER OR PARTITION CAPABLE OF DELAYING HEAT FROM A FIRE IN ONE AREA FROM FUSING SPRINKLERS IN THE ADJACENT AREA, THE REQUIRED SPRINKLER PROTECTION FOR THE MORE DEMANDING DESIGN BASIS SHALL EXTEND 18FT. BEYOND ITS PERIMETER.
  2. ADD WATER ALLOWANCE OF 250 GPM FOR INSIDE AND OUTSIDE HOSE STREAMS TO THE SPRINKLER REQUIREMENTS AT THE CONNECTION TO THE DISTRIBUTION MAIN.
  3. HYDRAULIC CALCULATIONS: THE CALCULATED DEMAND INCLUDING THE HOSE STREAM REQUIREMENTS SHALL FALL NO LESS THAN 10 PERCENT BELOW THE AVAILABLE SUPPLY CURVE.
  4. COMPLY WITH IBC & IFC (2021 EDITION), NFPA 13 (2021 EDITION), NFPA 14, STANDPIPES AND HOSE SYSTEMS, NFPA 20, STATIONARY FIRE PUMPS, NFPA 24, PRIVATE SERVICE MAINS NFPA 54, NATIONAL FUEL GAS CODE, NFPA 70, NATIONAL ELECTRIC CODE, NFPA 72, NATIONAL ALARM AND SIGNALING CODE, AND NFPA 101, LIFE SAFETY CODE (2021 EDITION).

**FIRE PROTECTION SHOP DRAWING NOTES**

- BEFORE SUBMITTING FIRE PROTECTION SHOP DRAWINGS FOR REVIEW:
1. CONFIRM THAT FIRE PROTECTION SHOP DRAWINGS ARE SEALED AND SIGNED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF ALABAMA.
  2. CONFIRM THAT EACH NODE POINT IN THE HYDRAULIC CALCULATIONS APPEARS ON THE FIRE PROTECTION SHOP DRAWINGS AND THAT NOMENCLATURE MATCHES. THIS INCLUDES NODE POINTS ON SITE SUCH AS THE BACKFLOW PREVENTER AND SOURCE.
  3. CONFIRM THAT PIPE SIZES, LENGTHS, AND ELEVATIONS NOTED IN HYDRAULIC CALCULATIONS MARCH THE PIPE SIZES, LENGTHS, AND ELEVATIONS INDICATED ON THE FIRE PROTECTION SHOP DRAWINGS.
  4. CONFIRM THAT NODE POINTS, PIPE SIZES, LENGTHS, AND ELEVATIONS DO NOT OVERLAP ARCHITECTURAL FEATURES OR OTHER GRAPHIC ELEMENTS SO THEY BECOME DIFFICULT TO READ WHEN PLOTTED.
  5. CONFIRM THAT WHEN MULTIPLE NODE POINTS ARE LOCATED IN CLOSE PROXIMITY TO ONE ANOTHER THAT LEADER LINES ARE USED TO IDENTIFY WHERE THE NODE POINT IS LOCATED IN THE DESIGN.
  6. CONFIRM THAT HYDRAULIC CALCULATIONS ACCURATELY ACCOUNT FOR PIPE ROUTING (ELBOWS, TEES, ELEVATION OFFSETS, ETC.) INDICATED IN THE FIRE PROTECTION SHOP DRAWINGS.
  7. CONFIRM THAT REMOTE AREAS ARE OUTLINED AND IDENTIFIED ON FIRE PROTECTION SHOP DRAWINGS AND THAT NOMENCLATURE MATCHES HYDRAULIC CALCULATIONS.

**FIRE PROTECTION CROSS MAINS**

FIRE PROTECTION CROSS MAINS HAVE BEEN SHOWN AS A PLACEHOLDER - FOR GENERAL COORDINATION. FINAL SIZES AND ROUTINGS OF THE CROSS MAINS SHALL BE DETERMINED BY THE INSTALLING FIRE SPRINKLER CONTRACTOR, BUT EFFORTS TO USE THE LOCATIONS SHOWN HEREIN SHOULD BE MADE.

IT IS NOT THE INTENT OF THIS PIPE ROUTING TO SUGGEST THAT ONLY TREE SYSTEMS OR GRID SYSTEMS ARE TO BE USED, BUT TO ENSURE THERE ARE ENOUGH CROSS MAINS TO PROVIDE A POINT OF SUPPLY TO ALL AREAS & BRANCH LINES.

THE INSTALLING CONTRACTOR WILL NEED TO COORDINATE WITH ALL OTHER DISCIPLINES AT ALL TIMES, ESPECIALLY THE MECHANICAL CONTRACTOR, AS THERE WILL BE LIMITED SPACE ABOVE CEILINGS IN SOME AREAS.

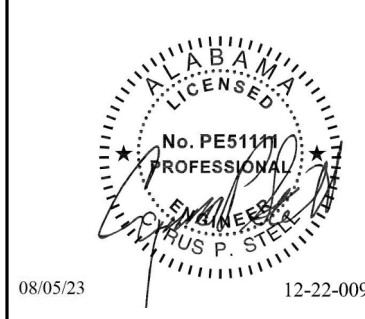
**WATER FLOW TEST:**

WATER FLOW TEST HAS NOT BEEN PROVIDED DURING THE DESIGN.

THE SUCCESSFUL BIDDER SHALL CONDUCT A NEW WATER FLOW TEST PRIOR TO DESIGN AND ORDERING OR THE FIRE PUMP. TO VERIFY THERE HAS BEEN NO SIGNIFICANT CHANGES IN THE WATER SUPPLY, AND SHALL PROVIDE RESULTS (DATE, TIME, WITNESSES, ETC.) OF THE NEW WATER FLOW TEST IN THE SUBMITTAL DOCUMENTS.



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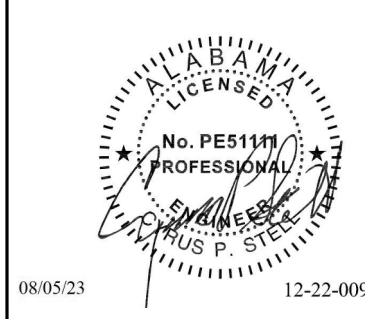
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job no.	4308	
drawn by	NEL	scale
checked by	CPS	of 156
sheet no.	<b>F0.01</b>	
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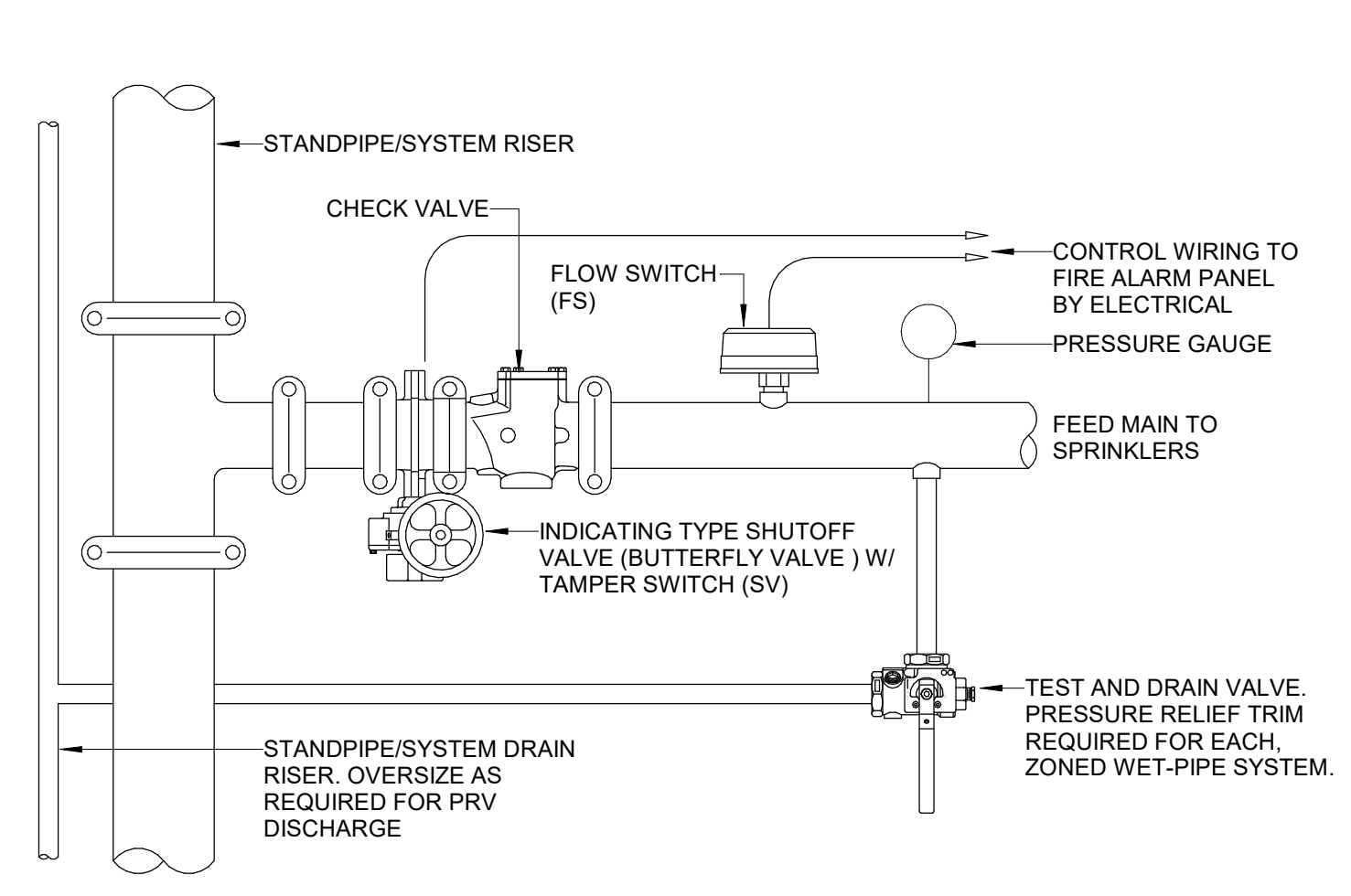
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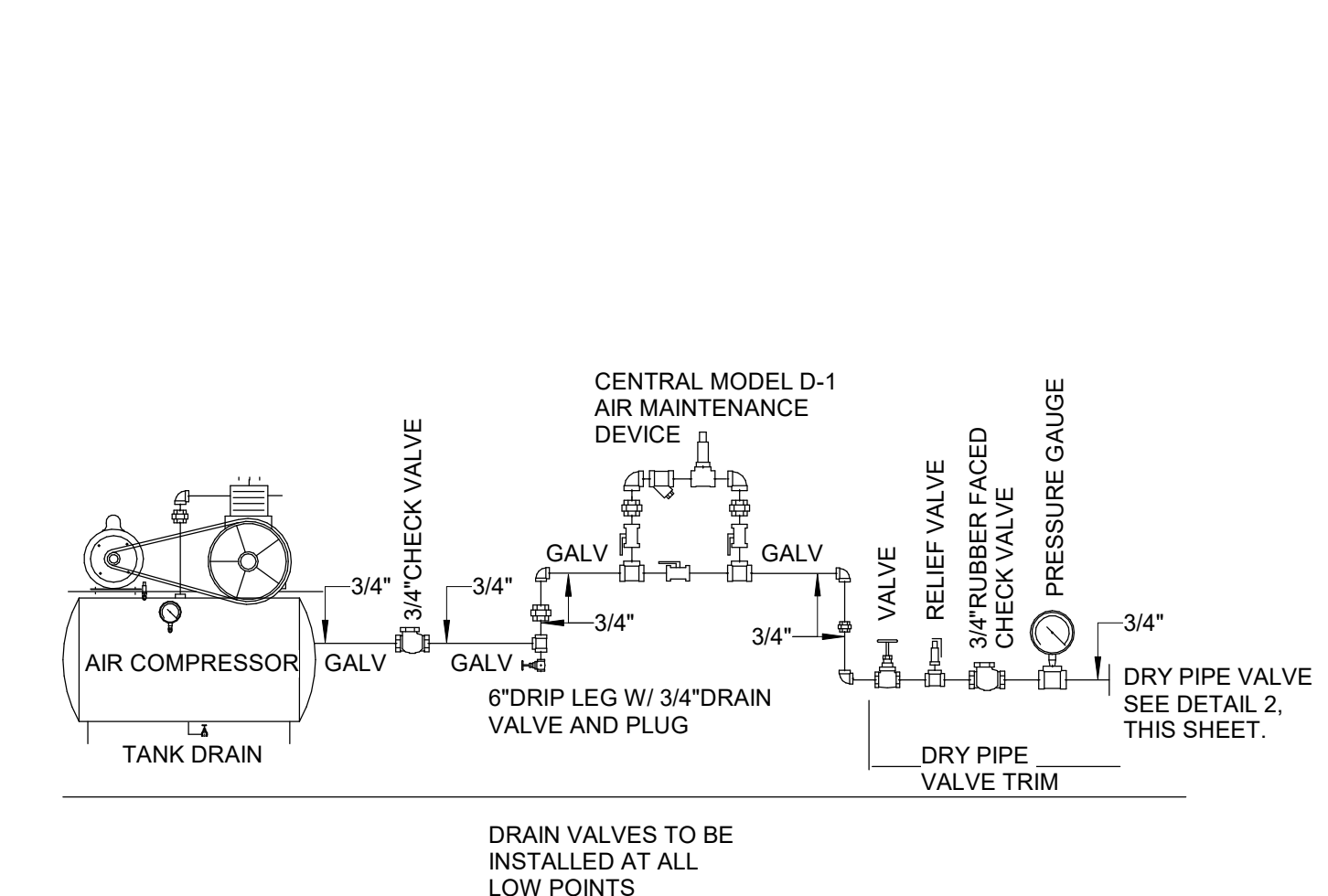
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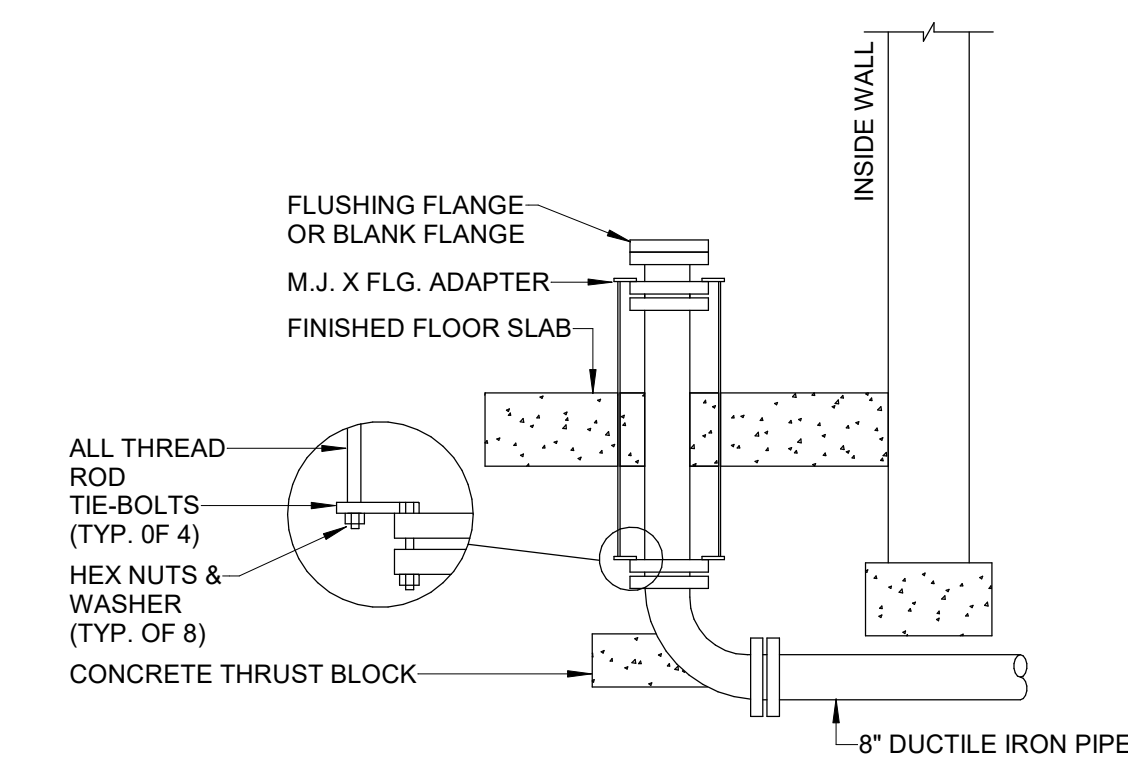
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date	August 5, 2023
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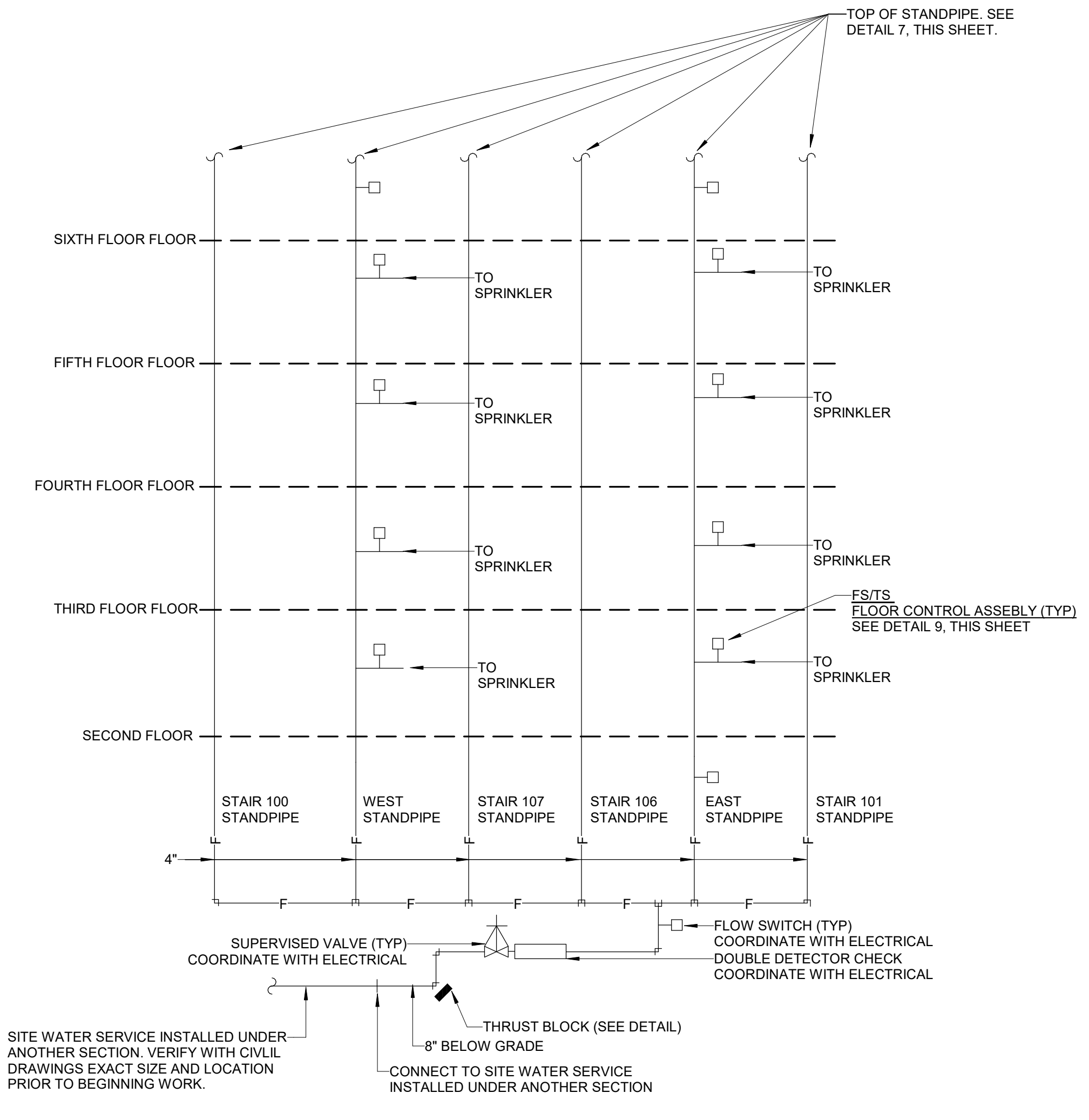
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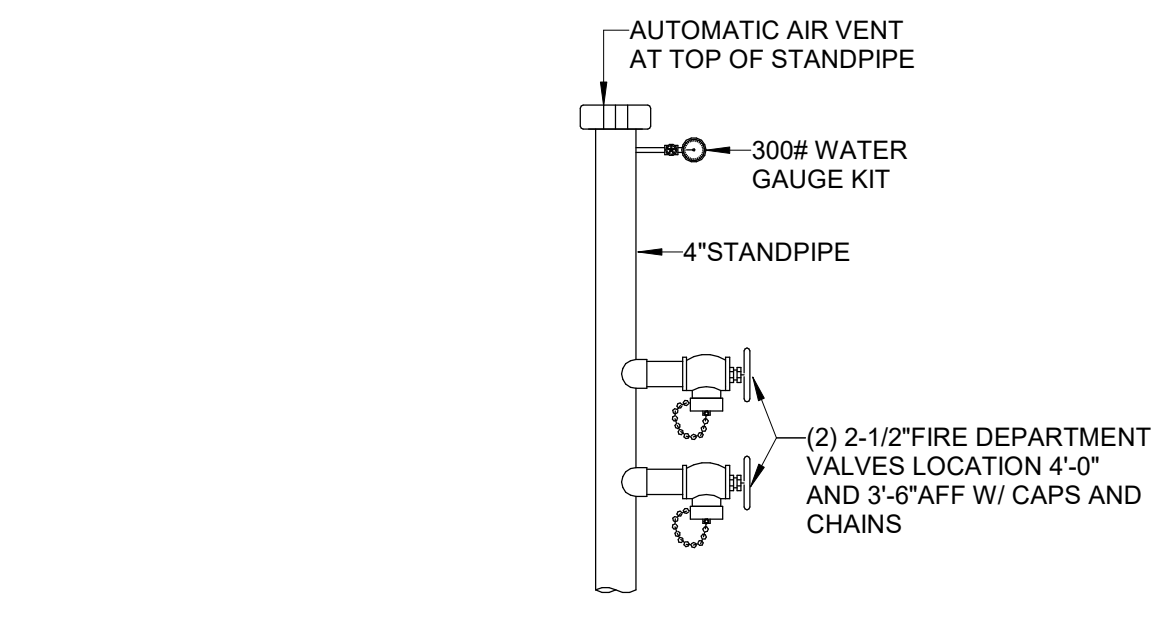
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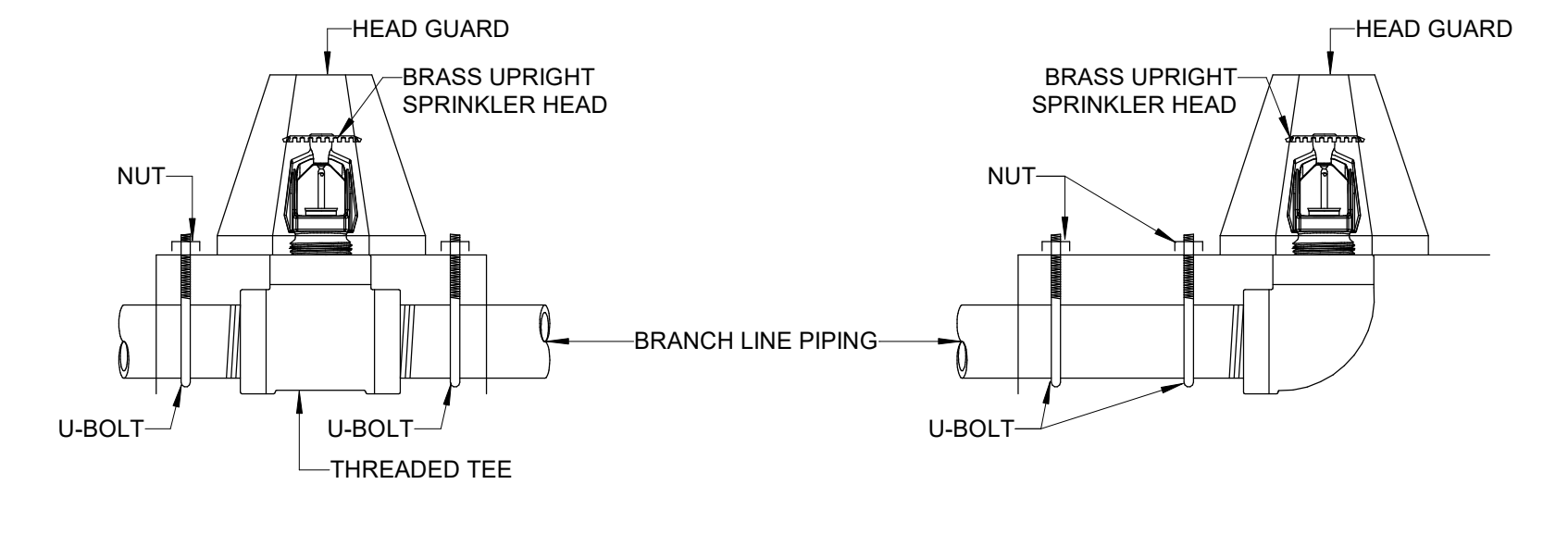
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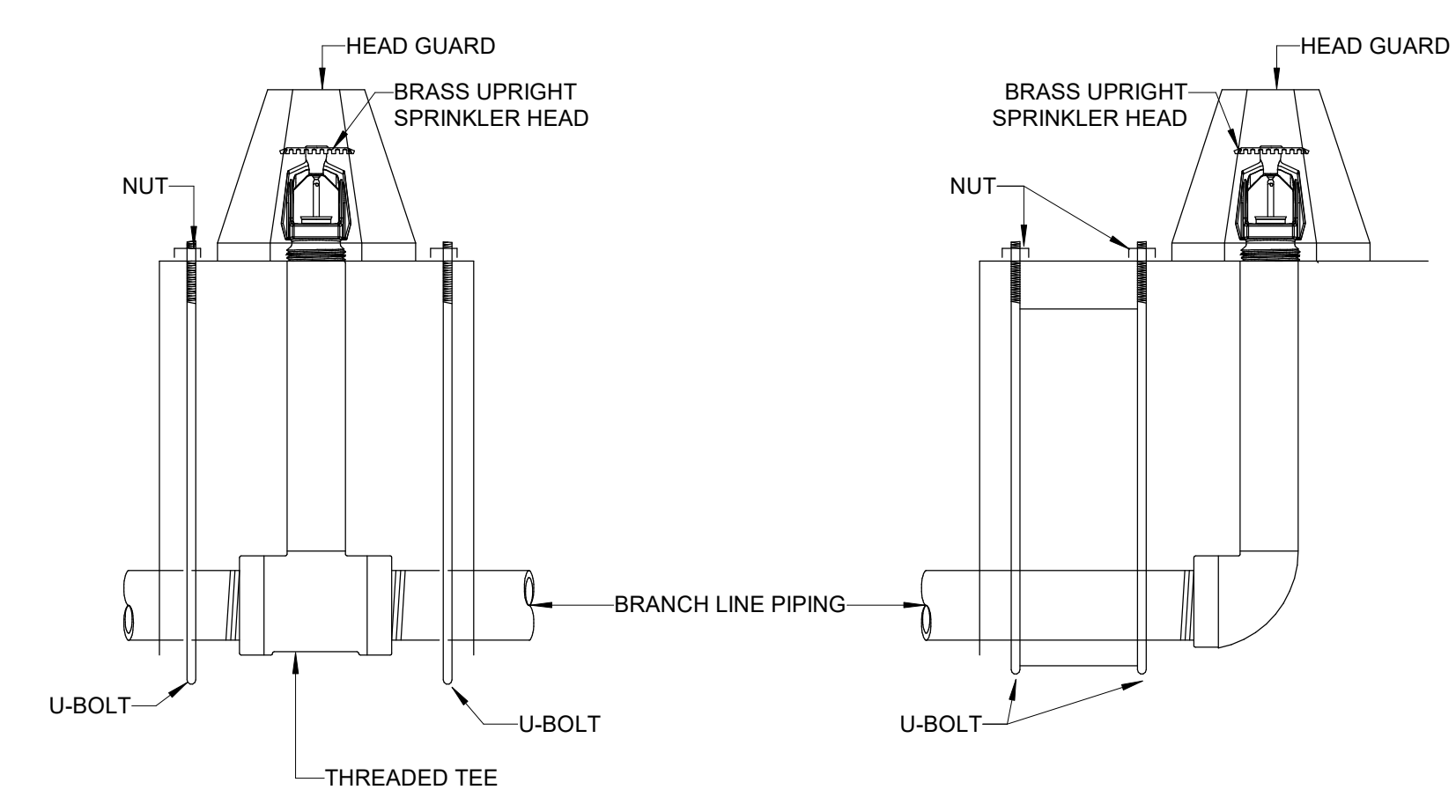
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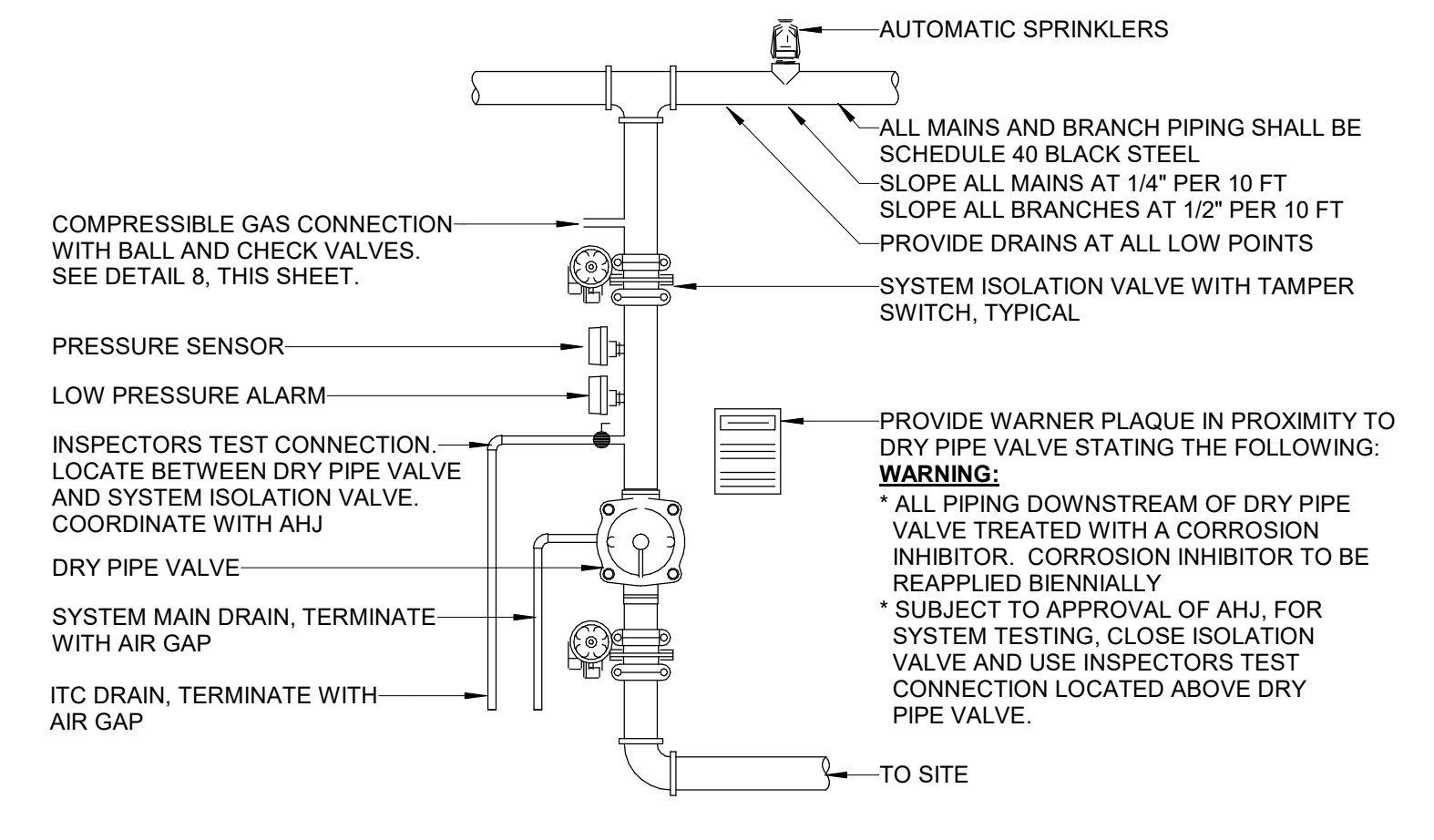
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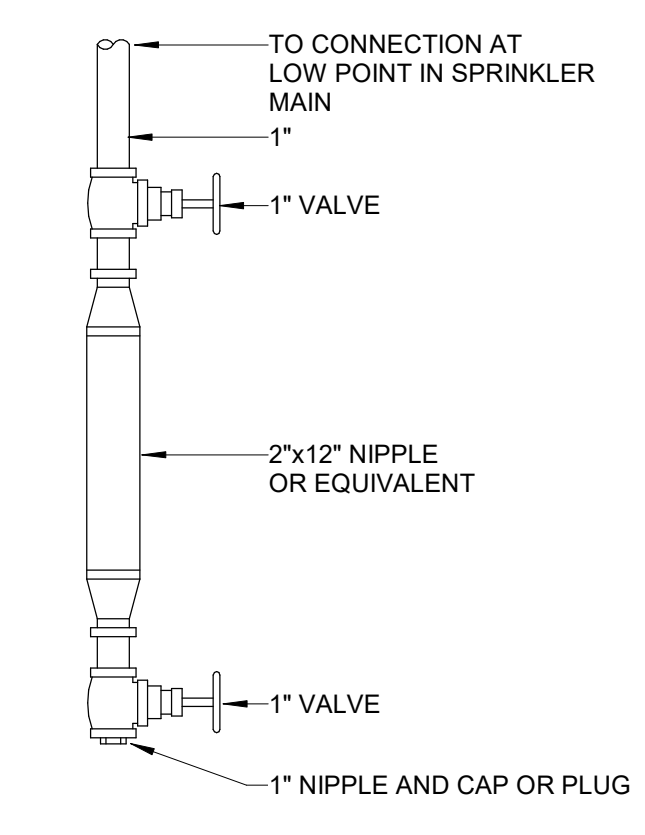
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3 UPRIGHT SPRINKLER HEAD ON 1" SPRIG DETAIL W/ GUARD DETAIL  
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2 DETAIL OF FIRE PROTECTION DRY PIPE SYSTEM  
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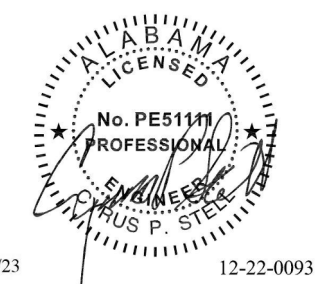
1 DETAIL OF DRY SYSTEM AUXILIARY DRAIN  
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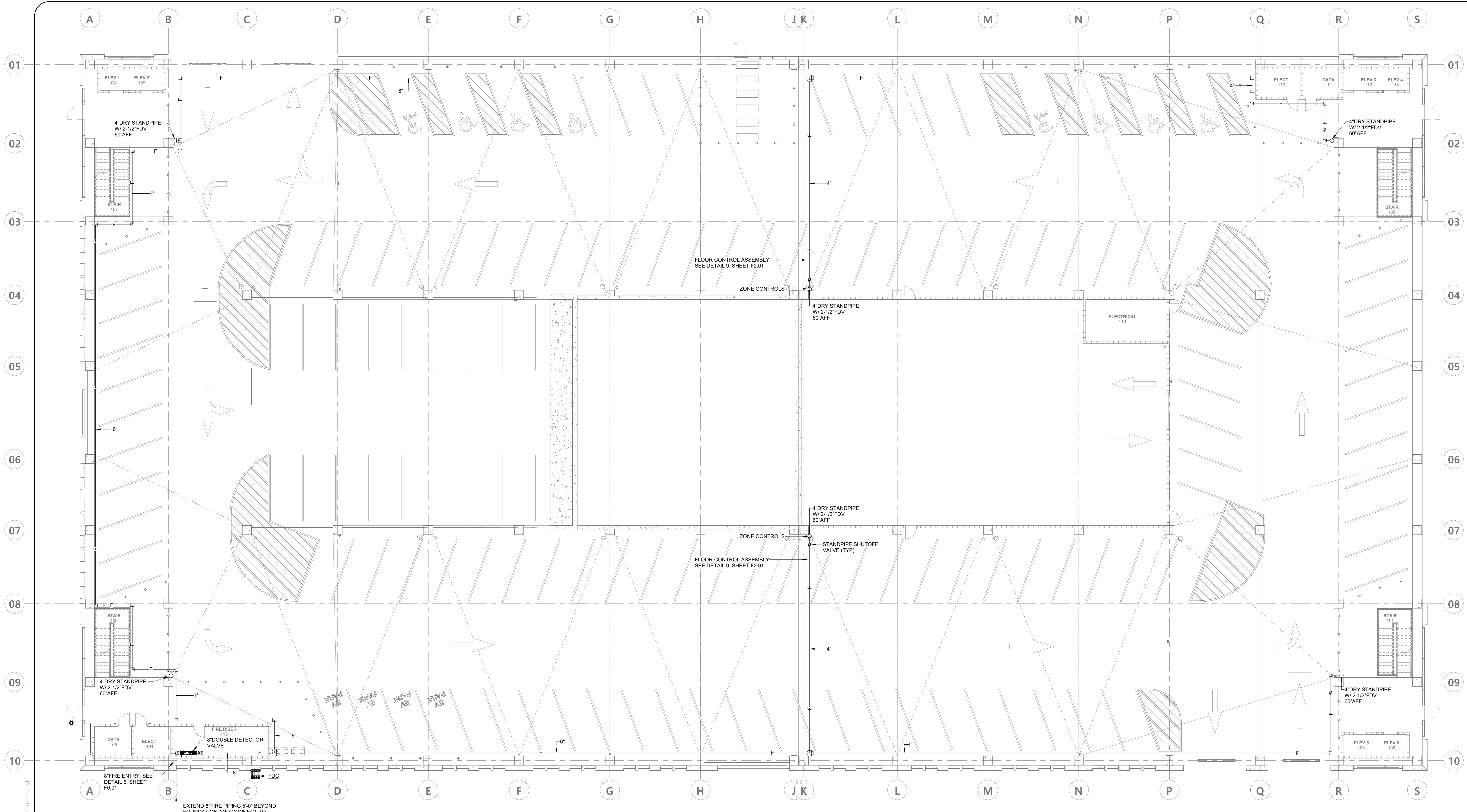
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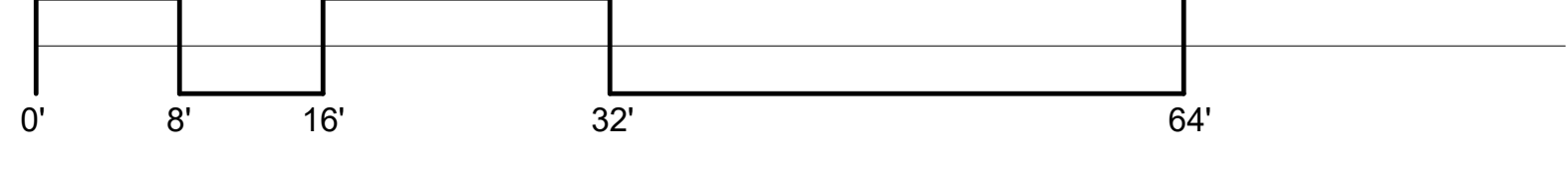
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designed by	NEL	108
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## LAYOUT PLAN - LEVEL 1 - FIRE PROTECTION

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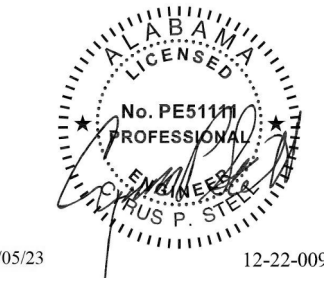
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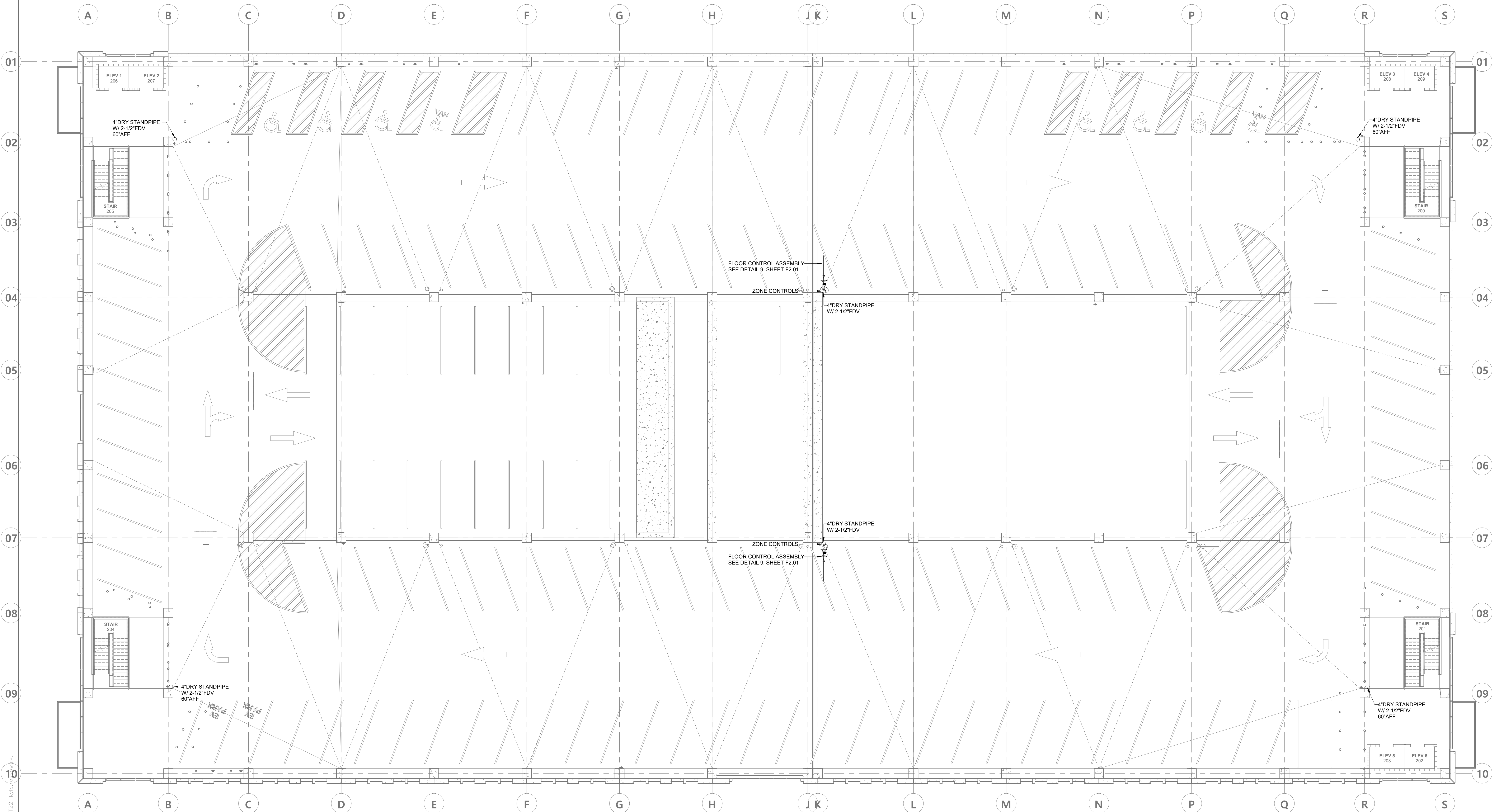
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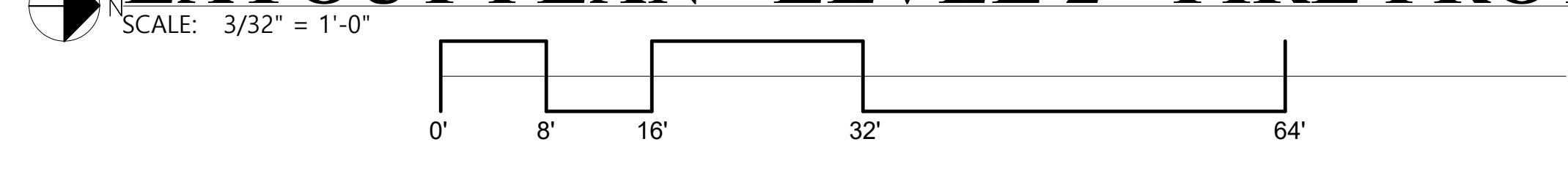


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## LAYOUT PLAN - LEVEL 2 - FIRE PROTECTION



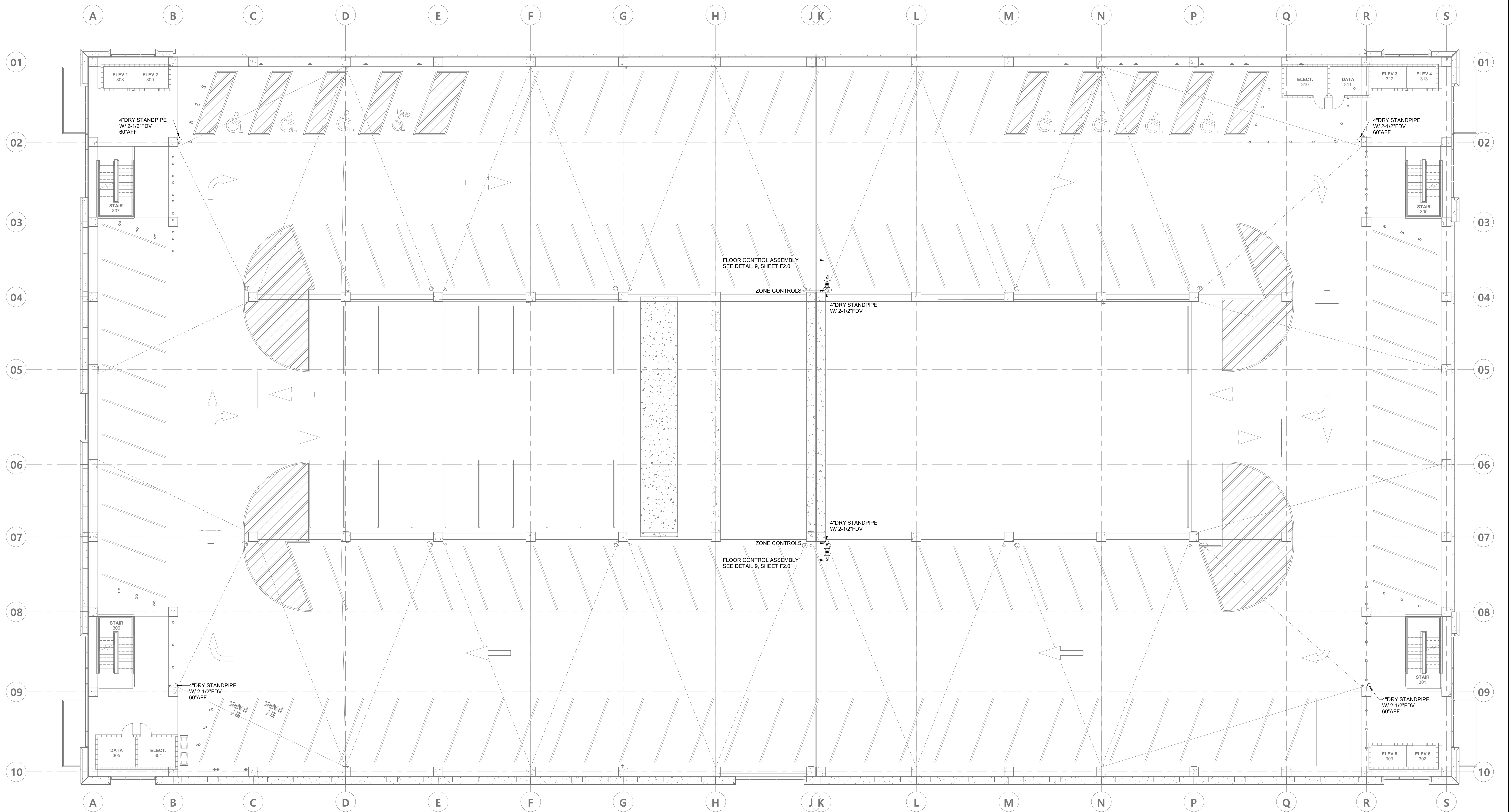
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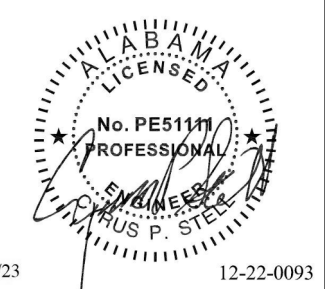
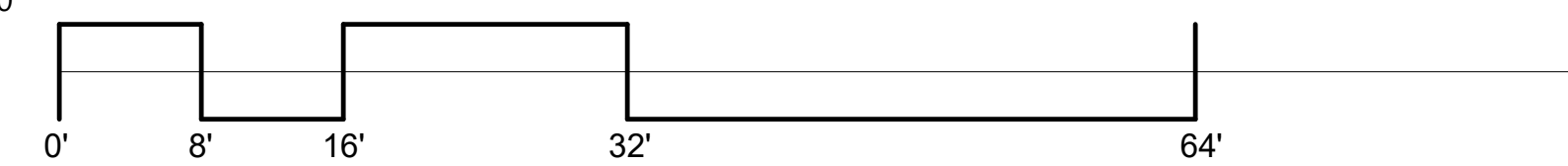
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## LAYOUT PLAN - LEVEL 3 - FIRE PROTECTION

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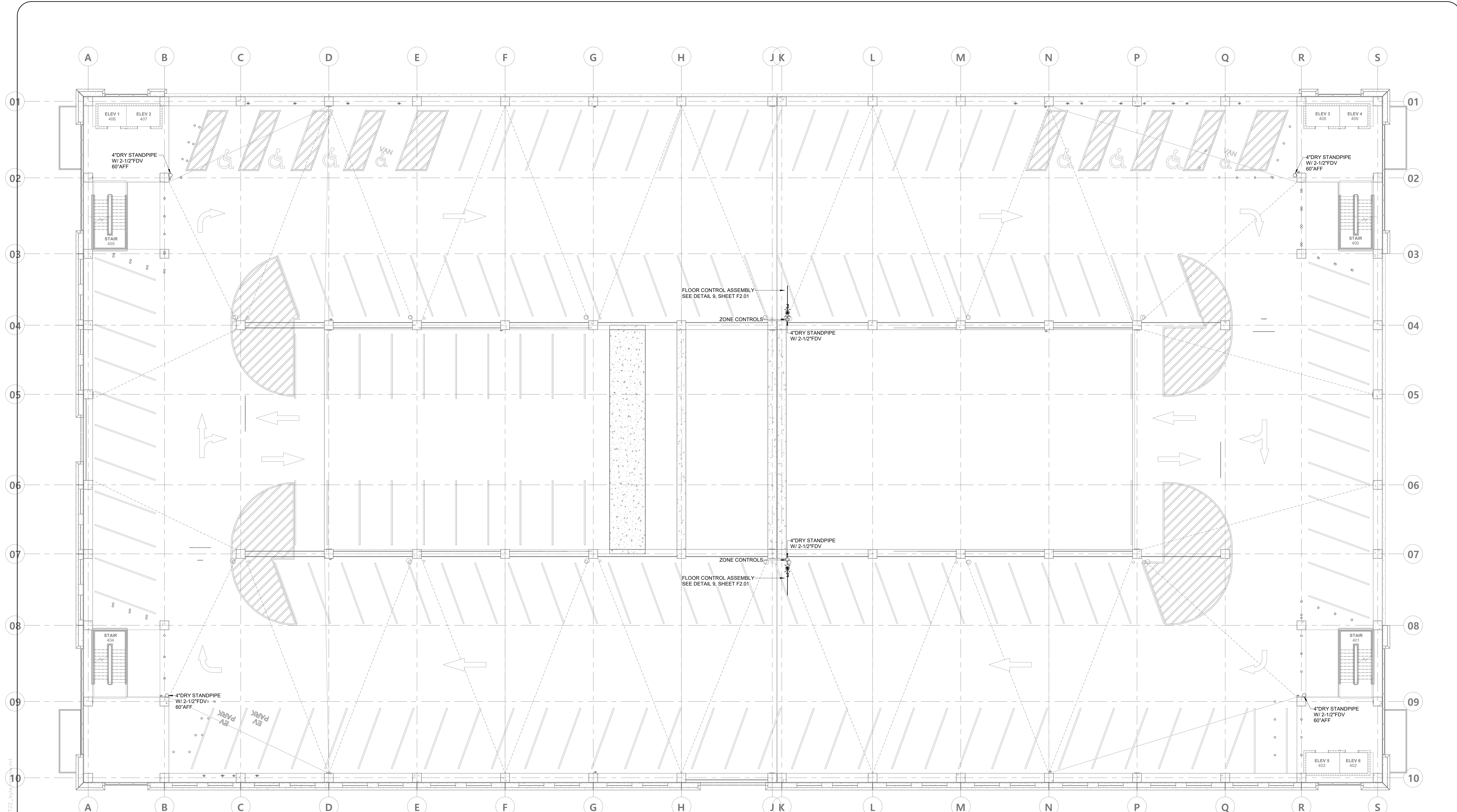
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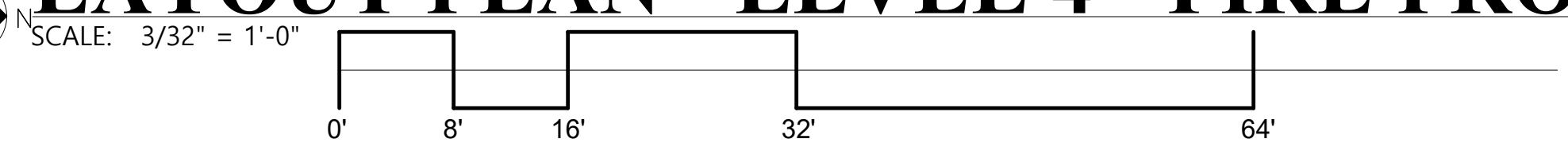
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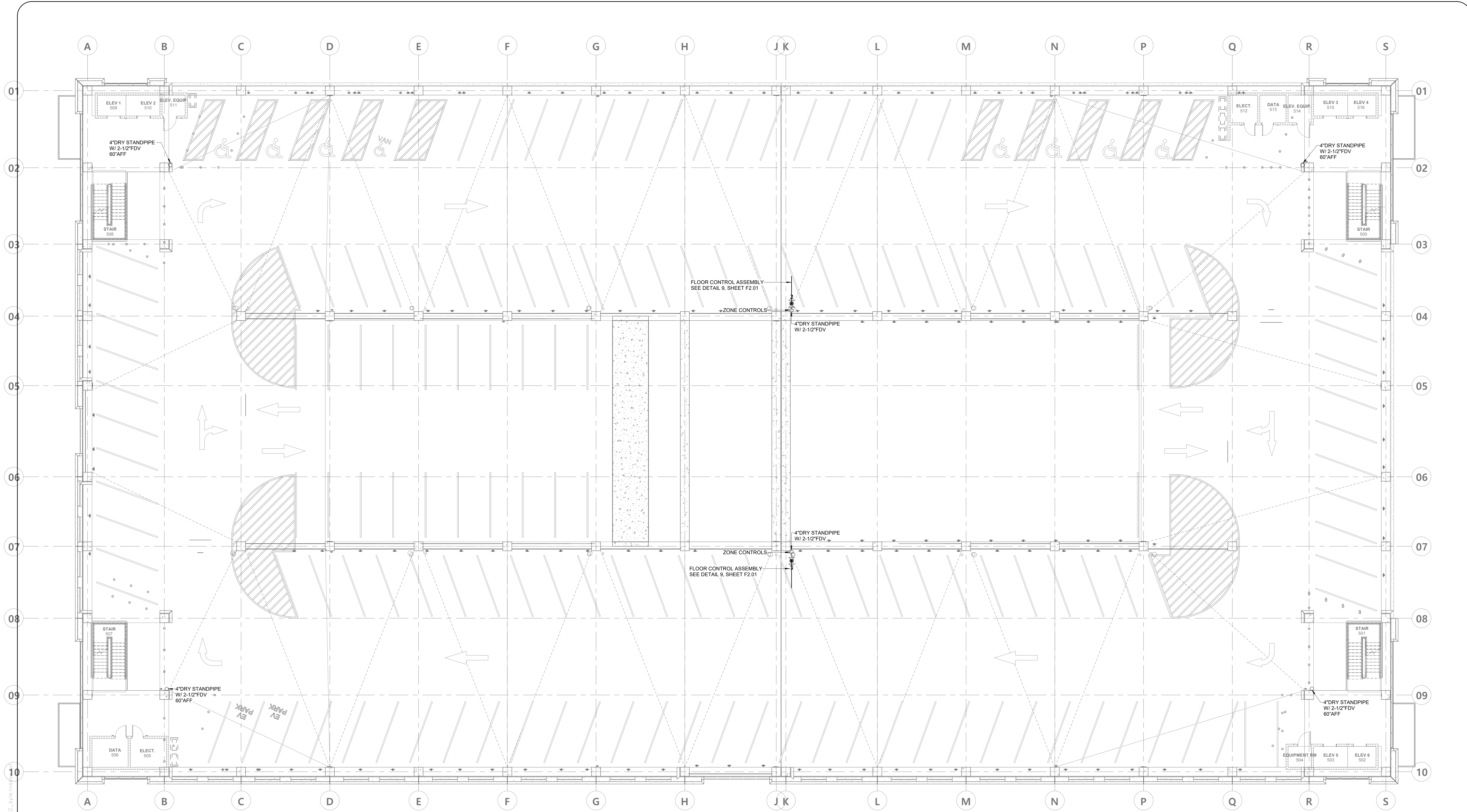
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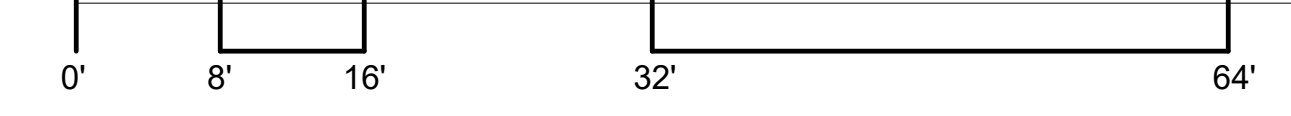
**Bernhard TME**  
Engineering

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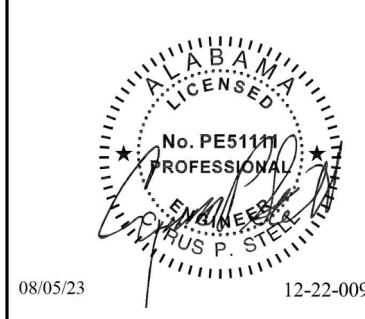
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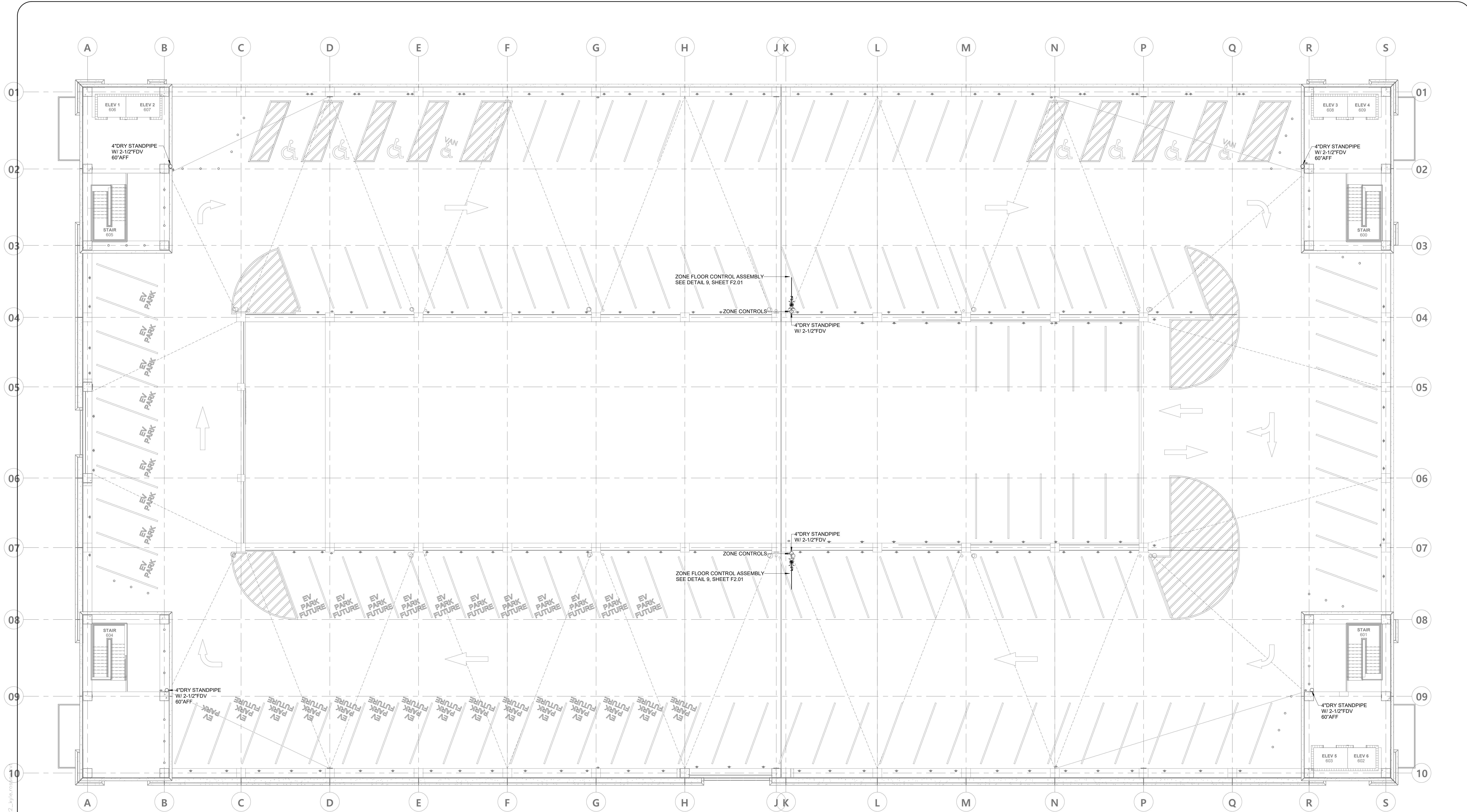
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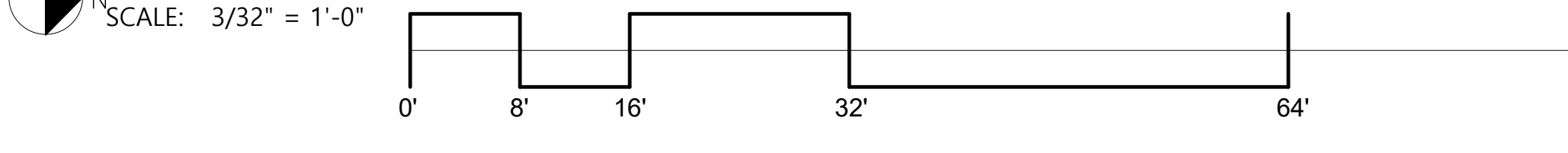


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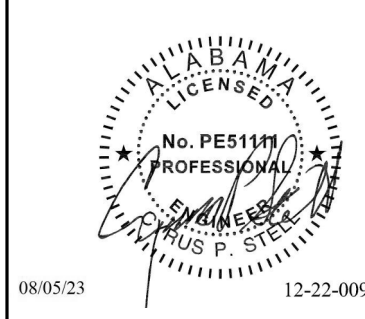
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drawn by	NEL
checked by	CPS
sheet no.	112 of 158
<b>F2.50</b>	
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**LAYOUT PLAN - LEVEL 6 - FIRE PROTECTION**



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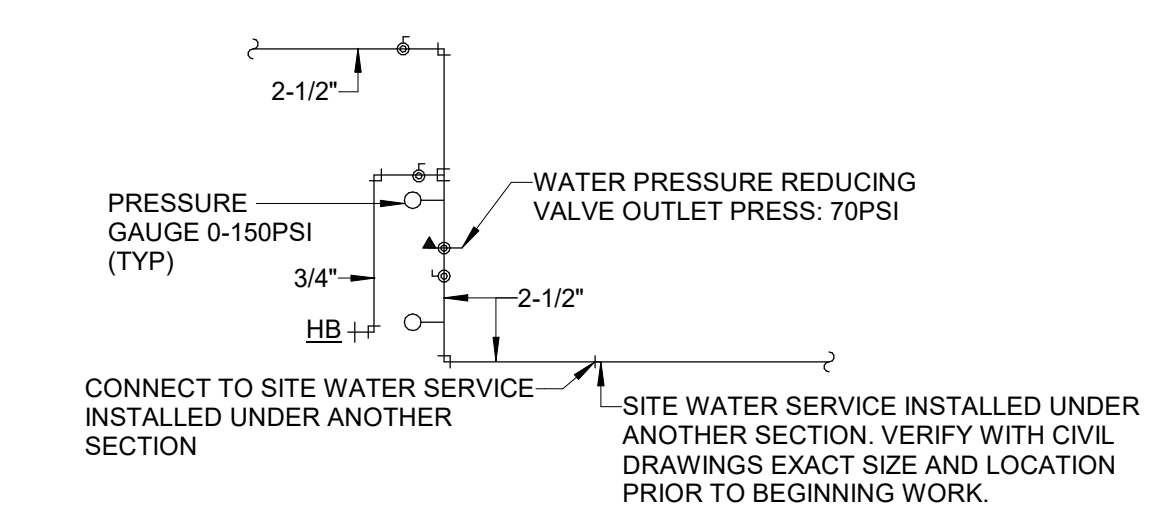
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						H.P.	VOLTS	PH		
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ESP-2	LIBERTY ELV280	ELEV 3 & 4 112/113	100	15	1/2	115	1		SUBMER.	-
ESP-3	LIBERTY ELV280	ELEV 5 & 6 103/102	100	15	1/2	115	1		SUBMER.	-

- GENERAL NOTES**
- ALL OUTSIDE CLEANOUTS SHALL BE BROUGHT TO GRADE AND EMBEDDED IN 18"x18"x6" THICK CONCRETE PAD. (J.R. SMITH 4258 OR EQUAL.)
  - WHEREVER DISSIMILAR METALS ARE CONNECTED ON WATER LINES, A DIELECTRIC NIPPLE SHALL BE USED.
  - ALL HORIZONTAL WATER PIPING IS RUN ABOVE CEILING ON PLAN UNLESS OTHERWISE NOTED.
  - ALL HORIZONTAL WATER PIPING IS RUN ABOVE CEILING ON PLAN UNLESS OTHERWISE NOTED.
  - COORDINATE ALL PIPE ROUTING TO AVOID CONFLICTS WITH STRUCTURAL, MECHANICAL, AND ELECTRICAL FEATURES OF BUILDING.
  - PLUMBING DRAWINGS ARE DIAGRAMMATIC AND DO NOT SHOW ALL DETAILS OF THE WORK. OBTAIN DIMENSIONS AND PERTINENT INFORMATION FROM ARCHITECTURAL DRAWINGS.
  - ALL HYDRANTS SHALL BE MOUNTED 24" ABOVE FINISH GRADE OR FINISH FLOOR UNLESS OTHERWISE NOTED.
  - INSTALL ALL OUTSIDE VALVES IN CONCRETE OR CAST IRON VALVE BOXES.
  - ALL HORIZONTAL STORM PIPING IS RUN BELOW FLOOR ON PLAN UNLESS OTHERWISE NOTED.
  - PAVEMENT CUTS, BACKFILLING, AND PATCHING SHALL MEET ALL LOCAL REQUIREMENTS.
  - CONTRACTOR TO VERIFY EXACT LOCATION OF ALL MECHANICAL EQUIPMENT PRIOR TO ROUGHING MECHANICAL ROOM FLOOR DRAINS, HOSE BIBBS, ETC.

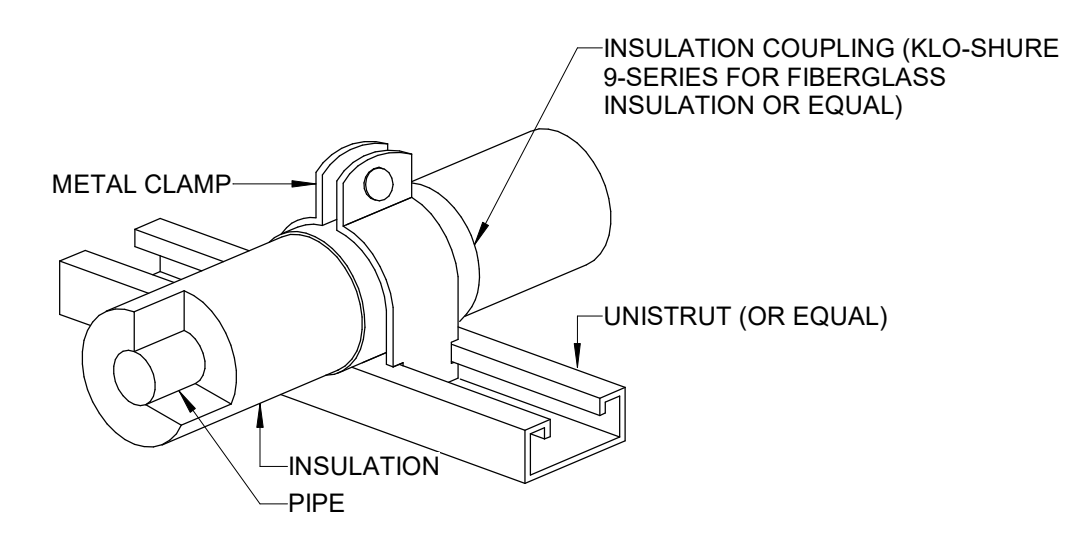
PLUMBING LEGEND			
---	COLD WATER LINE	⊙ RD	ROOF DRAIN
PD	PUMP DISCHARGE	⊙ TD	TRENCH DRAIN
S	STORM LINE	⊙ DD	DECK DRAIN
⊙	BALL VALVE	⊙ YCO	YARD CLEANOUT
⊙	WATER PRESSURE REGULATOR	A.F.F.	ABOVE FINISH FLOOR
⊙	CHECK VALVE	CO	CLEAN OUT
⊙	UNION	CW	COLD WATER
⊙	PIPE TURNING UP	FFE	FINISH FLOOR ELEVATION
⊙	PIPE TURNING DOWN	GPM	GALLONS PER MINUTE
⊙	P-TRAP	HP	HORSE POWER
HB	HOSE BIBB	INV	INVERT
WCO	WALL CLEANOUT	PD	PUMP DISCHARGE
FCO	FLOOR CLEANOUT	PSI	POUNDS PER SQUARE INCH
#	REVISION NUMBER	PRV	PRESSURE REDUCING VALVE
#	RISER DIAGRAM NUMBER	RL	RAIN LEADER
#	KEYNOTE NUMBER	RPZBF	REDUCED PRESSURE ZONE B.F. PREVENTER
HD	HUB DRAIN		



**7** DETAIL OF ELEVATOR SUMP PUMP  
NOT TO SCALE

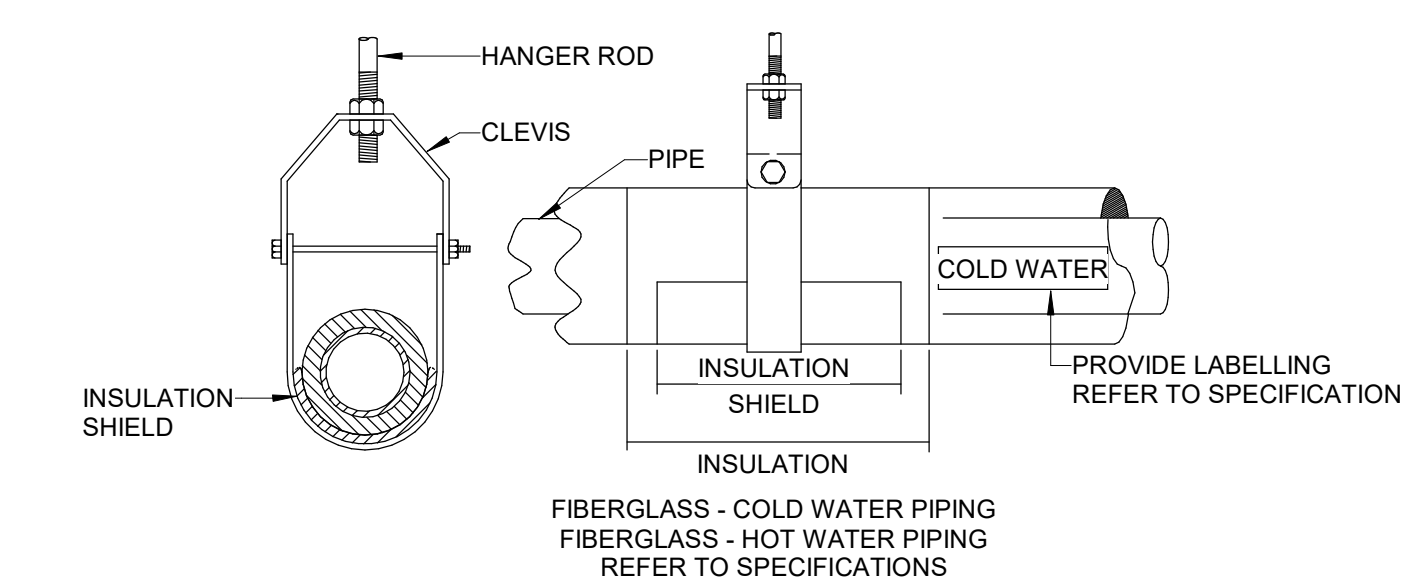


**6** DETAIL OF WATER SERVICE ENTRY W/ HB & WH  
NOT TO SCALE

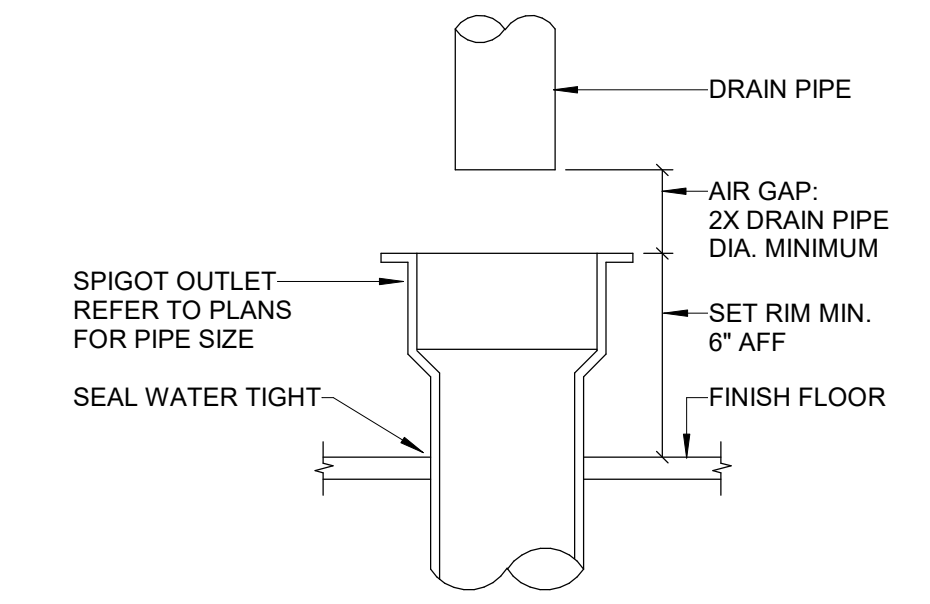


**NOTES:**  
1. APPLICATION: FOR STRUT-MOUNTED, 4" AND SMALLER, COPPER PIPE WITH FIBERGLASS INSULATION.  
2. ALLOWED FOR HORIZONTAL OR VERTICAL INSTALLATION.

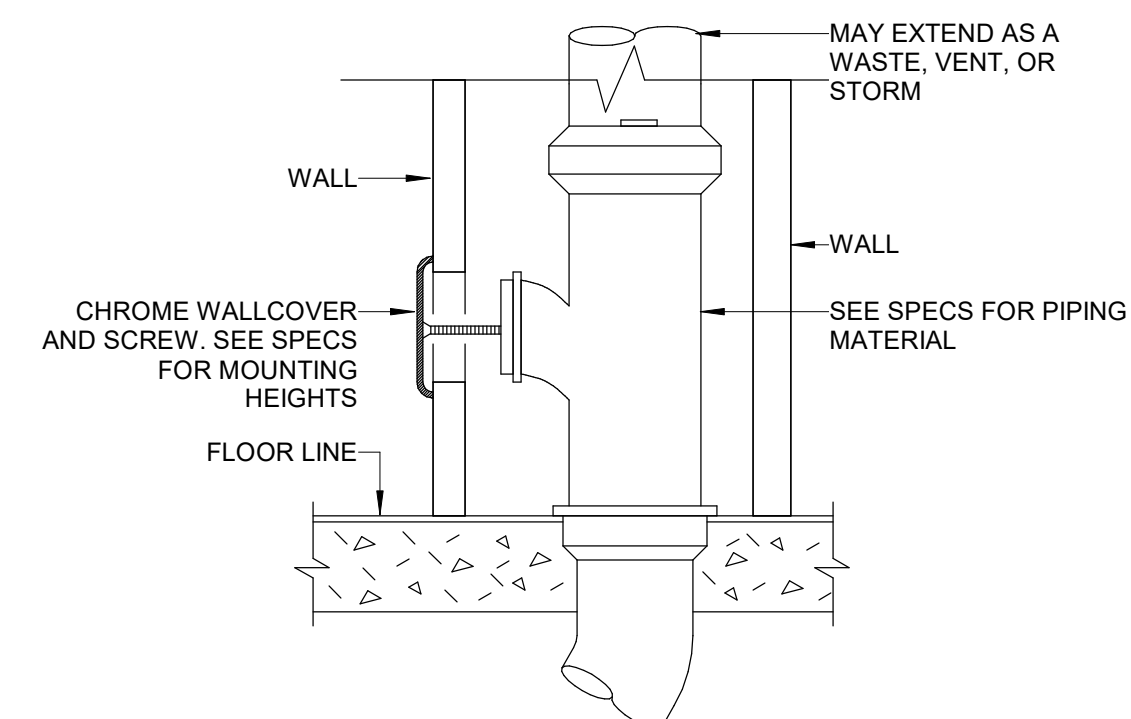
**5** STRUT-MOUNTED PIPING SUPPORT INSULATION COUPLING DETAIL  
NOT TO SCALE



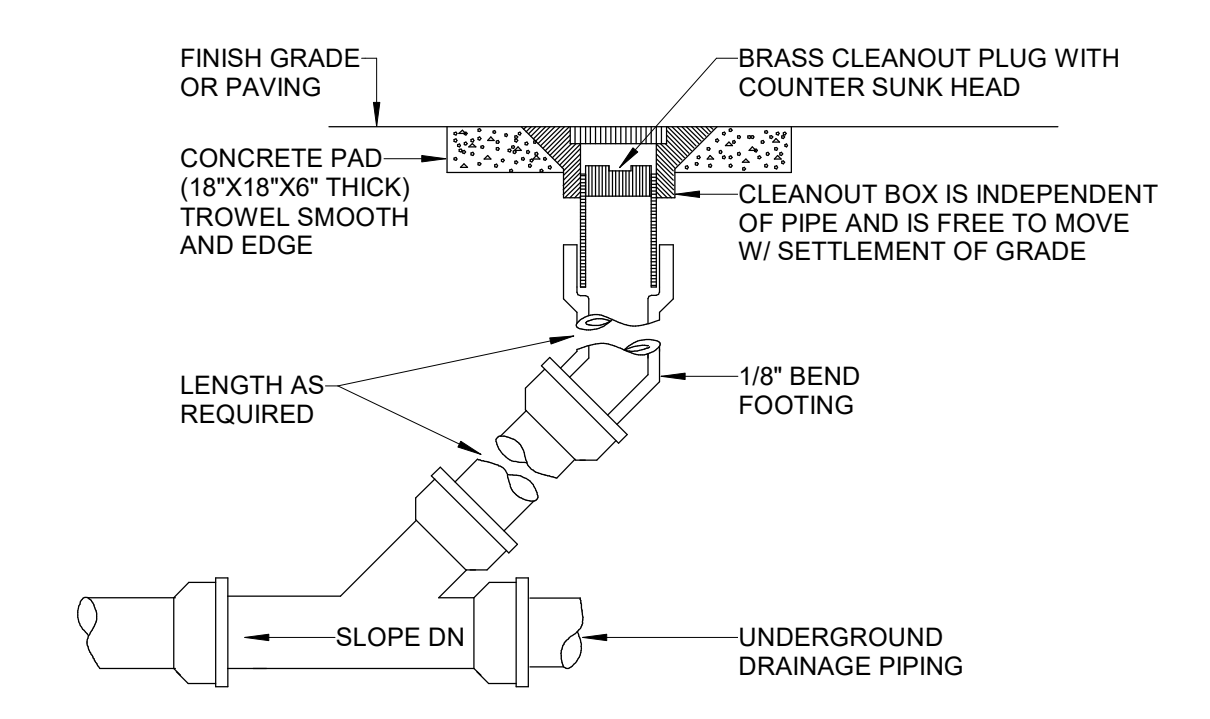
**4** DETAIL OF ADJUSTABLE CLEVIS HANGER  
NOT TO SCALE



**3** DETAIL OF HUB DRAIN CONNECTION  
NOT TO SCALE



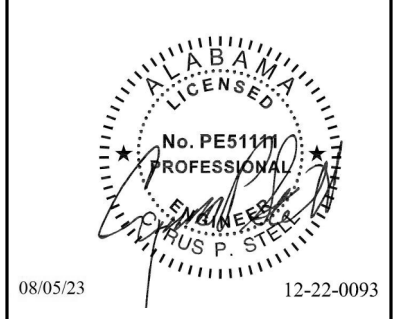
**2** DETAIL OF WALL CLEANOUT  
NOT TO SCALE



**1** DETAIL OF CLEANOUT TO GRADE  
NOT TO SCALE



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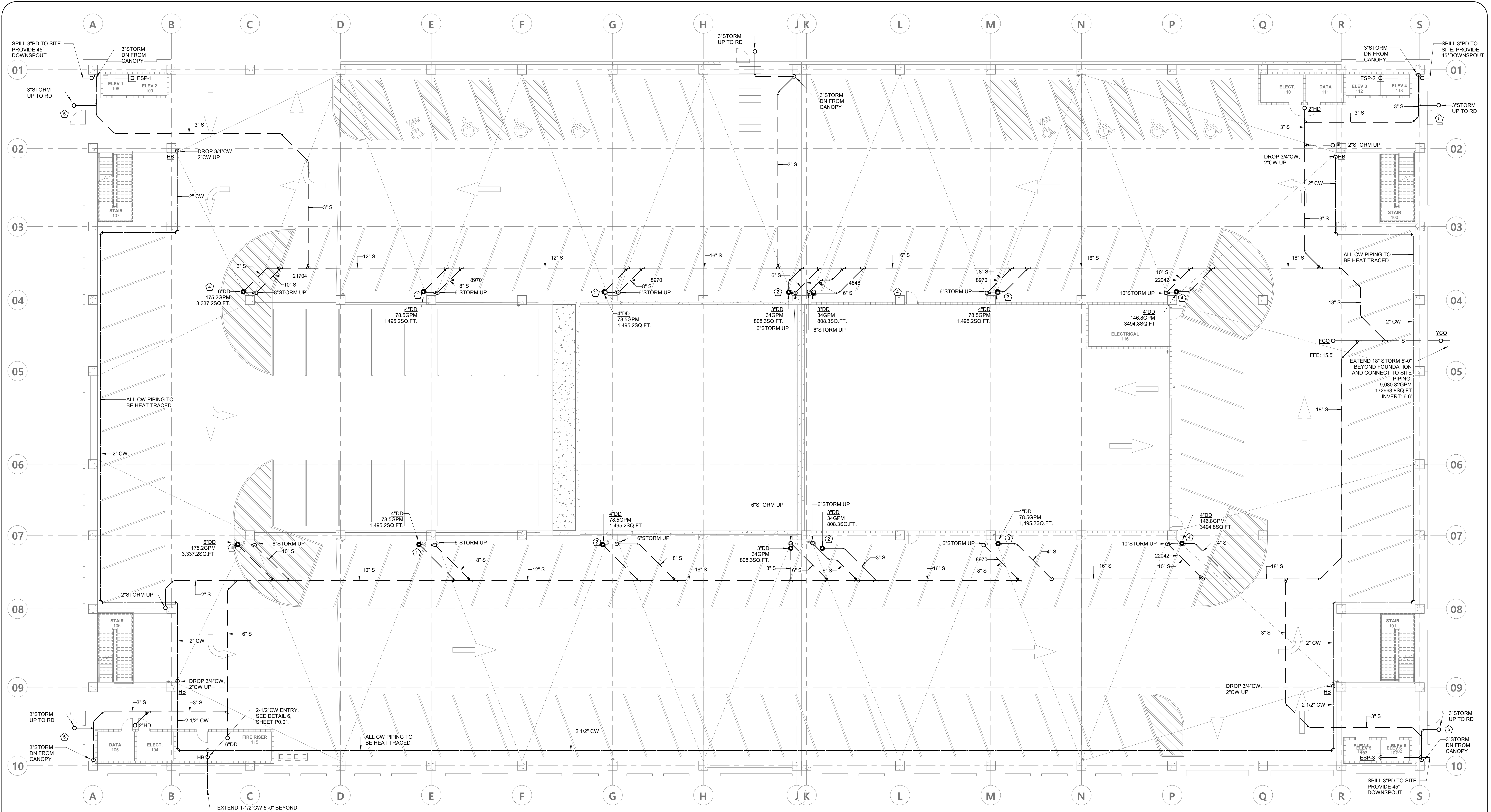


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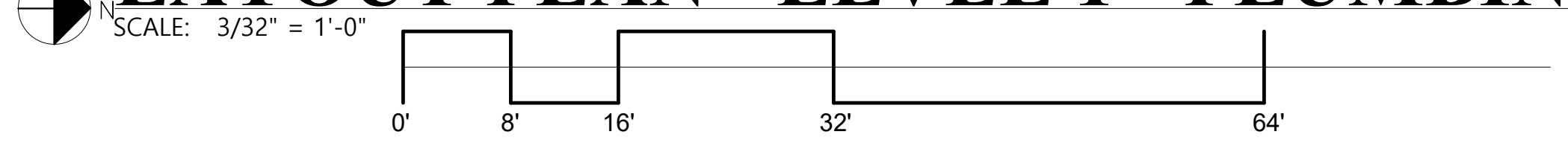
Revisions	sheet title
	LEGENDS, NOTES, AND SCHEDULES - PLUMBING
job no.	<b>4308</b>
drawn by	NEL
checked by	CPS
date	August 5, 2023
scale	1 of 8
revision no.	<b>P.01</b>
date	August 5, 2023
drawn by	NEL
checked by	CPS
date	August 5, 2023

# Mobile Civic Center Parking Facility

Mobile, Alabama



## LAYOUT PLAN - LEVEL 1 - PLUMBING

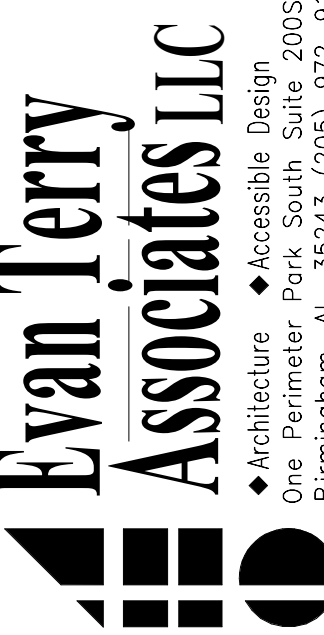
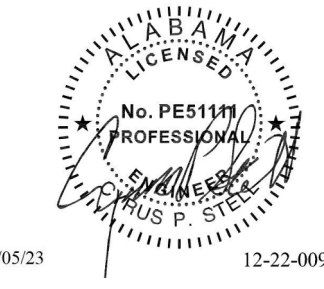


### GENERAL NOTES:

- HEAT TRACE ALL DOMESTIC WATER PIPING EXPOSED IN THE PARKING DECK.
- ALL P-TRAPS IN THE STORM SYSTEM REQUIRES A CLEANOUT ON THE SIDE.



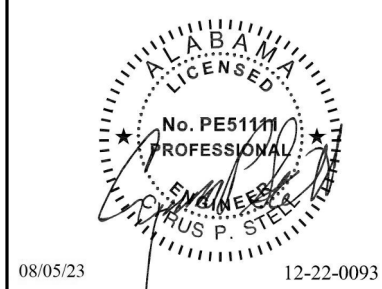
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Revisions	sheet title
	LAYOUT PLAN - LEVEL 1 - OVERALL PLUMBING
job no.	4308
drawn by	NEL
checked by	CPS
sheet no.	115 of 158
sheet title	<b>P2.10</b>
date	August 5, 2023
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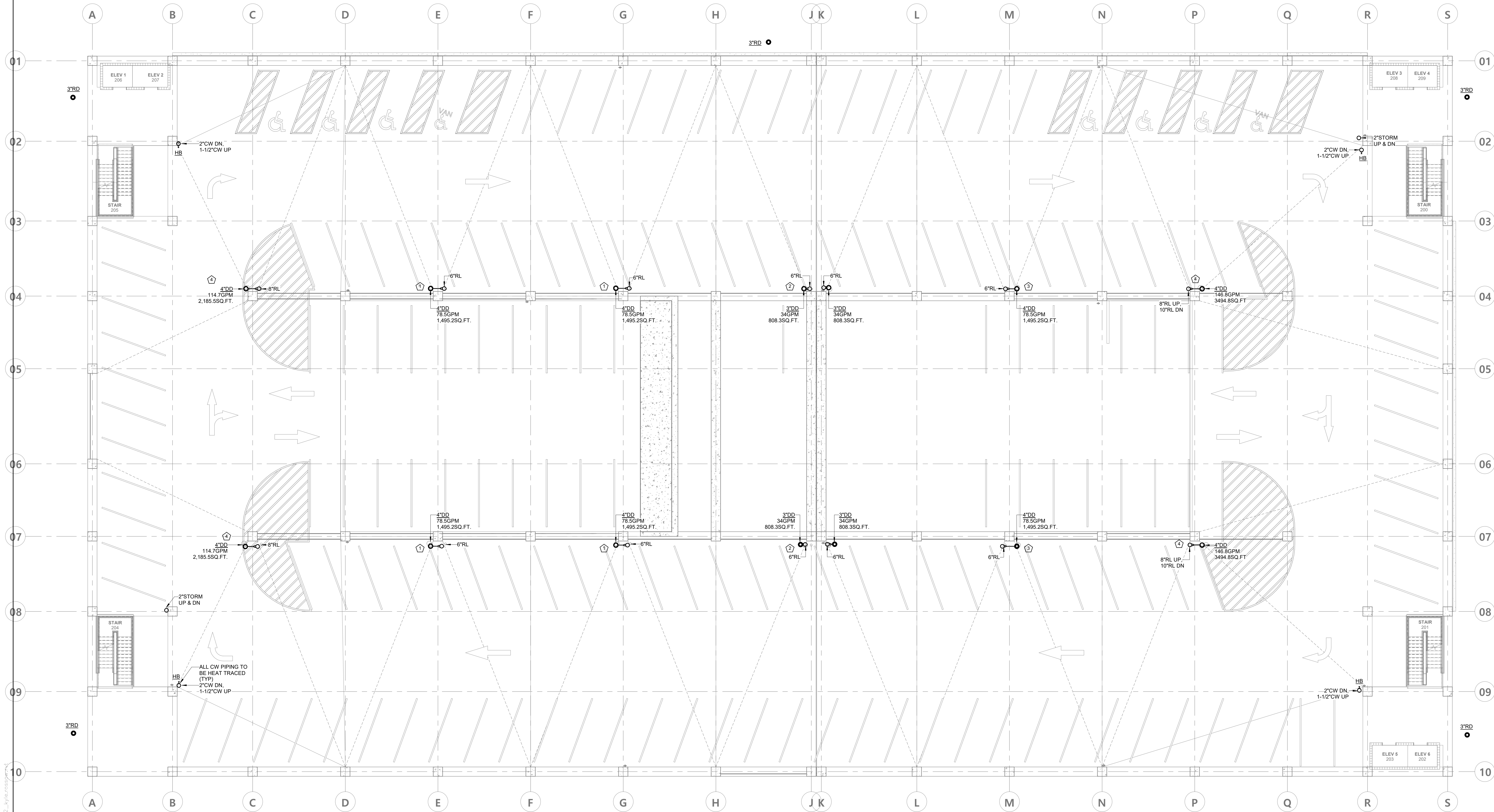
# Mobile Civic Center Parking Facility

Mobile, Alabama

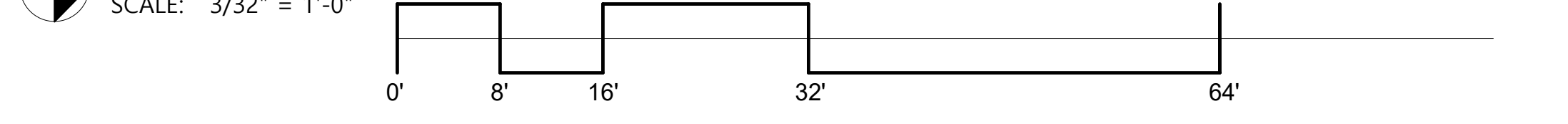


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Revisions	
sheet title	LAYOUT PLAN - LEVEL 2 - OVERALL PLUMBING
job no.	4308
designed by	NEL
checked by	CPS
scale	116
date	August 5, 2023
sheet no.	P2.20
of sheets	of 158
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## LAYOUT PLAN - LEVEL 2 - PLUMBING



### GENERAL NOTES:

- HEAT TRACE ALL DOMESTIC WATER PIPING EXPOSED IN THE PARKING DECK.
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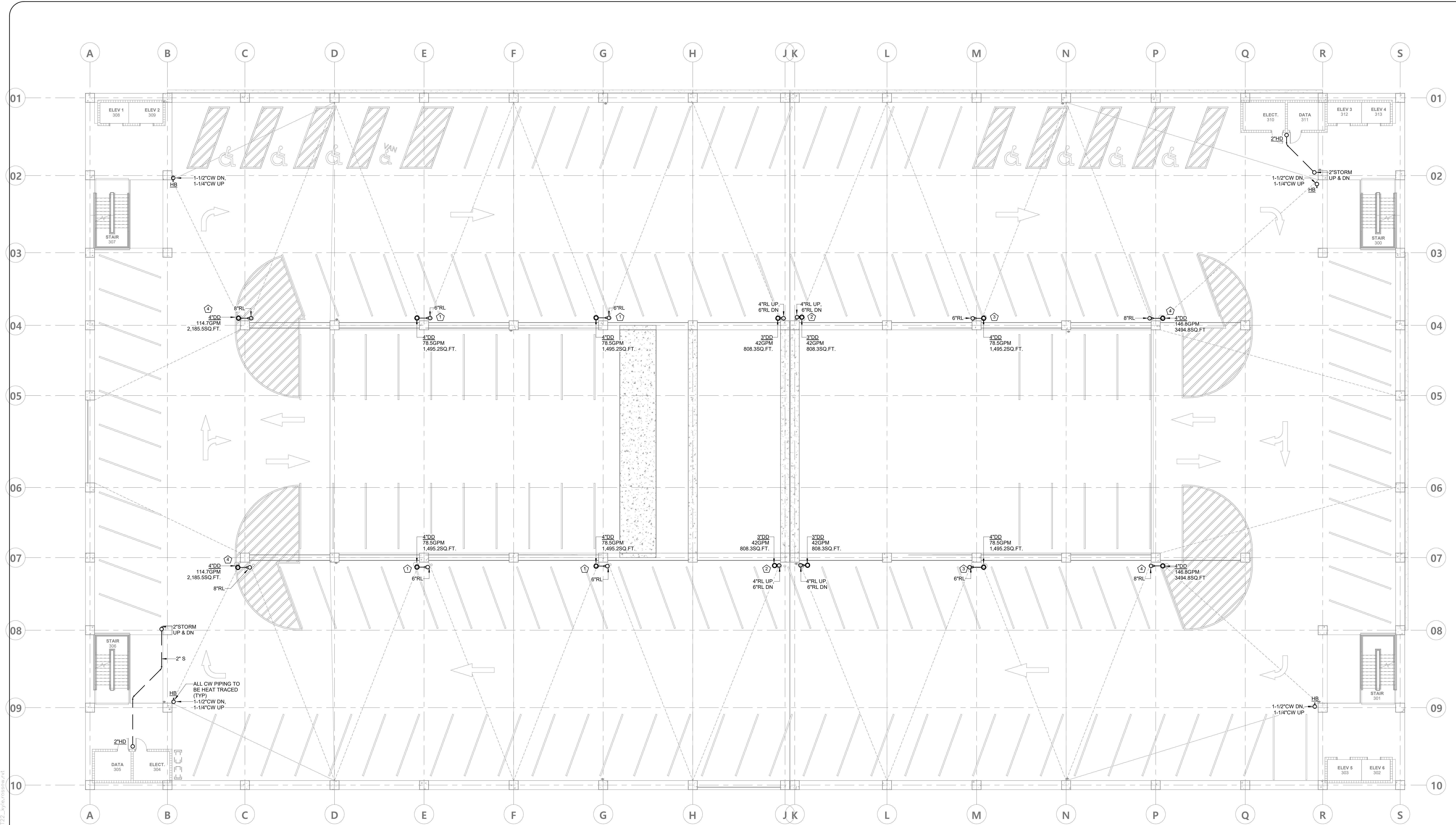
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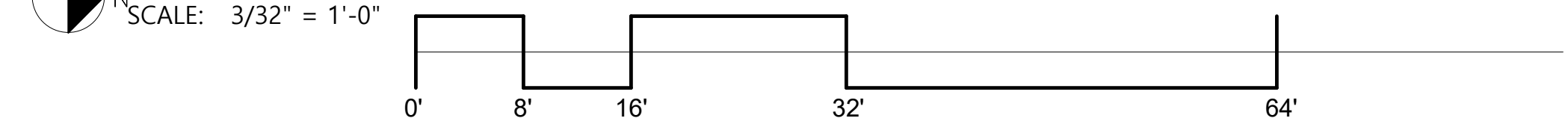


# Mobile Civic Center Parking Facility

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## LAYOUT PLAN - LEVEL 3 - PLUMBING

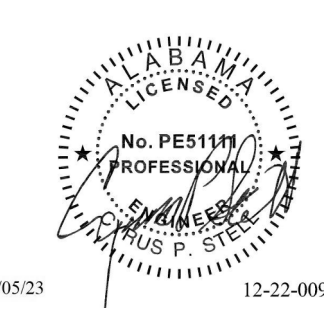


### GENERAL NOTES:

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- ALL P-TRAPS IN THE STORM SYSTEM REQUIRES A CLEANOUT ON THE SIDE.



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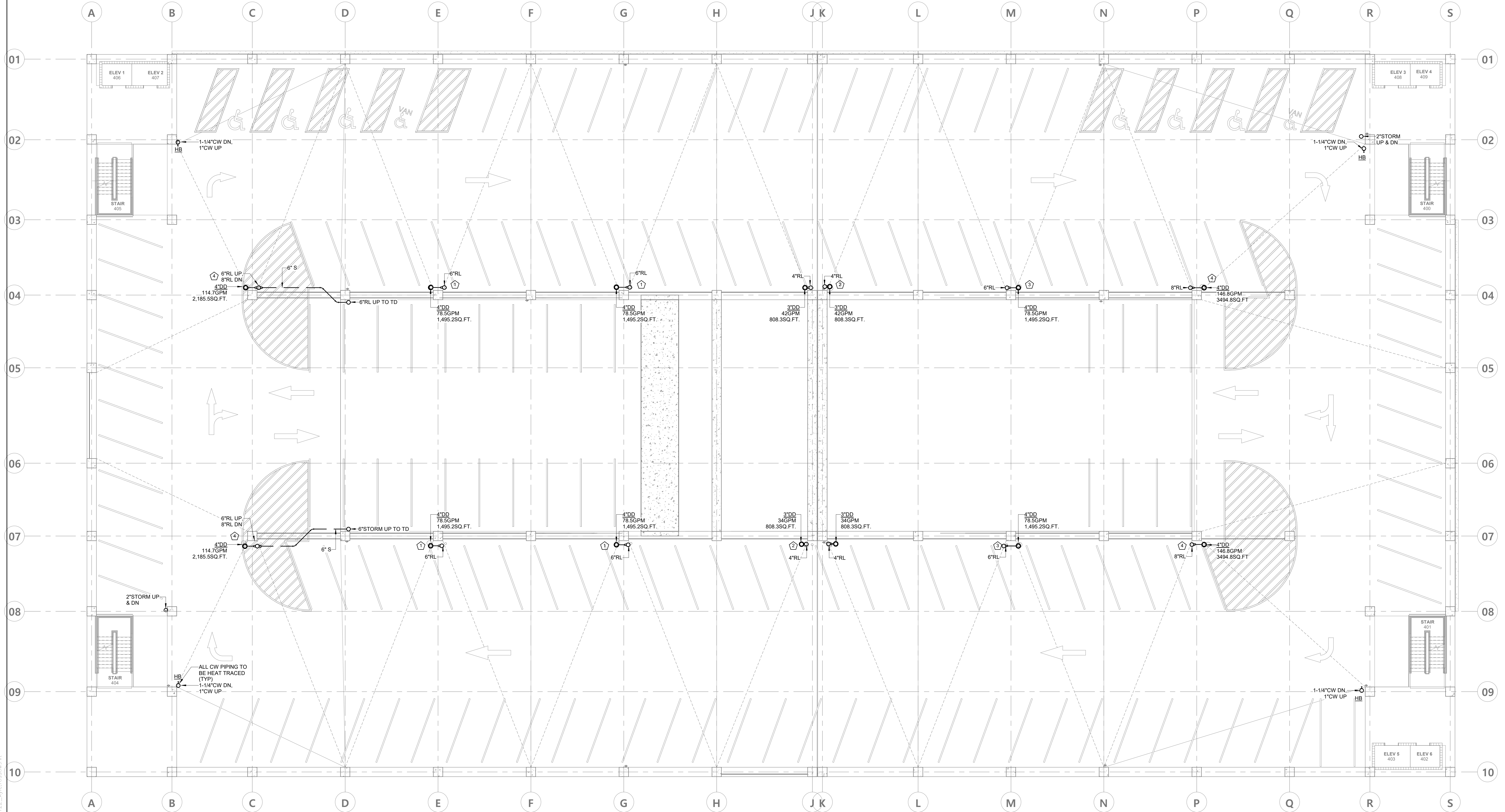
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Revisions	
sheet title	LAYOUT PLAN - LEVEL 3 - OVERALL PLUMBING
job no.	4308
drawn by	NEL
checked by	CPS
sheet no.	117 of 158
date	August 5, 2023
title	<b>P2.30</b>
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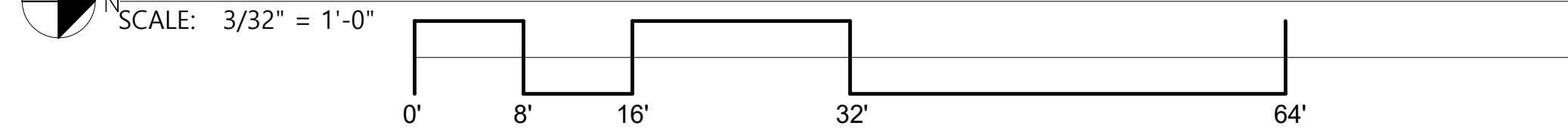
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# Mobile Civic Center Parking Facility

Mobile, Alabama



## LAYOUT PLAN - LEVEL 4 - PLUMBING

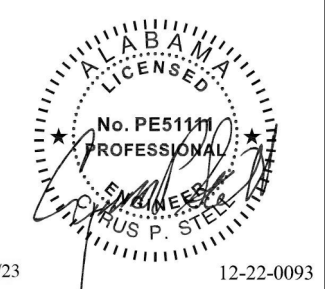


### GENERAL NOTES:

- HEAT TRACE ALL DOMESTIC WATER PIPING EXPOSED IN THE PARKING DECK.
- ALL P-TRAPS IN THE STORM SYSTEM REQUIRES A CLEANOUT ON THE SIDE.



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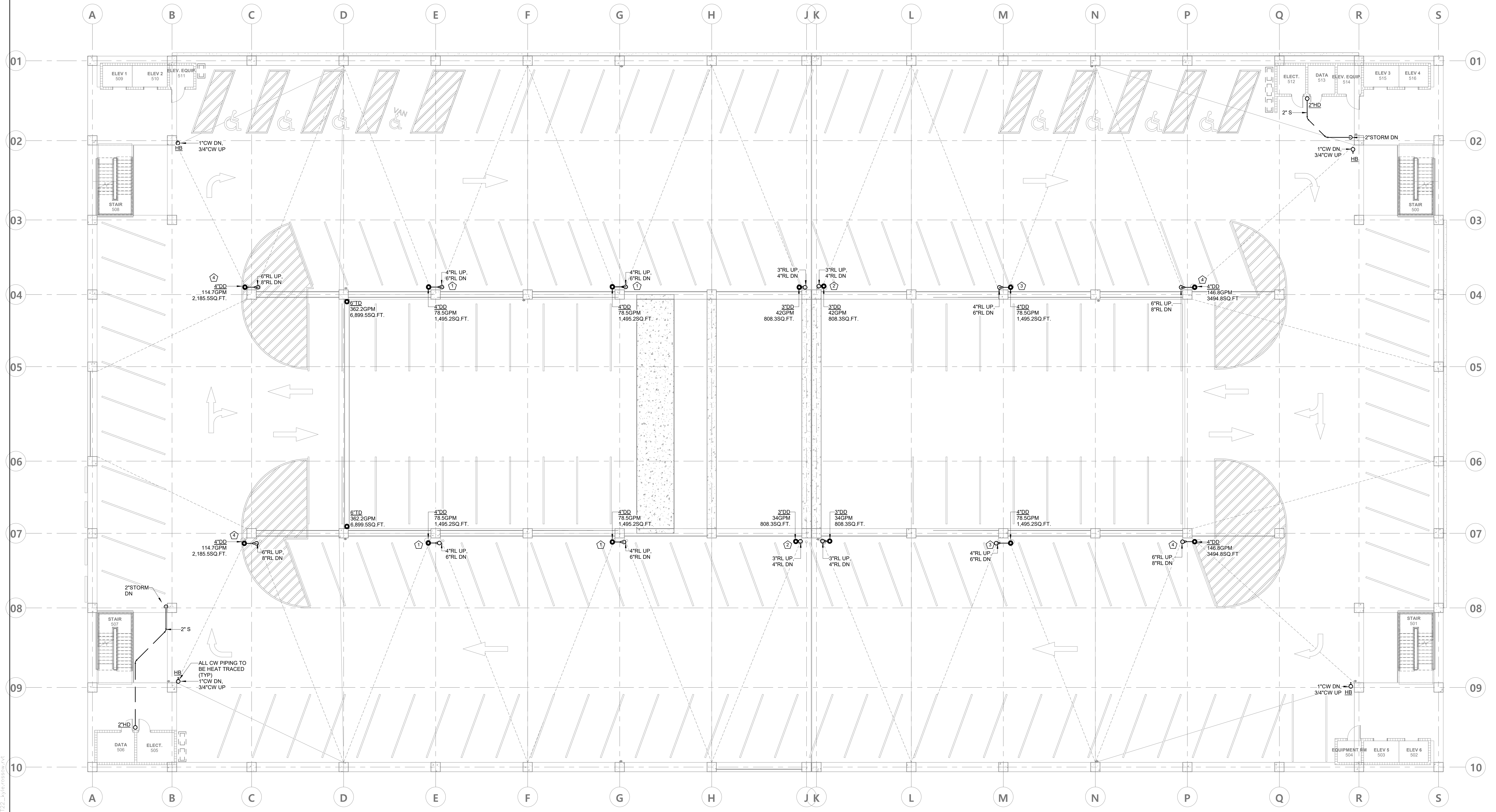
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Revisions	
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job no.	4308
drawn by	NEL
checked by	CPS
sheet no.	118 of 158
sheet title	<b>P2.40</b>
date	August 5, 2023
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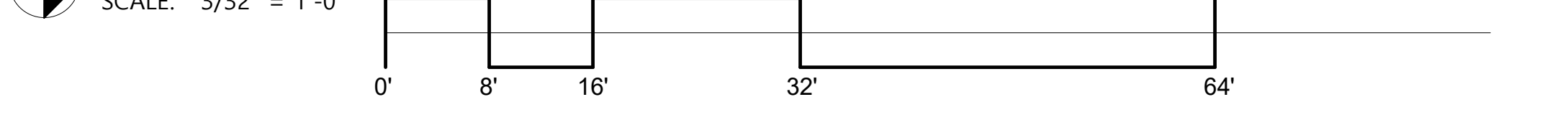
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# Mobile Civic Center Parking Facility

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## LAYOUT PLAN - LEVEL 5 - PLUMBING

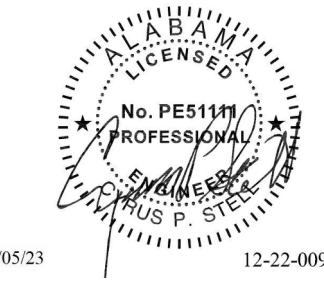


### GENERAL NOTES:

- HEAT TRACE ALL DOMESTIC WATER PIPING EXPOSED IN THE PARKING DECK.
- ALL P-TRAPS IN THE STORM SYSTEM REQUIRES A CLEANOUT ON THE SIDE.



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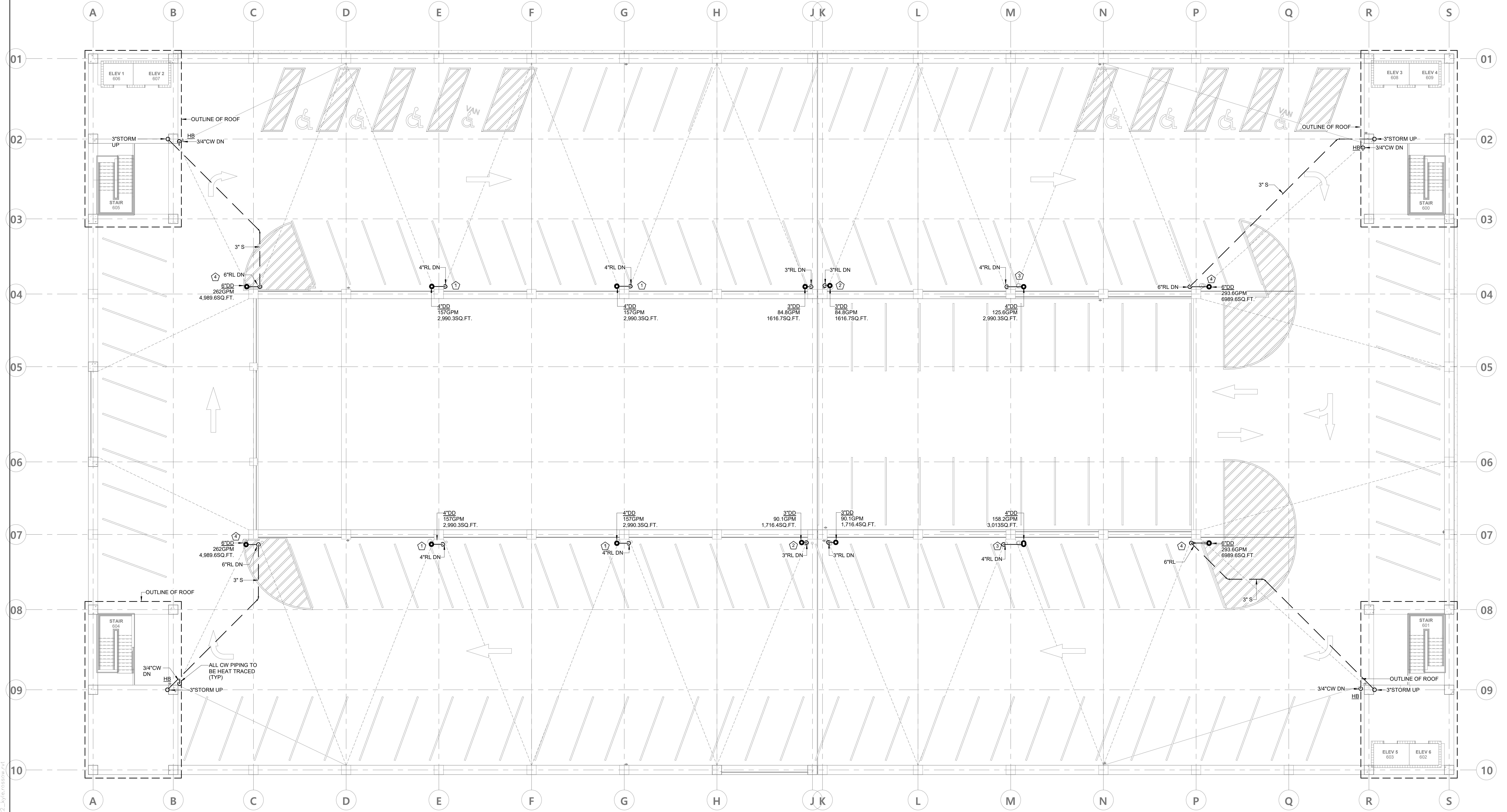
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sheet title	LAYOUT PLAN - LEVEL 5 - OVERALL PLUMBING
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drawn by	NEL
checked by	CPS
sheet no.	119 of 158
date	August 5, 2023
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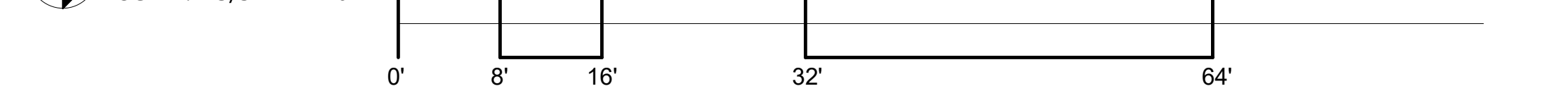
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# Mobile Civic Center Parking Facility

Mobile, Alabama



## LAYOUT PLAN - LEVEL 6 - PLUMBING

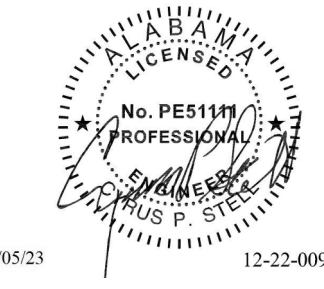


### GENERAL NOTES:

- HEAT TRACE ALL DOMESTIC WATER PIPING EXPOSED IN THE PARKING DECK.
- ALL P-TRAPS IN THE STORM SYSTEM REQUIRES A CLEANOUT ON THE SIDE.



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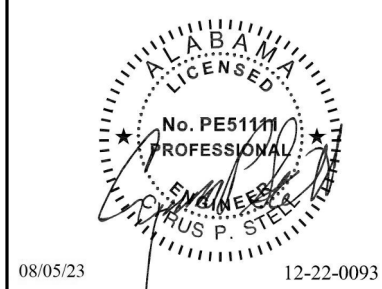
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Revisions	
sheet title	LAYOUT PLAN - LEVEL 6 - OVERALL PLUMBING
job no.	4308
drawn by	NEL
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sheet no.	120 of 158
date	August 5, 2023
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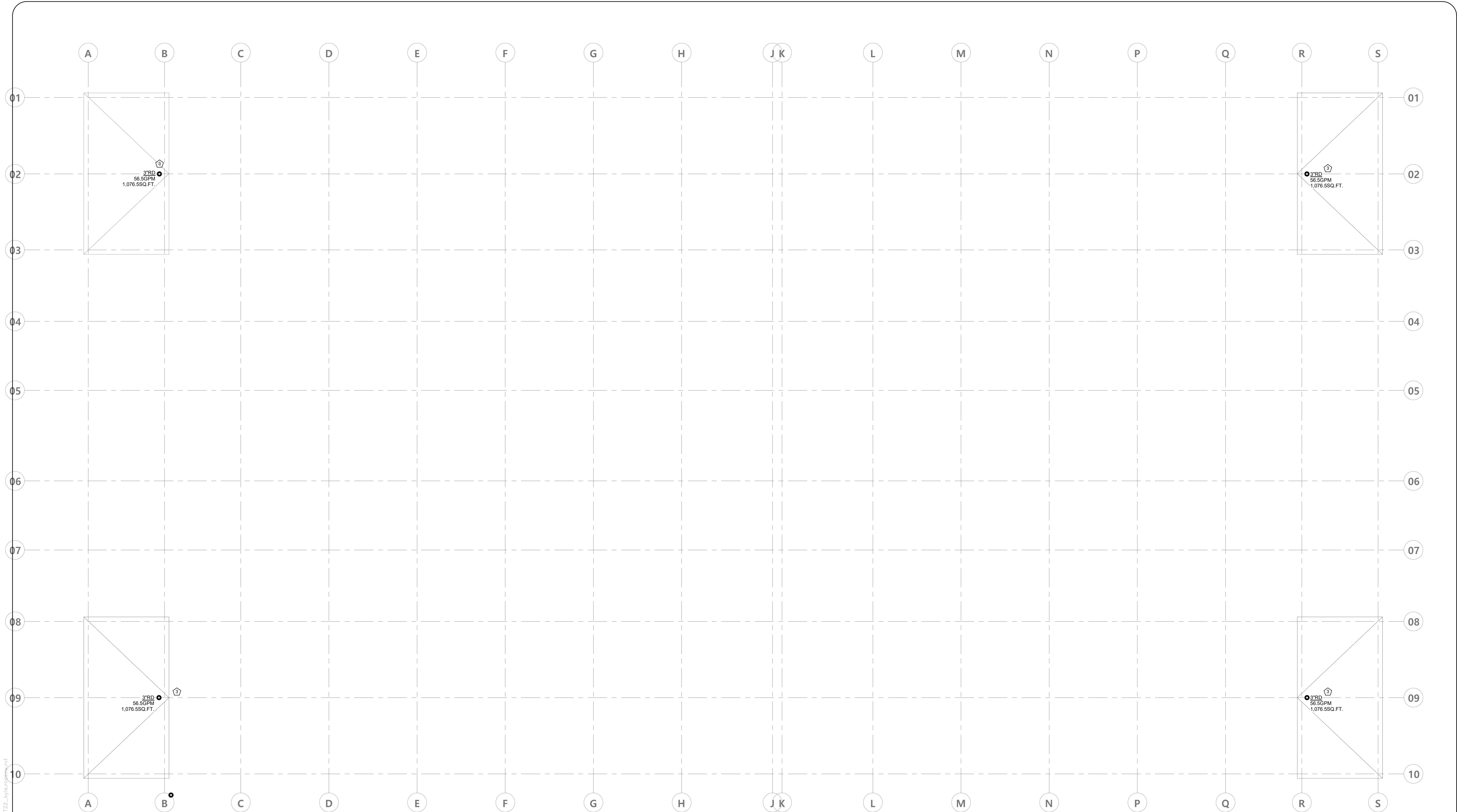
Revisions

sheet title <b>LAYOUT PLAN - ROOF - OVERALL PLUMBING</b>	
job no.	<b>4308</b>
desn. by	NEL
chk. by	CPS
sheet no.	<b>121</b> of 158
date	August 5, 2023
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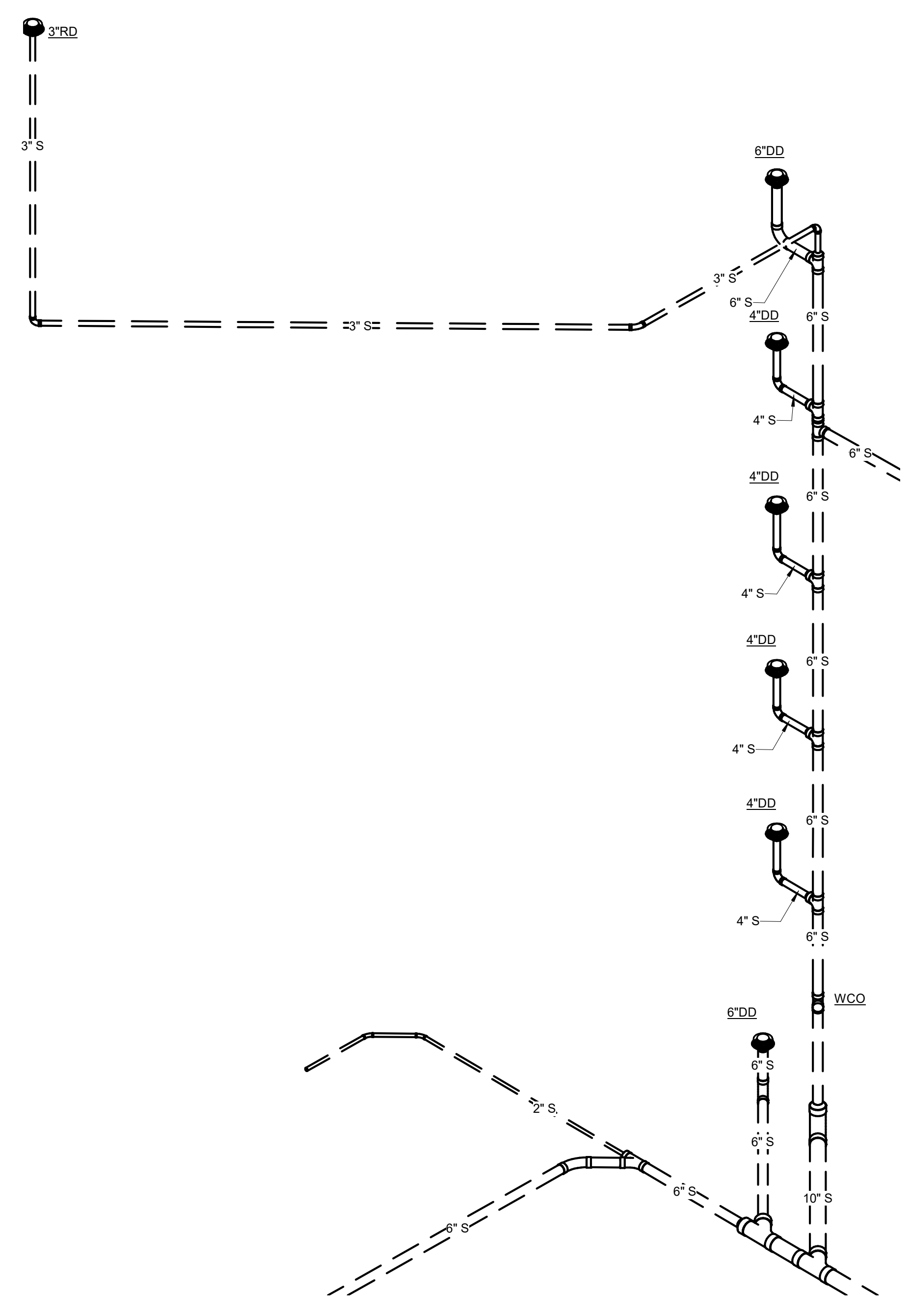
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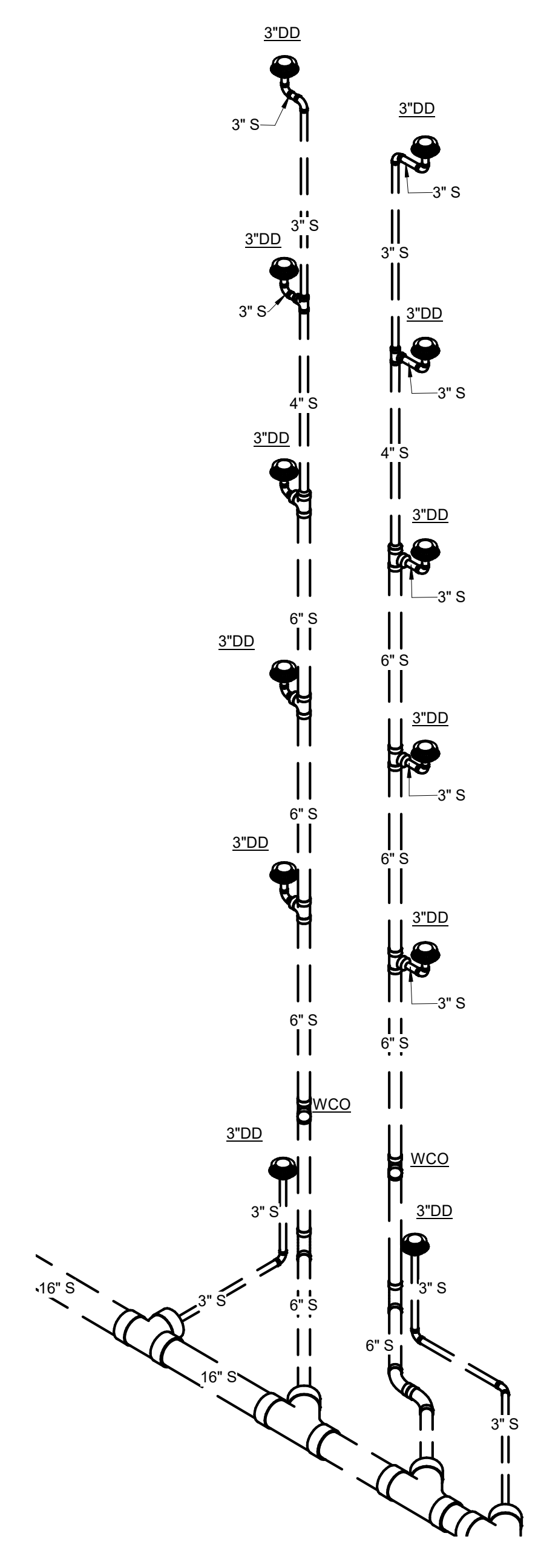
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SCALE: 3/32" = 1'-0"

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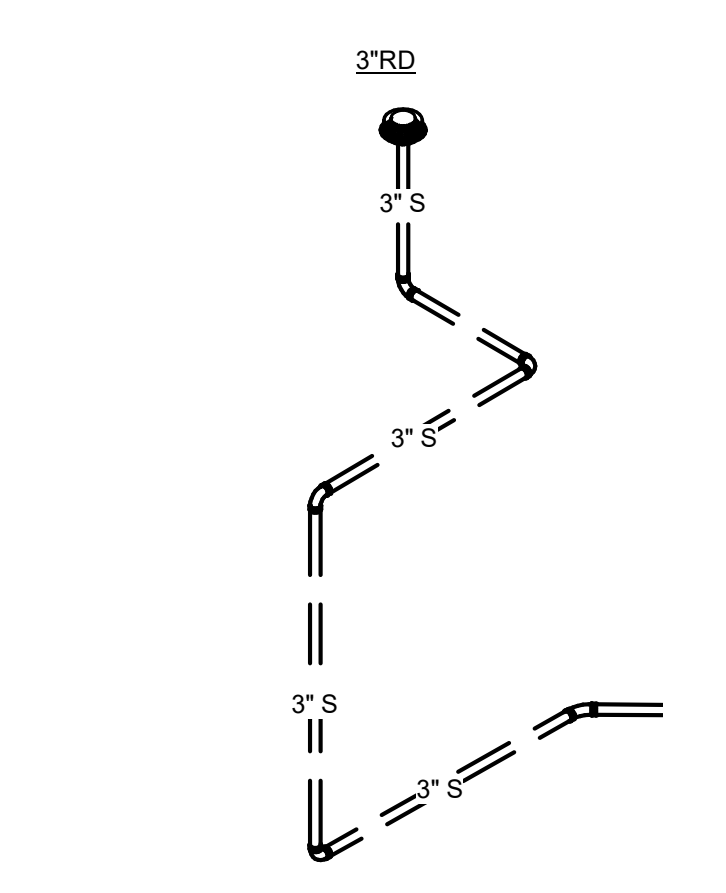
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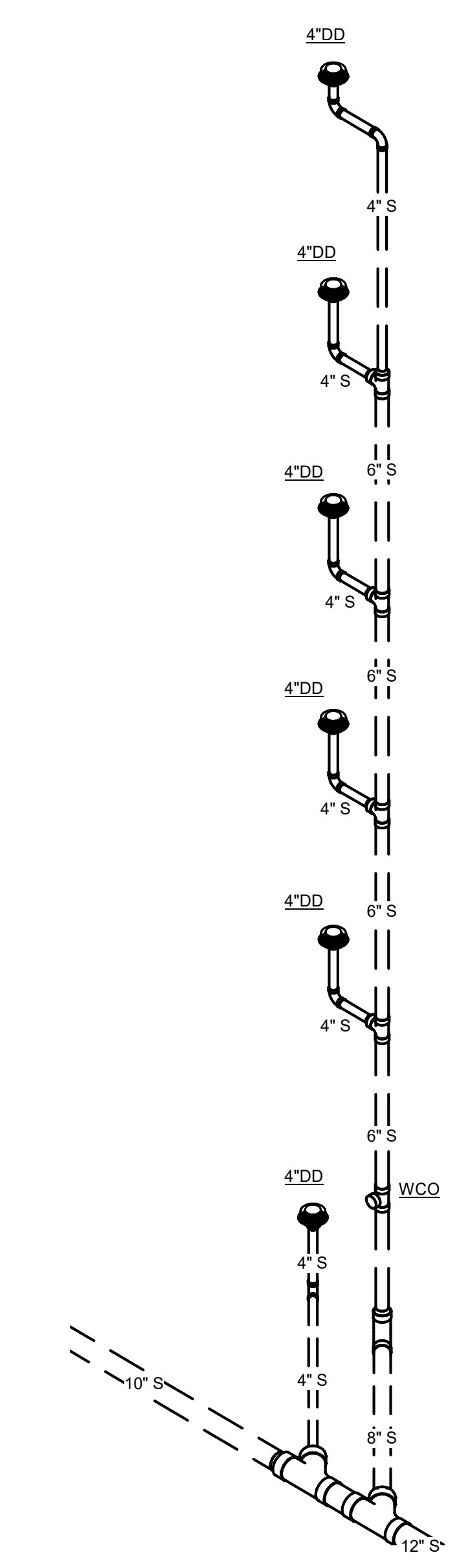
③ STORM RISER 3



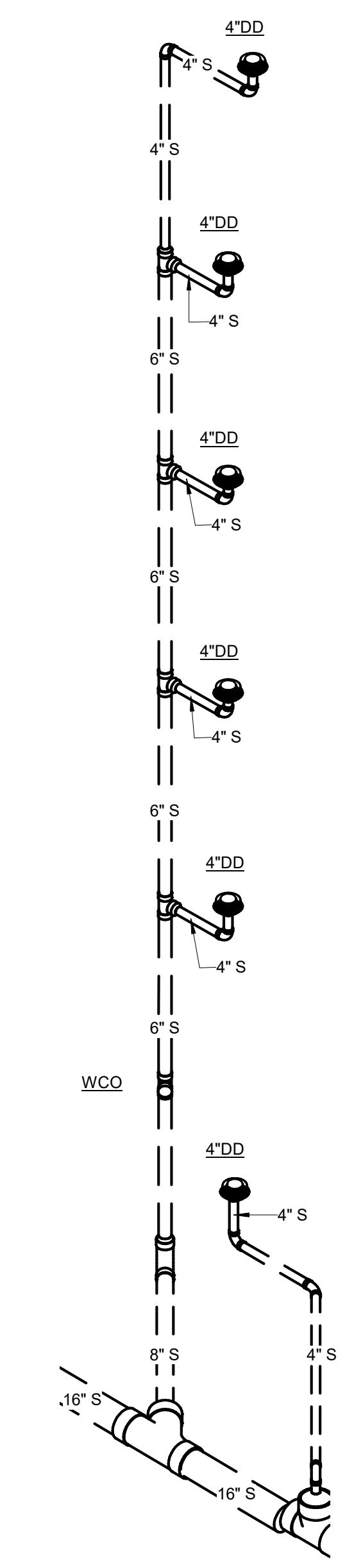
② STORM RISER 2



⑤ STORM RISER 5



① STORM RISER 1

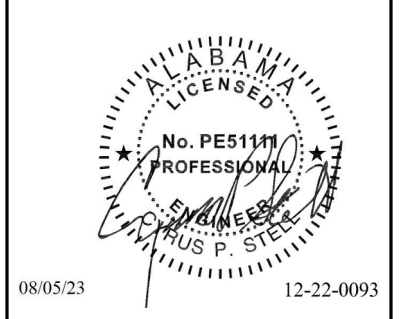


④ STORM RISER 4



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sheet title  
RISERS - PLUMBING

job no. **4308**

drawn by  
NEL **122**

checked by  
CPS of 158

date August 5, 2023  
**P3.01**

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# Mobile Civic Center Parking Facility

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### MINI SPLIT SYSTEM UNIT SCHEDULE - HEAT PUMP

INDOOR UNIT MARK	OUTDOOR UNIT MARK	SERVES	TYPE	SUPPLY FAN CFM	COOLING CAPACITY				HEATING CAPACITY				ACCESSORIES	NOMINAL TONS	ELECTRICAL					BASIS OF DESIGN (MITSUBISHI) (INDOOR/OUTDOOR)
					SENSIBLE MBH	TOTAL MBH	ENT. AIR		SEER	MBH	ENT. AIR °F	COP			INDOOR UNIT		OUTDOOR UNIT			
							°Fdb	°Fwb							FLA	VOLT V/Ø	MCA	MOCp	VOLT V/Ø	
DS-1	DSHP-1	DATA 105	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-2	DSHP-2	ELECT. 104	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-3	DSHP-3	ELECT. 110	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-4	DSHP-4	DATA 111	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-5	DSHP-5	DATA 305	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-6	DSHP-6	ELECT. 304	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-7	DSHP-7	ELECT. 310	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-8	DSHP-8	DATA 311	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-9	DSHP-9	DATA 506	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-10	DSHP-10	ELECT. 505	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-11	DSHP-11	ELECT. 512	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-12	DSHP-12	DATA 513	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-13	DSHP-13	ELEV. EQUIP. 501	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-14	DSHP-14	ELEV. EQUIP. 514	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-15	DSHP-15	ELEV. EQUIP. 504	A	250	9.0	12.0	80.0	67.0	21.0	10.6	70	2.3	[1] [2] [3]	1.0	0.19	208/1	11	30	208/1	PKA-A12LA/PUZA12NKA7
DS-16	DSHP-16	ELECTRICAL 116	A	260	4.5	6.0	80.0	67.0	30.0	7.2	70	2.6	[1] [2] [3]	0.5	0.65	208/1	10	15	208/1	MSZ-FS06NA/MUZ-FS06NA

**TYPE:**  
[A] WALL MOUNTED (PKA TYPE)

**ACCESSORIES:**  
[1] MICROPROCESSOR BASED CONTROLS WITH WIRELESS REMOTE CONTROLLER KIT  
[2] WASHABLE FILTER  
[3] WIND BAFFLE FOR LOW AMBIENT COOLING TO 10 DEGREE F.

**NOTES:**  
A. CAPACITIES ARE MINIMUM NET CAPACITIES  
B. COOLING: CAPACITY RATED AT 95°F AMBIENT.  
C. HEATING CAPACITY RATED AT 17°F AMBIENT.  
D. INDOOR UNIT RECEIVES POWER FROM OUTDOOR UNIT THROUGH FIELD-SUPPLIED INTERCONNECTING WIRING.

### CONTROL LEGEND

SYMBOL	DESCRIPTION
	DISCONNECT SWITCH
	ROOM TEMPERATURE SENSOR WITH SETPOINT ADJUSTMENT AND ANALOG OUTPUT SIGNAL
	DIGITAL INPUT
	DIGITAL OUTPUT
	ANALOG INPUT
	ANALOG OUTPUT
	NORMALLY-OPEN CONTACTS
	NORMALLY-CLOSED CONTACTS
	ADJUSTABLE CURRENT SENSOR

**NOTE:**  
NO MECHANICAL WORK  
REQUIRED ON LEVELS 2, 4, AND 6.

### ONE LINE PIPE SYMBOLS

	CONDENSATE DRAIN
	ELBOW, TURNED UP
	ELBOW, TURNED DOWN
	RISE OR DROP IN PIPE
	ELBOW
	TEE, SIDE CONNECTION
	TEE, OUTLET UP
	TEE, OUTLET DOWN
	CAPPED OUTLET
	CAPPED PIPE (CLEANOUT)
	DIRECTION OF PITCH
	PIPE TO FLOOR DRAIN

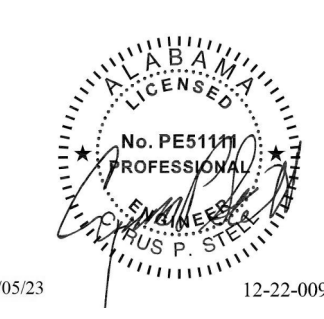
### ELECTRIC HEATER SCHEDULE

MARK	SERVES	TYPE	HEATING CAPACITY (KW)	HEATING CAPACITY (MBH)	AIRFLOW RATE (CFM)	ROTATION (RPM)	MOTOR SIZE (HP)	ELECTRICAL V/Ø	ACCESSORIES	BASIS OF DESIGN (MFG. / MODEL #)
EUH-1	STORAGE 114	A	5.0	17.0	350	1,600	1/100	208/3	[1] [2] [3]	MARLEY / MUH0581
EUH-2	STORAGE 114	A	5.0	17.0	350	1,600	1/100	208/3	[1] [2] [3]	MARLEY / MUH0581
WH-1	FIRE RISER 115	B	0.375	1.3	-	-	-	120/1	[1] [2]	QMARK / WHT500

**NOTES:**  
A. EUH - ELECTRIC UNIT HEATER  
B. WH = ELECTRIC WALL HEATER

**ACCESSORIES:**  
[1] UNIT-MOUNTED THERMOSTAT (TAMPER RESISTANT) (EXPOSED KNOB)  
[2] UNIT-MOUNTED DISCONNECT SWITCH  
[3] UNIVERSAL WALL / CEILING BRACKET

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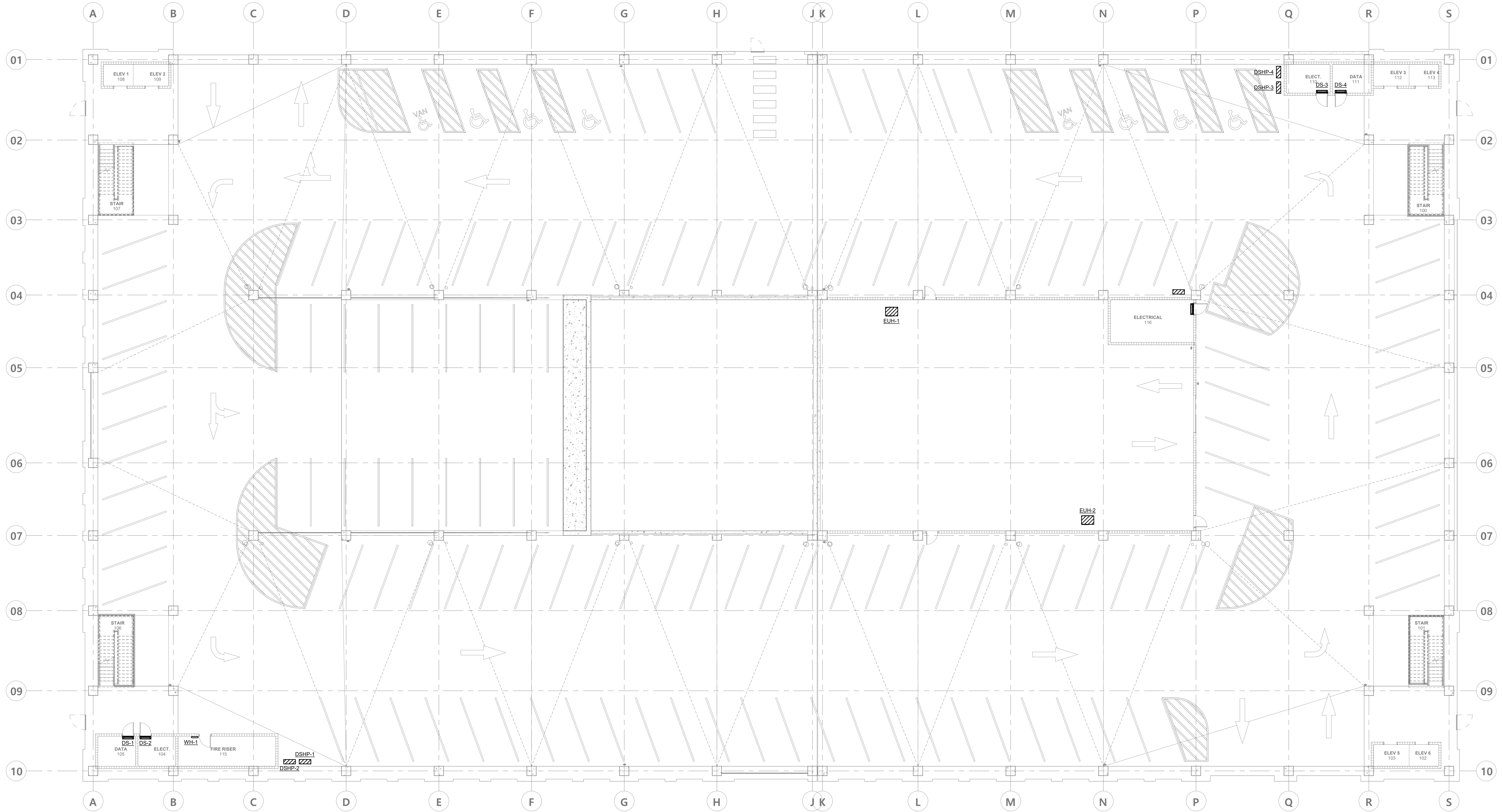
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Revisions

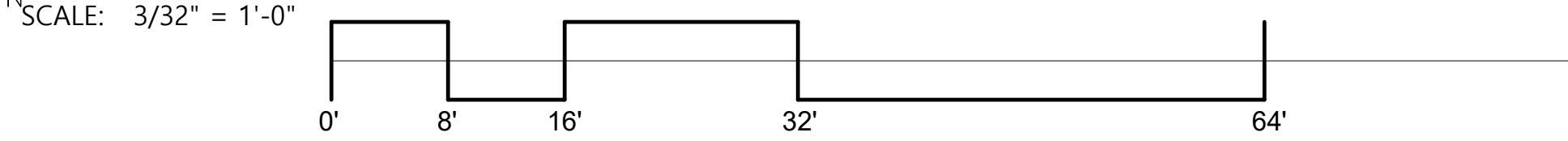


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sheet title	LEGENDS, SCHEDULES, AND DETAILS - MECHANICAL
job no.	4308
des. by	MDA
chk. by	CPS
date	August 5, 2023
rev. no.	1 of 11
title	<b>M0.01</b>
date	August 5, 2023
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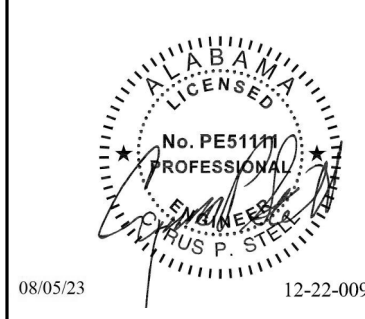


**LAYOUT PLAN - LEVEL 1 - MECHANICAL**



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sheet title	LAYOUT PLAN - LEVEL 1 - OVERALL MECHANICAL
job no.	4308
des. by	MDA
chk. by	CPS
dwg. no.	124 of 158
<b>M2.10</b>	
date August 5, 2023	
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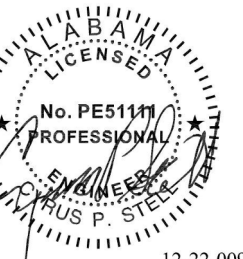
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sheet title	
LAYOUT PLAN - LEVEL 1 - MECHANICAL - PART A	
job no.	4308
des. by	MDA
chk. by	CPS
date	August 5, 2023
dwg. no.	M2.10A
of	158
3 of 11	
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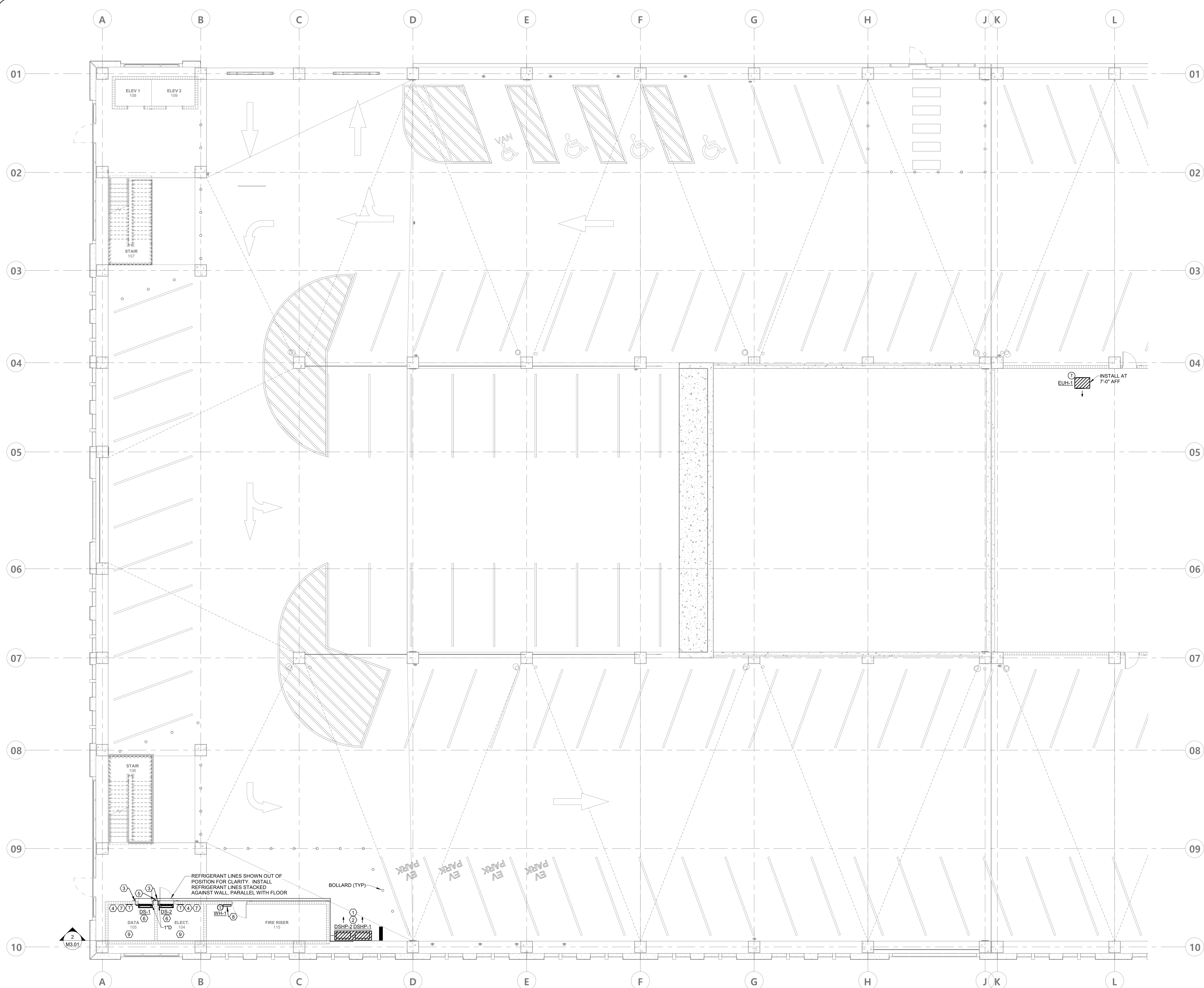


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### KEYED NOTES:

- 4" THICK CONCRETE HOUSEKEEPING PAD, 6" LARGER THAN EQUIPMENT FOOTPRINT, ALL AROUND.
- SECURE EQUIPMENT TO HOUSEKEEPING PAD WITH 5/8"x4" LONG HOT-DIPPED GALVANIZED WEDGE ANCHOR BOLTS, MINIMUM FOUR (4) LOCATIONS.
- FIELD-DRILL HOLES FOR REFRIGERANT LINE AND CONDENSATE DRAIN ROUTING. PENETRATIONS LARGER THAN 10" DIAMETER OR 10"x10" MUST BE COORDINATED WITH PARKING DECK MANUFACTURER.
- INSTALL INSULATION SHIELD BETWEEN THERMOSTAT AND WALL.
- PITCHED 1" D TERMINATING AT HUB DRAIN. COORDINATE WITH PLUMBING CONTRACTOR.
- INSTALL WALL-MOUNTED FAN COIL AT 9'-0" AFF.
- INSTALL WALL-MOUNTED THERMOSTAT AT 4'-0" AFF.
- INSTALL ELECTRIC WALL HEATER AT 8-INCHES AFF. COORDINATE FINAL LOCATION WITH FIRE PROTECTION REQUIREMENTS.
- COORDINATE ROUTING OF CONDENSATE DRAIN LINE WITH EQUIPMENT INSTALLED WITHIN THE ROOM. DO NOT INSTALL OVER TOP OF DATA EQUIPMENT, ELECTRICAL EQUIPMENT, OR ELEVATOR MACHINE EQUIPMENT.



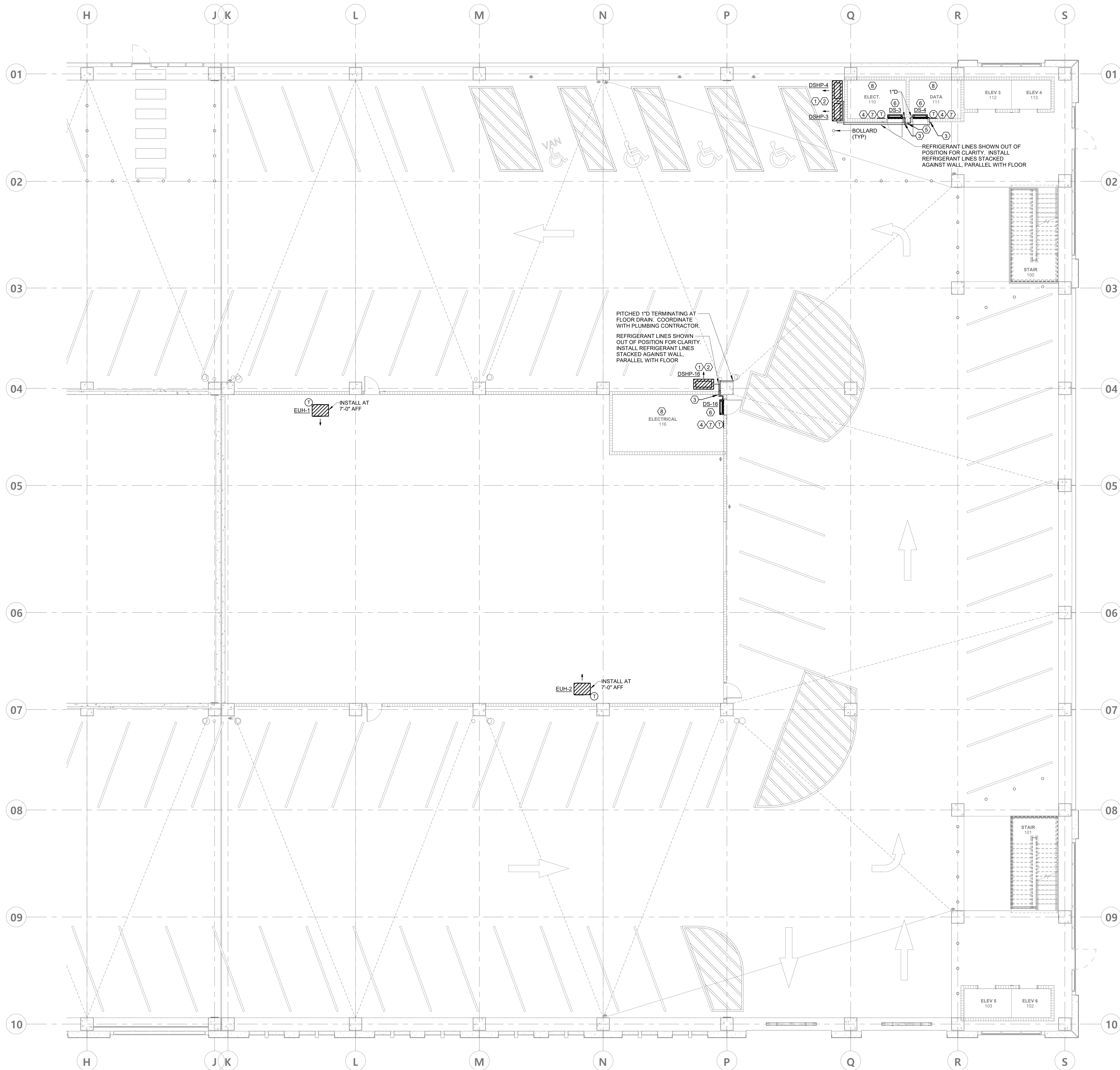
## LAYOUT PLAN - LEVEL 1 - MECHANICAL - PART A

SCALE: 1/8" = 1'-0"

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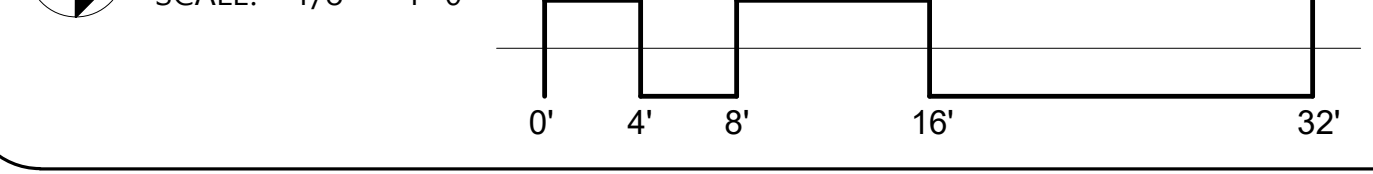
# Mobile Civic Center Parking Facility

Mobile, Alabama



- KEYED NOTES:**
- 4" THICK CONCRETE HOUSEKEEPING PAD, 6" LARGER THAN EQUIPMENT FOOTPRINT, ALL AROUND.
  - SECURE EQUIPMENT TO HOUSEKEEPING PAD WITH 5/8"x4" LONG HOT-DIPPED GALVANIZED WEDGE ANCHOR BOLTS, MINIMUM FOUR (4) LOCATIONS.
  - FIELD-DRILL HOLES FOR REFRIGERANT LINE AND CONDENSATE DRAIN ROUTING. PENETRATIONS LARGER THAN 10" DIAMETER OR 10"x10" MUST BE COORDINATED WITH PARKING DECK MANUFACTURER.
  - INSTALL INSULATION SHIELD BETWEEN THERMOSTAT AND WALL.
  - PITCHED 1"D TERMINATING AT HUB DRAIN. COORDINATE WITH PLUMBING CONTRACTOR.
  - INSTALL WALL-MOUNTED FAN COIL AT 9'-0" AFF.
  - INSTALL WALL-MOUNTED THERMOSTAT AT 4'-0" AFF.
  - COORDINATE ROUTING OF CONDENSATE DRAIN LINE WITH EQUIPMENT INSTALLED WITHIN THE ROOM. DO NOT INSTALL OVER TOP OF DATA EQUIPMENT, ELECTRICAL EQUIPMENT, OR ELEVATOR MACHINE EQUIPMENT.

## LAYOUT PLAN - LEVEL 1 - MECHANICAL - PART B



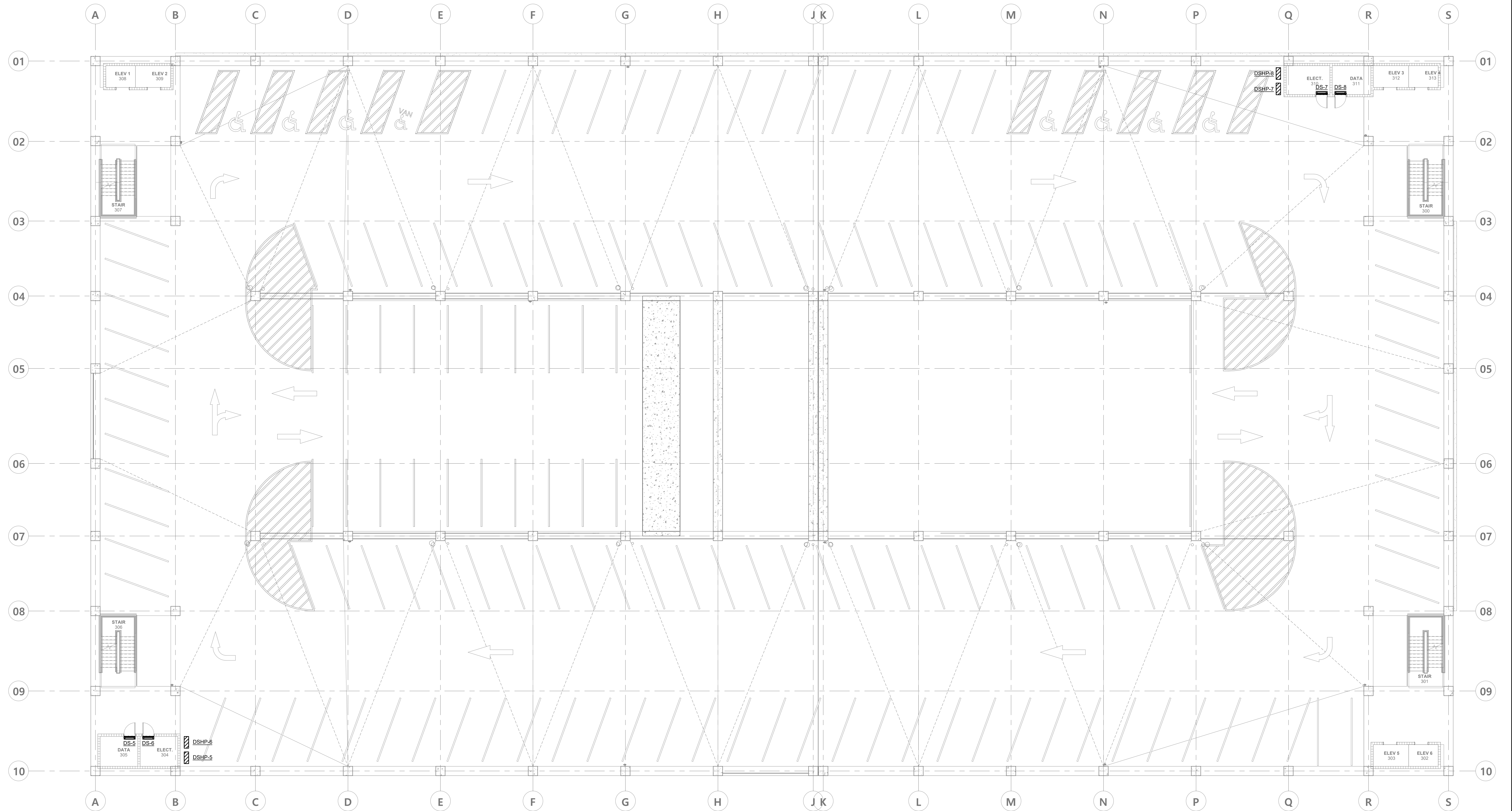
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**Bernhard TME**  
Engineering

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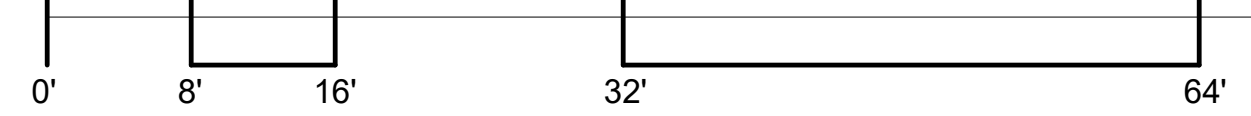
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job no.	4308
des. by	MDA
chk. by	CPS
dwg. no.	126 of 158
<b>M2.10B</b>	
4 of 11	
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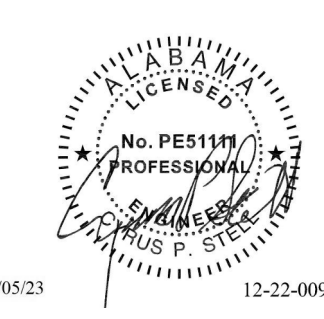


**LAYOUT PLAN - LEVEL 3 - MECHANICAL**

SCALE: 3/32" = 1'-0"



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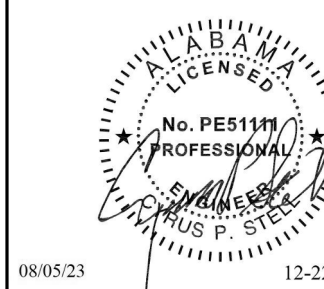
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job no.	4308
des. by	MDA
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dwg. no.	127
of	158
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LAYOUT PLAN - LEVEL 3 - MECHANICAL - PART A	
job no.	4308
des. by	MDA
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128	of 158
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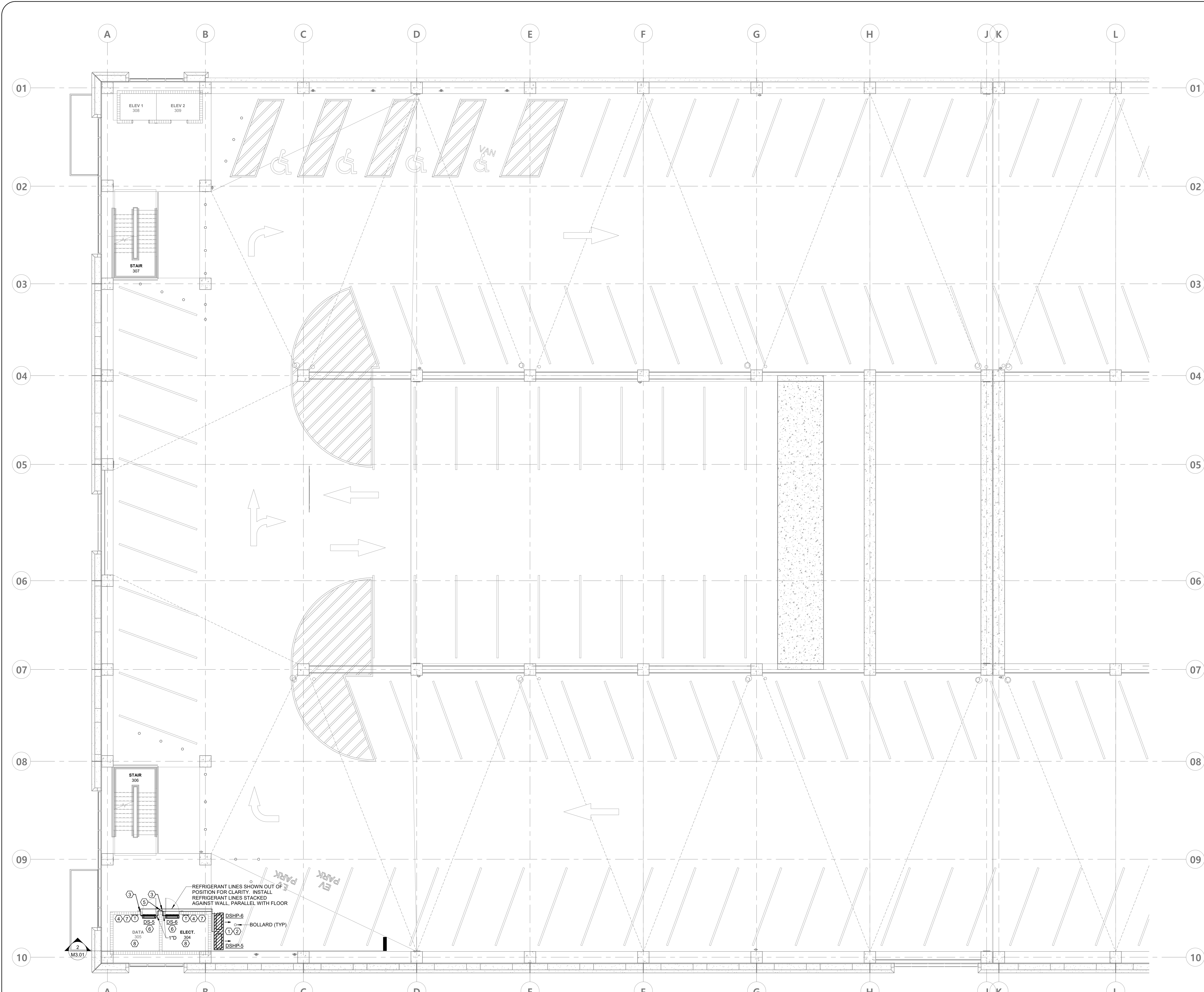


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CC-085-22

**KEYED NOTES:**

- ① 4" THICK CONCRETE HOUSEKEEPING PAD, 6" LARGER THAN EQUIPMENT FOOTPRINT, ALL AROUND.
- ② SECURE EQUIPMENT TO HOUSEKEEPING PAD WITH 5/8"x4" LONG HOT-DIPPED GALVANIZED WEDGE ANCHOR BOLTS, MINIMUM FOUR (4) LOCATIONS.
- ③ FIELD-DRILL HOLES FOR REFRIGERANT LINE AND CONDENSATE DRAIN ROUTING. PENETRATIONS LARGER THAN 10" DIAMETER OR 10"x10" MUST BE COORDINATED WITH PARKING DECK MANUFACTURER.
- ④ INSTALL INSULATION SHIELD BETWEEN THERMOSTAT AND WALL.
- ⑤ PITCHED 1" D TERMINATING AT HUB DRAIN. COORDINATE WITH PLUMBING CONTRACTOR.
- ⑥ INSTALL WALL-MOUNTED FAN COIL AT 9'-0" AFF.
- ⑦ INSTALL WALL-MOUNTED THERMOSTAT AT 4'-0" AFF.
- ⑧ COORDINATE ROUTING OF CONDENSATE DRAIN LINE WITH EQUIPMENT INSTALLED WITHIN THE ROOM. DO NOT INSTALL OVER TOP OF DATA EQUIPMENT, ELECTRICAL EQUIPMENT, OR ELEVATOR MACHINE EQUIPMENT.



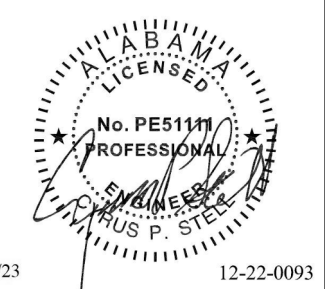
## LAYOUT PLAN - LEVEL 3 - MECHANICAL - PART A

SCALE: 1/8" = 1'-0"

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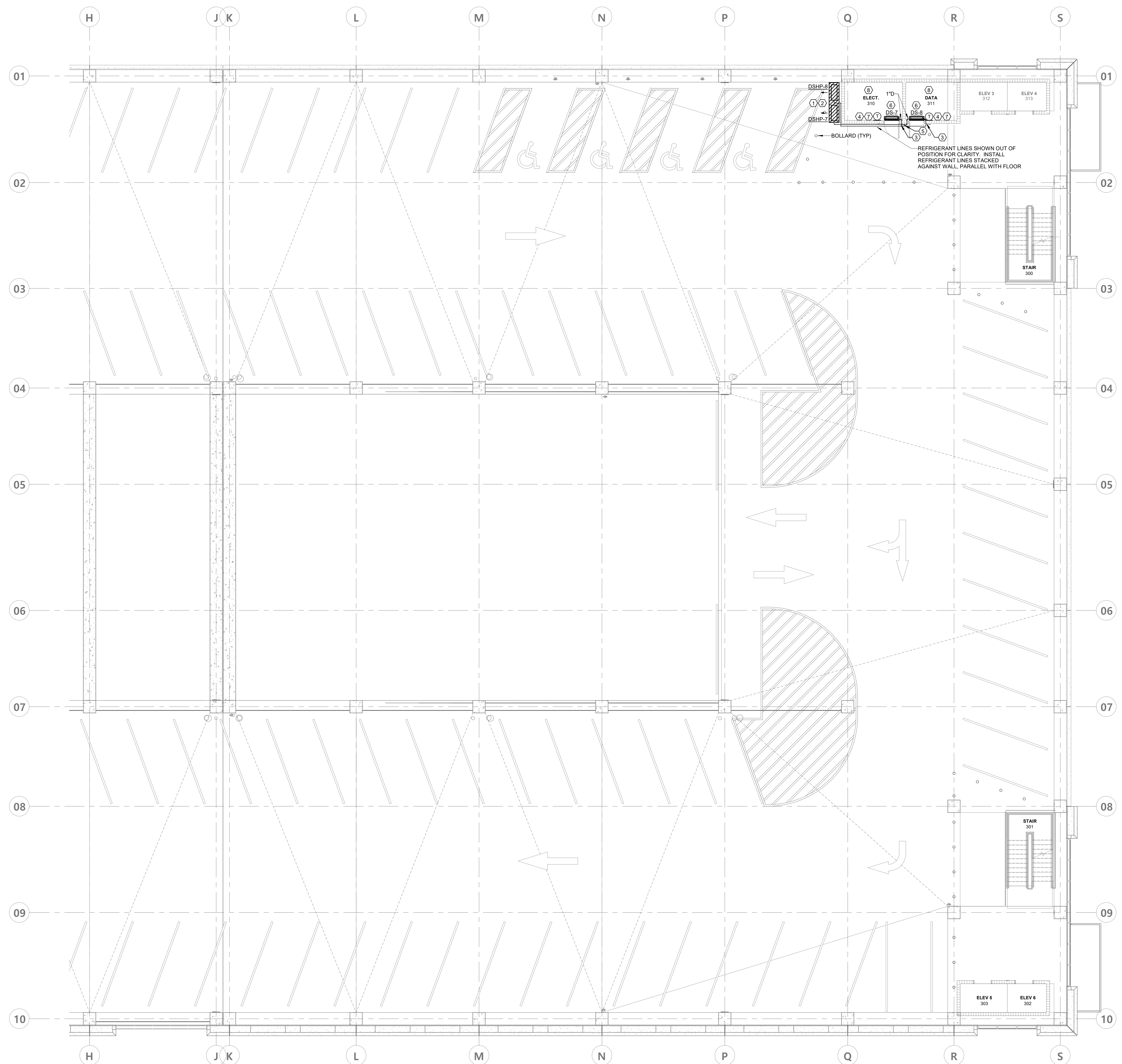
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sheet title	
LAYOUT PLAN - LEVEL 3 - MECHANICAL - PART B	
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of	158
<b>M2.30B</b>	
of	11
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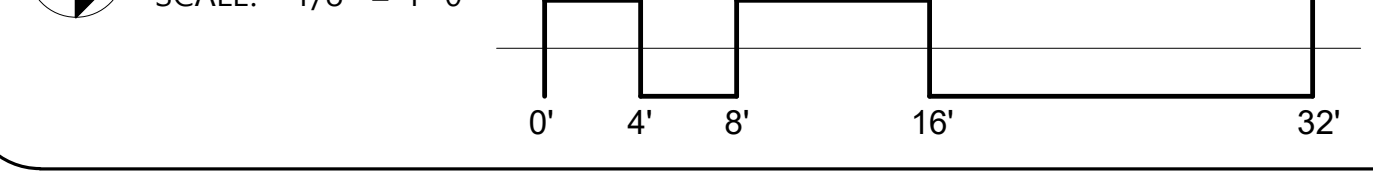


- KEYED NOTES:**
- 4" THICK CONCRETE HOUSEKEEPING PAD, 6" LARGER THAN EQUIPMENT FOOTPRINT, ALL AROUND.
  - SECURE EQUIPMENT TO HOUSEKEEPING PAD WITH 3/8"x4" LONG HOT-DIPPED GALVANIZED WEDGE ANCHOR BOLTS, MINIMUM FOUR (4) LOCATIONS.
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  - INSTALL INSULATION SHIELD BETWEEN THERMOSTAT AND WALL.
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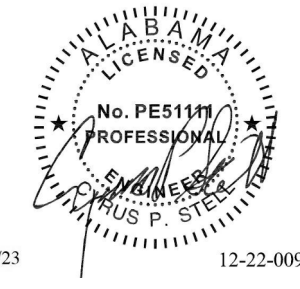
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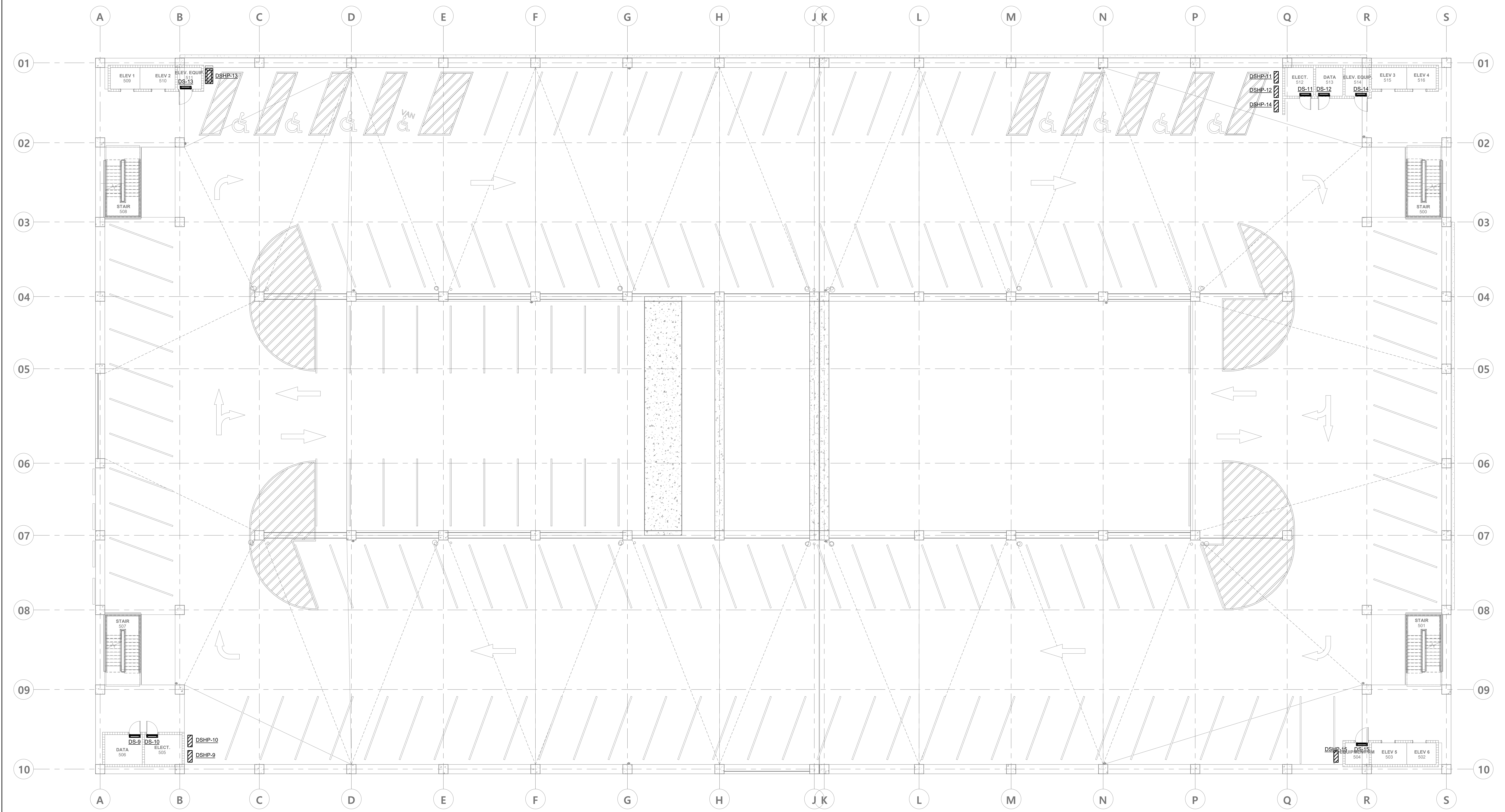
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job no.	4308
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date	August 5, 2023
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of	11
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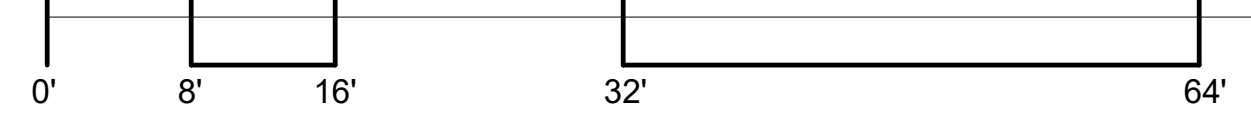
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## LAYOUT PLAN - LEVEL 5 - MECHANICAL

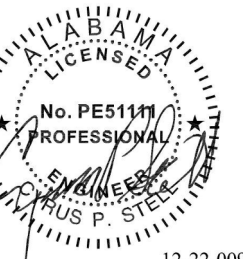
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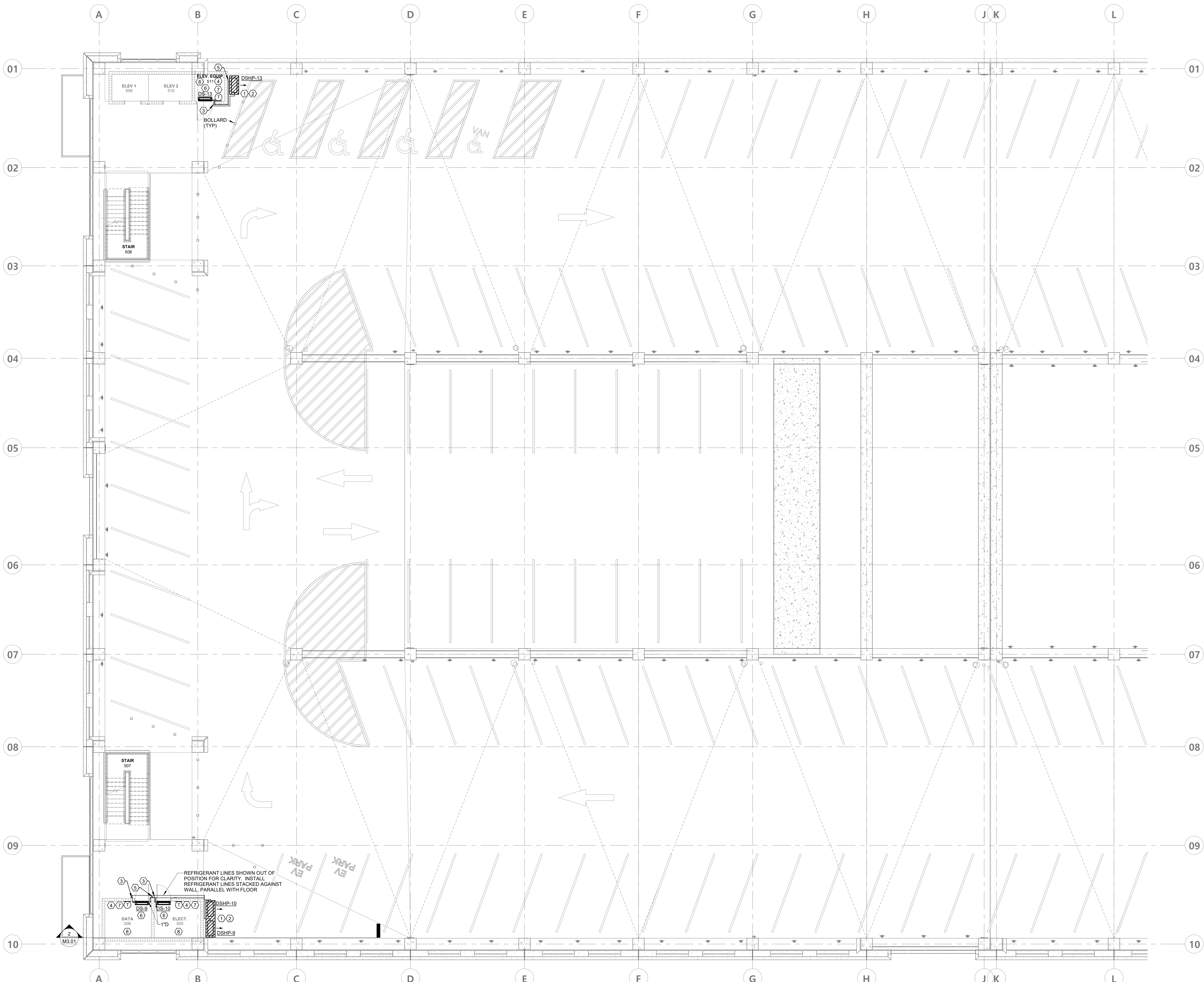
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sheet title	
LAYOUT PLAN - LEVEL 5 - MECHANICAL - PART A	
job no.	4308
des. by	MDA
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dwg. no.	131
of	158
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of	11
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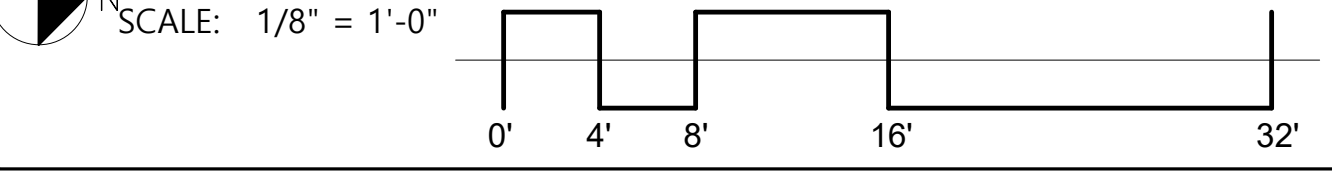
**KEYED NOTES:**

- ① 4" THICK CONCRETE HOUSEKEEPING PAD, 6" LARGER THAN EQUIPMENT FOOTPRINT, ALL AROUND.
- ② SECURE EQUIPMENT TO HOUSEKEEPING PAD WITH 5/8"x4" LONG HOT-DIPPED GALVANIZED WEDGE ANCHOR BOLTS, MINIMUM FOUR (4) LOCATIONS.
- ③ FIELD-DRILL HOLES FOR REFRIGERANT LINE AND CONDENSATE DRAIN ROUTING. PENETRATIONS LARGER THAN 10" DIAMETER OR 10"x10" MUST BE COORDINATED WITH PARKING DECK MANUFACTURER.
- ④ INSTALL INSULATION SHIELD BETWEEN THERMOSTAT AND WALL.
- ⑤ PITCHED 1" D TERMINATING AT HUB DRAIN. COORDINATE WITH PLUMBING CONTRACTOR.
- ⑥ INSTALL WALL-MOUNTED FAN COIL AT 9'-0" AFF.
- ⑦ INSTALL WALL-MOUNTED THERMOSTAT AT 4'-0" AFF.
- ⑧ COORDINATE ROUTING OF CONDENSATE DRAIN LINE WITH EQUIPMENT INSTALLED WITHIN THE ROOM. DO NOT INSTALL OVER TOP OF DATA EQUIPMENT, ELECTRICAL EQUIPMENT, OR ELEVATOR MACHINE EQUIPMENT.

**Bernhard TME**  
Engineering

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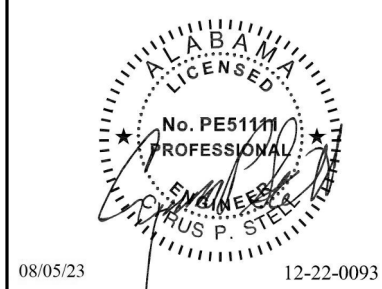
## LAYOUT PLAN - LEVEL 5 - MECHANICAL - PART A



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# Mobile Civic Center Parking Facility

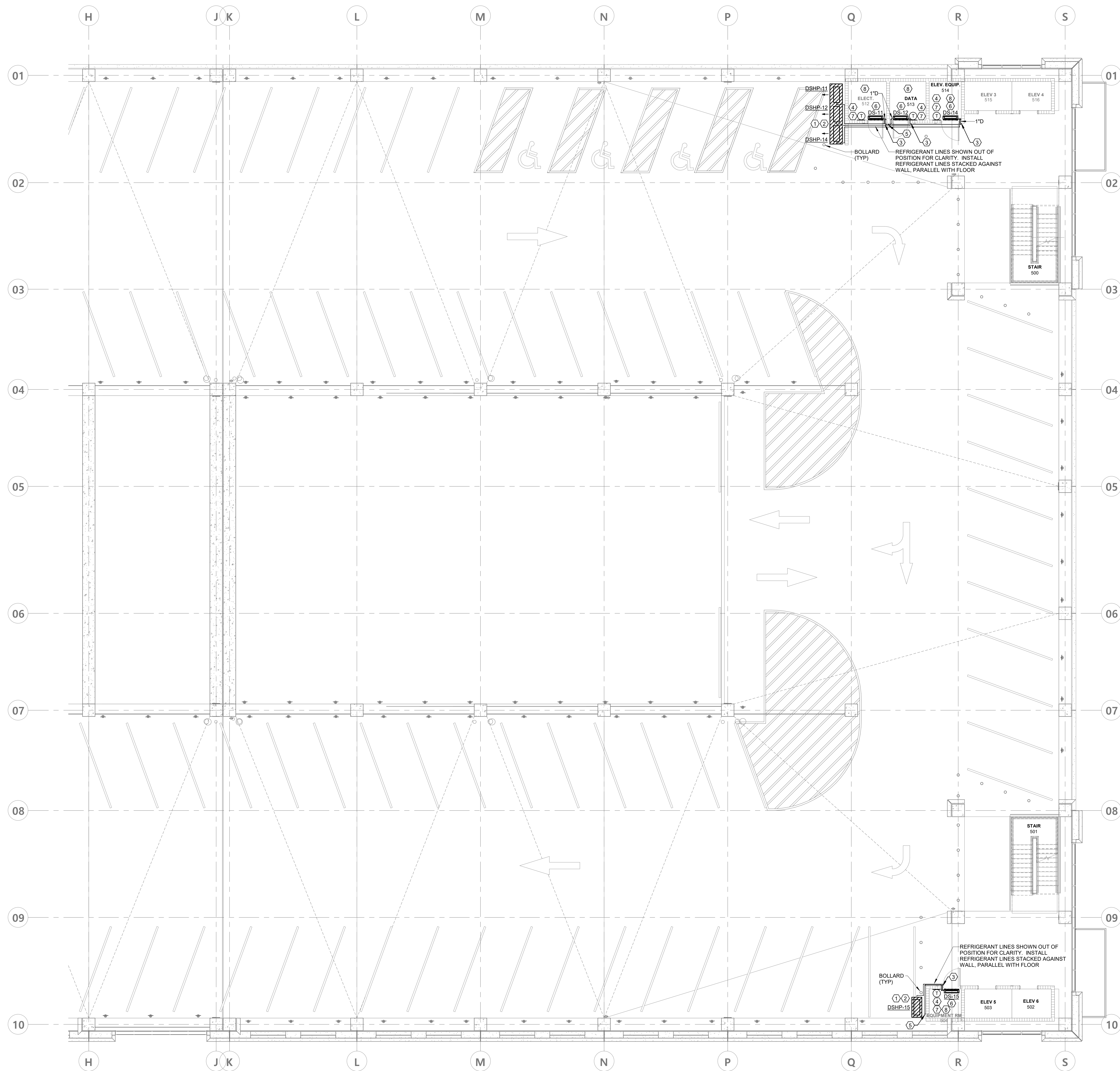
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sheet title	LAYOUT PLAN - LEVEL 5 - MECHANICAL - PART B
job no.	4308
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dwg. no.	132 of 158
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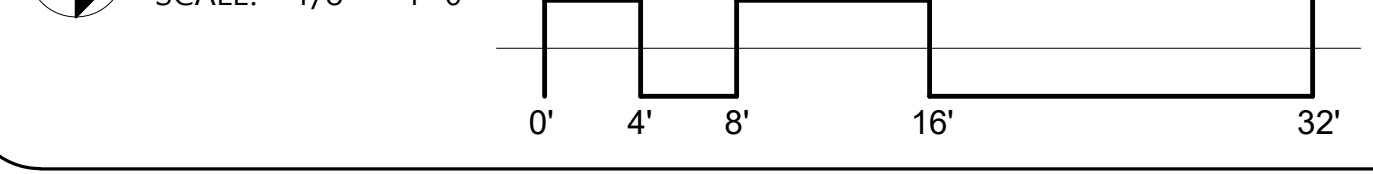


- KEYED NOTES:**
- 4" THICK CONCRETE HOUSEKEEPING PAD, 6" LARGER THAN EQUIPMENT FOOTPRINT, ALL AROUND.
  - SECURE EQUIPMENT TO HOUSEKEEPING PAD WITH 5/8"x4" LONG HOT-DIPPED GALVANIZED WEDGE ANCHOR BOLTS, MINIMUM FOUR (4) LOCATIONS.
  - FIELD-DRILL HOLES FOR REFRIGERANT LINE AND CONDENSATE DRAIN ROUTING. PENETRATIONS LARGER THAN 10" DIAMETER OR 10"x10" MUST BE COORDINATED WITH PARKING DECK MANUFACTURER.
  - INSTALL INSULATION SHIELD BETWEEN THERMOSTAT AND WALL.
  - PITCHED 1" D TERMINATING AT HUB DRAIN. COORDINATE WITH PLUMBING CONTRACTOR.
  - INSTALL WALL-MOUNTED FAN COIL AT 9'-0" AFF.
  - INSTALL WALL-MOUNTED THERMOSTAT AT 4'-0" AFF.
  - COORDINATE ROUTING OF CONDENSATE DRAIN LINE WITH EQUIPMENT INSTALLED WITHIN THE ROOM. DO NOT INSTALL OVER TOP OF DATA EQUIPMENT, ELECTRICAL EQUIPMENT, OR ELEVATOR MACHINE EQUIPMENT.



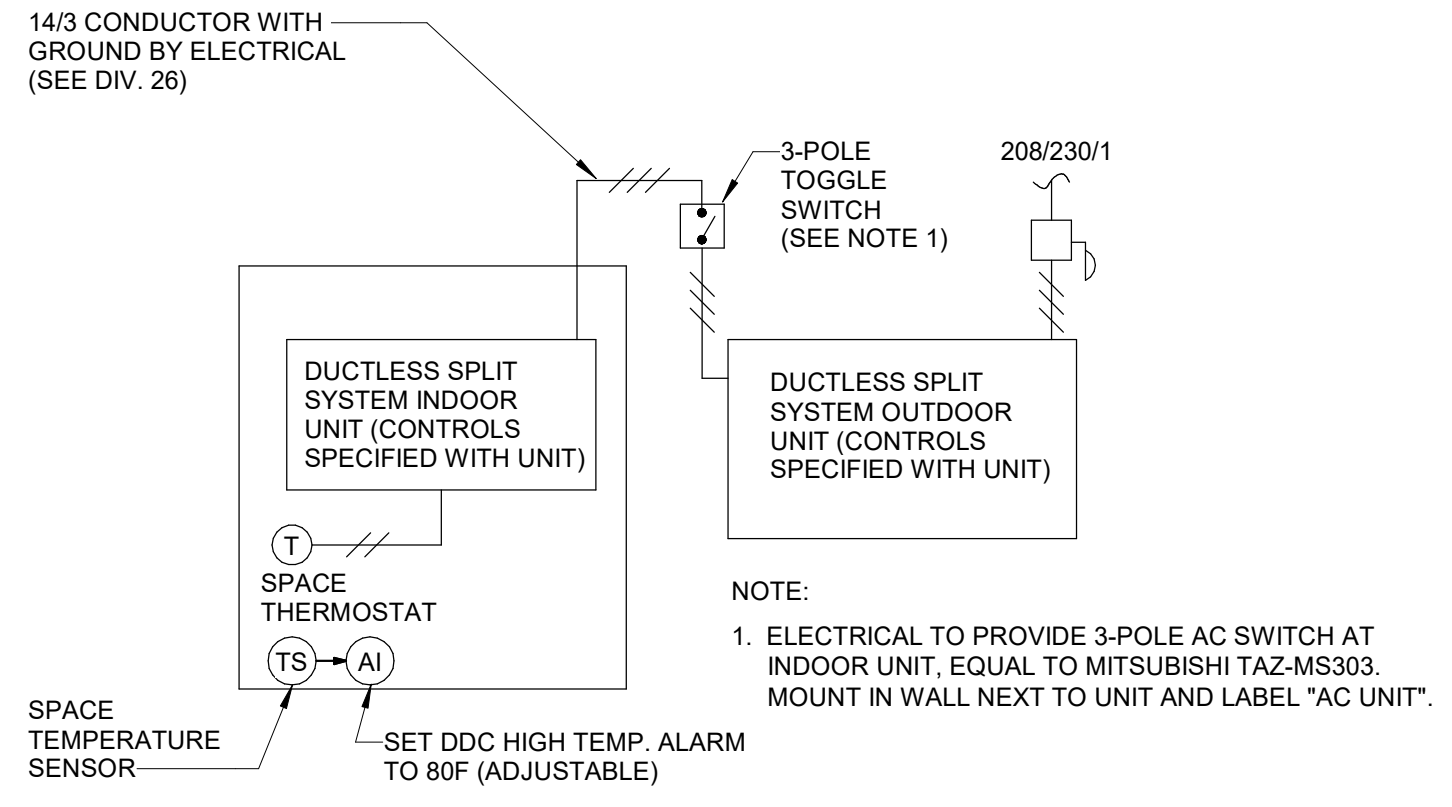
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## LAYOUT PLAN - LEVEL 5 - MECHANICAL - PART B



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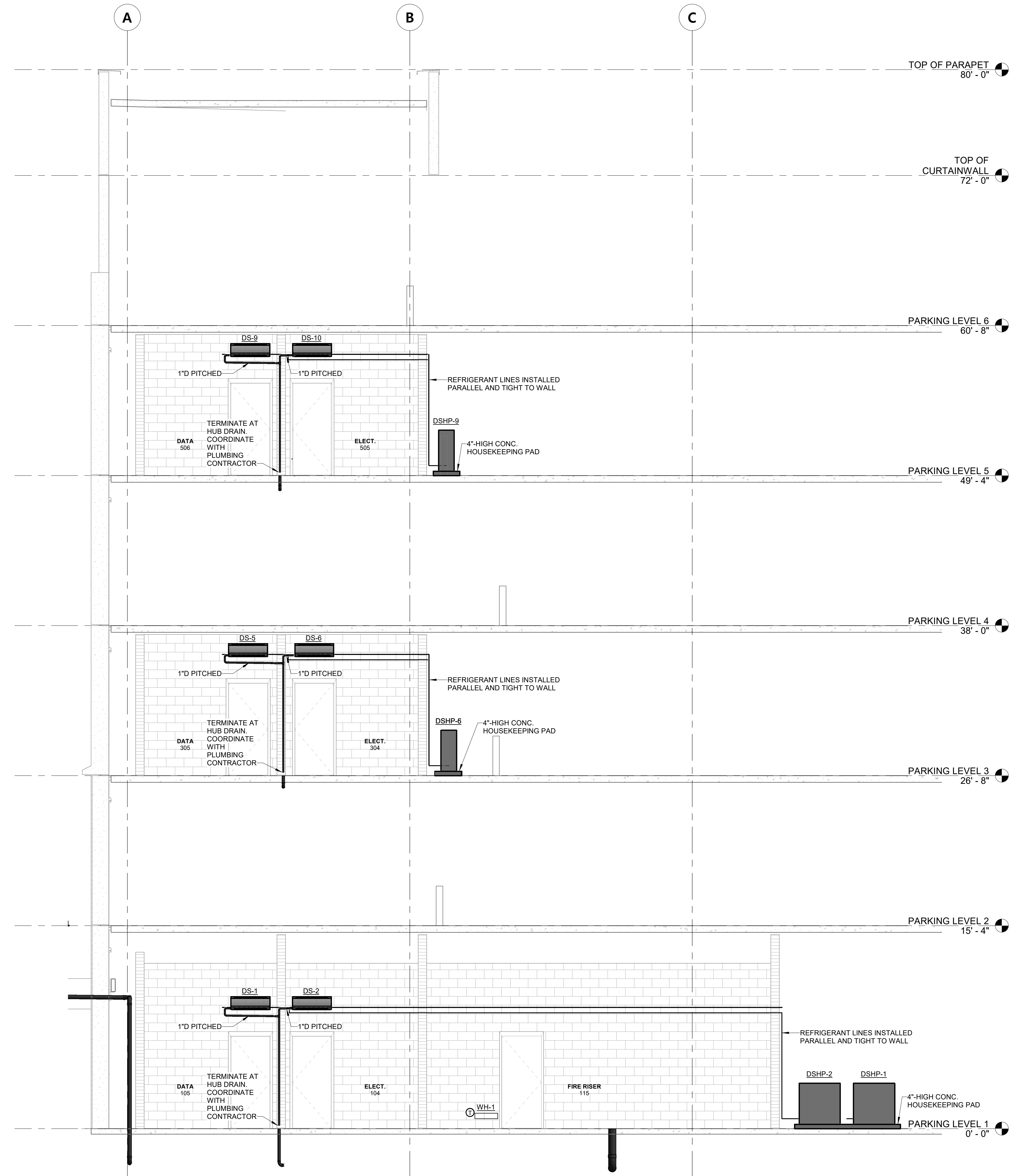




**CONTROL DIAGRAM - DUCTLESS SPLIT SYSTEM**  
SCALE: NONE

**SEQUENCES OF OPERATION:**

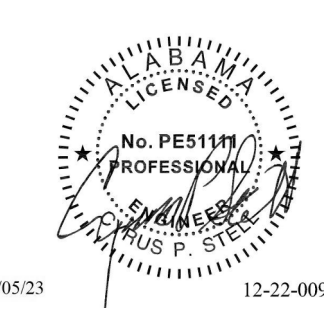
1. DUCTLESS SPLIT SYSTEMS: FACTORY-PROVIDED CONTROLS CYCLE HEATING AND COOLING TO MAINTAIN SPACE SETPOINT SUBJECT TO HIGH LEVEL CONDENSATE SWITCH. THE BAS SHALL MONITOR THE SPACE TEMPERATURE IN SPACES SERVED BY DUCTLESS SPLIT SYSTEMS. THE BAS SHALL ACTIVATE AN ALARM AT THE USER INTERFACE IF SPACE TEMPERATURE EXCEEDS 80F (ADJUSTABLE).



**SECTION A-A**  
1/4" = 1'-0"  
0' 2' 4' 8' 16'



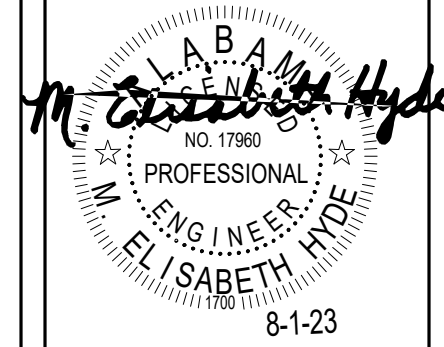
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Revisions

sheet title	SECTIONS AND CONTROLS - MECHANICAL
job no.	4308
des. by	MDA
chk. by	CPS
draw. no.	133 of 158
<b>M3.01</b>	11 of 11
date	August 5, 2023
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Revisions table with columns for revision number, description, and date.

Legend and Notes table with columns for job no., date, and sheet no.

NOTES

- 1. ALL ELECTRICAL WORK SHALL BE DONE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND LOCAL ORDINANCES. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS.
2. CONTRACTOR SHALL VISIT THE SITE AND FAMILIARIZE HIMSELF WITH ALL DETAILS OF THE WORK AND ALL EXISTING FIELD CONDITIONS.
3. CONTRACTOR SHALL PROVIDE A COMPLETE ELECTRICAL INSTALLATION INCLUDING ALL WORK CUSTOMARILY INCLUDED EVEN IF NOT SPECIFICALLY CALLED OUT.
4. THE ELECTRICAL CONTRACTOR SHALL CAREFULLY COORDINATE HIS WORK WITH OTHER CONTRACTORS THROUGH THE GENERAL CONTRACTOR FOR SPACE REQUIREMENTS, ETC.
5. CONTRACTOR SHALL VERIFY ALL MECHANICAL EQUIPMENT NAMEPLATE DATA BEFORE ANY WORK IS DONE AND MAKE ANY ADJUSTMENTS IN BREAKER AND WIRE SIZE AS MAY BE REQUIRED.
6. SHOULD THE CONTRACTOR FIND DISCREPANCIES OR OMISSIONS IN THE CONTRACT DOCUMENTS OR BE IN DOUBT AS TO INTENT, HE SHALL IMMEDIATELY OBTAIN CLARIFICATION FROM THE ARCHITECT OR ENGINEER.
7. THE ELECTRICAL DRAWINGS ARE SCHEMATIC AND ARE NOT INTENDED TO SHOW THE EXACT LOCATION OF CONDUITS, OUTLETS, ETC. THE CONTRACTOR SHALL REFER TO ARCHITECTURAL, MECHANICAL, AND PLUMBING DRAWINGS AND SHALL FIT HIS WORK TO CONFORM WITH THE BUILDING CONSTRUCTION AND WITH THE OTHER TRADES.
8. ELECTRICAL CONTRACTOR SHALL VERIFY EXACT HEIGHT OF ALL COUNTER TOPS AND BACK-SPLASHES ON CASEWORK SHOP DRAWINGS, AND CHANGE SPECIFIED MOUNTING HEIGHT OF WALL OUTLETS INDICATED AS REQUIRED SO THAT BOTTOM OF OUTLET BOX IS 2" ABOVE TOP OF BACK-SPLASH OR IF NO BACK-SPLASH IS USED, 4" ABOVE COUNTERTOP.
9. DO NOT MOUNT OUTLETS BACK-TO-BACK. PROVIDE MINIMUM 24" SEPARATION IN FIRE RATED WALLS.
10. ALL OUTLETS IN EXPOSED CONCRETE BLOCKS SHALL BE ADJUSTED AS REQUIRED TO ALLOW CUTTING OF ONLY ONE BLOCK. MAINTAIN UNIFORM HEIGHTS THROUGHOUT THE BUILDING.
11. VERIFY ALL DOOR SWINGS WITH ARCHITECT PRIOR TO ROUGHING LIGHT SWITCHES.
12. CONTRACTOR SHALL CHECK ALL LIGHT FIXTURES FOR EXACT TYPE MOUNTING AND SPACE REQUIRED BEFORE ROUGHING IN.
13. BRANCH CIRCUITS #12 A W.G. AND 1/2" CONDUIT (GALVANIZED) MINIMUM. CONDUCTORS SHALL BE 98% CONDUCTIVITY COPPER, SEE SPECIFICATIONS FOR TYPE INSULATION.
14. VOLTAGE DROP: FOR 20 AMP CIRCUITS OVER 100 FEET AND LESS THAN 175 FEET, USE #10 CONDUCTORS. FOR 20 AMP CIRCUITS OVER 175 FEET AND LESS THAN 275 FEET, USE #8 CONDUCTORS.
15. ALL CONDUITS CROSSING EXPANSION JOINTS SHALL HAVE EXPANSION TYPE FITTINGS.
16. THE ATTACHED DRAWINGS WERE DEVELOPED FROM RECORD DRAWINGS AND INFORMATION PROVIDED BY OTHERS WHICH MAY NOT REFLECT ACTUAL FIELD CONDITIONS. THE CONTRACTOR SHALL VERIFY ALL CONDITIONS IN THE FIELD BEFORE PROCEEDING WITH SUBSEQUENT WORK. THE DESIGN TEAM SHALL BE NOTIFIED OF ANY DISCREPANCIES OR CONFLICTS WITH DRAWINGS FOR CLARIFICATION PRIOR TO PROCEEDING WITH WORK.
17. FOR ALL SINGLE-PHASE CIRCUITS SHARING A NEUTRAL WITH OTHER SINGLE-PHASE CIRCUITS, CONTRACTOR SHALL INSTALL CIRCUIT BREAKER HANDLE TIES WHICH WILL PROVIDE FOR SIMULTANEOUS DISCONNECTION OF ALL CIRCUIT BREAKERS FOR CIRCUITS WHICH SHARE THE SAME NEUTRAL. HANDLE TIE SHALL NOT PREVENT THE REQUIRED TRIPPING OF A BREAKER.
18. QUESTIONS REGARDING THESE DRAWINGS SHALL BE ADDRESSED TO ENGINEER PRIOR TO AWARDING OF CONTRACT. OTHERWISE THE ENGINEER'S INTERPRETATION OF THE MEANING AND INTENT OF DRAWINGS SHALL BE FINAL.

SECURITY SYSTEMS: SEE SECURITY VENDOR DRAWINGS FOR REQUIREMENTS.

DO NOT SCALE DIMENSIONS FROM DRAWINGS. CONSULT OWNER/ARCHITECT FOR EXACT DIMENSIONAL DATA.

LIGHTNING PROTECTION: PROVIDE LIGHTNING PROTECTION SYSTEM FOR BUILDING WITH U.L. MASTER "C" LABEL.

SYSTEMS RESPONSIBILITY MATRIX table with columns for SYSTEM, SUBSYSTEM, A/E DESIGNED, OWNER/VENDOR DESIGNED, OWNER FURNISHED, CONTRACTOR FURNISHED, OWNER INSTALLED, CONTRACTOR INSTALLED, and NOTES.

JUNCTION & OUTLET BOXES

- CEILING OUTLET: JUNCTION BOX.
WALL OUTLET: JUNCTION BOX WITH FLEXIBLE CONNECTION.
WALL OUTLET: JUNCTION BOX.

LIGHTING (SEE LIGHT FIXTURE SCHEDULE)

- CEILING OUTLET: RECESSED LED LIGHT FIXTURE, AS NOTED, TYPE "A" CIRCUIT #1.
CEILING OUTLET: RECESSED EMERGENCY LED LIGHT FIXTURE, AS NOTED, TYPE "A" CIRCUIT #1.
CEILING OUTLET: EXIT LIGHT, SEE LIGHT FIXTURE SCHEDULE.
CEILING OUTLET: RECESSED LED LIGHT FIXTURE, LUMINAIRE TYPE "A", CIRCUIT #1
CEILING OUTLET: RECESSED EMERGENCY LED LIGHT FIXTURE, LUMINAIRE TYPE "A", CIRCUIT #1
CEILING OUTLET: SURFACE MOUNTED LED LIGHT FIXTURE.
CEILING OUTLET: SURFACE MOUNTED EMERGENCY LED LIGHT FIXTURE.
WALL OUTLET: WALL MOUNTED EMERGENCY LED LIGHT FIXTURE.
WALL OUTLET: WALL MOUNTED LED LIGHT FIXTURE.
POLE MOUNTED FIXTURE: LED LIGHT FIXTURE, TYPE "A", CIRCUIT #1.

LIGHTING CONTROLS

- WALL SWITCH: MANUAL DIMMER
WALL SWITCH: LINE VOLTAGE OR 0-10V, AS REQUIRED, WIRELESS.
WALL SWITCH: WIRELESS, DIMMER FOR USE WITH WIRELESS SYSTEM. SEE DETAILS.
WALL SWITCH: OCCUPANCY SENSOR, DIMMER, LINE VOLTAGE OR 0-10V, AS REQUIRED.
WALL SWITCH: A.C. TYPE, 1-POLE, 15A, 125/277V.
WALL SWITCH: A.C. TYPE, 3-WAY, 15A, 125/277V.
WALL SWITCH: A.C. TYPE, 4-WAY, 15A, 125/277V.
WALL SWITCH: SYSTEM ON/OFF, RAISE/LOWER, FOR USE WITH WIRELESS. SEE DETAILS.
PHOTOCELL: TORQ #2101 OR EQUAL MOUNTED ON ROOF.
WALL SWITCH: OCCUPANCY SENSOR & MANUAL ON/OFF. WATTSTOPPER DW-100 OR EQUAL.
SWITCH: LIGHT CONTROL SYSTEM, MOMENTARY, SEE DETAILS.
SWITCH: LOCAL ON/OFF OVERRIDE SWITCH FOR LOCAL OCCUPANCY SENSOR.
WALL SWITCH: WITH LIGHTED TOGGLE HANDLE.
WALL OCCUPANCY SENSOR: SEE DETAILS.
CEILING OCCUPANCY SENSOR: SEE DETAILS
LIGHTING POWER PACK: FOR USE WITH OCCUPANCY SENSORS & LIGHTING CONTROL. SEE DETAILS.
CEILING DAYLIGHT SENSOR: SEE DETAILS

POWER

- CEILING EXHAUST FAN.
NON-FUSED DISCONNECT SWITCH.
FUSED DISCONNECT SWITCH.
CIRCUIT BREAKER.
AUTOMATIC TRANSFER SWITCH.
ELECTRICAL PANEL: SEE SCHEDULE AND SPECIFICATIONS.
TRANSFORMER
FUSED DISCONNECT SWITCH WITH CONNECTION TO EQUIPMENT.
MANUAL MOTOR STARTER THERMAL SWITCH, WALL MOUNT 5'-6"H. OR AT MOTOR AS SHOWN.

ABBREVIATIONS

Table of abbreviations including AFG, AIC, AL, AWG, C, CB, CU, DISC, EM, EMT, EP, EX, F, G, GRD, GFI, IG, NL, MCB, MLO, RR, TBB, TP, TV, TYP, UC, UG, WAP, WP, XR, XRR, XRL, ISOLATED GROUND, NIGHT LIGHT, MAIN CIRCUIT BREAKER, MAIN LUGS ONLY, REMOVE AND REPLACE WITH NEW, TELEPHONE BACK BOARD, TAMPER PROOF, TELEVISION, TYPICAL, UNDER COUNTER, UNDER GROUND, WIRELESS ACCESS POINT, WEATHERPROOF, NEMA 3R, EXISTING - REMOVE, EXISTING - REMOVE AND RELOCATE, EXISTING - RELOCATED.

BRANCH CIRCUITS

- BRANCH CIRCUIT: CONCEALED IN CEILING OR WALL.
BRANCH CIRCUIT: HOMERUN TO PANELBOARD AND 20A, 1P, BREAKER, UNLESS OTHERWISE NOTED. SHOWN, 2#12-3/4" C. HASHMARKS INDICATE NUMBER OF CONDUCTORS WHEN GREATER THAN 2#12. THE NUMBER IN THE CIRCUIT INDICATES A.W.G. WIRE SIZE WHEN DIFFERENT THAN #12 AWG.
BRANCH CIRCUIT: CONCEALED IN OR BELOW FLOOR OR UNDERGROUND
RISER: DOWN
RISER: UP

RECEPTACLES

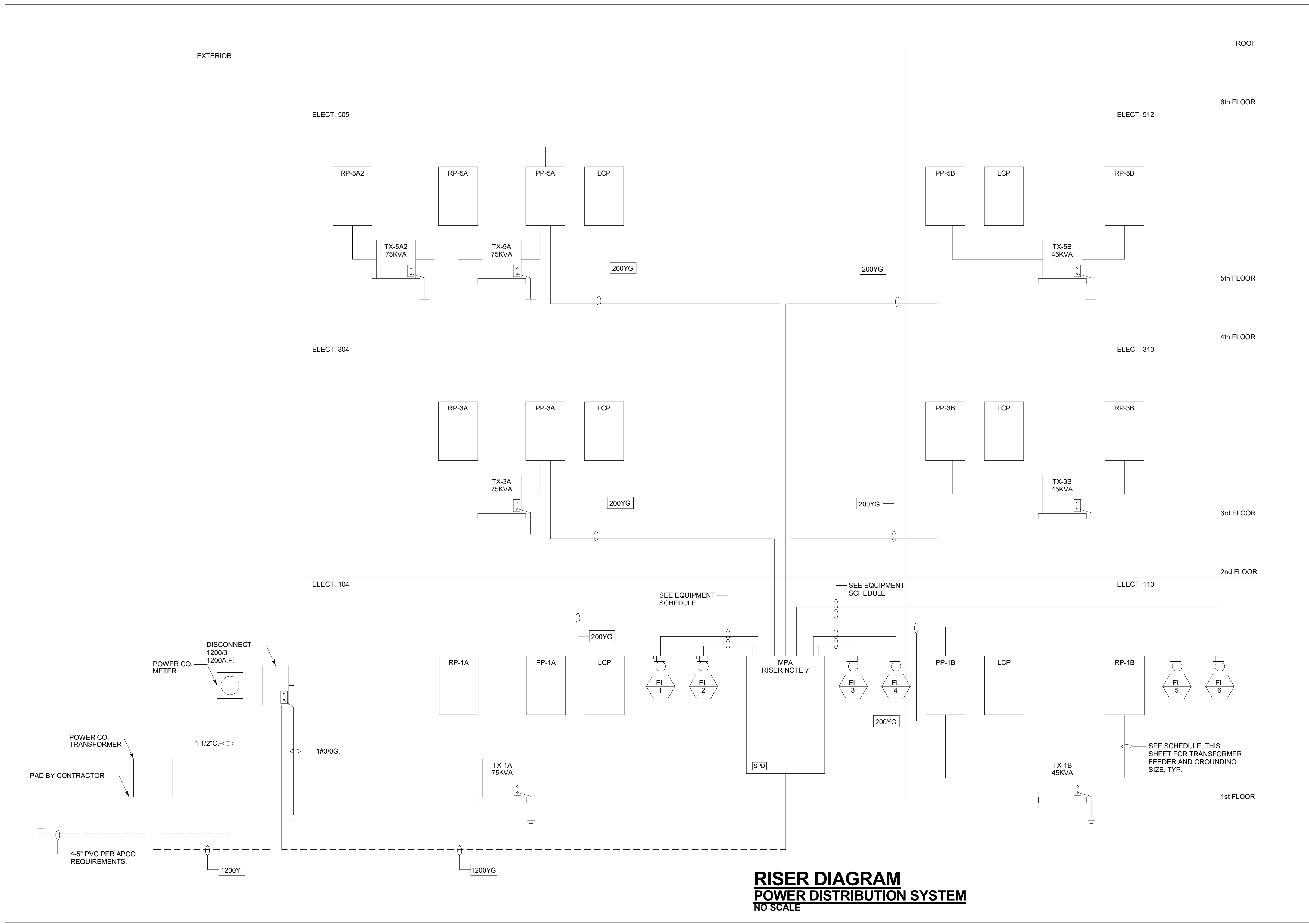
- WALL OUTLET: DUPLEX RECEPTACLE, NEMA 5-20R.
WALL OUTLET: SINGLE RECEPTACLE, NEMA 5-20R.
WALL OUTLET: DUPLEX RECEPTACLE, NEMA 5-20R, MOUNT 44" AFF UNLESS OTHERWISE NOTED OR EQUAL.
WALL OUTLET: SINGLE RECEPTACLE, NEMA 6-30R, MOUNT AT 18" AFF.
WALL OUTLET: ELECTRIC WATER COOLER DOUBLE DUPLEX RECEPTACLE, GFI TYPE, 20A, 125V, 2P, 3W, NEMA 5-20R. VERIFY EXACT HEIGHT AND LOCATION PRIOR TO INSTALLATION.
WALL OUTLET: GROUND FAULT INTERRUPTER RECEPTACLE, TERMINAL NEMA 5-15R, MOUNT AT 18" A.F.F. OR AS NOTED.
WALL OUTLET: DUPLEX RECEPTACLE, WEATHERPROOF, NEMA 5-20R.
WALL OUTLET: DOUBLE-DUPLEX, NEMA 5-20R., MOUNT 44" AFF.
WALL OUTLET: DOUBLE-DUPLEX, NEMA 5-20R., MOUNT 18" AFF.

TELE/DATA

- COMBINATION TELEDATA OUTLET: TWO-GANG BOX WITH ONE GANG PLASTER RING WITH 3/4" C. STUBBED TO TBB.
TELEPHONE BACKBOARD: 4'X8' VERTICAL ORIENTATION, PAINTED ALL SIDES WITH GRAY FIRE RETARDANT PAINT.
CAMERA OUTLET: TWO-GANG BOX WITH ONE GANG PLASTER RING AND 1" C TO TBB. COORDINATE MOUNTING HEIGHT WITH OWNER.

FIRE ALARM

- FIRE ALARM SYSTEM: MANUAL STATION, MOUNT 4'-0"H.
FIRE ALARM SYSTEM: ANNUNCIATOR
FIRE ALARM SYSTEM: SMOKE DETECTOR, SURFACE MOUNTED.
FIRE ALARM SYSTEM: AUTOMATIC FIRE DETECTOR, HIGH TEMPERATURE, 190 DEG. F. (THERMAL) (THERMAL AND RATE OF RISE).
FIRE ALARM SYSTEM: SMOKE DETECTOR IN A/C DUCT WITH SAMPLING TUBES.
FIRE ALARM SYSTEM: COMBINATION HORN AND LIGHT, MOUNT 80" A.F.F.
FIRE ALARM SYSTEM: ALARM SIGNAL LIGHT, MOUNT 80" A.F.F.
FIRE ALARM SYSTEM: CONTROL PANEL, (SURFACE) (FLUSH) MOUNTED.
FIRE ALARM SYSTEM: FLOW SWITCH CONNECTION
FIRE ALARM SYSTEM: SUPERVISORY VALVE CONNECTION
FIRE ALARM SYSTEM: ALARM SIGNAL LIGHT, CEILING MOUNTED
FIRE ALARM SYSTEM: NAC PANEL



**RISER DIAGRAM  
POWER DISTRIBUTION SYSTEM  
NO SCALE**

TRANSFORMER TABLE - 480V PRIMARY - 208/120V SECONDARY										
KVA	FL AMPS	BKR SIZE	FDR	TRANSFORMER WIRING		TRANSFORMER GROUNDING ELECTRODE (3)		FL AMPS	BKR SIZE	FDR
3PH	480V	(1)	(2)	WIRE AWG	CONDUIT IN	208V	(1)	(2)		
15	18	30	30DG	8	3/4	41.7	50	60YG		
30	36.1	50	60DG	6	3/4	83.3	100	125YG		
45	54.1	70	80DG	6	3/4	124.9	150	150YG		
75	90.2	125	150DG	2	3/4	208.2	250	250YG		
112.5	135.3	200	200DG	1/0	1	312.3	400	420YG		
150	180.4	225	225DG	1/0	1	416.4	500	500YG		
225	270.6	350	400DG	2/0	1	625.5	800	840YG		

NOTES:  
 1 - USE DEVICE TYPES INDICATED ON SINGLE LINE DIAGRAM.  
 2 - REFERENCE FEEDER TABLE FOR FEEDER SIZE  
 3 - PROVIDE COPPER GROUNDING ELECTRODE  
 DRY-TYPE TRANSFORMER WITH COPPER WINDINGS. PROVIDE NEMA 3R ENCLOSURE FOR ALL EXTERIOR TRANSFORMERS.

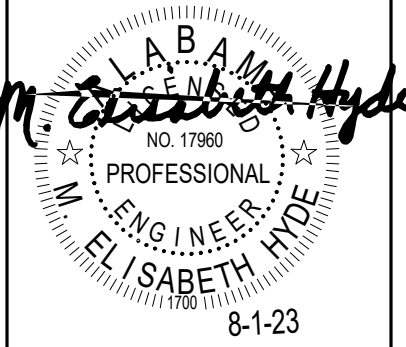
FEEDER SCHEDULE			
20DG	3#12 & 1#12G-1/2"C.	150DG	3#1/0 & 1#6G-2"C.
20SG	2#12 & 1#12G-1/2"C.	150YG	4#1/0 & 1#6G-2 1/2"C.
30SG	2#10 & 1#10G-3/4"C.	200YG	4#3/0 & 1#6G-3"C.
60DG	3#6 & 1#6G-1 1/4"C.	250YG	4#250MCM & 1#4G-3"C.
80DG	3#4 & 1#8G-1 1/2"C.	800Y	2 SETS OF 4#500MCM 4"C.
100DG	3#2 & 1#8G-1 1/2"C.	1200Y	4 SETS OF 4#350MCM 3 1/2"C.
100YG	4#2 & 1#8G-2"C.	1200YG	4 SETS OF 4#350MCM & 1#3/0G-3 1/2"C.
125YG	4#1 & 1#6G-2"C.		

- SERVICE NOTES:**
- THE SECONDARY SERVICE: 277/480V, 3P, 4W., GROUNDED NEUTRAL, WYE CONNECTED AS SHOWN ON SINGLE LINE DIAGRAM.
  - ARRANGE WITH LOCAL ELECTRICAL SERVICE COMPANY FOR SERVICE TO BE BROUGHT TO BUILDING, AND FOR THE INSTALLATION OF METER. PAY ALL CHARGES (IF ANY) IN CONNECTION THEREWITH, INCLUDING PERMANENT METER DEPOSIT, WHICH DEPOSITS WILL BE REFUNDED TO CONTRACTOR AT TIME OF OWNER'S OCCUPANCY IN THE BUILDING.
  - VERIFY WITH UTILITY COMPANIES INVOLVED THAT LOCATIONS, ARRANGEMENT, POWER COMPANY VOLTAGE, PHASE, METERING REQUIRED, AND CONNECTIONS TO UTILITY SERVICE ARE IN ACCORDANCE WITH THEIR REGULATIONS AND REQUIREMENTS. IF THEIR REQUIREMENTS ARE AT VARIANCE WITH THESE DRAWINGS AND/OR SPECIFICATIONS, CONTRACT SHALL INCLUDE AN ADDITIONAL COST NECESSARY TO MEET THOSE REQUIREMENTS WITHOUT EXTRA COST TO OWNER AFTER BIDS ARE ACCEPTED.
  - OBTAIN FROM UTILITY COMPANY ANY ADDITIONAL CHARGES FOR SERVICE OF TYPE, SIZE, AND LOCATION CALLED FOR. INCLUDE CHARGES IN BID TO BE PAID BY CONTRACTOR TO APPROPRIATE PARTY. PROVIDE PAYMENT OF THESE CHARGES SO AS TO ALLOW LOGICAL PROGRESSION OF CONSTRUCTION AND AVOID DELAY OF COMPLETION.
  - COORDINATE SERVICE WORK WITH POWER COMPANY. FURNISH AND INSTALL ALL SERVICE RELATED ITEMS NOT PROVIDED BY THE POWER COMPANY. PERFORM WORK IN ACCORDANCE WITH THEIR REQUIREMENTS AND RECOMMENDATIONS.

- RISER NOTES:**
- INDUSTRY AVERAGE EQUIPMENT SIZES WERE USED TO DETERMINE FIT AND WORKING CLEARANCES. E.C. IS TO VERIFY FIT AND WORKING CLEARANCES BASED ON ACTUAL EQUIPMENT CONSIDERED.
  - PROTECTIVE DEVICES RATED 1200A & GREATER SHALL HAVE ENERGY REDUCING MAINTENANCE SWITCHING WITH LOCAL STATUS INDICATOR OR ARC-FLASH ENERGY REDUCTION SCHEME/METHOD APPROVED BY ENGINEER.
  - SEE FLOOR PLANS FOR PLACEMENT OF EQUIPMENT.
  - PROVIDE DOUBLE LUGS IN TWO SECTION PANELS.
  - ALL EXTERIOR EQUIPMENT TO BE IN NEMA 3R ENCLOSURES.
  - SEE EQUIPMENT SCHEDULE ON SHEET E0.09 FOR EQUIPMENT FEEDER SIZES.
  - ALL BREAKERS IN 'MPA' SHALL BE LSI TYPE.

- SHORT CIRCUIT, COORDINATION, AND ARC FLASH:**
- ACTUAL AVAILABLE FAULT CURRENT DATA WAS NOT OBTAINED FROM THE POWER COMPANY. E.C. IS TO OBTAIN FAULT CURRENT DATA FROM POWER COMPANY.
  - E.C. TO PROVIDE SHORT CIRCUIT, COORDINATION, AND ARC FLASH STUDIES FOR ALL NEW EQUIPMENT AS WELL AS EXISTING UPSTREAM EQUIPMENT.
  - STUDIES ARE TO START AT UTILITY SOURCE AND/OR GENERATOR AND INCLUDE ALL EXISTING UPSTREAM EQUIPMENT.
  - E.C. IS RESPONSIBLE FOR COLLECTING ALL DATA NECESSARY TO COMPLETE STUDY.
  - STUDIES ARE TO BE PERFORMED USING SKM POWERWARE, EASYPower, OR ETAP SOFTWARE UNDER THE SUPERVISION OF A REGISTERED ENGINEER. ARC FLASH STUDIES SHALL BE CONSISTENT WITH IEEE 1584.
  - PROVIDE PRELIMINARY STUDY REPORT AT TIME OF POWER EQUIPMENT SUBMITTALS. POWER EQUIPMENT SUBMITTALS WILL BE REJECTED WITHOUT PRELIMINARY STUDY.
  - USE RESULTS OF STUDY TO SELECT AIC RATINGS, BREAKER TYPES, ETC. FOR POWER EQUIPMENT PRIOR TO ORDERING EQUIPMENT. MINIMUM AIC RATINGS ARE INDICATED IN PANEL SCHEDULES BASED ON ESTIMATED UTILITY TRANSFORMER SIZE AND AVAILABLE INFORMATION.
  - MARK EQUIPMENT PER BOTH NFPA 70 AND 70E TO INCLUDE, BUT NOT LIMITED TO, ARC FLASH LABELS.
  - PROVIDE FINAL STUDY REPORT AS PART OF CLOSE-OUT DOCUMENTATION (BOTH HARD COPY AND ELECTRONIC PDF FORM).

**Mobile Civic Center  
Parking Facility**  
Mobile, Alabama



**Evan Terry Associates LLC**  
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Revisions

sheet title  
RISER DIAGRAM

job no. **4308**

des. by [blank] snt. no. [blank]  
 kdp [blank]  
 cd. by MEH of 167  
 dws. no. [blank]  
**E0.02**  
 of 72  
 date August, 1 2023  
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ENGINEER:  
LIZ HYDE

PROJECT #  
23047.0



PANEL: RP5A2													
VOLTAGE:		120 /208V			PHASE/WIRE: 3P., 4W.			MAIN BUS RATING: 250A.			MAIN CB TRIP: 250 AMP		
MOUNTING: SURFACE													
MINIMUM BREAKER INTERRUPTING CAPACITY (RMS SYM AMPS):													
DEVI CE:													
AMPS TRIP	POLES	DESIGNATION	VOLTS-AMPS	NO.	PHASE LOAD (VOLT - AMPS)			NO.	VOLTS-AMPS	DESIGNATION	POLES	AMPS TRIP	
					Ø A	Ø B	Ø X						
		Space		1	0			2		Space			
		Space		3		0		4		Space			
		Space		5			0	6		Space			
		Space		7	0			8		Space			
		Space		9		0		10		Space			
		Space		11			0	12		Space			
		Space		13	0			14		Space			
		Space		15		0		16		Space			
		Space		17			0	18		Space			
		Space		19	0			20		Space			
		Space		21			0	22		Space			
		Space		23			0	24		Space			
		Space		25	0			26		Space			
		Space		27		0		28		Space			
		Space		29			0	30		Space			
		Space		31	0			32		Space			
		Space		33		0		34		Space			
		Space		35			0	36		Space			
		Space		37	0			38		Space			
		Space		39			0	40		Space			
		Space		41			0	42		Space			
<b>TOTAL</b>					0	0	0	<b>TOTAL CONNECTED LOAD (AMPS):</b> 0.00					
					<b>REQUIRED AMPACITY (AMPS):</b> 0.00								

PANEL: RP5B													
VOLTAGE:		120 /208V			PHASE/WIRE: 3P., 4W.			MAIN BUS RATING: 200A.			MAIN CB TRIP: 150 AMP		
MOUNTING: SURFACE													
MINIMUM BREAKER INTERRUPTING CAPACITY (RMS SYM AMPS):													
DEVI CE:													
AMPS TRIP	POLES	DESIGNATION	VOLTS-AMPS	NO.	PHASE LOAD (VOLT - AMPS)			NO.	VOLTS-AMPS	DESIGNATION	POLES	AMPS TRIP	
					Ø A	Ø B	Ø X						
	20	1	Electrical 512	400	1	1400		2	1000	FACP	1	20	
	20	1	Data 513	800	3		1300	4	500	LCP	1	20	
	20	1		400	5			6	200	Recept Elec Rm 509	1	20	
	20	1	Spare		7	1000		8	1000				
	20	1			9		1000	10	1000	DSHP-11	2	30	
	20	1	Spare		11			12	1000				
	20	1	Elevator 3/4 Cab Lights	500	13	1500		14	1000	DSHP-14	2	30	
	20	1	Elevator 3/4 Cab Power	500	15		600	16	100	DSHP-12	2	30	
	20	1	Elevator 5/6 Cab Lights	500	17			18	1000				
	20	1	Elevator 5/6 Cab Power	500	19	500		20		Space			
	20	1	Heat Tape	1500	21		1500	22		Space			
	20	1	Elev. Equip. 514	400	23			24		Space			
	20	1	Equipment Rm 504	400	25	400		26		Space			
			Space		27		0	28		Space			
			Space		29		0	30		Space			
			Space		31	0		32		Space			
			Space		33		0	34		Space			
			Space		35		0	36		Space			
			Space		37	0		38		Space			
			Space		39		0	40		Space			
			Space		41		0	42		Space			
<b>TOTAL</b>					4800	4400	3500	<b>TOTAL CONNECTED LOAD (AMPS):</b> 40.00					
					<b>REQUIRED AMPACITY (AMPS):</b> 50.00								

# Mobile Civic Center Parking Facility

Mobile, Alabama



**Evan Terry Associates LLC**  
 Architecture • Accessible Design  
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Revisions	

sheet title  
**PANEL SCHEDULES**

job no. **4308**

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cd. by MEH of 167

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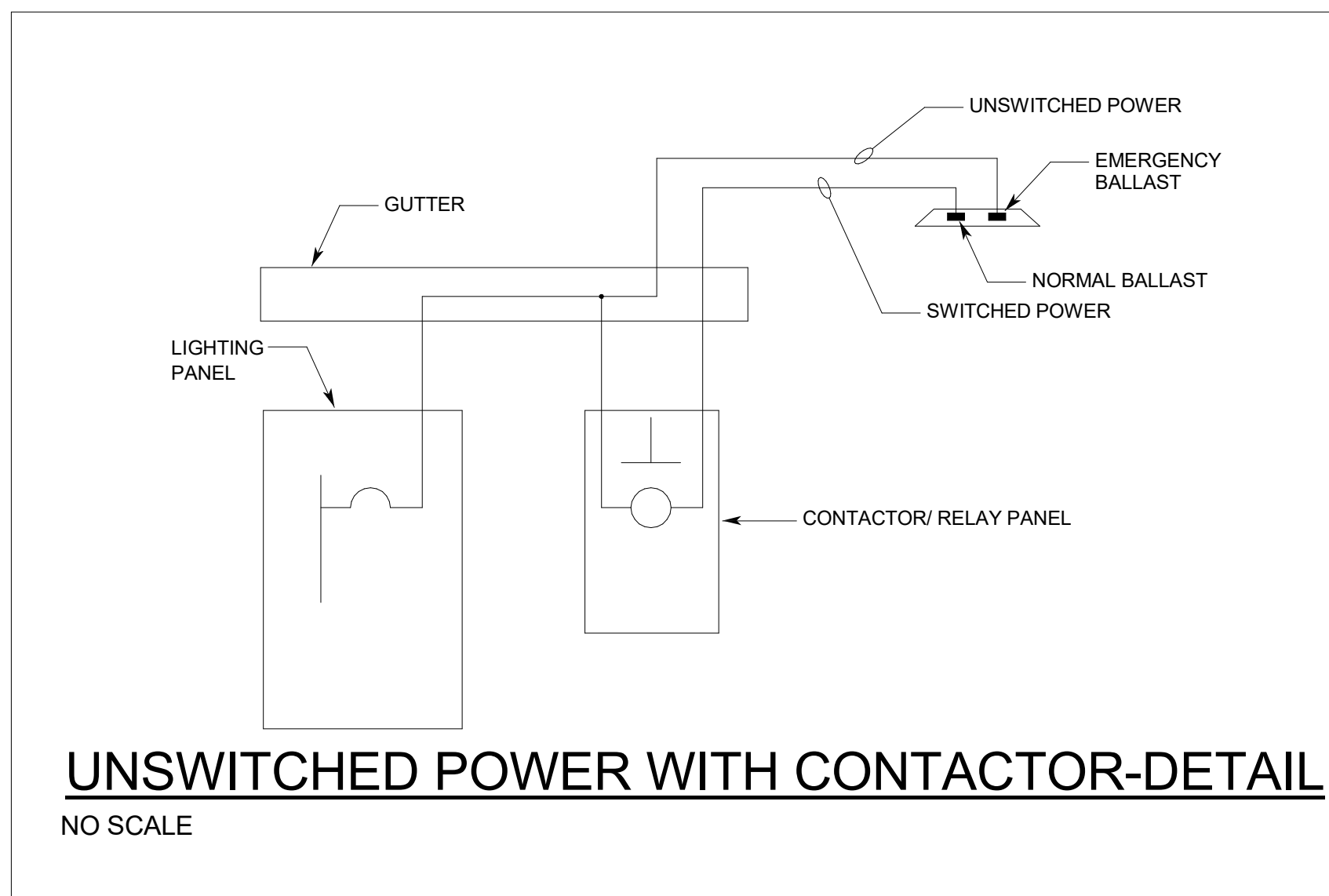
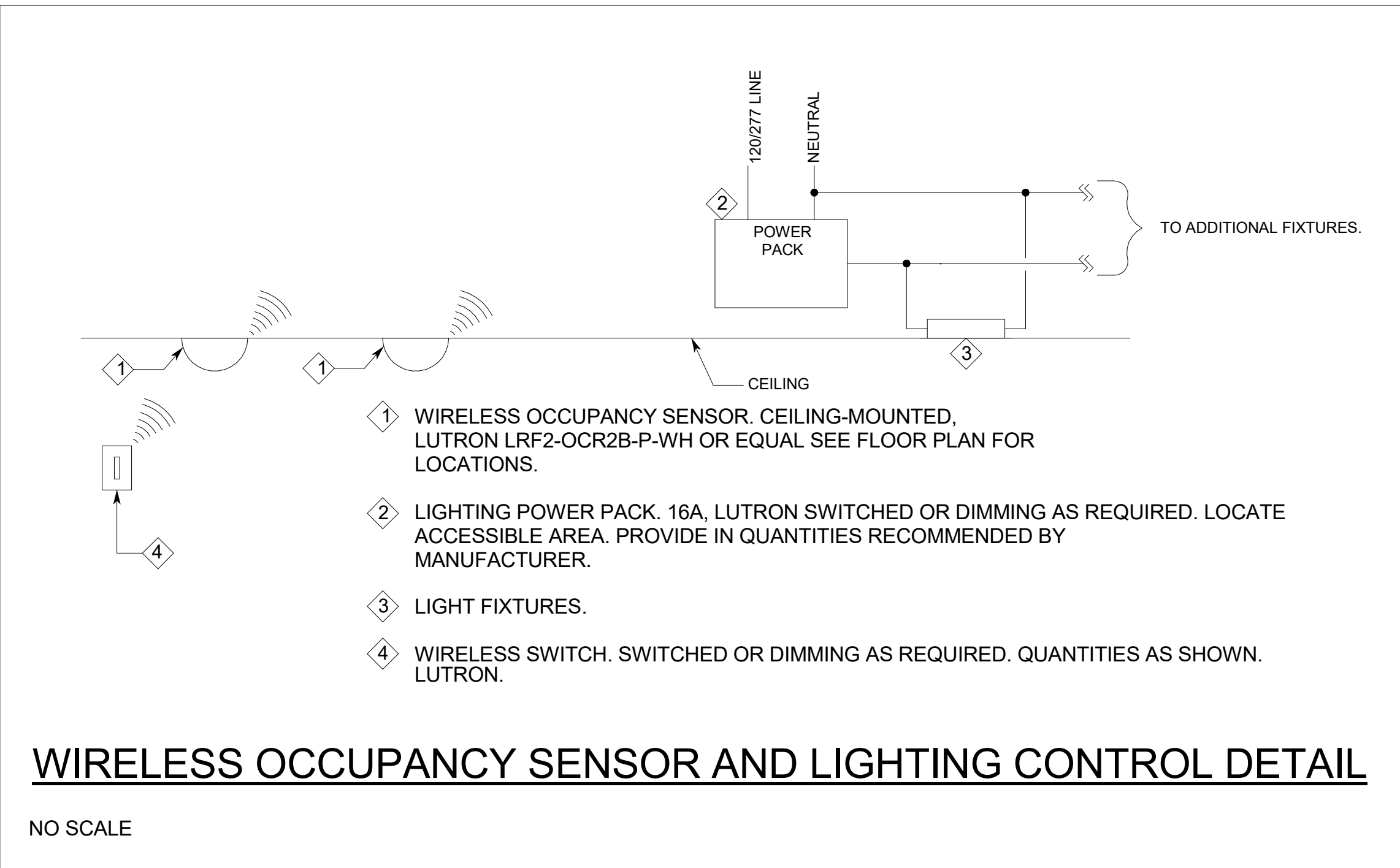
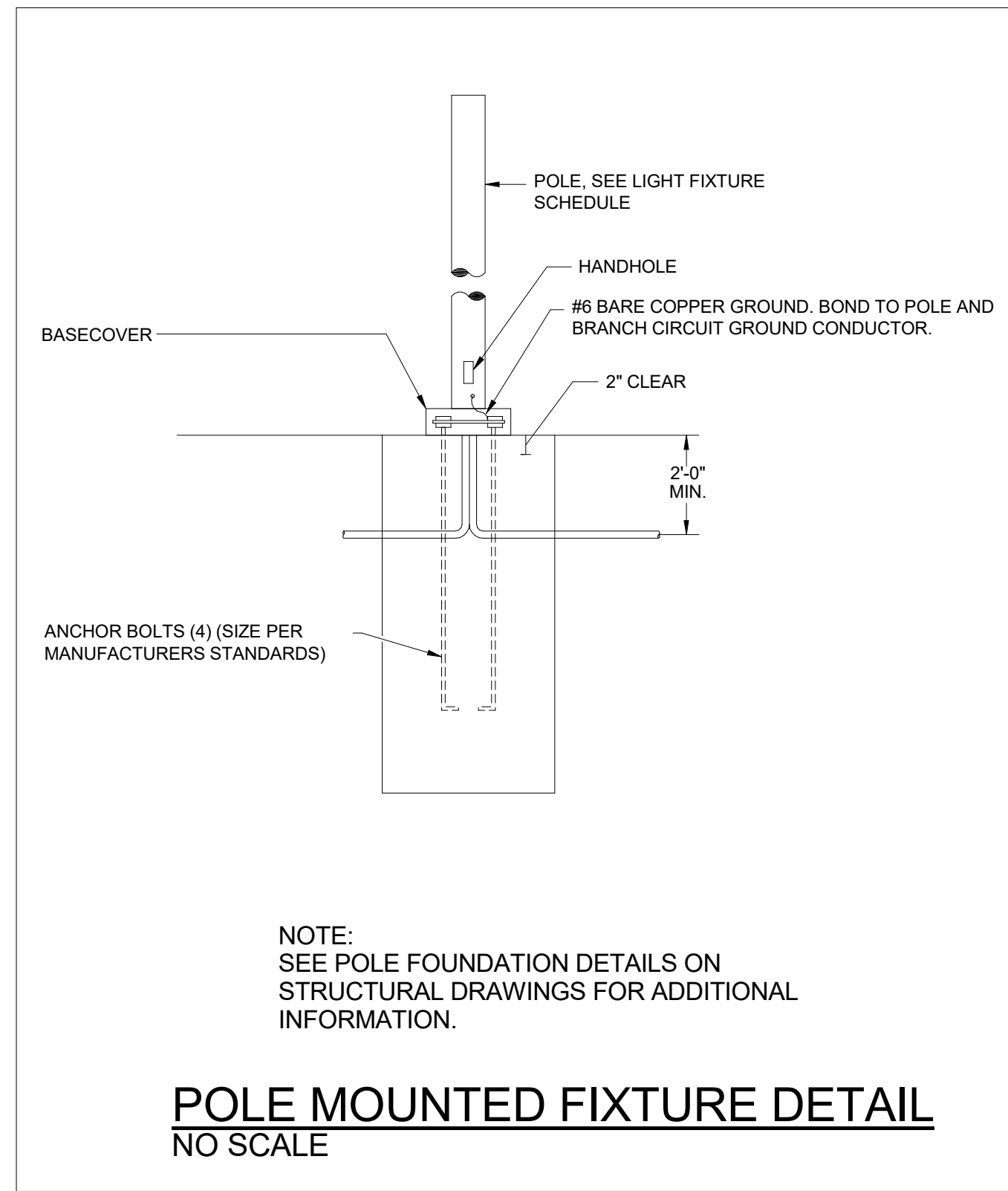
date August, 1 2023

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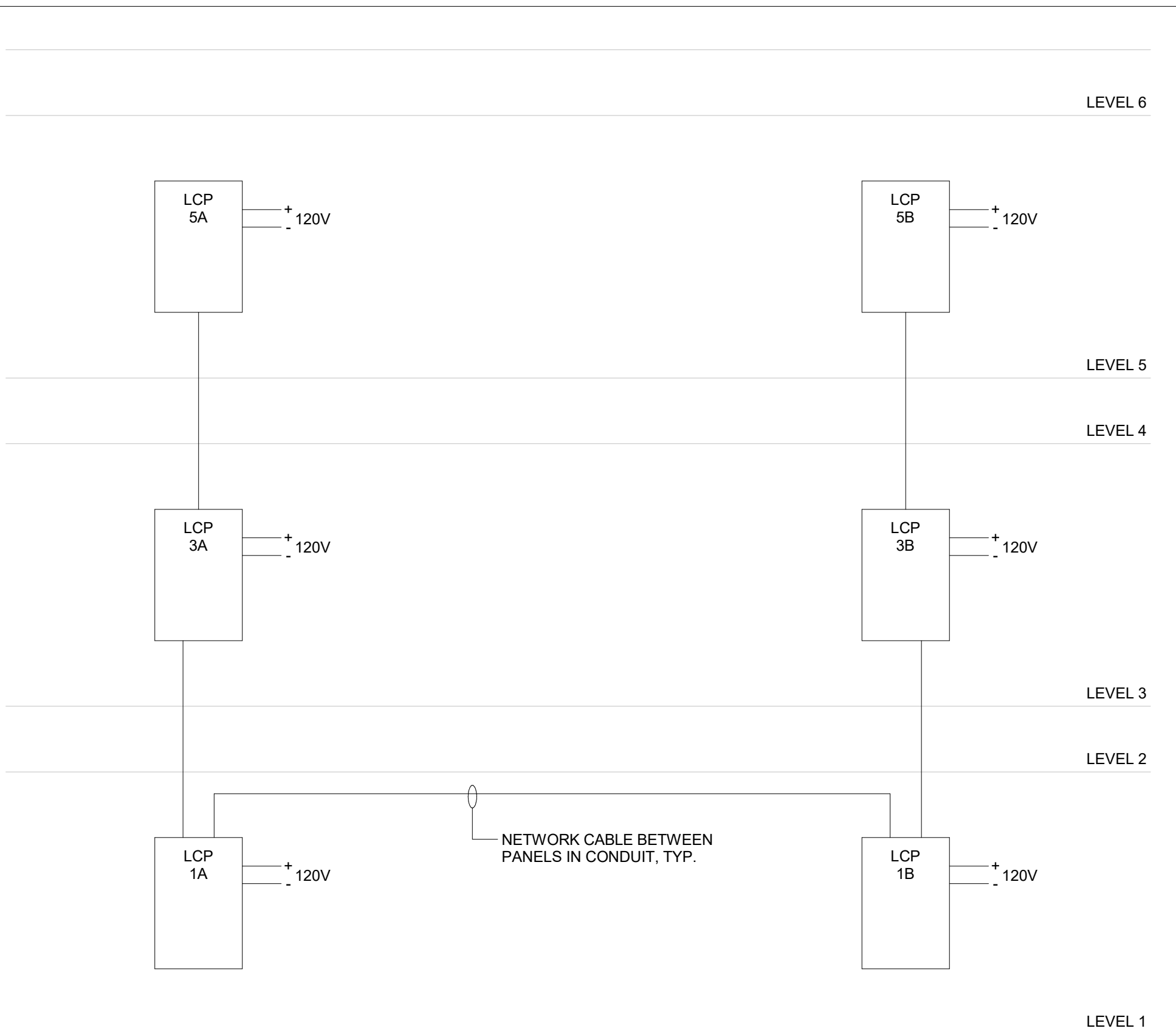
ENGINEER:  
**LIZ HYDE**

PROJECT #  
**23047.0**



**PARKING DECK LIGHTING CONTROL NARRATIVE**

- THE INTENT IS TO PROVIDE A COMPLETE LIGHTING CONTROL SYSTEM FOR THE PARKING DECK INTERIOR AND EXTERIOR LIGHTING. ALL LIGHT FIXTURES SHALL BE DIMMABLE.
- THE PERIMETER PARKING DECK LIGHT FIXTURES ARE TO BE CONTROLLED SEPARATELY FROM THE INTERIOR PARKING DECK LIGHT FIXTURES WITH THE PERIMETER LIGHTING DIMMED OR SHUT OFF DURING DAYLIGHT THROUGH DAYLIGHTING SENSORS.
- LIGHTING POWER AT EACH LIGHT FIXTURE SHALL BE AUTOMATICALLY REDUCED BY A MINIMUM OF 30% WHEN THERE IS NO ACTIVITY DETECTED IN A LIGHTING ZONE FOR 20 MINUTES. (ASHRAE 90.1-2013 9.4.1.2)
- LIGHTING AT ENTRANCE AND EXITS SHALL BE SEPARATELY CONTROLLED AND LIGHTING LEVELS SHALL BE REDUCED BY AT LEAST 50% FROM SUNRISE TO SUNSET.
- INTERIOR OF STAIRS AND EXIT SIGNAGE SHALL BE CONTINUOUSLY ON.
- EXTERIOR FLEXIBLE TUBE LIGHTING SHALL BE TIME CONTROLLED AND DIMMABLE.
- EXTERIOR LED LIGHTING AT CANOPIES AND EXTERIOR OF THE STAIR TOWER SHALL BE TIME CONTROLLED AND DIMMABLE.
- LIGHTING CONTROLS SHALL BE COMPLIANT WITH ASHRAE 90.1 2013.
- PROVIDE COMPLETE SHOP DRAWINGS WITH SUBMITTALS.



**LIGHTING CONTROL RISER DIAGRAM**  
NO SCALE

LCP LEVEL 1A				LCP LEVEL 1B			
DESCRIPTION	RELAY	PANEL AND CIRCUIT NUMBERS	SCHEDULE	DESCRIPTION	RELAY	PANEL AND CIRCUIT NUMBERS	SCHEDULE
LVL 1 GARAGE PERIMETER	1	PP-1A.#1	C	LVL 1 GARAGE ENTRANCE	1	PP-1B.#3	C
LVL 1 GARAGE INTERIOR	2	PP-1A.#3	C	LVL 1 GARAGE PERIMETER	2	PP-1B.#7	C
LVL 1 GARAGE INTERIOR	3	PP-1A.#5	C	LVL 1 GARAGE INTERIOR	3	PP-1B.#9	C
LVL 2 GARAGE PERIMETER	4	PP-1A.#13	C	LVL 2 GARAGE PERIMETER	4	PP-1B.#11	C
LVL 2 GARAGE INTERIOR	5	PP-1A.#15	C	LVL 2 GARAGE INTERIOR	5	PP-1B.#13	C
LVL 2 GARAGE INTERIOR	6	PP-1A.#17	C	LVL 2 GARAGE INTERIOR	6	PP-1B.#15	C
LVL 2 GARAGE ENTRANCE	7	PP-1A.#19	A	LVL 1 FACADE CANOPY	7	PP-1B.#21	A
LVL 2 BOLLARDS	8	PP-1A.#21	A	LVL 1 FACADE CANOPY	8	PP-1B.#4	A
SPARE (FUTURE)	9			LVL 1 FACADE CANOPY	9	PP-1B.#6	A
SPARE (FUTURE)	10			LVL 1 EXTERIOR CANOPY	10	PP-1B.#21	A
SPARE (FUTURE)	11			SPARE (FUTURE)	11		
SPARE (FUTURE)	12			SPARE (FUTURE)	12		
SPARE (FUTURE)	13			SPARE (FUTURE)	13		
SPARE (FUTURE)	14			SPARE (FUTURE)	14		
SPARE (FUTURE)	15			SPARE (FUTURE)	15		
SPARE (FUTURE)	16			SPARE (FUTURE)	16		

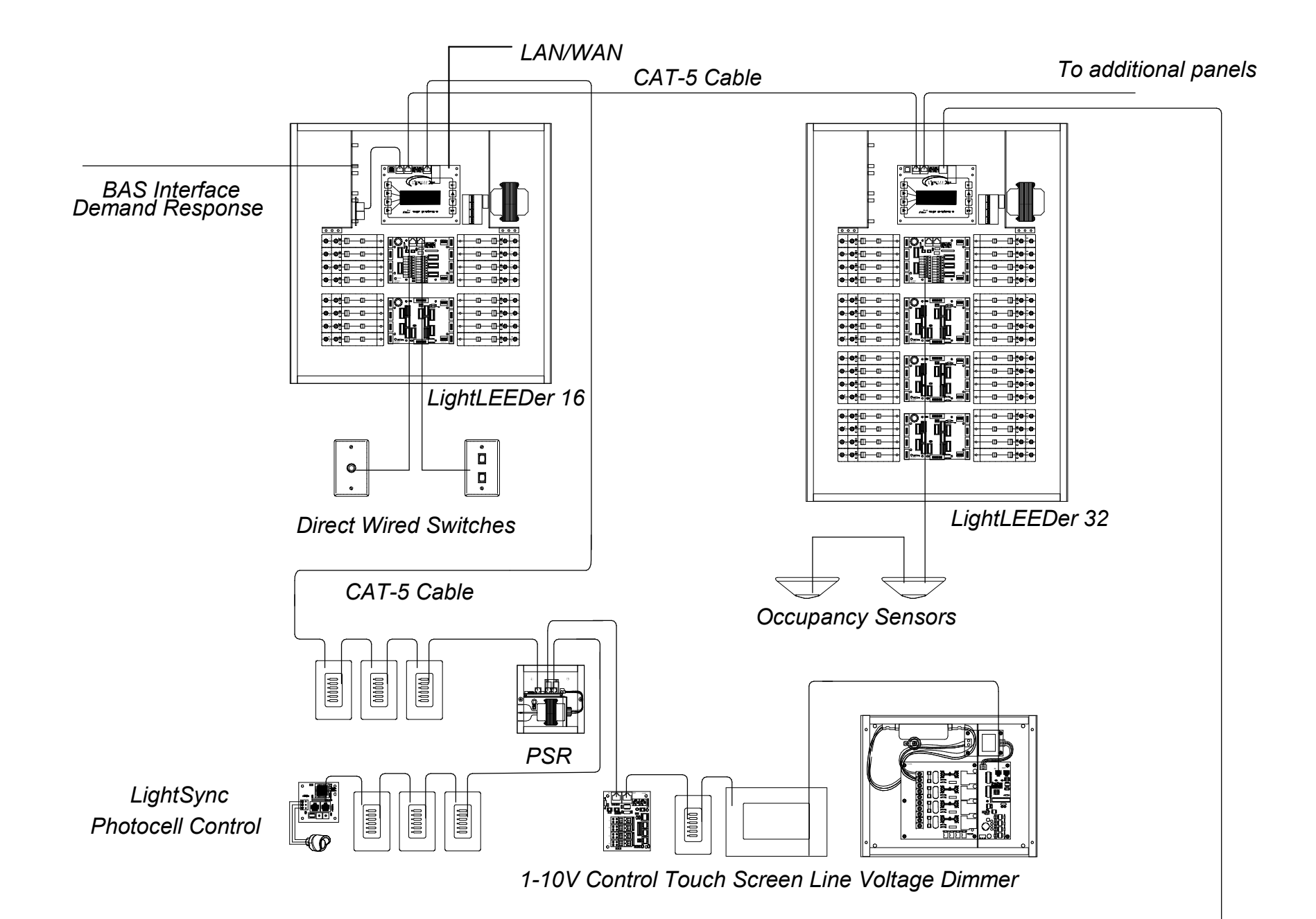
LCP LEVEL 3A				LCP LEVEL 3B			
DESCRIPTION	RELAY	PANEL AND CIRCUIT NUMBERS	SCHEDULE	DESCRIPTION	RELAY	PANEL AND CIRCUIT NUMBERS	SCHEDULE
LVL 3 GARAGE PERIMETER	1	PP-3A.#1	C	LVL 3 GARAGE ENTRANCE	1	PP-3B.#1	C
LVL 3 GARAGE INTERIOR	2	PP-3A.#3	C	LVL 3 GARAGE PERIMETER	2	PP-3B.#3	C
LVL 3 GARAGE INTERIOR	3	PP-3A.#5	C	LVL 3 GARAGE INTERIOR	3	PP-3B.#5	C
LVL 4 GARAGE PERIMETER	4	PP-3A.#9	C	LVL 4 GARAGE PERIMETER	4	PP-3B.#9	C
LVL 4 GARAGE INTERIOR	5	PP-3A.#11	C	LVL 4 GARAGE INTERIOR	5	PP-3B.#11	C
LVL 4 GARAGE INTERIOR	6	PP-3A.#13	C	LVL 4 GARAGE INTERIOR	6	PP-3B.#13	C
SPARE (FUTURE)	7			SPARE (FUTURE)	7		
SPARE (FUTURE)	8			SPARE (FUTURE)	8		
SPARE (FUTURE)	9			SPARE (FUTURE)	9		
SPARE (FUTURE)	10			SPARE (FUTURE)	10		
SPARE (FUTURE)	11			SPARE (FUTURE)	11		
SPARE (FUTURE)	12			SPARE (FUTURE)	12		
SPARE (FUTURE)	13			SPARE (FUTURE)	13		
SPARE (FUTURE)	14			SPARE (FUTURE)	14		
SPARE (FUTURE)	15			SPARE (FUTURE)	15		
SPARE (FUTURE)	16			SPARE (FUTURE)	16		

LCP LEVEL 5A				LCP LEVEL 5B			
DESCRIPTION	RELAY	PANEL AND CIRCUIT NUMBERS	SCHEDULE	DESCRIPTION	RELAY	PANEL AND CIRCUIT NUMBERS	SCHEDULE
LVL 5 GARAGE PERIMETER	1	PP-5A.#1	C	LVL 5 GARAGE ENTRANCE	1	PP-5B.#1	C
LVL 5 GARAGE INTERIOR	2	PP-5A.#3	C	LVL 5 GARAGE PERIMETER	2	PP-5B.#3	C
LVL 5 GARAGE INTERIOR	3	PP-5A.#5	C	LVL 5 GARAGE INTERIOR	3	PP-5B.#5	C
LVL 6 POLE FIXTURES	4	PP-5A.#9	A	LVL 6 POLE FIXTURES	4	PP-5B.#9	A
LVL 5 LINEAR STAIR TOWER	5	PP-5A.#2	-	LVL 6 POLE FIXTURES	5	PP-5B.#11	A
LVL 5 LINEAR STAIR TOWER	6	PP-5A.#4	-	LVL 5 LINEAR STAIR TOWER	6	PP-5B.#2	-
SPARE (FUTURE)	7			LVL 5 LINEAR STAIR TOWER	7	PP-5B.#4	-
SPARE (FUTURE)	8			SPARE (FUTURE)	8		
SPARE (FUTURE)	9			SPARE (FUTURE)	9		
SPARE (FUTURE)	10			SPARE (FUTURE)	10		
SPARE (FUTURE)	11			SPARE (FUTURE)	11		
SPARE (FUTURE)	12			SPARE (FUTURE)	12		
SPARE (FUTURE)	13			SPARE (FUTURE)	13		
SPARE (FUTURE)	14			SPARE (FUTURE)	14		
SPARE (FUTURE)	15			SPARE (FUTURE)	15		
SPARE (FUTURE)	16			SPARE (FUTURE)	16		

LIGHT FIXTURE SCHEDULE			
MARK	DESCRIPTION	LUMENS/WATTS	MANUFACTURER'S PART NO
EWA	EXTERIOR WALL MOUNTED FIXTURE, EMERGENCY BATTERY PACK, UL LISTED WET LOCATION, 277V.	6000 LM/55W	EATON #ISW AF 1000 LED E1 T4FT XX CWB
GA (GAE)	LED PARKING GARAGE FIXTURE, 4000K, WIDE DISTRIBUTION, UNIVERSAL VOLTAGE, MOUNT @ 13'5" ON LEVEL 1 AND 8'5" ON ALL OTHER LEVELS, PROVIDE WITH MOUNTING HARDWARE AND INTEGRAL OCCUPANCY/DAYLIGHT SENSOR, UL LISTED DAMP LOCATION (GAE = GA + EMERGENCY BATTERY)	9500 LM/75 WATTS	COOPER #TT-D5-740-U-WQ-SPB2-(EM)
GB (GBE)	LED PARKING GARAGE FIXTURE, 4000K, WIDE DISTRIBUTION, UNIVERSAL VOLTAGE, MOUNT @ 13'5" ON LEVEL 1 AND 8'5" ON ALL OTHER LEVELS, PROVIDE WITH MOUNTING HARDWARE AND INTEGRAL OCCUPANCY/DAYLIGHT SENSOR, UL LISTED DAMP LOCATION (GBE = GB + EMERGENCY BATTERY)	9500 LM/75 WATTS	COOPER #TT-D5-740-U-CQ-SPB2-(EM)
LF (ELF)	4' LED STRIP FIXTURE, SURFACE MOUNTED, 3500K, 0-10V DIMMING, 277V. (ELF = LF + EMERGENCY PACK)	3,150 LM/29W	EATON #45WLED-325L-LC-UNV-L835-CD-U-(EM)
LPA	LED POLE MOUNTED AREA LIGHT, 2 HEADS MOUNTED AT 180 DEGREES, 4000K, TYPE 5 WIDE DISTRIBUTION, UNV VOLTAGE, MOUNTED ON 25' SQUARE STEEL POLE, WITH DIMMING, 277V.	21,360 LM/153 W	COOPER #(2) PRV-C60-D-UNV-T5-BZ/MTD AT 25' AFG
LRA (ERA)	RECESSED LED DOWNLIGHT, UL LISTED WET LOCATION, 120 VOLT (EMERGENCY BALLAST)	4000 LM/50 W	COOPER LD6C 4090 40 D010 MD 1H (EMBOB)
LS2	SURFACE MOUNTED LED, MOUNTED ON METAL PANEL, SEALED AND LISTED FOR DAMP LOCATIONS (IP44), 120 VOLT	500 lm/ft 20 WATTS/FT	LUMENWERX V2SEALS D WET ASDO SW 80 500 40 XX UNV D1 1C GSM X CC NA
XA/XB	SURFACE MOUNTED EXIT SIGN SUITABLE FOR DAMP LOCATIONS, THERMOPLASTIC HOUSING, CHEVRONS AS INDICATED, 120 VOLT, XA= SINGLE FACE, XB=DOUBLE FACE	LEDS INCLUDED	SURE-LITES LPXW 7 1/2 G WH SD

NOTES:  
 1. MANUFACTURER'S PART NUMBERS ARE FOR LEVEL OF QUALITY AND PERFORMANCE. PROVIDE ALL OPTIONS AND ACCESSORIES TO MEET INTENT OF DESIGN.  
 2. 10 DAY PRIOR APPROVAL IS REQUIRED ON ALL FIXTURES NOT SPECIFICALLY CALLED OUT AS "OR EQUAL"  
 3. COORDINATE FIXTURE COLORS AND LAMP TEMP WITH ARCHITECT PRIOR TO ORDERING.  
 4. VERIFY CEILING TYPE AND COMPATIBILITY WITH FIXTURES PRIOR TO ORDERING.  
 5. FUSE FIXTURES IN FIELD.  
 6. FOR FIXTURES MARKED 'TBD', COORDINATE FIXTURE SELECTION WITH ENGINEER/ARCHITECT PRIOR TO SUBMITTAL.



**PARKING DECK LIGHTING CONTROL WIRING DIAGRAM**  
NO SCALE

INTERIOR SPACES LIGHTING CONTROLS PERFORMANCE SPEC:

- INTENT OF DESIGN IS TO PROVIDE 0-10V DIMMING (UNLESS OTHERWISE NOTED) IN ALL AREAS WITH DIMMER SYMBOL (Ⓢ) SHOWN.
- MULTIPLE ZONES OF CONTROL WITHIN A SINGLE AREA ARE DESIGNATED WITH a, b, ETC. PROVIDE (1) DIMMER PER DESIGNATED ZONE IN EACH LOCATION WITH DIMMER SYMBOL (Ⓢ) SHOWN.
- PROVIDE POWER PACKS AS REQUIRED FOR INTENDED DESIGN. POWER PACKS NOT SHOWN. PROVIDE QUANTITY AS RECOMMENDED BY VENDOR.
- LIGHTING CONTROLS ARE TO BE APPROVED PRIOR TO BID.
- PROVIDE COMPLETE LIGHTING CONTROLS SHOP DRAWINGS PRIOR TO INSTALLATION.

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23047.0



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Revisions

sheet title

LIGHT FIXTURE SCHEDULE & DETAILS

job no. **4308**

dwn. by KCP snt. no.

ckd. by MEH of 167

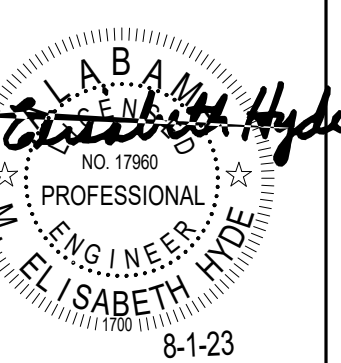
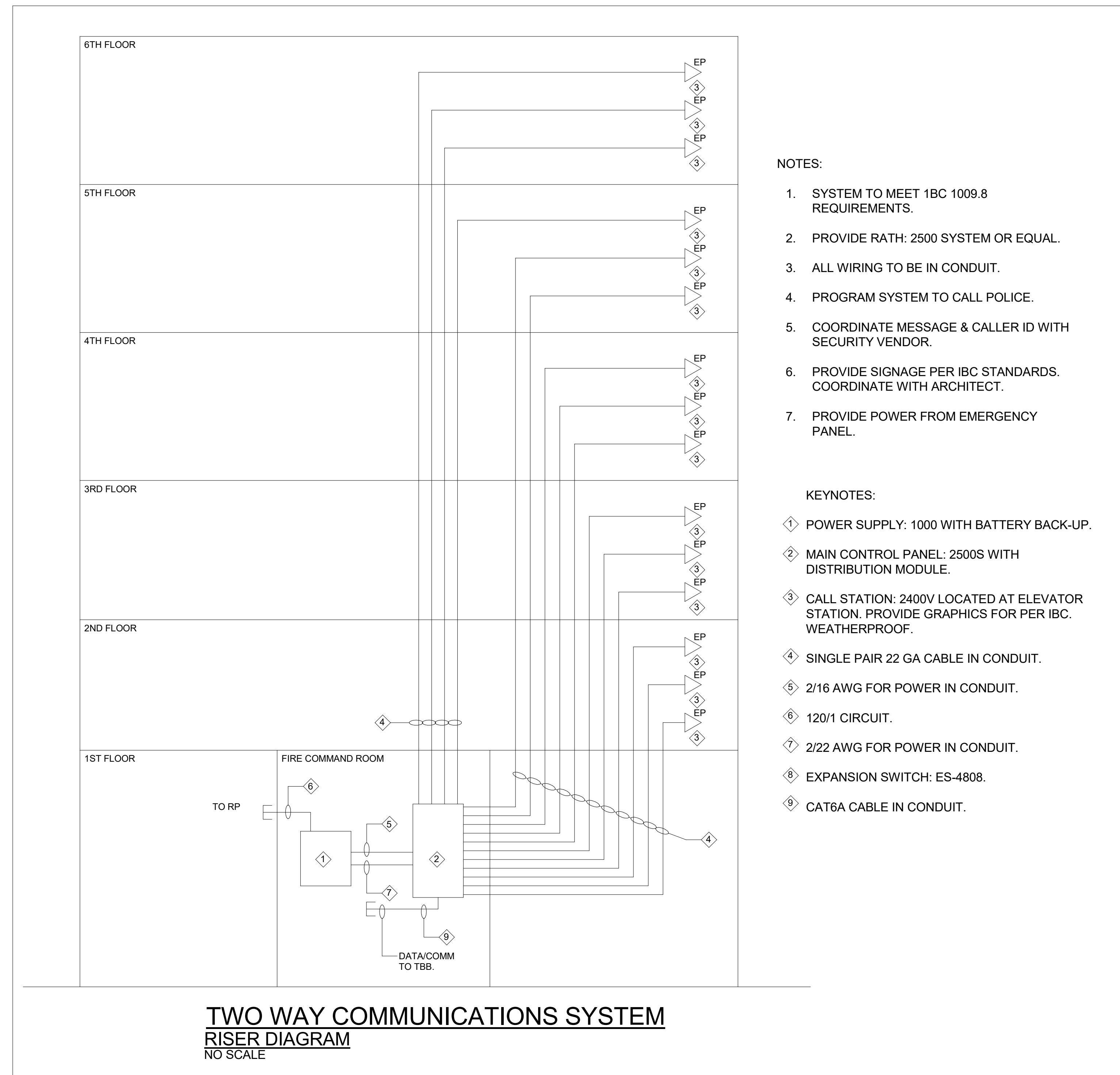
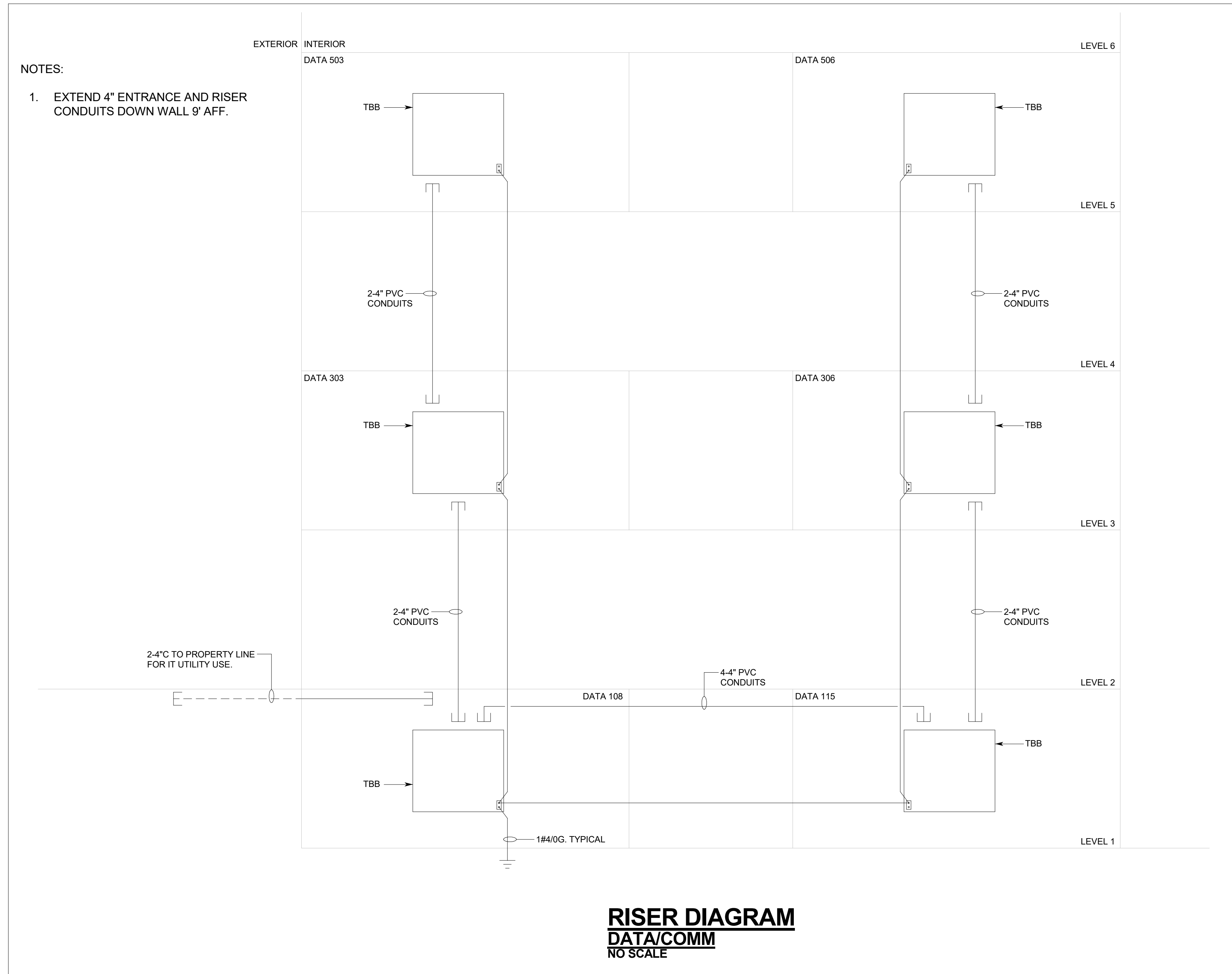
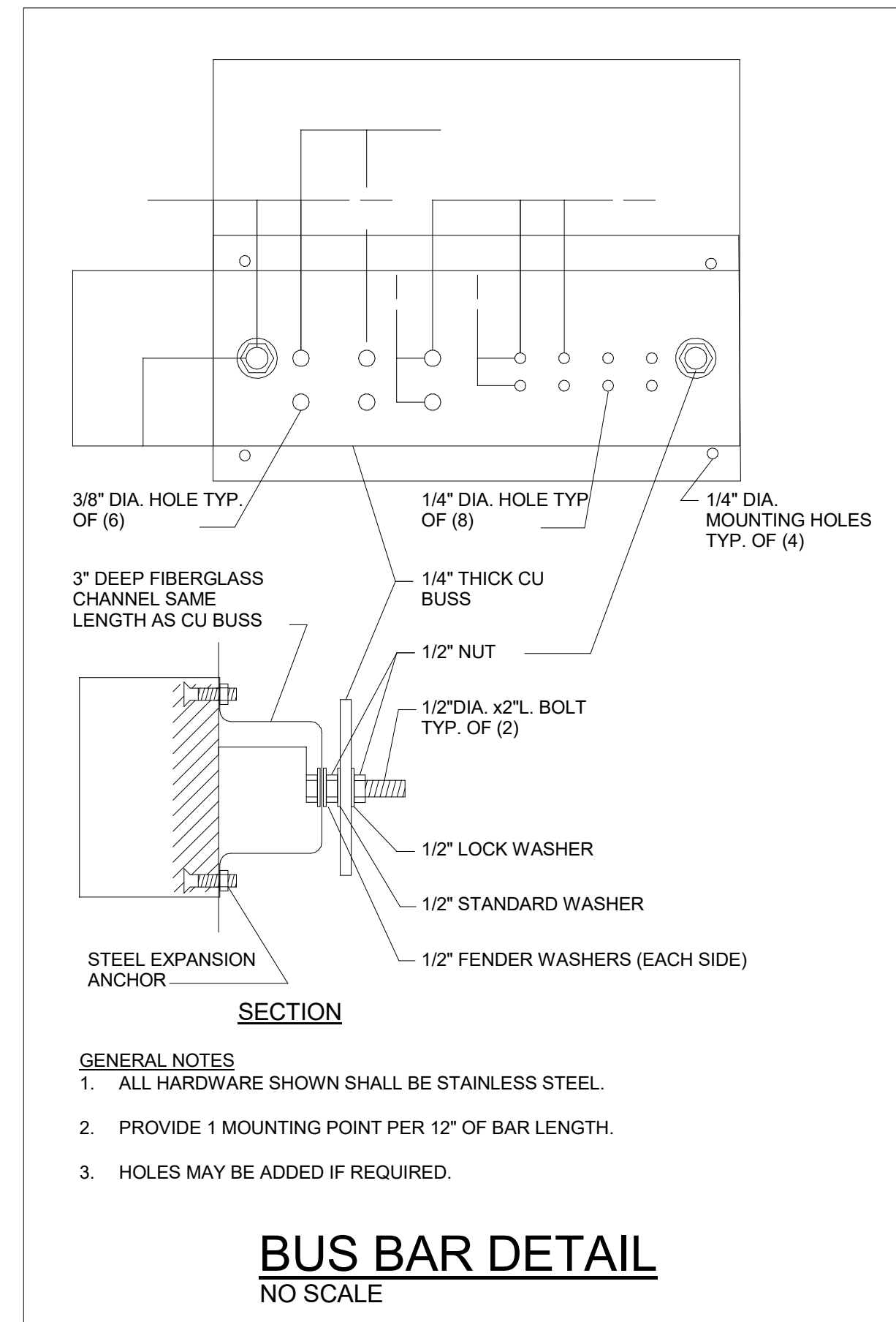
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TELE/COMM DETAILS

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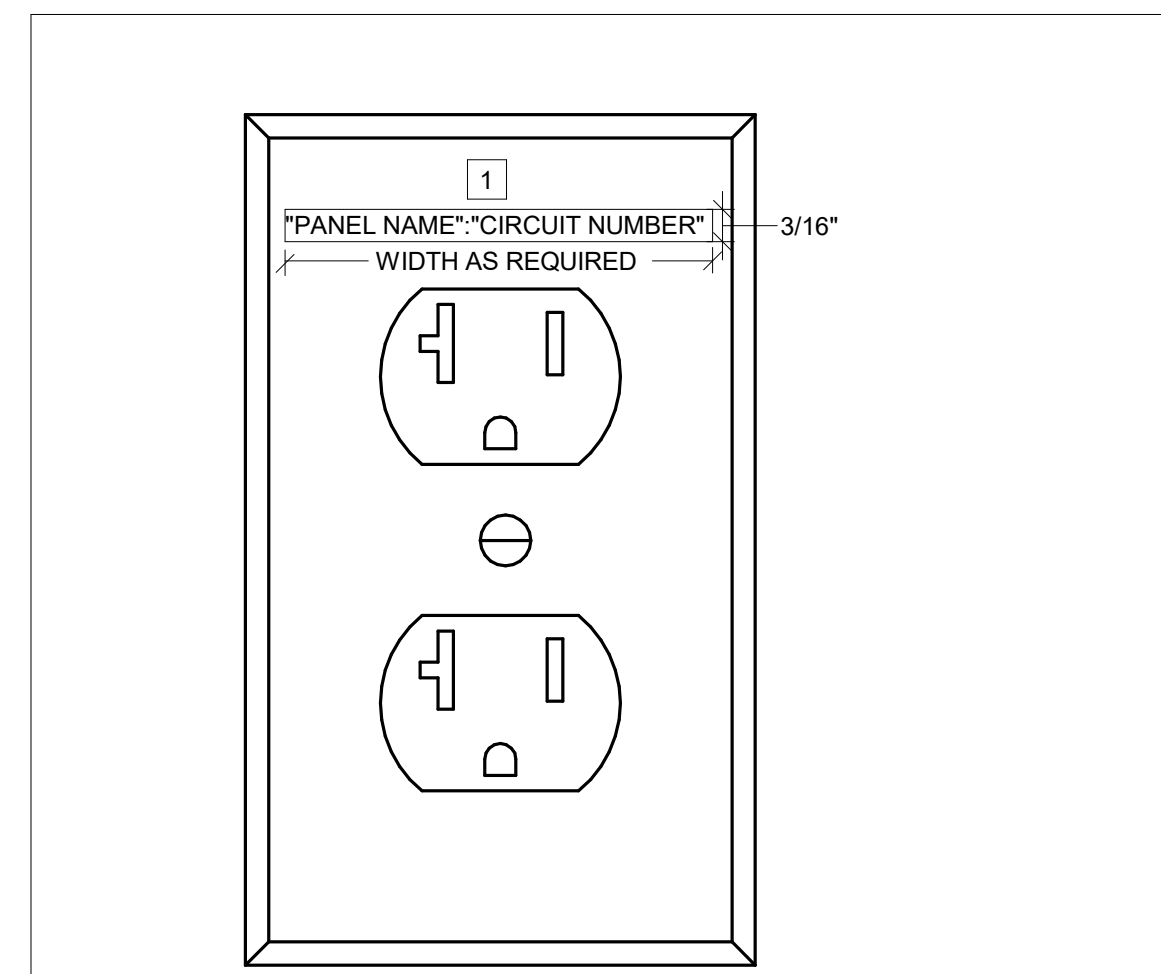
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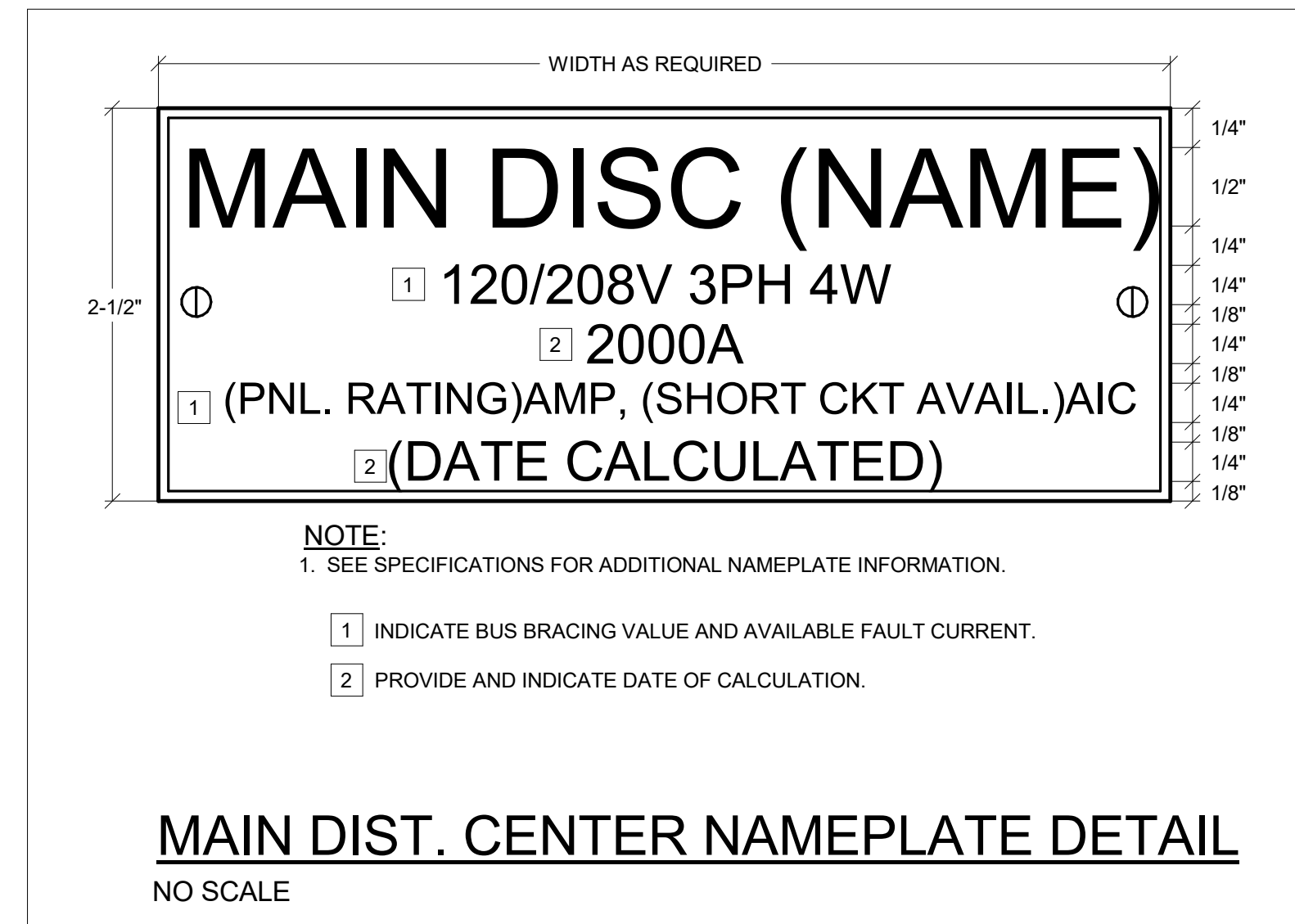
ENGINEER:  
LIZ HYDE

PROJECT #  
23047.0



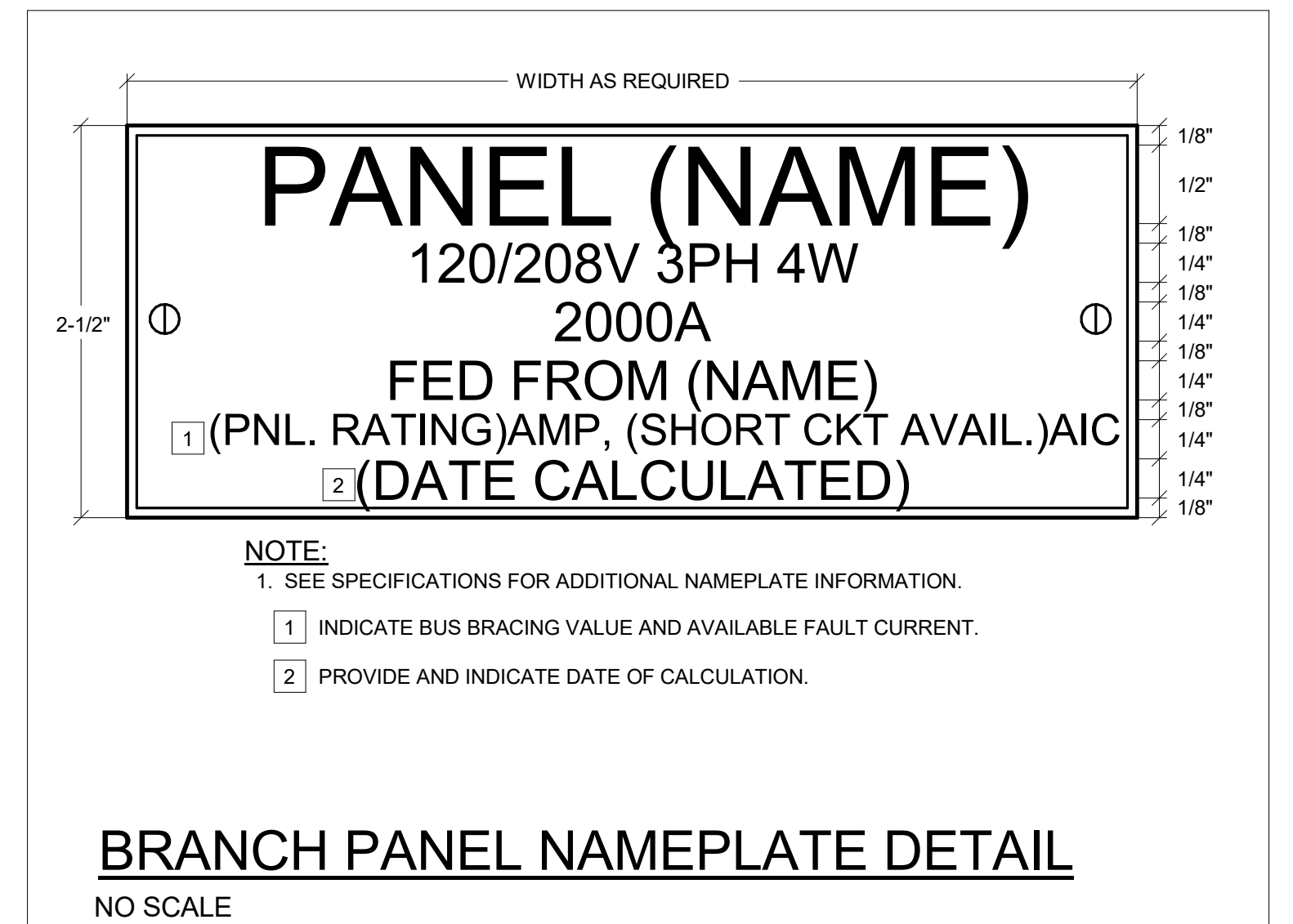
**KEYNOTES:**  
 1 PROVIDE BLACK LETTERING ON CLEAR LABEL FOR NORMAL CIRCUITS AND RED LETTERING ON CLEAR LABEL FOR EMERGENCY/STANDBY CIRCUITS.

**RECEPTACLE IDENTIFICATION**  
 NO SCALE



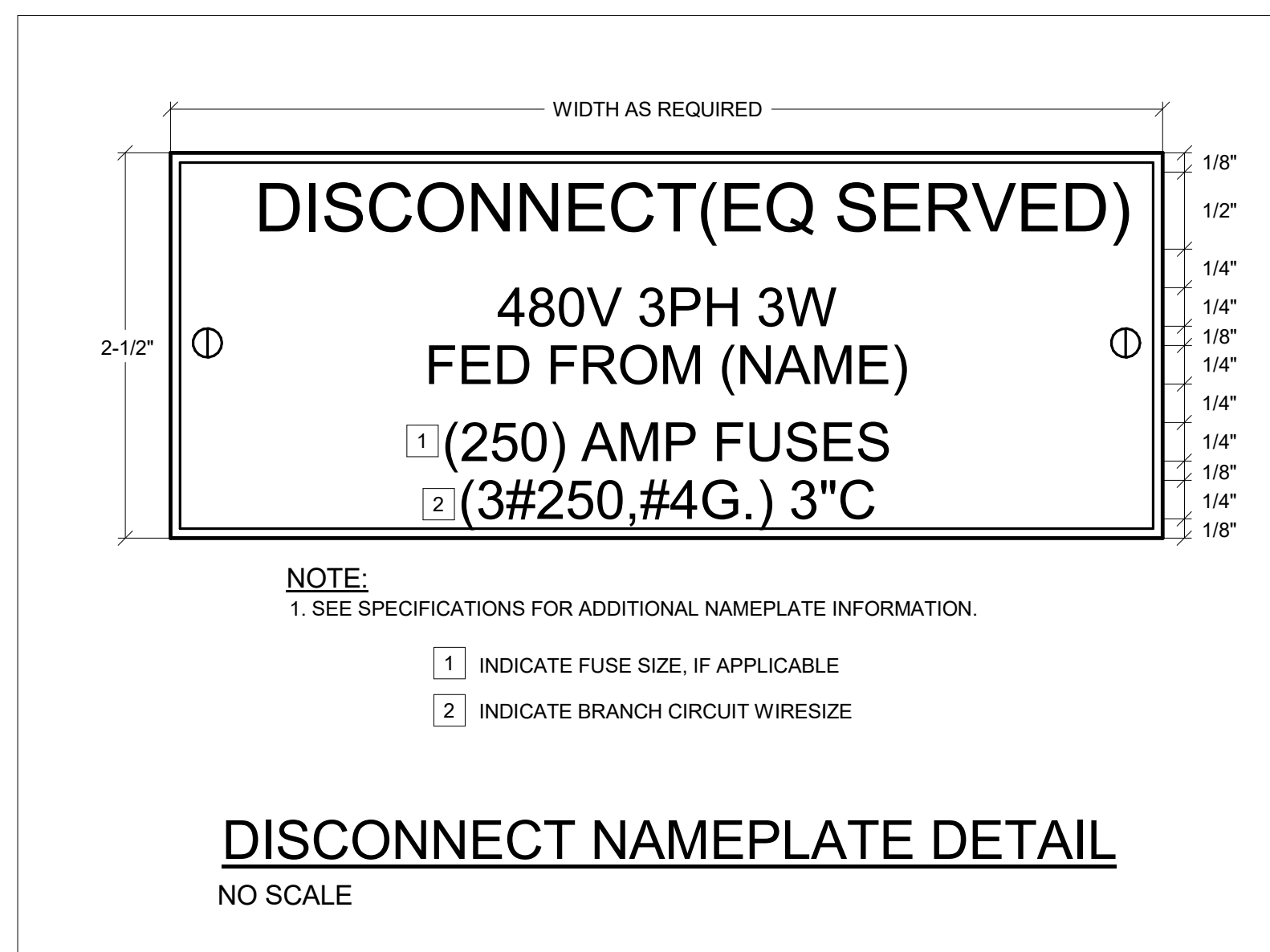
**NOTE:**  
 1. SEE SPECIFICATIONS FOR ADDITIONAL NAMEPLATE INFORMATION.  
 1 INDICATE BUS BRACING VALUE AND AVAILABLE FAULT CURRENT.  
 2 PROVIDE AND INDICATE DATE OF CALCULATION.

**MAIN DIST. CENTER NAMEPLATE DETAIL**  
 NO SCALE



**NOTE:**  
 1. SEE SPECIFICATIONS FOR ADDITIONAL NAMEPLATE INFORMATION.  
 1 INDICATE BUS BRACING VALUE AND AVAILABLE FAULT CURRENT.  
 2 PROVIDE AND INDICATE DATE OF CALCULATION.

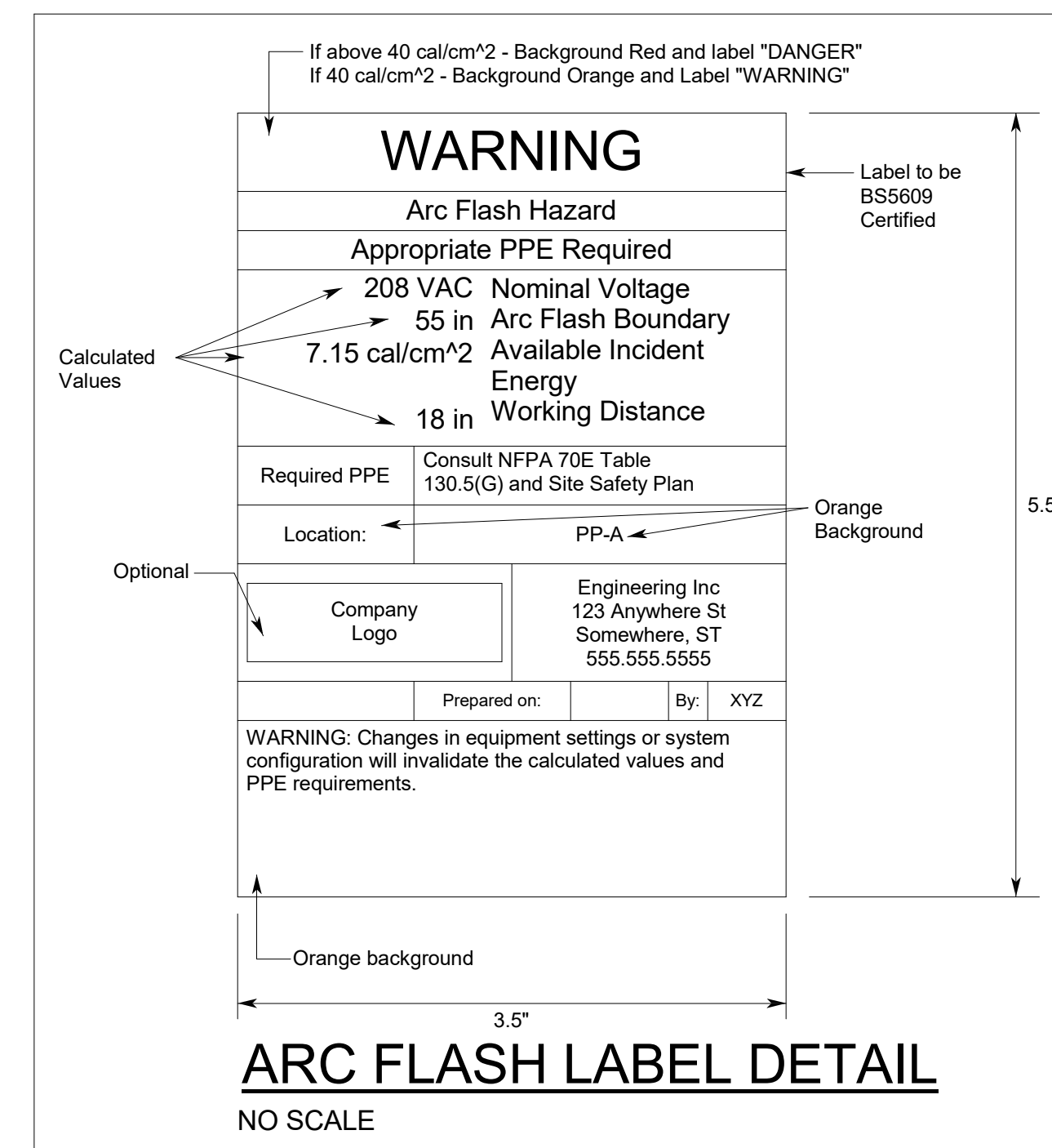
**BRANCH PANEL NAMEPLATE DETAIL**  
 NO SCALE



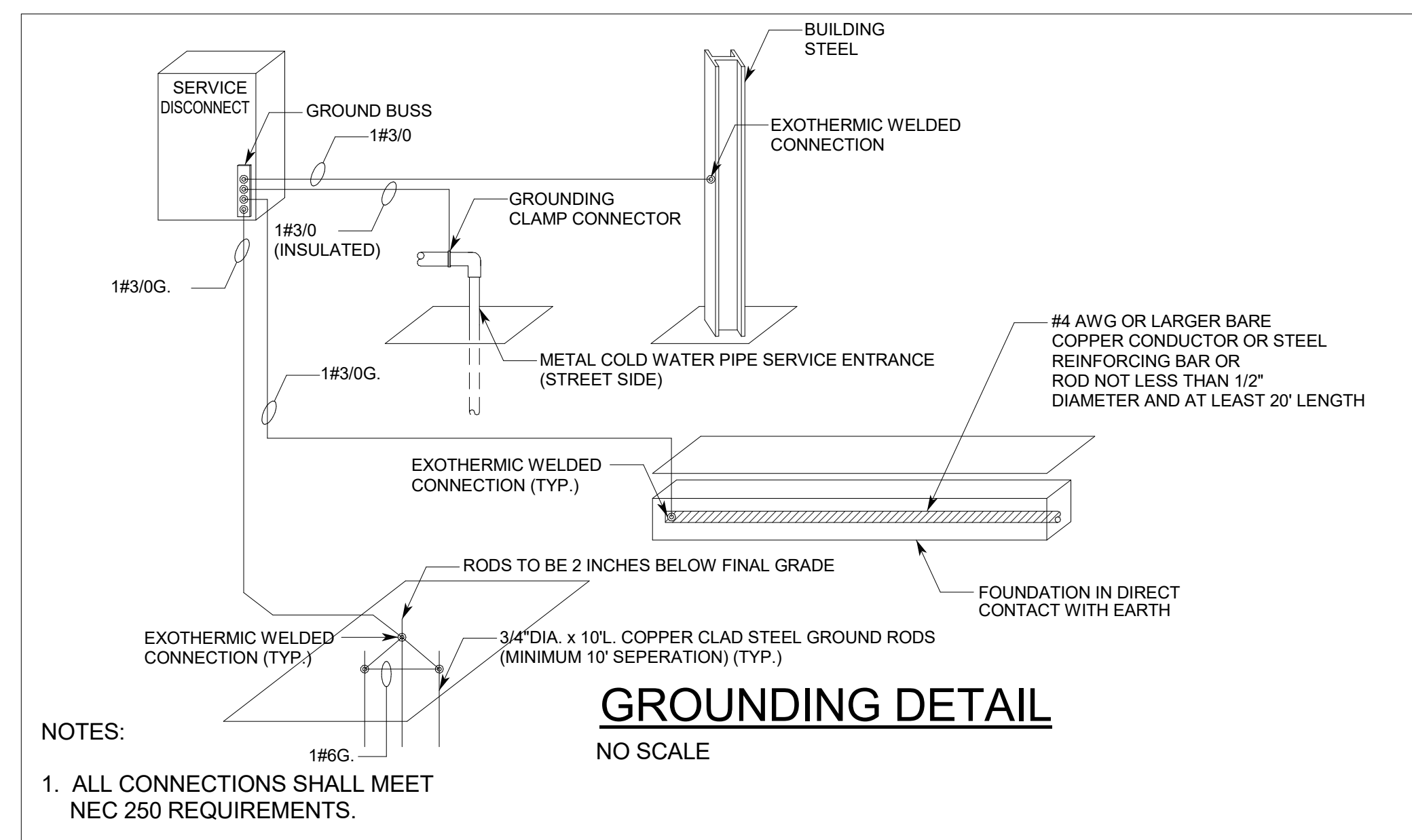
**NOTE:**  
 1. SEE SPECIFICATIONS FOR ADDITIONAL NAMEPLATE INFORMATION.  
 1 INDICATE FUSE SIZE, IF APPLICABLE.  
 2 INDICATE BRANCH CIRCUIT WIRE SIZE.

**DISCONNECT NAMEPLATE DETAIL**  
 NO SCALE

**CONDUIT AND JUNCTION BOX COLOR CODING:**  
 PAINT A 1\"/>

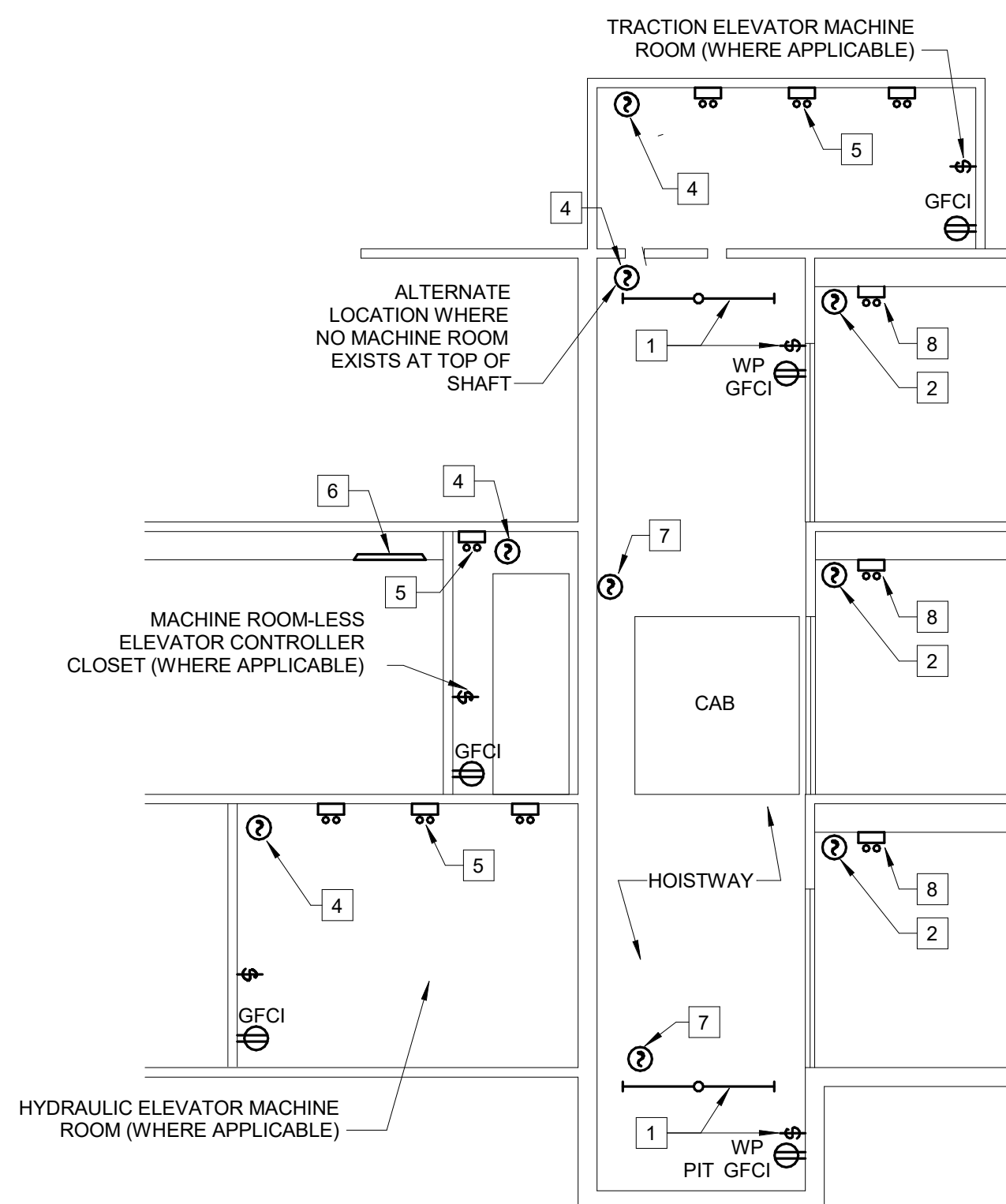


**ARC FLASH LABEL DETAIL**  
 NO SCALE



**NOTES:**  
 1. ALL CONNECTIONS SHALL MEET NEC 250 REQUIREMENTS.

**GROUNDING DETAIL**  
 NO SCALE



**DETAIL ELEVATOR ELECTRICAL REQUIREMENTS**  
 NO SCALE

**KEYNOTES:**

- 1 WEATHERPROOF GFCI RECEPTACLE ON DEDICATED [STANDBY] CIRCUIT, FLUORESCENT/LED WET LOCATION LENSED STRIPLIGHTS CONTROLLED BY SPST SWITCH. PROVIDE FIXTURES TO ACHIEVE A MINIMUM OF 10FC IN PIT. TYPICAL AT TOP AND BOTTOM OF HOISTWAY.
- 2 SMOKE DETECTOR AT ALL LEVELS OF ELEVATOR, LOBBY, AND EQUIPMENT ROOM SMOKE DETECTORS SHALL INITIATE RECALL. TYPICAL.
- 3 NOT USED.
- 4 SMOKE DETECTOR FOR FULL COVERAGE PER NFPA, DETECTORS SHALL INITIATE RECALL.
- 5 PROVIDE STRIPLIGHTS WITH WIREGUARD WITHIN MACHINE AND CONTROL ROOMS, PROVIDE FIXTURES TO ACHIEVE A MINIMUM OF 50FC IN ROOM OR CLOSET. COORDINATE LOCATION OF STRIPLIGHTS WITH ELEVATOR EQUIPMENT.
- 6 PROVIDE ADDITIONAL FIXTURES OUTSIDE OF CLOSET AS NEEDED TO ACHIEVE 30FC AT FRONT OF CONTROLLER. MATCH FIXTURES TYPICAL OF THIS SPACE.
- 7 PROVIDE SMOKE DETECTOR FOR SMOKE RELIEF DAMPER OR RELIEF HATCH. HATCH TO RELEASE ON SHAFT DETECTOR ALARM.
- 8 PROVIDE ADDITIONAL FIXTURES AT ELEVATOR LOBBY AS NEEDED TO ACHIEVE 10FC AT THE ELEVATOR SILL.

**Mobile Civic Center  
 Parking Facility**  
 Mobile, Alabama



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NO.	DATE	DESCRIPTION

sheet title  
**POWER DETAILS**

job no. **4308**

des. by LCH snt. no.   

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date August, 1 2023

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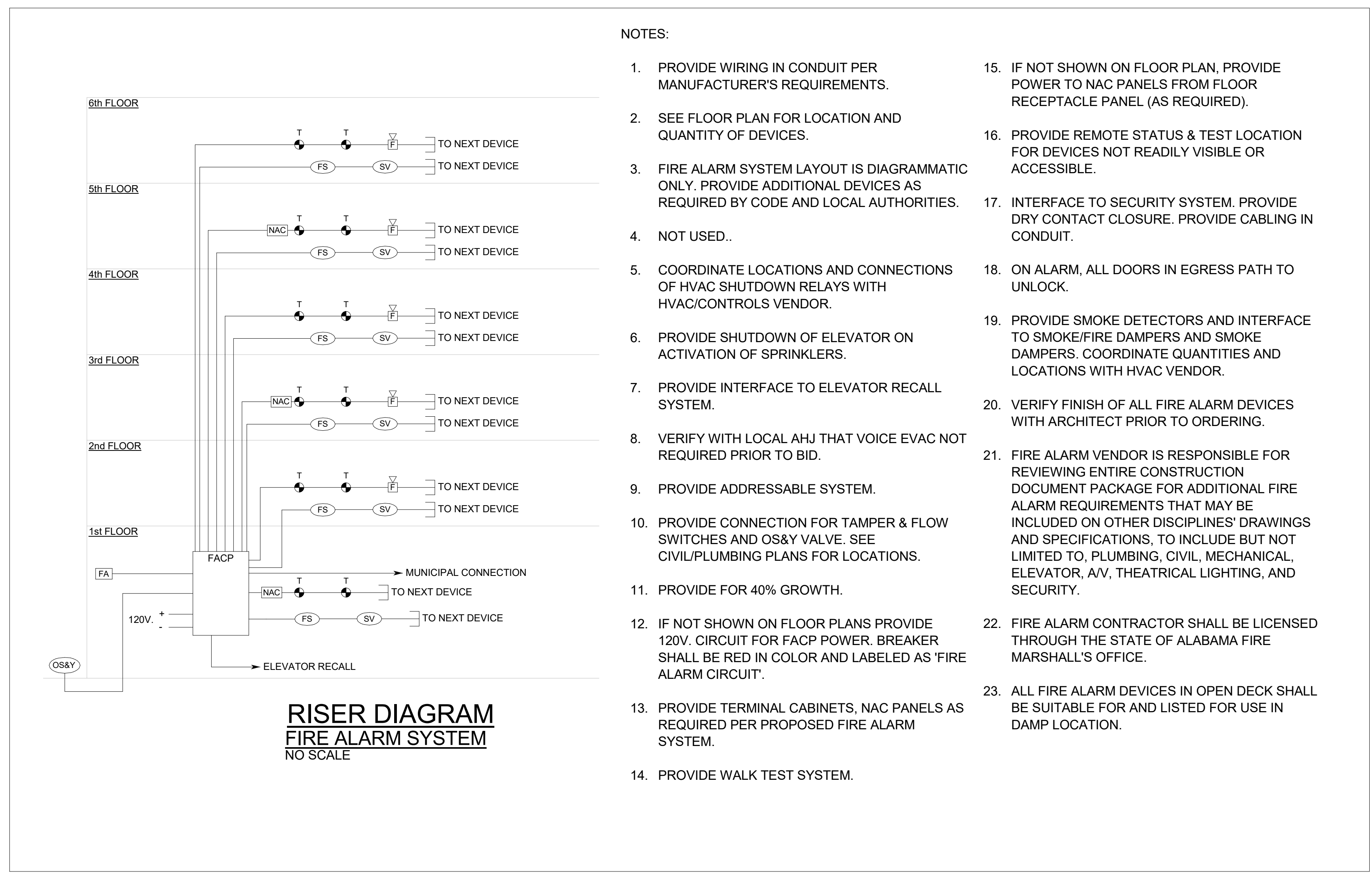
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 LIZ HYDE

PROJECT #  
 23047.0





- NOTES:
1. PROVIDE WIRING IN CONDUIT PER MANUFACTURER'S REQUIREMENTS.
  2. SEE FLOOR PLAN FOR LOCATION AND QUANTITY OF DEVICES.
  3. FIRE ALARM SYSTEM LAYOUT IS DIAGRAMMATIC ONLY. PROVIDE ADDITIONAL DEVICES AS REQUIRED BY CODE AND LOCAL AUTHORITIES.
  4. NOT USED.
  5. COORDINATE LOCATIONS AND CONNECTIONS OF HVAC SHUTDOWN RELAYS WITH HVAC/CONTROLS VENDOR.
  6. PROVIDE SHUTDOWN OF ELEVATOR ON ACTIVATION OF SPRINKLERS.
  7. PROVIDE INTERFACE TO ELEVATOR RECALL SYSTEM.
  8. VERIFY WITH LOCAL AHJ THAT VOICE EVAC NOT REQUIRED PRIOR TO BID.
  9. PROVIDE ADDRESSABLE SYSTEM.
  10. PROVIDE CONNECTION FOR TAMPER & FLOW SWITCHES AND OS&Y VALVE. SEE CIVIL/PLUMBING PLANS FOR LOCATIONS.
  11. PROVIDE FOR 40% GROWTH.
  12. IF NOT SHOWN ON FLOOR PLANS PROVIDE 120V. CIRCUIT FOR FACP POWER. BREAKER SHALL BE RED IN COLOR AND LABELED AS "FIRE ALARM CIRCUIT".
  13. PROVIDE TERMINAL CABINETS, NAC PANELS AS REQUIRED PER PROPOSED FIRE ALARM SYSTEM.
  14. PROVIDE WALK TEST SYSTEM.
  15. IF NOT SHOWN ON FLOOR PLAN, PROVIDE POWER TO NAC PANELS FROM FLOOR RECEPTACLE PANEL (AS REQUIRED).
  16. PROVIDE REMOTE STATUS & TEST LOCATION FOR DEVICES NOT READILY VISIBLE OR ACCESSIBLE.
  17. INTERFACE TO SECURITY SYSTEM. PROVIDE DRY CONTACT CLOSURE. PROVIDE CABLING IN CONDUIT.
  18. ON ALARM, ALL DOORS IN EGRESS PATH TO UNLOCK.
  19. PROVIDE SMOKE DETECTORS AND INTERFACE TO SMOKE/FIRE DAMPERS AND SMOKE DAMPERS. COORDINATE QUANTITIES AND LOCATIONS WITH HVAC VENDOR.
  20. VERIFY FINISH OF ALL FIRE ALARM DEVICES WITH ARCHITECT PRIOR TO ORDERING.
  21. FIRE ALARM VENDOR IS RESPONSIBLE FOR REVIEWING ENTIRE CONSTRUCTION DOCUMENT PACKAGE FOR ADDITIONAL FIRE ALARM REQUIREMENTS THAT MAY BE INCLUDED ON OTHER DISCIPLINES' DRAWINGS AND SPECIFICATIONS, TO INCLUDE BUT NOT LIMITED TO, PLUMBING, CIVIL, MECHANICAL, ELEVATOR, A/V, THEATRICAL LIGHTING, AND SECURITY.
  22. FIRE ALARM CONTRACTOR SHALL BE LICENSED THROUGH THE STATE OF ALABAMA FIRE MARSHALL'S OFFICE.
  23. ALL FIRE ALARM DEVICES IN OPEN DECK SHALL BE SUITABLE FOR AND LISTED FOR USE IN DAMP LOCATION.

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Parking Facility**  
Mobile, Alabama



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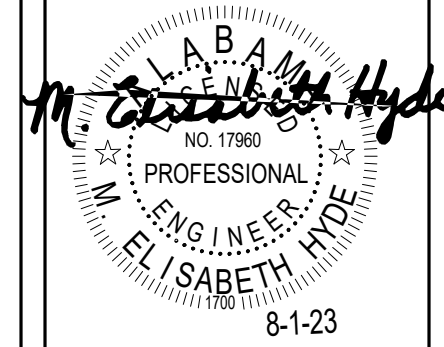
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job no.	4308
des. by	LOP
chk. by	MEH
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sheet no.	E0.08
of	72

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# Mobile Civic Center Parking Facility

Mobile, Alabama



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sheet title  
EQUIPMENT SCHEDULE

job no. **4308**

desn. by LOP	snt. no.
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date August, 1 2023	

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EQUIPMENT SCHEDULE										
MARK	DESCRIPTION	ELECTRICAL CHARACTERISTICS			PANEL	DISCONNECT SW		FEEDER	REMARKS	
		VOLT/PHASE	KW	HP		FLA	SIZE			FUSE
AC 1	AIR COMPRESSOR	208/1		0.5		RP-1A	30/1	20	20SG	1, 2
DS 1	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 2	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 3	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 4	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 5	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 6	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 7	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 8	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 9	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 10	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 11	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 12	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 13	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 14	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 15	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DS 16	MINI SPLIT AIR COND. INDOOR UNIT	208/1				-	-	-	-	4
DSHP 1	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-1A	30/2	30	30SG	1, 2
DSHP 2	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-1A	30/2	30	30SG	1, 2
DSHP 3	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-1B	30/2	30	30SG	1, 2
DSHP 4	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-1B	30/2	30	30SG	1, 2
DSHP 5	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-3A	30/2	30	30SG	1, 2
DSHP 6	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-3A	30/2	30	30SG	1, 2
DSHP 7	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-3B	30/2	30	30SG	1, 2
DSHP 8	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-3B	30/2	30	30SG	1, 2
DSHP 9	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-5A	30/2	30	30SG	1, 2
DSHP 10	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-5A	30/2	30	30SG	1, 2
DSHP 11	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-5B	30/2	30	30SG	1, 2
DSHP 12	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-5B	30/2	30	30SG	1, 2
DSHP 13	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-5A	30/2	30	30SG	1, 2
DSHP 14	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-5B	30/2	30	30SG	1, 2
DSHP 15	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			9.24	RP-5B	30/2	30	30SG	1, 2
DSHP 16	MINI SPLIT AIR COND. OUTDOOR UNIT	208/1			8	RP-1B	30/2	30	30SG	1, 2
EL 1	ELEVATOR	480/3		15		MPA	60/3	60	60DG	1, 2, 3, 6
EL 2	ELEVATOR	480/3		15		MPA	60/3	60	60DG	1, 2, 3, 6
EL 3	ELEVATOR	480/3		15		MPA	60/3	60	60DG	1, 2, 3, 6
EL 4	ELEVATOR	480/3		15		MPA	60/3	60	60DG	1, 2, 3, 6
EL 5	ELEVATOR	480/3		15		MPA	60/3	60	60DG	1, 2, 3, 6
EL 6	ELEVATOR	480/3		15		MPA	60/3	60	60DG	1, 2, 3, 6
ESP 1	ELEVATOR SUMP PUMP	120/1		1/2		RP-1A	30/1	20	20SG	1, 2, 5
ESP 2	ELEVATOR SUMP PUMP	120/1		1/2		RP-1B	30/1	20	20SG	1, 2, 5
ESP 3	ELEVATOR SUMP PUMP	120/1		1/2		RP-1B	30/1	20	20SG	1, 2, 5
EUH 1	ELECTRIC HEATER	208/3		5		RP-1B	30/3	20	20DG	1, 2
EUH 2	ELECTRIC HEATER	208/3		5		RP-1B	30/3	20	20DG	1, 2
WH 1	ELECTRIC HEATER	120/1		0.375		RP-1B	30/1	20	20SG	1, 2

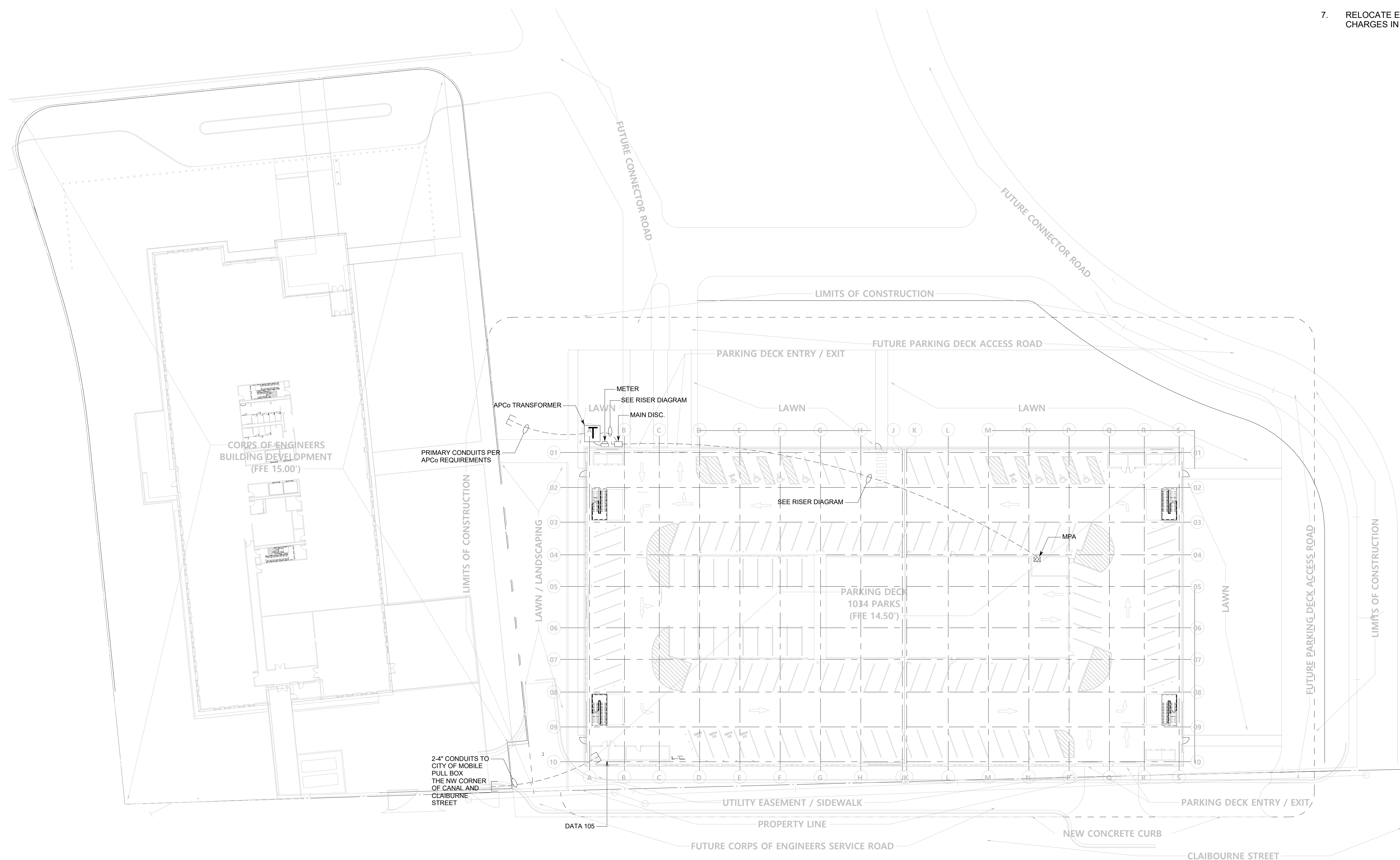
- NOTES:
1. VERIFY NAMEPLATE DATA PRIOR TO ROUGH-IN.
  2. PROVIDE REQUIRED WORKING CLEARANCE FOR ALL DISCONNECTS.
  3. ELEVATOR INFORMATION WAS NOT AVAILABLE AT TIME OF DESIGN. CONTRACTOR SHALL COORDINATE THE ELECTRICAL REQUIREMENTS PRIOR TO ROUGH-IN AND ORDERING ELECTRICAL EQUIPMENT.
  4. INDOOR UNIT FED FROM OUTDOOR UNIT. COORDINATE WITH MECHANICAL CONTRACTOR.
  5. PROVIDE WP GFI RECEPTACLE FOR SUMP PUMP. COORDINATE REQUIREMENTS PRIOR TO ROUGH-IN.
  6. PROVIDE AUX CONTACTS AT CIRCUIT BREAKER AS WELL AS DISCONNECTING MEANS FOR BATTERY LOWERING.

	<b>HYDE ENGINEERING</b> 3120 8TH AVENUE SOUTH BIRMINGHAM, ALABAMA 35233 (P) 205 982-0900 (F) 205 982-9911 E-MAIL: LIZ@HYDE-EGR.COM
ENGINEER: LIZ HYDE	PROJECT # 23047.0

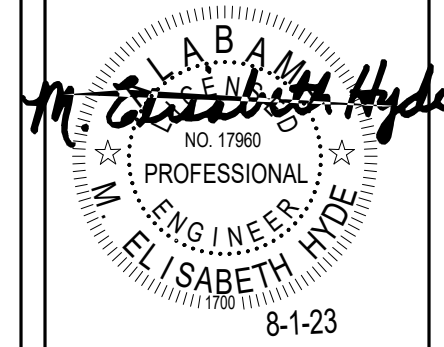
# Mobile Civic Center Parking Facility

Mobile, Alabama

- NOTES:
- COORDINATE NEW ELECTRICAL SERVICE WITH POWER COMPANY. VERIFY LOCATIONS OF TRANSFORMER & DIRECTION OF PRIMARY FEEDERS. VERIFY NEW POLE LOCATION, CONDUIT REQUIREMENTS (IF ANY), AND METER LOCATIONS PRIOR TO BID. INCLUDE ALL CHARGES IN BID.
  - COORDINATE NEW TELEPHONE SERVICE WITH PHONE COMPANY. PROVIDE CONDUITS PER TELEPHONE COMPANY REQUIREMENTS. INCLUDE ALL PHONE COMPANY CHARGES IN BID. VERIFY LOCATION OF SYSTEM TIE-IN PRIOR TO BID.
  - COORDINATE SIGNAGE REQUIREMENTS WITH VENDOR. ADJUST CIRCUITS AS NECESSARY.
  - COORDINATE NEW CABLE SERVICE WITH CABLE COMPANY. INCLUDE ALL CHARGES IN BID.
  - ALL EXTERIOR LIGHTING & SIGNAGE TO BE CIRCUITED THROUGH PHOTOCELL/TIMECLOCK.
  - COORDINATE LOCATIONS OF FIXTURE POLES WITH EXISTING OVERHEAD UTILITIES. ADJUST POLE LOCATION AS NECESSARY.
  - RELOCATE EXISTING OVERHEAD UTILITIES AS REQUIRED. INCLUDE CHARGES IN BID.



**SITE PLAN - ELECTRICAL**  
 SCALE: 1" = 30'-0"



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Revisions	

sheet title	SITE PLAN - ELECTRICAL
job no.	4308
des. by	LOP
chk. by	MEH
date	August, 1 2023
sheet no.	E1.00
of	72
date	August, 1 2023
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ENGINEER:  
LIZ HYDE

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# Mobile Civic Center Parking Facility

Mobile, Alabama

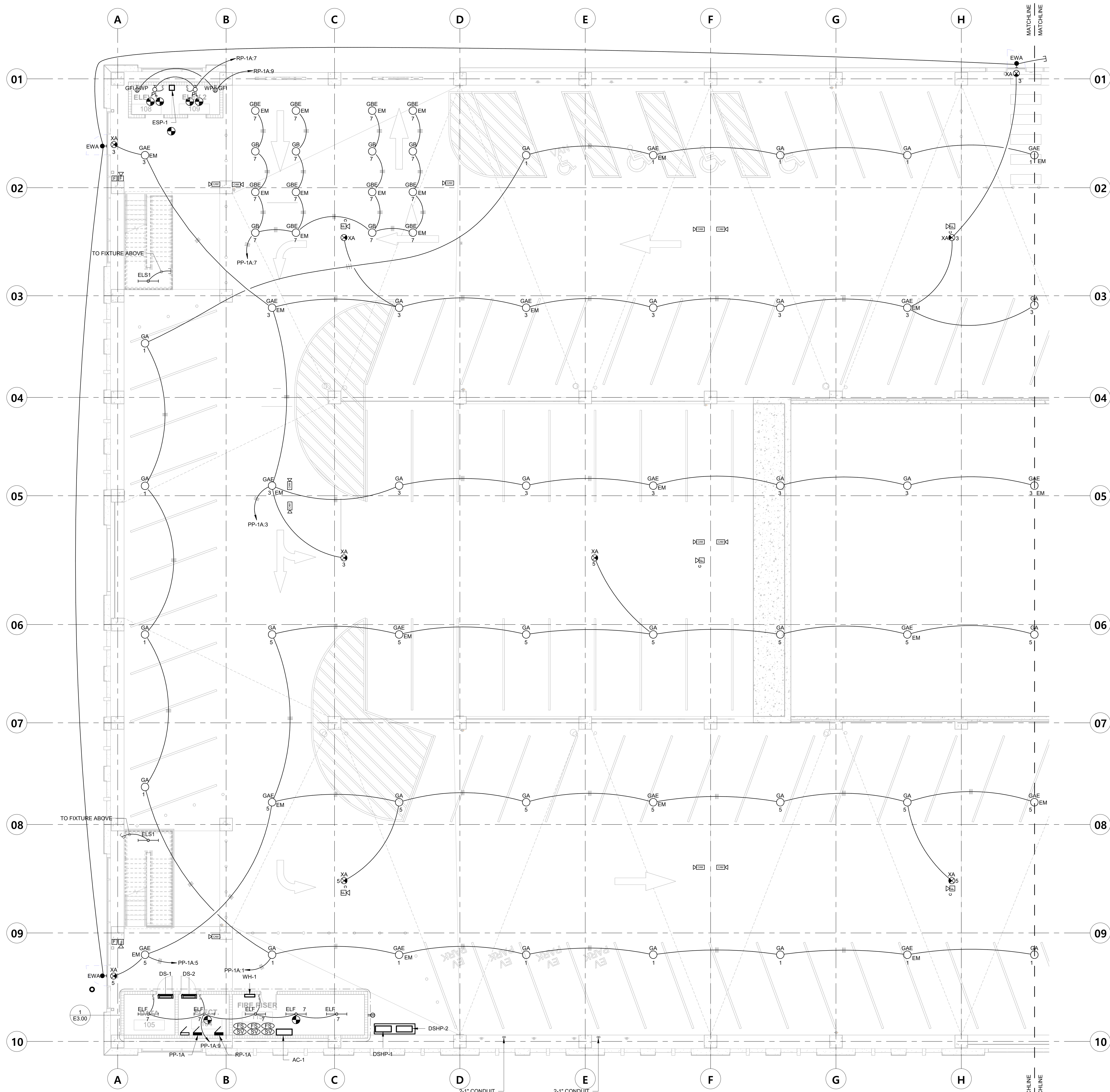


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sheet title	LEVEL 1 - PART A - ELECTRICAL		
job no.	4308		
dwg. by	LOP	snt. no.	
ckd. by	MEH	of	167
dwg. no.	<b>E2.10A</b>		
of	72		
date	August, 1 2023		
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- NOTES:
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  - ALL LIGHTING SHALL BE ROUTED THROUGH LIGHTING CONTROL PANEL. SEE DETAILS ON E0.06.
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  - CONFIRM CAMERA LOCATIONS WITH THE CITY OF MOBILE VENDOR PRIOR TO ROUGH-IN.



## LEVEL 1 - PART A - ELECTRICAL

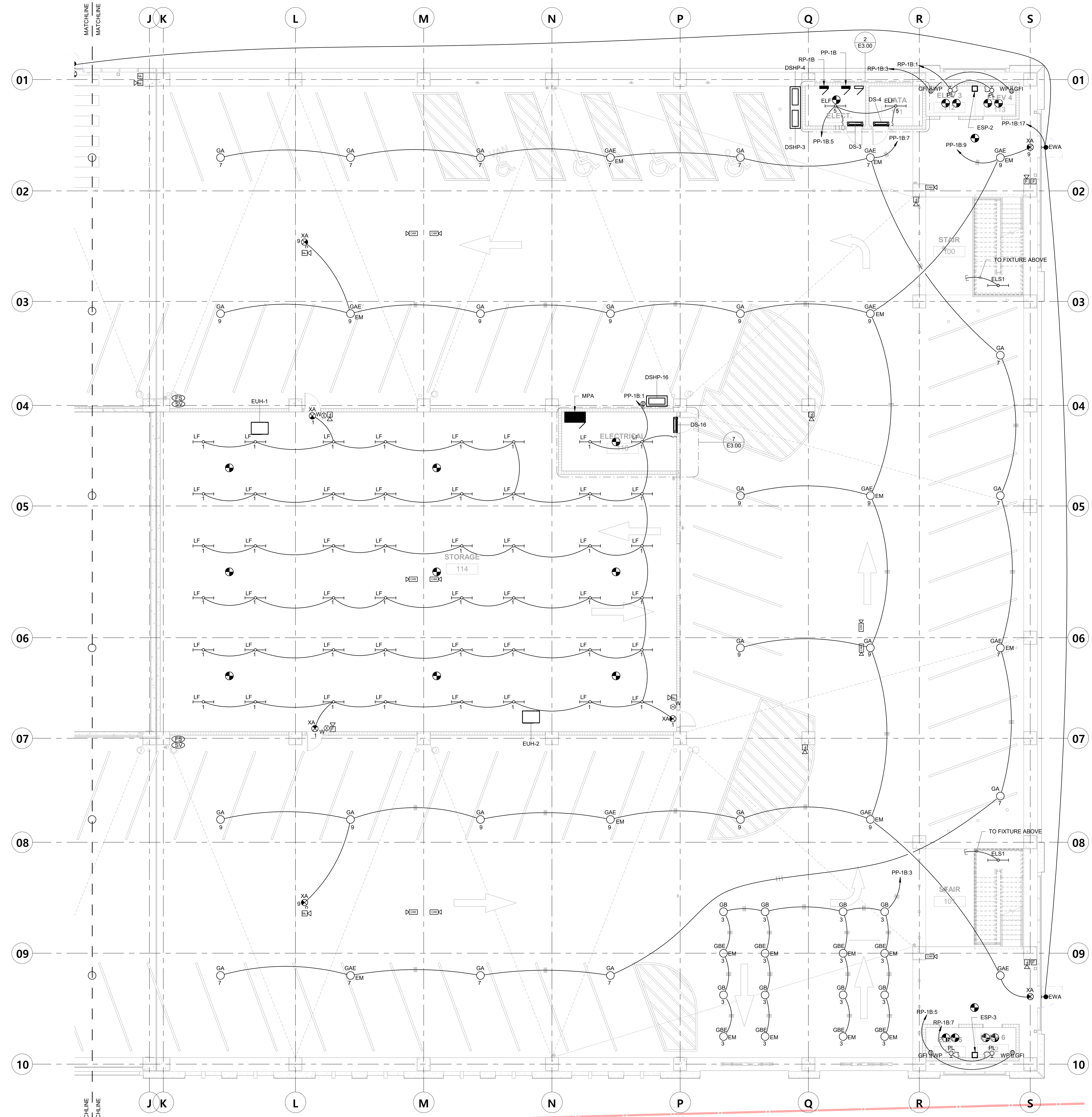
SCALE: 1/8" = 1'-0"

2-1" CONDUIT TO RP-1A SEE NOTE 5.

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**LEVEL 1 - PART B - ELECTRICAL**  
 SCALE: 1/8" = 1'-0"

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sheet title  
**LEVEL 1 - PART B - ELECTRICAL**

job no. **4308**

des. by: KDP      snt. no.:

chk. by: MEH      of 167

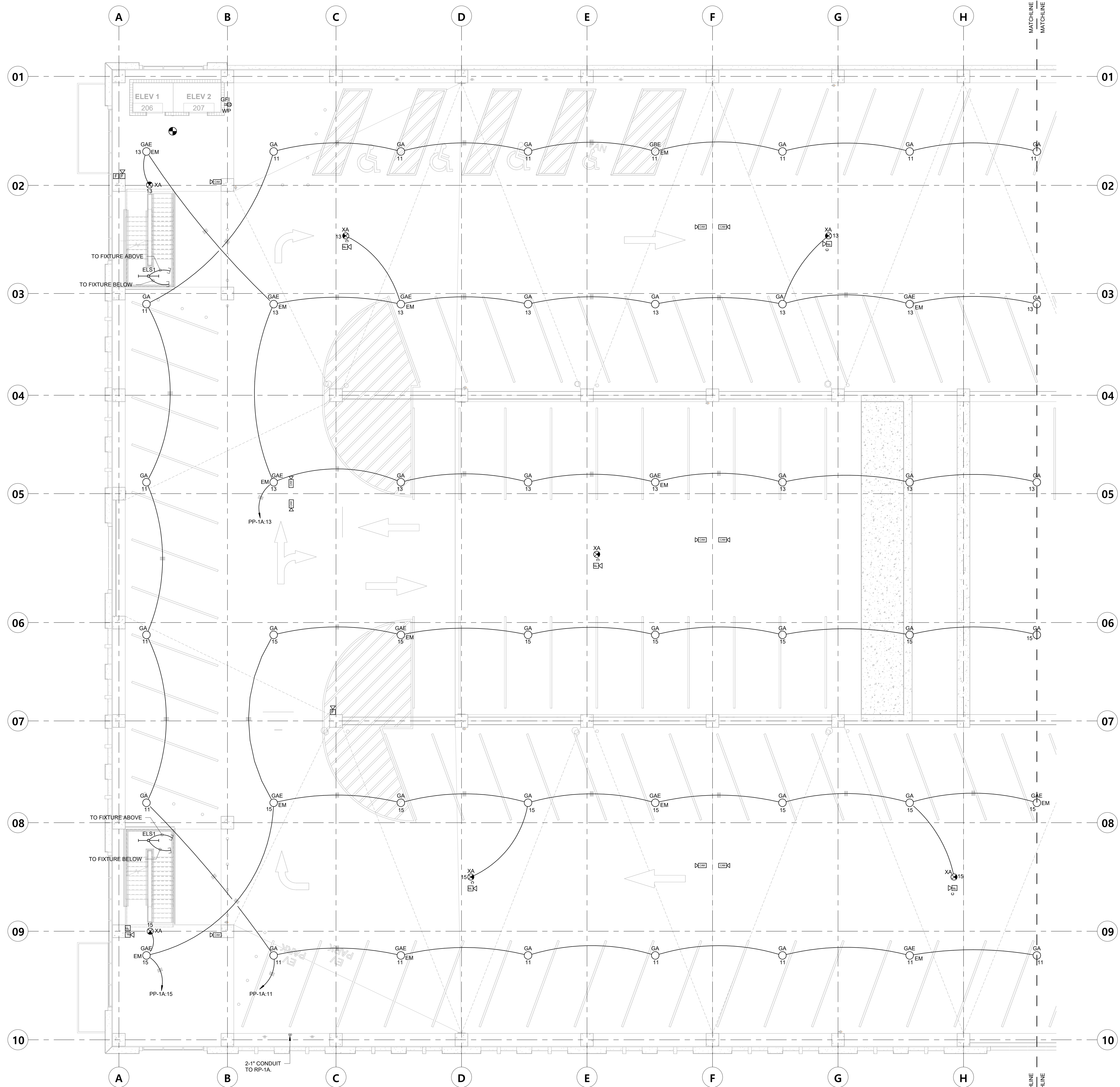
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**LEVEL 2 - PART A - ELECTRICAL**  
 SCALE: 1/8" = 1'-0"

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ENGINEER:  
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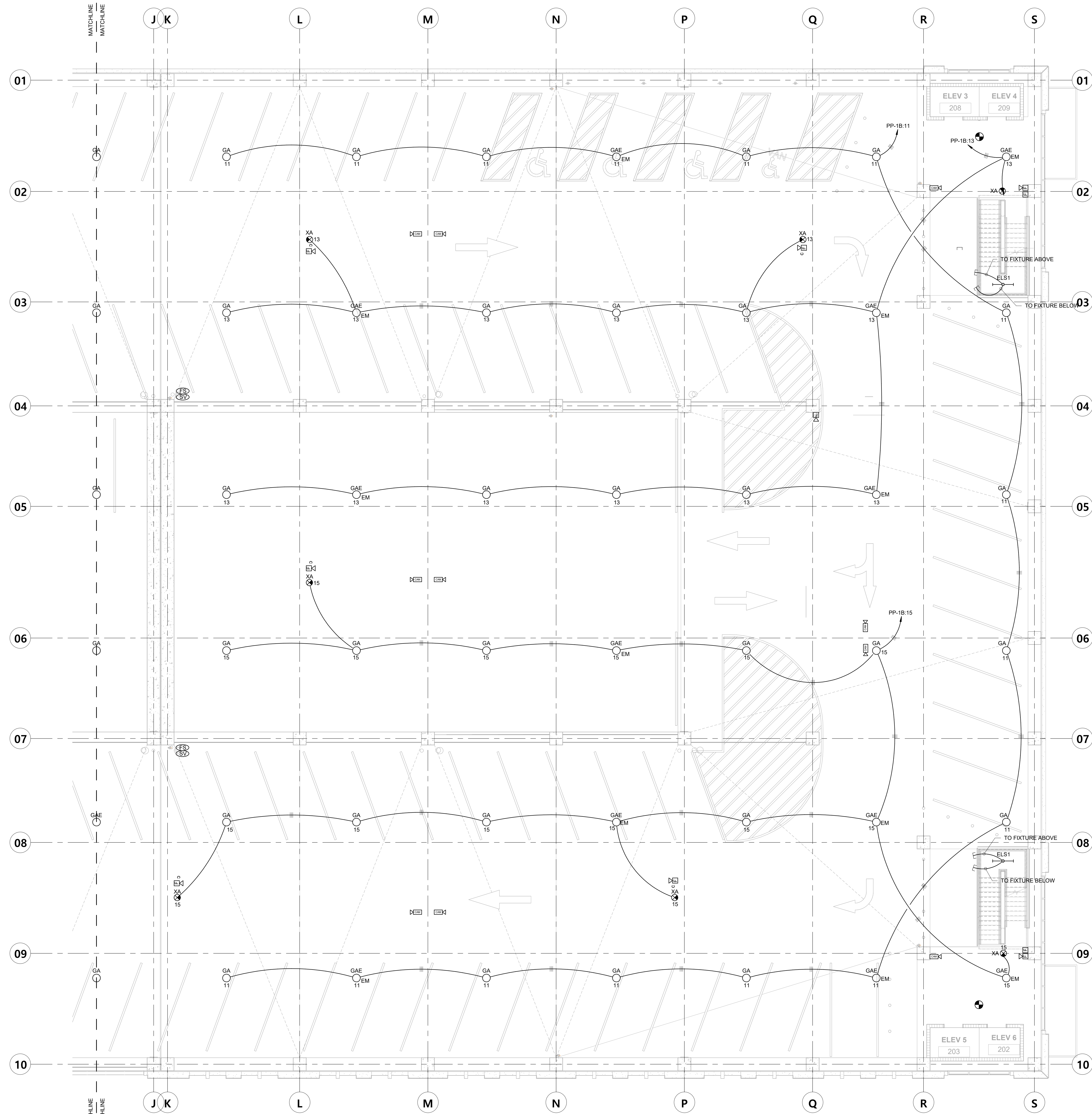
Construction Documents

**Mobile Civic Center  
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Mobile, Alabama

M. Elizabeth Hyde  
 PROFESSIONAL ENGINEER  
 ALABAMA  
 8-1-23

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	LEVEL 2 - PART A - ELECTRICAL
	job no. <b>4308</b>
	dwg. by: KDP snt. no.:
	ckd. by: MEH of 167
	<b>E2.20A</b>
	of 72
	date August, 1 2023
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**LEVEL 2 - PART B - ELECTRICAL**

SCALE: 1/8" = 1'-0"

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	ENGINEER: <b>LIZ HYDE</b>

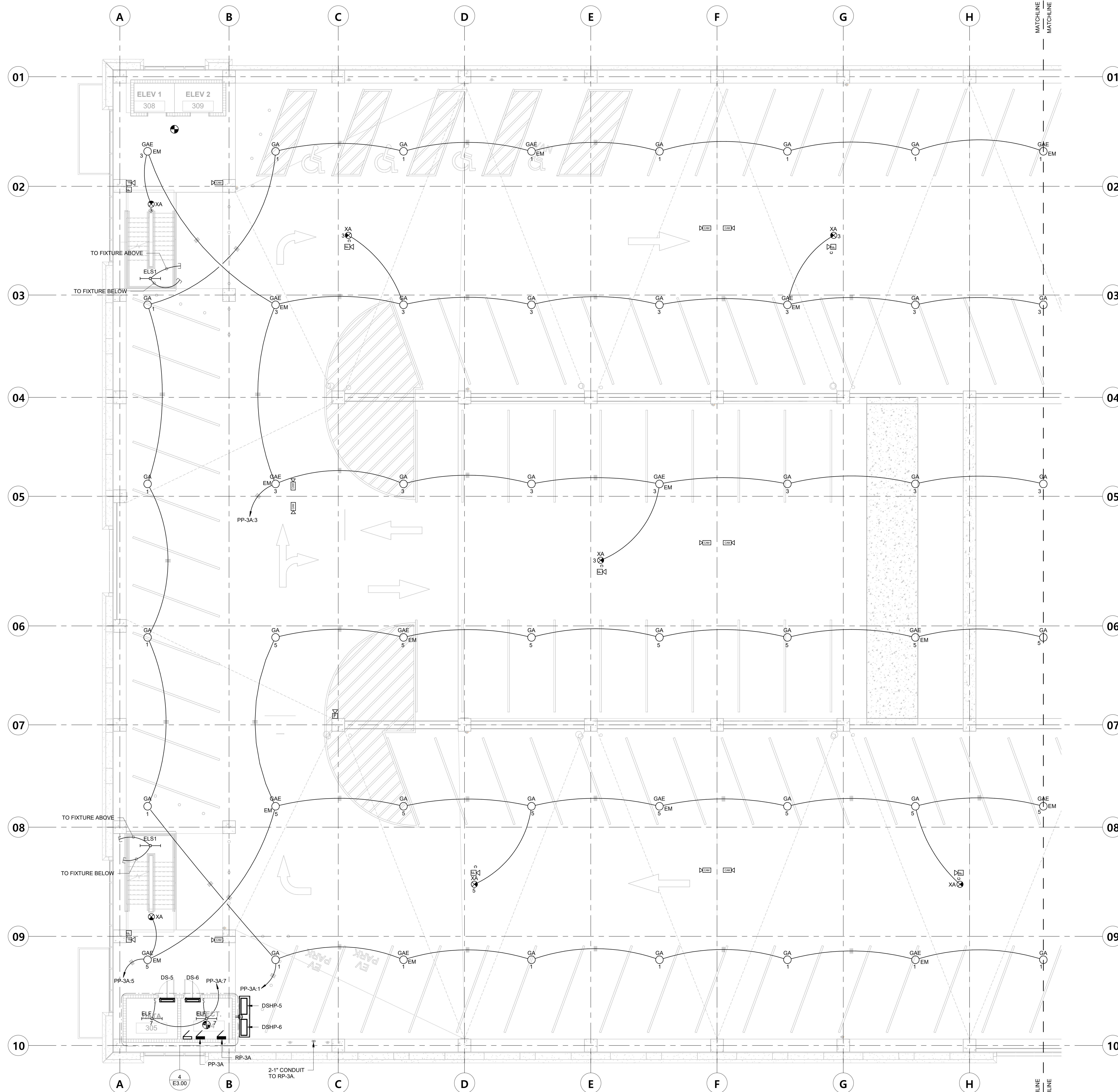


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sheet title	LEVEL 2 - PART B - ELECTRICAL
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sheet no.	<b>E2.20B</b>
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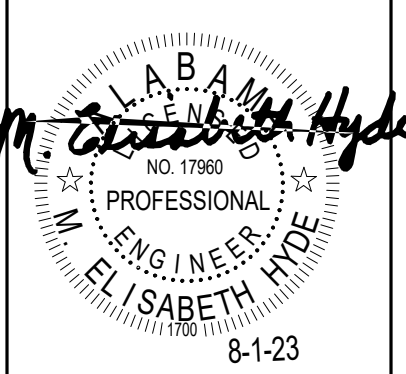
NOTES:

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**LEVEL 3 - PART A - ELECTRICAL**

SCALE: 1/8" = 1'-0"

	<b>HYDE ENGINEERING</b> 3120 8TH AVENUE SOUTH BIRMINGHAM, ALABAMA 35233 (P) 205 982-0900 (F) 205 982-9911 E-MAIL: LIZ@HYDE-EGR.COM
	ENGINEER: LIZ HYDE



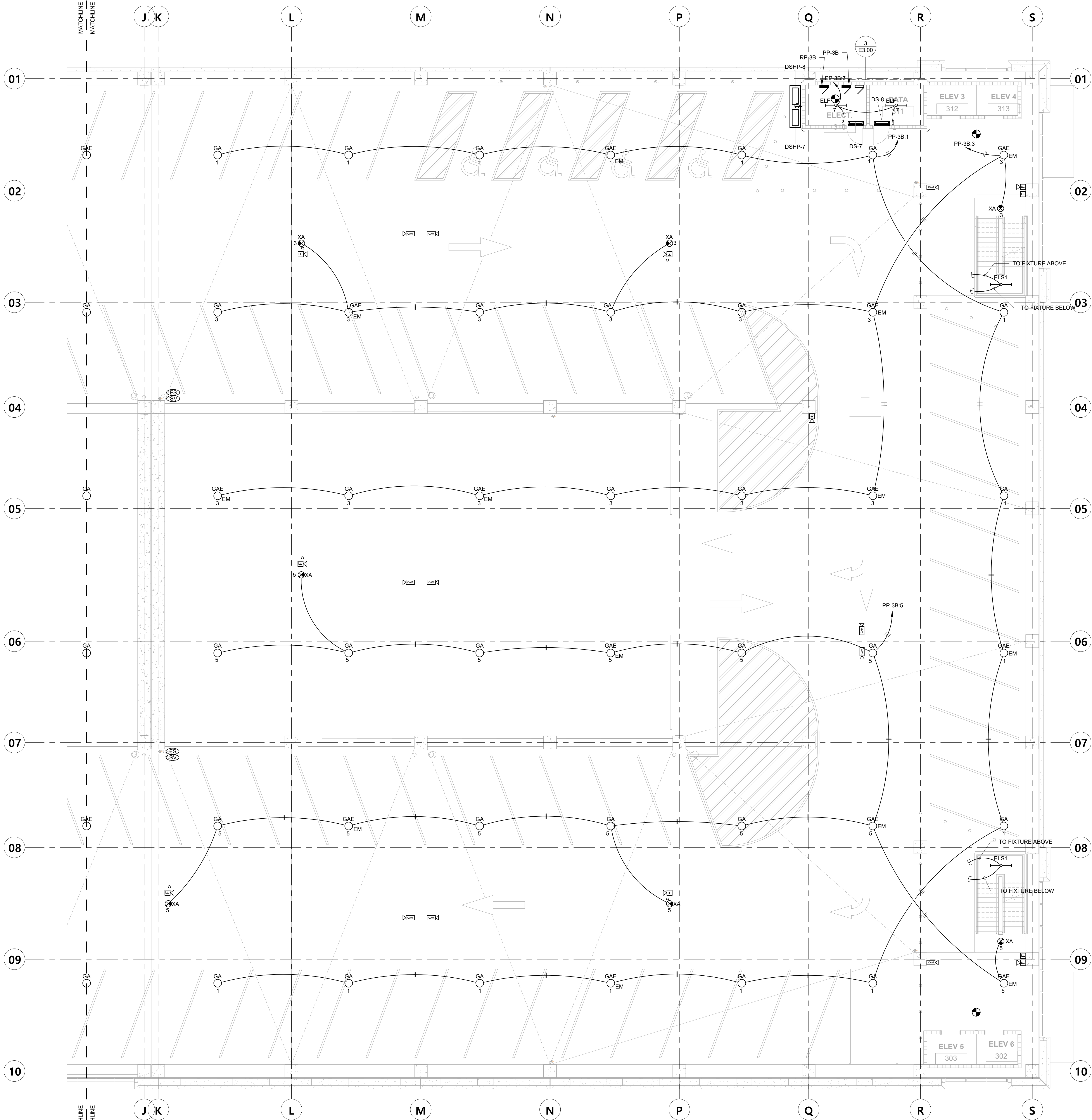
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sheet title	LEVEL 3 - PART A - ELECTRICAL
job no.	4308
dwg. by	LHZ
smt. no.	of 167
ckd. by	MEH
dwg. no.	<b>E2.30A</b>
of	72
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 Mobile, Alabama





- NOTES:
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**LEVEL 3 - PART B - ELECTRICAL**

SCALE: 1/8" = 1'-0"

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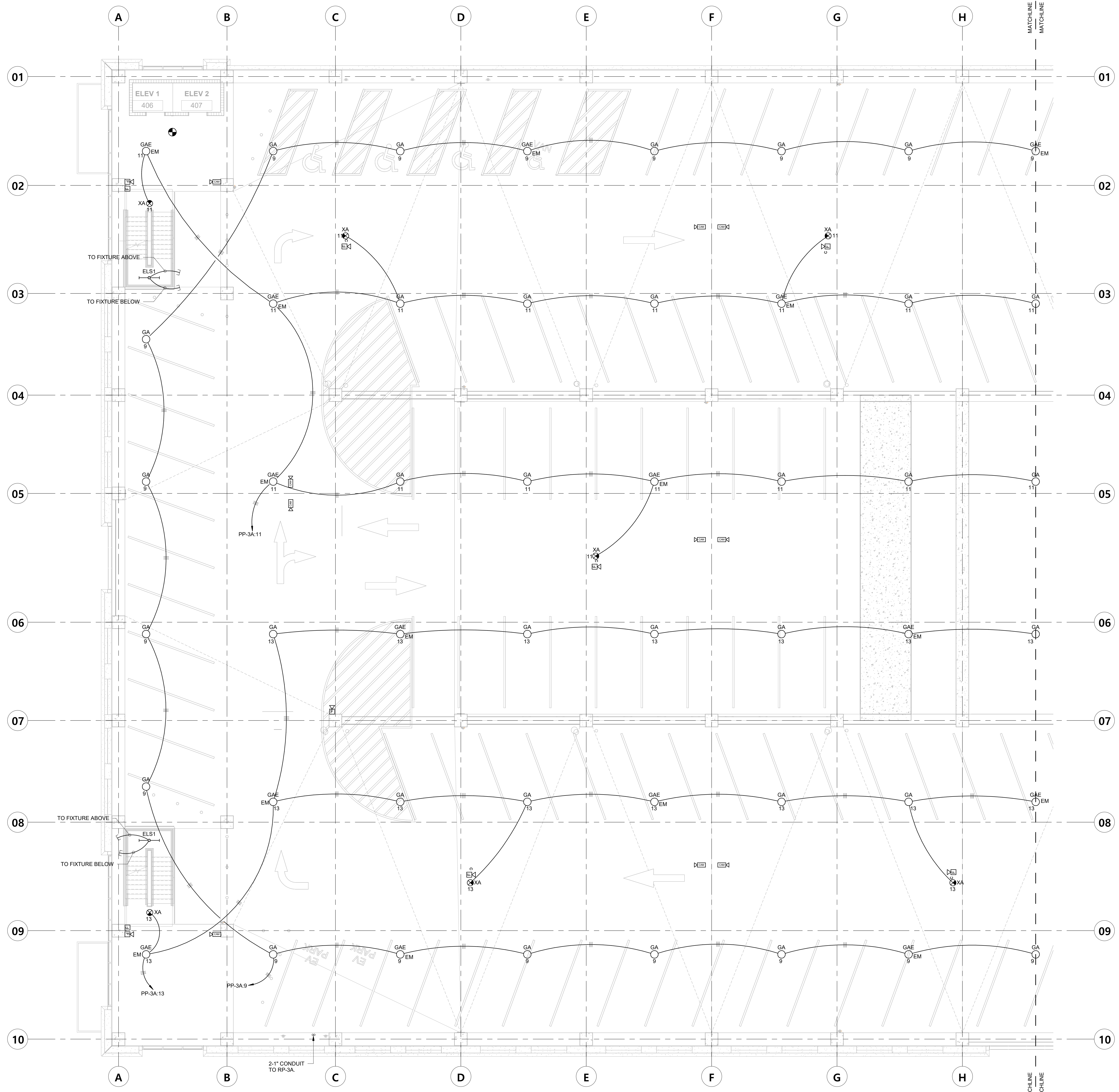
Revisions	

sheet title  
**LEVEL 3 - PART B - ELECTRICAL**

job no. **4308**

dwg. by: KDJ  
 snt. no.:  
 ckd. by: MEH  
 of 167  
**E2.30B**  
 of 72  
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 Mobile, Alabama



- NOTES:
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**LEVEL 4 - PART A - ELECTRICAL**  
 SCALE: 1/8" = 1'-0"

**HYDE ENGINEERING**  
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ENGINEER:  
LIZ HYDE

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Construction Documents

**Mobile Civic Center  
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Mobile, Alabama

Professional Engineer  
LIZ HYDE  
No. 17960  
Alabama  
8-1-23

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sheet title  
LEVEL 4 - PART A - ELECTRICAL

job no. **4308**

des. by: LKH snt. no. of 167

chk. by: MEH

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sheet title  
LEVEL 4 - PART B -  
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job no. **4308**

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ckd. by MEH of 167

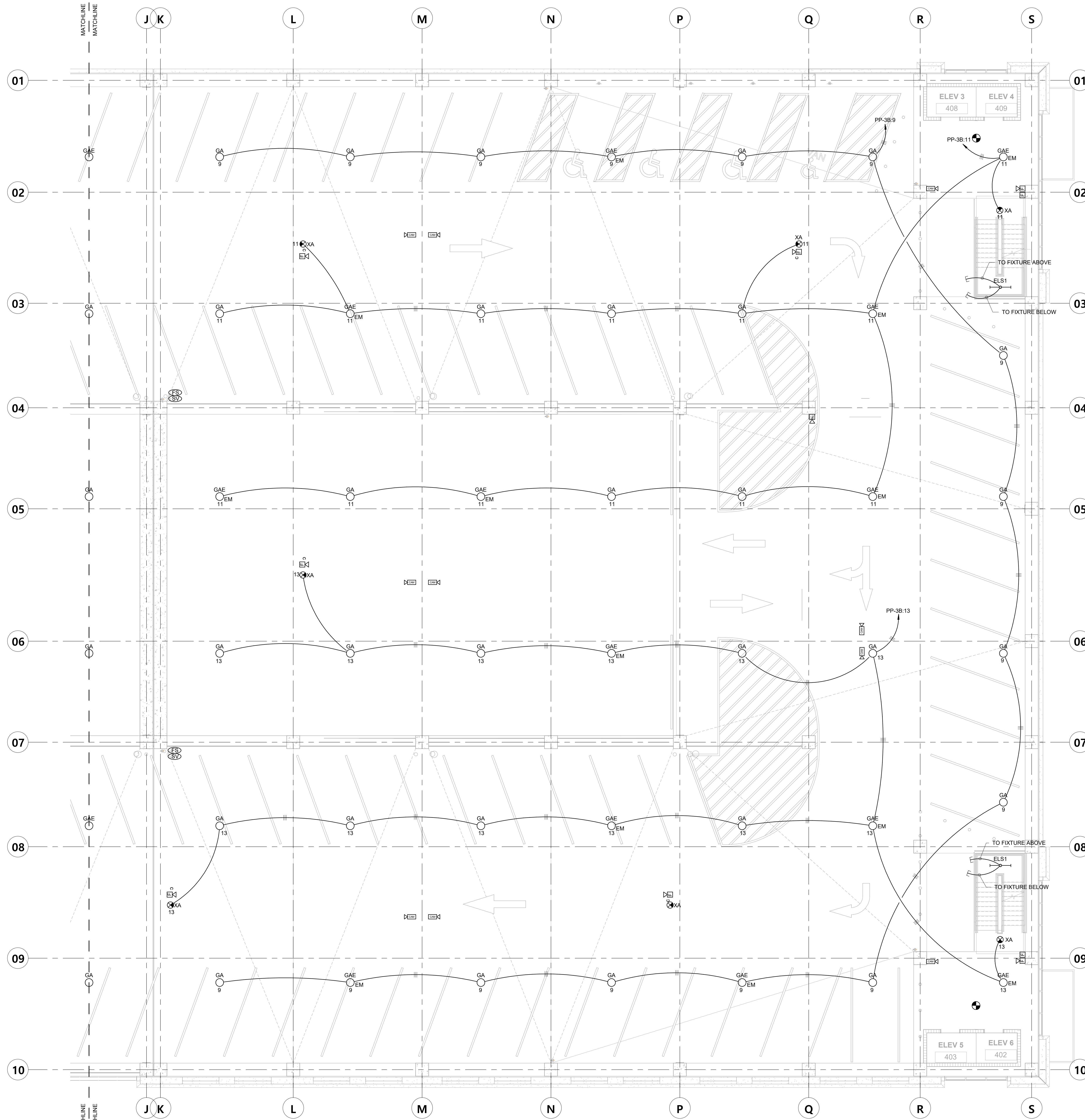
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NOTES:

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## LEVEL 4 - PART B - ELECTRICAL

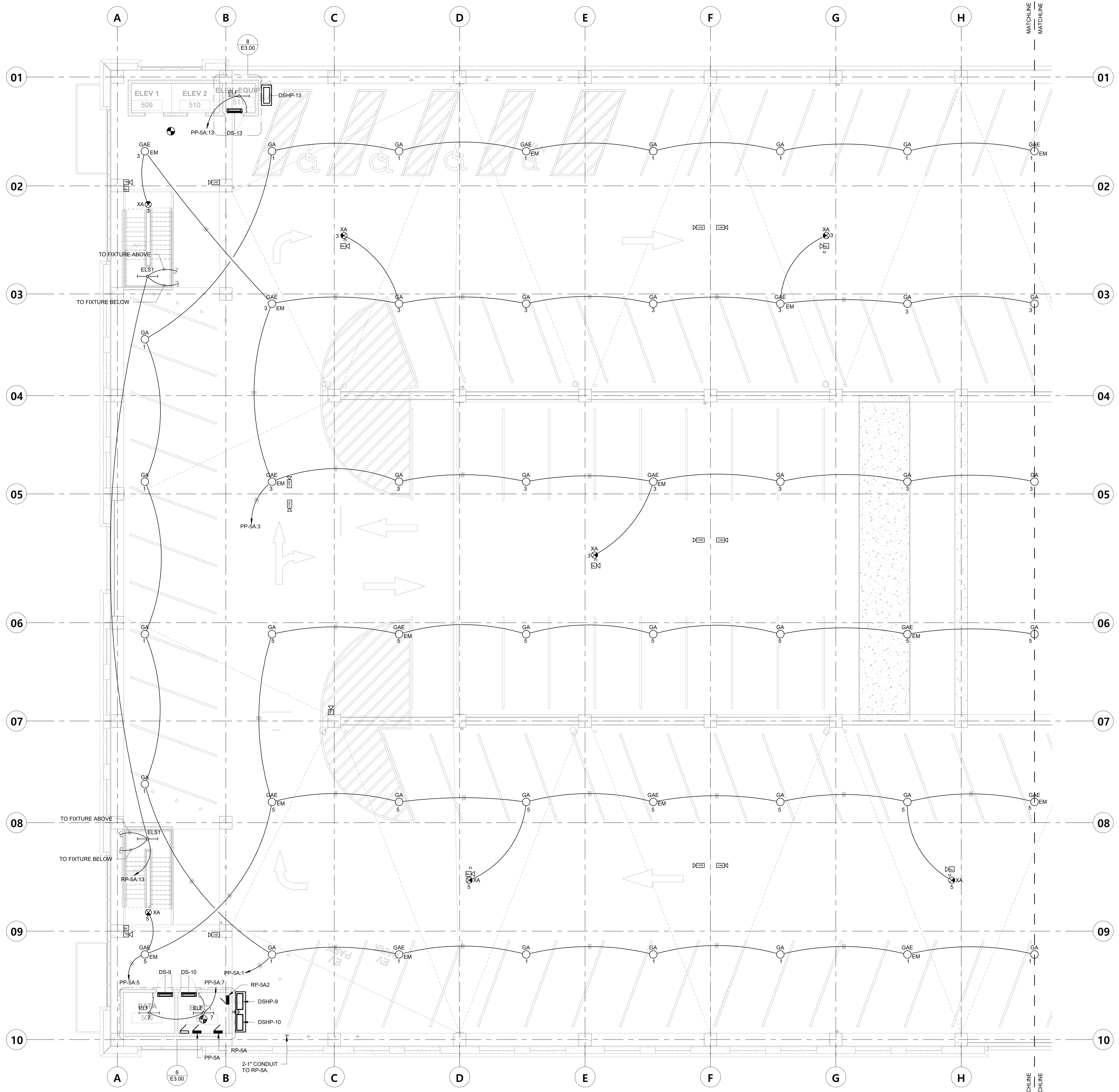
SCALE: 1/8" = 1'-0"

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ENGINEER:  
LIZ HYDE

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**LEVEL 5 - PART A - ELECTRICAL**  
 SCALE: 1/8" = 1'-0"

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ENGINEER:  
LIZ HYDE

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Construction Documents

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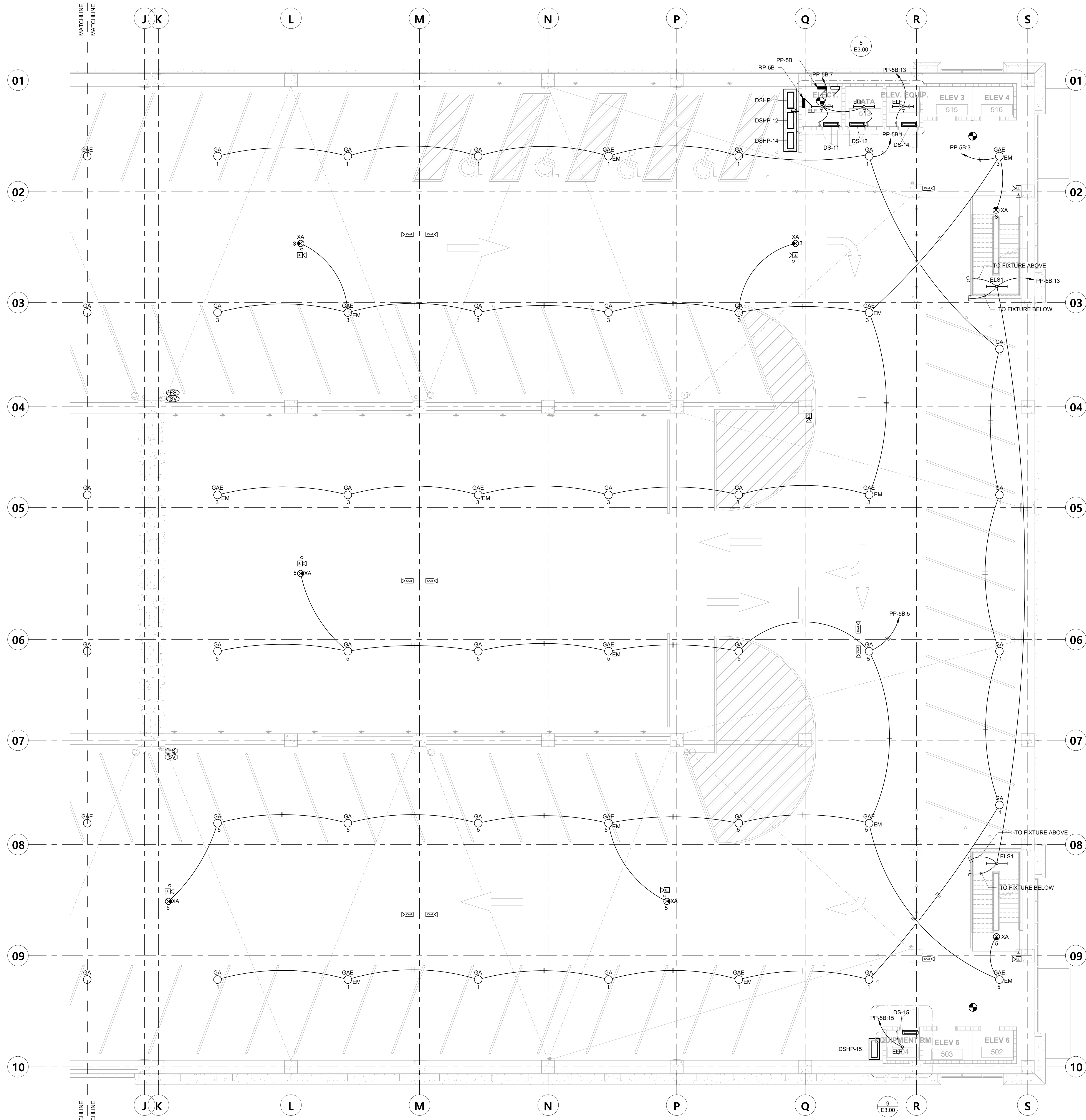
Revisions	sheet title
	LEVEL 5 - PART A - ELECTRICAL
job no.	4308
drawn by	skd
checked by	MEH
date	August, 1 2023

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 of 72  
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# Mobile Civic Center Parking Facility

Mobile, Alabama

- NOTES:
1. SEE SHEET E0.10 FOR EQUIPMENT SCHEDULE.
  2. ALL LIGHTING SHALL BE ROUTED THROUGH LIGHTING CONTROL PANEL. SEE DETAILS ON E0.06.
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**LEVEL 5 - PART B - ELECTRICAL**  
SCALE: 1/8" = 1'-0"



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**LEVEL 5 - PART B - ELECTRICAL**

job no. **4308**

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**E2.50B**

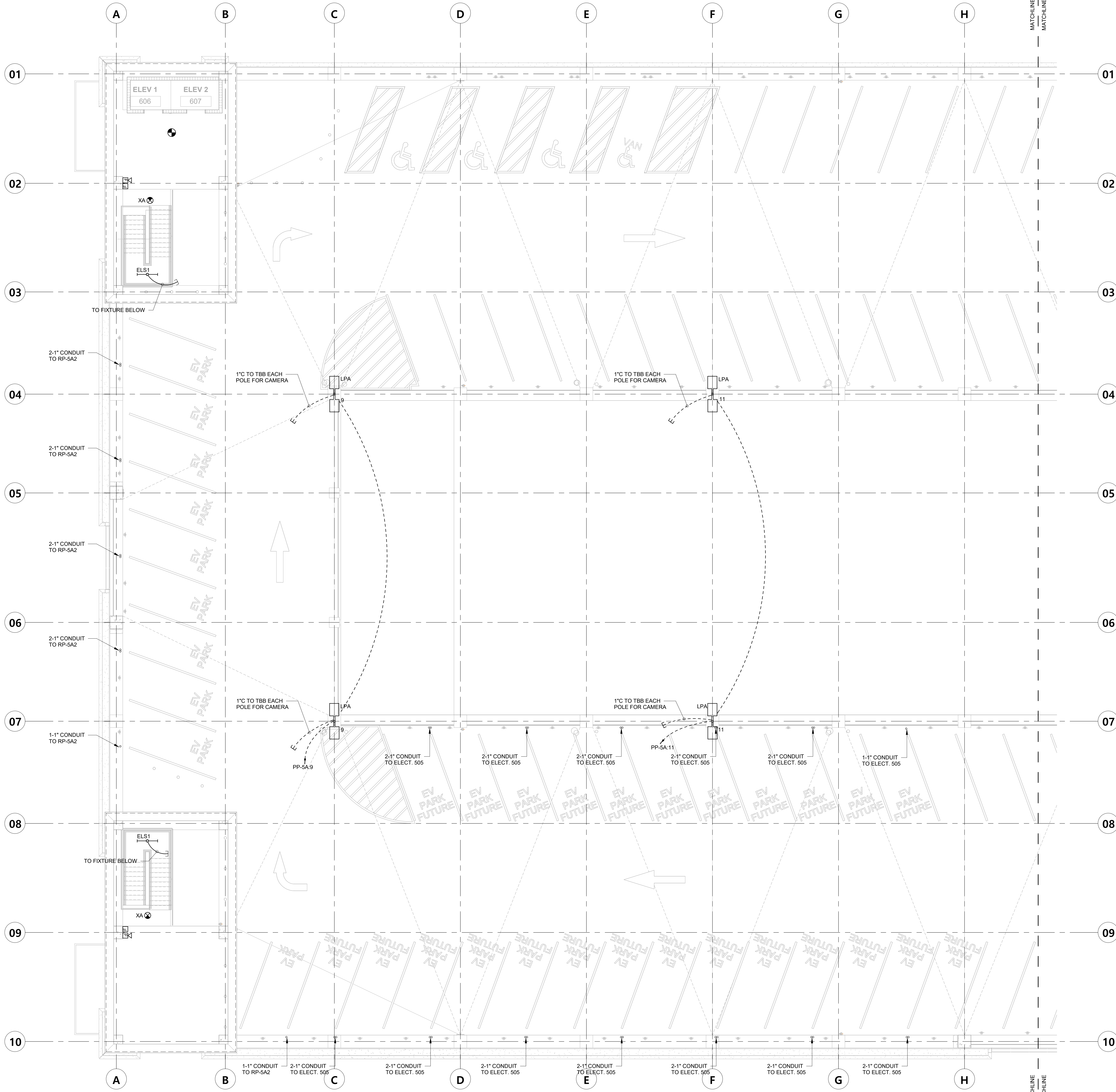
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 E-MAIL: LIZ@HYDE-EGR.COM

ENGINEER:  
LIZ HYDE

PROJECT #  
23047.0



- NOTES:
- SEE SHEET E0.10 FOR EQUIPMENT SCHEDULE.
  - ALL LIGHTING SHALL BE ROUTED THROUGH LIGHTING CONTROL PANEL. SEE DETAILS ON E0.06.
  - PROVIDE UNSWITCHED POWER FOR ALL EM FIXTURES.
  - EXIT SIGNS SHALL BE PLACED SO THAT THEY ARE VISIBLE TO OCCUPANTS. ADJUST LOCATIONS AS REQUIRED AND INCLUDE FOUR (4) ADDITIONAL EXIT SIGNS WITH 50' OF BRANCH CIRCUITING PER LEVEL IN THE BID.
  - FOR EV CHARGER. CONTRACTOR TO PROVIDE ROUGH-IN FROM PANEL TO CHARGER LOCATION. ALABAMA POWER TO WIRE AND INSTALL CHARGER. COORDINATE FINAL LOCATION OF ROUGH-IN AND REQUIREMENTS PRIOR TO INSTALLATION.
  - CONFIRM CAMERA LOCATIONS WITH THE CITY OF MOBILE MENDOR PRIOR TO ROUGH-IN.

**LEVEL 6 - PART A - ELECTRICAL**  
 SCALE: 1/8" = 1'-0"

**HYDE ENGINEERING**  
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PROJECT #  
23047.0

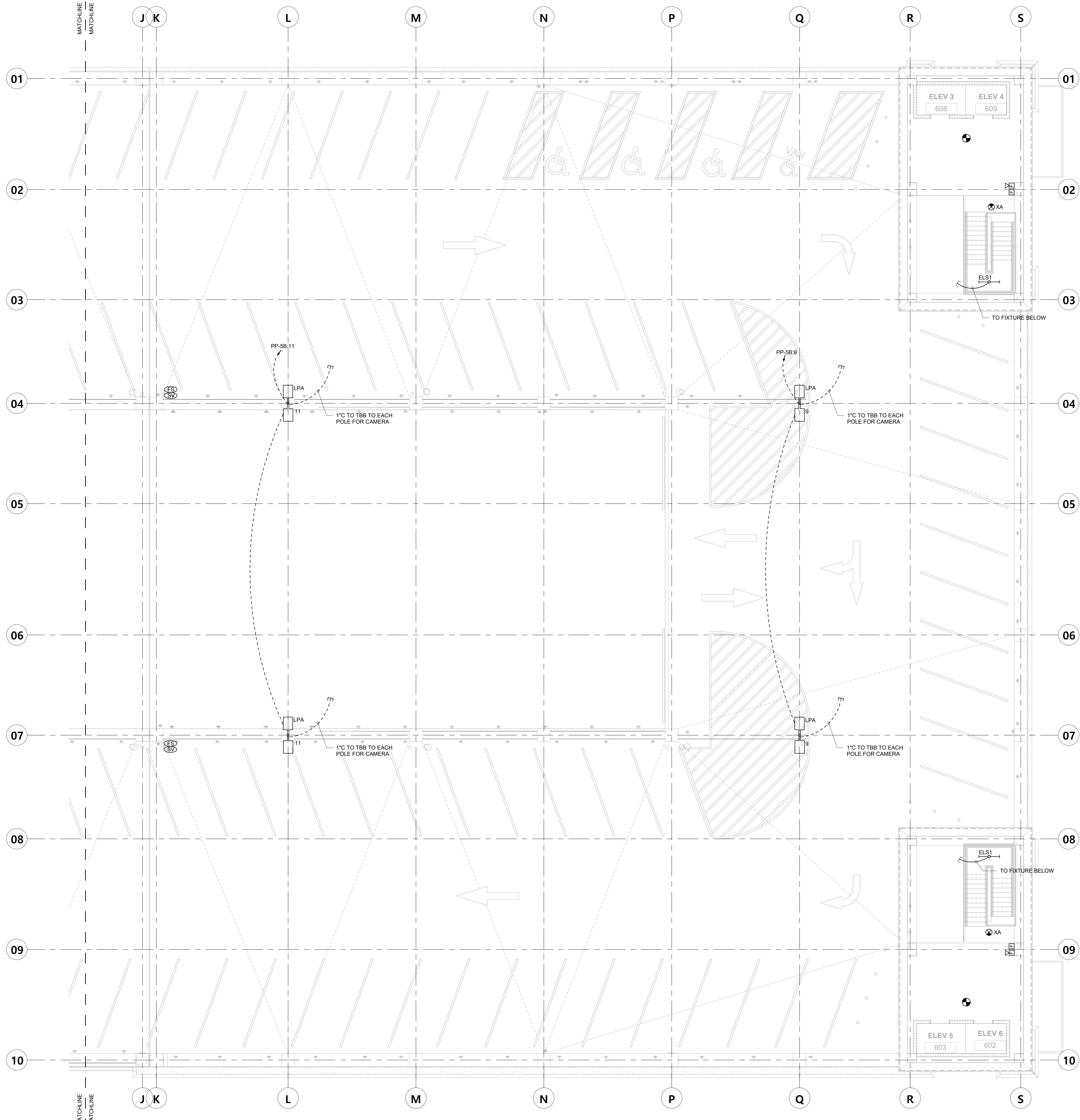


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Revisions	sheet title LEVEL 6 - PART A - ELECTRICAL
job no. 4308	job title
drawn by KDP	sent. no.
checked by MEH	of 167
date August, 1 2023	of 72
<b>E2.60A</b>	
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NOTES:

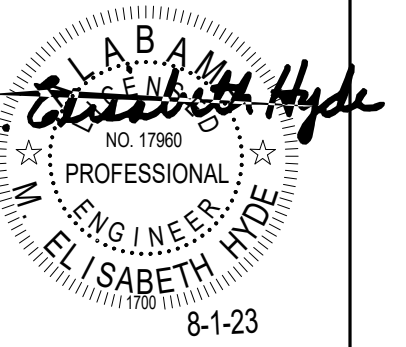
1. SEE SHEET E0.10 FOR EQUIPMENT SCHEDULE.
2. ALL LIGHTING SHALL BE ROUTED THROUGH LIGHTING CONTROL PANEL. SEE DETAILS ON E0.06.
3. PROVIDE UNSWITCHED POWER FOR ALL EM FIXTURES.
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6. CONFIRM CAMERA LOCATIONS WITH THE CITY OF MOBILE VENDOR PRIOR TO ROUGH-IN.



**LEVEL 6 - PART B - ELECTRICAL**

SCALE: 1/8" = 1'-0"

**Mobile Civic Center  
Parking Facility**  
Mobile, Alabama



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Revisions	

sheet title  
**LEVEL 6 - PART B - ELECTRICAL**

job no. **4308**

drawn by: KDJ  
 checked by: MEH  
 date: August, 1 2023

sheet no. **E2.60B**  
 of 72

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PROJECT #  
23047.0

# Mobile Civic Center Parking Facility

Mobile, Alabama



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Professional Engineer  
Architecture • Accessible Design  
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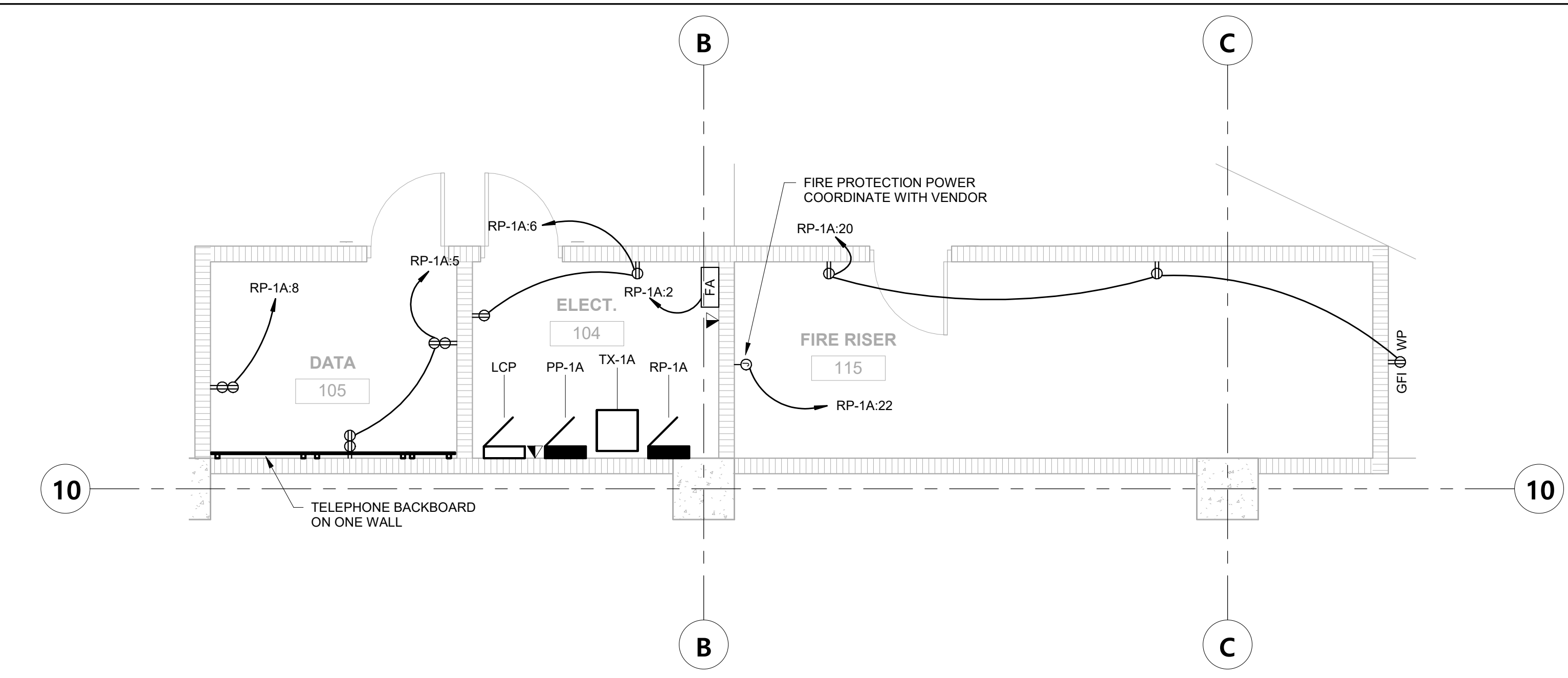
Revisions	

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des. by	LCH
chk. by	MEH
date	August, 1 2023
of	72
of	167
<b>E3.00</b>	

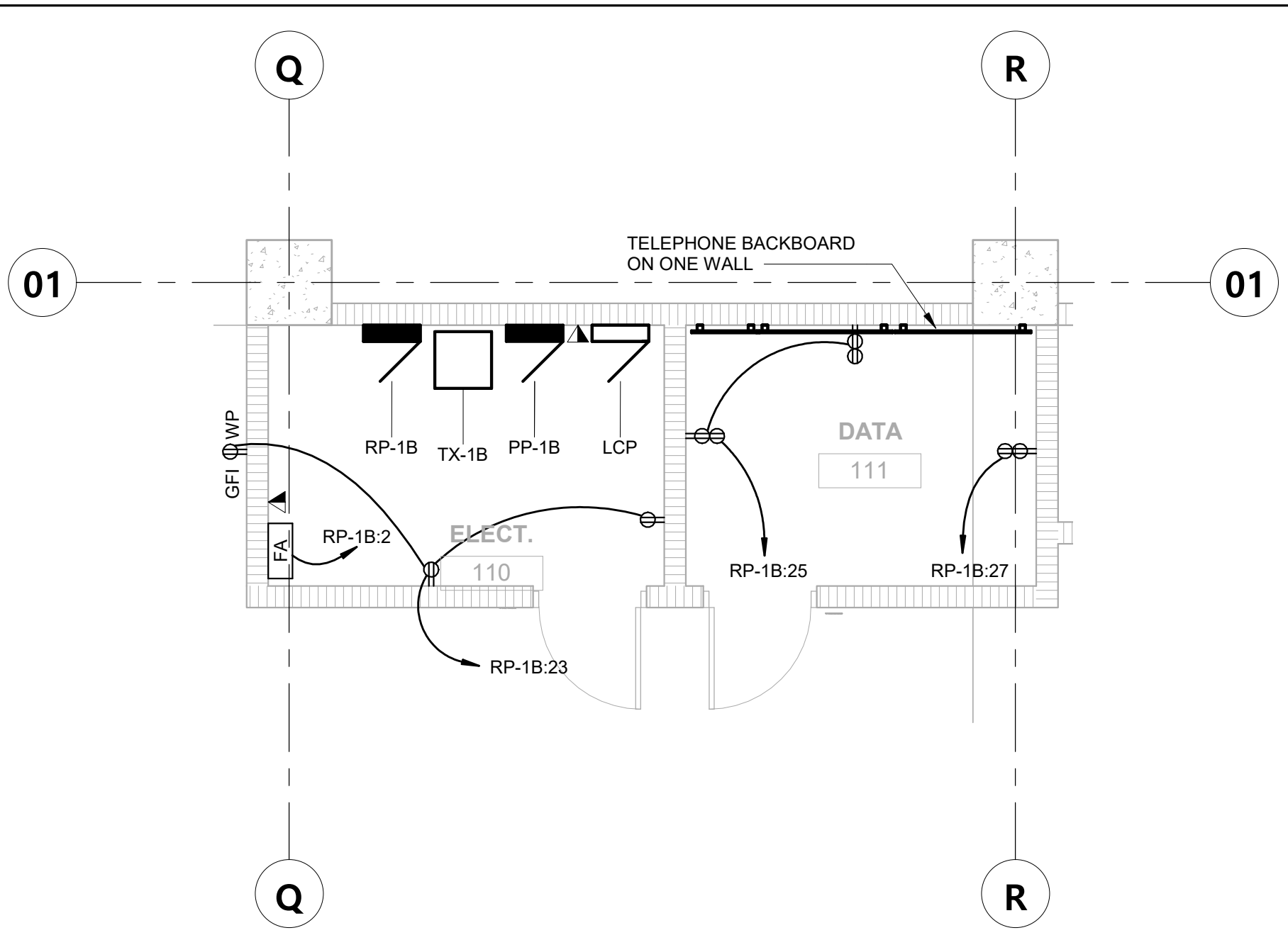
**HYDE ENGINEERING**  
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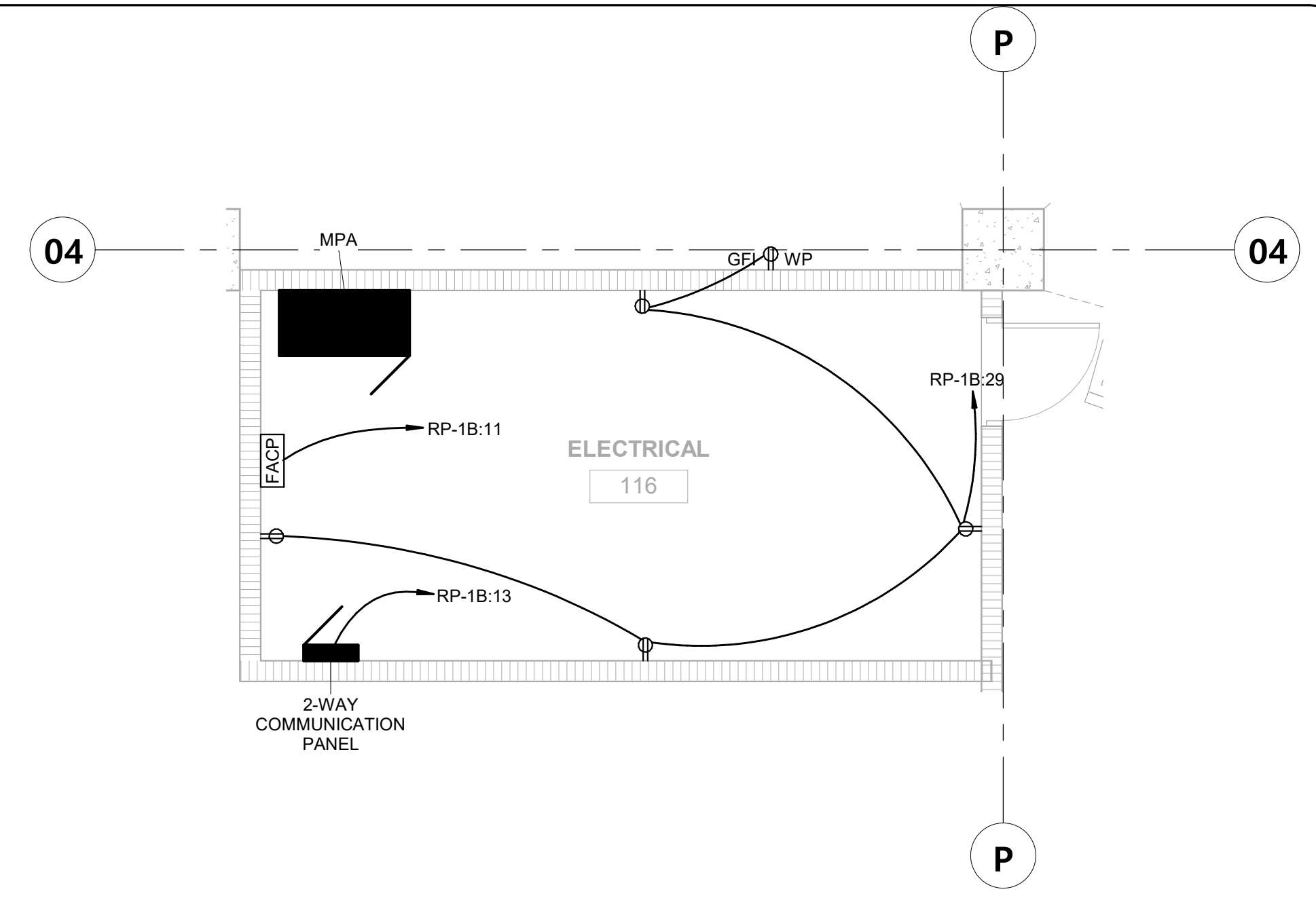
PROJECT #  
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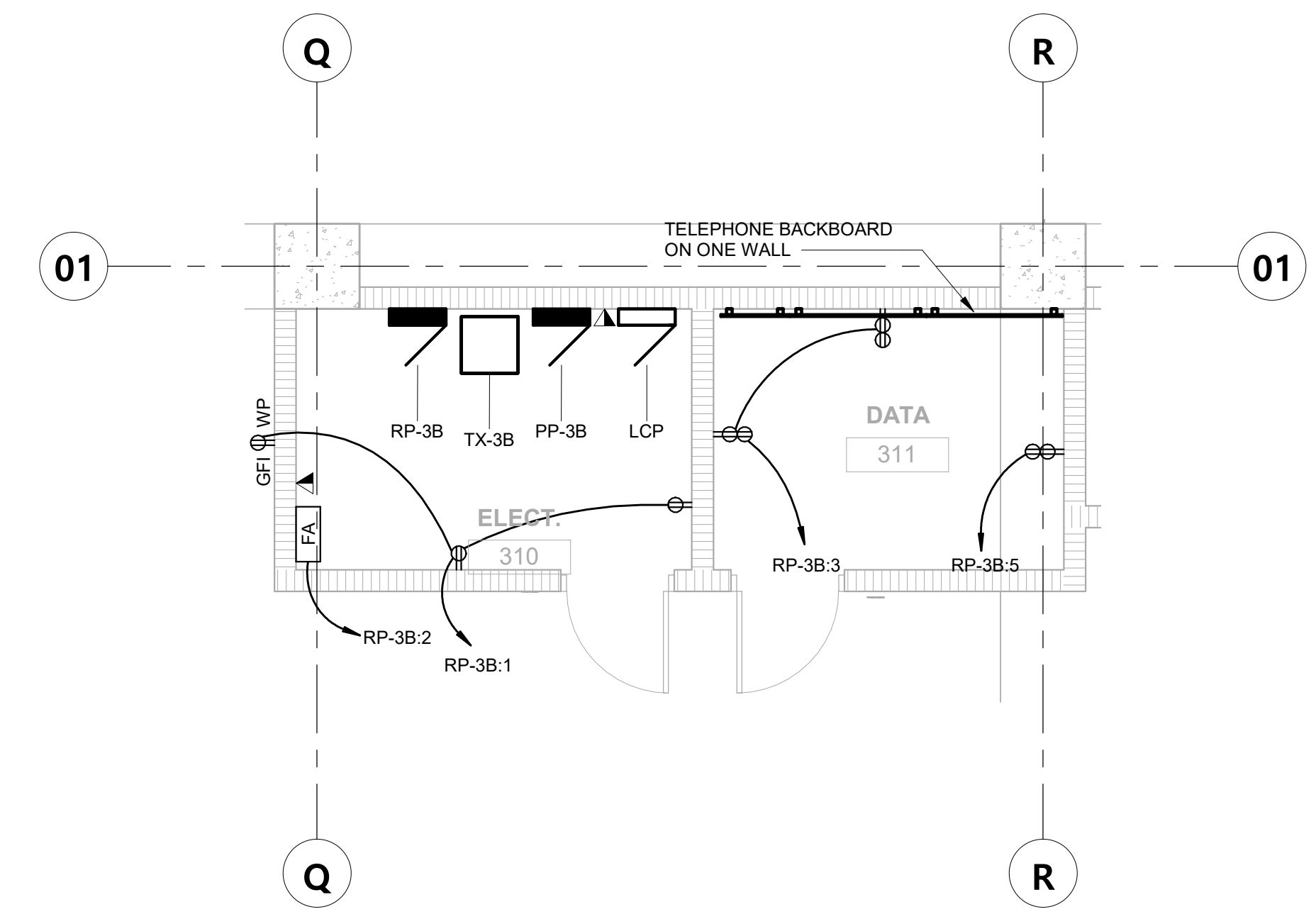
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1/4" = 1'-0"



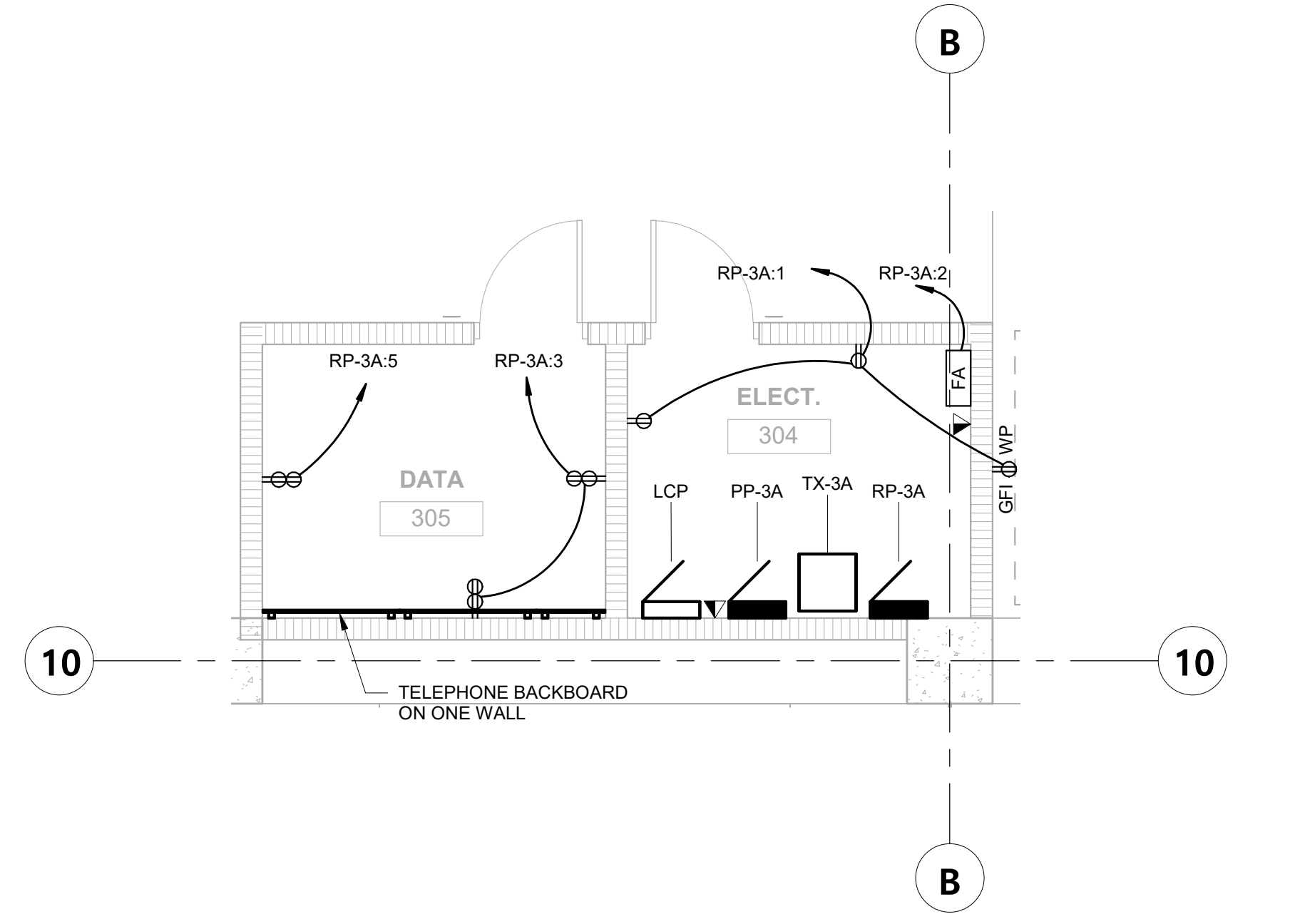
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1/4" = 1'-0"



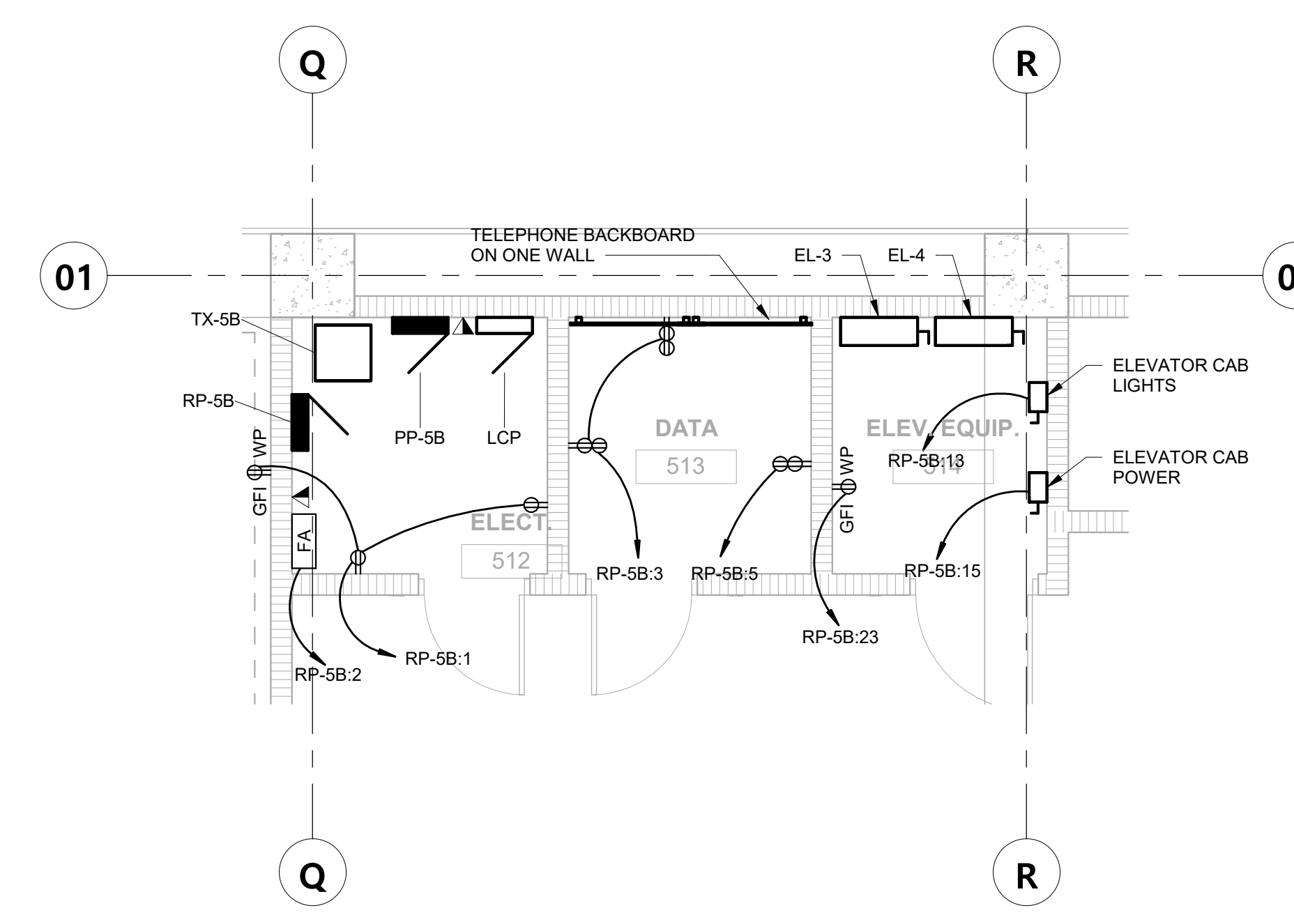
7 LEVEL 1 - ELECTRICAL 116 - ELECTRICAL  
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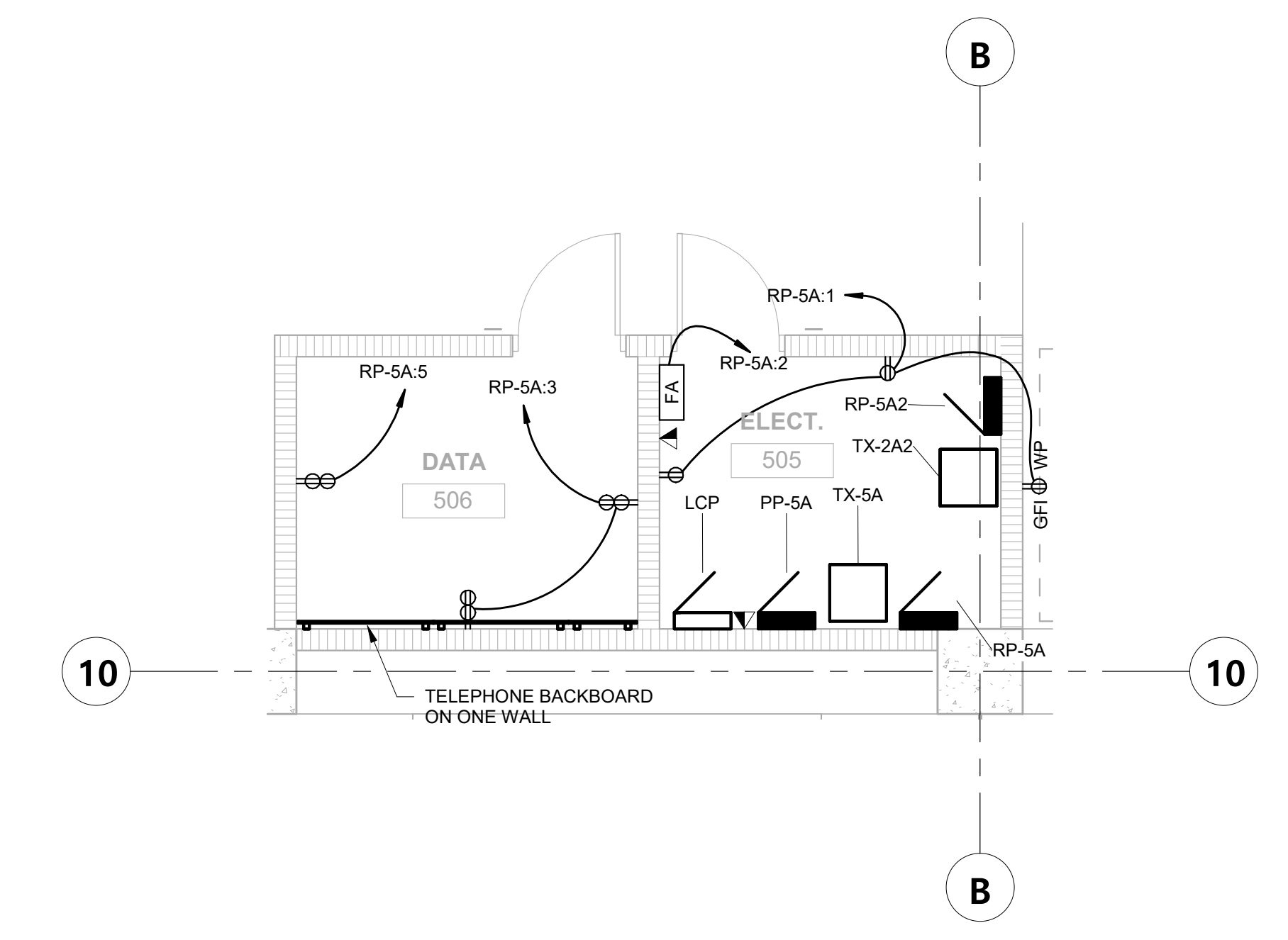
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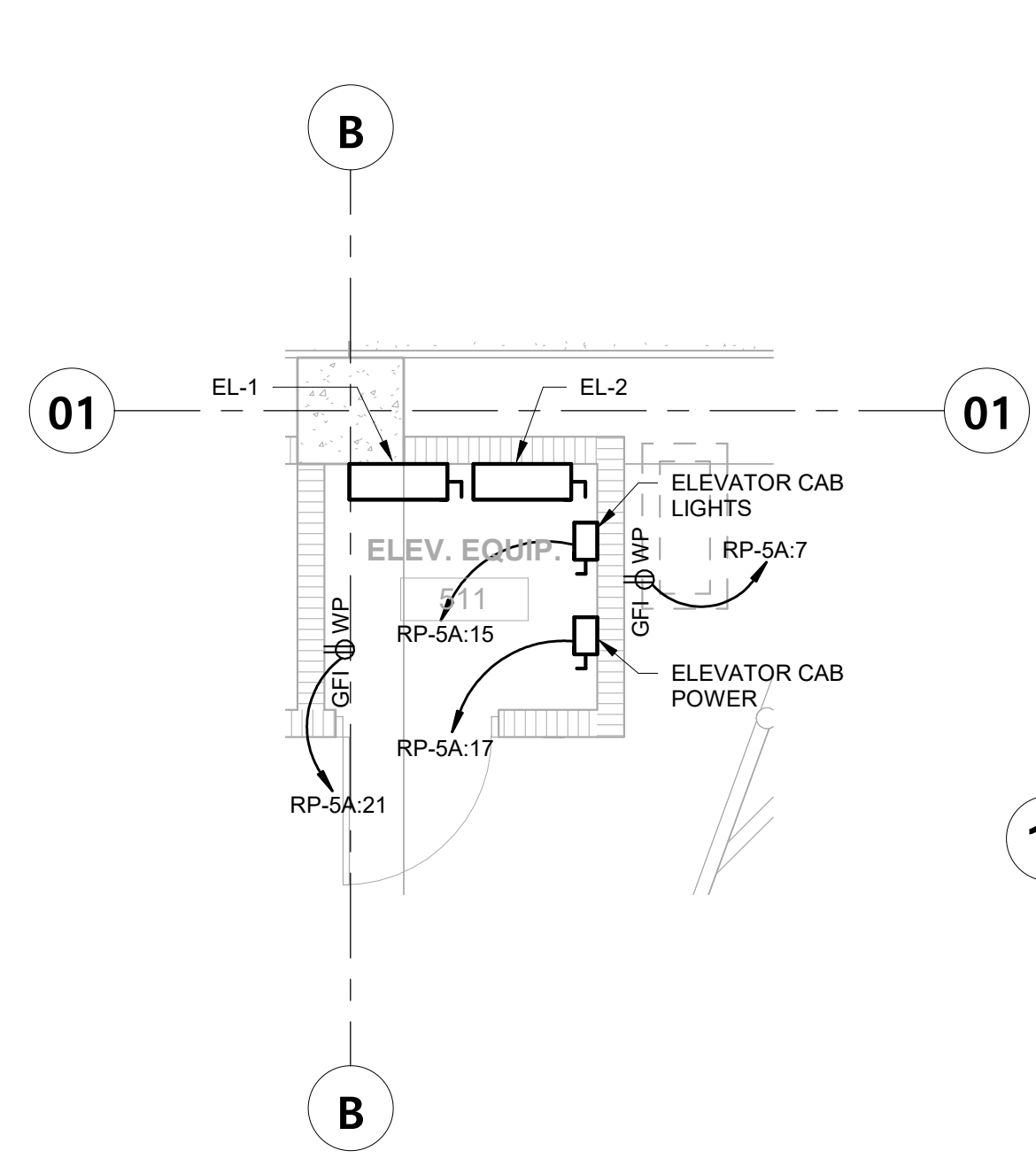
4 LEVEL 3 - DATA 305 & ELECT 304 - ELECTRICAL  
1/4" = 1'-0"



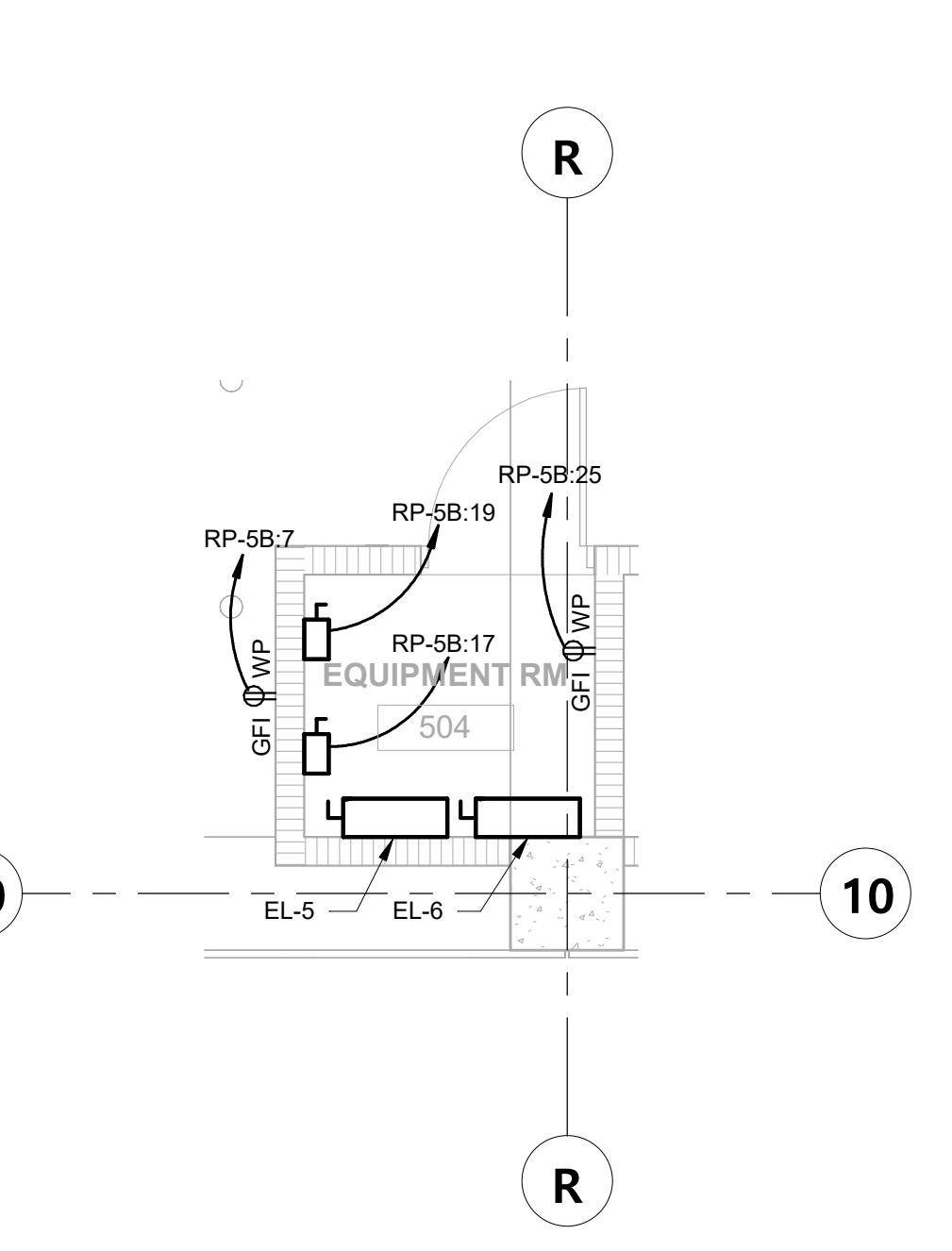
5 LEVEL 5 - DATA 513 & ELECT 512 - ELECTRICAL  
1/4" = 1'-0"



6 LEVEL 5 - DATA 506 & ELECT 505 - ELECTRICAL  
1/4" = 1'-0"



8 LEVEL 5 - ELEV. EQUIP 511 - ELECTRICAL  
1/4" = 1'-0"



9 LEVEL 5 - EQUIPMENT RM 504 - ELECTRICAL  
1/4" = 1'-0"