



**COLLETON COUNTY**  
**SOUTH CAROLINA**  
**Purchasing Department**  
**113 Mable T. Willis Blvd.**  
**Walterboro, SC 29488**  
**843.782.0504**

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**BID: FM-59**  
**VOTER REGISTRATION BUILDING RENOVATION PROJECT**

**Due: Thursday, July 20, 2023 at 11:00 am**

**EMAIL RESPONSE TO:**

**Kaye B. Syfrett, Procurement Manager at [ksyfrett@colletoncounty.org](mailto:ksyfrett@colletoncounty.org)**

**Non-mandatory Pre-bid Meeting.** Contractors and Subcontractors are encouraged to inspect the site on **Wednesday, June 28, 2023, at 10:00 am.** This will be the only available time for entry into the building.

All questions are to be submitted via email to; [jstieglitz@colletoncounty.org](mailto:jstieglitz@colletoncounty.org) no later than **11:00 am Tuesday, July 11, 2023.**

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END OF SECTION

## ADVERTISEMENT FOR BID

Owner: Colleton County, 109 Benson Street, Walterboro, South Carolina

**Bid: FM-59 Voter Registration Building Renovation Project** will be submitted **via email to: Kaye B. Syfrett, Procurement Manager, at [ksyfrett@colletoncounty.org](mailto:ksyfrett@colletoncounty.org)** until **11:00 am, Thursday, July 20, 2023**. The work to be completed as a part of this project consists of providing all required material, equipment, and labor necessary to complete the renovation of the Voter Registration Building located at 72 Bells Hwy, Walterboro, SC, with the following approximate quantities:

**Renovation of the building located at 72 Bells Hwy, Walterboro, SC 29488. The project includes up-fitting and renovating the open floor space into a Voter Registration facility.**

The Instructions to Bidders, bid packet, Contract, Plans, Specifications, and other contract documents may be examined at the following location:

Colleton County website: <https://www.colletoncounty.org/bids-proposal-requests>

Bidders must deposit security with all bids. Security shall be in the form of a certified check or bid bond made payable to Colleton County and shall be for an amount equal to not less than five percent (5%) of the amount of the bid. Provisions of the security shall be as described in the Information for Bidders. No bid will be considered unless the bidder is legally qualified under the provisions of the South Carolina Sections 40-11-10 through 40-11-428.

### NOTICE TO BIDDERS:

Each bidder shall fully acquaint him/herself with the conditions of this Bid. The failure or omission of a bidder to acquaint him/herself with the plans, specifications, and existing conditions shall in no way relieve him/herself of any obligation with respect to this Bid or the Contract.

BIDS WILL NOT BE CONSIDERED FROM ANY VENDOR THAT OWES DELINQUENT PROPERTY TAXES TO THE COUNTY OF COLLETON.

All questions about the meaning or intent of the Bidding Documents are to be submitted in writing via email to; [jstieglitz@colletoncounty.org](mailto:jstieglitz@colletoncounty.org) **no later than 11:00 am Tuesday, July 11, 2023.**

NOTICE TO BIDDERS: All amendments to and interpretations of this solicitation shall be in writing and issued by the Colleton County Procurement Manager. Colleton County shall not be legally bound by any amendment or interpretation that is not in writing. The award of the project is contingent on funding approval by Colleton County Council.

The Owner reserves the right to waive any informality or to reject any or all bids.

#### Architect

**Glick /Boehm & Associates, Inc.  
493 King Street  
Charleston, SC 29403  
Shawn Mellin, AIA, LEED AP**

#### Owner

**Colleton County  
109 Benson Street  
Walterboro, SC 29488**

## Information for Bidders

### ARTICLE 1 - DEFINED TERMS

- 1.01 Terms used in these Instructions to Bidders have the meanings indicated in the 001, General Conditions. Additional terms used in these Instructions to Bidders have the meanings indicated below:
- A. **Issuing Office** - The office from which the Bidding Documents are to be issued and where the bidding procedures are to be administered.
  - B. **Architect, Engineer, Owner** - The person or firm in charge of the design of the project. In some instances, the owner will self-perform, acting as the Architect.
  - C. **Construction Coordinator** - The person or company acting on behalf of the owner, and, in some instances, the owner will self-perform, acting as the Construction Coordinator.
  - D. **Owner** - Colleton County
  - E. **Official Time** - The time noted on the Atomic Clock in the Purchasing office lobby. All times are Eastern Standard Time.
  - F. **Substantial Completion** - The point of construction where the owner can fully occupy the facility, perform all aspects of the intended use of the facility, and not be inhibited with final punch list items. Certificate of occupancy does not constitute substantial completion. The owner must agree that the project is substantially complete.

### ARTICLE 2 - COPIES OF BIDDING DOCUMENTS

- 2.01 Complete sets of the Bidding Documents can be found on Colleton County's website at: <https://www.colletoncounty.org/bids-proposal-requests>
- 2.02 Complete sets of Bidding Documents shall be used in preparing Bids; neither the Owner nor Engineer or Architect assumes any responsibility for errors or misinterpretations resulting from complete sets of Bidding Documents.
- 2.03 The Owner, Engineer, or Architect, in making copies of Bidding Documents available on the above terms, do so only for the purpose of obtaining Bids for the Work and do not confer a license or grant for any other use.

### ARTICLE 3 - QUALIFICATIONS OF BIDDERS AND SPECIAL CONDITIONS

- 3.01 Bidders must be licensed as a General Contractor in the State of South Carolina and will hold all Trade Contracts and Building Permits on the project.
- 3.02 To demonstrate Bidder's qualifications to perform the Work, within five (5) days of the Owner's request, Bidder shall submit written evidence such as financial data, previous experience, and present commitments.
- 3.03 Davis-Bacon Prevailing Wage does not apply to this project.



#### ARTICLE 4 - EXAMINATION OF BIDDING DOCUMENTS, OTHER RELATED DATA, AND SITE

- 4.00 No mandatory Pre-bid Meeting. Contractors and Subcontractors are encouraged to inspect the site on **Wednesday, June 28, 2023, at 10:00 am.** This will be the only available time for entry into the building.
- 4.01 Subsurface and Physical Conditions
- A. The General Conditions identify:
- No reports of explorations and tests of conditions at or contiguous to the Site were performed.
- 4.02 Underground Facilities
- A. Information and data shown or indicated in the Bidding Documents concerning existing Underground Facilities at or contiguous to the Site is based upon information and data furnished to the Owner and Engineer or Architect by the owners of such Underground Facilities, including the Owner, or others.
- 4.03 Hazardous Environmental Condition
- A. The General Conditions identify those reports and drawings relating to a Hazardous Environmental Condition identified at the Site, if any, that Engineer or Architect has used in preparing the Bidding Documents.
- B. Copies of any reports and drawings referenced in Paragraph 4.03. A is included herein. Those reports and drawings are not part of the Contract Documents, but the “technical data” contained therein upon which Bidder is entitled to rely as provided in Paragraph 4.06 of the General Conditions has been identified and established. Bidder is responsible for any interpretation or conclusion Bidder draws from any “technical data” or any other data, interpretations, opinions, or information contained in such reports or shown or indicated in such drawings.
- 4.04 In addition, provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to subsurface conditions, other physical conditions and Underground Facilities, and possible changes in the Bidding Documents due to differing or unanticipated conditions appear in Paragraphs 4.02, 4.03, and 4.04 of the General Conditions. Provisions concerning responsibilities for the adequacy of data furnished to prospective Bidders with respect to a Hazardous Environmental Condition at the Site, if any, and possible changes in the Contract Documents due to any Hazardous Environmental Condition uncovered or revealed at the Site which was not shown or indicated in the Drawings or Specifications or identified in the Contract Documents to be within the scope of the Work appear in Paragraph 4.06 of the General Conditions.
- 4.05 Reference is made to Article 7 of the General Conditions for the identification of the general nature of other work that is to be performed at the Site by the Owner or others (such as utilities and other prime contractors) that relates to the Work contemplated by these Bidding Documents. On request, the Owner will provide to each Bidder for examination access to or copies of Contract Documents (other than portions thereof related to price) for such other work.

- 4.06 It is the responsibility of each Bidder before submitting a Bid to:
- a. Examine and carefully study the Bidding Documents, the other related data identified in the Bidding Documents, and any Addenda.
  - b. Visit the Site and become familiar with and satisfy Bidder as to the general, local, and Site conditions that may affect the work's cost, progress, and performance.
  - c. Become familiar with and satisfy Bidder as to all federal, state, and local Laws and Regulations that may affect the work's cost, progress, and performance.
  - d. Carefully study all: (1) all drawings of physical conditions relating to existing surface or subsurface structures (except Underground Facilities) which have been identified.
  - e. Obtain and carefully study (or accept consequences of not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site, which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.
  - f. Agree at the time of submitting its Bid that no further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of its Bid for the performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
  - g. Become aware of the general nature of the work to be performed by the Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
  - h. Correlate the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
  - i. Promptly give the Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder discovers in the Bidding Documents and confirm that the written resolution thereof by the Owner is acceptable to Bidder.
  - j. Determine that the Bidding Documents are generally sufficient to indicate and convey an understanding of all terms and conditions for the performance of the Work.
  - k. No plea of ignorance of conditions that exist or may hereafter exist on the site of the work, or difficulties that may be encountered in the execution of the work, as a result of failure to make necessary investigations and examinations, will be accepted as an excuse for any failure or omission on the part of the Contractor to fulfill in every detail all the requirements of the contract documents and to complete the work for the consideration set forth therein, or as a basis for any claim whatsoever.

- l. Apparent omission of a detailed description concerning any point shall be regarded as the best commercial practice is to prevail and that only material and workmanship of the finest quality is to be used.
  - m. Bidders may refer to Sections 2-67, 2-73, and 2-74 of Ordinance #2008-09, also known as the Colleton County, South Carolina Purchasing Policy, to determine their remedies concerning this competitive process. The failure to be awarded a bid shall not be valid grounds for protest.
  - n. The Bidder further agrees that the performance time specified is reasonable, having carefully considered the nature and scope of the project as aforesaid.
- 4.07 The submission of a Bid will constitute an incontrovertible representation by Bidder that Bidder has complied with every requirement of this Article 4, that without exception, the Bid is premised upon performing and furnishing the Work required by the Bidding Documents and applying any specific means, methods, techniques, sequences, and procedures of construction that may be shown or indicated or expressly required by the Bidding Documents, that Bidder has given the Owner written notice of all conflicts, errors, ambiguities, and discrepancies that Bidder has discovered in the Bidding Documents and the written resolutions thereof by the Owner are acceptable to Bidder, and that the Bidding Documents are generally sufficient to indicate and convey an understanding of all terms and conditions for performing and furnishing the Work.

#### **ARTICLE 5 - SITE AND OTHER AREAS**

- 5.01 The Site is identified in the Bidding Documents. Easements for permanent structures or permanent changes in existing facilities are to be obtained and paid for by the Owner unless otherwise provided in the Bidding Documents. All additional land and access thereto required for temporary construction facilities, construction equipment, or storage of materials and equipment to be incorporated in the Work are to be obtained and paid for by Contractor.

#### **ARTICLE 6 - INTERPRETATIONS AND ADDENDA**

- 6.01 All questions about the meaning or intent of the Bidding Documents are to be submitted via email to; **[jstieglitz@colletoncounty.org](mailto:jstieglitz@colletoncounty.org) no later than 11:00 am on Tuesday, July 11, 2023.** Questions received after this date and time will not be answered. Interpretations or clarifications considered necessary by the Owner in response to such questions will be issued by Addenda. Only questions answered by Addenda will be binding. Oral and other interpretations or clarifications will be without legal effect.
- 6.02 Addenda may be issued to clarify, correct, or change the Bidding Documents as deemed advisable by the Owner. Addenda will be posted on the Colleton County website. It is the responsibility of the bidder to monitor this website for addendums.
- 6.03 Division 000 and Division 001 shall have authority over all other documents in the project manual. Where duplication of titles, articles, standards, requirements, and such are found, Division 000 and Division 001 govern.

## ARTICLE 7 - BID SECURITY

- 7.01 A Bid must be accompanied by Bid security made payable to Colleton County in an amount of five percent (5%) of the Bidder's maximum Bid price and in the form of a certified check, bank money order, or a Bid Bond (on the form attached) issued by a surety meeting the requirements of Paragraphs 5.01 and 5.02 of the General Conditions.
- 7.02 The Bid security of the Successful Bidder will be retained until such Bidder has executed the Contract Documents, furnished the required contract security, and met the other conditions of the Notice of Award. If the Successful Bidder fails to execute and deliver the Contract Documents and furnish the required contract security within ten (10) days after the Notice of Award, the Owner may annul the Notice of Award, and the Bid security of that Bidder will be forfeited. The Bid security of other Bidders whom the Owner believes to have a reasonable chance of receiving the award may be retained by the Owner until seven (7) days after the Effective Date of the Agreement or sixty (60) days after the Bid opening. Bidders not receiving a contract will be issued a copy of the Notice of Award to send to their issuing Surety so that the Bid Bond can be canceled. Bidder's Bond documents will not be returned. All Certified Checks will be returned to the Bidders.

## ARTICLE 8 - CONTRACT TIMES

- 8.01 **Renovation of the building located at 72 Bells Hwy, Walterboro, SC 29488. The project includes up-fitting and renovating the open floor space into a Voter Registration facility to be completed within One Hundred eighty (180) calendar days after the "Notice to Proceed" has been issued.**

## ARTICLE 9 – LIQUIDATED DAMAGES

- 9.01 Document Execution
- A. The successful Bidder, upon failure or refusal to execute and deliver the contract and bonds within ten (10) days after they have received the notice of the acceptance of their bid, shall forfeit to the Owner, as liquidated damages, the security deposited with the bid.
- 9.02 Project Execution
- A. Bidder must agree to commence work on or before a date specified written "Notice to Proceed" by the Owner and to fully complete the project within the dates specified in the Bid Form, Article 6; Paragraph 6.01. Bidder must also agree to pay as liquidated damages the sum as indicated in the Bid Form, Article 6; Paragraph 6.02 for each consecutive calendar day thereafter as hereinafter provided in the General Conditions.

## ARTICLE 10 - SUBSTITUTE AND "OR-EQUAL" ITEMS

- 10.01 The Contract, if awarded, will be on the basis of materials and equipment specified or described in the Bidding Documents. Whenever it is specified or described in the Bidding Documents that a substitute or "or-equal" item of material or equipment may be furnished or used by Contractor if acceptable to the Construction Coordinator, application for such acceptance will not be considered by the Owner until after the Effective Date of the Agreement.

- (a) The use of a **“Brand Name Only”** specification is for the purpose of describing the sole item that will satisfy the county’s requirements. Bids offering alternate products will be declared non-responsive.
- (b) The use of a **“Brand Name or Equal”** specification is for the purpose of describing the standard of quality, performance, and characteristics desired. It is not intended to limit or restrict competition. An item shall be considered substantially equivalent, or “equal” to the specified brand in the opinion of the Purchasing Director, the County can reasonably anticipate sufficiently similar quality, capacity, durability, performance, utility, and productivity as provided by the specified brand.

#### **ARTICLE 11 - SUBCONTRACTORS, SUPPLIERS, AND OTHERS**

- 11.01 The General Conditions require the identity of certain Subcontractors, Suppliers, individuals, or entities to be submitted to the Owner with the bid packet. The bidder shall submit to the Owner a list of all such Subcontractors, Suppliers, individuals, or entities proposed for those portions of the Work for which such identification is required. Such list shall be accompanied by an experience statement with pertinent information regarding similar projects and other evidence of qualification for each such Subcontractor, Supplier, individual, or entity if requested by the Owner. If the Owner or Construction Coordinator, after due investigation, has reasonable objection to any proposed Subcontractor, Supplier, individual, or entity, the Owner may, before the Notice of Award is given, request apparent Successful Bidder to submit a substitute, in which case apparent Successful Bidder shall submit an acceptable substitute, Bidder’s Bid price will be increased (or decreased) by the difference in cost occasioned by such substitution, and the Owner may consider such price adjustment in evaluating Bids and making the Contract award.
- 11.02 If the apparent Successful Bidder declines to make any such substitution, the Owner may award the Contract to the next lowest Bidder that proposes to use acceptable Subcontractors, Suppliers, individuals, or entities. Declining to make requested substitutions will not constitute grounds for forfeiture of the Bid security of any Bidder. Any Subcontractor, Supplier, individual, or entity so listed and against which the Owner or Construction Coordinator makes no written objection prior to the giving of the Notice of Award will be deemed acceptable to the Owner and Construction Coordinator subject to revocation of such acceptance after the Effective Date of the Agreement as provided in Paragraph 6.06 of the General Conditions.
- 11.03 Contractor shall not be required to employ any Subcontractor, Supplier, individual, or entity against whom Contractor has a reasonable objection.
- 11.04 Each bidder shall fully acquaint himself with the conditions of this Bid. The failure or omission of a bidder to acquaint himself with existing conditions shall in no way relieve him of any obligation with respect to this Bid or the Contract.
- 11.05 Failure of a sub-contractor to fully acquaint himself with the conditions of this bid when working on behalf of the General Contractor or contract holder shall in no way relieve himself of any obligation with respect to this Bid or the Contract.

## **ARTICLE 12 - PREPARATION OF BID**

- 12.01 Should a bidder need any reasonable accommodations for any type of disability in order to participate in this procurement, you are asked to contact the Colleton County Purchasing office.
- 12.02 The Bid Form is included with the Bidding Documents on the Owner's Web Site.
- 12.03 All blanks on the Bid Form shall be completed by printing in ink or a typewriter, and the Bid signed in ink. Erasures or alterations shall be initialed in ink by the person signing the Bid Form. When required, a Bid price shall be indicated for each unit price item listed therein, or the words "No Bid," "No Charge," or "Not Applicable" entered. When a unit price is not required, the bid price shall be submitted in words and numbers as indicated on the bid form.
- 12.04 A Bid by an individual shall show the Bidder's name and official address.
- 12.05 A Bid by a joint venture shall be executed by each joint venture in the manner indicated on the Bid Form. The official address of the joint venture shall be shown below the signature.
- 12.06 All names shall be typed or printed in ink below the signatures.
- 12.07 The Bid shall contain an acknowledgment of receipt of all Addenda, the numbers of which shall be filled in on the Bid Form.
- 12.08 The address and telephone number for communications regarding the Bid shall be shown.
- 12.09 The Bid shall contain evidence of Bidder's authority and qualification to do business in the state where the Project is located or covenant to obtain such qualification prior to the award of the Contract. The bidder's state contractor license number, if any, shall also be shown on the Bid Form.
- 12.10 Any reports, studies, photographs, negatives, or other documents prepared by the vendor in the performance of its obligations shall be the exclusive property of the procurer, and all such material shall be remitted to the procurer by the vendor upon completion, termination, or cancellation of this order. The vendor shall not use, willingly allow or cause to have such material used for any purpose other than the performance of its obligations under this order without the prior written consent of the procurer.
- 12.11 The contractor will take affirmative action in complying with all Federal and State requirements concerning fair employment and employment of the handicapped, and concerning the treatment of all employees, without regard or discrimination by reason of age, race, color, religion, sex, national origin or physical handicap. The following are incorporated herein by reference: 41 C.F.R. 60-1.4, 60-250.4, and 60-741.4.
- 12.12 All construction contracts over \$2,000.00 must include a provision for compliance with the Copeland "Anti-Kickback" Act (18 U.S.C. 874) as supplemented in Department of Labor regulations (29 CFR Part 3). This act provides that each Contractor shall be prohibited from inducing, by any means, persons employed in the construction, completion, or repayment of public work to give up any part of their compensation.

- 12.13 The contractor certifies that the vendor(s) will provide a “drug-free workplace” as that term is defined in Section 44-107-30 of the Code of Laws of South Carolina, 1976, as amended, by the complying with the requirements set forth in Title 44, Chapter 107.
- 12.14 The federally-assisted construction contractor certifies that he will not maintain or provide, for his employees, segregated facilities at any of his establishments and that he will not permit his employees to perform their services at any location under his control where segregated facilities are maintained. The federally assisted construction contractor agrees that a breach of this certification is a violation of the Equal Opportunity Clause in this Contract. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms, and washrooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees who are segregated on the basis of race, color, religion, or national origin because of habit, local custom, or any other reason. The federally assisted construction contractor agrees that (except where he has obtained identical certifications from proposed subcontractors for specific time periods) he will obtain identical certifications from proposed subcontractors prior to the award of subcontracts exceeding \$10,000 which are not exempt from the provisions of the Equal Opportunity Clause and that he will retain such certifications in his files.
- 12.15 By signing this bid or proposal, the Contractor certifies that it will (a) comply with the applicable requirements of Title 8, Chapter 14, and (b) include in their contracts with the sub-subcontractor’s language requiring the sub-subcontractors to comply with the applicable requirements of Title 8, Chapter 14. (An overview is available at [www.procurement.sc.gov](http://www.procurement.sc.gov))
- 12.16 Bidders must mark as "confidential" each part of their bid that they consider to be proprietary information that could be exempt from disclosure under section 30-4-40, Code of Laws of South Carolina 1976, as amended (Freedom of Information Act). If any part is designated as confidential, there must be attached to that part an explanation of how this information fits within one or more categories listed in section 30-4-40. The County reserves the right to determine whether this information should be exempt from disclosure, and no legal action may be brought against the County or its agents for its determination in this regard.
- 12.17 Nothing herein is intended to exclude any responsible vendor, his product or service, or restrain or restrict competition. On the contrary, all responsible vendors are encouraged to bid, and their bids are solicited.
- 12.18 The successful Bidder must be responsible for obtaining all necessary city, county, and state permits/licenses and must comply with all State and local codes and ordinances. Copies of such permits/licenses shall be available to Colleton County upon request. Work within the Walterboro City Limits may require a City Business License.
- 12.19 This Agreement shall be governed by and construed in accordance with the laws of the State of South Carolina, U.S.A.
- 12.20 All claims, disputes, and other matters in question between parties arising out of, or relating to, this Agreement, or the breach thereof, shall be decided in the Circuit Court of the Fourteenth Judicial Circuit in Colleton County, South Carolina. By executing this Agreement, all parties consent to venue and jurisdiction in Colleton County, South Carolina, and waive any right to contest jurisdiction and venue in said Court.

- 12.21 Colleton County reserves the right to reject all or any part of any bid, waive informalities, and award the contract to the lowest responsive and responsible bidder to serve the interest of Colleton County best.
- 12.22 By submitting a bid, the Bidder certifies to the best of its knowledge and belief, that it and its principals, sub-contractors, and assigns are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal, State or local department or agency. A copy of the County's debarment procedure in accordance with Section 2-68 of Ordinance #2008-09, also known as the Colleton County, South Carolina Purchasing Policy, is available upon request.
- 12.23 Federal guidelines require grant recipients to obtain sufficient assurance that bidders are not suspended or debarred from participating in federal programs when contracts exceed \$25,000. By signing the bid submittal form, you verify that no party to this agreement is excluded from receiving Federal contracts, certain subcontracts, and certain Federal financial and nonfinancial assistance and benefits, pursuant to the provisions of 31 U.S.C. 6101, note, E.O. 12549, E.O. 12689, 48 CFR 9.404, and each agency's codification of the Common Rule for Non-procurement suspension and debarment. [See <https://www.epls.gov/> for additional information.]

### ARTICLE 13 - BASIS OF BID; COMPARISON OF BIDS

#### 13.01 Base Bid and Unit Price Schedule

- A. Bidders shall submit a base bid for the project, as listed in the Specifications, General Conditions, Drawings, and Addendums. Failure of the Contractor or Subcontractor(s) to properly perform takeoffs for the project does not relieve the bidder of their obligation to provide a complete, finished product for the submitted base bid amount. **The base bid shall include any owner-listed Allowances or contingencies in the plans, specifications, or bid packet.**
- B. Bidders shall submit a Base Bid as a lump sum.
- C. Within 48 hours of the apparent lowest responsive bidder being notified by Colleton County, the bidder shall submit to Colleton County for **review and approval** the attached unit price schedule for each item of work listed. All quantity take-offs shall be listed in the form as requested. All requested unit pricing shall have a figure entered into the form. Lumping of unit prices and or divisions will not be allowed. Unit prices shall be totaled to match the lump sum bid. Failure of the bidder to provide this information in the allotted time will result in the bidder being disqualified and shall forfeit their Bid Bond.
- D. The total of all unit prices will be the sum of the products of the quantity of each item and the corresponding unit price.
- E. Discrepancies between the indicated sum of any column of figures and the correct sum thereof will be resolved in favor of the correct sum. Discrepancies between words and figures will be resolved in favor of the words.

- 13.02 The Bid price shall include such amounts as the Bidder deems proper for overhead and profit and any account of cash allowances, if any, named in the Contract Documents as provided in Paragraph 11.02 of the General Conditions.



- 13.03 Bid prices will be compared after adjusting for differences in the time designated by Bidders for Substantial Completion. The adjusting amount will be determined at the rate set forth in the Contract Documents for liquidated damages for failing to achieve Substantial Completion for each day before or after the desired date appearing in Article 9.
- 13.04 The contents of the successful IFB/RFP are included as if fully reproduced herein. Therefore, the selected contractor must be prepared to be bound by his/her proposal as submitted.
- 13.05 Whereas, the Colleton County Purchasing Ordinance Chapter 3.08 has provisions for Local Vendor preference. Bidders are encouraged to review section 3.08.185 of Chapter 3.08 for their rights under the Local Vendor Preference, as this preference could be used in determining the lowest responsible bidder.

#### **ARTICLE 14 - SUBMITTAL OF BID**

- 14.01 **A Bidder shall submit one (1) copy of the "Bid Form." The Bid Forms shall contain the Bid security and a completed W-9 form.**
- 14.02 A Bid must be submitted via email no later than the date and the official time prescribed in the Advertisement or Invitation to Bid and shall be accompanied by the Bid security and other required documents. A Bid must be submitted via email to:
- Kaye B. Syfrett, Procurement Manager at [ksyfrett@colletoncounty.org](mailto:ksyfrett@colletoncounty.org)**
- 14.03 In the case of Inclement Weather/Closure of Colleton County offices; If the Colleton County office is closed for business at the time scheduled for bid opening, for whatever reason, emailed bids will be accepted on the next scheduled business day, at the originally scheduled official time.
- 14.04 The Bid shall be submitted on the Bid Form provided; no other form is acceptable.
- 14.05 The successful Bidder will be required to provide a verified unit breakdown of the costs of all services and work in a manner acceptable to the Owner.
- 14.06 All blanks on the Bid Forms shall be filled in, either typed or printed in ink. The person signing the bid shall initial all corrections or erasures.
- 14.07 Where indicated on the Bid Form, the Bid Sum shall be expressed in both words and figures; in case of a discrepancy between the two, the Sums expressed in words shall govern.
- 14.08 List unit price on bidder take-offs extend and show total. In case of errors in extension, unit prices shall govern. Unit pricing shall include all applicable overhead, administrative, profit, and other associated costs.
- 14.09 Bidder shall quote all Alternates in the Bidding Documents. If Bidder fails to bid on all Alternates, then his/her Bid may be considered irregular, non-responsive, and may be disqualified.
- 14.10 Bids containing qualifications will be considered irregular, non-responsive, and may be disqualified.

- 14.11 A Bid submitted by a partnership shall list the names of all partners and shall be signed in the partnership name by one of the members of the partnership who is authorized to sign for the partnership.
- 14.12 A Bid submitted by a corporation shall be executed in the legal name of the corporation, followed by the state of incorporation, and signed by the President or Vice President or another authorized officer. The name of each person signing the Bid Form shall be typed or printed below the signature.
- 14.13 When the person signing for a corporation is other than the President or Vice President and when requested by the Owner, a resolution or other satisfactory evidence of the authority of the officer signing on behalf of the corporation shall be furnished for the Owner's records. The name of each person signing the Bid Form shall be typed or printed below the signature.

#### **ARTICLE 15 - MODIFICATION OF BID-CLAIM OF ERROR**

- 15.01 A Bid may be modified or withdrawn by an appropriate document duly executed in the manner that a Bid must be executed and delivered to the place where Bids are to be submitted prior to the date and time for the opening of Bids.
- 15.02 A bidder may request their submitted bid withdrawn due to an error. The claim of error must be submitted within 24 hours of the bid submittal deadline. A description of the nature of the error shall accompany the request. The description shall include all original worksheets demonstrating the error. If a withdrawal request is approved, the bidder's Bid Bond will not be forfeited.

#### **ARTICLE 16 - OPENING OF BIDS**

- 16.01 Bids will be opened at the time indicated in the Advertisement or Invitation to Bid. An abstract of the amounts of the base Bids and major alternates, if any, will be made available to Bidders after the opening of Bids in the form of a Bid Tabulation and Bid Comparison to be posted on the County web page.

#### **ARTICLE 17 - BIDS TO REMAIN SUBJECT TO ACCEPTANCE**

- 17.01 All Bids will remain subject to acceptance for the period of time stated in the Bid Form, but the Owner may, in its sole discretion, release any Bid and return the Bid security prior to the end of this period.

#### **ARTICLE 18 - EVALUATION OF BIDS AND AWARD OF CONTRACT**

- 18.01 The Owner reserves the right to reject any or all Bids, including, without limitation, nonconforming, non-responsive, unbalanced, or conditional Bids. The Owner further reserves the right to reject the Bid of any Bidder whom it finds, after reasonable inquiry and evaluation, to not be responsible. The Owner may also reject the Bid of any Bidder if the Owner believes that it would not be in the best interest of the Project to make an award to that Bidder. The Owner also reserves the right to waive

all informalities not involving price, time, or changes in the Work and to negotiate contract terms with the Successful Bidder.

- 18.02 More than one Bid for the same Work from an individual or entity under the same or different names will not be considered. Reasonable grounds for believing that any Bidder has an interest in more than one Bid for the Work may be cause for disqualification of that Bidder and the rejection of all Bids in which that Bidder has an interest.
- 18.03 In evaluating Bids, the Owner will consider whether or not the Bids comply with the prescribed requirements, and such alternates, unit prices, and other data as may be requested in the Bid Form or prior to the Notice of Award.
- 18.04 In evaluating Bidders, the Owner will consider the qualifications of Bidders and may consider the qualifications and experience of Subcontractors, Suppliers, and other individuals or entities proposed for those portions of the Work for which the identity of Subcontractors, Suppliers, and other individuals or entities must be submitted as provided in the General Conditions.
- 18.05 The Owner may conduct such investigations as the Owner deems necessary to establish the responsibility, qualifications, and financial ability of Bidders, proposed Subcontractors, Suppliers, individuals, or entities to perform the Work in accordance with the Contract Documents.
- 18.06 If the Contract is to be awarded, the Owner will award the Contract to the Bidder whose Bid is in the best interests of the Project.
- 18.07 The Owner reserves the right not to Award the Project.
- 18.08 The Owner shall have the right to accept Alternates in any order or combination and to determine the low bidder on the basis of the sum of the Base Bid, and Alternates accepted.

#### **ARTICLE 19 - CONTRACT SECURITY AND INSURANCE**

- 19.01 Article 5 of the General Conditions sets forth the Owner's requirements as to the performance and payment bonds and insurance. When the Successful Bidder delivers the executed Agreement to the Owner, it shall be accompanied by such bonds.

#### **ARTICLE 20 - SIGNING OF AGREEMENT**

- 20.01 When the Owner gives a Notice of Award to the Successful Bidder, it shall be accompanied by the required number of unsigned counterparts of the Agreement with the other Contract Documents which are identified in the Agreement as attached thereto. Within seven (7) days thereafter, the Successful Bidder shall sign and deliver the required number of counterparts of the Agreement and attached documents to the Owner. Within seven (7) days thereafter, the Owner shall deliver one (1) fully signed counterpart to the Successful Bidder with a complete set of the Drawings with appropriate identification.

**ARTICLE 21 - RETAINAGE**

21.01 Retainage from progress payments to the Contractor shall be **ten percent** (10%) of each payment for work completed and stored materials on site. Upon substantial completion, the contractor may request in a payment application, five percent 5% of the held retainage.

**ARTICLE 22 – INSURANCE**

22.01 The successful bidder shall procure, maintain, and provide proof of insurance coverage for injuries to persons and/or property damage as may arise from or in conjunction with, the work performed on behalf of the County by the bidder, his agents, representatives, employees or subcontractors. Proof of coverage as contained herein shall be submitted fifteen (15) days prior to the commencement of work, and such coverage shall be maintained by the bidder for the duration of the contract period; for occurrence policies.

a. General Liability

Coverage shall be as broad as Comprehensive General Liability endorsed to include Broad Form, Commercial General Liability form including, Products/Completed Operations.

Minimum Limits

General Liability:

\$2,000,000 General Aggregate

\$2,000,000 Products & Completed Operations Aggregate

\$1,000,000 Personal and Advertising Injury

\$1,000,000 for Each Occurrence (Bodily Injury and Property Damage)

\$50,000 Fire Damage Limit

\$5,000 Medical Expense Limit

b. Automobile Liability

Coverage sufficient to cover all vehicles owned, used, or hired by the bidder, his agents, representatives, employees or subcontractors.

Minimum Limits

Automobile Liability:

\$1,000,000 Combined Single Limit

\$1,000,000 Each Occurrence

Limit \$5,000 Medical Expenses

c. Workers' Compensation

Limits as required by the Workers' Compensation Act of SC. Employers

Liability, \$1,000,000

d. Owners' & Contractors' Protective Liability

The policy will be in the name of Colleton County.

Minimum limits required are \$1,000,000

e. Excess or Umbrella Liability

General Aggregate \$2,000,000

	Each Occurrence	\$2,000,000
f. Contractual Liability		
	Bodily Injury:	
	Each Accident	\$2,000,000
	Annual Aggregate	\$2,000,000
	Property Damage:	
	Each Accident	\$2,000,000
	Annual Aggregate	\$2,000,000

g. Coverage Provisions

1. All deductibles or self-insured retention shall appear on the certificate(s).
2. The County of Colleton, its officers/officials, employees, agents, and volunteers shall be added as "additional insured" as their interests may appear. This provision does not apply to Professional Liability or Workers' Compensation/Employers' Liability.
3. The bidder's insurance shall be primary over any applicable insurance or self-insurance maintained by Colleton County.
4. Shall provide 30 days written notice to Colleton County before any cancellation, suspension, or void of coverage in whole or part, where such provision is reasonable.
5. All coverage for subcontractors of the bidder shall be subject to all of the requirements stated herein.
6. All deductibles or self-insured retention shall appear on the certificate(s) and shall be subject to approval by the County. At the option of Colleton County, either; the insurer shall reduce or eliminate such deductible or self-insured retention, or the bidder shall be required to procure a bond guaranteeing payment of losses and related claims expenses.
7. Failure to comply with any reporting provisions of the policy(s) shall not affect coverage provided to Colleton County, its officers/officials, agents, employees, and volunteers.
8. The insurer shall agree to waive all rights of subrogation against Colleton County, its' Officers/officials, agents, employees, or volunteers for any act, omission, or condition of premises for which the parties may be held liable by reason of negligence.
9. The bidder shall furnish Colleton County certificates of insurance, including endorsement affecting coverage. The certificates are to be signed by a person authorized by the insurance company(s) to bind coverage on its behalf, if executed by a broker, a notarized copy of the authorization to bind or certify coverage must be attached.
10. All insurance shall be placed with insurers maintaining an A.M. Best rating of no less than an A: VII. If A.M. Best rating is less than A: VII, approval must be received from Colleton County's Risk Officer.

- 22.02 Colleton County, SC will require each contractor and service provider to maintain on file with the Procurement Manager, a current Certificate of Insurance showing limits as required by the Workers' Compensation Act of SC:

Employers Liability, \$1,000,000.

The law also recognizes "statutory employees." These are employees who work for a subcontractor who may be working for a business or another contractor. Employers should inquire whether or not a subcontractor working for them has workers' compensation insurance, regardless of the number of employees employed by the subcontractor. If the subcontractor does not, the injured employees would be covered under the employer's workers' compensation insurance. If the subcontractor does not carry workers' compensation insurance, then the owner or the principal contractor would be liable as if the subcontractor's employee was one of their employees. For answers to additional questions, visit the SC Worker's Compensation Commission website at: <http://www.wcc.state.sc.us/Frequently%20Asked%20Questions/FAQ.htm>

- 22.03 Contractor shall provide and maintain, during the progress of the work and until execution of the Certificate of Contract Completion, a Builder's Risk Insurance policy to cover all work in the course of construction including false work, temporary buildings, scaffolding, and materials used in the construction process (including materials designated for the project but stored off-site or in transit). The coverage shall equal the total completed value of the work and shall provide recovery at replacement cost.

- a) Such insurance shall be on a special cause of loss form, providing coverage on an open perils basis, insuring against the direct physical loss of or damage to covered property, including but not limited to theft, vandalism, malicious mischief, earthquake, tornado, lightning, and explosion, breakage of glass, collapse, water damage, and testing /startup.
- b) Coverage shall include coverage for "soft costs" (costs other than replacement of building materials) including, but not limited to, the reasonable extra costs of the architect/engineer and reasonable Contractor extension or acceleration costs. This coverage shall also include the reasonable extra costs of expediting temporary and permanent repairs to, or permanent replacement of, damaged property. This shall include overtime wages and the extra cost of express or other means for rapidly transporting materials and supplies necessary for the repair or replacement.
- c) The policy shall specifically permit and allow for partial occupancy by the owner prior to the execution of the final Certification of Contract Completion, and coverage shall remain in effect until all punch list items are completed.
- d) The Builder's Risk deductible may not exceed \$5,000. The Contractor or subcontractor experiencing any loss claimed under the Builder's Risk policy shall be responsible for that loss up to the amount of the deductible.
- e) If the Contractor is involved solely in the installation of material and equipment and not in new building construction, the Contractor shall provide an Installation Floater policy in lieu of a Builder's Risk policy. The policy must comply with the provisions of this paragraph.

## **ARTICLE 23 – WARRANTY**

- 23.01 Warranty of workmanship and products shall be covered for **730 days** from the date of the issuance of the Certificate of Substantial Completion. During the 730-day warranty period, all product warranties or workmanship repairs are the sole responsibility of the Contract holder and shall include all parts and labor associated with the repair.
- 23.02 All items repaired or replaced during the initial Warranty period due to workmanship or product failure shall be warranted for 365 days from the date of the repair and or replacement.
- 23.03 All Surety Bonds shall cover the warranty period listed in 23.01 and 23.02. The surety shall be updated to reconcile the date of the warranty period as needed.
- 23.04 Should a product installed during the construction process not have a manufactures warranty period that extends out to one year, it is the responsibility of the Contract holder to cover the product and any resulting expenses related to that product for one year.

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**CONTRACT**

THIS AGREEMENT is by and between Colleton County, 109 Benson Street.,  
Walterboro, South Carolina 29488

(hereinafter called "Owner") and \_\_\_\_\_

doing business as an **individual/partnership/corporation/joint venture** (strike out inapplicable terms), with its primary office in the City of \_\_\_\_\_, County of \_\_\_\_\_, State of \_\_\_\_\_.

The Owner and Contractor, in consideration of the mutual covenants set forth herein, agree as follows:

**ARTICLE 1 - WORK**

1.01 Contractor shall complete all Work as specified or indicated in the Contract Documents. The Work is generally described as follows:

**Renovation of the building located at 72 Bells Hwy, Walterboro, SC 29488. The project includes up-fitting and renovating the open floor space into a Voter Registration facility.**

**ARTICLE 2 - THE PROJECT**

2.01 The Project for which the Work under the Contract Documents may be the whole or only a part is generally described as follows:

**Renovation of the building located at 72 Bells Hwy, Walterboro, SC 29488. The project includes up-fitting and renovating the open floor space into a Voter Registration facility.**

**ARTICLE 3 - DESIGN**

3.01 The Project has been designed by: Glick/Boehm Associates, Inc., Doug Clark, will act as the Construction Coordinator as the Owner's representative, assume all duties and responsibilities, and have the rights and authority assigned to the Construction Coordinator in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

**ARTICLE 4 - CONTRACT TIMES**

4.01 Time of the Essence

A. All time limits for Milestones for final payment, as stated in the Contract Documents, are of the essence of the Contract.

4.02 Dates for Substantial Completion and Final Payment

**Renovation of the building located at 72 Bells Hwy, Walterboro, SC 29488. The project includes up-fitting and renovating the open floor space into a Voter Registration facility to be completed within One Hundred eighty (180) calendar days after the "Notice to Proceed" has been issued.**

4.03 Liquidated Damages



- A. Contractor and the Owner recognize that time is of the essence of this Agreement and that the Owner will suffer financial loss if the Work is not completed within the times specified in Paragraph 4.02 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expenses and difficulties involved in proving in a legal or arbitration proceeding the actual loss suffered by the Owner if the Work is not completed on time. Accordingly, instead of requiring any such proof, the Owner and Contractor agree that as liquidated damages for delay (but not as a penalty), the Contractor shall pay the Owner \$500 for each day that expires after the time specified in Paragraph 4.02 for completion and readiness for final payment until the Work is completed and ready for final payment.
- B. Liquidated damages can and will be assessed against the final payment request and any retainage held by Colleton County. Should funding for Liquidated damages exceed the amount held by Colleton County in the form of Payments or Retainage, work shall stop until such time as the Liquidated Damages issue is resolved.
- C. Substantial Completion does not constitute compliance with the allotted time as outlined in the bid packet or within the Contract Documents.

**ARTICLE 5 - CONTRACT PRICE**

5.01 The Owner shall pay the Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the sum of the amounts determined pursuant to Paragraphs 5.01.A below:

- A. For all Unit Price Work, an amount equal to the sum of the established unit price for each separately identified item of Unit Price Work, times the estimated quantity of that item as indicated in the Bid Form attached hereto as part of these Contract Documents.
- B. Allowances to be used at the owner's discretion shall be included in Base Bid Proposal. Allowances will be listed separately in the submitted schedule of values and unit price sheet. All unused allowances shall be credited back to the owner at the completion of the project in the form of a change order.

Unfounded issues	LS	1	\$ 50,000.00
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C. The sum of unit price work to be completed as noted in 5.01(A) and 5.01(B) is,

\_\_\_\_\_ \$ \_\_\_\_\_.

**ARTICLE 6 - PAYMENT PROCEDURES**

6.01 Submittal and Processing of Payments

- A. Contractor shall submit Applications for Payment in accordance with Article 14 of the General Conditions. Applications for Payment will be processed by the Construction Coordinator as provided in the General Conditions.

6.02 Progress Payments; Retainage

- A. The Owner shall make progress payments on account of the Contract Price on the basis of the Contractor's Applications for Payment on or about the 15th day of each month during a performance of the Work as provided in Paragraphs 6.02.A.1 and 6.02.A.2 below. All such payments will be measured by the schedule of values established as provided in Paragraph 2.07.A of the General Conditions (and in the case of Unit Price Work based on the number of

units completed) or, in the event there is no schedule of values, as provided in the General Requirements:

1. Prior to Substantial Completion, progress payments will be made in an amount equal to the percentage indicated below but, in each case, less the aggregate of payments previously made and less such amounts as the Construction Coordinator may determine or the Owner may withhold, including but not limited to liquidated damages, in accordance with Paragraph 14.02 of the General Conditions:
  - a. **90%** of Work completed (with the balance being Retainage).
  - b. **90%** of the cost of materials and equipment not incorporated in the Work (with the balance being Retainage).
2. Upon Substantial Completion, the Owner shall pay an amount sufficient to increase total payments to the Contractor to **95%** of the Work completed, less such amounts as the Construction Coordinator shall determine in accordance with Paragraph 14.02.B.5 of the General Conditions and less **10%** of the Construction Coordinator estimate of the value of Work to be completed or corrected as shown on the tentative list of items to be completed or corrected attached to the certificate of Substantial Completion.

#### 6.03 Final Payment

- A. Upon final completion and acceptance of the Work in accordance with Paragraph 14.07 of the General Conditions, the Owner shall pay the remainder of the Contract Price as recommended by the Construction Coordinator as provided in said Paragraph 14.07.

### ARTICLE 7 – CONTRACTOR’S REPRESENTATIONS

7.01 In order to induce the Owner to enter into this Agreement Contractor makes the following representations:

- A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
- B. Contractor has visited the Site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect the cost, progress, and performance of the Work.
- C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect the cost, progress, and performance of the Work.
- D. Contractor has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities) which have been identified in Paragraph 4.02 of the General Conditions and (2) reports and drawings of a Hazardous Environmental Condition, if any, at the Site which has been identified in Paragraph 4.06 of the General Conditions.
- E. Contractor has obtained and carefully studied (or assumes responsibility for doing so) all examinations, investigations, explorations, tests, studies, and data concerning conditions (surface, subsurface, and Underground Facilities) at or contiguous to the Site which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents, and safety precautions and programs incident thereto.

- F. Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. Contractor is aware of the general nature of work to be performed by the Owner and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has correlated the information known to Contractor, information and observations obtained from visits to the Site, reports and drawings identified in the Contract Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Contract Documents.
- I. Contractor has given the Owner written notice of all conflicts, errors, ambiguities, or discrepancies that the Contractor has discovered in the Contract Documents, and the written resolution thereof by the Owner is acceptable to the Contractor.
- J. The Contract Documents are generally sufficient to indicate and convey an understanding of all terms and conditions for the performance and furnishing of the Work.

## **ARTICLE 8 - CONTRACT DOCUMENTS**

- 8.01 A. The Contract Documents shall consist of all sections in the following divisions;

DIVISION 000 - BIDDING AND CONTRACT REQUIREMENTS  
 DIVISION 001 - GENERAL CONDITIONS  
 DIVISION 00 - INTRODUCTORY INFORMATION  
 DIVISION 02 - SITE CONSTRUCTION  
 DIVISION 06 - WOOD AND PLASTIC  
 DIVISION 07 - THERMAL AND MOISTURE PROTECTION  
 DIVISION 08 - DOORS AND WINDOWS  
 DIVISION 09 - FINISHES  
 DIVISION 10 - SPECIALTIES  
 DIVISION 12 - FURNISHINGS  
 DIVISION 22 - PLUMBING  
 DIVISION 23 - HEATING, VENTILATING, AND AIR CONDITIONING  
 DIVISION 26 - ELECTRICAL  
 DIVISION 28 - ELECTRONIC SAFETY AND SECURITY  
 DIVISION 32 - EXTERIOR IMPROVEMENTS  
 EXHIBIT "A" - PLANS  
 EXHIBIT "B" - SPECIFICATIONS  
 EXHIBIT "C" - ASBESTOS & LEAD TESTING REPORT

All information contained within these Divisions, and the requirements thereof are of the sole responsibility of the bidder.

- B. There are no Contract Documents other than those listed above in this Article 8.
- C. The Contract Documents may only be amended, modified, or supplemented as provided in Paragraph 3.04 of the General Conditions.

## **ARTICLE 9 - MISCELLANEOUS**

- 9.01 Terms

- A. Terms in this Agreement will have the meanings stated in the 001, General Conditions.

- 9.02 Assignment of Contract

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

9.03 Successors and Assigns

- A. The Owner and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

9.04 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon the Owner and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

9.05 Waiver or Forbearance

- A. Any delay or failure of Colleton County to insist upon strict performance of any obligation under this Agreement or to exercise any right or remedy provided under this Agreement shall not be a waiver of Colleton County's right to demand strict compliance, irrespective of the number or duration of any delay(s) or failure(s). No term or condition imposed on Contractor under this Agreement shall be waived, and no breach by Contractor shall be excused unless that waiver or excuse of a breach has been put in writing and signed by both parties. No waiver in any instance of any right or remedy shall constitute waiver of any other right or remedy under this Agreement. No consent to or forbearance of any breach or substandard performance of any obligation under this Agreement shall constitute consent to modification or reduction of the other obligations or forbearance of any other breach.

9.06 Subject to the provisions below, the contract may be terminated by Colleton County upon fifteen (15) days advance written notice to the other party; but if any work or service hereunder is in progress, but not completed as of the date of termination, then this contract may be extended upon written approval of the County until said work or services are completed and accepted.

- a. Termination for Convenience

- In the event that this contract is terminated or canceled upon request and for the convenience of the County, without the required fifteen (15) days advance written notice, then the County shall negotiate reasonable termination costs, if applicable.

- b. Termination for Cause

- Termination by the County for cause, default, or negligence on the part of the Contractor shall be excluded from the foregoing provision; termination costs, if any, shall not apply. The fifteen (15) days advance notice requirement is waived in the event of Termination for Cause.

- c. Non-Appropriation:

- It is understood and agreed by the parties that in the event funds are not

Appropriated in the current fiscal year or any subsequent fiscal years, this contract will become null and void, and the County will only be required to pay for services completed to the satisfaction of the County.

IN WITNESS, WHEREOF, the Owner and Contractor have signed this Agreement. One counterpart each has been delivered to the Owner, Contractor, and Construction Coordinator and provided to the Contractor for his Bonding Agency. All portions of the Contract Documents have been signed or identified by the Owner and Contractor or on their behalf.

This Agreement will be effective on this \_\_\_\_ day of \_\_\_\_\_, 2023 (which is the Effective Date of the Agreement).

OWNER:

CONTRACTOR:

**Colleton County**

By:

**J. Kevin Griffin**

Title:

**County Administrator**

Attest:

Title:

Address for giving notices:

**Colleton County Purchasing Department**

**Attn: Kaye Syfrett, Procurement Manager**

**113 Mable T. Willis Boulevard**

**Walterboro, SC, 29488**

By:

Title:

Attest:

Title:

Address for giving notices:

License No.:

(Where applicable)

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## REFERENCE FORMS

### 1- BOND FORMS

#### Bond Requirements

- a. All Bonds shall be placed with insurers maintaining an A.M. Best rating of no less than an A: VII. If A.M. Best rating is less than A: VII, approval must be received from Colleton County's Risk or Finance Officer before issuance.
- b. Bonding Companies shall submit as proof of good standing, a copy of the A.M Rating along with the Bond.
- c. Bonding/Surety Companies shall use the Bonds provided in this Bid/Proposal Packet.
- d. Bonding/Surety Companies shall issue a new Performance Bond and Payment Bond at such time that the contract has been altered by a change order adjusting the compensation of the contract.
- e. Bonding companies shall note the warranty periods as outlined in this Proposal Document and listed on the reverse side of the bond itself. Should the warranty period be extended past the initial contract period due to a warranty claim, then the bond shall be re-issued to match the new warranty period as outlined in the proposal documents.

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**PERFORMANCE BOND**

Any singular reference to Contractor, Surety, the Owner, or another party shall be considered plural where applicable.

CONTRACTOR:

SURETY:

OWNER: Colleton County  
109 Benson Street  
Walterboro, SC 29488

CONTRACT: FM-59

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

Amount: \_\_\_\_\_

Description (Name and Location): **Renovation of the building located at 72 Bells Hwy, Walterboro, SC 29488. The project includes up-fitting and renovating the open floor space into a Voter Registration facility.**

**BOND**

Bond Number: \_\_\_\_\_

Date (Not earlier than Contract Date): \_\_\_\_\_

Amount: \_\_\_\_\_

Modifications to this Bond Form: \_\_\_\_\_

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do causes this Performance Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

**CONTRACTOR AS PRINCIPAL**

**SURETY**

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

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

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

\_\_\_\_\_  
Surety's Name and Corporate Seal

By: \_\_\_\_\_  
Signature and Title  
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest: \_\_\_\_\_  
Signature and Title

**CONTRACTOR AS PRINCIPAL**

**SURETY**

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

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

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

\_\_\_\_\_  
Surety's Name and Corporate Seal

By: \_\_\_\_\_  
Signature and Title  
(Attach Power of Attorney)

Attest: \_\_\_\_\_  
Signature and Title:

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner for the performance of the Contract, which is incorporated herein by reference.
2. If Contractor performs the Contract, Surety and Contractor have no obligation under this Bond, except to participate in conferences as provided in Paragraph 3.1.
3. If there is no Owner Default, Surety's obligation under this Bond shall arise after:
  - 3.1. Owner has notified Contractor and Surety, at the addresses described in Paragraph 10 below, that Owner is considering declaring a Contractor Default and has requested and attempted to arrange a conference with Contractor and Surety to be held not later than 15 days after receipt of such notice to discuss methods of performing the Contract. If Owner, Contractor and Surety agree, Contractor shall be allowed a reasonable time to perform the Contract, but such an agreement shall not waive Owner's right, if any, subsequently to declare a Contractor Default; and
  - 3.2. Owner has declared a Contractor Default and formally terminated Contractor's right to complete the Contract. Such Contractor Default shall not be declared earlier than 20 days after Contractor and Surety have received notice as provided in Paragraph 3.1; and
  - 3.3. Owner has agreed to pay the Balance of the Contract Price to:
    1. Surety in accordance with the terms of the Contract;
    2. Another contractor selected pursuant to Paragraph 4.3 to perform the Contract.
  4. When Owner has satisfied the conditions of Paragraph 3, Surety shall promptly and at Surety's expense take one of the following actions:
    - 4.1. Arrange for Contractor, with consent of Owner, to perform and complete the Contract; or
    - 4.2. Undertake to perform and complete the Contract itself, through its agents or through independent contractors; or
    - 4.3. Obtain bids or negotiated proposals from qualified contractors acceptable to Owner for a contract for performance and completion of the Contract, arrange for a contract to be prepared for execution by Owner and Contractor selected with Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Contract, and pay to Owner the amount of damages as described in Paragraph 6 in excess of the Balance of the Contract Price incurred by Owner resulting from Contractor Default; or
    - 4.4. Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:
      1. After investigation, determine the amount for which it may be liable to Owner and, as soon as practicable after the amount is determined, tender payment therefor to Owner; or
      2. Deny liability in whole or in part and notify Owner citing reasons therefor.
5. If Surety does not proceed as provided in Paragraph 4 with reasonable promptness, Surety shall be deemed to be in default on this Bond 15 days after receipt of an additional written notice from Owner to Surety demanding that Surety perform its obligations under this Bond, and Owner shall be entitled to enforce any remedy available to Owner. If Surety proceeds as provided in Paragraph 4.4, and Owner refuses the payment tendered or Surety has denied liability, in whole or in part, without further notice Owner shall be entitled to enforce any remedy available to Owner.
6. After Owner has terminated Contractor's right to complete the Contract, and if Surety elects to act under Paragraph 4.1, 4.2, or 4.3 above, then the responsibilities of Surety to Owner shall not be greater than those of Contractor under the Contract, and the responsibilities of Owner to Surety shall not be greater than those of Owner under the Contract. To a limit of the amount of this Bond, but subject to commitment by Owner of the Balance of the Contract Price to mitigation of costs and damages on the Contract, Surety is obligated without duplication for:
  - 6.1. The responsibilities of Contractor for correction of defective Work and

completion of the Contract;

- 6.2. Additional legal, design professional, and delay costs resulting from Contractor's Default, and resulting from the actions or failure to act of Surety under Paragraph 4; and
  - 6.3. Liquidated damages, or if no liquidated damages are specified in the Contract, actual damages caused by delayed performance or non-performance of Contractor.
7. Surety shall not be liable to Owner or others for obligations of Contractor that are unrelated to the Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than Owner or its heirs, executors, administrators, or successors.
  8. Surety hereby waives notice of any change, including changes of time, to Contract, Contract amount or to related subcontracts, purchase orders, and other obligations.
  9. Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the Work or part of the Work is located and shall be instituted within two years after Contractor Default or within two years after Contractor ceased working or within two years after Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
  10. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the address shown on the signature page.
  11. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted here from and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory bond and not as a common law bond.
  12. The Surety will be obligated until such time as the Contractor has faithfully performed all terms of the Contract, which includes a two (2) year warranty coverage period.
    - 12.1 The standard two-year warranty period starts on the date of issuance of the Substantial Completion Certification.
    - 12.2 The standard warranty covers the full cost of Labor, Parts, Shipping, Sales Tax and any and all other associated cost for the warranty repair.
    - 12.3 The surety agrees that should a warranty issue arise within the allotted standard two (2) year warranty period, the item repaired during the warranty period shall be covered for an addition year (365 days) from the completed repair of the warranty issue.
  13. Definitions
    - 13.1 Balance of the Contract Price: The total amount payable by Owner to Contractor under the Contract after all proper adjustments have been made, including allowance to Contractor of any amounts received or to be received by Owner in settlement of insurance or other Claims for damages to which Contractor is entitled, reduced by all valid and proper payments made to or on behalf of Contractor under the Contract.
    - 13.2 Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
    - 13.3 Contractor Default: Failure of Contractor, which has neither been remedied nor waived, to perform or otherwise to comply with the terms of the Contract.
    - 13.4 Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.



**PAYMENT BOND**

Any singular reference to Contractor, Surety, the Owner, or another party shall be considered plural where applicable.

CONTRACTOR:

SURETY:

OWNER: Colleton County  
109 Benson Street  
Walterboro, SC 29488

CONTRACT: FM-59

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

Amount: \_\_\_\_\_

Description (Name and Location): **Renovation of the building located at 72 Bells Hwy, Walterboro, SC 29488. The project includes up-fitting and renovating the open floor space into a Voter Registration facility.**

**BOND**

Bond Number: \_\_\_\_\_

Date (Not earlier than Contract Date): \_\_\_\_\_

Amount: \_\_\_\_\_

Modifications to this Bond Form: \_\_\_\_\_

Surety and Contractor, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each causes this Payment Bond to be duly executed on its behalf by its authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

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

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

Name and Title:

\_\_\_\_\_  
Surety's Name and Corporate Seal

By:

\_\_\_\_\_  
Signature and Title  
(Attach Power of Attorney)

(Space is provided below for signatures of additional parties, if required.)

Attest:

\_\_\_\_\_  
Signature and Title

CONTRACTOR AS PRINCIPAL

SURETY

Company:

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

Name and Title:

\_\_\_\_\_  
Surety's Name and Corporate Seal

By:

\_\_\_\_\_  
Signature and Title  
(Attach Power of Attorney)

Attest:

\_\_\_\_\_

1. Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to Owner to pay for labor, materials, and equipment furnished by Claimants for use in the performance of the Contract, which is incorporated herein by reference.
2. With respect to Owner, this obligation shall be null and void if Contractor:
  - 2.1. Promptly makes payment, directly or indirectly, for all sums due Claimants, and
  - 2.2. Defends, indemnifies, and holds harmless Owner from all claims, demands, liens, or suits alleging non-payment by Contractor by any person or entity who furnished labor, materials, or equipment for use in the performance of the Contract, provided Owner has promptly notified Contractor and Surety (at the addresses described in Paragraph 12) of any claims, demands, liens, or suits and tendered defense of such claims, demands, liens, or suits to Contractor and Surety, and provided there is no Owner Default.
3. With respect to Claimants, this obligation shall be null and void if Contractor promptly makes payment, directly or indirectly, for all sums due.
4. Surety shall have no obligation to Claimants under this Bond until:
  - 4.1. Claimants who are employed by or have a direct contract with Contractor have given notice to Surety (at the addresses described in Paragraph 12) and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and, with substantial accuracy, the amount of the claim.
  - 4.2. Claimants who do not have a direct contract with Contractor:
    1. Have furnished written notice to Contractor and sent a copy, or notice thereof, to Owner, within 90 days after having last performed labor or last furnished materials or equipment included in the claim stating, with substantial accuracy, the amount of the claim and the name of the party to whom the materials or equipment were furnished or supplied, or for whom the labor was done or performed; and
    2. Have either received a rejection in whole or in part from Contractor, or not received within 30 days of furnishing the above notice any communication from Contractor by which Contractor had indicated the claim will be paid directly or indirectly; and
    3. Not having been paid within the above 30 days, have sent a written notice to Surety and sent a copy, or notice thereof, to Owner, stating that a claim is being made under this Bond and enclosing a copy of the previous written notice furnished to Contractor.
5. If a notice by a Claimant required by Paragraph 4 is provided by Owner to Contractor or to Surety that is sufficient compliance.
6. When a Claimant has satisfied the conditions of Paragraph 4, the Surety shall promptly and at Surety's expense take the following actions:
  - 6.1. Send an answer to that Claimant, with a copy to Owner, within 45 days after receipt of the claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed.
  - 6.2. Pay or arrange for payment of any undisputed amounts.
7. Surety's total obligation shall not exceed the amount of this Bond, and the amount of this Bond shall be credited for any payments made in good faith by Surety.
8. Amounts owed by Owner to Contractor under the Contract shall be used for the performance of the Contract and to satisfy claims, if any, under any performance bond. By Contractor furnishing and Owner accepting this Bond, they agree that all funds earned by Contractor in the performance of the Contract are dedicated to satisfy obligations of Contractor and Surety under this Bond, subject to Owner's priority to use the funds for the completion of the Work.
9. Surety shall not be liable to Owner, Claimants, or others for obligations of Contractor that are unrelated to the Contract. Owner shall not be liable for payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligations to make payments to, give notices on behalf of, or otherwise have obligations to Claimants under this Bond.
10. Surety hereby waives notice of any change, including changes of time, to the Contract or to related Subcontracts, purchase orders and other obligations.
  11. No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the location in which the Work or part of the Work is located or after the expiration of one year from the date (1) on which the Claimant gave the notice required by Paragraph 4.1 or Paragraph 4.2.3, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.
  12. Notice to Surety, Owner, or Contractor shall be mailed or delivered to the addresses shown on the signature page. Actual receipt of notice by Surety, Owner, or Contractor, however accomplished, shall be sufficient compliance as of the date received at the address shown on the signature page.
  13. When this Bond has been furnished to comply with a statutory requirement in the location where the Contract was to be performed, any provision in this Bond conflicting with said statutory requirement shall be deemed deleted here from and provisions conforming to such statutory requirement shall be deemed incorporated herein. The intent is that this Bond shall be construed as a statutory Bond and not as a common law bond.
  14. Upon request of any person or entity appearing to be a potential beneficiary of this Bond, Contractor shall promptly furnish a copy of this Bond or shall permit a copy to be made.
  15. The Surety will be obligated until such time as the Contractor has faithfully performed all terms of the Contract, which includes a two (2) year warranty coverage period.
    - 15.1 The standard two-year warranty period starts on the date of issuance of the Substantial Completion Certification.
    - 15.2 The standard warranty covers the full cost of Labor, Parts, Shipping, Sales Tax and any and all other associated cost for the warranty repair.
    - 15.3 The surety agrees that should a warranty issue arise within the allotted standard two (2) year warranty period, the item repaired during the warranty period shall be covered for an addition year (365 days) from the completed repair of the warranty issue.
16. DEFINITIONS
  - 16.1. Claimant: An individual or entity having a direct contract with Contractor, or with a first-tier subcontractor of Contractor, to furnish labor, materials, or equipment for use in the performance of the Contract. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service, or rental equipment used in the Contract, architectural and engineering services required for performance of the Work of Contractor and Contractor's Subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials, or equipment were furnished.
  - 16.2. Contract: The agreement between Owner and Contractor identified on the signature page, including all Contract Documents and changes thereto.
  - 16.3. Owner Default: Failure of Owner, which has neither been remedied nor waived, to pay Contractor as required by the Contract or to perform and complete or comply with the other terms thereof.

**CONTRACTOR'S AFFIDAVIT**

The State of \_\_\_\_\_ Date \_\_\_\_\_

The County of \_\_\_\_\_

The City/Town of \_\_\_\_\_

\_\_\_\_\_  
(Officer's Name)

\_\_\_\_\_  
(Officer's Title)

Being duly sworn, deposes and says that \_\_\_\_\_, has furnished

(Contractor's Name)

all labor and material entering into the: **Renovation of the building located at 72 Bells Hwy, Walterboro, SC 29488. The project includes up-fitting and renovating the open floor space into a Voter Registration facility.**, called for in the Contract Documents dated \_\_\_\_\_ with **Colleton County** states further that this officer has full knowledge of all obligations for such labor and materials, which have entered into and become part of that certain project known and designated above, and that this officer further deposes and says that all debts and other obligations for such labor and materials have been fully and completely paid for in good and lawful money of the United States of America and that there are no suits for damages against them proceeding, prospective and/or that there are no suits for damages against them proceeding, prospective, or otherwise, in consequence of their operations on the above said project.

The said \_\_\_\_\_ will hold the Owners,

(Contractor's Name)

**Colleton County, South Carolina** blameless of any and all mechanic's liens that may be hereafter entered or filed for record, so as to constitute a charge against said premises for work or labor done or materials furnished by them.

IN WITNESS HEREOF, this officer has heretofore put his hand and seal: \_\_\_\_\_ (Seal)

(Officer's Name)

I, \_\_\_\_\_, Notary Public in and for the above-named County and State do

hereby certify that \_\_\_\_\_ personally known to me to be the affiant in the foregoing

(Officer's Name)

Affidavit, personally appeared before me this day and, having been duly sworn, deposes and says that the facts set forth in the above Affidavit are true and correct.

WITNESS my hand and seal this \_\_\_\_\_ day of \_\_\_\_\_, 2023

\_\_\_\_\_  
(Seal)

Notary Public for the State of \_\_\_\_\_

My Commission Expires: \_\_\_\_\_

## CONTRACTOR/SUBCONTRACTOR QUALIFICATIONS

### PART 1 - GENERAL

**1.01** The following information and completed forms may be requested by the Owner of the three (3) lowest bidders. The request will be made the day of the Bid Opening or within five (5) days following the Bid Opening. If requested, this data must be submitted to the Construction Coordinator or the Owner within five (5) days of the request. Failure to provide the data in this section, upon request, will subject bidder to disqualification.

### 1.02 DESCRIPTION

- A. Information provided will be used by the Construction Coordinator or the Owner to determine the competency and ability of the Contractor and/or Subcontractor to perform the scheduled work in a manner that is satisfactory to the Construction Coordinator or the Owner. The Construction Coordinator's or the Owner's decision shall be final.
- B. Any Subcontractor being used by the General Contractor, whose portion of the project exceeds 5% of the total bid price amount, will be required to provide the same information as the General Contractor.
- C. The Contractor and Subcontractor shall include with this section a detailed financial statement indicating the Contractor's or Subcontractor's financial resources. The information on that statement shall be certified by a Certified Public Accountant and shall be submitted on the Associated General Contractors of America form "Standard Questionnaires and Financial Statement for Bidders".
- D. The Contractor and Subcontractor shall certify by attaching his signature to this Section as provided that all information contained herein is complete and all statements and answers are accurate and true. Providing misinformation, incomplete information, inaccurate information, or failure to certify the information, will subject bidder to disqualification.

### 1.03 QUALIFICATIONS

A. Complete the following for General Contractor and any Subcontractors (attach additional sheets as required):

- 1. Name: \_\_\_\_\_
- 2. Address: \_\_\_\_\_
- 3. City, State, Zip: \_\_\_\_\_
- 4. Principle: \_\_\_\_\_

B. Number of years the company has been in business: \_\_\_\_\_

C. List and describe at least five (5) projects that have been completed, that are similar in size and type, and that has been completed within the last ten (10) years:

- 1. \_\_\_\_\_  
\_\_\_\_\_
- 2. \_\_\_\_\_  
\_\_\_\_\_

3. \_\_\_\_\_  
\_\_\_\_\_
4. \_\_\_\_\_  
\_\_\_\_\_
5. \_\_\_\_\_  
\_\_\_\_\_

D. For the projects listed above provide the following:

1. Project Owner: \_\_\_\_\_  
 Contact Name and Title: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_
2. Project Owner: \_\_\_\_\_  
 Contact Name and Title: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_
3. Project Owner: \_\_\_\_\_  
 Contact Name and Title: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_
4. Project Owner: \_\_\_\_\_  
 Contact Name and Title: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_
5. Project Owner: \_\_\_\_\_  
 Contact Name and Title: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_

E. For each of the projects listed in Items C & D provide the following:

1. Original Bid Amount: \_\_\_\_\_  
 Final Construction Cost: \_\_\_\_\_  
 Contract Period: \_\_\_\_\_  
 Actual Contract Period: \_\_\_\_\_  
 Explanation: \_\_\_\_\_
2. Original Bid Amount: \_\_\_\_\_  
 Final Construction Cost: \_\_\_\_\_  
 Contract Period: \_\_\_\_\_  
 Actual Contract Period: \_\_\_\_\_  
 Explanation: \_\_\_\_\_

3. Original Bid Amount: \_\_\_\_\_  
 Final Construction Cost: \_\_\_\_\_  
 Contract Period: \_\_\_\_\_  
 Actual Contract Period: \_\_\_\_\_  
 Explanation: \_\_\_\_\_
4. Original Bid Amount: \_\_\_\_\_  
 Final Construction Cost: \_\_\_\_\_  
 Contract Period: \_\_\_\_\_  
 Actual Contract Period: \_\_\_\_\_  
 Explanation: \_\_\_\_\_
5. Original Bid Amount: \_\_\_\_\_  
 Final Construction Cost: \_\_\_\_\_  
 Contract Period: \_\_\_\_\_  
 Actual Contract Period: \_\_\_\_\_  
 Explanation: \_\_\_\_\_

F. Provide the following for any portion of the work that is being subcontracted (5% or more of the Bid Amount):

1. Name of Subcontractor: \_\_\_\_\_  
 Address City/State/Zip: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_  
 Work being completed: \_\_\_\_\_
2. Name of Subcontractor: \_\_\_\_\_  
 Address City/State/Zip: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_  
 Work being completed: \_\_\_\_\_
3. Name of Subcontractor: \_\_\_\_\_  
 Address City/State/Zip: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_  
 Work being completed: \_\_\_\_\_
4. Name of Subcontractor: \_\_\_\_\_  
 Address City/State/Zip: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_  
 Work being completed: \_\_\_\_\_
5. Name of Subcontractor: \_\_\_\_\_  
 Address City/State/Zip: \_\_\_\_\_  
 Telephone Number: \_\_\_\_\_  
 Work being completed: \_\_\_\_\_

G. Provide a list of equipment that is owned by the Contractor and is available for this project.

\_\_\_\_\_  
\_\_\_\_\_

H. Provide a list of equipment that will be purchased, leased or rented for this project.

\_\_\_\_\_  
\_\_\_\_\_

I. Provide a list of the superintendent(s) or others that will be in charge of this project (Provide resumes and qualifications):

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

J. Provide the following for current projects being completed:

1. Project Name: \_\_\_\_\_  
Owner: \_\_\_\_\_  
Current Status: \_\_\_\_\_  
Estimated Schedule of Completion: \_\_\_\_\_

2. Project Name: \_\_\_\_\_  
Owner: \_\_\_\_\_  
Current Status: \_\_\_\_\_  
Estimated Schedule of Completion: \_\_\_\_\_

3. Project Name: \_\_\_\_\_  
Owner: \_\_\_\_\_  
Current Status: \_\_\_\_\_  
Estimated Schedule of Completion: \_\_\_\_\_

4. Project Name: \_\_\_\_\_  
Owner: \_\_\_\_\_  
Current Status: \_\_\_\_\_  
Estimated Schedule of Completion: \_\_\_\_\_

5. Project Name: \_\_\_\_\_  
Owner: \_\_\_\_\_  
Current Status: \_\_\_\_\_  
Estimated Schedule of Completion: \_\_\_\_\_

K. Provide a list of the last five (5) projects that has been completed with the Owner over the past fifteen (15) years:

1. Project Name: \_\_\_\_\_  
Contact Name and Title: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_
  
2. Project Name: \_\_\_\_\_  
Contact Name and Title: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_
  
3. Project Name: \_\_\_\_\_  
Contact Name and Title: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_
  
4. Project Name: \_\_\_\_\_  
Contact Name and Title: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_
  
5. Project Name: \_\_\_\_\_  
Contact Name and Title: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_

L. Provide a list of last five (5) projects that Bid with the Owner over the past fifteen (15) years:

1. Project Name: \_\_\_\_\_  
Contact Name and Title: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_
  
2. Project Name: \_\_\_\_\_  
Contact Name and Title: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_
  
3. Project Name: \_\_\_\_\_  
Contact Name and Title: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_
  
4. Project Name: \_\_\_\_\_  
Contact Name and Title: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_
  
5. Project Name: \_\_\_\_\_  
Contact Name and Title: \_\_\_\_\_  
Telephone Number: \_\_\_\_\_



M. Provide a list of projects completed with the Construction Coordinator over the past fifteen (15) years:

1. Project Name: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_  
Original Bid Amount: \_\_\_\_\_  
Final Construction Cost: \_\_\_\_\_  
Contract Period: \_\_\_\_\_  
Actual Contract Period: \_\_\_\_\_  
Explanation: \_\_\_\_\_
  
2. Project Name: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_  
Original Bid Amount: \_\_\_\_\_  
Final Construction Cost: \_\_\_\_\_  
Contract Period: \_\_\_\_\_  
Actual Contract Period: \_\_\_\_\_  
Explanation: \_\_\_\_\_
  
3. Project Name: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_  
Original Bid Amount: \_\_\_\_\_  
Final Construction Cost: \_\_\_\_\_  
Contract Period: \_\_\_\_\_  
Actual Contract Period: \_\_\_\_\_  
Explanation: \_\_\_\_\_
  
4. Project Name: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_  
Original Bid Amount: \_\_\_\_\_  
Final Construction Cost: \_\_\_\_\_  
Contract Period: \_\_\_\_\_  
Actual Contract Period: \_\_\_\_\_  
Explanation: \_\_\_\_\_
  
5. Project Name: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_  
Original Bid Amount: \_\_\_\_\_  
Final Construction Cost: \_\_\_\_\_  
Contract Period: \_\_\_\_\_  
Actual Contract Period: \_\_\_\_\_  
Explanation: \_\_\_\_\_

N. Provide a list of projects involved with litigation, arbitration and/or mediation over the past twenty (20) years:

1. Project Name: \_\_\_\_\_  
Project Owner: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_  
Date: \_\_\_\_\_  
Explanation: \_\_\_\_\_
  
2. Project Name: \_\_\_\_\_  
Project Owner: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_  
Date: \_\_\_\_\_  
Explanation: \_\_\_\_\_
  
3. Project Name: \_\_\_\_\_  
Project Owner: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_  
Date: \_\_\_\_\_  
Explanation: \_\_\_\_\_
  
4. Project Name: \_\_\_\_\_  
Project Owner: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_  
Date: \_\_\_\_\_  
Explanation: \_\_\_\_\_
  
5. Project Name: \_\_\_\_\_  
Project Owner: \_\_\_\_\_  
Project Engineer: \_\_\_\_\_  
Date: \_\_\_\_\_  
Explanation: \_\_\_\_\_

O. Attach a rate schedule associated with equipment that includes labor, overhead and profit.

\_\_\_\_\_ Rate Schedule Attached.

P. Additional information if necessary.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**I HEREBY CERTIFY that as a duly authorized representative of \_\_\_\_\_ (Bidder), the information provided is to the best of my knowledge accurate and that failure to provide accurate information will result in disqualification of my bid.**

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Name (Please Print)

\_\_\_\_\_  
Title

\_\_\_\_\_  
Date

Notary Public for South Carolina

My Commission Expires: \_\_\_\_\_

**Unit Prices – FM-59 Voter Registration Building Renovation Project. Bidder to apply quantities to each description**

<i>Item</i>	<i>Description</i>	<i>Unit</i>	<i>Quantity</i>	<i>Unit Price</i>	<i>Bid Price</i>
<b>General</b>					
	Mobilization	LS	1	\$	\$
	Bonds	%	1	\$	\$
	Insurance	LS	1	\$	\$
	Permitting	LS	1	\$	\$
	Utilities	LS	1	\$	\$
	Rental Equipment	LS	1	\$	\$
	Site Superintendent/Supervision	HR	1	\$	\$
	Overhead and Profit	%	1	\$	\$
	Temporary Facility Rental and Set Up	LS	1	\$	\$
	Temporary Power	LS	1	\$	\$
	Warranties	LS	1	\$	\$
<b>Demolition-General Cost</b>					
	Temporary partitions	SF	1	\$	\$
	Demo Complete	LS		\$	\$
	Barricades / signs	LS	1	\$	\$
	Haul and dump	CY		\$	\$
	Dump charges	CY		\$	\$
<b>Architecture</b>					
	Framing	SF		\$	\$
	Wooden finishes	LF		\$	\$
	Reception Counters	LS		\$	\$
	Hourly Rate	HR	1	\$	XXXXXXXXXXXXXXXXXXXX
<b>Doors and Windows</b>					
	Wood Interior Doors, Complete	EA		\$	\$
	Interior Windows				
<b>Door Hardware Includes installation</b>					
	Hardware Set 0	LS		\$	\$
	Hourly Rate	HR	1		XXXXXXXXXXXXXXXXXXXX
<b>Finishes</b>					
	Paint Flat Surface	SF		\$	\$
	Paint Doors	SF		\$	\$
	Paint Exterior	LS		\$	\$
	LVT Flooring	SF		\$	\$
	Carpet	SF		\$	\$
	Ceiling tiles and track	SF		\$	\$
	Hourly Rate	HR	1	\$	XXXXXXXXXXXXXXXXXXXX
<b>Specialties</b>					
	Fire Extinguisher w/cabinet, complete	EA		\$	\$
	Hourly Rate	HR	1	\$	XXXXXXXXXXXXXXXXXXXX
<b>HVAC</b>					
	HVAC Complete	LS	1	\$	\$
	Hourly Rate	HR	1	\$	XXXXXXXXXXXXXXXXXXXX
<b>Electrical</b>					
	Empty Raceway System	LS		\$	\$
	Outlet Empty	EA		\$	\$

	3/4" EMT	LF		\$	\$
	Pull String	LF		\$	\$
	3" PVC	LF		\$	\$
	Pull String	LF		\$	\$
	Telephone/Data Outlet Empty	EA		\$	\$
	Fire Alarm System	LS		\$	\$
	Hourly Rate	HR	1	\$	XXXXXXXXXXXXXXXXXXXX
	<b>Owners Allowances at Owners Discretion</b>				
	Unfounded issues	LS	1	\$50,000.00	\$50,000.00
				<b>Total:</b>	\$

\* Total should match the bid price\*



**FM-59 BID SUBMITTAL**

**Bids are to be submitted via email to:  
Kaye B. Syfrett, Procurement Manager at [ksyfrett@colletoncounty.org](mailto:ksyfrett@colletoncounty.org)**

=====

Contractor: \_\_\_\_\_

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

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

Telephone Number: (    ) \_\_\_\_\_

Contact Person & Title: \_\_\_\_\_

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

Federal Tax ID number: \_\_\_\_\_

Contractor's license number: \_\_\_\_\_

**REFERENCES**

The contractor must list a minimum of three (3) references along with pictures of the completed work.

<b><u>Reference 1</u></b>	
Name of Business: _____	
Address: _____	City: _____ State: _____ Zip: _____
Contact: _____	Title: _____ Telephone #: _____
Email Address: _____	
Services provided: _____	Years of Service: _____

**THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID**

**Reference 2**

Name of Business: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_ Zip: \_\_\_\_\_

Contact: \_\_\_\_\_ Title: \_\_\_\_\_ Telephone #: \_\_\_\_\_

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

Services provided: \_\_\_\_\_ Years of Service: \_\_\_\_\_

**Reference 3**

Name of Business: \_\_\_\_\_

Address: \_\_\_\_\_ City: \_\_\_\_\_ State: \_\_\_\_ Zip: \_\_\_\_\_

Contact: \_\_\_\_\_ Title: \_\_\_\_\_ Telephone #: \_\_\_\_\_

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

Services provided: \_\_\_\_\_ Years of Service: \_\_\_\_\_

**ADDENDA ACKNOWLEDGMENT**

The contractor has examined and carefully studied the Request for Bid and the following Addenda, receipt of all of which is hereby acknowledged:

<b><i>Amendment No.</i></b>	<b><i>Issue Date</i></b>

***By signing the Bid Submittal Form the Contractor(s) acknowledges any and all issued addenda. Bids which fail to acknowledge the contractor's receipt of any addendum will result in the rejection of the offer if the addendum contained information which substantively changes the Owner's requirements or pricing.***

**Contractor:** \_\_\_\_\_

**Authorized Representative Name and Title:** \_\_\_\_\_

**Signature of Authorized Representative:** \_\_\_\_\_

**THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID**

**INDEMNIFICATION**

The undersigned Bidder/Proposer will indemnify and hold harmless the Owner, Colleton County and their agents and employees from and against all claims, damages, losses and expenses, including attorney's fees, arising out of or resulting from the performance of the Work provided that any such claims, damages, loss, or expense is attributable to bodily injury, sickness, disease or death, injury to or destruction of tangible property, including the loss of use resulting there from, and is caused by any negligent or willful act or omission of the Bidder/Proposer, and anyone directly or indirectly employed by him/her or anyone for whose acts any of them may be liable.

In any and all claims against the Owner, Colleton County or any of their agents and / or employees by an employee of the Bidder/Proposer, and anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, the indemnification obligation shall not be limited in any way to the amount or type of damages, compensation or benefits payable by or for the Bidder / Proposer under the Worker's Compensation Acts, Disability Benefit Acts, or other employee benefit acts.

The obligation of the Bidder/Proposer under this paragraph shall not extend to the liability of Colleton County or its agents and/or employees arising out of the reports, surveys, Change Orders, designs or Technical Specifications.

**CERTIFICATE OF FAMILIARITY**

The undersigned, having fully familiarized him/her with the information contained within this entire solicitation and applicable amendments, submits the attached response, and other applicable information to the County, which I verify to be true and correct to the best of my knowledge. I further certify that this response is made without prior understanding, agreement, or connection with any corporation, contractor, or person submitting a response for the same materials, supplies or equipment, and is in all respects, fair and without collusion or fraud. I agree to abide by all conditions outlined in this solicitation and certify that I have signature authority to bind the company listed herein.

Are you a minority business?

▶ **Yes** \_\_\_\_\_ ( \_\_\_\_\_ Women-owner/ \_\_\_\_\_ Disadvantaged) if yes, please submit a copy of your certificate with your response.

▶ **No** \_\_\_\_\_

**Contractor:** \_\_\_\_\_

**Authorized Representative Name and Title:** \_\_\_\_\_

**Signature of Authorized Representative:** \_\_\_\_\_

**THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID**



**DEBARMENT**

The Contractor is certifying that they are not currently debarred from responding to any request for bids by any agency or subdivision of the State of South Carolina or the United States Federal Government, nor are they an agent of any person or entity that is currently debarred from submitting bids on contracts by any agency or subdivision of the State of South Carolina or the United States Federal Government.

A Registered Contractor with SAM's: Yes  No

Cage Code. \_\_\_\_\_

DUN's No. \_\_\_\_\_

**Contractor:** \_\_\_\_\_

**Authorized Representative Name and Title:** \_\_\_\_\_

**Signature of Authorized Representative:** \_\_\_\_\_

**THIS PAGE MUST BE COMPLETED AND SUBMITTED AS A PART OF YOUR BID**

**ACKNOWLEDGMENT OF PRINCIPAL, IF A PARTNERSHIP**

State of: ( \_\_\_\_\_ )

County of: ( \_\_\_\_\_ )

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, before me personally, came and appeared \_\_\_\_\_, to me known and known to me to be the person described in and who executed the foregoing instrument and he acknowledged to me that he executed the same as and for the act and deed of said firm.

(Seal) \_\_\_\_\_  
Notary Public

**ACKNOWLEDGMENT OF PRINCIPAL, IF AN INDIVIDUAL**

State of: ( \_\_\_\_\_ )

County of: ( \_\_\_\_\_ )

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, before me personally, came and appeared \_\_\_\_\_, to me known and known to me to be the person described in and who executed the foregoing instrument and acknowledged that he executed the same.

(Seal) \_\_\_\_\_  
Notary Public

**ACKNOWLEDGMENT OF PRINCIPLE, IF A CORPORATION**

State of: ( \_\_\_\_\_ )

County of: ( \_\_\_\_\_ )

On this \_\_\_\_\_ day of \_\_\_\_\_, 20\_\_\_\_, before me personally came and appeared \_\_\_\_\_ to me Known, who, being by me duly sworn, did depose and say to me that he resides at \_\_\_\_\_, that he/she is the \_\_\_\_\_ of \_\_\_\_\_, the corporation described in and which executed the foregoing instrument is an impression of such seal; that it was so affixed by the order of the directors of said corporation, and that he signed his name thereto by like order.

(Seal) \_\_\_\_\_  
Notary Public

**LIST OF PRIME AND SUBCONTRACTORS**

*The undersigned Bidder/Proposer states that the following is a full and complete list of proposed prime contractors and subcontractors on this Project and the class of work to be performed by each, and that such list will not be added to nor altered without the written consent of the Owner.*

	<b>Class of Work to be Performed</b>	<b>Subcontractor</b>
1)	Finished Flooring	_____
2)	Electrical	_____
3)	Mechanical	_____
4)	Ceiling tiles	_____
5)	Architectural wood work	_____
6)	Masonry	_____
7)	Painting	_____
8)	Plumbing	_____
9)	Interior Glass & storefront	_____

*Listed subcontractors must meet all qualifications including documented experience set forth in specifications, including those sections specifying single source contractor requirements.*

**The remainder of this page was intentionally left blank**

**BID BOND**

Any singular reference to Bidder, Surety, Owner, or another party shall be considered plural where applicable.

BIDDER (Name and Address): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

SURETY (Name and Address of Principal Place of Business): \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

OWNER (Name and Address): Colleton County  
109 Benson Street  
Walterboro, SC 29488

Bid Number: **FM-59**

Bid Due Date: **Thursday, July 20, 2023 at 11:00am**

Project (Brief Description Including Location): **Renovation of the building located at 72 Bells Hwy, Walterboro, SC 29488. The project includes up-fitting and renovating the open floor space into a Voter Registration facility.**

Bond Number: \_\_\_\_\_

Date (Not later than Bid due date): \_\_\_\_\_

Penal sum \_\_\_\_\_ (Words) \_\_\_\_\_ (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms printed on the reverse side hereof, do each because this Bid Bond is to be duly executed on its behalf by its authorized officer, agent, or representative.

BIDDER  
  
\_\_\_\_\_  
Bidder's Name and Corporate Seal

SURETY  
(Seal) \_\_\_\_\_ (Seal)  
Surety's Name and Corporate Seal

By: \_\_\_\_\_  
Signature and Title

By: \_\_\_\_\_  
Signature and Title  
(Attach Power of Attorney)

Attest: \_\_\_\_\_  
Signature and Title

Attest: \_\_\_\_\_  
Signature and Title

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Surety's liability.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
  - 3.1. Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
  - 3.2. All Bids are rejected by Owner, or
  - 3.3. Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default by Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage prepaid, and shall be deemed to be effective upon receipt by the party concerned.
9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.
10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.
11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

## 1 - BIDDER'S ACKNOWLEDGMENTS

- 1.01 The undersigned Bidder/Proposer, proposes and agrees, if this Bid is accepted, to enter into an Agreement/Contract with the Owner as stated in the form included in the Bidding Documents to perform all Work as specified or indicated in the Bidding Documents for the prices and within the times indicated in this Bid and in accordance with the other terms and conditions of the Bidding Documents.
- 1.02 The undersigned Bidder/Proposer, having fully familiarized him/her with the information contained within this entire solicitation and applicable amendments, submits the attached response, and other applicable information to the County, which I verify to be true and correct to the best of my knowledge. I further certify that this response is made without prior understanding, agreement, or connection with any corporation, Offeror or person submitting a response for the same materials, supplies or equipment, and is in all respects, fair and without collusion or fraud. I agree to abide by all conditions set forth in this solicitation and certify that I have signature authority to bind the company listed herein.
- 1.03 Bidder accepts all of the terms and conditions of the Instructions to Bidders, including without limitation those dealing with the disposition of Bid security. This Bid will remain subject to acceptance for **ninety (90) days** after the Bid opening, or for such longer period of time that Bidder may agree to in writing upon request of the Owner.
- 1.04 For additional work authorized after signing the Contract, the amount of overhead and the amount of profit to be added to base costs of labor and materials as noted in the unit price sheet shall be (10%) total for overhead and profit on work performed by the General Contractor's own forces and (15%) total on work by Subcontractors. The request of additional charges for site supervision, utilities, rentals, or administrative services will not be approved unless the additional requested work warrants adding additional days to the contract term. All requests for additional work authorization shall have as an attachment, an **itemized breakdown** of the subcontractor and/or General Contractors work to be performed to include the actual quote for supplies from the general contractor or sub-contractor's suppliers. The General Contractor and sub-contractors itemized list shall have the Labor Hours, Rates, Overhead and Profit itemized. The Sub-contractor shall list as an itemized unit cost any additional labor to include the labor hours and rates associated with the requested work. The itemized list shall be shown on the subcontractor or General Contractors letterhead and signed by the head officer or the owner of the said company.
- 1.05 Bidder acknowledges the requirements of the Performance Bonds and Payment Bonds.

## 2 - BIDDER'S REPRESENTATIONS

- 2.01 In submitting this Bid, Bidder represents that:
- A. Bidder has examined and carefully studied the Bidding Documents, the other related data identified in the Bidding Documents, and the any issued Addenda, which is hereby acknowledged with the attached Addendum form.
  - B. Bidder has visited the Site and become familiar with and is satisfied as to the general, local and Site conditions that may affect cost, progress, and performance of the Work.
  - C. Bidder is familiar with and is satisfied as to all federal, state and local Laws and Regulations that may affect cost, progress and performance of the Work.

- D. Bidder has carefully studied all: (1) reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site (except Underground Facilities), which have been identified in Paragraph 4.02 of General Conditions, and (2) reports and drawings of Hazardous Environmental Conditions that have been identified in Paragraph 4.06 of General Conditions.
- E. Bidder has obtained and carefully studied (or accepts the consequences for not doing so) all additional or supplementary examinations, investigations, explorations, tests, studies and data concerning conditions (surface, subsurface and Underground Facilities) at or contiguous to the Site, which may affect cost, progress, or performance of the Work or which relate to any aspect of the means, methods, techniques, sequences, and procedures of construction to be employed by Bidder, including applying the specific
- F. Means, methods, techniques, sequences, and procedures of construction expressly required by the Bidding Documents to be employed by Bidder, and safety precautions and programs incident thereto.
- G. Bidder does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the determination of this Bid for performance of the Work at the price(s) bid and within the times and in accordance with the other terms and conditions of the Bidding Documents.
- H. Bidder is aware of the general nature of work to be performed by the Owner and others at the Site that relates to the Work as indicated in the Bidding Documents.
- I. Bidder has correlated the information known to Bidder, information and observations obtained from visits to the Site, reports and drawings identified in the Bidding Documents, and all additional examinations, investigations, explorations, tests, studies, and data with the Bidding Documents.
- J. Bidder has given the Owner written notice of all conflicts, errors, ambiguities, or discrepancies that Bidder has discovered in the Bidding Documents, and the written resolution thereof by the Owner is acceptable to Bidder.
- K. The Bidding Documents are generally sufficient to indicate and convey understanding of all terms and conditions for the performance of the Work for which this Bid is submitted.
- L. Bidder will submit written evidence of its authority to do business in the state where the Project is located not later than the date of its execution of the Agreement.

### **3 - FURTHER REPRESENTATIONS**

3.01 Bidder further represents that:

- A. This Bid is genuine and not made in the interest of or on behalf of any undisclosed individual or entity and is not submitted in conformity with any agreement or rules of any group, association, organization, or corporation.
- B. Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid.
- C. Bidder has not solicited or induced any individual or entity to refrain from bidding.

- D. The bidder affirms that in making such a Bid, neither he/she nor any company may represent, nor anyone on behalf of him/her or their company, directly or indirectly, has entered into any combination, collusion, undertaking, or agreement with any other Bidder or Bidders to maintain the prices of said work, or any compact to prevent any other Bidder or Bidders from Bidding on said Contract or work and further affirms that such bid is made without regard or reference to any other Bidder or Proposer and without any agreement or understanding or combination either directly or indirectly with any other person or persons with reference to such Bidding in any way or manner whatsoever.
  
- E. Any attempt by the vendor to influence the opinion of Colleton County Staff or Colleton County Council by discussion, promotion, advertising, or misrepresentation of the submittal or purchasing process or any procedure to promote their offer will constitute a violation of the vendor submittal conditions and will cause the vendor's submittal to be declared null and void.

**4 - TIME OF COMPLETION**

- 4.01 **Renovation of the building located at 72 Bells Hwy, Walterboro, SC 29488. The project includes up-fitting and renovating the open floor space into a Voter Registration facility to be completed within One Hundred eighty (180) calendar days after the "Notice to Proceed" has been issued.**
  
- 4.02 Bidder accepts the provisions of the Agreement as to liquidate damages, in the event of failure to complete the Work within the Contract dates in the amount of \$500 per day for each calendar day required to complete the work in the manner and within the dates as stated in Paragraph 4.01 above.

**5 - BID SUBMITTAL**

5.01 This Bid was submitted by:

**An Individual**

Name (typed or printed): \_\_\_\_\_

By: \_\_\_\_\_ (SEAL) Title: \_\_\_\_\_  
*(Individual's signature)*

Doing business as: \_\_\_\_\_

**A Partnership**

Partnership Name: \_\_\_\_\_

By: \_\_\_\_\_ (SEAL) Title: \_\_\_\_\_  
*(Signature of general partner -attach evidence of authority to sign)*

Name (typed or printed): \_\_\_\_\_



**A Corporation**

Corporation Name: \_\_\_\_\_ (SEAL)

State of Incorporation: \_\_\_\_\_ Type (General Business, Professional, Service, Limited Liability): \_\_\_\_\_

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

*(Signature -- attach evidence of authority to sign)*

Name (typed or printed): \_\_\_\_\_

Title: \_\_\_\_\_ (CORPORATE SEAL)

Attest \_\_\_\_\_

Date of Authorization to do business in [South Carolina] is \_\_\_\_/\_\_\_\_/\_\_\_\_.

**A Joint Venture**

Name of Joint Venture: \_\_\_\_\_

First Joint Ventures Name: \_\_\_\_\_ (SEAL)

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

*(Signature of first joint venture partner -- attach evidence of authority to sign)*

Name (typed or printed): \_\_\_\_\_

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

Second Joint Ventures Name: \_\_\_\_\_ (SEAL)

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

*(Signature of second joint venture partner -- attach evidence of authority to sign)*

Name (typed or printed): \_\_\_\_\_

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

(Each joint venture must sign. The manner of signing for each individual, partnership, and corporation that is a party to the joint venture should be in the manner indicated above.)

Bidder's Business Address \_\_\_\_\_  
\_\_\_\_\_

Telephone No.: \_\_\_\_\_ Fax No.: \_\_\_\_\_

SUBMITTED on \_\_\_\_\_, 2023.

State Contractor License No. \_\_\_\_\_

**6 – BASIS OF BID**

**BASE BID & ALTERNATE BID LS PRICES**

Base Bid price and Alternate Bid Prices shall be for the Work as specified, and shall include all labor, supervision, administrative support, materials, equipment, accessories, shipping, preparation, insurance, testing, overhead, profit, applicable taxes, permits, fees, supervision, warranties and all other associated costs for the finished and completed Work. Bid shall include the prices for undercut soils shall include material in place, surveyed and compacted pursuant to the Contract Documents.

Contractor shall make quantity take-offs using drawings and specifications to determine quantities to his satisfaction, reporting promptly any discrepancies which may affect bidding.

**The Owner shall have the right to accept Alternates in any order or combination, and to determine the low bidder on the basis of the sum of the Base Bid and Alternates accepted.**

- a. Bidder will complete the Work in accordance with the Contract Documents and the following Allowances are established for this project.

<b><u>Owner’s Allowance – FM-59 Renovation of the building located at 72 Bells Hwy, Walterboro, SC 29488. The project includes up-fitting and renovating the open floor space into a Voter Registration facility to be completed within One Hundred eighty (180) calendar days after the “Notice to Proceed” has been issued.</u></b>			
Unfounded issues	LS	1	\$ 50,000.00

**7 - BASE BID ALTERNATES**

7.01 **No Alternates**

**The remainder of this page was intentionally left blank**

**8 - Base Bid**

8.01 BID BREAKDOWN **This section must be completed.** Bid breakdown total should match the bid proposal. **Failure to complete the bid breakdown will result in the submitted bid being disqualified.**

Unfounded issues Allowance	LS	1	\$ 50,000.00
Voter Registration Improvements Complete	LS	1	\$
		Total	\$

8.02 BASE BID PROPOSAL: The Bidder agrees to perform all of the work described in the solicitation document CC-38 to include the Specifications, General Conditions, including allowances, and items shown on the drawings, as totaled in 8.01 for the sum of:

\_\_\_\_\_ \$ \_\_\_\_\_  
(Amount in words) (Numerical)

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

**Contact Person:** \_\_\_\_\_

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

**City/State/Zip:** \_\_\_\_\_

**Phone Number:** \_\_\_\_\_

**Cell Phone Number:** \_\_\_\_\_

**E-mail Address:** \_\_\_\_\_  
(Please print)

**Signature:** \_\_\_\_\_

**End of Base Bid**

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END OF SECTION

## **DIVISION 001 – GENERAL CONDITIONS**

### **STANDARD GENERAL CONDITIONS OF THE CONSTRUCTION CONTRACT**

#### **PART 1 - DEFINITIONS AND TERMINOLOGY**

##### **1.01 Defined Terms**

- A. Wherever used in the Bidding Requirements or Contract Documents and printed with initial capital letters, the terms listed below will have the meanings indicated which are applicable to both the singular and plural thereof. In addition to terms specifically defined, terms with initial capital letters in the Contract Documents include references to identified Parts and paragraphs and the titles of other documents or forms.
1. Addenda – Written or graphic instruments issued prior to the opening of Bids that clarify, correct, or change the Bidding Requirements or the proposed Contract Documents.
  2. Agreement – The written instrument which is evidence of the agreement between the Owner and Contractor covering the Work.
  3. Application for Payment – The form acceptable to the Construction Coordinator which is to be used by the Contractor during the course of the Work in requesting progress or final payments and which is to be accompanied by such supporting documentation as is required by the Contract Documents.
  4. Asbestos – Any material that contains more than one percent asbestos and is friable or is releasing asbestos fibers into the air above current action levels established by the United States Occupational Safety and Health Administration.
  5. Bid – The offer or proposal of a Bidder submitted on the prescribed form setting forth the prices for the Work to be performed.
  6. Bidder – The individual or entity who submits a Bid directly to the Owner.
  7. Bidding Documents – The Bidding Requirements, Contract Documents, and the General Conditions (including all Addenda).
  8. Bidding Requirements – The Advertisement or Invitation to Bid, Instructions to Bidders, bid security of acceptable form, if any, and the Bid Form with any supplements.
  9. Change Order – A document recommended by the Construction Coordinator which is signed by the Contractor and Owner and authorizes an addition, deletion, or revision in the Work or an adjustment in the Contract Price or the Contract Times, issued on or after the Effective Date of the Agreement.
  10. Claim – A demand or assertion by the Owner or Contractor seeking an adjustment of Contract Price or Contract Times, or both, or other relief with respect to the terms of the Contract. A demand for money or services by a third party is not a Claim.
  11. Construction Coordinator - The person or firm in charge of the project. The person or firm will be selected by the owner and in some instances, the owner will self-perform, acting as the Construction Coordinator. The firm could be an Architectural Firm, Engineering Firm, or third party as so designated by the owner.

12. Contract – The entire and integrated written agreement between the Owner and Contractor including the General Conditions concerning the Work. The Contract supersedes prior negotiations, representations, or agreements, whether written or oral.
13. Contract Documents – Those items so designated in the Agreement. Only printed or hard copies of the items listed in the Agreement Are Contract Documents. Approved Shop Drawings, other Contractor submittals, and the reports and drawings of subsurface and physical conditions are not Contract Documents.
14. Contract Price – The money payable by the Owner to the Contractor for completion of the Work in accordance with the Contract Documents as stated in the Agreement (subject to the provisions of Paragraph 11.03 in the case of Unit Price Work).
15. Contract Times – The number of days or the dates stated in the Agreement to: (i) achieve Milestones, if any, (ii) achieve Substantial Completion; and (iii) complete the Work so that it is ready for final payment as evidenced by Engineer's written recommendation of final payment.
16. Contractor – The individual or entity with whom Owner has entered into the Agreement.
17. Cost of the Work – See Paragraph 11.01.A for definition.
18. Drawings – That part of the Contract Documents prepared or approved by the Construction Coordinator which graphically shows the scope, extent, and character of the Work to be performed by the Contractor. Shop Drawings and other Contractor submittals are not Drawings as so defined.
19. Effective Date of the Agreement – The date indicated in the Agreement on which it becomes effective, but if no such date is indicated, it means the date on which the Agreement is signed and delivered by the last of the two parties to sign and deliver.
20. Field Order – A written order issued by the Construction Coordinator which requires minor changes in the Work but which does not involve a change in the Contract Price or the Contract Times.
21. General Requirements – Sections of Division 1 of the Specifications. The General Requirements pertain to all sections of the Specifications.
22. Hazardous Environmental Condition – The presence at the Site of Asbestos, PCBs, Petroleum, Hazardous Waste, or Radioactive Material in such quantities or circumstances that may present a substantial danger to persons or property exposed thereto in connection with the Work.
23. Hazardous Waste – The term Hazardous Waste shall have the meaning provided in Section 1004 of the Solid Waste Disposal Act (42 USC Section 6903) as amended from time to time.
24. Laws and Regulations; Laws or Regulations – Any and all applicable laws, rules, regulations, ordinances, codes, and orders of any and all governmental bodies, agencies, authorities, and courts having jurisdiction.
25. Liens – Charges, security interests, or encumbrances upon Project funds, real property, or personal property.
26. Milestone – A principal event specified in the Contract Documents relating to an intermediate completion date or time prior to Substantial Completion of all the Work.



27. Notice of Award – The written notice by Owner to the Successful Bidder stating that upon timely compliance by the Successful Bidder with the conditions precedent listed therein, the Owner will sign and deliver the Agreement.
28. Notice to Proceed – A written notice given by Owner or Construction Coordinator to Contractor fixing the date on which the Contract Times will commence to run and on which Contractor shall start to perform the Work under the Contract Documents.
29. Owner – The individual or entity with whom Contractor has entered into the Agreement and for whom the Work is to be performed.
30. PCBs – Polychlorinated biphenyls.
31. Petroleum – Petroleum, including crude oil or any fraction thereof which is liquid at standard conditions of temperature and pressure (60 degrees Fahrenheit and 14.7 pounds per square inch absolute), such as oil, petroleum, fuel oil, oil sludge, oil refuse, gasoline, kerosene, and oil mixed with other non-Hazardous Waste and crude oils.
32. Progress Schedule – A schedule, prepared and maintained by Contractor, describing the sequence and duration of the activities comprising the Contractor's plan to accomplish the Work within the Contract Times.
33. Project – The total construction of which the Work to be performed under the Contract Documents may be the whole, or a part.
34. Project Manual – The bound documentary information prepared for bidding and constructing the Work. A listing of the contents of the Project Manual, which may be bound in one or more volumes, is contained in the table(s) of contents.
35. Radioactive Material – Source, special nuclear, or byproduct material as defined by the Atomic Energy Act of 1954 (42 USC Section 2011 et seq.) as amended from time to time.
36. Related Entity – An officer, director, partner, employee, agent, consultant, or subcontractor.
37. Resident Project Representative – The authorized representative of the Construction Coordinator who may be assigned to the Site or any part thereof.
38. Samples – Physical examples of materials, equipment, or workmanship that are representative of some portion of the Work and which establish the standards by which such portion of the Work will be judged.
39. Schedule of Submittals – A schedule, prepared and maintained by Contractor, of required submittals and the time requirements to support the scheduled performance of related construction activities.
40. Schedule of Values – A schedule, prepared and maintained by Contractor, allocating portions of the Contract Price to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.
41. Shop Drawings – All drawings, diagrams, illustrations, schedules, and other data or information which are specifically prepared or assembled by or for Contractor and submitted by Contractor to illustrate some portion of the Work.
42. Site – Lands or areas indicated in the Contract Documents as being furnished by the Owner upon which the Work is to be performed, including rights-of-way and easements for access

thereto, and such other lands furnished by the Owner which are designated for the use of Contractor.

43. Specifications – That part of the Contract Documents consisting of written requirements for materials, equipment, systems, standards, and workmanship as applied to the Work, and certain administrative requirements and procedural matters applicable thereto.
44. Subcontractor – An individual or entity having a direct contract with the Contractor or with any other Subcontractor for the performance of a part of the Work at the Site.
45. Substantial Completion – The time at which the Work (or a specified part thereof) has progressed to the point where, in the opinion of the Construction Coordinator, the Work (or a specified part thereof) is sufficiently complete, in accordance with the Contract Documents, so that the Work (or a specified part thereof) can be utilized for the purposes for which it is intended. The terms “substantially complete” and “substantially completed” as applied to all or part of the Work refer to Substantial Completion thereof.
46. Successful Bidder – The Bidder submitting a responsive Bid to whom Owner makes an award.
47. Supplementary Conditions – That part of the Contract Documents which amends or supplements these General Conditions.
48. Supplier – A manufacturer, fabricator, supplier, distributor, material man, or vendor having a direct contract with the Contractor or with any Subcontractor to furnish materials or equipment to be incorporated in the Work by the Contractor or any Subcontractor.
49. Underground Facilities – All underground pipelines, conduits, ducts, cables, wires, manholes, vaults, tanks, tunnels, or other such facilities or attachments, and any encasements containing such facilities, including those that convey electricity, gases, steam, liquid petroleum products, telephone or other communications, cable television, water, wastewater, storm water, other liquids or chemicals, or traffic or other control systems.
50. Unit Price Work – Work to be paid for on the basis of unit prices.
51. Work – The entire construction or the various separately identifiable parts thereof required to be provided under the Contract Documents. Work includes and is the result of performing or providing all labor, services, and documentation necessary to produce such construction, and furnishing, installing, and incorporating all materials and equipment into such construction, all as required by the Contract Documents.
52. Work Change Directive – A written statement to the Contractor issued on or after the Effective Date of the Agreement and signed by the Owner and recommended by the Construction Coordinator ordering an addition, deletion, or revision in the Work, or responding to differing or unforeseen subsurface or physical conditions under which the Work is to be performed or to emergencies. A Work Change Directive will not change the Contract Price or the Contract Times but is evidence that the parties expect that the change ordered or documented by a Work Change Directive will be incorporated in a subsequently issued Change Order following negotiations by the parties as to its effect, if any, on the Contract Price or Contract Times.
53. Warranty- Such time period as stated in the contract, which shall cover all workmanship and products installed under the contract requirements.

## 1.02 Terminology

- A. The following words or terms are not defined but, when used in the Bidding Requirements or Contract Documents, have the following meaning.
- B. Intent of Certain Terms or Adjectives
1. The Contract Documents include the terms “as allowed,” “as approved,” “as ordered”, “as directed” or terms of like effect or import to authorize an exercise of professional judgment by the Construction Coordinator. In addition, the adjectives “reasonable,” “suitable,” “acceptable,” “proper,” “satisfactory,” or adjectives of like effect or import are used to describe an action or determination of the Construction Coordinator as to the Work. It is intended that such exercise of professional judgment, action or determination will be solely to evaluate, in general, the Work for compliance with the requirements of and information in the Contract Documents and conformance with the design concept of the completed Project as a functioning whole as shown or indicated in the Contract Documents (unless there is a specific statement indicating otherwise). The use of any such term or adjective is not intended to and shall not be effective to assign to the Construction Coordinator any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility contrary to the provisions of Paragraph 9.09 or any other provision of the Contract Documents.
- C. Day
1. The word “day” means a calendar day of 24 hours measured from midnight to the next midnight.
  2. The wording “business day” means any day Monday thru Friday.
- D. Defective
1. The word “defective,” when modifying the word “Work,” refers to Work that is unsatisfactory, faulty, or deficient in that it:
    - a. does not conform to the Contract Documents, or
    - b. does not meet the requirements of any applicable inspection, reference standard, test, or approval referred to in the Contract Documents, or
    - c. has been damaged prior to the Construction Coordinator’s recommendation of final payment (unless responsibility for the protection thereof has been assumed by Owner at Substantial Completion in accordance with Paragraph 14.04 or 14.05).
- E. Furnish, Install, Perform, Provide
1. The word “furnish,” when used in connection with services, materials, or equipment, shall mean to supply and deliver said services, materials, or equipment to the Site (or some other specified location) ready for use or installation and in usable or operable condition.
  2. The word “install,” when used in connection with services, materials, or equipment, shall mean to put into use or place in final position said services, materials, or equipment complete and ready for intended use.
  3. The words “perform” or “provide,” when used in connection with services, materials, or equipment, shall mean to furnish and install said services, materials, or equipment complete and ready for intended use.

4. When “furnish,” “install,” “perform,” or “provide” is not used in connection with services, materials, or equipment in a context clearly requiring an obligation of Contractor, “provide” is implied.
- F. Unless stated otherwise in the Contract Documents, words or phrases which have a well-known technical or construction industry or trade meaning are used in the Contract Documents in accordance with such recognized meaning.

## **PART 2 - PRELIMINARY MATTERS**

### **2.01 Delivery of Bonds and Evidence of Insurance**

- A. When Contractor delivers the executed counterparts of the Agreement to Owner, Contractor shall also deliver to Owner such bonds as Contractor may be required to furnish.
- B. Evidence of Insurance: Before any Work at the Site is started, Contractor and Owner shall each deliver to the other, with copies to each additional insured identified in the General Conditions, certificates of insurance (and other evidence of insurance which either of them or any additional insured may reasonably request) which Contractor and Owner respectively are required to purchase and maintain in accordance with Part 5.

### **2.02 Copies of Documents**

- A. Owner shall furnish to Contractor up to two (2) printed or hard copies of the Drawings and Project Manual. Additional copies will be furnished upon request at the cost of reproduction.

### **2.03 Commencement of Contract Times; Notice to Proceed**

- A. The Contract Times will commence to run on the thirtieth day after the Effective Date of the Agreement or, if a Notice to Proceed is given, on the day indicated in the Notice to Proceed. A Notice to Proceed may be given at any time within 30 days after the Effective Date of the Agreement. In no event, will the Contract Times commence to run later than the thirtieth day after the Effective Date of the Agreement.

### **2.04 Starting the Work**

- A. Contractor shall start to perform the Work on the date when the Contract Times commence to run. No Work shall be done at the Site prior to the date on which the Contract Times commence to run.

### **2.05 Before Starting Construction**

- A. *Preliminary Schedules:* Within ten (10) days after the Effective Date of the Agreement (unless otherwise specified in the General Requirements), Contractor shall submit to the Construction Coordinator for timely review:
  1. A preliminary Progress Schedule; indicating the times (numbers of days or dates) for starting and completing the various stages of the Work, including any Milestones specified in the Contract Documents;
  2. A preliminary Schedule of Submittals; and
  3. A preliminary Schedule of Values for all of the Work which includes quantities and prices of items which when added together equal the Contract Price and subdivides the Work into component parts in sufficient detail to serve as the basis for progress payments during

performance of the Work. Such prices will include an appropriate amount of overhead and profit applicable to each item of Work.

## **2.06 Preconstruction Conference**

- A. Before any Work at the Site is started, a conference attended by Owner, Contractor, the Construction Coordinator, and others as appropriate will be held to establish a working understanding among the parties as to the Work and to discuss the schedules referred to in Paragraph 2.05.A, procedures for handling Shop Drawings and other submittals, processing Applications for Payment, and maintaining required records.

## **2.07 Initial Acceptance of Schedules**

- A. At least ten (10) days before submission of the first Application for Payment a conference attended by Contractor, the Construction Coordinator, and others as appropriate will be held to review for acceptability to the Construction Coordinator as provided below the schedules submitted in accordance with Paragraph 2.05.A. Contractor shall have an additional ten (10) days to make corrections and adjustments and to complete and resubmit the schedules. No progress payment shall be made to Contractor until acceptable schedules are submitted to the Construction Coordinator.
  - 1. The Progress Schedule will be acceptable to the Construction Coordinator if it provides an orderly progression of the Work to completion within the Contract Times. Such acceptance will not impose on the Construction Coordinator responsibility for the Progress Schedule, for sequencing, scheduling, or progress of the Work nor interfere with or relieve Contractor from Contractor's full responsibility therefor.
  - 2. Contractor's Schedule of Submittals will be acceptable to the Construction Coordinator if it provides a workable arrangement for reviewing and processing the required submittals.
  - 3. Contractor's Schedule of Values will be acceptable to the Construction Coordinator as to form and substance if it provides a reasonable allocation of the Contract Price to component parts of the Work.

## **PART 3 – CONTRACT DOCUMENTS: INTENT, AMENDING, REUSE**

### **3.01 Intent**

- A. The Contract Documents are complementary; what is required by one is as binding as if required by all.
- B. It is the intent of the Contract Documents to describe a functionally complete Project (or part thereof) to be constructed in accordance with the Contract Documents. Any labor, documentation, services, materials, or equipment that may reasonably be inferred from the Contract Documents or from prevailing custom or trade usage as being required to produce the intended result will be provided whether or not specifically called for at no additional cost to Owner.
- C. Clarifications and interpretations of the Contract Documents shall be issued by the Construction Coordinator as provided in Part 9.

### **3.02 Reference Standards**

- A. Standards, Specifications, Codes, Laws, and Regulations
  - 1. Reference to standards, specifications, manuals, or codes of any technical society, organization, or association, or to Laws or Regulations, whether such reference be specific

or by implication, shall mean the standard, specification, manual, code, or Laws or Regulations in effect at the time of opening of Bids (or on the Effective Date of the Agreement if there were no Bids), except as may be otherwise specifically stated in the Contract Documents.

2. No provision of any such standard, specification, manual or code, or any instruction of a Supplier shall be effective to change the duties or responsibilities of Owner, Contractor, or the Construction Coordinator, or any of their subcontractors, consultants, agents, employees from those set forth in the Contract Documents. No such provision or instruction shall be effective to assign to Owner, or the Construction Coordinator, or any of, their Related Entities, any duty or authority to supervise or direct the performance of the Work or any duty or authority to undertake responsibility inconsistent with the provisions of the Contract Documents.

### **3.03 Reporting and Resolving Discrepancies**

#### **A. Reporting Discrepancies**

1. *Contractor's Review of Contract Documents before Starting Work:* Before undertaking each part of the Work, Contractor shall carefully study and compare the Contract Documents and check and verify pertinent figures therein and all applicable field measurements. Contractor shall promptly report in writing to the Construction Coordinator any conflict, error, ambiguity, or discrepancy which Contractor may discover and shall obtain a written interpretation or clarification from the Construction Coordinator before proceeding with any Work affected thereby.
2. *Contractor's Review of Contract Documents During Performance of Work:* If, during the performance of the Work, Contractor discovers any conflict, error, ambiguity, or discrepancy within the Contract Documents or between the Contract Documents and any provision of any Law or Regulation applicable to the performance of the Work or of any standard, specification, manual or code, or of any instruction of any Supplier, Contractor shall promptly report it to the Construction Coordinator in writing. Contractor shall not proceed with the Work affected thereby (except in an emergency as required by Paragraph 6.16.A) until an amendment or supplement to the Contract Documents has been issued by one of the methods indicated in Paragraph 3.04.
3. Contractor shall not be liable to Owner or the Construction Coordinator for failure to report any conflict, error, ambiguity, or discrepancy in the Contract Documents unless Contractor knew or reasonably should have known thereof.

#### **B. Resolving Discrepancies**

1. Except as may be otherwise specifically stated in the Contract Documents, the provisions of the Contract Documents shall take precedence in resolving any conflict, error, ambiguity, or discrepancy between the provisions of the Contract Documents and:
  - a. the provisions of any standard, specification, manual, code, or instruction (whether or not specifically incorporated by reference in the Contract Documents); or
  - b. the provisions of any Laws or Regulations applicable to the performance of the Work (unless such an interpretation of the provisions of the Contract Documents would result in violation of such Law or Regulation).

### **3.04 Amending and Supplementing Contract Documents**

- A. The Contract Documents may be amended to provide for additions, deletions, and revisions in the Work or to modify the terms and conditions thereof by either a Change Order or a Work Change Directive.
- B. The requirements of the Contract Documents may be supplemented and minor variations and deviations in the Work may be authorized, by one or more of the following ways:
  - 1. A Field Order;
  - 2. Construction Coordinator approval of a Shop Drawing or Sample; (Subject to the provisions of Paragraph 6.17.D.3); or
  - 3. Construction Coordinator written interpretation or clarification.

### **3.05 Reuse of Documents**

- A. Contractor and any Subcontractor or Supplier or other individual or entity performing or furnishing all of the Work under a direct or indirect contract with Contractor, shall not:
  - 1. Have or acquire any title to or ownership rights in any of the Drawings, Specifications, or other documents (or copies of any thereof) prepared by or bearing the seal of Architects, Engineer or Architects and or Engineer's consultants, including electronic media editions; or
  - 2. Reuse any of such Drawings, Specifications, other documents, or copies thereof on extensions of the Project or any other project without written consent of Owner and Architect or Engineer and specific written verification or adaption by Architect or Engineer.
- B. The prohibition of this Paragraph 3.05 will survive final payment, or termination of the Contract. Nothing herein shall preclude Contractor from retaining copies of the Contract Documents for record purposes.

### **3.06 Electronic Data**

- A. Copies of data furnished by Owner or the Construction Coordinator to Contractor or Contractor to Owner or the Construction Coordinator that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.
- B. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60 days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- C. When transferring documents in electronic media format, the transferring party makes no representations as to long term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

## **PART 4 - AVAILABILITY OF LANDS; SUBSURFACE AND PHYSICAL CONDITIONS; HAZARDOUS ENVIRONMENTAL CONDITIONS; REFERENCE POINTS**

### **4.01 Availability of Lands**

- A. Owner shall furnish the Site. Owner shall notify Contractor of any encumbrances or restrictions not of general application but specifically related to use of the Site with which Contractor must comply in performing the Work. Owner will obtain in a timely manner and pay for easements for permanent structures or permanent changes in existing facilities. If Contractor and Owner are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, as a result of any delay in Owner's furnishing the Site or a part thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.
- B. Upon reasonable written request, Owner shall furnish Contractor with a current statement of record legal title and legal description of the lands upon which the Work is to be performed and Owner's interest therein as necessary for giving notice of or filing a mechanic's or construction lien against such lands in accordance with applicable Laws and Regulations.
- C. Contractor shall provide for all additional lands and access thereto that may be required for temporary construction facilities or storage of materials and equipment.

#### **4.02 Subsurface and Physical Conditions**

- A. Reports and Drawings: Reports of explorations and tests of conditions at or contiguous to the Site have been included in the documents. The contractor should insure that capable soils are found for any and all compacted surfaces.

#### **4.03 Differing Subsurface or Physical Conditions**

- A. Notice: If Contractor believes that any subsurface or physical condition at or contiguous to the Site that is uncovered or revealed either:
  - 1. Is of such a nature as to establish that any "technical data" on which Contractor is entitled to rely as provided in Paragraph 4.02 is materially inaccurate; or
  - 2. Is of such a nature as to require a change in the Contract Documents; or
  - 3. Differs materially from that shown or indicated in the Contract Documents; or
  - 4. Is of an unusual nature, and differs materially from conditions ordinarily encountered and generally recognized as inherent in work of the character provided for in the Contract Documents; then Contractor shall, promptly after becoming aware thereof and before further disturbing the subsurface or physical conditions or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), notify Owner and the Construction Coordinator in writing about such condition. Contractor shall not further disturb such condition or perform any Work in connection therewith (except as aforesaid) until receipt of written order to do so.
- B. Construction Coordinator Review: After receipt of written notice as required by Paragraph 4.03.A, Construction Coordinator will promptly review the pertinent condition, determine the necessity of Owner's obtaining additional exploration or tests with respect thereto, and advise Owner in writing (with a copy to Contractor) of the Construction Coordinator findings and conclusions.
- C. Possible Price and Times Adjustments
  - 1. The Contract Price or the Contract Times, or both, will be equitably adjusted to the extent that the existence of such differing subsurface or physical condition causes an increase or



decrease in Contractor's cost of, or time required for, performance of the Work; subject, however, to the following:

- a. such condition must meet any one or more of the categories described in Paragraph 4.03.A; and
  - b. with respect to Work that is paid for on a Unit Price Basis, any adjustment in Contract Price will be subject to the provisions of Paragraphs 9.07 and 11.03.
2. Contractor shall not be entitled to any adjustment in the Contract Price or Contract Times if:
- a. Contractor knew of the existence of such conditions at the time Contractor made a final commitment to Owner with respect to Contract Price and Contract Times by the submission of a Bid or becoming bound under a negotiated contract; or
  - b. the existence of such condition could reasonably have been discovered or revealed as a result of any examination, investigation, exploration, test, or study of the Site and contiguous areas required by the Bidding Requirements or Contract Documents to be conducted by or for Contractor prior to Contractor's making such final commitment; or
  - c. Contractor failed to give the written notice as required by Paragraph 4.03.A.
3. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any adjustment in the Contract Price or Contract Times, or both, a Claim may be made therefor as provided in Paragraph 10.05. However, Owner and the Construction Coordinator, and any of their Related Entities shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.

#### **4.04 Underground Facilities**

- A. Shown or Indicated: The information and data shown or indicated in the Contract Documents with respect to existing Underground Facilities at or contiguous to the Site is based on information and data furnished to Owner or the Construction Coordinator by the owners of such Underground Facilities, including Owner, or by others:
1. Owner and Construction Coordinator shall not be responsible for the accuracy or completeness of any such information or data; and
  2. The cost of all of the following will be included in the Contract Price, and Contractor shall have full responsibility for:
    - a. reviewing and checking all such information and data,
    - b. locating all Underground Facilities shown or indicated in the Contract Documents,
    - c. coordination of the Work with the owners of such Underground Facilities, including Owner, during construction, and
    - d. the safety and protection of all such Underground Facilities and repairing any damage thereto resulting from the Work.
- B. Not Shown or Indicated

1. If an Underground Facility is uncovered or revealed at or contiguous to the Site which was not shown or indicated, or not shown or indicated with reasonable accuracy in the Contract Documents, Contractor shall, promptly after becoming aware thereof and before further disturbing conditions affected thereby or performing any Work in connection therewith (except in an emergency as required by Paragraph 6.16.A), identify the owner of such Underground Facility and give written notice to that owner and to Owner and the Construction Coordinator. Construction Coordinator will promptly review the Underground Facility and determine the extent, if any, to which a change is required in the Contract Documents to reflect and document the consequences of the existence or location of the Underground Facility. During such time, Contractor shall be responsible for the safety and protection of such Underground Facility.
2. If the Construction Coordinator concludes that a change in the Contract Documents is required, a Work Change Directive or a Change Order will be issued to reflect and document such consequences. An equitable adjustment shall be made in the Contract Price or Contract Times, or both, to the extent that they are attributable to the existence or location of any Underground Facility that was not shown or indicated or not shown or indicated with reasonable accuracy in the Contract Documents and that Contractor did not know of and could not reasonably have been expected to be aware of or to have anticipated. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment in Contract Price or Contract Times, Owner or Contractor may make a Claim therefor as provided in Paragraph 10.05.

#### **4.05 Reference Points**

- A. Owner shall provide engineering surveys to establish reference points for construction which in the Construction Coordinator judgment are necessary to enable Contractor to proceed with the Work. Contractor shall be responsible for laying out the Work, shall protect and preserve the established reference points and property monuments, and shall make no changes or relocations without the prior written approval of Owner. Contractor shall report to the Construction Coordinator whenever any reference point or property monument is lost or destroyed or requires relocation because of necessary changes in grades or locations, and shall be responsible for the accurate replacement or relocation of such reference points or property monuments by professionally qualified personnel.

#### **4.06 Hazardous Environmental Condition at Site**

- A. Reports: See S&ME report attached as exhibit "C".

### **PART 5 - BONDS AND INSURANCE**

#### **5.01 Performance, Payment, and Other Bonds**

- A. Contractor shall furnish performance and payment bonds, each in an amount at least equal to the Contract Price as security for the faithful performance and payment of all of Contractor's obligations under the Contract Documents. These bonds shall remain in effect until one year after the date when final payment becomes due or until completion of the correction period specified in Paragraph 13.07, whichever is later, except as provided otherwise by Laws or Regulations or by the Contract Documents. Contractor shall also furnish such other bonds as are required by the Contract Documents.
- B. All bonds shall be in the form prescribed by the Contract Documents except as provided otherwise by Laws or Regulations, and shall be executed by such sureties as are named in the current list of "Companies Holding Certificates of Authority as Acceptable Sureties on Federal Bonds and as Acceptable Reinsuring Companies" as published in Circular 570 (amended) by the Financial Management Service, Surety Bond Branch, U.S. Department of the Treasury. All

bonds signed by an agent must be accompanied by a certified copy of the agent's authority to act.

- C. If the surety on any bond furnished by Contractor is declared bankrupt or becomes insolvent or its right to do business is terminated in any state where any part of the Project is located or it ceases to meet the requirements of Paragraph 5.01.B, Contractor shall promptly notify Owner and the Construction Coordinator and shall, within 20 days after the event giving rise to such notification, provide another bond and surety, both of which shall comply with the requirements of Paragraphs 5.01.B and 5.02.

#### **5.02 Licensed Sureties and Insurers**

- A. All bonds and insurance required by the Contract Documents to be purchased and maintained by Owner or Contractor shall be obtained from surety or insurance companies that are duly licensed or authorized in the jurisdiction in which the Project is located to issue bonds or insurance policies for the limits and coverages so required. Such surety and insurance companies shall also meet such additional requirements and qualifications.

#### **5.03 Certificates of Insurance**

- A. Contractor shall deliver to Owner, with copies to each additional insured, certificates of insurance (and other evidence of insurance requested by Owner or any other additional insured) which Contractor is required to purchase and maintain.
- B. Owner shall deliver to Contractor, with copies to each additional insured, certificates of insurance (and other evidence of insurance requested by Contractor or any other additional insured) which Owner is required to purchase and maintain.
- C. Failure of Owner to demand such certificates or other evidence of full compliance with these insurance requirements or failure of Owner to identify a deficiency from evidence provided shall not be construed as a waiver of Contractor's obligation to maintain such insurance.
- D. By requiring such insurance and insurance limits herein, Owner does not represent that coverage and limits will necessarily be adequate to protect contractor and such coverage and limits shall not be deemed as a limitation on Contractor's liability under the indemnities granted to Owner in the Contract Documents.

#### **5.04 Contractor's Liability Insurance**

- A. Contractor shall purchase and maintain such liability and other insurance as is appropriate for the Work being performed and as will provide protection from claims set forth below which may arise out of or result from Contractor's performance of the Work and Contractor's other obligations under the Contract Documents, whether it is to be performed by Contractor, any Subcontractor or Supplier, or by anyone directly or indirectly employed by any of them to perform any of the Work, or by anyone for whose acts any of them may be liable:
  - 1. claims under workers' compensation, disability benefits, and other similar employee benefit acts;
  - 2. claims for damages because of bodily injury, occupational sickness or disease, or death of Contractor's employees;
  - 3. claims for damages because of bodily injury, sickness or disease, or death of any person other than Contractor's employees;

4. claims for damages insured by reasonably available personal injury liability coverage which are sustained:
    - a. by any person as a result of an offense directly or indirectly related to the employment of such person by Contractor, or
    - b. by any other person for any other reason;
  5. claims for damages, other than to the Work itself, because of injury to or destruction of tangible property wherever located, including loss of use resulting therefrom; and
  6. claims for damages because of bodily injury or death of any person or property damage arising out of the ownership, maintenance or use of any motor vehicle.
- B. The policies of insurance required by this Paragraph 5.04 shall:
1. with respect to insurance required by Paragraphs 5.04.A.3 through 5.04.A.6 inclusive, include as additional insured (subject to any customary exclusion regarding professional liability) Owner and Construction Coordinator, and any other individuals or entities, all of whom shall be listed as additional insureds, and include coverage for the respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of all such additional insureds, and the insurance afforded to these additional insureds shall provide primary coverage for all claims covered thereby;
  2. include at least the specific coverages and be written for not less than the limits of liability provided or required by Laws or Regulations, whichever is greater;
  3. include completed operations insurance;
  4. include contractual liability insurance covering Contractor's indemnity obligations under Paragraphs 6.11 and 6.20;
  5. contain a provision or endorsement that the coverage afforded will not be canceled, materially changed or renewal refused until at least 30 days' prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued (and the certificates of insurance furnished by the Contractor pursuant to Paragraph 5.03 will so provide);
  6. remain in effect at least until final payment and at all times thereafter when Contractor may be correcting, removing, or replacing defective Work in accordance with Paragraph 13.07; and
  7. with respect to completed operations insurance, and any insurance coverage written on a claims-made basis, remain in effect for at least two years after final payment.
    - a. Contractor shall furnish Owner and each other additional insured to whom a certificate of insurance has been issued, evidence satisfactory to Owner and any such additional insured of continuation of such insurance at final payment and one year thereafter.
- C. The limits of liability for the insurance required by Paragraph 5.04 of the General Conditions shall provide coverage for not less than the following amounts or greater where required by Laws and Regulations:
1. Workers' Compensation, and related coverages under Paragraphs 5.04.A.1 and A.2 of the General Conditions:
    - a. State: South Carolina

Statutory Benefits

- b. Applicable Federal (e.g., Longshoreman's): Statutory
  - c. Employer's Liability:
    - Each Accident \$1,000,000
    - Disease-Policy Limit \$500,000
    - Disease-Each Employee \$500,000
2. Contractor's General Liability under Paragraphs 5.04.A.3 through A.6 of the General Conditions which shall include completed operations and product liability coverages and eliminate the exclusion with respect to property under the care, custody and control of Contractor and for this project only:
- a. General Aggregate \$2,000,000
  - b. Products - Completed Operations Aggregate \$2,000,000
  - c. Personal and Advertising Injury \$1,000,000
  - d. Each Occurrence (Bodily Injury and Property Damage) \$1,000,000
  - e. Fire Damage (any one (1) fire) \$50,000
  - f. Medical Expense (any one (1) person) \$5,000
  - g. Property Damage liability insurance will provide Explosion, Collapse, and Under-ground coverages where applicable.
  - h. Excess or Umbrella Liability
    - 1) General Aggregate \$2,000,000
    - 2) Each Occurrence \$2,000,000
3. Automobile Liability under Paragraph 5.04.A.6 of the General Conditions:
- a. Include coverage for all owned, hired and non-owned automobiles.
  - b. Combined Single Limit of \$1,000,000
  - c. Each Occurrence \$1,000,000
  - d. Limits Medical Expense \$5,000
4. The Contractual Liability coverage required by Paragraph 5.04.B.4 of the General Conditions shall provide coverage for not less than the following amounts:
- a. Bodily Injury:
    - Each Accident \$2,000,000
    - Annual Aggregate \$2,000,000
  - b. Property Damage:
    - Each Accident \$2,000,000
    - Annual Aggregate \$2,000,000

5. Flood Insurance: The Contractor is required to carry flood insurance for projects located in designated flood hazard areas in which Federal Flood Insurance is available.

#### **5.05 Owner's Liability Insurance**

- A. In addition to the insurance required to be provided by Contractor under Paragraph 5.04, Owner, at Owner's option, may purchase and maintain at Owner's expense Owner's own liability insurance as will protect Owner against claims which may arise from operations under the Contract Documents.

#### **5.06 Property Insurance**

- A. Contractor shall purchase and maintain property insurance upon the Work at the Site in the amount of the full replacement cost thereof.
  1. This insurance shall:
    - a. includes the interests of Owner, Contractor, Subcontractors, Construction Coordinator and any other individuals or entities identified herein, and the officers, directors, partners, employees, agents and other consultants and subcontractors of any of them each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured;
    - b. in addition to the individuals and entities specified, include as additional insureds, the following:
    - c. be written on a Builder's Risk "all-risk" or open peril or special causes of loss policy form that shall at least include insurance for physical loss and damage to the Work, temporary buildings, falsework, and materials and equipment in transit and shall insure against at least the following perils or causes of loss: fire, lightning, extended coverage, theft, vandalism and malicious mischief, earthquake, collapse, debris removal, demolition occasioned by enforcement of Laws and Regulations, water damage (other than that caused by flood), and such other perils or causes of loss as may be specifically required;
    - d. includes expenses incurred in the repair or replacement of any insured property (including but not limited to fees and charges of engineers and architects);
    - e. cover materials and equipment stored at the Site or at another location that was agreed to in writing by Owner prior to being incorporated in the Work, provided that such materials and equipment have been included in an Application for Payment recommended by the Construction Coordinator;
    - f. allows for partial utilization of the Work by Owner;
    - g. includes testing and startup; and
    - h. be maintained in effect until final payment is made unless otherwise agreed to in writing by Owner, Contractor and the Construction Coordinator with 30 days' written notice to each other additional insured to whom a certificate of insurance has been issued.
  2. Contractor shall be responsible for any deductible or self-insured retention.
  3. The policies of insurance required to be purchased and maintained by Contractor in accordance with this Paragraph SC-5.06 A, shall comply with the requirements of paragraph 5.06.C of the General Conditions.

- B. Owner shall purchase and maintain such boiler and machinery insurance or additional property insurance as may be required Laws and Regulations which will include the interests of Owner, Contractor, Subcontractors, and Construction Coordinator, and any other individuals or entities identified, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them, each of whom is deemed to have an insurable interest and shall be listed as an insured or additional insured.
- C. All the policies of insurance (and the certificates or other evidence thereof) required to be purchased and maintained in accordance with Paragraph 5.06 will contain a provision or endorsement that the coverage afforded will not be canceled or materially changed or renewal refused until at least thirty (30) days prior written notice has been given to Owner and Contractor and to each other additional insured to whom a certificate of insurance has been issued and will contain waiver provisions in accordance with Paragraph 5.07.
- D. Owner shall not be responsible for purchasing and maintaining any property insurance specified in this Paragraph 5.06 to protect the interests of Contractor, Subcontractors, or others in the Work to the extent of any deductible amounts that are identified. The risk of loss within such identified deductible amount will be borne by Contractor, Subcontractors, or others suffering any such loss, and if any of them wishes property insurance coverage within the limits of such amounts, each may purchase and maintain it at the purchaser's own expense.

#### **5.07 Waiver of Rights**

- A. Owner and Contractor intend that all policies purchased in accordance with Paragraph 5.06 will protect Owner, Contractor, Subcontractors, and Construction Coordinator, and all other individuals or entities identified to be listed as insureds or additional insureds (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) in such policies and will provide primary coverage for all losses and damages caused by the perils or causes of loss covered thereby. All such policies shall contain provisions to the effect that in the event of payment of any loss or damage the insurers will have no rights of recovery against any of the insureds or additional insureds thereunder. Owner and Contractor waive all rights against each other and their respective officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them for all losses and damages caused by, arising out of or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work; and, in addition, waive all such rights against Subcontractors, and the Construction Coordinator, and all other individuals or entities identified to be listed as insured or additional insured (and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them) under such policies for losses and damages so caused. None of the above waivers shall extend to the rights that any party making such waiver may have to the proceeds of insurance held by Owner as trustee or otherwise payable under any policy so issued.
- B. Any insurance policy maintained by Owner covering any loss, damage or consequential loss referred to in Paragraph 5.07.B shall contain provisions to the effect that in the event of payment of any such loss, damage, or consequential loss, the insurers will have no rights of recovery against Contractor, Subcontractors, or the Construction Coordinator, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them.

#### **5.08 Receipt and Application of Insurance Proceeds**

- A. Any insured loss under the policies of insurance required by Paragraph 5.06 will be adjusted with Owner and made payable to Owner as fiduciary for the insureds, as their interests may appear, subject to the requirements of any applicable mortgage clause and of Paragraph 5.08.B. Owner shall deposit in a separate account any money so received and shall distribute it in accordance with such agreement as the parties in interest may reach. If no other special agreement is reached, the damaged Work shall be repaired or replaced, the moneys so

received applied on account thereof, and the Work and the cost thereof covered by an appropriate Change Order.

- B. Owner as fiduciary shall have power to adjust and settle any loss with the insurers unless one of the parties in interest shall object in writing within 15 days after the occurrence of loss to Owner's exercise of this power. If such objection be made, Owner as fiduciary shall make settlement with the insurers in accordance with such agreement as the parties in interest may reach. If no such agreement among the parties in interest is reached, Owner as fiduciary shall adjust and settle the loss with the insurers and, if required in writing by any party in interest, Owner as fiduciary shall give bond for the proper performance of such duties.

#### **5.09 Acceptance of Bonds and Insurance; Option to Replace**

- A. If either Owner or Contractor has any objection to the coverage afforded by or other provisions of the bonds or insurance required to be purchased and maintained by the other party in accordance with Part 5 on the basis of nonconformance with the Contract Documents, the objecting party shall so notify the other party in writing within ten (10) days after receipt of the certificates (or other evidence requested) required by Paragraph 2.01.B. Owner and Contractor shall each provide to the other such additional information in respect of insurance provided as the other may reasonably request. If either party does not purchase or maintain all of the bonds and insurance required of such party by the Contract Documents, such party shall notify the other party in writing of such failure to purchase prior to the start of the Work, or of such failure to maintain prior to any change in the required coverage. Without prejudice to any other right or remedy, the other party may elect to obtain equivalent bonds or insurance to protect such other party's interests at the expense of the party who was required to provide such coverage, and a Change Order shall be issued to adjust the Contract Price accordingly.

#### **5.10 Partial Utilization, Acknowledgment of Property Insurer**

- A. If Owner finds it necessary to occupy or use a portion or portions of the Work prior to Substantial Completion of all the Work as provided in Paragraph 14.05, no such use or occupancy shall commence before the insurers providing the property insurance pursuant to Paragraph 5.06 have acknowledged notice thereof and in writing effected any changes in coverage necessitated thereby. The insurers providing the property insurance shall consent by endorsement on the policy or policies, but the property insurance shall not be canceled or permitted to lapse on account of any such partial use or occupancy.

### **PART 6 - CONTRACTOR'S RESPONSIBILITIES**

#### **6.01 Supervision and Superintendence**

- A. **When working is being performed on site the superintendent must be present, without exception.**
- B. Contractor shall supervise, inspect, and direct the Work competently and efficiently, devoting such attention thereto and applying such skills and expertise as may be necessary to perform the Work in accordance with the Contract Documents. Contractor shall be solely responsible for the means, methods, techniques, sequences, and procedures of construction. Contractor shall not be responsible for the negligence of Owner or the Construction Coordinator in the design or specification of a specific means, method, technique, sequence, or procedure of construction which is shown or indicated in and expressly required by the Contract Documents.
- C. At all times during the progress of the Work, Contractor shall assign a competent resident superintendent who shall not be replaced without written notice to Owner and the Construction Coordinator except under extraordinary circumstances. The superintendent will be Contractor's representative at the Site and shall have authority to act on behalf of Contractor. All communications given to or received from the superintendent shall be binding on Contractor.



## **6.02 Labor; Working Hours**

- A. Contractor shall provide competent, suitably qualified personnel to survey and lay out the Work and perform construction as required by the Contract Documents. Contractor shall at all times maintain good discipline and order at the Site.
- B. Except as otherwise required for the safety or protection of persons or the Work or property at the Site or adjacent thereto, and except as otherwise stated in the Contract Documents, all Work at the Site shall be performed on business days during regular working hours. Contractor will not permit the performance of Work on a Saturday, Sunday, or any legal holiday without Owner's written consent (which will not be unreasonably withheld) given after prior written notice to the Construction Coordinator.

## **6.03 Services, Materials, and Equipment**

- A. Unless otherwise specified in the Contract Documents, Contractor shall provide and assume full responsibility for all services, materials, equipment, labor, transportation, construction equipment and machinery, tools, appliances, fuel, power, light, heat, telephone, water, sanitary facilities, temporary facilities, and all other facilities and incidentals necessary for the performance, testing, startup, and completion of the Work.
- B. All materials and equipment incorporated into the Work shall be as specified or, if not specified, shall be of good quality and new, except as otherwise provided in the Contract Documents. All special warranties and guarantees required by the Specifications shall expressly run to the benefit of Owner. If required by the Construction Coordinator, Contractor shall furnish satisfactory evidence (including reports of required tests) as to the source, kind, and quality of materials and equipment.
- C. All materials and equipment shall be stored, applied, installed, connected, erected, protected, used, cleaned, and conditioned in accordance with instructions of the applicable Supplier, except as otherwise may be provided in the Contract Documents.

## **6.04 Progress Schedule**

- A. Contractor shall adhere to the Progress Schedule established in accordance with Paragraph 2.07 as it may be adjusted from time to time as provided below.
  - 1. Contractor shall submit to the Construction Coordinator for acceptance (to the extent indicated in Paragraph 2.07) proposed adjustments in the Progress Schedule that will not result in changing the Contract Times. Such adjustments will comply with any provisions of the General Requirements applicable thereto.
  - 2. Proposed adjustments in the Progress Schedule that will change the Contract Times shall be submitted in accordance with the requirements of Part 12. Adjustments in Contract Times may only be made by a Change Order.

## **6.05 Substitutes and "Or-Equals"**

- A. Whenever an item of material or equipment is specified or described in the Contract Documents by using the name of a proprietary item or the name of a particular Supplier, the specification or description is intended to establish the type, function, appearance, and quality required. Unless the specification or description contains or is followed by words reading that no like, equivalent, or "or-equal" item or no substitution is permitted, other items of material or equipment or material or equipment of other Suppliers may be submitted to the Construction Coordinator for review under the circumstances described below.

1. "Or-Equal" Items: If in the Construction Coordinators sole discretion an item of material or equipment proposed by Contractor is functionally equal to that named and sufficiently similar so that no change in related Work will be required, it may be considered by Engineer as an "or-equal" item, in which case review and approval of the proposed item may, in Engineer's sole discretion, be accomplished without compliance with some or all of the requirements for approval of proposed substitute items. For the purposes of this Paragraph 6.05.A.1, a proposed item of material or equipment will be considered functionally equal to an item so named if:
  - a. in the exercise of reasonable judgment Engineer determines that:
    - 1) it is at least equal in materials of construction, quality, durability, appearance, strength, and design characteristics;
    - 2) it will reliably perform at least equally well the function and achieve the results imposed by the design concept of the completed Project as a functioning whole,
    - 3) it has a proven record of performance and availability of responsive service; and
  - b. Contractor certifies that, if approved and incorporated into the Work:
    - 1) there will be no increase in cost to the Owner or increase in Contract Times, and
    - 2) it will conform substantially to the detailed requirements of the item named in the Contract Documents.
2. Substitute Items
  - a. If in the Construction Coordinators sole discretion an item of material or equipment proposed by Contractor does not qualify as an "or-equal" item under Paragraph 6.05.A.1, it will be considered a proposed substitute item.
  - b. Contractor shall submit sufficient information as provided below to allow the Construction Coordinator to determine that the item of material or equipment proposed is essentially equivalent to that named and an acceptable substitute therefor. Requests for review of proposed substitute items of material or equipment will not be accepted by the Construction Coordinator from anyone other than Contractor.
  - c. The requirements for review by the Construction Coordinator will be as set forth in Paragraph 6.05.A.2.d, as supplemented in the General Requirements and as the Construction Coordinator may decide is appropriate under the circumstances.
  - d. Contractor shall make written application to the Construction Coordinator for review of a proposed substitute item of material or equipment that Contractor seeks to furnish or use. The application:
    - 1) shall certify that the proposed substitute item will:
      - a) perform adequately the functions and achieve the results called for by the general design,
      - b) be similar in substance to that specified, and
      - c) be suited to the same use as that specified;
    - 2) will state:

- a) the extent, if any, to which the use of the proposed substitute item will prejudice Contractor's achievement of Substantial Completion on time;
    - b) whether or not use of the proposed substitute item in the Work will require a change in any of the Contract Documents (or in the provisions of any other direct contract with Owner for other work on the Project) to adapt the design to the proposed substitute item; and
    - c) whether or not incorporation or use of the proposed substitute item in connection with the Work is subject to payment of any license fee or royalty;
  - 3) will identify:
    - a) all variations of the proposed substitute item from that specified, and
    - b) available engineering, sales, maintenance, repair, and replacement services;
  - 4) and shall contain an itemized estimate of all costs or credits that will result directly or indirectly from use of such substitute item, including costs of redesign and claims of other contractors affected by any resulting change,
- B. Substitute Construction Methods or Procedures: If a specific means, method, technique, sequence, or procedure of construction is expressly required by the Contract Documents, Contractor may furnish or utilize a substitute means, method, technique, sequence, or procedure of construction approved by the Construction Coordinator. Contractor shall submit sufficient information to allow the Construction Coordinator, in the Construction Coordinator's sole discretion, to determine that the substitute proposed is equivalent to that expressly called for by the Contract Documents. The requirements for review by the Construction Coordinator will be similar to those provided in Paragraph 6.05.A 2.
- C. Construction Coordinator Evaluation: The Construction Coordinator will be allowed a reasonable time within which to evaluate each proposal or submittal made pursuant to Paragraphs 6.05.A and 6.05.B. The Construction Coordinator may require Contractor to furnish additional data about the proposed substitute item. The Construction Coordinator will be the sole judge of acceptability. No "or equal" or substitute will be ordered, installed or utilized until the Construction Coordinator's review is complete, which will be evidenced by either a Change Order for a substitute or an approved Shop Drawing for an "or-equal." The Construction Coordinator will advise Contractor in writing of any negative determination.
- D. Special Guarantee: Owner may require Contractor to furnish at Contractor's expense a special performance guarantee or other surety with respect to any substitute.
- E. Cost Reimbursement: The Construction Coordinator will record the Architect or Engineer's costs in evaluating a substitute proposed or submitted by Contractor pursuant to Paragraphs 6.05.A.2 and 6.05.B. Whether or not the Construction Coordinator approves a substitute item so proposed or submitted by Contractor, Contractor shall reimburse Owner for the charges of the Architect or Engineer for evaluating each such proposed substitute. Contractor shall also reimburse Owner for the charges of the Architect or Engineer for making changes in the Contract Documents (or in the provisions of any other direct contract with Owner) resulting from the acceptance of each proposed substitute.
- F. Contractor's Expense: Contractor shall provide all data in support of any proposed substitute or "or-equal" at Contractor's expense.

## 6.06 Concerning Subcontractors, Suppliers, and Others

- A. Contractor shall not employ any Subcontractor, Supplier, or other individual or entity (including those acceptable to Owner as indicated in Paragraph 6.06.B), whether initially or as a replacement, against whom Owner may have reasonable objection. Contractor shall not be required to employ any Subcontractor, Supplier, or other individual or entity to furnish or perform any of the Work against whom Contractor has reasonable objection.
- B. The identity of certain Subcontractors, Suppliers, or other individuals or entities to be submitted to Owner in advance for acceptance by Owner by a specified date prior to the Effective Date of the Agreement, and if Contractor has submitted a list thereof, Owner's acceptance (either in writing or by failing to make written objection thereto by the date indicated for acceptance or objection in the Bidding Documents or the Contract Documents) of any such Subcontractor, Supplier, or other individual or entity so identified may be revoked on the basis of reasonable objection after due investigation. Contractor shall submit an acceptable replacement for the rejected Subcontractor, Supplier, or other individual or entity, and the Contract Price will be adjusted by the difference in the cost occasioned by such replacement, and an appropriate Change Order will be issued. No acceptance by Owner of any such Subcontractor, Supplier, or other individual or entity, whether initially or as a replacement, shall constitute a waiver of any right of Owner or the Construction Coordinator to reject defective Work.
- C. Contractor shall be fully responsible to Owner and the Construction Coordinator for all acts and omissions of the Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work just as Contractor is responsible for Contractor's own acts and omissions. Nothing in the Contract Documents:
  - 1. shall create for the benefit of any such Subcontractor, Supplier, or other individual or entity any contractual relationship between Owner or the Construction Coordinator and any such Subcontractor, Supplier or other individual or entity, nor
  - 2. shall anything in the Contract Documents create any obligation on the part of Owner or the Construction Coordinator to pay or to see to the payment of any moneys due any such Subcontractor, Supplier, or other individual or entity except as may otherwise be required by Laws and Regulations.
- D. Contractor shall be solely responsible for scheduling and coordinating the Work of Subcontractors, Suppliers, and other individuals or entities performing or furnishing any of the Work under a direct or indirect contract with Contractor.
- E. Contractor shall require all Subcontractors, Suppliers, and such other individuals or entities performing or furnishing any of the Work to communicate with the Construction Coordinator through Contractor.
- F. The divisions and sections of the Specifications and the identifications of any Drawings shall not control Contractor in dividing the Work among Subcontractors or Suppliers or delineating the Work to be performed by any specific trade.
- G. All Work performed for Contractor by a Subcontractor or Supplier will be pursuant to an appropriate agreement between Contractor and the Subcontractor or Supplier which specifically binds the Subcontractor or Supplier to the applicable terms and conditions of the Contract Documents for the benefit of Owner and Construction Coordinator. Whenever any such agreement is with a Subcontractor or Supplier who is listed as an additional insured on the property insurance provided in Paragraph 5.06, the agreement between the Contractor and the Subcontractor or Supplier will contain provisions whereby the Subcontractor or Supplier waives all rights against Owner, Contractor, and Construction Coordinator,, and all other individuals or entities to be listed as insureds or additional insureds (and the officers, directors,

partners, employees, agents, consultants and subcontractors of each and any of them) for all losses and damages caused by, arising out of, relating to, or resulting from any of the perils or causes of loss covered by such policies and any other property insurance applicable to the Work. If the insurers on any such policies require separate waiver forms to be signed by any Subcontractor or Supplier, Contractor will obtain the same.

- H. Owner or Construction Coordinator may furnish to any Subcontractor or Supplier, to the extent practicable, information about amounts paid to Contractor on account of Work performed for Contractor by a particular Subcontractor or Supplier.

#### **6.07 Patent Fees and Royalties**

- A. Contractor shall pay all license fees and royalties and assume all costs incident to the use in the performance of the Work or the incorporation in the Work of any invention, design, process, product, or device which is the subject of patent rights or copyrights held by others. If a particular invention, design, process, product, or device is specified in the Contract Documents for use in the performance of the Work and if to the actual knowledge of Owner or Construction Coordinator its use is subject to patent rights or copyrights calling for the payment of any license fee or royalty to others, the existence of such rights shall be disclosed by Owner in the Contract Documents.
- B. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Construction Coordinator, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any infringement of patent rights or copyrights incident to the use in the performance of the Work or resulting from the incorporation in the Work of any invention, design, process, product, or device not specified in the Contract Documents.

#### **6.08 Permits**

- A. Contractor shall obtain and pay for all construction permits and licenses. Contractor shall pay all governmental charges and inspection fees necessary for the Work which are applicable at the time of opening of Bids, or, if there are no Bids, on the Effective Date of the Agreement.

#### **6.09 Laws and Regulations**

- A. Contractor shall give all notices required by and shall comply with all Laws and Regulations applicable to the performance of the Work. Except where otherwise expressly required by applicable Laws and Regulations, neither Owner nor Construction Coordinator shall be responsible for monitoring Contractor's compliance with any Laws or Regulations.
- B. If Contractor performs any Work knowing or having reason to know that it is contrary to Laws or Regulations, Contractor shall bear all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such Work. However, it shall not be Contractor's primary responsibility to make certain that the Specifications and Drawings are in accordance with Laws and Regulations, but this shall not relieve Contractor of Contractor's obligations under Paragraph 3.03.
- C. Changes in Laws or Regulations not known at the time of opening of Bids (or, on the Effective Date of the Agreement if there were no Bids) having an effect on the cost or time of performance of the Work shall be the subject of an adjustment in Contract Price or Contract Times. If Owner and Contractor are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

## 6.10 Taxes

- A. Contractor shall pay all sales, consumer, use, and other similar taxes required to be paid by Contractor in accordance with the Laws and Regulations of the place of the Project which are applicable during the performance of the Work.

## 6.11 Use of Site and Other Areas

- A. Limitation on Use of Site and Other Areas
  - 1. Contractor shall confine construction equipment, the storage of materials and equipment, and the operations of workers to the Site and other areas permitted by Laws and Regulations, and shall not unreasonably encumber the Site and other areas with construction equipment or other materials or equipment. Contractor shall assume full responsibility for any damage to any such land or area, or to the owner or occupant thereof, or of any adjacent land or areas resulting from the performance of the Work.
  - 2. Should any claim be made by any such owner or occupant because of the performance of the Work, Contractor shall promptly settle with such other party by negotiation or otherwise resolve the claim by arbitration or other dispute resolution proceeding or at law.
  - 3. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Construction Coordinator, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to any claim or action, legal or equitable, brought by party against Owner, Construction Coordinator, or any other party indemnified hereunder to the extent caused by or based upon Contractor's performance of the Work.
- B. *Removal of Debris During Performance of the Work:* During the progress of the Work Contractor shall keep the Site and other areas free from accumulations of waste materials, rubbish, and other debris. Removal and disposal of such waste materials, rubbish, and other debris shall conform to applicable Laws and Regulations.
- C. *Cleaning:* Prior to Substantial Completion of the Work, Contractor shall clean the Site and the Work and make it ready for utilization by Owner. At the completion of the Work, Contractor shall remove from the Site all tools, appliances, construction equipment and machinery, and surplus materials and shall restore to original condition all property not designated for alteration by the Contract Documents.
- D. *Loading Structures:* Contractor shall not load nor permit any part of any structure to be loaded in any manner that will endanger the structure, nor shall Contractor subject any part of the Work or adjacent property to stresses or pressures that will endanger it.

## 6.12 Record Documents

- A. Contractor shall maintain in a safe place at the Site one record copy of all Drawings, Specifications, Addenda, Change Orders, Work Change Directives, Field Orders, and written interpretations and clarifications in good order and annotated to show changes made during construction. These record documents together with all approved Samples and a counterpart of all approved Shop Drawings will be available to Construction Coordinator for reference. Upon completion of the Work, these record documents, Samples, and Shop Drawings will be delivered to Construction Coordinator for Owner in digital format as an as-built file.

### **6.13 Safety and Protection**

- A. Contractor shall be solely responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the Work. Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
  - 1. all persons on the Site or who may be affected by the Work;
  - 2. all the Work and materials and equipment to be incorporated therein, whether in storage on or off the Site; and
  - 3. other property at the Site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and Underground Facilities not designated for removal, relocation, or replacement in the course of construction.
- B. Contractor shall comply with all applicable Laws and Regulations relating to the safety of persons or property, or to the protection of persons or property from damage, injury, or loss; and shall erect and maintain all necessary safeguards for such safety and protection. Contractor shall notify owners of adjacent property and of Underground Facilities and other utility owners when prosecution of the Work may affect them, and shall cooperate with them in the protection, removal, relocation, and replacement of their property.
- C. All damage, injury, or loss to any property referred to in Paragraph 6.13.A.2 or 6.13.A.3 caused, directly or indirectly, in whole or in part, by Contractor, any Subcontractor, Supplier, or any other individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, shall be remedied by Contractor (except damage or loss attributable to the fault of Drawings or Specifications or to the acts or omissions of Owner or Construction Coordinator or , or anyone employed by any of them, or anyone for whose acts any of them may be liable, and not attributable, directly or indirectly, in whole or in part, to the fault or negligence of Contractor or any Subcontractor, Supplier, or other individual or entity directly or indirectly employed by any of them).
- D. Contractor's duties and responsibilities for safety and for protection of the Work shall continue until such time as all the Work is completed and Construction Coordinator has issued a notice to Owner and Contractor in accordance with Paragraph 14.07.B that the Work is acceptable (except as otherwise expressly provided in connection with Substantial Completion).

### **6.14 Safety Representative**

- A. Contractor shall designate a qualified and experienced safety representative at the Site whose duties and responsibilities shall be the prevention of accidents and the maintaining and supervising of safety precautions and programs.

### **6.15 Hazard Communication Programs**

- A. Contractor shall be responsible for coordinating any exchange of material safety data sheets or other hazard communication information required to be made available to or exchanged between or among employers at the Site in accordance with Laws or Regulations. All MSDS Sheets shall be kept on site in good order as outlined in OSHA, laws, rules and regulations.

### **6.16 Emergencies**

- A. In emergencies affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Contractor is obligated to act to prevent threatened damage, injury, or loss. Contractor shall give Construction Coordinator prompt written notice if Contractor believes that any significant changes in the Work or variations from the Contract Documents have been

caused thereby or are required as a result thereof. If Engineer determines that a change in the Contract Documents is required because of the action taken by Contractor in response to such an emergency, a Work Change Directive or Change Order will be issued.

## **6.17 Shop Drawings and Samples**

- A. Contractor shall submit Shop Drawings and Samples to Construction Coordinator for review and approval in accordance with the acceptable Schedule of Submittals (as required by Paragraph 2.07). Each submittal will be identified as Construction Coordinator may require.
  - 1. Shop Drawings
    - a. Submit number of copies specified in the General Requirements.
    - b. Data shown on the Shop Drawings will be complete with respect to quantities, dimensions, specified performance and design criteria, materials, and similar data to show Construction Coordinator the services, materials, and equipment Contractor proposes to provide and to enable Engineer to review the information for the limited purposes required by Paragraph 6.17.D.
  - 2. Samples: Contractor shall also submit Samples to Construction Coordinator for review and approval in accordance with the acceptable schedule of Shop Drawings and Sample submittals.
    - a. Submit number of Samples specified in the Specifications.
    - b. Clearly identify each Sample as to material, Supplier, pertinent data such as catalog numbers, the use for which intended and other data as Construction Coordinator may require to enable Construction Coordinator to review the submittal for the limited purposes required by Paragraph 6.17.D.
- B. Where a Shop Drawing or Sample is required by the Contract Documents or the Schedule of Submittals, any related Work performed prior to Construction Coordinator's review and approval of the pertinent submittal will be at the sole expense and responsibility of Contractor.
- C. Submittal Procedures
  - 1. Before submitting each Shop Drawing or Sample, Contractor shall have determined and verified:
    - a. all field measurements, quantities, dimensions, specified performance and design criteria, installation requirements, materials, catalog numbers, and similar information with respect thereto;
    - b. the suitability of all materials with respect to intended use, fabrication, shipping, handling, storage, assembly, and installation pertaining to the performance of the Work;
    - c. all information relative to Contractor's responsibilities for means, methods, techniques, sequences, and procedures of construction, and safety precautions and programs incident thereto; and
    - d. shall also have reviewed and coordinated each Shop Drawing or Sample with other Shop Drawings and Samples and with the requirements of the Work and the Contract Documents.



2. Each submittal shall bear a stamp or specific written certification that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractor's review and approval of that submittal.
3. With each submittal, Contractor shall give Construction Coordinator specific written notice of any variations, that the Shop Drawing or Sample may have from the requirements of the Contract Documents. This notice shall be both a written communication separated from the Shop Drawing's or Sample Submittal; and, in addition, by a specific notation made on each Shop Drawing or Sample submitted to Construction Coordinator for review and approval of each such variation.

**D. Construction Coordinator's Review**

1. Construction Coordinator will provide timely review of Shop Drawings and Samples in accordance with the Schedule of Submittals acceptable to Construction Coordinator. Construction Coordinator's review and approval will be only to determine if the items covered by the submittals will, after installation or incorporation in the Work, conform to the information given in the Contract Documents and be compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents.
2. Construction Coordinator's review and approval will not extend to means, methods, techniques, sequences, or procedures of construction (except where a particular means, method, technique, sequence, or procedure of construction is specifically and expressly called for by the Contract Documents) or to safety precautions or programs incident thereto. The review and approval of a separate item as such will not indicate approval of the assembly in which the item functions.
3. Construction Coordinator's review and approval shall not relieve Contractor from responsibility for any variation from the requirements of the Contract Documents unless Contractor has complied with the requirements of Paragraph 6.17.C.3 and Construction Coordinator has given written approval of each such variation by specific written notation thereof incorporated in or accompanying the Shop Drawing or Sample. Construction Coordinator's review and approval shall not relieve Contractor from responsibility for complying with the requirements of Paragraph 6.17.C 1.

**E. Resubmittal Procedures**

1. Contractor shall make corrections required by Construction Coordinator and shall return the required number of corrected copies of Shop Drawings and submit, as required, new Samples for review and approval. Contractor shall direct specific attention in writing to revisions other than the corrections called for by the Construction Coordinator on previous submittals.
- F.** Contractor shall furnish required submittals with sufficient information and accuracy in order to obtain required approval of an item with no more than three (3) submittals. Construction Coordinator will record the Architect or Engineer's time for reviewing subsequent submittals of Shop Drawings, samples or other items requiring approval and Contractor shall reimburse Owner for the Architect or Engineer's charges for such time.
- G.** In the event that Contractor requests a substitution for a previously approved item, Contractor shall reimburse Owner for the Architect or Engineer's charges for such time unless the need for such substitution is beyond the control of Contractor.

**6.18 Continuing the Work**

- A.** Contractor shall carry on the Work and adhere to the Progress Schedule during all disputes or disagreements with Owner. No Work shall be delayed or postponed pending resolution of any

disputes or disagreements, except as permitted by Paragraph 15.04 or as Owner and Contractor may otherwise agree in writing.

#### **6.19 Contractor's General Warranty and Guarantee**

- A. Contractor warrants and guarantees to Owner that all Work will be in accordance with the Contract Documents and will not be defective. Construction Coordinator and its Related Entities shall be entitled to rely on representation of Contractor's warranty and guarantee.
- B. Contractor's warranty and guarantee hereunder excludes defects or damage caused by:
  - 1. abuse, modification, or improper maintenance or operation by persons other than Contractor, Subcontractors, Suppliers, or any other individual or entity for whom Contractor is responsible; or
  - 2. normal wear and tear under normal usage.
- C. Contractor's obligation to perform and complete the Work in accordance with the Contract Documents shall be absolute. None of the following will constitute an acceptance of Work that is not in accordance with the Contract Documents or a release of Contractor's obligation to perform the Work in accordance with the Contract Documents:
  - 1. observations by Construction Coordinator;
  - 2. recommendation by Construction Coordinator or payment by Owner of any progress or final payment;
  - 3. the issuance of a certificate of Substantial Completion by Construction Coordinator or any payment related thereto by Owner;
  - 4. use or occupancy of the Work or any part thereof by Owner;
  - 5. any review and approval of a Shop Drawing or Sample submittal or the issuance of a notice of acceptability by Construction Coordinator;
  - 6. any inspection, test, or approval by others; or
  - 7. any correction of defective Work by Owner.
- D. The Contractor's General Warranty and Guarantee shall be for a period of one (1) year after work has been accepted and final payment made to the Contractor. In the case of Water and Wastewater lines, the warranty period will start after acceptance of these lines into the utility provider's system for ownership, operation, and maintenance. The Contractor accepts the transference of all warranties and guarantees to the utility provider owning and operating the new lines.

#### **6.20 Indemnification**

- A. To the fullest extent permitted by Laws and Regulations, Contractor shall indemnify and hold harmless Owner and Construction Coordinator, and the officers, directors, partners, employees, agents, consultants and subcontractors of each and any of them from and against all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to the performance of the Work, provided that any such claim, cost, loss, or damage is attributable to bodily injury, sickness, disease, or death, or to injury to or destruction of tangible property (other than the Work itself), including the loss of use resulting therefrom but only to the extent caused by any negligent act or

omission of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work or anyone for whose acts any of them may be liable .

- B. In any and all claims against Owner or Construction Coordinator or any of their respective consultants, agents, officers, directors, partners, or employees by any employee (or the survivor or personal representative of such employee) of Contractor, any Subcontractor, any Supplier, or any individual or entity directly or indirectly employed by any of them to perform any of the Work, or anyone for whose acts any of them may be liable, the indemnification obligation under Paragraph 6.20.A shall not be limited in any way by any limitation on the amount or type of damages, compensation, or benefits payable by or for Contractor or any such Subcontractor, Supplier, or other individual or entity under workers' compensation acts, disability benefit acts, or other employee benefit acts.
- C. The indemnification obligations of Contractor under Paragraph 6.20.A shall not extend to the liability of Construction Coordinator and Construction Coordinator's officers, directors, partners, employees, agents, consultants and subcontractors arising out of:
  - 1. the preparation or approval of, or the failure to prepare or approve, maps, Drawings, opinions, reports, surveys, Change Orders, designs, or Specifications; or
  - 2. giving directions or instructions, or failing to give them, if that is the primary cause of the injury or damage.

#### **6.21 Delegation of Professional Design Services**

- A. Contractor will not be required to provide professional design services unless such services are specifically required by the Contract Documents for a portion of the Work or unless such services are required to carry out Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. Contractor shall not be required to provide professional services in violation of applicable law.
- B. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of Contractor by the Contract Documents, Owner and Construction Coordinator will specify all performance and design criteria that such services must satisfy. Contractor shall cause such services or certifications to be provided by a properly licensed 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 Construction Coordinator.
- C. Owner and Construction Coordinator shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications or approvals performed by such design professionals, provided Owner and Construction Coordinator have specified to Contractor all performance and design criteria that such services must satisfy.
- D. Pursuant to this Paragraph 6.21, Construction Coordinator's review and approval of design calculations and design drawings will be only for the limited purpose of checking for conformance with performance and design criteria given and the design concept expressed in the Contract Documents. Construction Coordinator's review and approval of Shop Drawings and other submittals (except design calculations and design drawings) will be only for the purpose stated in Paragraph 6.17.D 1.
- E. Contractor shall not be responsible for the adequacy of the performance or design criteria required by the Contract Documents.

## **PART 7 - OTHER WORK AT THE SITE**

### **7.01 Related Work at Site**

- A. Owner may perform other work related to the Project at the Site with Owner's employees or via other direct contracts therefor, or have other work performed by utility owners. If such other work is not noted in the Contract Documents.
- B. Contractor shall afford each other contractor who is a party to such a direct contract, each utility owner and Owner, if Owner is performing other work with Owner's employees, proper and safe access to the Site, a reasonable opportunity for the introduction and storage of materials and equipment and the execution of such other work, and shall properly coordinate the Work with theirs. Contractor shall do all cutting, fitting, and patching of the Work that may be required to properly connect or otherwise make its several parts come together and properly integrate with such other work. Contractor shall not endanger any work of others by cutting, excavating, or otherwise altering their work and will only cut or alter their work with the written consent of Construction Coordinator and the others whose work will be affected. The duties and responsibilities of Contractor under this Paragraph are for the benefit of such utility owners and other contractors to the extent that there are comparable provisions for the benefit of Contractor in said direct contracts between Owner and such utility owners and other contractors.
- C. If the proper execution or results of any part of Contractor's Work depends upon work performed by others under this Part 7, Contractor shall inspect such other work and promptly report to Construction Coordinator in writing any delays, defects, or deficiencies in such other work that render it unavailable or unsuitable for the proper execution and results of Contractor's Work. Contractor's failure to so report will constitute an acceptance of such other work as fit and proper for integration with Contractor's Work except for latent defects and deficiencies in such other work.

### **7.02 Coordination**

- A. If Owner intends to contract with others for the performance of other work on the Project at the Site, the following will be set forth:
  - 1. the individual or entity who will have authority and responsibility for coordination of the activities among the various contractors will be identified;
  - 2. the specific matters to be covered by such authority and responsibility will be itemized; and
  - 3. the extent of such authority and responsibilities will be provided.
- B. Owner shall have sole authority and responsibility for such coordination.

### **7.03 Legal Relationships**

- A. Paragraphs 7.01.A and 7.02 are not applicable for utilities not under the control of Owner.
- B. Each other direct contract of Owner under Paragraph 7.01.A shall provide that the other contractor is liable to Owner and Contractor for the reasonable direct delay and disruption costs incurred by Contractor as a result of the other contractor's actions or inactions.
- C. Contractor shall be liable to Owner and any other contractor for the reasonable direct delay and disruption costs incurred by such other contractor as a result of Contractor's action or inactions.

### **7.04 Claims Between Contractors**

- A. Should Contractor cause damage to the work or property of any other contractor at the Site, or should any claim arising out of Contractor's performance of the Work at the Site be made by any other contractor against Contractor, Owner, Construction Coordinator, or Contractor shall promptly attempt to settle with such other contractor by agreement, or to otherwise resolve the dispute by arbitration or at law.
- B. Contractor shall, to the fullest extent permitted by Laws and Regulations, indemnify and hold harmless Owner, the Construction Coordinator and the officers, directors, partners, employees, agents and other consultants and subcontractors of each and any of them from and against all claims, costs, losses and damages (including, but not limited to, fees and charges of engineers, architects, attorneys, and other professionals and court and arbitration costs) arising directly, indirectly or consequentially out of any action, legal or equitable, brought by any other contractor against Owner, Construction Coordinator, Construction Coordinator's Consultants to the extent said claim is based on or arises out of Contractor's performance of the Work. Should another contractor cause damage to the Work or property of Contractor or should the performance of work by any other contractor at the Site give rise to any other Claim, Contractor shall not institute any action, legal or equitable, against Owner, or the Construction Coordinator or permit any action against any of them to be maintained and continued in its name or for its benefit in any court or before any arbiter which seeks to impose liability on or to recover damages from Owner, or the Construction Coordinator on account of any such damage or Claim.
- C. If Contractor is delayed at any time in performing or furnishing Work by any act or neglect of another contractor, and Owner and Contractor are unable to agree as to the extent of any adjustment in Contract Times attributable thereto, Contractor may make a Claim for an extension of times in accordance with Part 12. An extension of the Contract Times shall be Contractor's exclusive remedy with respect to Owner, and construction coordinator for any delay, disruption, interference, or hindrance caused by any other contractor. This paragraph does not prevent recovery from Owner, or construction coordinator for activities that are their respective responsibilities.

## **PART 8 - OWNER'S RESPONSIBILITIES**

### **8.01 Communications to Contractor**

- A. Except as otherwise provided in these General Conditions, Owner shall issue all communications to Contractor through the Construction Coordinator.

### **8.02 Replacement of Construction Coordinator**

- A. In case of termination of the employment of the Construction Coordinator, Owner shall appoint a Construction Coordinator to whose status under the Contract Documents shall be that of the former Construction Coordinator.

### **8.03 Furnish Data**

- A. Owner shall promptly furnish the data required of Owner under the Contract Documents.

### **8.04 Pay When Due**

- A. Owner shall make payments to Contractor when they are due as provided in Paragraphs 14.02.C and 14.07.C.

### **8.05 Lands and Easements; Reports and Tests**

- A. Owner's duties in respect of providing lands and easements and providing engineering surveys to establish reference points are set forth in Paragraphs 4.01 and 4.05. Paragraph 4.02 refers to Owner's identifying and making available to Contractor copies of reports of explorations and

tests of subsurface conditions and drawings of physical conditions in or relating to existing surface or subsurface structures at or contiguous to the Site that have been utilized by the Architect or Engineer in preparing the Contract Documents.

#### **8.06 Insurance**

- A. Owner's responsibilities, if any, in respect to purchasing and maintaining liability and property insurance are set forth in Part 5.

#### **8.07 Change Orders**

- A. Owner is obligated to execute Change Orders as indicated in Paragraph 10.03.

#### **8.08 Inspections, Tests, and Approvals**

- A. Owner's responsibility in respect to certain inspections, tests, and approvals is set forth in Paragraph 13.03.B.

#### **8.09 Limitations on Owner's Responsibilities**

- A. The Owner shall not supervise, direct, or have control or authority over, nor be responsible for, Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Owner will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.

#### **8.10 Undisclosed Hazardous Environmental Condition**

- A. Owner's responsibility in respect to an undisclosed Hazardous Environmental Condition is set forth in Paragraph 4.06.

#### **8.11 Evidence of Financial Arrangements**

- A. If and to the extent Owner has agreed to furnish Contractor reasonable evidence that financial arrangements have been made to satisfy Owner's obligations under the Contract Documents, Owner's responsibility in respect thereof will be as set forth.

### **PART 9 - Construction Coordinator's STATUS DURING CONSTRUCTION**

#### **9.01 Owner's Representative**

- A. Construction Coordinator will be Owner's representative during the construction period. The duties and responsibilities and the limitations of authority of Construction Coordinator as Owner's representative during construction are set forth in the Contract Documents and will not be changed without written consent of Owner and Construction Coordinator.

#### **9.02 Visits to Site**

- A. Construction Coordinator will make visits to the Site at intervals appropriate to the various stages of construction as Engineer deems necessary in order to observe as an experienced and qualified design professional the progress that has been made and the quality of the various aspects of Contractor's executed Work. Based on information obtained during such visits and observations, Construction Coordinator, for the benefit of Owner, will determine, in general, if the Work is proceeding in accordance with the Contract Documents. Construction Coordinator will not be required to make exhaustive or continuous inspections on the Site to check the quality or quantity of the Work. Construction Coordinator's efforts will be directed

toward providing for Owner a greater degree of confidence that the completed Work will conform generally to the Contract Documents. On the basis of such visits and observations, Construction Coordinator will keep Owner informed of the progress of the Work and will endeavor to guard Owner against defective Work.

- B. Construction Coordinator's visits and observations are subject to all the limitations on Construction Coordinator's authority and responsibility set forth in Paragraph 9.09. Particularly, but without limitation, during or as a result of Construction Coordinator's visits or observations of Contractor's Work Construction Coordinator will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work.

### **9.03 Project Representative**

- A. If Owner and Construction Coordinator agree; Construction Coordinator will furnish a Resident Project Representative to assist Construction Coordinator in providing more extensive observation of the Work. The authority and responsibilities of any such Resident Project Representative and assistants will be as provided, and limitations on the responsibilities thereof will be as provided in Paragraph 9.09. If Owner designates another representative or agent to represent Owner at the Site who is not Construction Coordinator's consultant, agent or employee, the responsibilities and authority and limitations thereon of such other individual or entity will be as provided in Paragraph 9.09.

### **9.04 Authorized Variations in Work**

- A. Construction Coordinator may authorize minor variations in the Work from the requirements of the Contract Documents which do not involve an adjustment in the Contract Price or the Contract Times and are compatible with the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. These may be accomplished by a Field Order and will be binding on Owner and also on Contractor, who shall perform the Work involved promptly. If Owner or Contractor believes that a Field Order justifies an adjustment in the Contract Price or Contract Times, or both, and the parties are unable to agree on entitlement to or on the amount or extent, if any, of any such adjustment, a Claim may be made therefor as provided in Paragraph 10.05.

### **9.05 Rejecting Defective Work**

- A. Construction Coordinator will have authority to reject Work, which Construction Coordinator believes to be defective, or that Construction Coordinator believes will not produce a completed Project that conforms to the Contract Documents or that will prejudice the integrity of the design concept of the completed Project as a functioning whole as indicated by the Contract Documents. Construction Coordinator will also have authority to require special inspection or testing of the Work as provided in Paragraph 13.04, whether or not the Work is fabricated, installed, or completed.

### **9.06 Shop Drawings, Change Orders and Payments**

- A. In connection with Construction Coordinator's authority, and limitations thereof, as to Shop Drawings and Samples, see Paragraph 6.17.
- B. In connection with Construction Coordinator's authority, and limitations thereof, as to design calculations and design drawings submitted in response to a delegation of professional design services, if any, see Paragraph 6.21.

- C. In connection with Construction Coordinator's authority as to Change Orders, see Parts 10, 11, and 12.
- D. In connection with Construction Coordinator's authority as to Applications for Payment, see Part 14.

**9.07 Determinations for Unit Price Work**

- A. Construction Coordinator will determine the actual quantities and classifications of Unit Price Work performed by Contractor. Construction Coordinator will review with Contractor the Construction Coordinator's preliminary determinations on such matters before rendering a written decision thereon (by recommendation of an Application for Payment or otherwise). Construction Coordinator's written decision thereon will be final and binding (except as modified by Construction Coordinator to reflect changed factual conditions or more accurate data) upon Owner and Contractor, subject to the provisions of Paragraph 10.05.

**9.08 Decisions on Requirements of Contract Documents and Acceptability of Work**

- A. Construction Coordinator will be the initial interpreter of the requirements of the Contract Documents and judge of the acceptability of the Work thereunder. All matters in question and other matters between Owner and Contractor arising prior to the date final payment is due relating to the acceptability of the Work, and the interpretation of the requirements of the Contract Documents pertaining to the performance of the Work, will be referred initially to the Construction Coordinator in writing within 30 days of the event giving rise to the question
- B. Construction Coordinator will, with reasonable promptness, render a written decision on the issue referred. If Owner or Contractor believe that any such decision entitles them to an adjustment in the Contract Price or Contract Times or both, a Claim may be made under Paragraph 10.05. The date of Construction Coordinator's decision shall be the date of the event giving rise to the issues referenced for the purposes of Paragraph 10.05.B.
- C. Construction Coordinator's written decision on the issue referred will be final and binding on Owner and Contractor, subject to the provisions of Paragraph 10.05.
- D. When functioning as interpreter and judge under this Paragraph 9.08, Construction Coordinator will not show partiality to Owner or Contractor and will not be liable in connection with any interpretation or decision rendered in good faith in such capacity.

**9.09 Limitations on Construction Coordinator's Authority and Responsibilities**

- A. Neither Construction Coordinator's authority or responsibility under this Part 9 or under any other provision of the Contract Documents nor any decision made by Construction Coordinator in good faith either to exercise or not exercise such authority or responsibility or the undertaking, exercise, or performance of any authority or responsibility by Construction Coordinator shall create, impose, or give rise to any duty in contract, tort, or otherwise owed by Construction Coordinator to Contractor, any Subcontractor, any Supplier, any other individual or entity, or to any surety for or employee or agent of any of them.
- B. Construction Coordinator will not supervise, direct, control, or have authority over or be responsible for Contractor's means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or for any failure of Contractor to comply with Laws and Regulations applicable to the performance of the Work. Construction Coordinator will not be responsible for Contractor's failure to perform the Work in accordance with the Contract Documents.
- C. Construction Coordinator will not be responsible for the acts or omissions of Contractor or of any Subcontractor, any Supplier, or of any other individual or entity performing any of the Work.



- D. Construction Coordinator's review of the final Application for Payment and accompanying documentation and all maintenance and operating instructions, schedules, guarantees, bonds, certificates of inspection, tests and approvals, and other documentation required to be delivered by Paragraph 14.07.A will only be to determine generally that their content complies with the requirements of, and in the case of certificates of inspections, tests, and approvals that the results certified indicate compliance with the Contract Documents.
- E. The limitations upon authority and responsibility set forth in this Paragraph 9.09 shall also apply to, the Resident Project Representative, if any, and assistants, if any.

## **PART 10 - CHANGES IN THE WORK; CLAIMS**

### **10.01 Authorized Changes in the Work**

- A. Without invalidating the Contract and without notice to any surety, Owner may, at any time or from time to time, order additions, deletions, or revisions in the Work by a Change Order, or a Work Change Directive. Upon receipt of any such document, Contractor shall promptly proceed with the Work involved which will be performed under the applicable conditions of the Contract Documents (except as otherwise specifically provided).
- B. If Owner and Contractor are unable to agree on entitlement to, or on the amount or extent, if any, of an adjustment in the Contract Price or Contract Times, or both, that should be allowed as a result of a Work Change Directive, a Claim may be made therefor as provided in Paragraph 10.05.

### **10.02 Unauthorized Changes in the Work**

- A. Contractor shall not be entitled to an increase in the Contract Price or an extension of the Contract Times with respect to any work performed that is not required by the Contract Documents as amended, modified, or supplemented as provided in Paragraph 3.04, except in the case of an emergency as provided in Paragraph 6.16 or in the case of uncovering Work as provided in Paragraph 13.04.B.

### **10.03 Execution of Change Orders**

- A. Owner and Contractor shall execute appropriate Change Orders recommended by Construction Coordinator covering:
  - 1. changes in the Work which are: (i) ordered by Owner pursuant to Paragraph 10.01.A, required because of acceptance of defective Work under Paragraph 13.08.A or Owner's correction of defective Work under Paragraph 13.09, or (iii) agreed to by the parties;
  - 2. changes in the Contract Price or Contract Times which are agreed to by the parties, including any undisputed sum or amount of time for Work actually performed in accordance with a Work Change Directive; and
  - 3. changes in the Contract Price or Contract Times which embody the substance of any written decision rendered by Construction Coordinator pursuant to Paragraph 10.05; provided that, in lieu of executing any such Change Order, an appeal may be taken from any such decision in accordance with the provisions of the Contract Documents and applicable Laws and Regulations, but during any such appeal, Contractor shall carry on the Work and adhere to the Progress Schedule as provided in Paragraph 6.18.A.

### **10.04 Notification to Surety**

- A. If notice of any change affecting the general scope of the Work or the provisions of the Contract Documents (including, but not limited to, Contract Price or Contract Times and Warranty Requirements) is required by the provisions of any bond to be given to a surety, the giving of any such notice will be Contractor's responsibility. The amount of each applicable bond will be adjusted to reflect the effect of any such change.

## **10.05 Claims**

- A. Construction Coordinator's Decision Required: All Claims, except those waived pursuant to Paragraph 14.09, shall be referred to the Construction Coordinator for decision. A decision by Construction Coordinator shall be required as a condition precedent to any exercise by Owner or Contractor of any rights or remedies either may otherwise have under the Contract Documents or by Laws and Regulations in respect of such Claims.
- B. Notice: Written notice stating the general nature of each Claim shall be delivered by the claimant to Construction Coordinator and the other party to the Contract promptly (but in no event, later than 30 days) after the start of the event giving rise thereto. The responsibility to substantiate a Claim shall rest with the party making the Claim. Notice of the amount or extent of the Claim, with supporting data shall be delivered to the Construction Coordinator and the other party to the Contract within 60 days after the start of such event (unless Construction Coordinator allows additional time for claimant to submit additional or more accurate data in support of such Claim). A Claim for an adjustment in Contract Price shall be prepared in accordance with the provisions of Paragraph 12.01.B. A Claim for an adjustment in Contract Time shall be prepared in accordance with the provisions of Paragraph 12.02.B. Each Claim shall be accompanied by claimant's written statement that the adjustment claimed is the entire adjustment to which the claimant believes it is entitled as a result of said event. The opposing party shall submit any response to Construction Coordinator and the claimant within 30 days after receipt of the claimant's last submittal (unless Construction Coordinator allows additional time).
- C. Construction Coordinator's Action: Construction Coordinator will review each Claim and, within 30 days after receipt of the last submittal of the claimant or the last submittal of the opposing party, if any, take one of the following actions in writing:
  - 1. deny the Claim in whole or in part,
  - 2. approve the Claim, or
  - 3. notify the parties that the Construction Coordinator is unable to resolve the Claim if, in the Construction Coordinator's sole discretion, it would be inappropriate for the Construction Coordinator to do so. For purposes of further resolution of the Claim, such notice shall be deemed a denial.
- D. In the event that Construction Coordinator does not take action on a Claim within said 30 days, the Claim shall be deemed denied.
- E. Nonwithstanding anything herein final approval rests with the Owner.
- F. No Claim for an adjustment in Contract Price or Contract Times will be valid if not submitted in accordance with this Paragraph 10.05.

## **PART 11 - COST OF THE WORK; ALLOWANCES; UNIT PRICE WORK**

### **11.01 Cost of the Work**

- A. Costs Included: The term Cost of the Work means the sum of all costs, except those excluded in Paragraph 11.01.B, necessarily incurred and paid by Contractor in the proper performance of the Work. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, the costs to be reimbursed to Contractor will be only those additional or incremental costs required because of the change in the Work or because of the event giving rise to the Claim. Except as otherwise may be agreed to in writing by Owner, such costs shall be in amounts no higher than those prevailing in the locality of the Project, shall include only the following items, and shall not include any of the costs itemized in Paragraph 11.01.B.
1. Payroll costs for employees in the direct employ of Contractor in the performance of the Work under schedules of job classifications agreed upon by Owner and Contractor. Such employees shall include, without limitation, superintendents, foremen, and other personnel employed full time at the Site. Payroll costs for employees not employed full time on the Work shall be apportioned on the basis of their time spent on the Work. Payroll costs shall include, but not be limited to, salaries and wages plus the cost of fringe benefits, which shall include social security contributions, unemployment, excise, and payroll taxes, workers' compensation, health and retirement benefits, bonuses, sick leave, vacation and holiday pay applicable thereto. The expenses of performing Work outside of regular working hours, on Saturday, Sunday, or legal holidays, shall be included in the above to the extent authorized by Owner.
  2. Cost of all materials and equipment furnished and incorporated in the Work, including costs of transportation and storage thereof, and Suppliers' field services required in connection therewith. All cash discounts shall accrue to Contractor unless Owner deposits funds with Contractor with which to make payments, in which case the cash discounts shall accrue to Owner. All trade discounts, rebates and refunds and returns from sale of surplus materials and equipment shall accrue to Owner, and Contractor shall make provisions so that they may be obtained.
  3. Payments made by Contractor to Subcontractors for Work performed by Subcontractors. If required by Owner, Contractor shall obtain competitive bids from subcontractors acceptable to Owner and Contractor and shall deliver such bids to Owner, who will then determine, with the advice of Construction Coordinator, which bids, if any, will be acceptable. If any subcontract provides that the Subcontractor is to be paid on the basis of Cost of the Work plus a fee, the Subcontractor's Cost of the Work and fee shall be determined in the same manner as Contractor's Cost of the Work and fee as provided in this Paragraph 11.01.
  4. Costs of special consultants (including but not limited to Engineers, Architects, testing laboratories, surveyors, attorneys, and accountants) employed for services specifically related to the Work.
  5. Supplemental costs including the following:
    - a. The proportion of necessary transportation, travel, and subsistence expenses of Contractor's employees incurred in discharge of duties connected with the Work.
    - b. Cost, including transportation and maintenance, of all materials, supplies, equipment, machinery, appliances, office, and temporary facilities at the Site, and hand tools not owned by the workers, which are consumed in the performance of the Work, and cost, less market value, of such items used but not consumed which remain the property of Contractor.
    - c. Rentals of all construction equipment and machinery, and the parts thereof whether rented from Contractor or others in accordance with rental agreements approved by Owner with the advice of Construction Coordinator, and the costs of transportation,

loading, unloading, assembly, dismantling, and removal thereof. All such costs shall be in accordance with the terms of said rental agreements. The rental of any such equipment, machinery, or parts shall cease when the use thereof is no longer necessary for the Work.

- d. Sales, consumer, use, and other similar taxes related to the Work, and for which Contractor is liable, imposed by Laws and Regulations.
- e. Deposits lost for causes other than negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, and royalty payments and fees for permits and licenses.
- f. Losses and damages (and related expenses) caused by damage to the Work, not compensated by insurance or otherwise, sustained by Contractor in connection with the performance of the Work (except losses and damages within the deductible amounts of property insurance established in accordance with Paragraph 5.06.D), provided such losses and damages have resulted from causes other than the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable. Such losses shall include settlements made with the written consent and approval of Owner. No such losses, damages, and expenses shall be included in the Cost of the Work for the purpose of determining Contractor's fee.
- g. The cost of utilities, fuel, and sanitary facilities at the Site.
- h. Minor expenses such as telegrams, long distance telephone calls, telephone service at the Site, expresses, and similar petty cash items in connection with the Work.
- i. The costs of premiums for all bonds and insurance Contractor is required by the Contract Documents to purchase and maintain.

B. Costs Excluded: The term Cost of the Work shall not include any of the following items:

- 1. Payroll costs and other compensation of Contractor's officers, executives, principals (of partnerships and sole proprietorships), general managers, safety managers, engineers, architects, estimators, attorneys, auditors, accountants, purchasing and contracting agents, expeditors, timekeepers, clerks, and other personnel employed by Contractor, whether at the Site or in Contractor's principal or branch office for general administration of the Work and not specifically included in the agreed upon schedule of job classifications referred to in Paragraph 11.01.A.1 or specifically covered by Paragraph 11.01.A.4, all of which are to be considered administrative costs covered by the Contractor's fee.
- 2. Expenses of Contractor's principal and branch offices other than Contractor's office at the Site.
- 3. Any part of Contractor's capital expenses, including interest on Contractor's capital employed for the Work and charges against Contractor for delinquent payments.
- 4. Costs due to the negligence of Contractor, any Subcontractor, or anyone directly or indirectly employed by any of them or for whose acts any of them may be liable, including but not limited to, the correction of defective Work, disposal of materials or equipment wrongfully supplied, and making good any damage to property.
- 5. Other overhead or general expense costs of any kind and the costs of any item not specifically and expressly included in Paragraphs 11.01.A and 11.01.B.

- C. Contractor's Fee: When all the Work is performed on the basis of cost-plus, Contractor's fee shall be determined as set forth in the Agreement. When the value of any Work covered by a Change Order or when a Claim for an adjustment in Contract Price is determined on the basis of Cost of the Work, Contractor's fee shall be determined as set forth in Paragraph 12.01.C.
- D. Documentation: Whenever the Cost of the Work for any purpose is to be determined pursuant to Paragraphs 11.01.A and 11.01.B, Contractor will establish and maintain records thereof in accordance with generally accepted accounting practices and submit in a form acceptable to Engineer an itemized cost breakdown together with supporting data.

## **11.02 Allowances**

- A. It is understood that Contractor has included in the Contract Price all allowances so named in the Contract Documents and shall cause the Work so covered to be performed for such sums and by such persons or entities as may be acceptable to Owner and Construction Coordinator.
- B. Cash Allowances
  - 1. Contractor agrees that:
    - a. the cash allowances include the cost to Contractor (less any applicable trade discounts) of materials and equipment required by the allowances to be delivered at the Site, and all applicable taxes; and
    - b. Contractor's costs for unloading and handling on the Site, labor, installation, overhead, profit, and other expenses contemplated for the cash allowances have been included in the Contract Price and not in the allowances, and no demand for additional payment on account of any of the foregoing will be valid.
- C. Contingency Allowance
  - 1. Contractor agrees that a contingency allowance, if any, is for the sole use of Owner to cover unanticipated costs.
- D. Prior to final payment, an appropriate Change Order will be issued as recommended by Construction Coordinator to reflect actual amounts due Contractor on account of Work covered by allowances, and the Contract Price shall be correspondingly adjusted.

## **11.03 Unit Price Work**

- A. Initially the Contract Price will be deemed to include for all Unit Price Work an amount equal to the sum of the unit price for each separately identified item of Unit Price Work times the estimated quantity of each item as indicated in the Agreement.
- B. The estimated quantities of items of Unit Price Work are not guaranteed and are solely for the purpose of comparison of Bids and determining an initial Contract Price. Determinations of the actual quantities and classifications of Unit Price Work performed by Contractor will be made by the Owner subject to the provisions of Paragraph 9.07.
- C. Each unit price will be deemed to include an amount considered by Contractor to be adequate to cover Contractor's overhead and profit for each separately identified item.
- D. Owner or Contractor may make a Claim for an adjustment in the Contract Price in accordance with Paragraph 10.05 if:

1. the quantity of any item of Unit Price Work performed by Contractor differs materially and significantly from the estimated quantity of such item indicated in the Agreement; and
2. there is no corresponding adjustment with respect any other item of Work; and
3. Contractor believes that Contractor is entitled to an increase in Contract Price as a result of having incurred additional expense or Owner believes that Owner is entitled to a decrease in Contract Price and the parties are unable to agree as to the amount of any such increase or decrease.

## **PART 12 - CHANGE OF CONTRACT PRICE; CHANGE OF CONTRACT TIMES**

### **12.01 Change of Contract Price**

- A. The Contract Price may only be changed by a Change Order. Any Claim for an adjustment in the Contract Price shall be based on written notice submitted by the party making the Claim to the Construction Coordinator and the other party to the Contract in accordance with the provisions of Paragraph 10.05. Final approval of all change orders rests with the owner.
- B. The value of any Work covered by a Change Order or of any Claim for an adjustment in the Contract Price will be determined as follows:
  1. where the Work involved is covered by unit prices contained in the Contract Documents, by application of such unit prices to the quantities of the items involved (subject to the provisions of Paragraph 11.03); or
  2. where the Work involved is not covered by unit prices contained in the Contract Documents, by a mutually agreed lump sum (which may include an allowance for overhead and profit not necessarily in accordance with Paragraph 12.01.C.2); or
  3. where the Work involved is not covered by unit prices contained in the Contract Documents and agreement to a lump sum is not reached under Paragraph 12.01.B.2, on the basis of the Cost of the Work (determined as provided in Paragraph 11.01) plus a Contractor's fee for overhead and profit (determined as provided in Paragraph 12.01.C).
- C. Contractor's Fee: The Contractor's fee for overhead and profit shall be determined as follows:
  1. a mutually acceptable fixed fee; or
  2. if a fixed fee is not agreed upon, then a fee based on the following percentages of the various portions of the Cost of the Work:
    - a. for costs incurred under Paragraphs 11.01.A.1 and 11.01.A.2, the Contractor's fee shall be 15 percent;
    - b. for costs incurred under Paragraph 11.01.A.3, the Contractor's fee shall be five percent;
    - c. where one or more tiers of subcontracts are on the basis of Cost of the Work plus a fee and no fixed fee is agreed upon, the intent of Paragraph 12.01.C.2.a is that the Subcontractor who actually performs the Work, at whatever tier, will be paid a fee of 15 percent of the costs incurred by such Subcontractor under Paragraphs 11.01.A.1 and 11.01.A.2 and that any higher tier Subcontractor and Contractor will each be paid a fee of five percent of the amount paid to the next lower tier Subcontractor;
    - d. no fee shall be payable on the basis of costs itemized under Paragraphs 11.01.A.4, 11.01.A.5, and 11.01.B;

- e. the amount of credit to be allowed by Contractor to Owner for any change which results in a net decrease in cost will be the amount of the actual net decrease in cost plus a deduction in Contractor's fee by an amount equal to five percent of such net decrease; and
- f. when both additions and credits are involved in any one change, the adjustment in Contractor's fee shall be computed on the basis of the net change in accordance with Paragraphs 12.01.C.2.a through 12.01.C.2.e, inclusive.

## **12.02 Change of Contract Times**

- A. The Contract Times may only be changed by a Change Order. Any Claim for an adjustment in the Contract Times shall be based on written notice submitted by the party making the Claim to the Construction Coordinator and the other party to the Contract in accordance with the provisions of Paragraph 10.05. Final approval of all change orders rests with the owner.
- B. Any adjustment of the Contract Times covered by a Change Order or any Claim for an adjustment in the Contract Times will be determined in accordance with the provisions of this Part 12.

## **12.03 Delays**

- A. Where Contractor is prevented from completing any part of the Work within the Contract Times due to delay beyond the control of Contractor, the Contract Times will be extended in an amount equal to the time lost due to such delay if a Claim is made therefor as provided in Paragraph 12.02.A. Delays beyond the control of Contractor shall include, but not be limited to, acts or neglect by Owner, acts or neglect of utility owners or other contractors performing other work as contemplated by Part 7, fires, floods, epidemics, abnormal weather conditions, or acts of God.
- B. If Owner, Construction Coordinator, or other contractors or utility owners performing other work for Owner as contemplated by Part 7, or anyone for whom Owner is responsible, delays, disrupts, or interferes with the performance or progress of the Work, then Contractor shall be entitled to an equitable adjustment in the Contract Price or the Contract Times, or both. Contractor's entitlement to an adjustment of the Contract Times is conditioned on such adjustment being essential to Contractor's ability to complete the Work within the Contract Times.
- C. If Contractor is delayed in the performance or progress of the Work by fire, flood, epidemic, abnormal weather conditions, acts of God, acts or failures to act of utility owners not under the control of Owner, or other causes not the fault of and beyond control of Owner and Contractor, then Contractor shall be entitled to an equitable adjustment in Contract Times, if such adjustment is essential to Contractor's ability to complete the Work within the Contract Times. Such an adjustment shall be Contractor's sole and exclusive remedy for the delays described in this Paragraph 12.03.C.
- D. Owner, Construction Coordinator and the Related Entities of each of them shall not be liable to Contractor for any claims, costs, losses, or damages (including but not limited to all fees and charges of Engineers, Architects, Attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Contractor on or in connection with any other project or anticipated project.
- E. Contractor shall not be entitled to an adjustment in Contract Price or Contract Times for delays within the control of Contractor. Delays attributable to and within the control of a Subcontractor or Supplier shall be deemed to be delays within the control of Contractor.

- F. All claims for delays shall be submitted at the submission of any application for payment or within fifteen (15) days of the event causing the delay. Any claims made after the allowable time shall be denied.

## **PART 13 - TESTS AND INSPECTIONS; CORRECTION, REMOVAL OR ACCEPTANCE OF DEFECTIVE WORK**

### **13.01 Notice of Defects**

- A. Prompt notice of all defective Work of which Owner or Construction Coordinator has actual knowledge will be given to Contractor. All defective Work may be rejected, corrected, or accepted as provided in this Part 13.

### **13.02 Access to Work**

- A. Owner, Construction Coordinator, their consultants and other representatives and personnel of Owner, independent testing laboratories, and governmental agencies with jurisdictional interests will have access to the Site and the Work at reasonable times for their observation, inspecting, and testing. Contractor shall provide them proper and safe conditions for such access and advise them of Contractor's Site safety procedures and programs so that they may comply therewith as applicable.

### **13.03 Tests and Inspections**

- A. Contractor shall give Construction Coordinator timely notice of readiness of the Work for all required inspections, tests, or approvals and shall cooperate with inspection and testing personnel to facilitate required inspections or tests.
- B. Contractor shall employ and pay for the services of an independent testing laboratory to perform all inspections, tests, or approvals required by the Contract Documents.
- C. If Laws or Regulations of any public body having jurisdiction require any Work (or part thereof) specifically to be inspected, tested, or approved by an employee or other representative of such public body, Contractor shall assume full responsibility for arranging and obtaining such inspections, tests, or approvals, pay all costs in connection therewith, and furnish Construction Coordinator the required certificates of inspection or approval.
- D. Contractor shall be responsible for arranging and obtaining and shall pay all costs in connection with any inspections, tests, or approvals required for Owner's and Construction Coordinator's acceptance of materials or equipment to be incorporated in the Work; or acceptance of materials, mix designs, or equipment submitted for approval prior to Contractor's purchase thereof for incorporation in the Work. Such inspections, tests, or approvals shall be performed by third party organizations acceptable to Owner and Construction Coordinator.
- E. If any Work (or the work of others) that is to be inspected, tested, or approved is covered by Contractor without written concurrence of Construction Coordinator, it must, if requested by Construction Coordinator, be uncovered for observation.
- F. Uncovering Work as provided in Paragraph 13.03.E shall be at Contractor's expense unless Contractor has given Construction Coordinator timely notice of Contractor's intention to cover the same and Construction Coordinator has not acted with reasonable promptness in response to such notice.

### **13.04 Uncovering Work**



- A. If any Work is covered contrary to the written request of Construction Coordinator, it must, if requested by Construction Coordinator, be uncovered for Construction Coordinator's observation and replaced at Contractor's expense.
- B. If Construction Coordinator considers it necessary or advisable that covered Work be observed by Construction Coordinator or inspected or tested by others, Contractor, at Construction Coordinator's request, shall uncover, expose, or otherwise make available for observation, inspection, or testing as Construction Coordinator may require, that portion of the Work in question, furnishing all necessary labor, material, and equipment.
- C. If it is found that the uncovered Work is defective, Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of Construction Coordinator, Engineers, Architects, Attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such uncovering, exposure, observation, inspection, and testing, and of satisfactory replacement or reconstruction (including but not limited to all costs of repair or replacement of work of others); and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05.
- D. If, the uncovered Work is not found to be defective, Contractor shall be allowed an increase in the Contract Price or an extension of the Contract Times, or both, directly attributable to such uncovering, exposure, observation, inspection, testing, replacement, and reconstruction. If the parties are unable to agree as to the amount or extent thereof, Contractor may make a Claim therefor as provided in Paragraph 10.05.

#### **13.05 Owner May Stop the Work**

- A. If the Work is defective, or Contractor fails to supply sufficient skilled workers or suitable materials or equipment, or fails to perform the Work in such a way that the completed Work will conform to the Contract Documents, Owner may order Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, this right of Owner to stop the Work shall not give rise to any duty on the part of Owner to exercise this right for the benefit of Contractor, any Subcontractor, any Supplier, any other individual or entity, or any surety for, or employee or agent of any of them.

#### **13.06 Correction or Removal of Defective Work**

- A. Promptly after receipt of notice, Contractor shall correct all defective Work, whether or not fabricated, installed, or completed, or, if the Work has been rejected by Construction Coordinator, remove it from the Project and replace it with Work that is not defective. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of construction coordinator, engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or removal (including but not limited to all costs of repair or replacement of work of others).
- B. When correcting defective Work under the terms of this Paragraph 13.06 or Paragraph 13.07, Contractor shall take no action that would void or otherwise impair Owner's special warranty and guarantee, if any, on said Work.

#### **13.07 Correction Period**

- A. If within one year after the date of Substantial Completion (or such longer period of time as may be prescribed by the terms of any applicable special guarantee required by the Contract Documents) or by any specific provision of the Contract Documents, any Work is found to be defective, or if the repair of any damages to the land or areas made available for Contractor's use by Owner or permitted by Laws and Regulations as contemplated in Paragraph 6.11.A is

found to be defective, Contractor shall promptly, without cost to Owner and in accordance with Owner's written instructions:

1. repair such defective land or areas; or
  2. correct such defective Work; or
  3. if the defective Work has been rejected by Owner, remove it from the Project and replace it with Work that is not defective, and
  4. satisfactorily correct or repair or remove and replace any damage to other Work, to the work of others or other land or areas resulting therefrom.
- B. If Contractor does not promptly comply with the terms of Owner's written instructions, or in an emergency where delay would cause serious risk of loss or damage, Owner may have the defective Work corrected or repaired or may have the rejected Work removed and replaced. All claims, costs, losses, and damages (including but not limited to all fees and charges of construction coordinator, engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) arising out of or relating to such correction or repair or such removal and replacement (including but not limited to all costs of repair or replacement of work of others) will be paid by Contractor.
- C. In special circumstances where a particular item of equipment is placed in continuous service before Substantial Completion of all the Work, the correction period for that item may start to run from an earlier date if so provided in the Specifications.
- D. Where defective Work (and damage to other Work resulting therefrom) has been corrected or removed and replaced under this Paragraph 13.07, the correction period hereunder with respect to such Work will be extended for an additional period of one year after such correction or removal and replacement has been satisfactorily completed.
- E. Contractor's obligations under this Paragraph 13.07 are in addition to any other obligation or warranty. The provisions of this Paragraph 13.07 shall not be construed as a substitute for or a waiver of the provisions of any applicable statute of limitation or repose.

### **13.08 Acceptance of Defective Work**

- A. If, instead of requiring correction or removal and replacement of defective Work, Owner (and, prior to Construction Coordinator's recommendation of final payment, Construction Coordinator) prefers to accept it, Owner may do so. Contractor shall pay all claims, costs, losses, and damages (including but not limited to all fees and charges of construction coordinator, engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) attributable to Owner's evaluation of and determination to accept such defective Work (such costs to be approved by Construction Coordinator as to reasonableness) and the diminished value of the Work to the extent not otherwise paid by Contractor pursuant to this sentence. If any such acceptance occurs prior to Construction Coordinator's recommendation of final payment, a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work, and Owner shall be entitled to an appropriate decrease in the Contract Price, reflecting the diminished value of Work so accepted. If the parties are unable to agree as to the amount thereof, Owner may make a Claim therefor as provided in Paragraph 10.05. If the acceptance occurs after such recommendation, an appropriate amount will be paid by Contractor to Owner.

### **13.09 Owner May Correct Defective Work**

- A. If Contractor fails within a reasonable time after written notice from Construction Coordinator to correct defective Work or to remove and replace rejected Work as required by Construction Coordinator in accordance with Paragraph 13.06.A, or if Contractor fails to perform the Work in accordance with the Contract Documents, or if Contractor fails to comply with any other provision of the Contract Documents, Owner may, after seven (7) days written notice to Contractor, correct or remedy any such deficiency.
- B. In exercising the rights and remedies under this Paragraph 13.09, Owner shall proceed expeditiously. In connection with such corrective or remedial action, Owner may exclude Contractor from all or part of the Site, take possession of all or part of the Work and suspend Contractor's services related thereto, take possession of Contractor's tools, appliances, construction equipment and machinery at the Site, and incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere. Contractor shall allow Owner, Owner's representatives, agents and employees, Owner's other contractors, and Construction Coordinator and Construction Coordinator's consultants access to the Site to enable Owner to exercise the rights and remedies under this Paragraph.
- C. All claims, costs, losses, and damages (including but not limited to all fees and charges of construction coordinator, engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred or sustained by Owner in exercising the rights and remedies under this Paragraph 13.09 will be charged against Contractor, and a Change Order will be issued incorporating the necessary revisions in the Contract Documents with respect to the Work; and Owner shall be entitled to an appropriate decrease in the Contract Price. If the parties are unable to agree as to the amount of the adjustment, Owner may make a Claim therefor as provided in Paragraph 10.05. Such claims, costs, losses and damages will include but not be limited to all costs of repair, or replacement of work of others destroyed or damaged by correction, removal, or replacement of Contractor's defective Work.
- D. Contractor shall not be allowed an extension of the Contract Times because of any delay in the performance of the Work attributable to the exercise by Owner of Owner's rights and remedies under this Paragraph 13.09.

## **PART 14 - PAYMENTS TO CONTRACTOR AND COMPLETION**

### **14.01 Schedule of Values**

- A. The Schedule of Values established as provided in Paragraph 2.07.A will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the Construction Coordinator. Progress payments on account of Unit Price Work will be based on the number of units completed.

### **14.02 Progress Payments**

- A. Applications for Payments
  - 1. At least 20 days before the date established in the Agreement for each progress payment (but not more often than once a month), Contractor shall submit to the Construction Coordinator for review an Application for Payment filled out and signed by Contractor covering the Work completed as of the date of the Application and accompanied by such supporting documentation as is required by the Contract Documents. The date of the pay application must be the last day of the month. If payment is requested on the basis of materials and equipment not incorporated in the Work but delivered and suitably stored at the Site or at another location agreed to in writing, the Application for Payment shall also

be accompanied by a bill of sale, invoice, or other documentation warranting that Owner has received the materials and equipment free and clear of all Liens and evidence that the materials and equipment are covered by appropriate property insurance or other arrangements to protect Owner's interest therein, all of which must be satisfactory to Owner.

2. Beginning with the second Application for Payment, each Application shall include an affidavit of Contractor stating that all previous progress payments received on account of the Work have been applied on account to discharge Contractor's legitimate obligations associated with prior Applications for Payment.
3. The amount of retainage with respect to progress payments will be as stipulated in the Agreement.

#### B. Review of Applications

1. Construction Coordinator will, within fifteen (15) days after receipt of each Application for Payment, either indicate in writing a recommendation of payment and present the Application to Owner or return the Application to Contractor indicating in writing Construction Coordinator's reasons for refusing to recommend payment. In the latter case, Contractor may make the necessary corrections and resubmit the Application.
2. Construction Coordinator's recommendation of any payment requested in an Application for Payment will constitute a representation by Construction Coordinator to Owner, based on Construction Coordinator's observations on the Site of the executed Work as an experienced and qualified design professional and on Construction Coordinator's review of the Application for Payment and the accompanying data and schedules, that to the best of Construction Coordinator's knowledge, information and belief:
  - a. the Work has progressed to the point indicated;
  - b. the quality of the Work is generally in accordance with the Contract Documents (subject to an evaluation of the Work as a functioning whole prior to or upon Substantial Completion, to the results of any subsequent tests called for in the Contract Documents, to a final determination of quantities and classifications for Unit Price Work under Paragraph 9.07, and to any other qualifications stated in the recommendation); and
  - c. the conditions precedent to Contractor's being entitled to such payment appear to have been fulfilled in so far as it is Construction Coordinator's responsibility to observe the Work.
3. By recommending any such payment Construction Coordinator will not thereby be deemed to have represented that:
  - a. inspections made to check the quality or the quantity of the Work as it has been performed have been exhaustive, extended to every aspect of the Work in progress, or involved detailed inspections of the Work beyond the responsibilities specifically assigned to Construction Coordinator in the Contract Documents; or
  - b. that there may not be other matters or issues between the parties that might entitle Contractor to be paid additionally by Owner or entitle Owner to withhold payment to Contractor.

4. Neither Construction Coordinator's review of Contractor's Work for the purposes of recommending payments nor Construction Coordinator's recommendation of any payment, including final payment, will impose responsibility on Construction Coordinator:
  - a. to supervise, direct, or control the Work, or
  - b. for the means, methods, techniques, sequences, or procedures of construction, or the safety precautions and programs incident thereto, or
  - c. for Contractor's failure to comply with Laws and Regulations applicable to Contractor's performance of the Work, or
  - d. to make any examination to ascertain how or for what purposes Contractor has used the moneys paid on account of the Contract Price, or
  - e. to determine that title to any of the Work, materials, or equipment has passed to Owner free and clear of any Liens.
5. Construction Coordinator may refuse to recommend the whole or any part of any payment if, in Construction Coordinator's opinion, it would be incorrect to make the representations to Owner stated in Paragraph 14.02.B 2. Construction Coordinator may also refuse to recommend any such payment or, because of subsequently discovered evidence or the results of subsequent inspections or tests, revise or revoke any such payment recommendation previously made, to such extent as may be necessary in Construction Coordinator's opinion to protect Owner from loss because:
  - a. the Work is defective, or completed Work has been damaged, requiring correction or replacement;
  - b. the Contract Price has been reduced by Change Orders;
  - c. Owner has been required to correct defective Work or complete Work in accordance with Paragraph 13.09; or
  - d. Construction Coordinator has actual knowledge of the occurrence of any of the events enumerated in Paragraph 15.02.A.

#### C. Payment Becomes Due

1. Fifteen (15) days after presentation of the Application for Payment to Owner with Construction Coordinator's recommendation, the amount recommended will (subject to the provisions of Paragraph 14.02.D) become due, and when due will be paid by Owner to Contractor.

#### D. Reduction in Payment

1. Owner may refuse to make payment of the full amount recommended by Construction Coordinator because:
  - a. claims have been made against Owner on account of Contractor's performance or furnishing of the Work;
  - b. Liens have been filed in connection with the Work, except where Contractor has delivered a specific bond satisfactory to Owner to secure the satisfaction and discharge of such Liens;

- c. there are other items entitling Owner to a set-off against the amount recommended; or
  - d. Owner has actual knowledge of the occurrence of any of the events enumerated in Paragraphs 14.02.B.5.a through 14.02.B.5.c or Paragraph 15.02.A.
- 2. If Owner refuses to make payment of the full amount recommended by Construction Coordinator, Owner will give Contractor immediate written notice (with a copy to Construction Coordinator) stating the reasons for such action and promptly pay Contractor any amount remaining after deduction of the amount so withheld. Owner shall promptly pay Contractor the amount so withheld, or any adjustment thereto agreed to by Owner and Contractor, when Contractor corrects to Owner's satisfaction the reasons for such action.
  - 3. If it is subsequently determined that Owner's refusal of payment was not justified, the amount wrongfully withheld shall be treated as an amount due as determined by Paragraph 14.02.C 1.

#### **14.03 Contractor's Warranty of Title**

- A. Contractor warrants and guarantees that title to all Work, materials, and equipment covered by any Application for Payment, whether incorporated in the Project or not, will pass to Owner no later than the time of payment free and clear of all Liens.

#### **14.04 Substantial Completion**

- A. When Contractor considers the entire Work ready for its intended use Contractor shall notify Owner and Construction Coordinator in writing that the entire Work is substantially complete (except for items specifically listed by Contractor as incomplete) and request that Construction Coordinator issue a certificate of Substantial Completion.
- B. Promptly after Contractor's notification, Owner, Contractor, and Construction Coordinator shall make an inspection of the Work to determine the status of completion. If Construction Coordinator does not consider the Work substantially complete, Construction Coordinator will notify Contractor in writing giving the reasons therefor.
- C. If Construction Coordinator considers the Work substantially complete, the Construction Coordinator will deliver to Owner a tentative certificate of Substantial Completion which shall fix the date of Substantial Completion. There shall be attached to the certificate a tentative list of items to be completed or corrected before final payment. Owner shall have seven (7) days after receipt of the tentative certificate during which to make written objection to Construction Coordinator as to any provisions of the certificate or attached list. If, after considering such objections, Construction Coordinator concludes that the Work is not substantially complete, Construction Coordinator will within 14 days after submission of the tentative certificate to Owner notify Contractor in writing, stating the reasons therefor. If, after consideration of Owner's objections, the Construction Coordinator considers the Work substantially complete, the Construction Coordinator will within be said 14 days execute and deliver to Owner and Contractor a definitive certificate of Substantial Completion (with a revised tentative list of items to be completed or corrected) reflecting such changes from the tentative certificate as Construction Coordinator believes justified after consideration of any objections from Owner.
- D. At the time of delivery of the tentative certificate of Substantial Completion, Construction Coordinator will deliver to Owner and Contractor a written recommendation as to division of responsibilities pending final payment between Owner and Contractor with respect to security, operation, safety, and protection of the Work, maintenance, heat, utilities, insurance, and warranties and guarantees. Unless Owner and Contractor agree otherwise in writing and so informs the Construction Coordinator in writing prior to Construction Coordinator's issuing the definitive certificate of Substantial Completion, Construction Coordinator's aforesaid recommendation will be binding on Owner and Contractor until final payment.

- E. Owner shall have the right to exclude Contractor from the Site after the date of Substantial Completion subject to allowing Contractor reasonable access to complete or correct items on the tentative list.

#### **14.05 Partial Utilization**

- A. Prior to Substantial Completion of all the Work, Owner may use or occupy any substantially completed part of the Work which has specifically been identified in the Contract Documents, or which Owner, Construction Coordinator, and Contractor agree constitutes a separately functioning and usable part of the Work that can be used by Owner for its intended purpose without significant interference with Contractor's performance of the remainder of the Work, subject to the following conditions.
  - 1. Owner at any time may request Contractor in writing to permit Owner to use or occupy any such part of the Work Which Owner believes to be ready for its intended use and substantially complete. If and when Contractor agrees that such part of the Work is substantially complete, Contractor will certify to Owner and Construction Coordinator that such part of the Work is substantially complete and request Construction Coordinator to issue a certificate of Substantial Completion for that part of the Work.
  - 2. Contractor at any time may notify Owner and Construction Coordinator in writing that Contractor considers any such part of the Work ready for its intended use and substantially complete and request Construction Coordinator to issue a certificate of Substantial Completion for that part of the Work. Said work should have, at a minimum, a temporary Certificate of Occupancy from the authority having jurisdiction.
  - 3. Within a reasonable time after either such request, Owner, Contractor, and Construction Coordinator shall make an inspection of that part of the Work to determine its status of completion. If Construction Coordinator does not consider that part of the Work to be substantially complete, Construction Coordinator will notify Owner and Contractor in writing giving the reasons therefor. If Construction Coordinator considers that part of the Work to be substantially complete, the provisions of Paragraph 14.04 will apply with respect to certification of Substantial Completion of that part of the Work and the division of responsibility in respect thereof and access thereto.
  - 4. No use or occupancy or separate operation of part of the Work may occur prior to compliance with the requirements of Paragraph 5.10 regarding property insurance.

#### **14.06 Final Inspection**

- A. Upon written notice from Contractor that the entire Work or an agreed portion thereof is complete, Construction Coordinator will promptly make a final inspection with Owner and Contractor and will notify Contractor in writing of all particulars in which this inspection reveals that the Work is incomplete or defective. Contractor shall immediately take such measures as are necessary to complete such Work or remedy such deficiencies.

#### **14.07 Final Payment**

- A. Application for Payment
  - 1. After Contractor has, in the opinion of Construction Coordinator, satisfactorily completed all corrections identified during the final inspection and has delivered, in accordance with the Contract Documents, all maintenance, training and operating instructions, schedules, guarantees, bonds, certificates or other evidence of insurance certificates of inspection, marked-up record documents to include digital as-builds of the project (as provided in

Paragraph 6.12), and other documents, Contractor may make application for final payment following the procedure for progress payments.

2. The final Application for Payment shall be accompanied (except as previously delivered) by:
  - a. all documentation called for in the Contract Documents, including but not limited to the evidence of insurance required by Paragraph 5.04.B.7;
  - b. consent of the surety, if any, to final payment;
  - c. a list of all Claims against Owner that Contractor believes are unsettled; and
  - d. complete and legally effective releases or waivers (satisfactory to Owner) of all Lien rights arising out of or Liens filed in connection with the Work.
3. In lieu of the releases or waivers of Liens specified in Paragraph 14.07.A.2 and as approved by Owner, Contractor may furnish receipts or releases in full and an affidavit of Contractor that: (i) the releases and receipts include all labor, services, material, and equipment for which a Lien could be filed; and (ii) all payrolls, material and equipment bills, and other indebtedness connected with the Work for which Owner or Owner's property might in any way be responsible have been paid or otherwise satisfied. If any Subcontractor or Supplier fails to furnish such a release or receipt in full, Contractor may furnish a bond or other collateral satisfactory to Owner to indemnify Owner against any Lien.

**B. Construction Coordinator's Review of Application and Acceptance**

1. If, on the basis of Construction Coordinator's observation of the Work during construction and final inspection, and Construction Coordinator's review of the final Application for Payment and accompanying documentation as required by the Contract Documents, Construction Coordinator is satisfied that the Work has been completed and Contractor's other obligations under the Contract Documents have been fulfilled, Construction Coordinator will, within ten (10) days after receipt of the final Application for Payment, indicate in writing Construction Coordinator's recommendation of payment and present the Application for Payment to Owner for payment. At the same time, Construction Coordinator will also give written notice to Owner and Contractor that the Work is acceptable subject to the provisions of Paragraph 14.09. Otherwise, Construction Coordinator will return the Application for Payment to Contractor, indicating in writing the reasons for refusing to recommend final payment, in which case Contractor shall make the necessary corrections and resubmit the Application for Payment.

**C. Payment Becomes Due**

1. Thirty (30) days after the presentation to Owner of the Application for Payment and accompanying documentation, the amount recommended by Construction Coordinator, less any sum Owner is entitled to set off against Construction Coordinator's recommendation, including but not limited to liquidated damages, will become due and, will be paid by Owner to Contractor.

**14.08 Final Completion Delayed**

- A. If, through no fault of Contractor, final completion of the Work is significantly delayed, and if Construction Coordinator so confirms, Owner shall, upon receipt of Contractor's final Application for Payment (for Work fully completed and accepted) and recommendation of Construction Coordinator, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance to be held by Owner for Work not fully completed or corrected is less than the retainage stipulated in



the Agreement, and if bonds have been furnished as required in Paragraph 5.01, the written consent of the surety to the payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by Contractor to the Construction Coordinator with the Application for such payment. Such payment shall be made under the terms and conditions governing final payment, except that it shall not constitute a waiver of Claims.

#### **14.09 Waiver of Claims**

- A. The making and acceptance of final payment will constitute:
  - 1. a waiver of all Claims by Owner against Contractor, except Claims arising from unsettled Liens, from defective Work appearing after final inspection pursuant to Paragraph 14.06, from failure to comply with the Contract Documents or the terms of any special guarantees specified therein, or from Contractor's continuing obligations under the Contract Documents; and
  - 2. a waiver of all Claims by Contractor against Owner other than those previously made in accordance with the requirements herein and expressly acknowledged by Owner in writing as still unsettled.

### **PART 15 - SUSPENSION OF WORK AND TERMINATION**

#### **15.01 Owner May Suspend Work**

- A. At any time and without cause, Owner may suspend the Work or any portion thereof for a period of not more than 90 consecutive days by notice in writing to Contractor and Construction Coordinator which will fix the date on which Work will be resumed. Contractor shall resume the Work on the date so fixed. Contractor shall be granted an adjustment in the Contract Price or an extension of the Contract Times, or both, directly attributable to any such suspension if Contractor makes a Claim therefor as provided in Paragraph 10.05.

#### **15.02 Owner May Terminate for Cause**

- A. The occurrence of any one or more of the following events will justify termination for cause:
  - 1. Contractor's persistent failure to perform the Work in accordance with the Contract Documents (including, but not limited to, failure to supply sufficient skilled workers or suitable materials or equipment or failure to adhere to the Progress Schedule established under Paragraph 2.07 as adjusted from time to time pursuant to Paragraph 6.04);
  - 2. Contractor's disregard of Laws or Regulations of any public body having jurisdiction;
  - 3. Contractor's disregard of the authority of the Construction Coordinator; or
  - 4. Contractor's violation in any substantial way of any provisions of the Contract Documents.
- B. If one or more of the events identified in Paragraph 15.02.A occur, Owner may, after giving Contractor (and surety) seven (7) days written notice of its intent to terminate the services of Contractor:
  - 1. exclude Contractor from the Site, and take possession of the Work and of all Contractor's tools, appliances, construction equipment, and machinery at the Site, and use the same to the full extent they could be used by Contractor (without liability to Contractor for trespass or conversion),

2. incorporate in the Work all materials and equipment stored at the Site or for which Owner has paid Contractor but which are stored elsewhere, and
  3. complete the Work as Owner may deem expedient.
- C. If Owner proceeds as provided in Paragraph 15.02.B, Contractor shall not be entitled to receive any further payment until the Work is completed. If the unpaid balance of the Contract Price exceeds all claims, costs, losses, and damages (including but not limited to all fees and charges of construction coordinator, engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) sustained by Owner arising out of or relating to completing the Work, such excess will be paid to Contractor. If such claims, costs, losses, and damages exceed such unpaid balance, Contractor shall pay the difference to Owner. Such claims, costs, losses, and damages incurred by Owner will be reviewed by the Construction Coordinator as to their reasonableness and, when so approved by the Construction Coordinator, incorporated in a Change Order. When exercising any rights or remedies under this Paragraph Owner shall not be required to obtain the lowest price for the Work performed.
- D. Notwithstanding Paragraphs 15.02.B and 15.02.C, Contractor's services will not be terminated if Contractor begins within seven (7) days of receipt of notice of intent to terminate to correct its failure to perform and proceeds diligently to cure such failure within no more than 30 days of receipt of said notice.
- E. Where Contractor's services have been so terminated by Owner, the termination will not affect any rights or remedies of Owner against Contractor then existing or which may thereafter accrue. Any retention or payment of moneys due Contractor by Owner will not release Contractor from liability.
- F. If and to the extent that Contractor has provided a performance bond under the provisions of Paragraph 5.01.A, the termination procedures of that bond shall supersede the provisions of Paragraphs 15.02.B, and 15.02.C.

### **15.03 Owner May Terminate for Convenience**

- A. Upon fifteen (15) days written notice to Contractor and Construction Coordinator, Owner may, without cause and without prejudice to any other right or remedy of Owner, terminate the Contract. In such case, Contractor shall be paid for (without duplication of any items):
1. completed and acceptable Work executed in accordance with the Contract Documents prior to the effective date of termination, including fair and reasonable sums for overhead and profit on such Work;
  2. expenses sustained prior to the effective date of termination in performing services and furnishing labor, materials, or equipment as required by the Contract Documents in connection with uncompleted Work, plus fair and reasonable sums for overhead and profit on such expenses;
  3. all claims, costs, losses, and damages (including but not limited to all fees and charges of engineers, architects, attorneys, and other professionals and all court or arbitration or other dispute resolution costs) incurred in settlement of terminated contracts with Subcontractors, Suppliers, and others; and
  4. reasonable expenses directly attributable to termination.
- B. Contractor shall not be paid on account of loss of anticipated profits or revenue or other economic loss arising out of or resulting from such termination.

## **15.04 Contractor May Stop Work or Terminate**

- A. If, through no act or fault of Contractor, (i) the Work is suspended for more than 90 consecutive days by Owner or under an order of court or other public authority, or (ii) Construction Coordinator fails to act on any Application for Payment within 30 days after it is submitted, or (iii) Owner fails for 30 days to pay Contractor any sum finally determined to be due, then Contractor may, upon seven (7) days written notice to Owner and Construction Coordinator, and provided Owner or Construction Coordinator do not remedy such suspension or failure within that time, terminate the Contract and recover from Owner payment on the same terms as provided in Paragraph 15.03.
- B. In lieu of terminating the Contract and without prejudice to any other right or remedy, if Construction Coordinator has failed to act on an Application for Payment within 30 days after it is submitted, or Owner has failed for 30 days to pay Contractor any sum finally determined to be due, Contractor may, seven (7) days after written notice to Owner and Construction Coordinator, stop the Work until payment is made of all such amounts due Contractor, including interest thereon. The provisions of this Paragraph 15.04 are not intended to preclude Contractor from making a Claim under Paragraph 10.05 for an adjustment in Contract Price or Contract Times or otherwise for expenses or damage directly attributable to Contractor's stopping the Work as permitted by this Paragraph.

## **PART 16 - DISPUTE RESOLUTION**

### **16.01 Methods and Procedures**

- A. Either Owner or Contractor may request mediation of any Claim submitted to Construction Coordinator for a decision under Paragraph 10.05 before such decision becomes final and binding. The mediation will be governed by the Mediation Rules of the South Carolina Supreme Court in effect as of the Effective Date of the Agreement. The request for mediation shall stay the effect of paragraph 10.05.E.
- B. Owner and Contractor shall participate in the mediation process in good faith. The process shall be concluded within 60 days of the request.
- C. If the Claim is not resolved by mediation, Engineer's action under Paragraph 10.05.C or a denial pursuant to Paragraphs 10.05.C.3 or 10.05.D shall become final and binding 30 days after termination of the mediation unless, within that time period, Owner or Contractor:
  - 1. agrees with the other party to submit the Claim to another dispute resolution process, or
  - 2. gives written notice to the other party of their intent to submit the Claim to a court of competent jurisdiction.

## **PART 17 - MISCELLANEOUS**

### **17.01 Giving Notice**

- A. Whenever any provision of the Contract Documents requires the giving of written notice, it will be deemed to have been validly given if:
  - 1. delivered in person to the individual or to a member of the firm or to an officer of the corporation for whom it is intended, or
  - 2. delivered at or sent by registered or certified mail, postage prepaid, to the last business address known to the giver of the notice.

## **17.02 Computation of Times**

- A. When any period of time is referred to in the Contract Documents by days, it will be computed to exclude the first and include the last day of such period. If the last day of any such period falls on a Saturday or Sunday or on a day made a legal holiday by the law of the applicable jurisdiction, such day will be omitted from the computation.

## **17.03 Cumulative Remedies**

- A. The duties and obligations imposed by these General Conditions and the rights and remedies available hereunder to the parties hereto are in addition to, and are not to be construed in any way as a limitation of, any rights and remedies available to any or all of them which are otherwise imposed or available by Laws or Regulations, by special warranty or guarantee, or by other provisions of the Contract Documents. The provisions of this Paragraph will be as effective as if repeated specifically in the Contract Documents in connection with each particular duty, obligation, right, and remedy to which they apply.

## **17.04 Survival of Obligations**

- A. All representations, indemnifications, warranties, and guarantees made in, required by, or given in accordance with the Contract Documents, as well as all continuing obligations indicated in the Contract Documents, will survive final payment, completion, and acceptance of the Work or termination or completion of the Contract or termination of the services of Contractor.

## **17.05 Controlling Law**

- A. This Contract is to be governed by the law of the State of South Carolina.

## **17.06 Headings**

- A. Part and paragraph headings are inserted for convenience only and do not constitute parts of these General Conditions.

# COLLETON COUNTY VOTER REGISTRATION CENTER

TAX ID# 163-03-00-086

72 BELLS HIGHWAY  
WALTERBORO, S.C. 29488

FOR

## COLLETON COUNTY

### STRUCTURAL ENGINEER

**ADC ENGINEERING**  
1226 YEAMANS HALL ROAD  
HANAHAN, SC 29410  
843.566.0161

### ARCHITECT

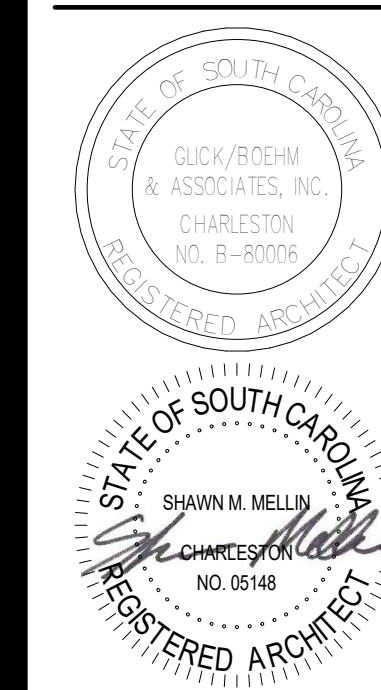
**GLICK/BOEHM & ASSOCIATES**  
493 KING STREET, SUITE 100  
CHARLESTON, SOUTH CAROLINA 29403  
843.577.6377

### MEP ENGINEERS

**DWG CONSULTING ENGINEERING**  
1009 ANNA KNAPP BLVD., SUITE 200  
MOUNT PLEASANT, SC 29464  
843.849.1141



REV.	DATE	DESCRIPTION



**COLLETON COUNTY VOTER  
REGISTRATION CENTER**  
  
COLLETON COUNTY  
72 BELLS HWY  
WALTERBORO, SC 29488

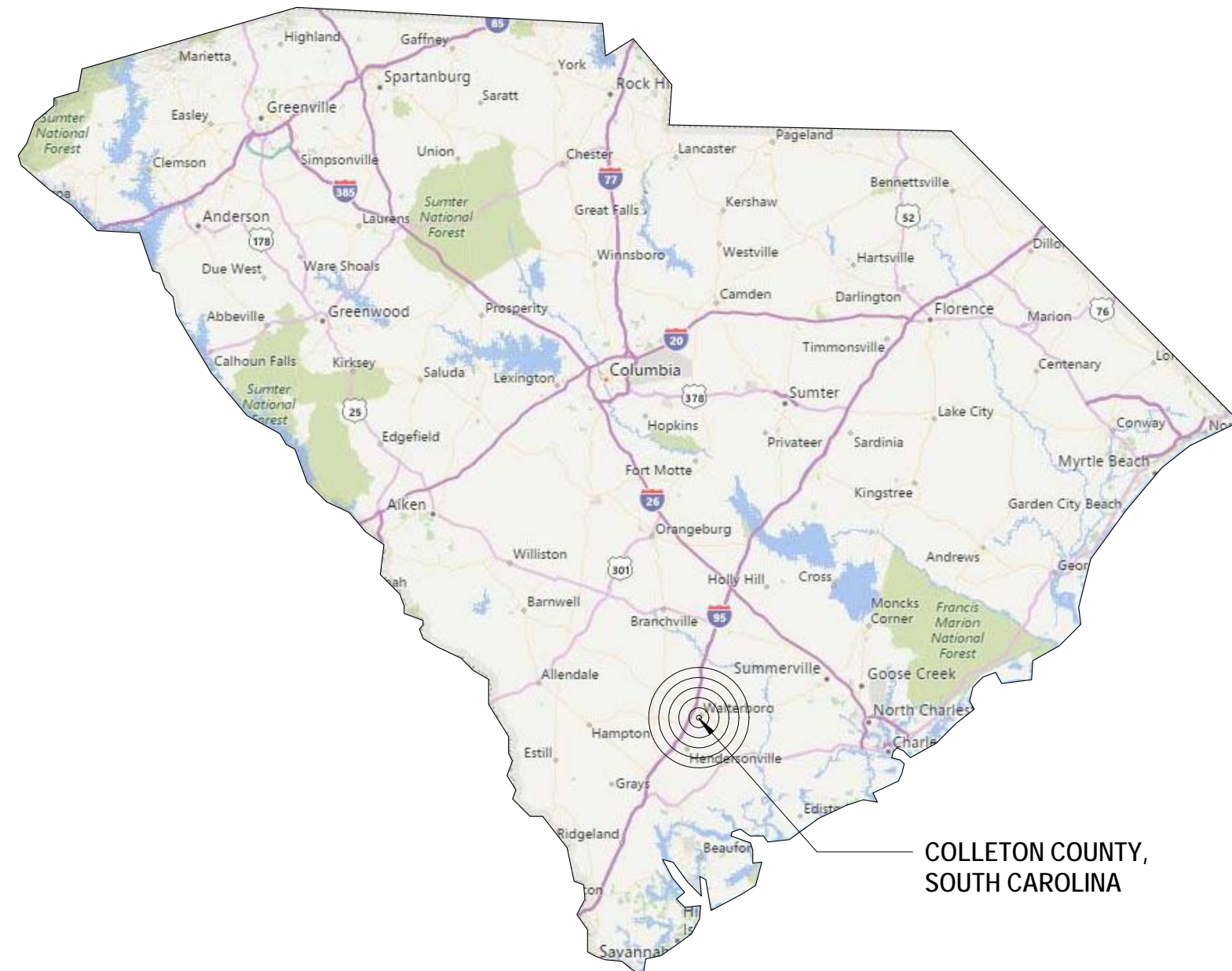
COPYRIGHT © 2023  
GLICK/BOEHM & ASSOCIATES, INC.  
JOB NUMBER: 2217  
PROJECT MGR.: SM  
DRAWN BY: DR  
CHECKED BY: SM  
APPROVED BY: SM  
DATE ISSUED FOR: CD'S 4-27-2023

COVER SHEET

# G000

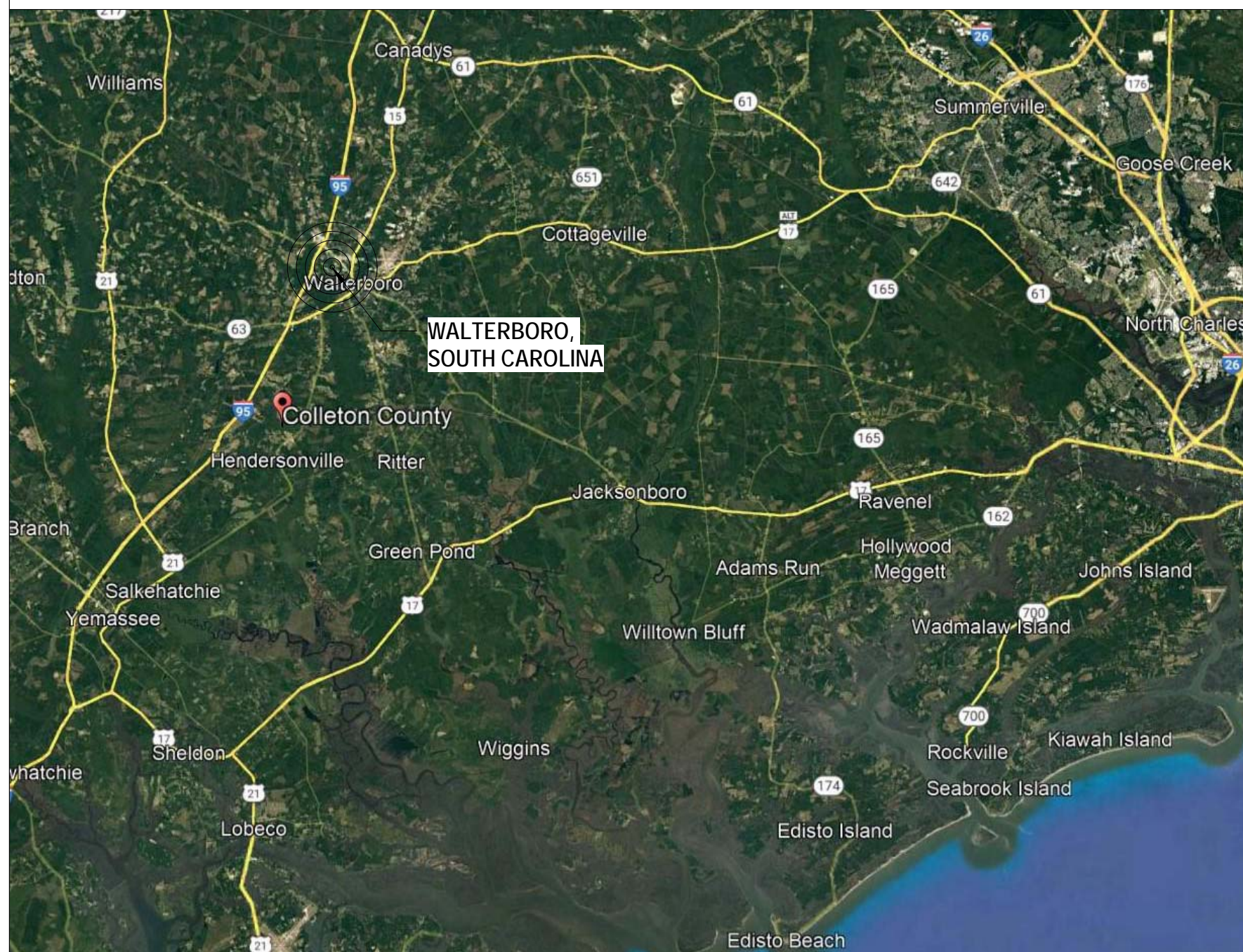


### SOUTH CAROLINA MAP

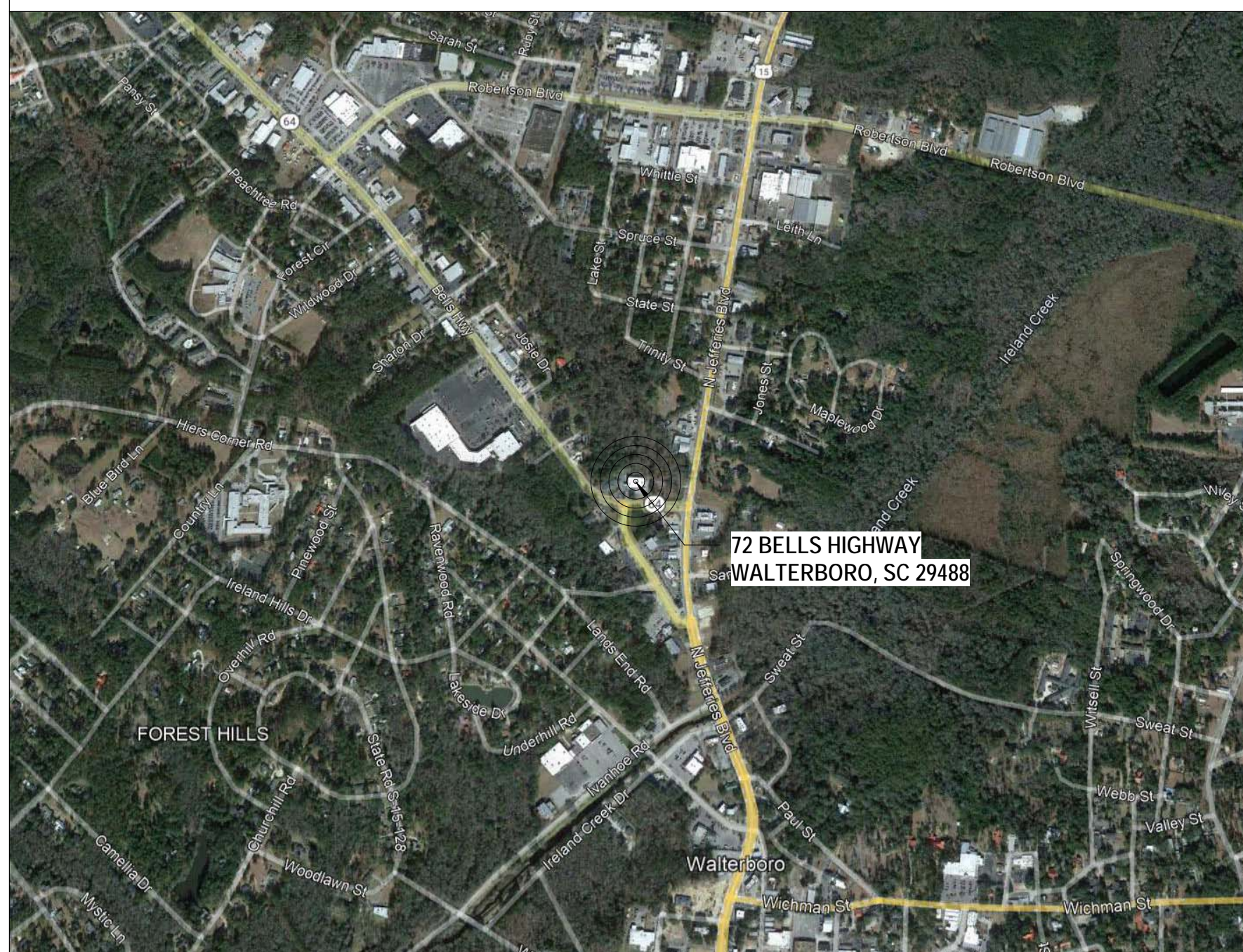


COLLETON COUNTY, SOUTH CAROLINA

### AREA LOCATION MAP



### PROJECT LOCATION MAP



## GENERAL PROJECT INFORMATION

### PROJECT SCOPE

RENOVATION/COVERSION OF AN EMPTY RITE AID PHARMACY AND STORE INTO A MUNICIPAL VOTER REGISTRATION CENTER FOR COLLETON COUNTY.

WORK INCLUDES DEMOLITION OF SELECTED INTERIOR WALL AND CEILINGS TO MAKE WAY FOR NEW CONSTRUCTION. PORTIONS OF THE EXTERIOR WALL WILL ALSO BE DEMOLISHED TO ACCOMMODATE NEW OPENINGS - TRADITIONAL DOORS AND OVERHEAD ROLL-UP DOORS. REMOVE DESIGNATED CEILINGS, FIXTURES, AND ANNOUNCEMENT, LIFE SAFETY, SECURITY DEVICES & ASSOCIATED WIRING. DEMOLISH PORTIONS OF SURROUNDING SIDEWALK TO PREPARE FOR RAMPED/ADA APPROACHES.

NEW CONSTRUCTION CONSISTS OF NEW INTERIOR WALLS, DOORS, CEILINGS AND ASSOCIATED MECHANICAL, ELECTRICAL, AND PLUMBING FIXTURES.

### SPECIAL INSPECTIONS

- SPECIAL INSPECTIONS ARE REQUIRED
- SPECIAL INSPECTIONS ARE NOT REQUIRED

IF SPECIAL INSPECTIONS ARE REQUIRED, THE OWNER SHALL EMPLOY ONE OR MORE SPECIAL INSPECTORS TO PROVIDE INSPECTION SERVICES DURING THE CONSTRUCTION PHASE IN ACCORDANCE WITH CHAPTER 17 OF IBC 2021. SEE SPECIFICATION SECTION 01 45 33 FOR THE ACTUAL REQUIREMENTS OF WORK SUBJECT TO SPECIAL INSPECTIONS FOR THIS PROJECT.

### BASIC PROJECT INFO

PROJECT NAME: Voter Registration Center

PROJECT ADDRESS: 72 Bells Highway  
Walterboro, SC 29488

OWNER REPRESENTATIVE: John Sleglitz

REPRS. ADDRESS: 403 E. Washington St., Suite D  
Walterboro, SC 29488  
843.782.0508

OWNER: Colleton County

#### PRIMARY CODES AND ORDINANCES USED:

1. 2021 INTERNATIONAL BUILDING CODE W/ SC MODIFICATIONS
2. 2021 INTERNATIONAL FIRE CODE W/ SC MODIFICATIONS
3. 2021 INTERNATIONAL MECHANICAL CODE
4. 2021 INTERNATIONAL PLUMBING CODE
5. 2021 INTERNATIONAL FUEL GAS CODE W/ SC MODIFICATIONS
6. 2009 INTERNATIONAL ENERGY CONSERVATION CODE
7. 2017 NATIONAL ELECTRIC CODE
8. WALTERBORO ZONING ORDINANCE
9. 1992 AMERICANS WITH DISABILITY ACT
10. ICC/ANSI A117.1 ACCESSIBLE AND USEABLE BUILDINGS AND FACILITIES, LATEST ED.
11. SOUTH CAROLINA ELEVATOR CODE AND REGULATIONS, LATEST EDITION
12. SC ENERGY EFFICIENCY STANDARDS ACT
13. ASHRAE 90.1-2004, ENERGY EFFICIENT DESIGN OF NEW BUILDINGS EXCEPT LOW-RISE RESIDENTIAL BUILDINGS
14. STATE FIRE MARSHAL REGULATIONS

### DESIGN TEAM

#### ARCHITECT

GLICK/BOEHM & ASSOCIATES, INC.  
493 King Street, Suite 100  
Charleston, South Carolina 29403  
843.577.6377

#### STRUCTURAL ENGINEER

ADC ENGINEERING  
1226 Yeamans Hall Road  
Hanahan, SC 29410  
843.566.0161

#### MECHANICAL ENGINEER

DWG CONSULTING ENGINEERING  
1009 Anna Knapp Blvd., Suite 200  
Mount Pleasant, SC 29464  
843.849.1141

#### PLUMBING ENGINEER

DWG CONSULTING ENGINEERING  
1009 Anna Knapp Blvd., Suite 200  
Mount Pleasant, SC 29464  
843.849.1141

#### ELECTRICAL ENGINEER

DWG CONSULTING ENGINEERING  
1009 Anna Knapp Blvd., Suite 200  
Mount Pleasant, SC 29464  
843.849.1141

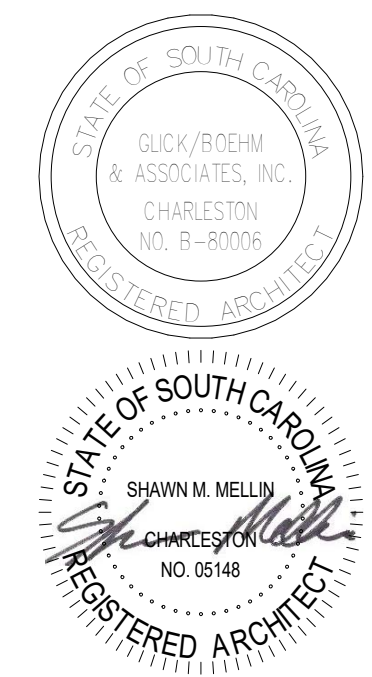
## DRAWING LIST

SHEET NO.	SHEET TITLE
GENERAL	
G000	COVER SHEET
G100	DRAWING LIST & PROJECT INFORMATION
G110	GENERAL PROJECT & BUILDING CODE INFORMATION
G111	FIRST FLOOR LIFE SAFETY PLAN
STRUCTURAL	
S001	GENERAL NOTES
S101	FOUNDATION PLAN
S102	ROOF FRAMING PLAN
S501	SECTIONS AND DETAILS
DEMOLITION	
AD100	FIRST FLOOR DEMOLITION PLAN
AD120	REFLECTED CEILING DEMOLITION PLAN
AD200	BUILDING DEMOLITION ELEVATIONS
ARCHITECTURAL	
A000	GENERAL ARCHITECTURAL INFORMATION
A100	FLOOR PLAN - NEW CONSTRUCTION
A120	FIRST FLOOR REFLECTED CEILING PLAN
A140	FINISH SCHEDULE & LEGEND
A200	BUILDING ELEVATIONS
A300	BUILDING SECTIONS
A400	ENLARGED FLOOR PLANS - NEW CONSTRUCTION
A401	ENLARGED FLOOR PLANS - NEW CONSTRUCTION
A402	ENLARGED FLOOR PLANS - NEW CONSTRUCTION
A501	TYPICAL WALL TYPES & DETAILS
A550	INTERIOR SECTION DETAILS
A560	TYPICAL SEISMIC CEILING DETAILS
A600	DOOR TYPES, SCHEDULE & DETAILS
A610	STOREFRONT TYPES, SCHEDULE & DETAILS
PLUMBING	
PD051	FIRST FLOOR PLUMBING DEMOLITION PLAN
P001	PLUMBING NOTES & LEGENDS
P002	PLUMBING DETAILS
P101	FIRST FLOOR DOMESTIC WATER PLAN
P201	FIRST FLOOR SANITARY & VENT PLAN
MECHANICAL	
MD051	FIRST FLOOR MECHANICAL DEMOLITION PLAN
M001	MECHANICAL NOTES & LEGENDS
M002	MECHANICAL SCHEDULES AND DETAILS
M101	FIRST FLOOR MECHANICAL PLAN
ELECTRICAL	
E001	ELECTRICAL NOTES
E002	ELECTRICAL LEGENDS
E010	ELECTRICAL ONE-LINE DIAGRAM
E020	ELECTRICAL PANEL SCHEDULES
E050	SITE DEMOLITION PLAN
E051	FIRST FLOOR POWER & TELECOM DEMO PLAN
E052	FIRST FLOOR LIGHTING DEMOLITION PLAN
E053	FIRST FLOOR SYSTEMS DEMOLITION PLAN
E061	MEZZANINE ELECTRICAL DEMOLITION PLAN
E100	SITE ELECTRICAL RENOVATION PLAN
E101	FIRST FLOOR POWER & TELECOM RENOVATION PLAN
E102	FIRST FLOOR LIGHTING PLAN
E103	FIRST FLOOR SYSTEMS RENOVATION PLAN
E200	ROOF ELECTRICAL PLAN



DESCRIPTION

REV. DATE



COLLETON COUNTY VOTER  
REGISTRATION CENTER

COLLETON COUNTY  
72 BELLS HWY  
WALTERBORO, SC 29488

2023  
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GLICK/BOEHM & ASSOCIATES, INC.  
JOB NUMBER:  
2217  
PROJECT MGR.: SM  
DRAWN BY: DR  
CHECKED BY: SM  
APPROVED BY: SM  
DATE ISSUED FOR:  
CD'S

4-27-2023  
DRAWING LIST &  
PROJECT  
INFORMATION

G100



## BUILDING DESIGN & CODE INFORMATION

PLUMBING INFORMATION				
ASSEMBLY CLASSIFICATION - 150 OCCUPANTS (75 MEN / 75 WOMEN)				
MINIMUM PLUMBING FIXTURES (per IPC Section 403 & Table 403.1)				
	Male-Required	Male-Provided	Female-Req'd	Female-Provided
Water Closets	0.06	-	1.15	-
Lavatories	0.38	-	0.38	-
Urinals*	--	-	-	-
OTHER FIXTURES (per IPC Section 403 & Table 403.1)				
	Required	Provided		
Drinking Fountains	0.35	-	-	-
Unisex toilet	--	--	-	-
Service Sink	1	-	-	-
Others (list)	--	--	-	-
BUSINESS CLASSIFICATION - 37 OCCUPANTS (18.5 MEN / 18.5 WOMEN)				
MINIMUM PLUMBING FIXTURES (per IPC Section 403 & Table 403.1)				
	Male-Required	Male-Provided	Female-Req'd	Female-Provided
Water Closets	0.74	-	0.74	-
Lavatories	0.92	-	0.92	-
Urinals*	--	-	-	-
OTHER FIXTURES (per IPC Section 403 & Table 403.1)				
	Required	Provided		
Drinking Fountains	0.37	-	-	-
Unisex toilet	--	--	-	-
Service Sink	1	-	-	-
Others (list)	--	--	-	-
STORAGE CLASSIFICATION - 12 OCCUPANTS (6 MEN / 6 WOMEN)				
MINIMUM PLUMBING FIXTURES (per IPC Section 403 & Table 403.1)				
	Male-Required	Male-Provided	Female-Req'd	Female-Provided
Water Closets	0.06	-	0.06	-
Lavatories	0.06	-	0.06	-
Urinals*	--	-	-	-
OTHER FIXTURES (per IPC Section 403 & Table 403.1)				
	Required	Provided		
Drinking Fountains	0.01	-	-	-
Unisex toilet	--	--	-	-
Service Sink	1	-	-	-
Others (list)	--	--	-	-

\*Urinals - See IPC 419.2  
NOTE: Where mixed Occupancies occur within buildings, expand this table to indicate Occupant loads for each. The minimum required toilet fixtures are calculated for the total Design Occupant Load indicated in BUILDING DESIGN OCCUPANT LOAD.

PLUMBING INFORMATION				
MINIMUM PLUMBING FIXTURES (per IPC Section 403 & Table 403.1)				
	Male-Required	Male-Provided	Female-Req'd	Female-Provided
Water Closets	0.86	2	1.95	2
Lavatories	1.36	2	1.36	2
Urinals*	--	0	-	-
OTHER FIXTURES (per IPC Section 403 & Table 403.1)				
	Required	Provided		
Drinking Fountains	0.73	1	-	-
Unisex toilet	--	--	-	-
Service Sink	1	1	-	-
Others (list)	--	--	-	-

NOTE: Where mixed Occupancies occur within buildings, expand this table to indicate Occupant loads for each. The minimum required toilet fixtures are calculated for the total Design Occupant Load indicated in BUILDING DESIGN OCCUPANT LOAD.

BUILDING DESIGN OCCUPANT LOAD					
Stories & Levels	Function of Space (1)	A	B	C	D
		Floor Area (2) <i>(specify NSF or GSF)</i>	Max Area per Occupant (3) <i>(specify NSF or GSF)</i>	Persons on floor for this Function (4)	Design Occupant Load
1	BUSINESS	5464	150 GROSS	37	222
	STORAGE	3588	300 GROSS	12	
	ASSEMBLY (CONCENTRATED)	1226	7 NET	150	
	ASSEMBLY (UNCONCENTRATED)	342	15 NET	23	
Subtotal Design Occupant Load for this Story: (5)					222
<i>Add or delete rows as needed for each story &amp; level of building (including mezzanine)</i>					
Total Building Design Occupant Load: (6)					222

**Footnotes:**  
1. Provide the complete name of the Function of space using the left column of Table 1004.1.2 of the IBC.  
2. Design Area per each occupant of this function on this floor in either Gross or Net square footage.  
3. Allowed Floor Areas in SF per Occupant per right column in Table 1004.1.2 of the IBC.  
4. Divide Column A (2) by Column B (3) for each function and enter the result, rounded up to the nearest whole person.  
5. Subtotal all Column C values for this floor to yield the Design Occupant Load.  
6. Total Building Design Occupant Load - sum of all Column D value

BUILDING HEIGHT				
	AS DESIGNED		AS ALLOWED BY IBC	
	In Feet	In Stories	In Feet (TABLE 504.3)	In Stories (TABLE 504.4)
Without any Allowable Increase	20'-0"	1	55'-0"	2

SEPARATED OCCUPANCY ALLOWABLE AREA		
<b>506.2.2 MIXED-OCCUPANCY BUILDINGS.</b>		
The allowable area of each story of a mixed-occupancy building shall be determined in accordance with the applicable provisions of Section 508.4.2 for separated occupancies.		
<b>508.4.2 ALLOWABLE BUILDING AREA.</b>		
In each story, the building area shall be such that the sum of the ratios of the actual building area of each separated occupancy divided by the allowable building area of each separated occupancy shall not exceed 1.		
A-3	$\frac{1,568}{9,500}$	= .165
B	$\frac{5,464}{23,000}$	= .238
S-1	$\frac{4,260}{17,500}$	= .244
		.647

BASIC BUILDING CODE INFORMATION		
CONSTRUCTION CLASSIFICATION	Type <u>II-B</u>	(IBC 602)
OCCUPANCY GROUP <i>(indicate all)</i>	<u>B - BUSINESS</u> <u>S1 - STORAGE</u> <u>A3 - ASSEMBLY</u>	(IBC 302)
OCCUPANCY GROUP <i>(indicate most restrictive)</i>	<u>A3 - ASSEMBLY</u>	(IBC Table 503)
Does building require Incidental Use Area Separation?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	(IBC 509)
Does building have Accessory Occupancy (ies)? What percent of story is accessory occupancy?	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	(IBC 508.3.1) <u>xxx</u> SF <u>xxx</u> %
Mixed Occupancy	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	(IBC 508)
Non separated	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes	(IBC 508.3)
Separated	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes	(IBC 508.4 (IBC506.4.1))

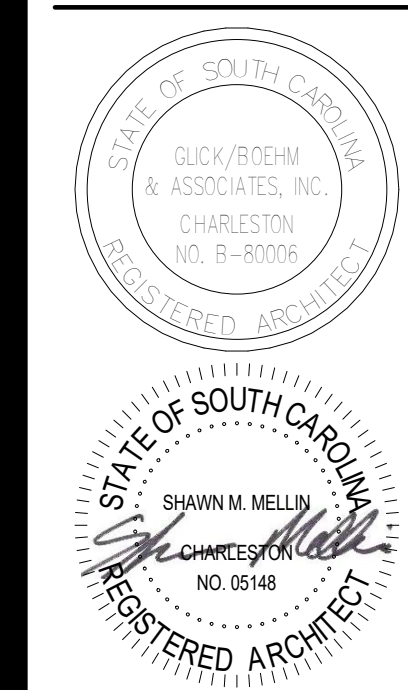
BUILDING AREA		
AREA LIMIT BY TABLE 506.2 OF IBC	A-3	<u>9,500</u> SF <i>(area limitation per story)</i>
AREA MODIFICATION FROM EQUATION 5-2 OF IBC (IBC 506.2.3) <i>(insert equation from IBC 506.2.3 with completed calculations in this box)</i> (Equation 5-2) Aa = [At + (NS x If)] x Sa where: Aa = Allowable area (square feet). At = Tabular allowable area factor in accordance with Table 506.2. If = Area increase factor due to frontage (percent) as calculated in accordance with Section 506.3. NS = Tabular allowable area factor in accordance with Section 506.2 for a nonsprinklered building. Sa = Actual number of building stories above grade plane not to exceed three. For buildings equipped throughout with an automatic sprinkler system installed in accordance with Section 903.3.1.2, use the actual number of building stories above gradeplane, not to exceed four.		<u>16,625</u> SF <i>(maximum modified area per story)</i>
16,625 = [9,500 + (9,500 x 0.75)] x 1		
TOTAL ALLOWED AREA OF BUILDING <i>(Summary of all stories)</i>		<u>16,625</u> SF
AREA AS DESIGNED PER STORY <i>(Repeat for each story)</i>		<u>10,855</u> SF <i>(area per story)</i>
TOTAL DESIGNED AREA OF BUILDING		<u>10,855</u> SF

FIRE PROTECTION REQUIREMENTS			
SEPARATIONS			
Fireblocking Required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IBC Section 718.2
Draftstopping Required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IBC Section 718.3
Smoke Control System Required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IBC Section 909
Smoke Barriers Required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IBC Sections 407 and 408
Smoke Partitions Required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IBC Section 407
Fire Partition Required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IBC Section 708
Fire Barrier Required (As Shaft)	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IBC Section 707
ALARM & DETECTION			
Fire Alarm System Required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IFC Section 907
Emergency Alarm System Required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IFC 908
SUPPRESSION			
Standpipes Required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IFC Section 905
Sprinklers Required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IFC Section 903
Sprinklers Provided	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		
Portable extinguishers required	<input type="checkbox"/> No <input checked="" type="checkbox"/> Yes		per IFC 906
Other suppression systems required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IFC 904
Smoke & heat vents required	<input checked="" type="checkbox"/> No <input type="checkbox"/> Yes		per IFC 910
Other: <i>(indicate other provided fire and life safety features not listed above, if any)</i>			

FIRE RATING OF BUILDING ELEMENTS				
BUILDING ELEMENT	Rating As Required (in hours)	Rating As Designed (in hours)	Testing Agency & Design No. (UL, FM, etc.)	Designers Wall / Partition Key Code
Structural Frame <i>(per IBC Table 601)</i>	N/A	N/A	N/A	
Bearing Walls Exterior Interior <i>(per IBC Table 601)</i>	N/A	N/A	N/A	N/A
Nonbearing Walls & Partitions Exterior Interior <i>(per IBC Table 601 &amp; 602)</i>	N/A	N/A	N/A	N/A
Floor Construction including supporting beams & joists <i>(per IBC Table 601)</i>	N/A	N/A	N/A	
Roof Construction including supporting beams & joists <i>(per IBC Table 601)</i>	N/A	N/A	N/A	
Fire Walls <i>(per IBC Section 706)</i>	N/A	N/A	N/A	N/A
Fire Barriers <i>(per IBC Section 707)</i>	N/A	N/A	N/A	N/A
Shaft Enclosures <i>(per IBC Section 713)</i>	N/A	N/A	N/A	N/A
Fire Partitions <i>(per IBC Section 708)</i>	N/A	N/A	N/A	N/A
Opening & Protective Listing by Category (fire shutters, doors, etc.) <i>(per IBC Section 715)</i>	N/A	N/A	N/A	N/A
Others as required by Designer	N/A	N/A	N/A	N/A



REV.	DATE	DESCRIPTION



**COLLETON COUNTY VOTER REGISTRATION CENTER**

**COLLETON COUNTY**  
72 BELLS HWY  
WALTERBORO, SC 29488

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PROJECT MGR.: SM  
DRAWN BY: DR  
CHECKED BY: SM  
APPROVED BY: SM  
DATE ISSUED FOR: CD'S 4-27-2023

**GENERAL PROJECT & BUILDING CODE INFORMATION**  
**G110**



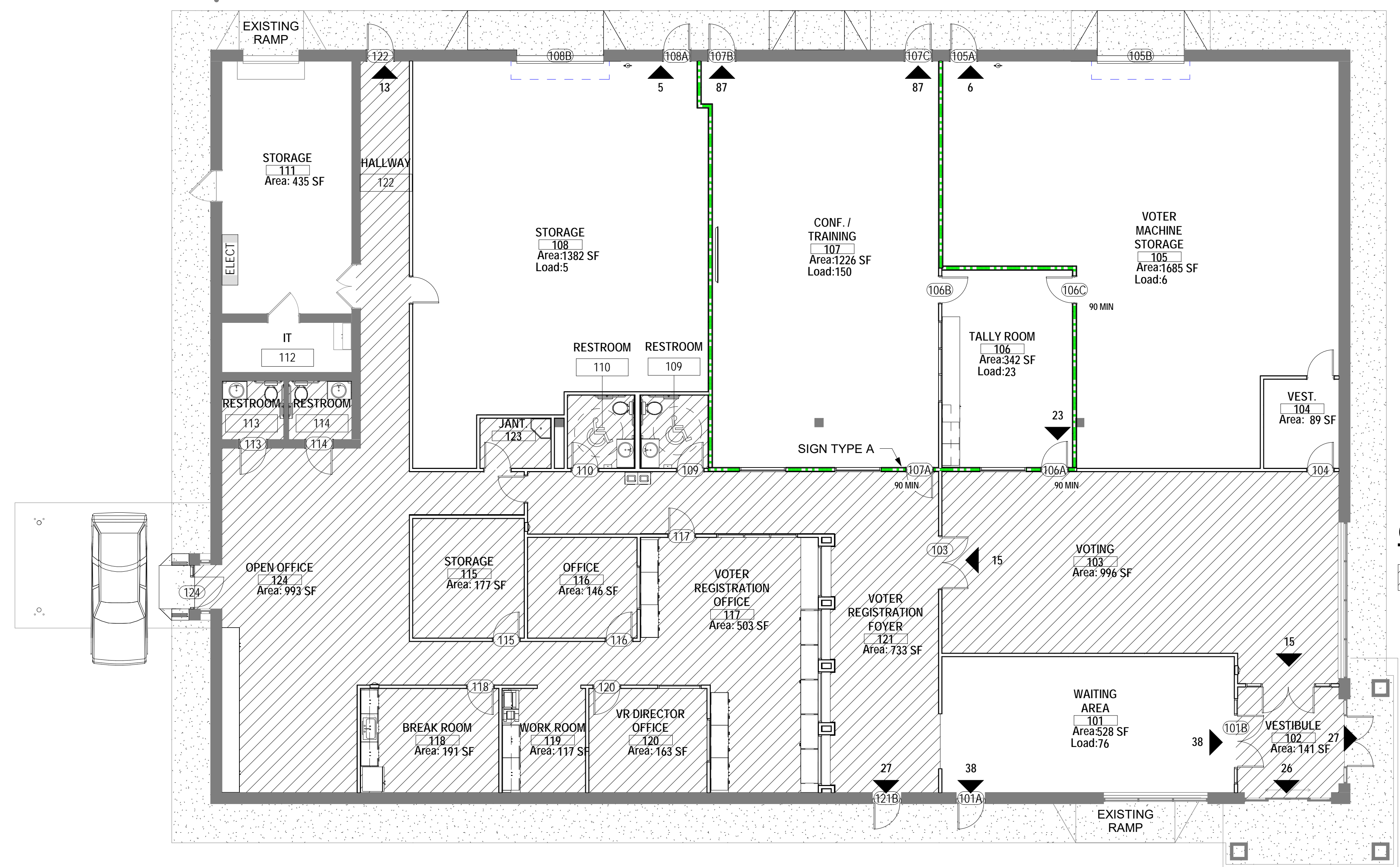
COMMON PATH OF EGRESS TRAVEL	
OCCUPANCY	TRAVEL DISTANCE (WITHOUT SPRINKLER SYSTEM)
A	75'
B	75'
S	100'

EXIT ACCESS TRAVEL DISTANCE	
OCCUPANCY	EXIT ACCESS TRAVEL DISTANCE (W/OUT SPRINKLER SYSTEM)
A, B, S	200' - 0"

EGRESS DISTANCES	
ROUTE TYPE	DISTANCE

OCCUPANCY CLASSIFICATION		
FUNCTION OF SPACE	OCCUPANT LOAD FACTOR	OCCUPANCY GROSS OR NET
ACCESSORY STORAGE AREA (MECHANICAL EQUIP RM)	300 SF	GROSS
ASSEMBLY (CONCENTRATED)	7 SF	NET
ASSEMBLY (STANDING SPACE)	5 SF	NET
ASSEMBLY (UNCONCENTRATED)	15 SF	NET
BUSINESS AREA	150 SF	GROSS
DAY CARE	35 SF	NET
EDUCATIONAL (CLASSROOM AREA)	20 SF	NET
EDUCATIONAL (SHOPS & VOCATIONAL AREA)	50 SF	NET
EXERCISE ROOM	50 SF	GROSS
INDUSTRIAL AREA	100 SF	GROSS
KITCHEN (COMMERCIAL)	200 SF	GROSS
LIBRARY (READING RM)	50 SF	NET
LIBRARY (STACK AREA)	100 SF	GROSS
MERCANTILE (AREA ON OTHER FLOORS)	60 SF	GROSS
MERCANTILE (BASEMENT & GRADE FLOORS)	30 SF	GROSS
MERCANTILE (STORAGE / STOCK / SHIPPING)	300 SF	GROSS
PARKING GARAGE	200 SF	GROSS
RESIDENTIAL	200 SF	GROSS
SKATING RINK & SWIMMING POOL (DECK)	15 SF	GROSS
SKATING RINK & SWIMMING POOL (RINK / POOL)	50 SF	GROSS
STAGES & PLATFORMS	15 SF	NET
UNOCCUPIED	0 SF	NET
WAREHOUSE	500 SF	GROSS

OCCUPANCY SCHEDULE				
ROOM NO.	ROOM NAME	AREA	AREA PER OCCUPANT	OCCUPANT LOAD
ACCESSORY STORAGE AREA (MECHANICAL EQUIPMENT)				
	STORAGE	3588	300 SF	12
ASSEMBLY (CONCENTRATED)				
107	CONF./TRAINING	1226 SF	*	150
ASSEMBLY (UNCONCENTRATED)				
106	TALLY ROOM	342 SF	15 SF	23
BUSINESS AREA				
	BUSINESS	5464 SF	150 SF	37
GRAND TOTAL				222
* MAXIMUM OCCUPANCY SIGN SHALL LIST 150 OCCUPANTS AT THE MAXIMUM				



### LEGEND & SYMBOLS

- 2 HOUR FIRE RATED WALL
- SMOKE RATED WALL
- FIRE RATED DOOR / WINDOW
  - 20 MIN. - 1/3 HOUR
  - 45 MIN. - 3/4 HOUR
  - 60 MIN. - 1 HOUR
  - 90 MIN. - 1-1/2 HOUR
  - 180 MIN. - 3 HOUR
- COMMON PATH OF TRAVEL TRAVEL DISTANCE
- DIRECTION OF EGRESS WITH OCCUPANT LOAD
- REQUIRED EGRESS WIDTH
- ACTUAL EGRESS WIDTH
- FIRE EXTINGUISHER CABINET (FEC)

### OCCUPANCY CLASSIFICATION

BUSINESS AREA

MAIN BUSINESS AREA = 4,914 SF  
 UNDER ROOF AREA = 550 SF  
 TOTAL BUSINESS AREA = 5,464 SF

AREA PER OCCUPANT: 150  
 OCCUPANCY LOAD: 37

**107**

**MAXIMUM OCCUPANT LOAD**

**150**

GRADE 2 BRAILLE TEXT

SCALE: 6" = 1'-0"

**1 FIRST FLOOR LIFE SAFETY PLAN**  
SCALE: 1/8" = 1'-0"

### SIGN TYPE A

SCALE: 6" = 1'-0"

PROJ.

GRAPHIC SCALE

TRUE

0 4 8 12 16

REV.	DATE	DESCRIPTION

SHAWN M. MELLIS  
REGISTERED ARCHITECT  
NO. 05148

GLICK/BOEHM & ASSOCIATES, INC.  
REGISTERED ARCHITECT  
NO. B-80008

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**FIRST FLOOR LIFE SAFETY PLAN**

**G111**



ABBREVIATIONS:

Table of abbreviations and their corresponding full names, including terms like ANCHOR BOLT, ADJACENT, ARCHITECTURALLY EXPOSED STRUCTURAL STEEL, etc.

MASONRY

- 1. ALL MASONRY SHALL CONFORM TO ACI REQUIREMENTS.
2. MASONRY CONSTRUCTION SHALL CONFORM TO "BUILDING CODE REQUIREMENTS AND SPECIFICATION FOR MASONRY STRUCTURES" (ACI 530) EXCEPT AS MODIFIED OR AMENDED BY THE CONTRACT DOCUMENTS.

CAST-IN-PLACE CONCRETE

- 1. ALL CAST-IN-PLACE CONCRETE SHALL CONFORM TO ACI STANDARDS.
2. LAP ALL W/W/W/R ONE MESH SPACING PLUS A 2" OFFSET AND SECURELY ANCHOR.

STRUCTURAL DESIGN CRITERIA

DESIGN BASED ON THE FOLLOWING CODES:
INTERNATIONAL BUILDING CODE (IBC) 2021
AMERICAN SOCIETY OF CIVIL ENGINEERS (ASCE) 7-16 - MINIMUM DESIGN LOADS AND ASSOCIATED CRITERIA FOR BUILDINGS AND OTHER STRUCTURES

- 1. FOUNDATION DESIGN VALUES: ALLOWABLE BEARING CAPACITY 1,500 PSF
2. GRAVITY LOAD DESIGN VALUES: FLOOR LIVE LOADS: (1ST FLOOR) CORRIDORS 100-PSF, LOBBY 100-PSF, RESTROOMS 100-PSF, OFFICES 50-PSF, CLASSROOMS 40-PSF

VOTER REGISTRATION BUILDING WALTERBORO, SC

Table with columns: DESCRIPTION, AREA (SQ FT), ZONE, WIND PRESSURE (PSF), MAX P (PSF), MIN P (PSF). Rows include Roof Field, Roof Edge, Roof Corner, Wall Field, Wall End Zone.

GENERAL NOTES

- 1. STRUCTURAL DRAWINGS ARE TO BE USED IN CONJUNCTION WITH THE ENTIRE SET OF PROJECT DRAWINGS, PROJECT MANUAL, AND ALL SHOP DRAWING SUBMITTALS.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND COORDINATING DIMENSIONS, CLEARANCES AND ALL OTHER COORDINATION ISSUES WITH OTHER TRADES.

STRUCTURAL STEEL FRAMING

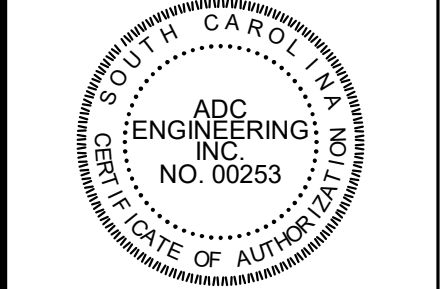
- 1. ALL STRUCTURAL STEEL FRAMING SHALL CONFORM TO AISC SPECIFICATIONS.
2. ALL STRUCTURAL STEEL ERECTION SHALL COMPLY WITH AISC 360-16 AND AISC 303-16.

FIELD WELDING

- 1. ALL FIELD WELDING SHALL BE IN ACCORDANCE WITH AWS D1.1, "STRUCTURAL WELDING CODE-STEEL" AND AWS D1.3, "STRUCTURAL WELDING CODE-SHEET STEEL", LATEST EDITIONS.



Table with columns: REV. No., DATE, DESCRIPTION. Contains revision history entries.



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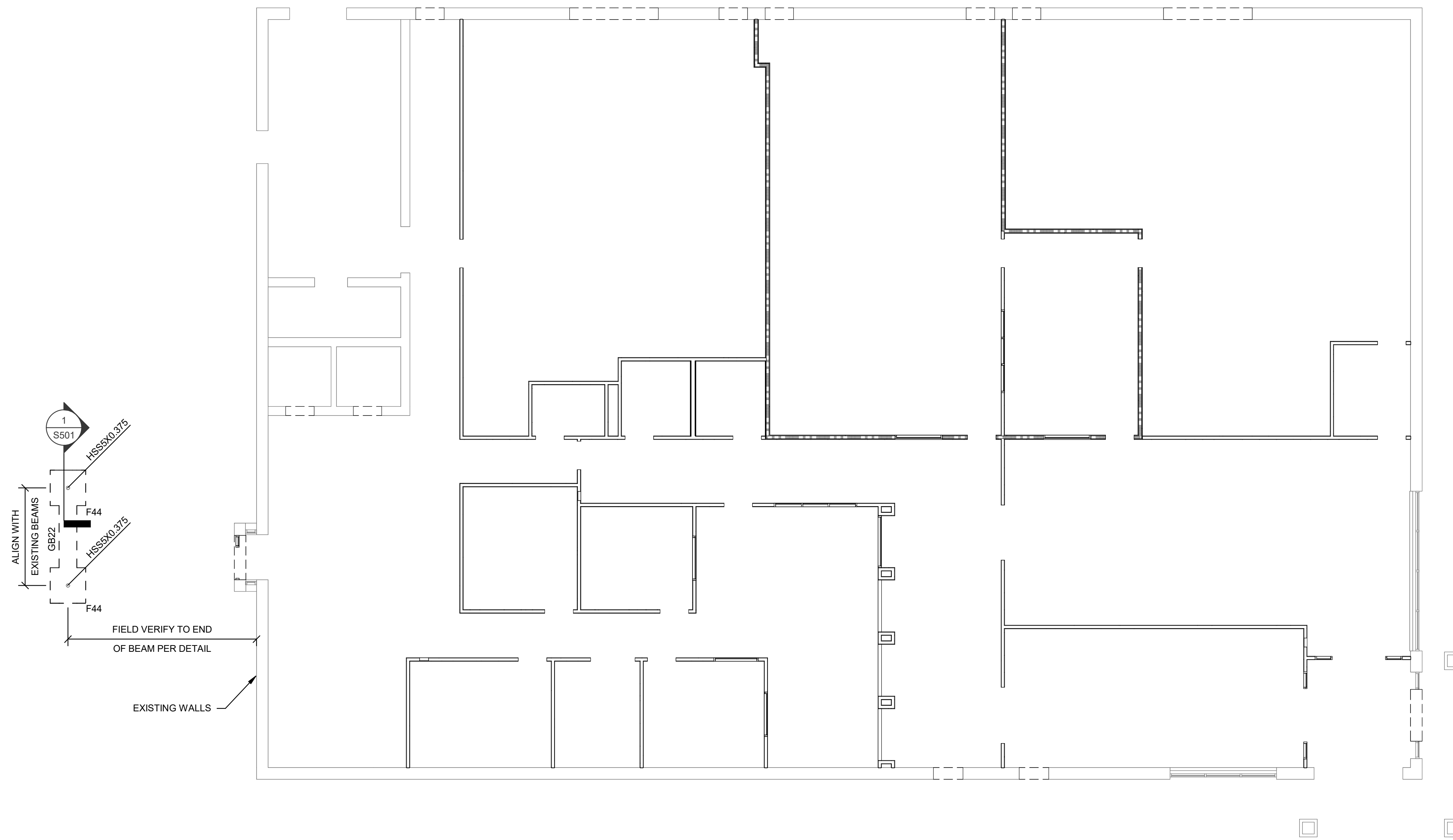
GENERAL NOTES

S001

GRADE BEAM/TIE BEAM SCHEDULE						
TYPE	WIDTH	THICKNESS	TOP REINFORCING	BOTTOM REINFORCING	STIRRUPS	NOTES
GB22	2'-0"	2'-0"	(9)#5'S	(5)#5'S	#3'S @ 12" O.C.	CONTINUE GB TO FAR SIDES OF FOOTING

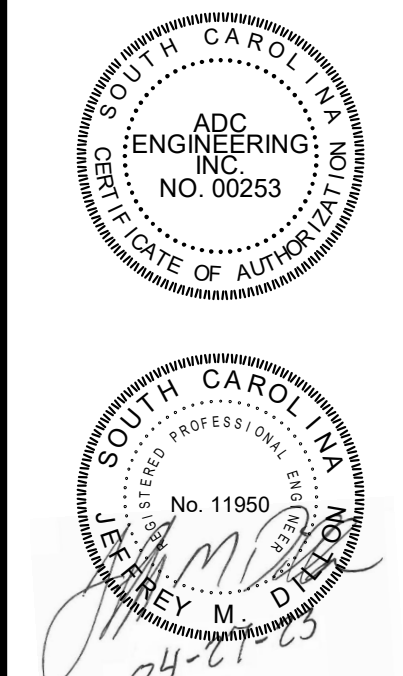
SPREAD FOOTING SCHEDULE					
FOOTING TYPE	LENGTH	WIDTH	THICKNESS	BOTTOM REINFORCING	TOP REINFORCING
F44	4'-0"	4'-0"	1'-0"	(4)#5'S EW	N/A

FOR NEW OPENINGS AND INFILL OF EXISTING OPENINGS, SEE TYPICAL DETAILS AND ARCHITECTURAL PLANS FOR LOCATIONS AND SIZES



**1 FOUNDATION**  
1/8" = 1'-0"

REV. No. | DATE | DESCRIPTION

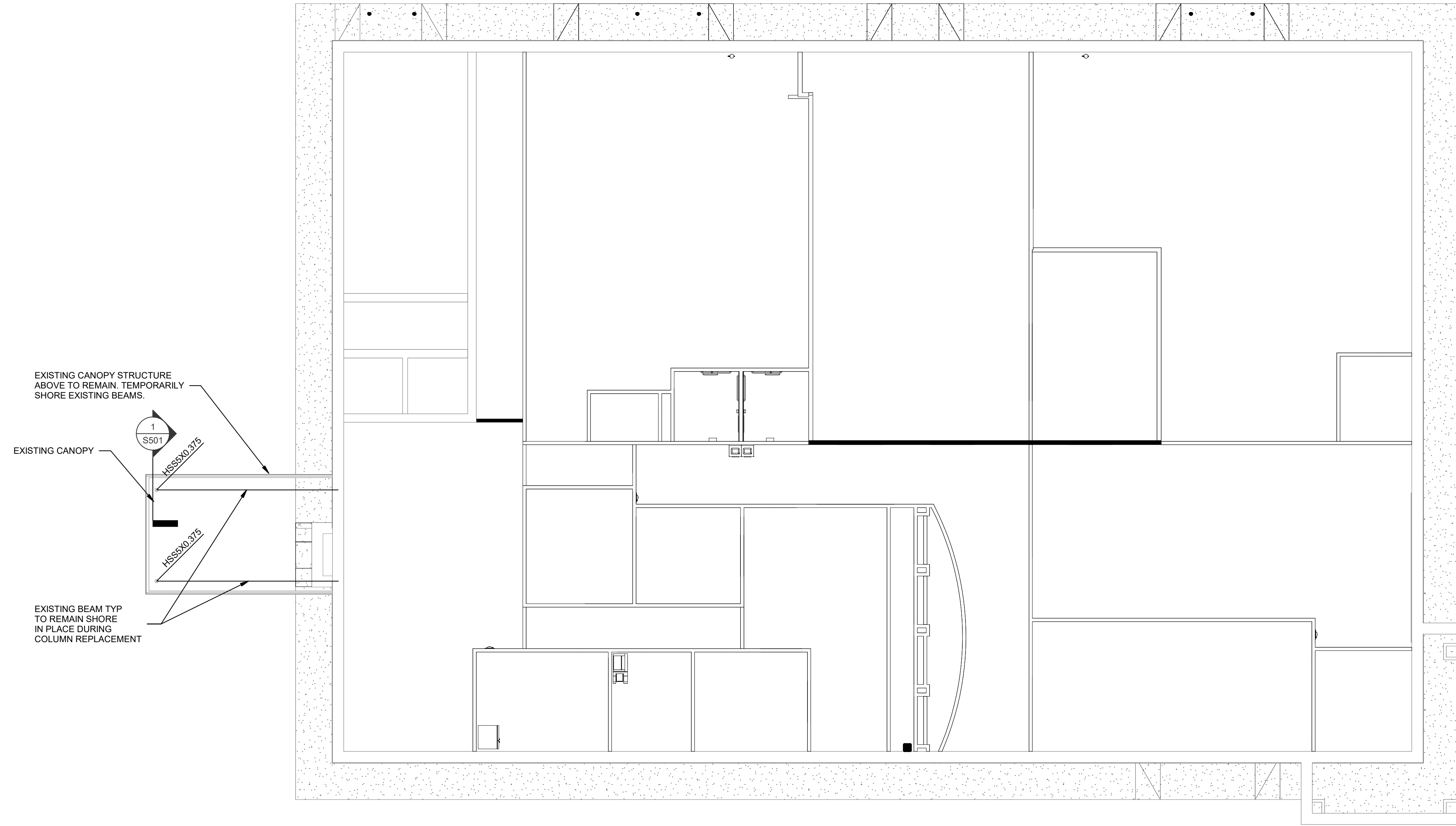


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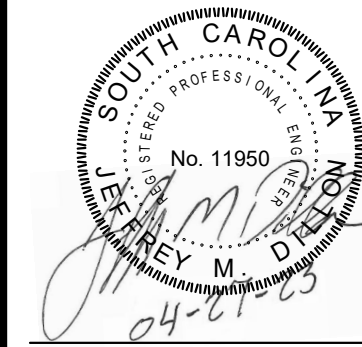
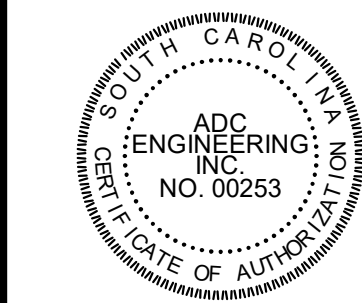
**FOUNDATION  
PLAN**

**S101**



**1 ROOF FRAMING PLAN**  
1/8" = 1'-0"

REV. No. | DATE | DESCRIPTION

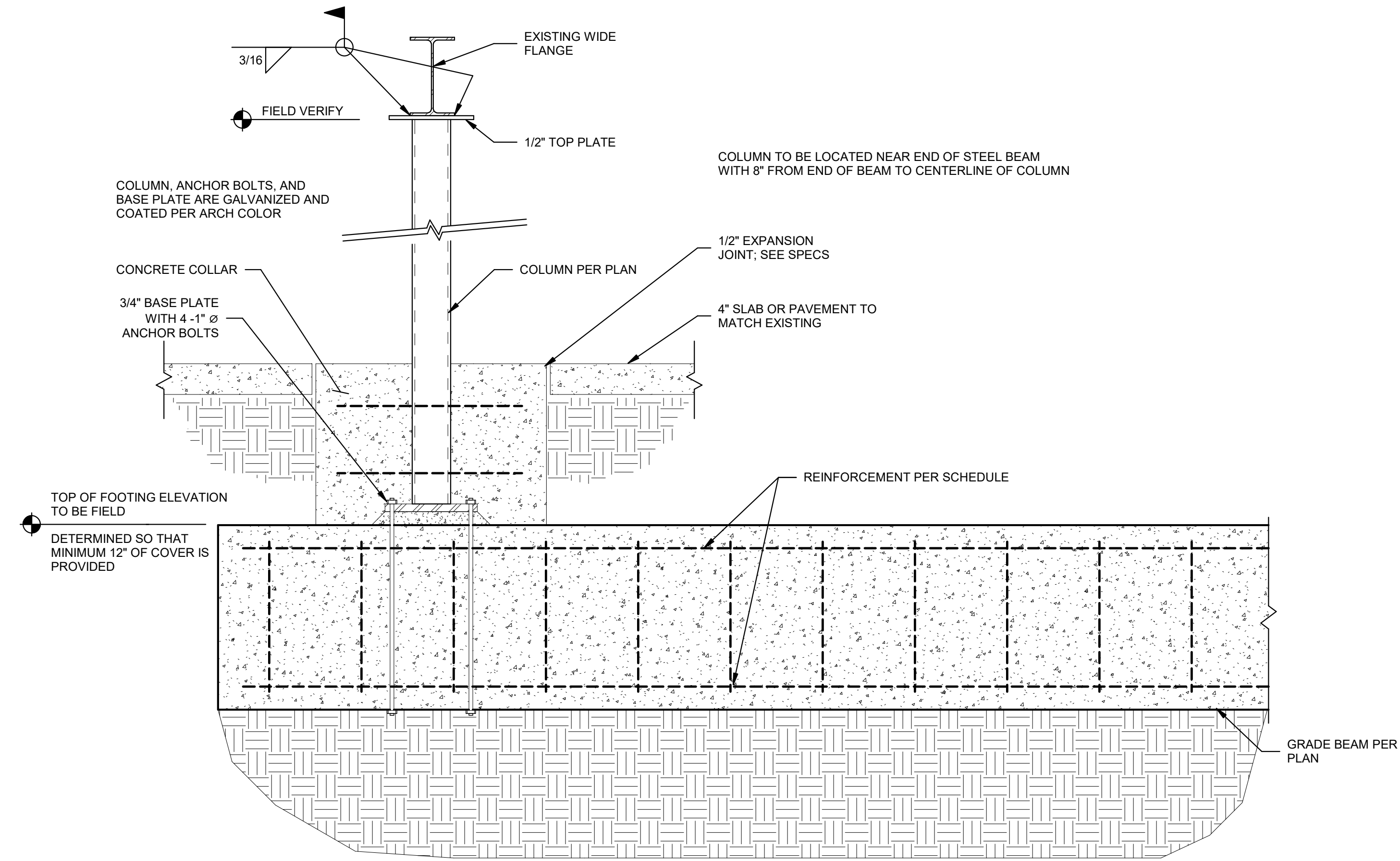


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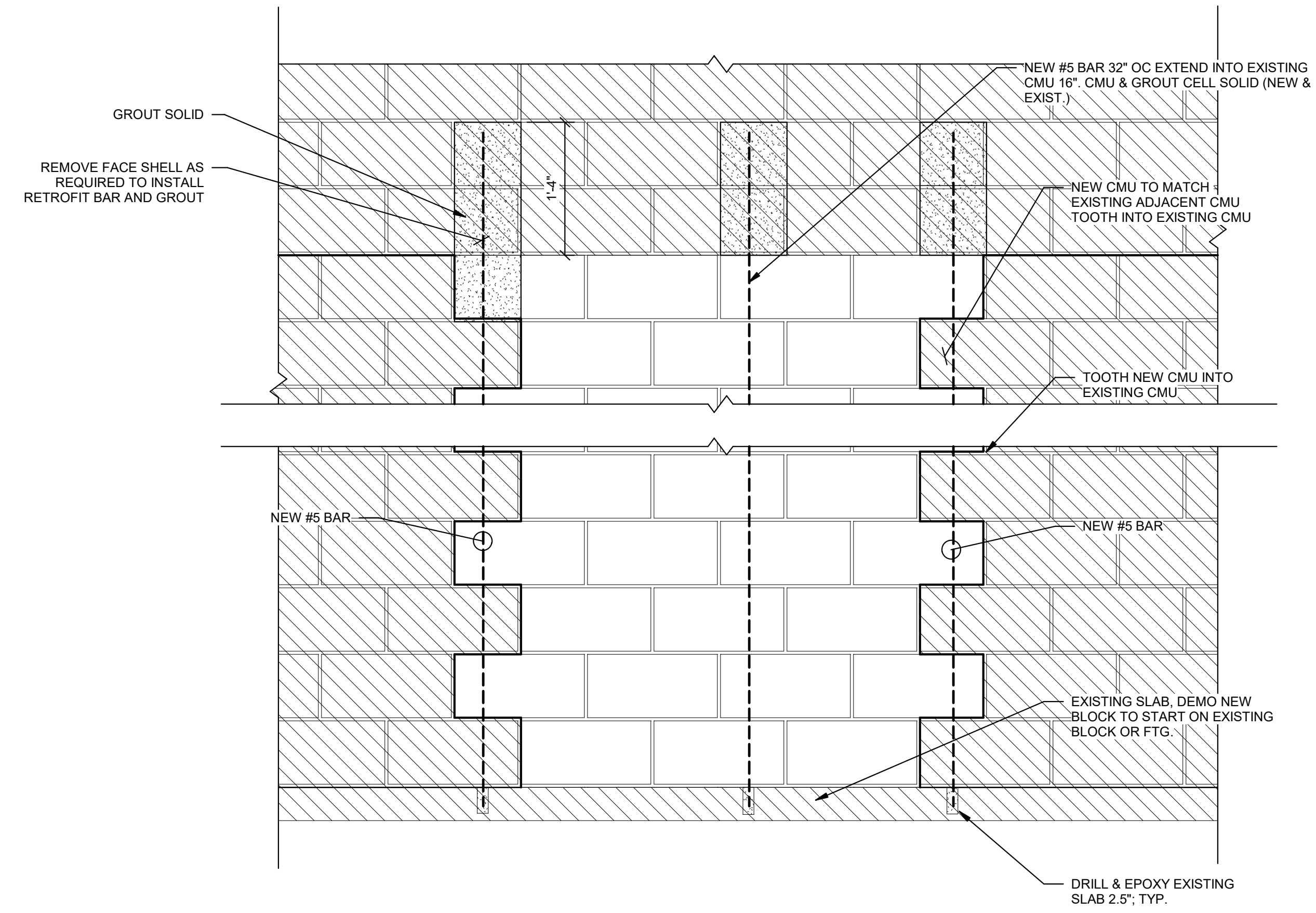
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**ROOF FRAMING  
PLAN**

**S102**



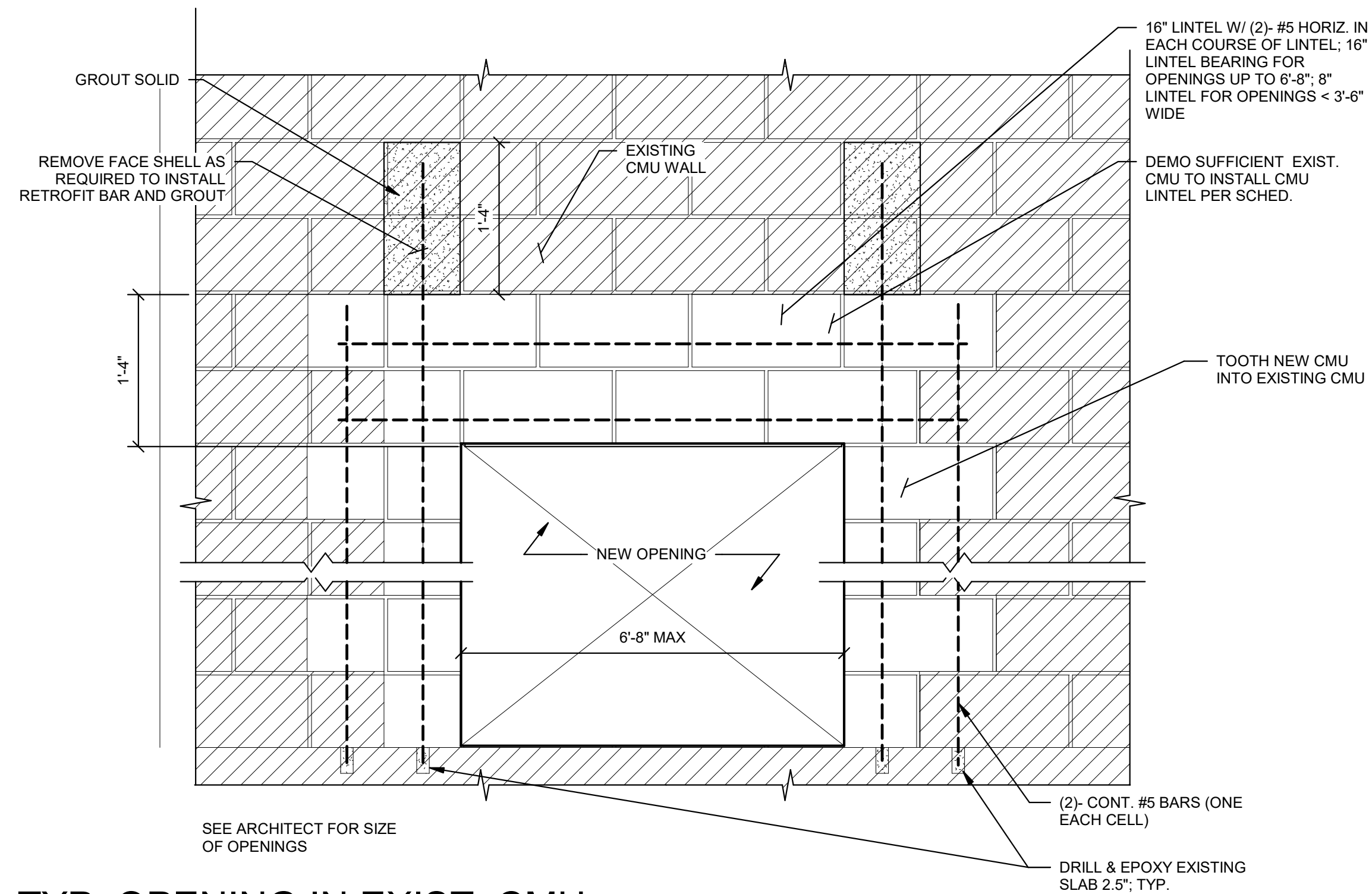
1 F44 SECTION  
1" = 1'-0"



2 TYP. NEW WALL INFILL DETAIL  
1" = 1'-0"

BRICK LINTEL SCHEDULE	
EQUIVALENT OPENING WIDTH	LINTEL SIZE
LESS THAN 5'-0"	L4X4X3/8
5'-4" TO 10'-0"	L7X4X3/8

- NOTES:  
 1. BEAR LINTELS 8" EACH END  
 2. LINTELS ARE GALVANIZED  
 3. SEE ARCHITECTURAL DETAILS FOR FLASHING



3 TYP. OPENING IN EXIST. CMU  
1" = 1'-0"

REV. No. | DATE | DESCRIPTION



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 04/27/2023

SECTIONS AND DETAILS

**S501**





NOTE: DEMOLISH TWO (2) SIGNS ON SITE. LEAVE ELECTRICAL FOR POTENTIAL FUTURE SIGNS.

### GENERAL DEMOLITION NOTES

- 1 ELEMENTS OR PORTIONS OF ELEMENTS TO BE REMOVED ARE SHOWN DASHED. REFER TO KEY NOTES FOR ADDITIONAL CLARIFICATION FOR PARTIALLY REMOVED OR REUSED ELEMENTS.
- 2 VERIFY EXISTING CONDITIONS OF SPACE PRIOR TO DEMOLITION WORK.
- 3 AREAS OF DEMOLITION ARE APPROXIMATE. GENERAL CONTRACTOR TO COORDINATE TO COORDINATE DEMOLITION WITH EXISTING CONDITIONS, NEW CONSTRUCTION, AND ADDITIONAL SCOPE OF WORK INCLUDED IN MECHANICAL, PLUMBING, AND ELECTRICAL DOCUMENTS.
- 4 WALL DEMOLITION TO INCLUDE FRAMING, SHEATHING, FINISHES AND ALL APPURTENANCES.
- 5 ANY HIDDEN STRUCTURAL COLUMNS OR SUPPORT IS TO BE BROUGHT TO THE ATTENTION OF THE ARCHITECT PRIOR TO REMOVAL. ANY BUILDING SUPPORT WHICH DEVIATES FROM THAT SHOWN OR IS IN QUESTION IS TO BE BROUGHT TO ARCHITECT'S ATTENTION IMMEDIATELY.
- 6 REFER TO MECHANICAL, PLUMBING, AND ELECTRICAL DOCUMENTS FOR REMOVAL AND CAPPING OF SERVICES FOR ITEMS SHOWN TO BE REMOVED.
- 7 CONTRACTOR SHALL TAKE NECESSARY PRECAUTIONS TO PROTECT EXISTING FLOORING AND FINISHES TO REMAIN.
- 8 REMOVE ALL ABANDONED ACCESSORIES AND DEVICES NOT OTHERWISE NOTED. PATCH DRYWALL AND PREP FOR NEW FINISHES.
- 9 CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY OF BUILDING CONTENTS AS WELL AS BUILDING MATERIALS STORED ON SITE DURING CONSTRUCTION.
- 10 REFER TO STRUCTURAL, PLUMBING, MECHANICAL, ELECTRICAL FOR OTHER DEMOLITION. CONTRACTOR TO COORDINATE DEMOLITION REQUIRED BY OTHER DISCIPLINES AND COMPLETE PREPARATION FOR NEW WORK.
- 11 EXISTING CONSTRUCTION TO REMAIN SHALL BE PROTECTED DURING DEMOLITION AND NEW WORK CONSTRUCTION ACTIVITIES.

### GENERAL DEMOLITION NOTES

- 12 THE EXTENT OF DEMOLITION INDICATED IS BASED ON AS BUILT DRAWING PROVIDED BY THE OWNER AND FIELD OBSERVATIONS. ANY DISCREPANCIES BETWEEN ACTUAL CONDITIONS AND THOSE INDICATED ARE TO BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AS SOON AS DISCREPANCIES ARE DISCOVERED.
- 13 DEMOLITION PLANS AND ELEVATIONS SHOW THE INTENT OF DEMOLITION TO BE PERFORMED. ALL DASHED ITEMS ARE TO BE DEMOLISHED COMPLETE. CONTRACTOR SHALL INCLUDE ALL DEMOLITION, CUTTING AND PATCHING REQUIRED FOR NEW CONSTRUCTION. REFER TO OTHER DISCIPLINES (CIVIL STRUCTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND FIRE PROTECTION) DEMOLITION DRAWINGS FOR ADDITIONAL ITEMS TO BE DEMOLISHED. THE CONTRACTOR SHALL REPORT ANY DISCREPANCIES BETWEEN DISCIPLINES DEMOLITION AND NEW WORK TO THE ARCHITECT. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO SHORE, BRACE AND/OR SECURE MATERIALS AND STRUCTURE TO REMAIN.
- 14 WHERE EXISTING WALL, CEILING, ROOF OR FLOOR SYSTEMS ARE TO REMAIN AND ARE DISTURBED BY DEMOLITION, THEY SHALL BE REPAIRED AS REQUIRED TO MATCH ORIGINAL INTEGRITY AND ADJACENT CONSTRUCTION.
- 15 REFER TO PLUMBING FOR LOCATIONS OF NEW FIXTURES AND ADDITIONAL SLAB DEMOLITION.

### DEMOLITION PLAN NOTES

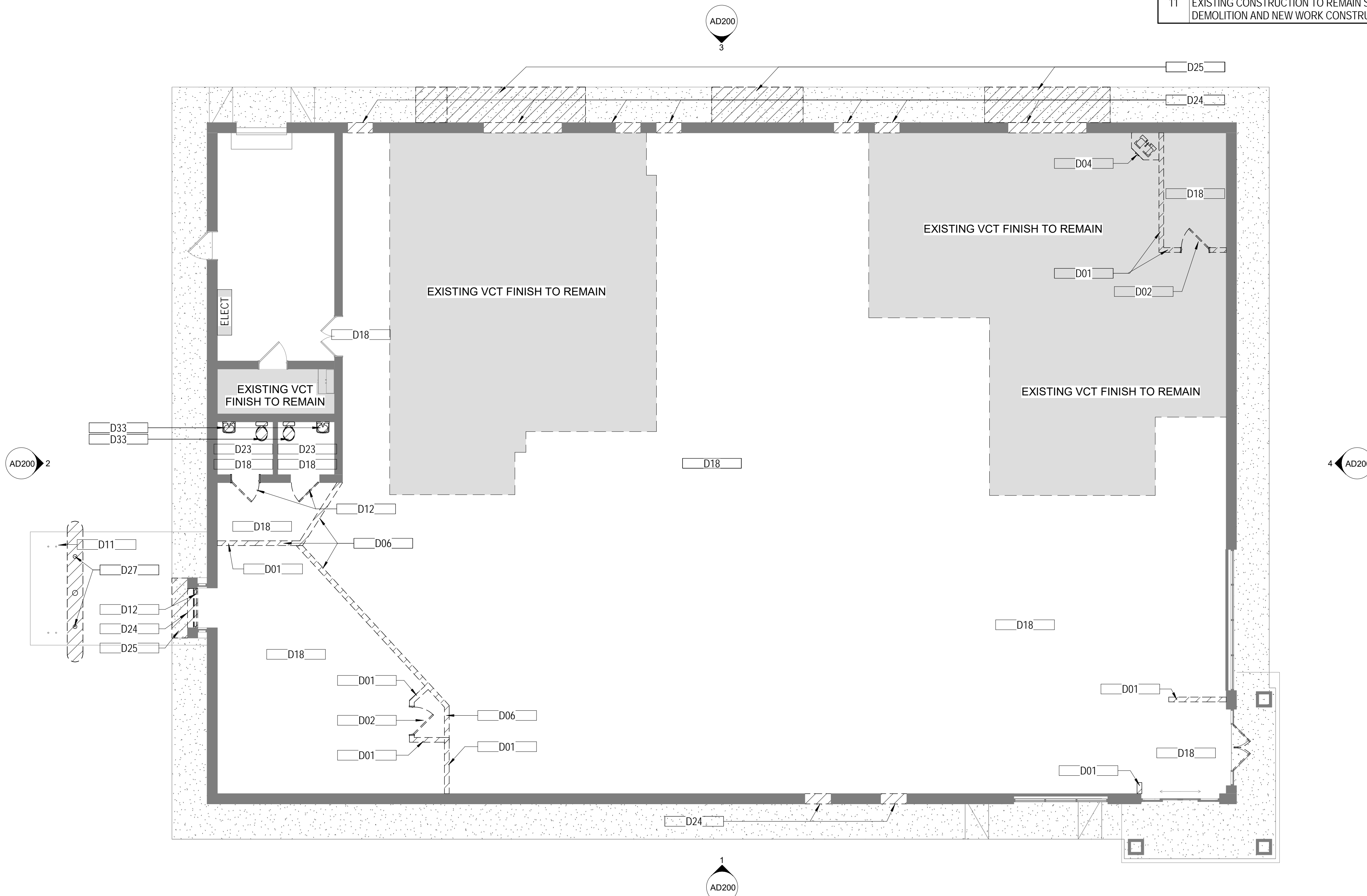
- 1 REFER TO DEMOLITION ELEVATIONS & SECTIONS FOR ADDITIONAL DEMOLITION INFORMATION.
- 2 COORDINATE DEMOLITION AND NEW WORK WITH ELECTRICAL / MECHANICAL / PLUMBING DRAWINGS.

### LEGEND & SYMBOLS

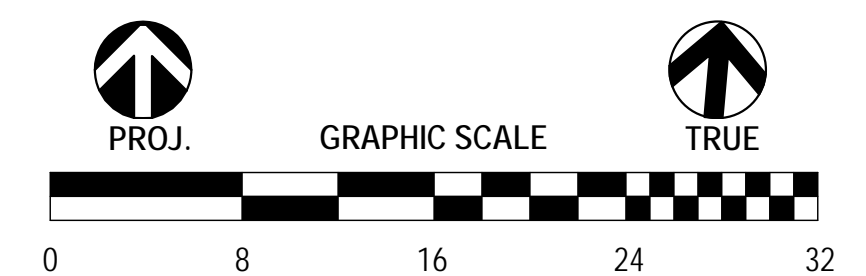
- EXISTING WALL CONSTRUCTION TO BE DEMOLISHED REFER TO KEYNOTES
- EXISTING WALL CONSTRUCTION TO REMAIN
- WALL / SOFFIT / ROOF OVERHEAD
- EXISTING DOOR TO BE DEMOLISHED REFER TO KEYNOTES
- EXISTING WINDOW TO BE DEMOLISHED REFER TO KEYNOTES
- DEMOLITION KEYNOTE

### KEYNOTE LEGEND

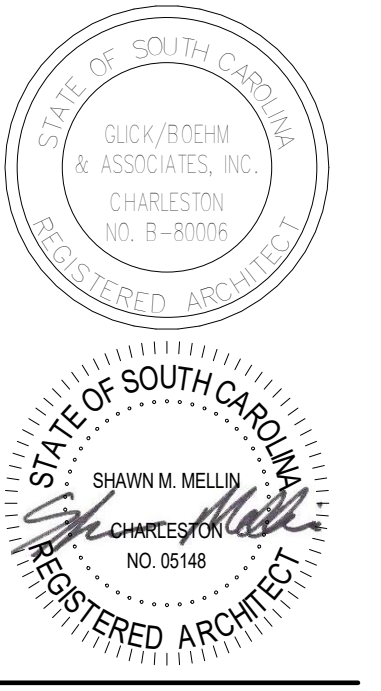
KEY VALUE	KEYNOTE TEXT
D01	DEMOLISH WALL
D02	DEMOLISH DOOR AND FRAME COMPLETE
D04	DEMOLISH COUNTERTOPS, BASE CABINETS, & SINK
D06	DEMOLISH OVERHEAD WALL
D11	DEMOLISH CONCRETE CURB, BOLLARDS, & DELIVERY EQUIPMENT
D12	DEMOLISH STOREFRONT WINDOW
D18	DEMOLISH VCT FLOORING & BASE; CLEAN & PREPARE FOR NEW FLOORING
D23	DEMOLISH EXISTING FRP PANELS, ALL WALLS.
D24	DEMOLISH BRICK VENEER AND CMU WALL CONSTRUCTION. COORDINATE SIZE WITH NEW DOOR OPENING REQUIREMENTS.
D25	DEMOLISH CONCRETE SIDEWALK AND PREPARE FOR NEW CURB RAMPS
D27	DEMOLISH COLUMNS; REFER TO STRUCT.
D33	DEMOLISH EXISTING TOILET, SINK, GRAB BARS, AND MIRROR



**1** DEMOLITION FIRST FLOOR  
SCALE: 1/8" = 1'-0"



REVISION	DATE	DESCRIPTION



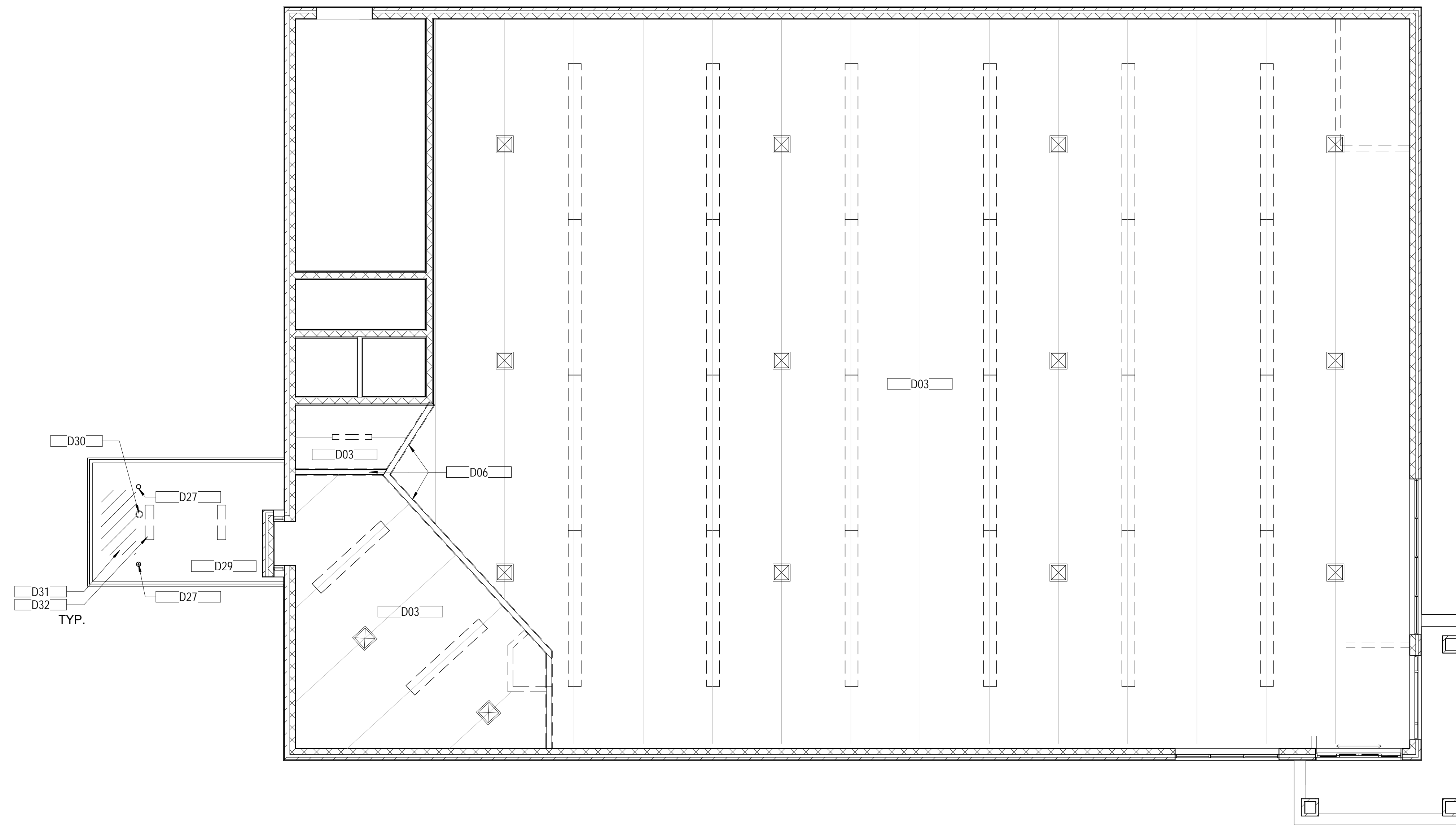
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DATE ISSUED FOR: CD'S 4-27-2023

**FIRST FLOOR DEMOLITION PLAN**

**AD100**





**1** REFLECTED CEILING DEMOLITION PLAN  
SCALE: 1/8" = 1'-0"

**GENERAL DEMOLITION CEILING NOTES**

- 1 REMOVE DESIGNATED CEILINGS, ASSOCIATED FRAMING, BLOCKING & SUPPORTS
- 2 REMOVE DESIGNATED LIGHTING FIXTURES, ASSOCIATED FRAMING, BLOCKING & SUPPORTS

**DEMOLITION CEILING NOTES**

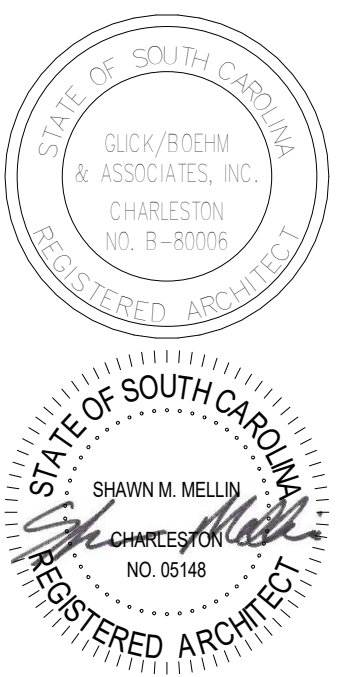
- 1 REFER TO SHEET AD100 FOR GENERAL DEMOLITION NOTES.
- 2 REFER TO DEMOLITION PLANS, ELEVATIONS & SECTIONS FOR ADDITIONAL DEMOLITION INFORMATION.
- 3 COORDINATE DEMOLITION AND NEW WORK WITH ELECTRICAL / MECHANICAL / PLUMBING DRAWINGS.

**KEYNOTE LEGEND**

KEY VALUE	KEYNOTE TEXT
D03	DEMOLISH CEILING, LIGHT FIXTURES & AIR SUPPLY/RETURNS; PATCH HOLES AND PREP FOR PAINT.
D06	DEMOLISH OVERHEAD WALL
D27	DEMOLISH COLUMNS; REFER TO STRUCT.
D29	DEMOLISH STUCCO CEILING
D30	DEMOLISH BANK TUBE SYSTEM
D31	DEMOLISH PLYWOOD AS REQUIRED TO INSTALL NEW COLUMNS
D32	DEMOLISH LIGHT

**LEGEND & SYMBOLS**

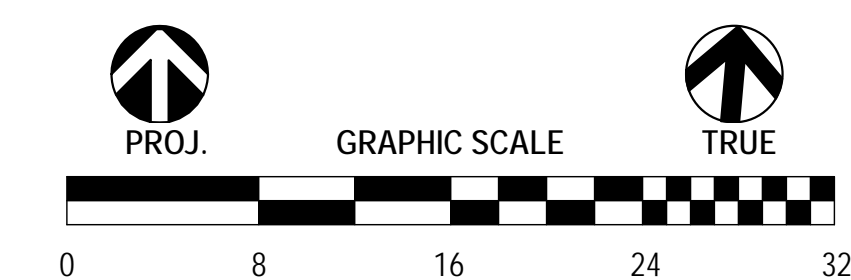
	DEMOLISH CEILING GRID SYSTEM
	DEMOLISH LINEAR LIGHT FIXTURE REFER TO ELECTRICAL DRAWINGS
	WALL MOUNTED LIGHT FIXTURE REFER TO ELECTRICAL DRAWINGS
	DEMOLISH SUPPLY AIR TERMINAL REFER TO MECHANICAL DRAWINGS
	DEMOLISH RETURN AIR TERMINAL REFER TO MECHANICAL DRAWINGS
	DEMOLITION KEYNOTE



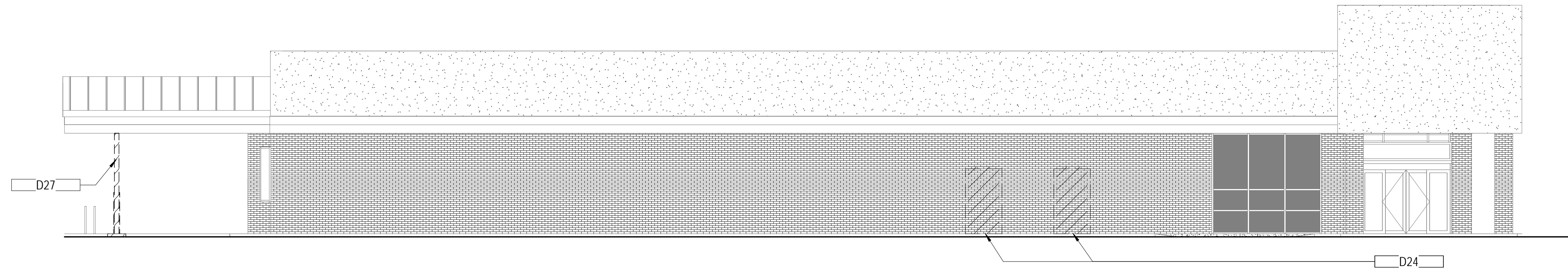
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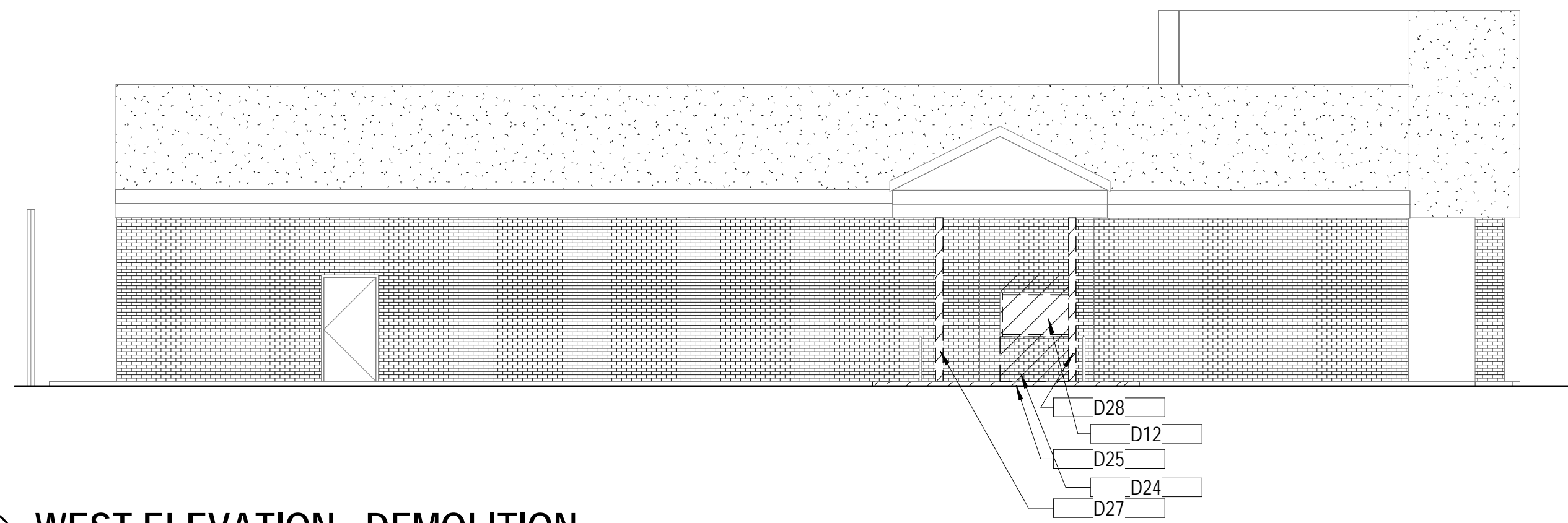
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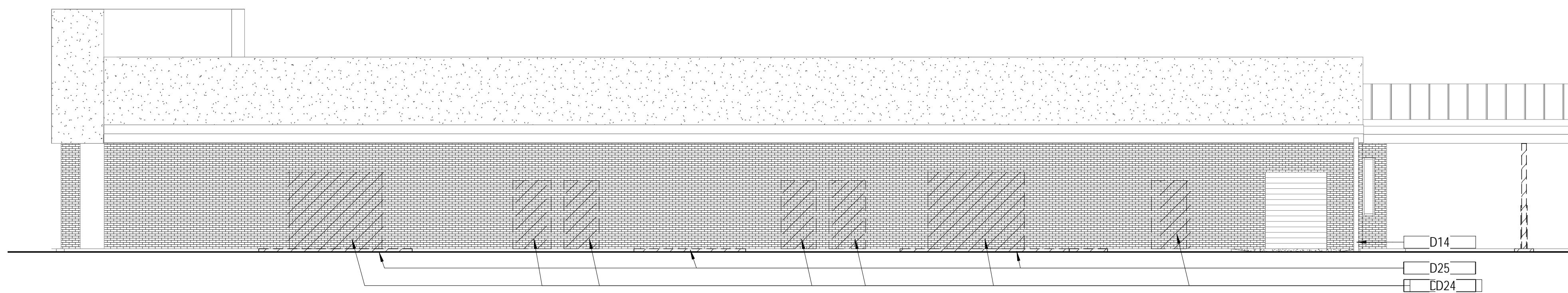
**REFLECTED  
CEILING  
DEMOLITION  
PLAN  
AD120**



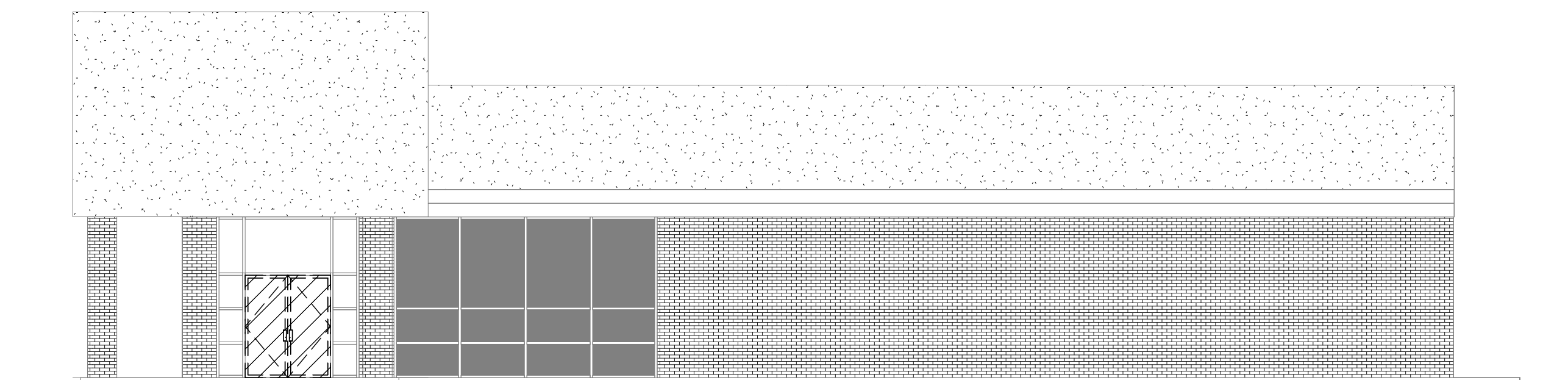
**1 SOUTH ELEVATION - DEMOLITION**  
SCALE: 1/8" = 1'-0"



**2 WEST ELEVATION - DEMOLITION**  
SCALE: 1/8" = 1'-0"



**3 NORTH ELEVATION - DEMOLITION**  
SCALE: 1/8" = 1'-0"



**4 EAST ELEVATION - DEMOLITION**  
SCALE: 1/8" = 1'-0"

**DEMOLITION ELEVATION NOTES**

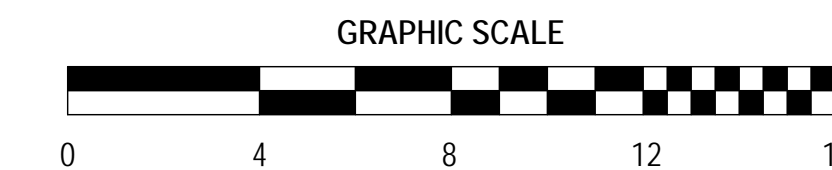
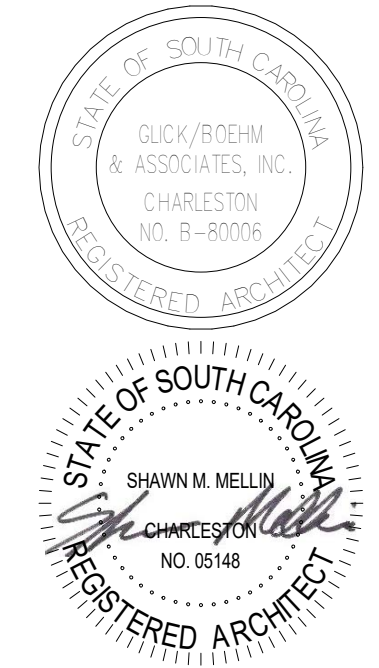
- 1 NOT ALL KEYNOTES WILL BE USED ON ALL SHEETS; REFER TO MASTER KEYNOTE LIST ON G111
- 2 REFER TO SHEET AD100 FOR GENERAL DEMOLITION NOTES.
- 3 REFER TO DEMOLITION PLANS & SECTIONS FOR ADDITIONAL DEMOLITION INFORMATION.
- 4 REFER TO SHEET AD130 FOR ROOF DEMOLITION NOTES.
- 5 COORDINATE DEMOLITION AND NEW WORK WITH ELECTRICAL / MECHANICAL / PLUMBING DRAWINGS.
- 6 CONTRACTOR TO DEMOLISH ALL EXTERIOR SIGNS, LEAVE ELECTRICAL IN PLACE.

**KEYNOTE LEGEND**

KEY VALUE	KEYNOTE TEXT
D12	DEMOLISH STOREFRONT WINDOW
D14	REPAIR VEHICLE CLEARANCE DEVICE
D24	DEMOLISH BRICK VENEER AND CMU WALL CONSTRUCTION. COORDINATE SIZE WITH NEW DOOR OPENING REQUIREMENTS.
D25	DEMOLISH CONCRETE SIDEWALK AND PREPARE FOR NEW CURB RAMPS
D27	DEMOLISH COLUMNS; REFER TO STRUCT.
D28	DEMOLISH DOOR & DOOR HARDWARE



REV.	DATE	DESCRIPTION



**LEGEND & SYMBOLS**

	EXISTING STUCCO FINISH COAT
	EXISTING BRICK VENEER
	EXISTING STANDING SEAM METAL ROOF PANEL
	EXISTING ITEM / AREA TO BE DEMOLISHED REFER TO KEYNOTES
	SLOPE ARROW / TRIANGLE (RISE / RUN)
	DEMOLITION KEYNOTE

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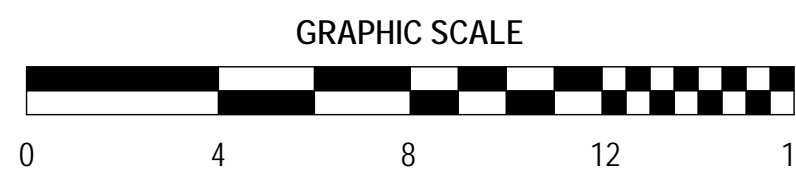
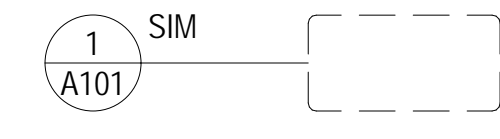
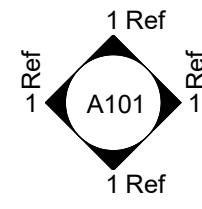
**BUILDING DEMOLITION ELEVATIONS**  
**AD200**



### ARCHITECTURAL TYPICAL LEGEND & SYMBOLS

**55** View Name  
SCALE: 1/8" = 1'-0"

**1** View Name  
SCALE: 1/8" = 1'-0"



DETAIL TITLE WITHOUT DETAIL NUMBER: USED ONLY FOR TYPICAL DETAILS THAT DO NOT HAVE TO BE REFERENCED OR FOR "FLOOR" TYPE PLANS.

2-PART DETAIL TITLE WITH DETAIL NUMBER & REFERENCED SHEET NO.: USED TO IDENTIFY DETAILS THAT NEED TO BE REFERENCED BACK TO DETAIL CUT.

2-PART WALL SECTION CALLOUT KEY WITH DETAIL NUMBER & SHEET REFERENCE WHERE DETAIL IS DRAWN.

2-PART BUILDING SECTION CALLOUT KEY WITH DETAIL NUMBER & SHEET REFERENCE WHERE DETAIL IS DRAWN.

ELEVATION CALLOUT KEY WITH DETAIL NUMBER & SHEET REFERENCE WHERE DETAIL IS DRAWN.

2-PART ELEVATION CALLOUT KEY WITH DETAIL NUMBER & SHEET REFERENCE WHERE DETAIL IS DRAWN.

GRAPHIC SCALE OF A SHEET OR DETAIL.

### ABBREVIATIONS

<b>A</b>	
ACT	ACOUSTICAL CEILING TILE
AFF	ABOVE FINISH FLOOR
ALT	ALTERNATE
ALUM	ALUMINUM
<b>B</b>	
B/	BOTTOM OF
BD	BOARD
BLDG	BUILDING
BLKG	BLOCKING
BM	BEAM
BRG	BEARING
<b>C</b>	
CA	CAST ACRYLIC
CI	CONTINUOUS INSULATION
CIP	CAST-IN-PLACE
CJ	CONTROL JOINT
CL	CENTERLINE
CLG	CEILING
CLO	CLOSET
CLR	CLEAR
CMU	CONCRETE MASONRY UNIT
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUOUS
CPT	CARPET
<b>D</b>	
DET	DETAIL
DIAM	DIAMETER
DIM	DIMENSION
DN	DOWN
DWG	DRAWING
<b>E</b>	
EA	EACH
EJ	EXPANSION JOINT
EL OR ELEV	ELEVATION
EQ	EQUAL
EQUIP	EQUIPMENT
ET	EPOXY TERRAZO
EW	EACH WAY
EXIST	EXISTING
EXP	EXPOSED (TO STRUCTURE)
EXT	EXTERIOR
<b>F</b>	
FACT	FACTORY FINISH
FD	FLOOR DRAIN
FDN	FOUNDATION
FEC	FIRE EXTINGUISHER CABINET
FIN	FINISH (ED)
FIP	FOAM-IN-PLACE
FL OR FLR	FLOOR
FOB	FACE OF BRICK
FOF	FACE OF FINISH
FOS	FACE OF STUD
FT	FOOT / FEET
<b>G</b>	
G	GROUT
GA	GAGE / GAUGE
GALV	GALVANIZED
GCB	GLAZED COVE BASE
GFCI	GOVERNMENT FURNISHED CONTRACTOR INSTALLED
GFRC	GLASS FIBER REINFORCED CONCRETE
GL	GLASS / GLAZING
GWB	GYP SUM WALL BOARD
GYP	GYP SUM
<b>H</b>	
HC	HOLLOW CORE
HM	HOLLOW METAL
<b>I</b>	
ID	INSIDE DIAMETER
INSUL	INSULATION

### ABBREVIATIONS

<b>J</b>	
JT	JOINT
<b>L</b>	
LAV	LAVATORY
LP	LOW POINT
<b>M</b>	
MAX	MAXIMUM
MECH	MECHANICAL
MFR	MANUFACTURER
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
MT	METAL THRESHOLD
MTL	METAL
<b>N</b>	
N	NORTH
NIC	NOT IN CONTRACT
NO OR #	NUMBER
NTS	NOT TO SCALE
<b>O</b>	
OC	ON CENTER
OD	OUTSIDE DIAMETER
OPG	OPENING
OPP	OPPOSITE
OS	OVERFLOW SCUPPER
<b>P</b>	
PL	PLASTIC LAMINATE
PNT	PAINT
<b>R</b>	
R	RISER
RAD	RADIUS
RCP	REFLECTED CEILING PLAN
RD	ROOF DRAIN
REINF	REINFORCED
REQD	REQUIRED
REV	REVERSED
RO	ROUGH OPENING
<b>S</b>	
SC	SEALED CONCRETE
SCW	SOLID CORE DOOR
SF	STOREFRONT
SHT	SHEET
SIM	SIMILAR
SPEC	SPECIFICATION
SQ	SQUARE
SS	STAINLESS STEEL
ST	STAIN
STL	STEEL
SUSP	SUSPENDED
SV	SHEET VINYL FLOORING
<b>T</b>	
T	TREAD
T/	TOP OF
TBB	TILE BACKERBOARD
TEMP	TEMPORARY
THK	THICK
TP	TOILET PARTITION
TYP	TYPICAL
<b>U</b>	
U.N.O.	UNLESS NOTED OTHERWISE
<b>V</b>	
VB	VINYL BASE
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VJ	VERTICAL JOINT
VPAB	VAPOR PERMEABLE AIR BARRIER
VWC	VINYL WALL COVERING
<b>W</b>	
W/	WITH
W/O	WITHOUT
WD	WOOD
WT	WALL TILE

### GENERAL PROJECT NOTES

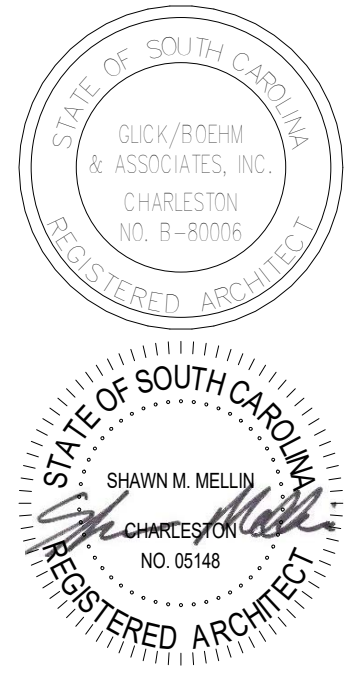
- PROVIDE ACCESS PANELS WHERE NEEDED TO ACCESS VALVES, EQUIPMENT, FILTERS, ETC EVEN IF NOT NOTED IN THE DRAWINGS.
- DETAILS ARE SHOWN TO DESCRIBE DESIGN INTENT, COORDINATE COMPLETE SHOP DRAWINGS, SHOWING ALL CONSTRUCTION DETAILS AND LAYOUTS AS REQUIRED FOR A COMPLETE JOB, ADHERING TO THE MANUFACTURER'S INSTALLATION INSTRUCTIONS, WARRANTIES AND GOVERNING CODES.
- THE CONSTRUCTION SUBSYSTEMS AND PARTITION TYPES SHOWN INDICATE THE GENERAL CONSTRUCTION FEATURES OF THE WORK TO BE COMPLETED. THEY ARE NOT INTENDED TO REPRESENT THE ENTIRE CONSTRUCTION PROCSS AND ACCESSORIES USED. THE CONTRACTOR AND SUBCONTRACTORS ARE RESPONSIBLE FOR COMPLETED SYSTEMS AND TO BE IN COMPLIANCE WITH GOVERNING CODES AND THE INTENT OF THE DRAWINGS.
- CONSTRUCTION MATERIALS OR PROCESSES WHICH ARE HAZARDOUS TO WORKERS OR FUTURE OCCUPANTS ARE NOT PERMITTED.
- REFER TO STRUCTURAL MECHANICAL, ELECTRICAL, PLUMBING OR FIRE PROTECTION DRAWINGS FOR ADDITIONAL NOTES AND REFERENCES.
- GENERAL CONTRACTOR AND APPLICABLE SUB CONTRACTORS SHALL VERIFY ALL DIMENSIONS IN FIELD PRIOR TO COMMENCING DEMOLITION AND NEW CONSTRUCTION. DO NOT SCALE DRAWINGS.
- GENERAL CONTRACTOR TO COORDINATE WITH OWNER ON ALL OWNER PROVIDED EQUIPMENT AND FURNISHINGS.

### GENERAL PLAN NOTES

- BEFORE BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS AND VERIFY EXISTING CONDITIONS AND COMPARE RESULTS
- DOOR FRAMES MOUNTED IN INTERIOR WALLS SHALL BE LOCATED 4" FROM THE ROOM CORNER TO THE OUTSIDE FACE OF THE FRAME UNLESS NOTED OTHER WISE.
- PROVIDE A MINIMUM OF 20 GAUGE SHEET METAL BLOCKING OR WOOD BLOCKING FOR ALL WALL MOUNTED CABINETS, SHELVES, EQUIPMENT, ACCESSORIES, SOAP DISPENSERS, PAPAER TOWEL DISPENSERS/ GRAB BARS AND TV'S.
- DO NOT SCALE PLANS.



DESCRIPTION



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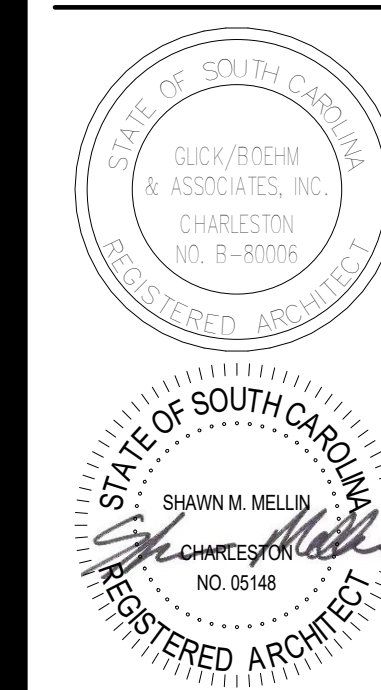
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CD'S  
GENERAL ARCHITECTURAL INFORMATION

**A000**



REV.	DATE	DESCRIPTION



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**FLOOR PLAN - NEW CONSTRUCTION**  
**A100**

**GENERAL PLAN NOTES**

- BEFORE BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL TAKE FIELD MEASUREMENTS AND VERIFY EXISTING CONDITIONS AND COMPARE RESULTS.
- DOOR FRAMES MOUNTED IN INTERIOR WALLS SHALL BE LOCATED 4" FROM THE ROOM CORNER TO THE OUTSIDE FACE OF THE FRAME UNLESS NOTED OTHERWISE.
- PROVIDE A MINIMUM OF 20 GAUGE SHEET METAL BLOCKING OR WOOD BLOCKING FOR ALL WALL MOUNTED CABINETS, SHELVES, EQUIPMENT, ACCESSORIES, SOAP DISPENSERS, PAPER TOWEL DISPENSERS/ GRAB BARS AND TV'S.
- DO NOT SCALE PLANS.

**PLAN NOTES**

- NOT ALL KEYNOTES WILL BE USED ON ALL SHEETS; REFER TO MASTER KEYNOTE LIST ON A000.
- REFER TO SHEET A000 FOR GENERAL PROJECT NOTES.
- REFER TO ELEVATIONS & SECTIONS FOR ADDITIONAL INFORMATION.

**GENERAL DIMENSION NOTES**

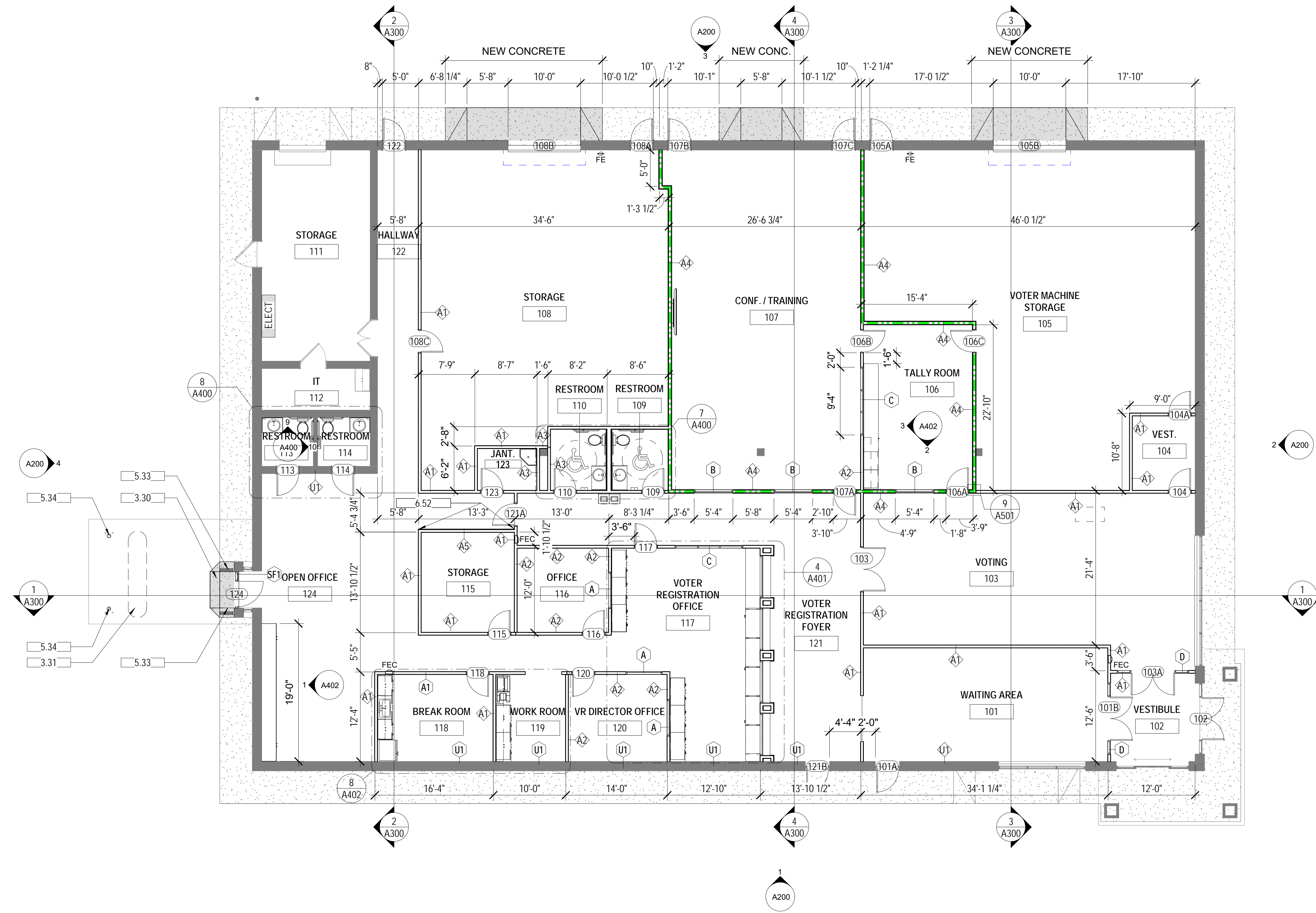
- DIMENSIONS INDICATED ARE FROM FACE OF STUD AND TO FACE OF MASONRY, U.O.N. REFER TO ENLARGED PLANS FOR ADDITIONAL DIMENSIONS NOT INDICATED ON OVERALL PLANS.
- DIMENSIONS TO EXISTING WALLS ARE TO FACE OF FINISH, U.O.N.
- CONTRACTOR TO COORDINATE LOCATIONS OF ADDITIONAL PENETRATIONS THROUGH WALLS AND FLOORS NOT INDICATED ON ARCHITECTURAL DRAWINGS. RE: MECHANICAL, PLUMBING AND ELECTRICAL. REFER TO STRUCTURAL FOR LINTEL OR FRAMING REQUIREMENTS.
- CLEAR (CLR) DIMENSIONS MUST BE FROM FINISH FACE TO FINISH FACE.

**KEYNOTE LEGEND**

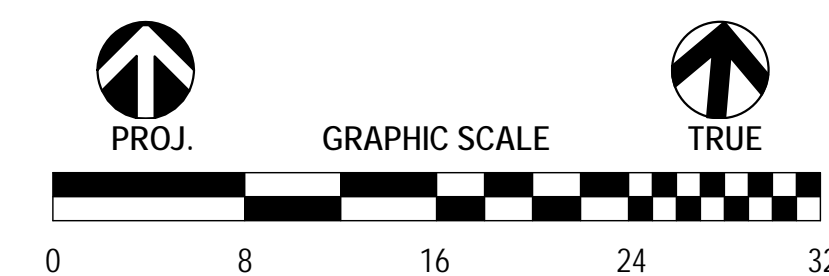
KEY VALUE	KEYNOTE TEXT
3.30	NEW CONCRETE RAMP
3.31	PATCH CONCRETE WHERE RAISED CONCRETE CURB WAS REMOVED
5.33	METAL PIPE RAIL, PAINT
5.34	NEW METAL COLUMNS, PAINT
6.52	INSTALL 5/8" PLYWOOD FROM FLOOR TO CEILING OVER STUDS. THEN INSTALL 5/8" GYPSUM BOARD.

**LEGEND & SYMBOLS**

- EXISTING WALL CONSTRUCTION
- NEW STUD WALL REFER TO WALL TYPES
- WALL / SOFFIT / ROOF OVERHEAD
- DOOR MARK REFER TO DOOR SCHEDULE A600
- WINDOW / STOREFRONT MARK REFER TO A610
- WALL TYPE MARK, SEE A501
- NEW CONSTRUCTION KEYNOTE
- FLOOR DRAIN REFER TO PLUMBING DRAWINGS
- FIRE EXTINGUISHER CABINET
- FIRE EXTINGUISHER



**1 FIRST FLOOR PLAN**  
SCALE: 1/8" = 1'-0"





### GENERAL CEILING PLAN NOTES

- 1 ALL CEILING HEIGHTS ARE X' - X" A.F.F., U.O.N.
- 2 ALL NOTED CEILING HEIGHTS ARE RELATIVE TO THE FINISH FLOOR BELOW.
- 3 ALL DIMENSIONS ARE TO FINISH FACE OF SOFFIT OR PARTITION AND TO CENTERLINE OF LIGHT FIXTURE, U.O.N.
- 4 CENTER CEILING GRID IN BOTH DIRECTIONS IN ROOM, U.O.N.
- 5 CENTER RECESSED DOWN LIGHTS IN CEILING SYSTEM, U.O.N.
- 6 REFER TO MECHANICAL DRAWINGS FOR DIFFUSER TYPES. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT PLACEMENT OF DEVICES. NOTIFY ARCHITECT OF ANY POTENTIAL CONFLICTS PRIOR TO PROCEEDING WITH WORK.
- 7 REFER TO ELECTRICAL DRAWINGS FOR LIGHT FIXTURE TYPES. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT PLACEMENT OF FIXTURES. NOTIFY ARCHITECT OF ANY POTENTIAL CONFLICTS PRIOR TO PROCEEDING WITH WORK.
- 8 UNDER CABINET LIGHTING (UCL) IS INDICATED ON INTERIOR ELEVATIONS.
- 9 SCUNCES ARE SHOWN ON ARCHITECTURAL FLOOR PLANS AND ELEVATIONS.
- 10 REFER TO SHEET A140 FOR FINISH SCHEDULE AND LEGEND FOR CEILING TYPES AND MATERIALS.

### CEILING PLAN NOTES

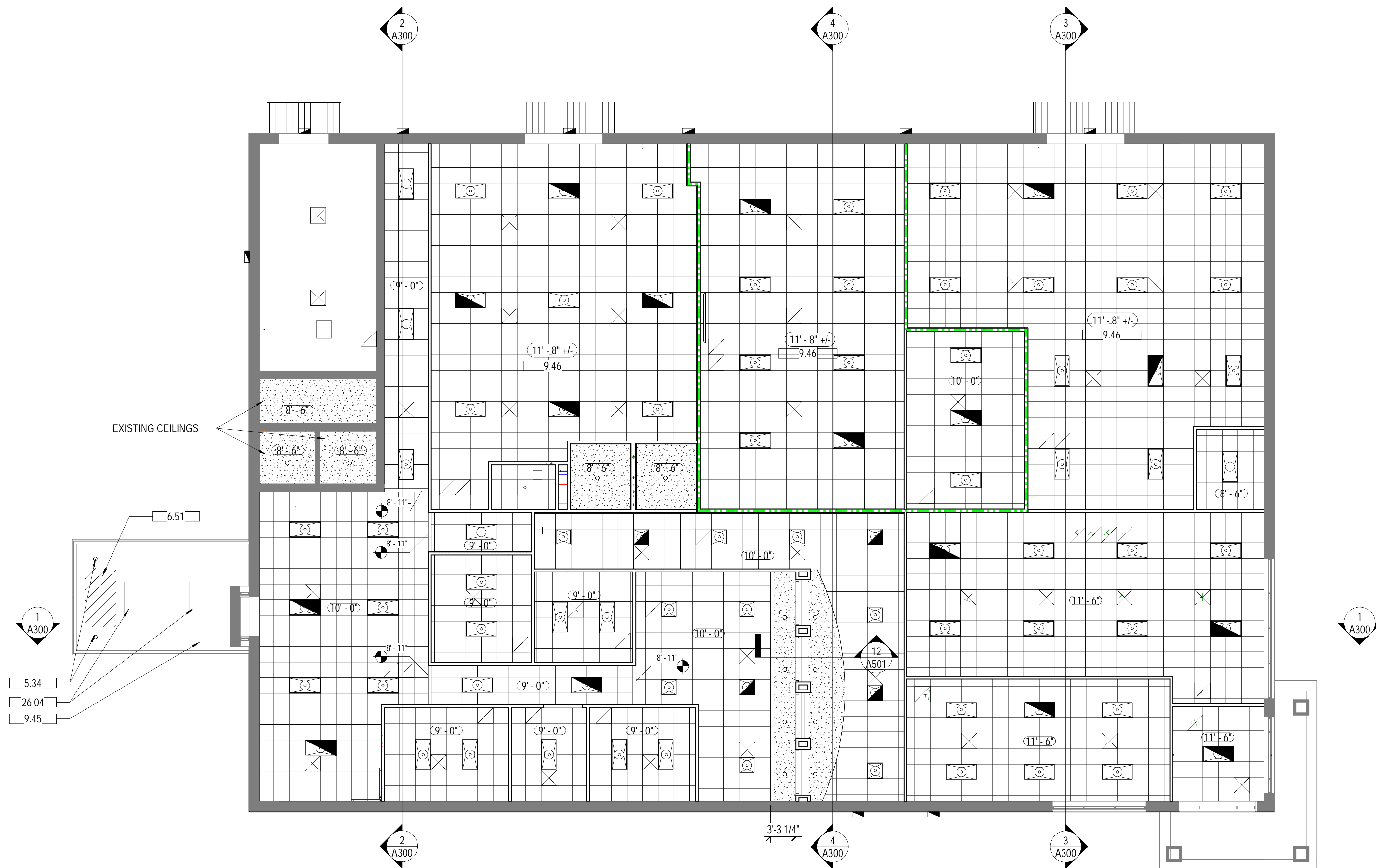
- 1 NOT ALL KEYNOTES WILL BE USED ON ALL SHEETS; REFER TO MASTER KEYNOTE LIST ON A000.
- 2 REFER TO SHEET A000 FOR GENERAL PROJECT NOTES.
- 3 REFER TO ELEVATIONS & SECTIONS FOR ADDITIONAL INFORMATION.
- 4 REFER TO FINISH LEGEND AND FINISH SCHEDULE FOR CEILING TYPES AND MATERIALS.
- 5 COORDINATE REFLECTED CEILING PLANS WITH ELECTRICAL, MECHANICAL, STRUCTURAL, FIRE PROTECTION AND ROOM FINISH SCHEDULE.
- 6 IN THE CASE OF MINOR DISCREPANCIES IN THE LOCATION OF CEILING MOUNTED COMPONENTS THE REFLECTED CEILING PLAN SHALL GOVERN. IN THE CASE OF MAJOR DISCREPANCIES, THE ARCHITECT SHALL BE NOTIFIED PRIOR TO PROCEEDING WITH THE WORK.
- 7 REFER TO MECHANICAL AND/OR ELECTRICAL DRAWINGS FOR MOUNTING LOCATIONS OF ITEMS WHERE NO CEILING IS INDICATED OR REQUIRED.
- 8 LIGHTS, DIFFUSERS, EXIT SIGNS, SMOKE DETECTORS, SPEAKERS, GENERAL ALARM SPEAKERS/STROBES AND OTHER DEVICES SHALL BE CENTERED IN THE CEILING TILES IN WHICH THEY OCCUR, UNLESS NOTED OTHERWISE, REFER TO MECHANICAL AND ELECTRICAL FOR LOCATIONS.
- 9 CEILING SEISMIC DETAILS ARE PROVIDED TO ILLUSTRATE THE GENERAL REQUIREMENTS OF CISCA GUIDELINES FOR SEISMIC RESTRAIN AND IBC CHAPTER 16. CONTRACTOR IS RESPONSIBLE FOR MEETING ALL APPLICABLE PROVISIONS OF THE STANDARDS. IN CASE OF CONFLICT THE MORE STRINGENT REQUIREMENT SHALL PREVAIL.
- 10 REFER TO A560 FOR RCP SEISMIC REQUIREMENTS AND CEILING DETAILS.

### KEYNOTE LEGEND

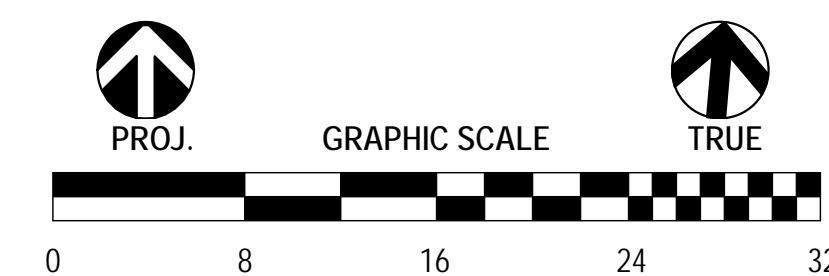
KEY VALUE	KEYNOTE TEXT
5.34	NEW METAL COLUMNS, PAINT
6.51	PATCH PLYWOOD WHERE CEILING REMOVED
9.45	NEW STUCCO CEILING FINISH
9.46	INSTALL AT EXISTING CEILING HEIGHT
26.04	LIGHT FIXTURE, RE: ELEC.

### LEGEND & SYMBOLS

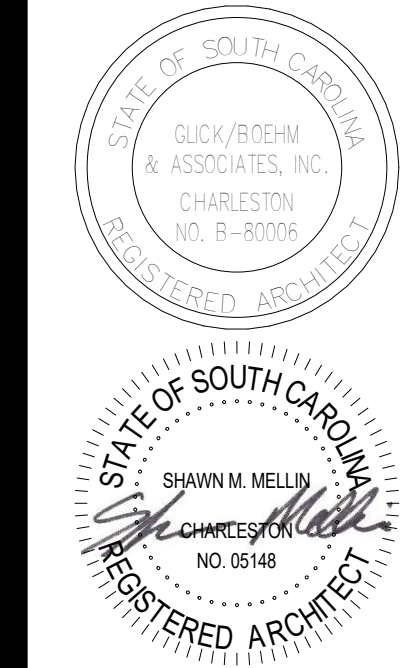
- 2' x 2' ACT CEILING GRID SYSTEM  
REFER TO FINISH SCHEDULE
- GYPSUM BOARD CEILING SYSTEM  
REFER TO FINISH SCHEDULE
- FIBER CEMENT SOFFIT PANEL  
REFER TO EXTERIOR MATERIAL SCHEDULE
- 2' x 2' LIGHT FIXTURE  
REFER TO ELECTRICAL DRAWINGS
- 2' x 4' LIGHT FIXTURE  
REFER TO ELECTRICAL DRAWINGS
- LINEAR LIGHT FIXTURE  
REFER TO ELECTRICAL DRAWINGS
- STRIP LIGHT FIXTURE  
REFER TO ELECTRICAL DRAWINGS
- WALL MOUNTED LIGHT FIXTURE  
REFER TO ELECTRICAL DRAWINGS
- RECESSED CAN LIGHT FIXTURE  
REFER TO ELECTRICAL DRAWINGS
- SUPPLY AIR TERMINAL  
REFER TO MECHANICAL DRAWINGS
- RETURN AIR TERMINAL  
REFER TO MECHANICAL DRAWINGS
- CEILING TAG WITH HEIGHT
- NEW CONSTRUCTION KEYNOTE



**1** FIRST FLOOR REFLECTED CEILING  
SCALE: 1/8" = 1'-0"



REV.	DATE	DESCRIPTION



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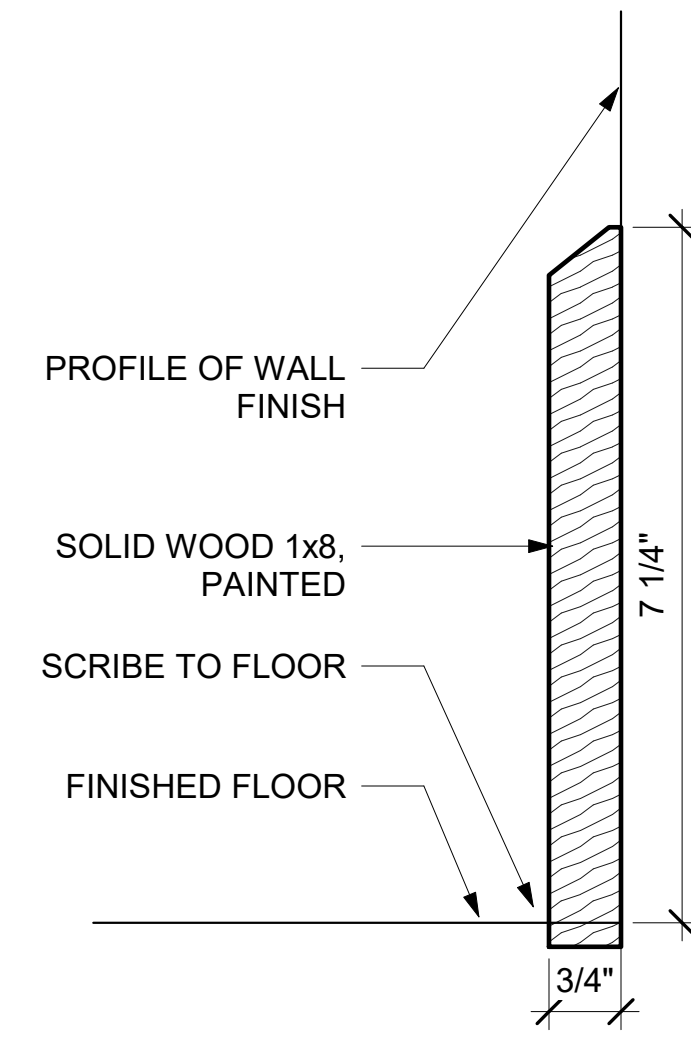
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PROJECT MGR.: SM  
DRAWN BY: DR  
CHECKED BY: SM  
APPROVED BY: SM  
DATE ISSUED FOR: CD'S 4-27-2023

**FIRST FLOOR REFLECTED CEILING PLAN**  
**A120**

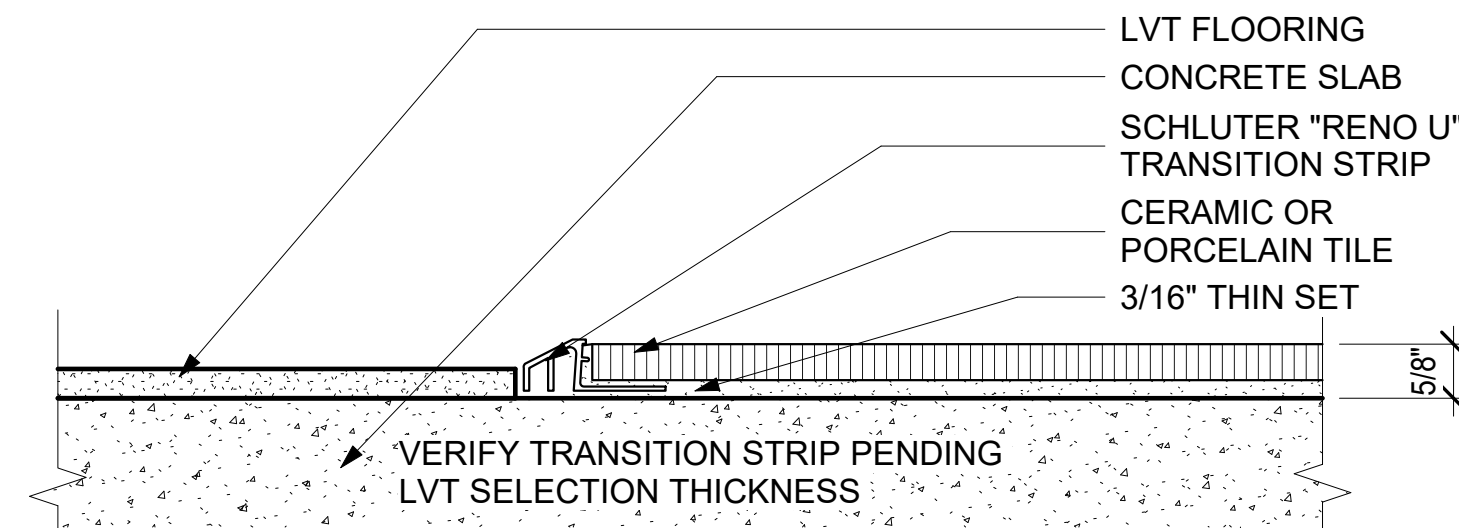


### FINISH MATERIAL LEGEND

MATERIAL TAG	DESCRIPTION	MANUFACTURER	PRODUCT NAME	PRODUCT NUMBER	PRODUCT COLOR / DESCRIPTION	SIZE	NOTES
<b>FLOOR FINISHES</b>							
CPT-1	CARPET TILE	MILLIKEN	ELEVATION	TRU132	SATELITE	-	
CT-1	PORCELAIN TILE FLOOR	CROSSVILLE		#AV246	ASH UPS	12"x24"x10.5 mm	
LVT-1	LUXURY VINYL TILE	FLEXCO			#670 "NORDIC"	6"x48"x1/8"	
<b>BASE &amp; TRIM FINISHES</b>							
RB-1	RUBBER BASE	ROPPE			TBD	-	
<b>CEILING FINISHES</b>							
ACT-1	ACOUSTICAL CEILING TILE	USG			MARS HIGH - NRC SLT	24"x24"	
ACT-2	ACOUSTICAL CEILING TILE	USG			RADAR	24"x24"	
<b>CABINETS &amp; MILLWORK FINISHES</b>							
PL-1	PLASTIC LAMINATE	WILSONART		4991-38	PRESSED LINEN	-	
SS-1	SOLID SURFACE	WILSONART		9230SS	POWDER WHITE	-	
<b>DOOR PANEL &amp; DOOR FRAME</b>							
PNT-1	PAINT	BENJAMIN MOORE			TBD	-	
ST-1	STAIN	TBD			TBD	-	



**2 TYP. WOOD BASE**  
SCALE: 6" = 1'-0"



**3 LVT TO TILE TRANSITION**  
SCALE: 6" = 1'-0"

### GENERAL FINISH NOTES

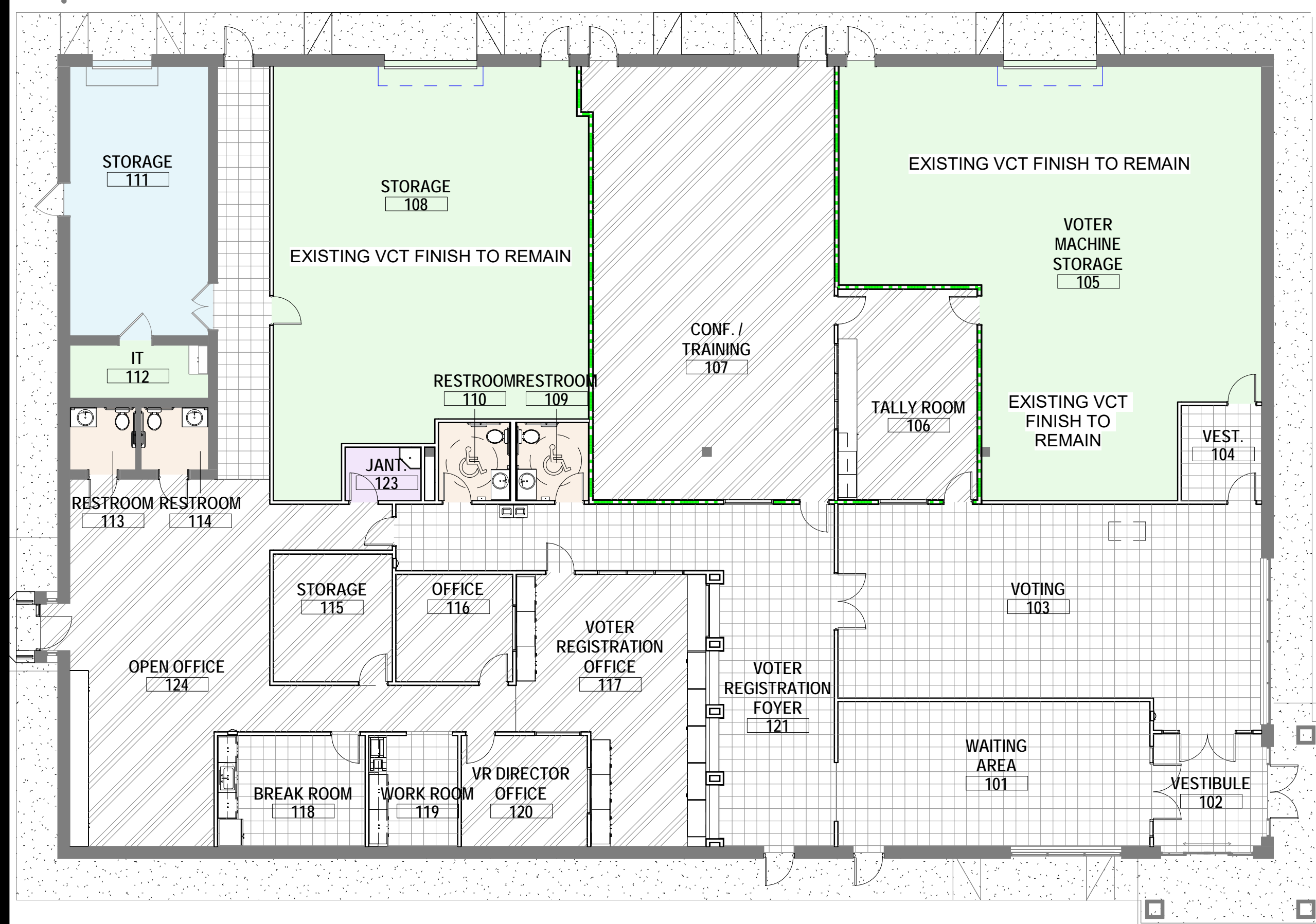
- FLOORING**
- TRANSITION BETWEEN DIFFERENT FLOORING MATERIALS AT DOORWAYS TO OCCUR IN MIDDLE OF CLOSED DOOR THRESHOLD.
  - ALL EXPOSED CONCRETE TO BE SEALED, REFER TO SPECIFICATIONS FOR DETAILS.
  - FLOORING CONTRACTORS ARE RESPONSIBLE TO VERIFY THAT ALL ADJOINING FLOORING MATERIALS WILL BE FLUSH BUTTED TO AVOID RUBBER THRESHOLDS WHERE POSSIBLE. FLOOR PREP TO FAN OUT 36" TO AVOID VISIBLE MOUND.
- TILE**
- ALL TILED AREAS WILL HAVE EPOXY GROUT APPLIED ON FLOORS AND WALLS.

### FINISH LEGEND NOTES

- REFER TO FLOORING MATERIAL TRANSITION DETAILS ON SHEET A140.

### FINISH ABBREVIATIONS

ACT	ACOUSTICAL CEILING TILE
ACW	ALUMINUM CLAD WOOD
ALUM	ALUMINUM
CONC.	CONCRETE
CP	CARPET
CT	CERAMIC TILE
FF	FACTORY FINISH
GYP BD	GYP SUM BOARD
LVT	LUXURY VINYL TILE
MFR	MANUFACTURER FINISH
PT	PAINT
SCW	SOLID CORE (WOOD DOOR)
ST	STAIN (FACTORY FINISH)
VCT	VINYL COMPOSITION TILE
WC	WAINSCOT
WD	WOOD



### FLOOR FINISH LEGEND

- CONC.
- CPT-1
- CT-1
- EXISTING CONC.
- EXISTING VCT
- LVT-1

**1 FIRST FLOOR FINISH PLAN**  
N.T.S.

### FINISH SCHEDULE

ROOM NO.	ROOM NAME	FLOOR			WALLS								CEILING		NOTES	ROOM NO.
		MTRL.	FINISH	BASE	NORTH		EAST		SOUTH		WEST		MTRL.	FINISH		
					MTRL.	FINISH	MTRL.	FINISH	MTRL.	FINISH	MTRL.	FINISH				
101	WAITING AREA	CONC.	LVT-1	WD	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		101
102	VESTIBULE	CONC.	LVT-1	WD	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		102
103	VOTING	CONC.	LVT-1	WD	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		103
104	VEST.	CONC.	LVT-1	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		104
105	VOTER MACHINE STORAGE	CONC.	EXISTING VCT	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-2	FF		105
106	TALLY ROOM	CONC.	CPT-1	CPT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		106
107	CONF. / TRAINING	CONC.	CPT-1	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		107
108	STORAGE	CONC.	EXISTING VCT	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-2	FF	CLEAR STRIP & WAX VCT	108
109	RESTROOM	CONC.	CT-1	CT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	CT-1	EX. GYP BD	PT-2		109
110	RESTROOM	CONC.	CT-1	CT-1	GYP BD	PT-1	GYP BD	CT-1	GYP BD	PT-1	GYP BD	PT-1	EX. GYP BD	PT-2		110
111	STORAGE	CONC.	EXISTING CONC.	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		111
112	IT	CONC.	EXISTING VCT	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	EX. GYP BD	FF	CLEAR STRIP & WAX VCT	112
113	RESTROOM	CONC.	CT-1	CT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	EX. GYP BD	PT-2	PATCH & REPAIR*	113
114	RESTROOM	CONC.	CT-1	CT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	EX. GYP BD	PT-2	PATCH & REPAIR*	114
115	STORAGE	CONC.	CPT-1	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-2	FF		115
116	OFFICE	CONC.	CPT-1	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		116
117	VOTER REGISTRATION OFFICE	CONC.	CPT-1	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		117
118	BREAK ROOM	CONC.	LVT-1	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		118
119	WORK ROOM	CONC.	LVT-1	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		119
120	VR DIRECTOR OFFICE	CONC.	CPT-1	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		120
121	VOTER REGISTRATION FOYER	CONC.	LVT-1	WD	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		121
122	HALLWAY	CONC.	LVT-1	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-1	FF		122
123	JANT.	CONC.	CONC.	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-2	FF		123
124	OPEN OFFICE	CONC.	CPT-1	RB-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	GYP BD	PT-1	ACT-2	FF		124

\* PATCH & REPAIR GYP SUM WALL BOARD. PREP. FOR PAINT, ALL FOUR (4) WALLS.



REV.	DATE	DESCRIPTION

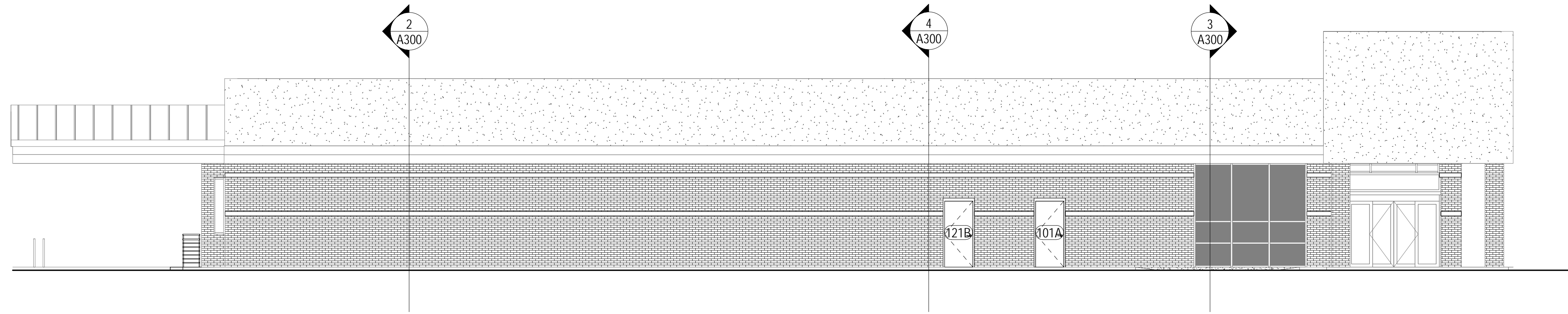


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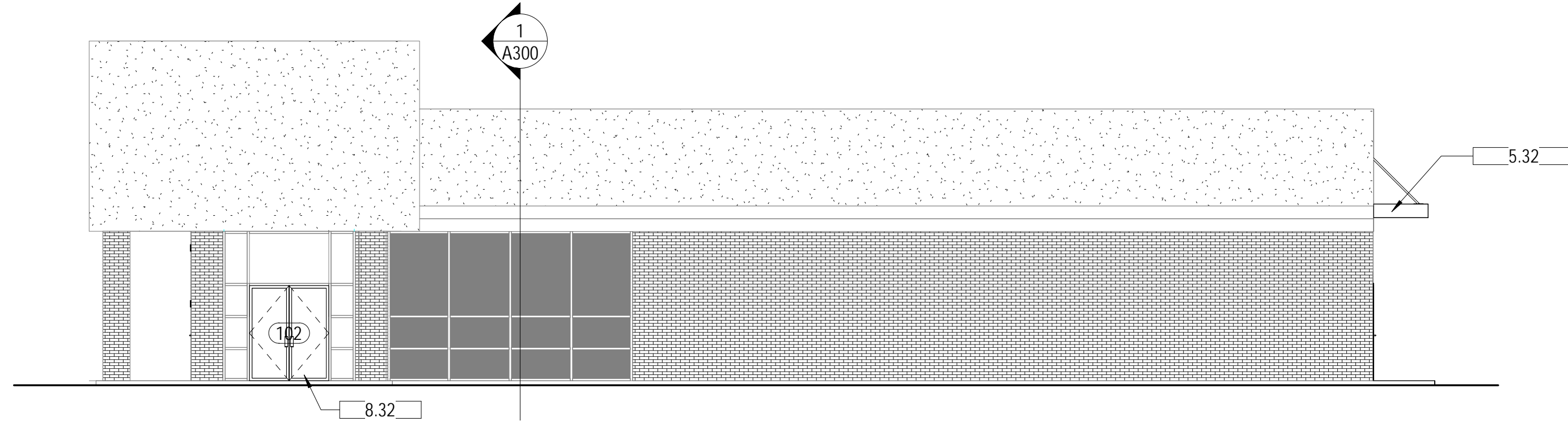
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PROJECT MGR.: SM  
DRAWN BY: Author  
CHECKED BY: Checker  
APPROVED BY: Approver  
DATE ISSUED FOR: CD'S  
4-27-2023

**FINISH SCHEDULE & LEGEND**

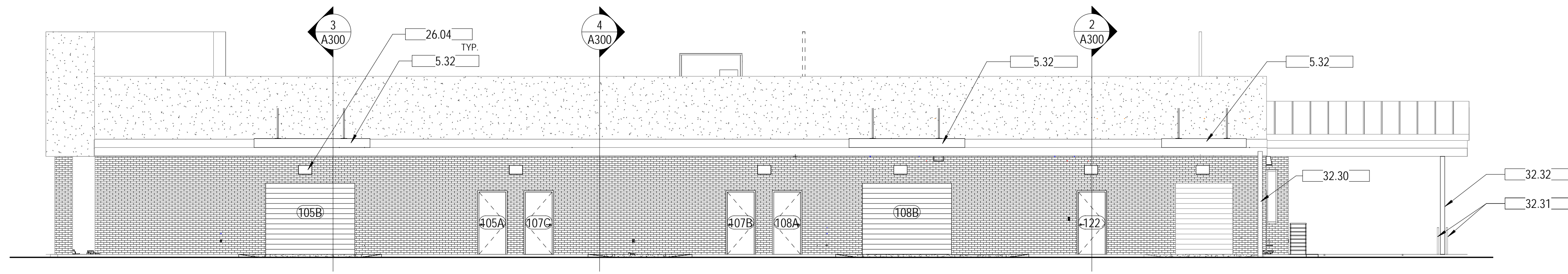




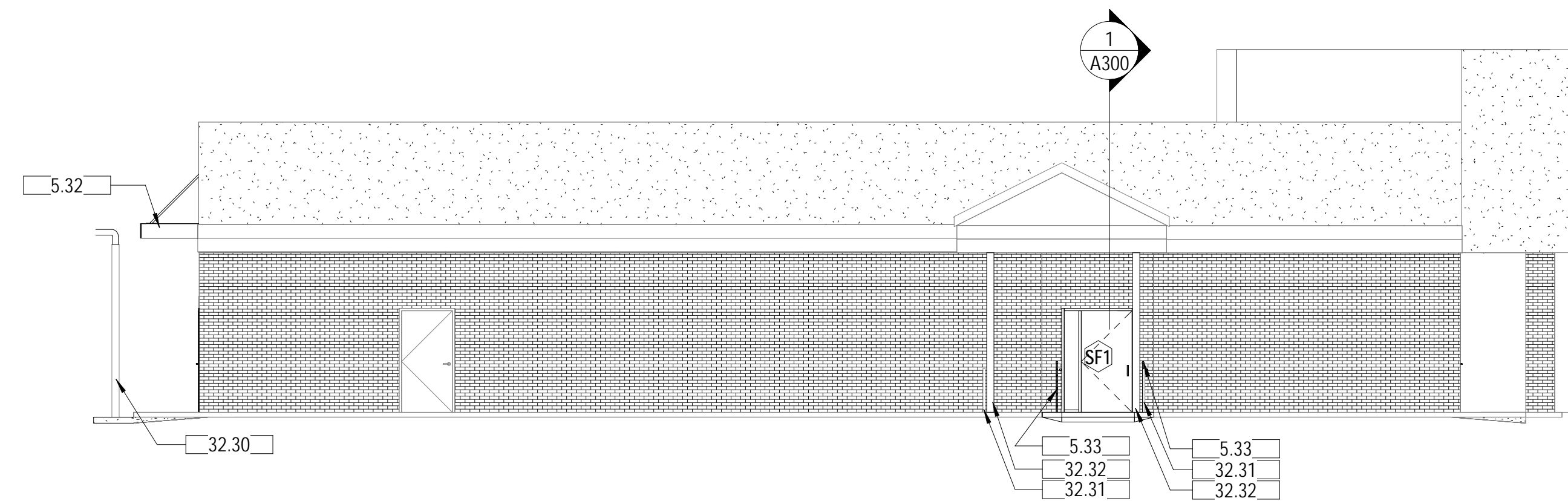
**1 SOUTH ELEVATION - NEW CONSTRUCTION**  
SCALE: 1/8" = 1'-0"



**2 WEST ELEVATION - NEW CONSTRUCTION**  
SCALE: 1/8" = 1'-0"



**3 NORTH ELEVATION - NEW CONSTRUCTION**  
SCALE: 1/8" = 1'-0"



**4 EAST ELEVATION - NEW CONSTRUCTION**  
SCALE: 1/8" = 1'-0"

**ELEVATION NOTES**

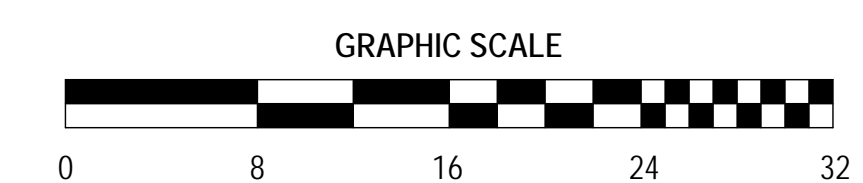
- 1 NOT ALL KEYNOTES WILL BE USED ON ALL SHEETS; REFER TO MASTER KEYNOTE LIST ON A000.
- 2 REFER TO SHEET A000 FOR GENERAL PROJECT NOTES.
- 3 REFER TO PLANS & SECTIONS FOR ADDITIONAL INFORMATION.

**KEYNOTE LEGEND**

KEY VALUE	KEYNOTE TEXT
5.32	CANOPY
5.33	METAL PIPE RAIL, PAINT
8.32	NEW DOOR & HARDWARE TO MATCH EXISTING SURROUND
26.04	LIGHT FIXTURE, RE: ELEC.
32.30	REPAIR VEHICLE CLEARANCE PIPE & SIGNAGE
32.31	NEW BOLLARDS; PAINT
32.32	NEW COLUMN, REFER TO STRUCT. DWGS., PAINT

**LEGEND & SYMBOLS**

	EXISTING STUCCO FINISH COAT REFER TO EXTERIOR MATERIAL SCHEDULE
	EXISTING BRICK VENEER REFER TO EXTERIOR MATERIAL SCHEDULE
	12" X" SLOPE ARROW / TRIANGLE (RISE / RUN)
	101 NEW DOOR MARK
	11 NEW STOREFRONT MARK
	? NEW CONSTRUCTION KEYNOTE



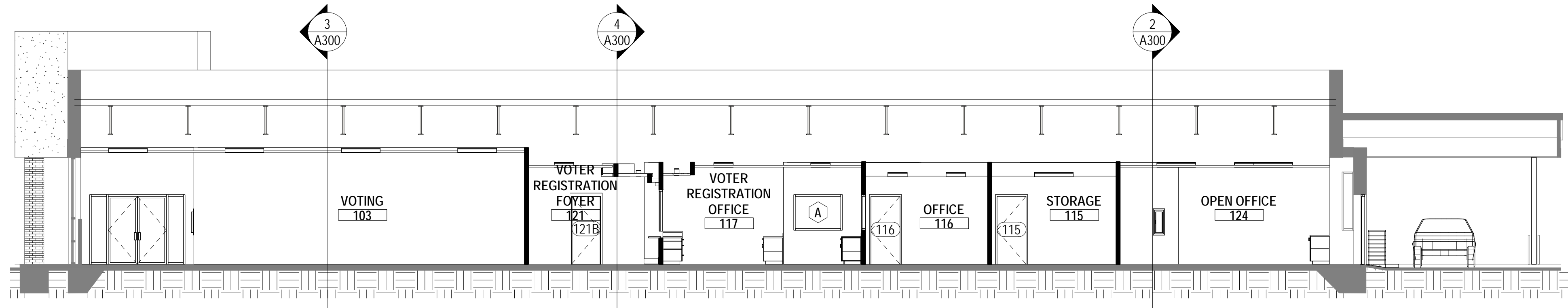
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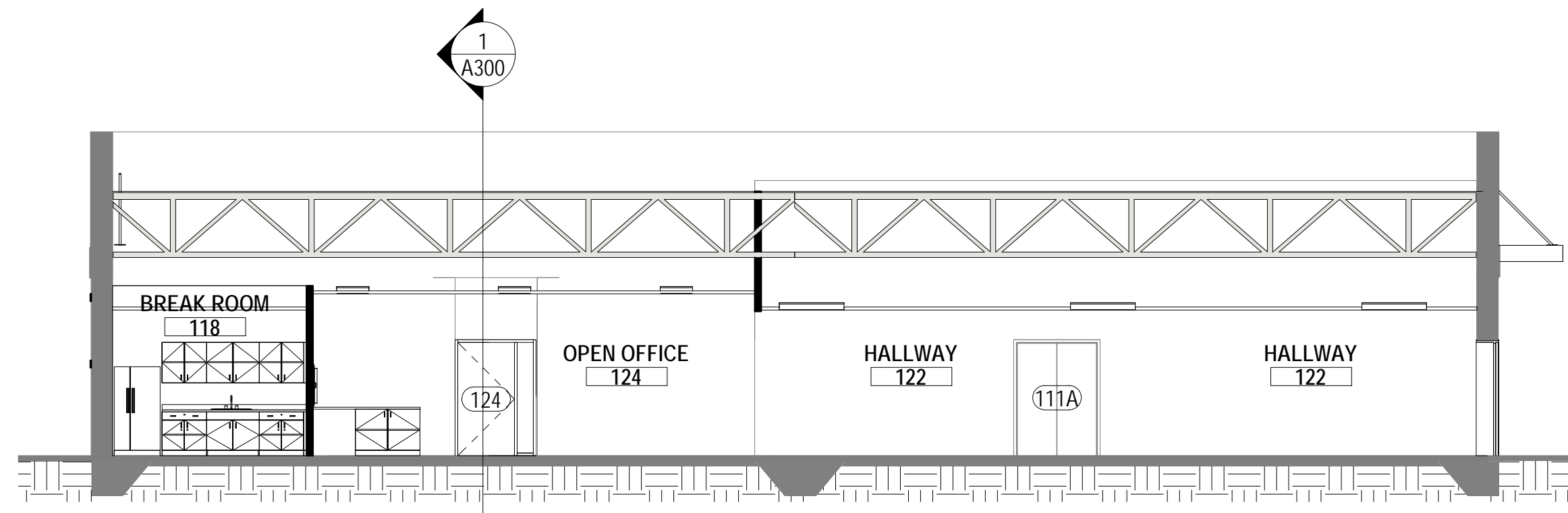
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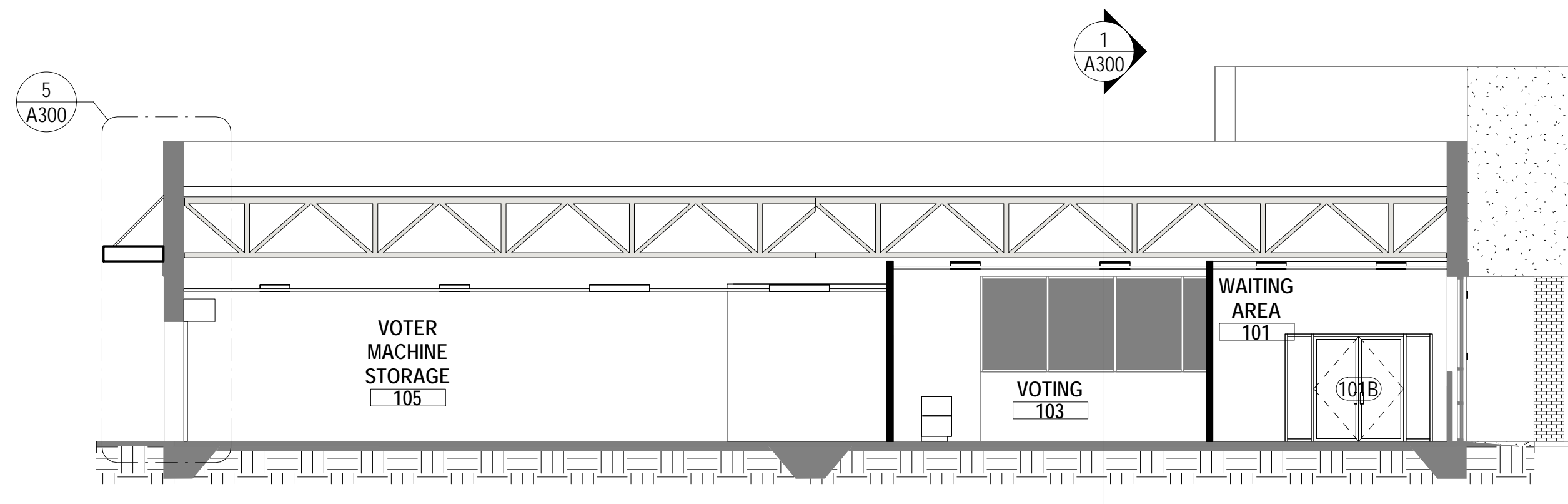
**BUILDING ELEVATIONS**



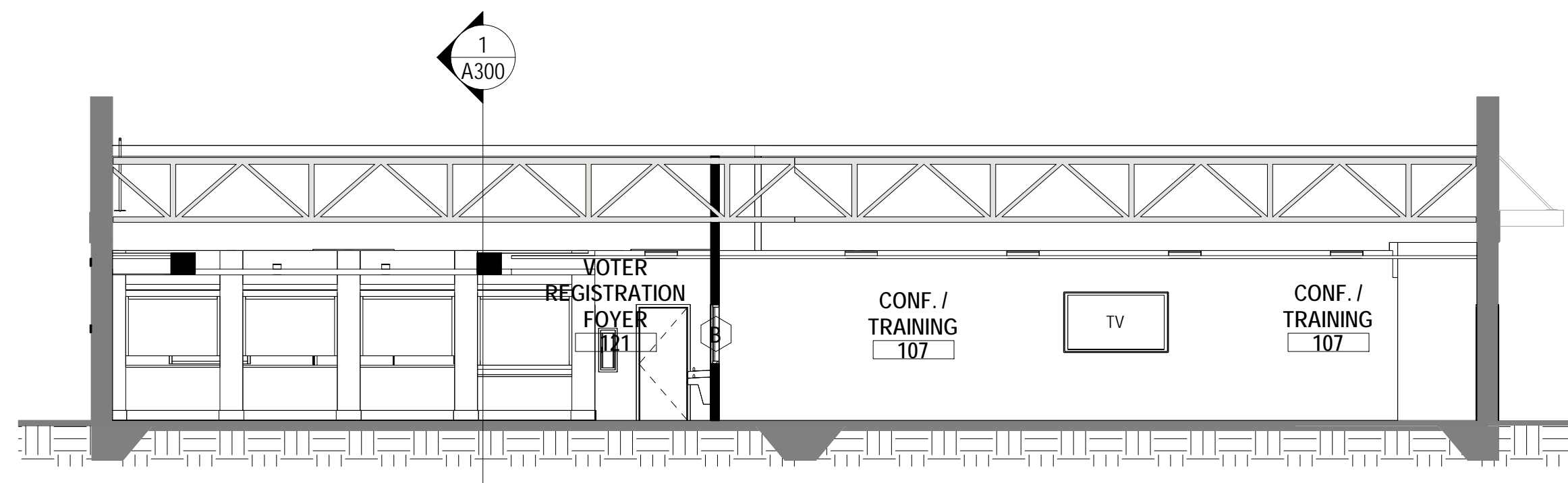
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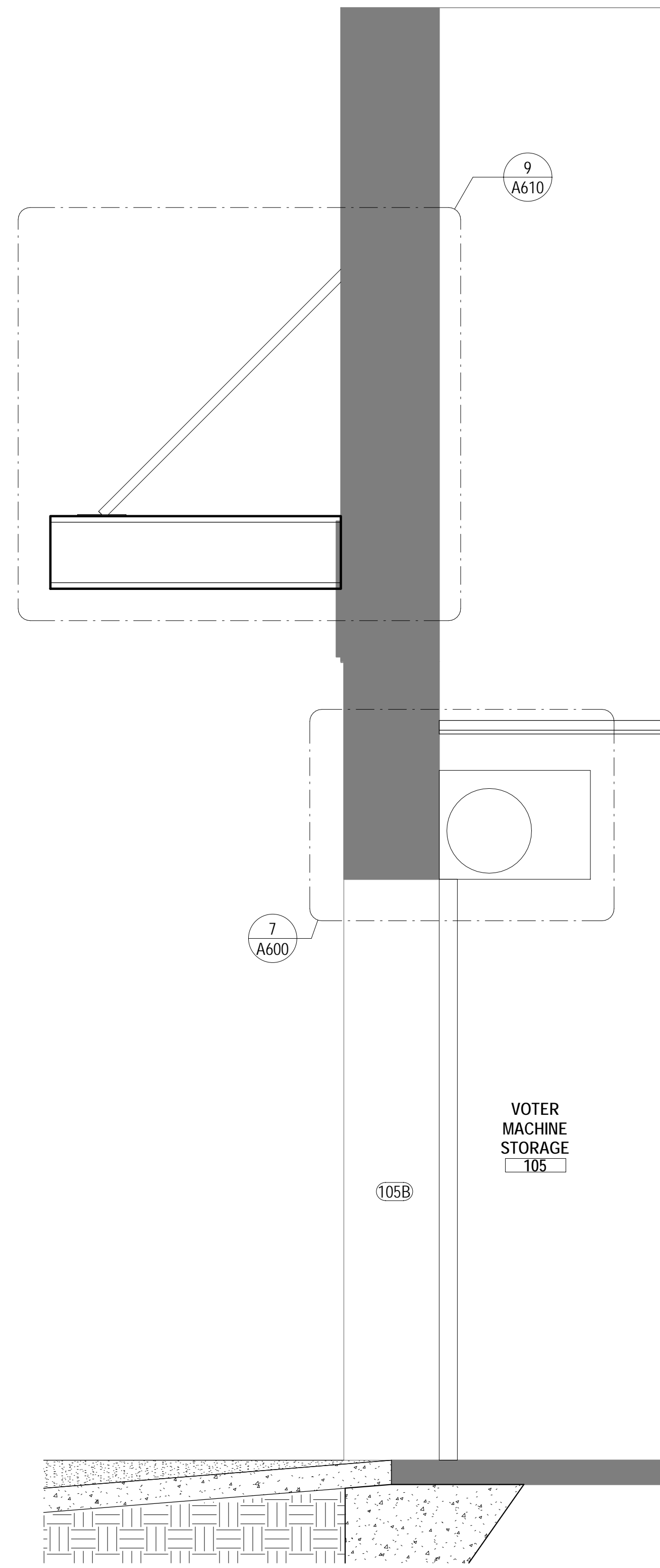
**2 BUILDING SECTION**  
SCALE: 1/8" = 1'-0"



**3 BUILDING SECTION**  
SCALE: 1/8" = 1'-0"



**4 BUILDING SECTION**  
SCALE: 1/8" = 1'-0"



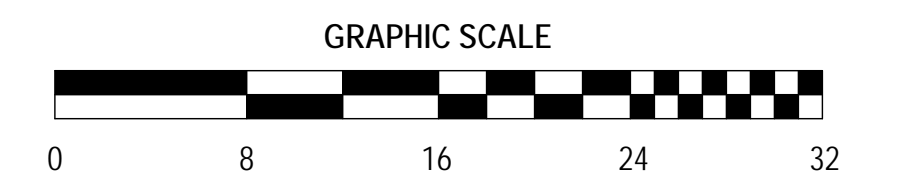
**5 WALL SECTION**  
SCALE: 3/4" = 1'-0"

SECTION NOTES	
1	NOT ALL KEYNOTES WILL BE USED ON ALL SHEETS; REFER TO MASTER KEYNOTE LIST ON A000.
2	REFER TO SHEET A000 FOR GENERAL PROJECT NOTES.
3	REFER TO PLANS & ELEVATIONS FOR ADDITIONAL INFORMATION.

KEYNOTE LEGEND	
KEY VALUE	KEYNOTE TEXT

LEGEND & SYMBOLS	
	EXISTING STUCCO FINISH COAT REFER TO EXTERIOR MATERIAL SCHEDULE
	EXISTING BRICK VENEER REFER TO EXTERIOR MATERIAL SCHEDULE
	12° SLOPE ARROW / TRIANGLE (RISE / RUN)
	101 NEW DOOR MARK
	11 NEW STOREFRONT MARK
	? NEW CONSTRUCTION KEYNOTE



REV.	DATE	DESCRIPTION

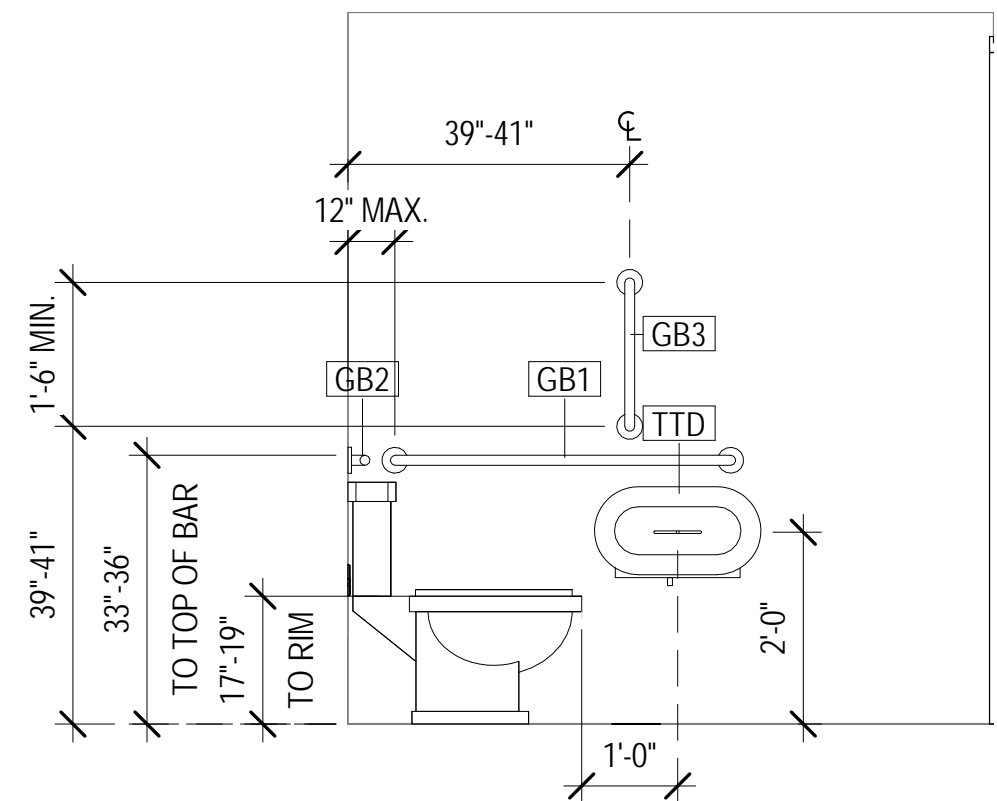




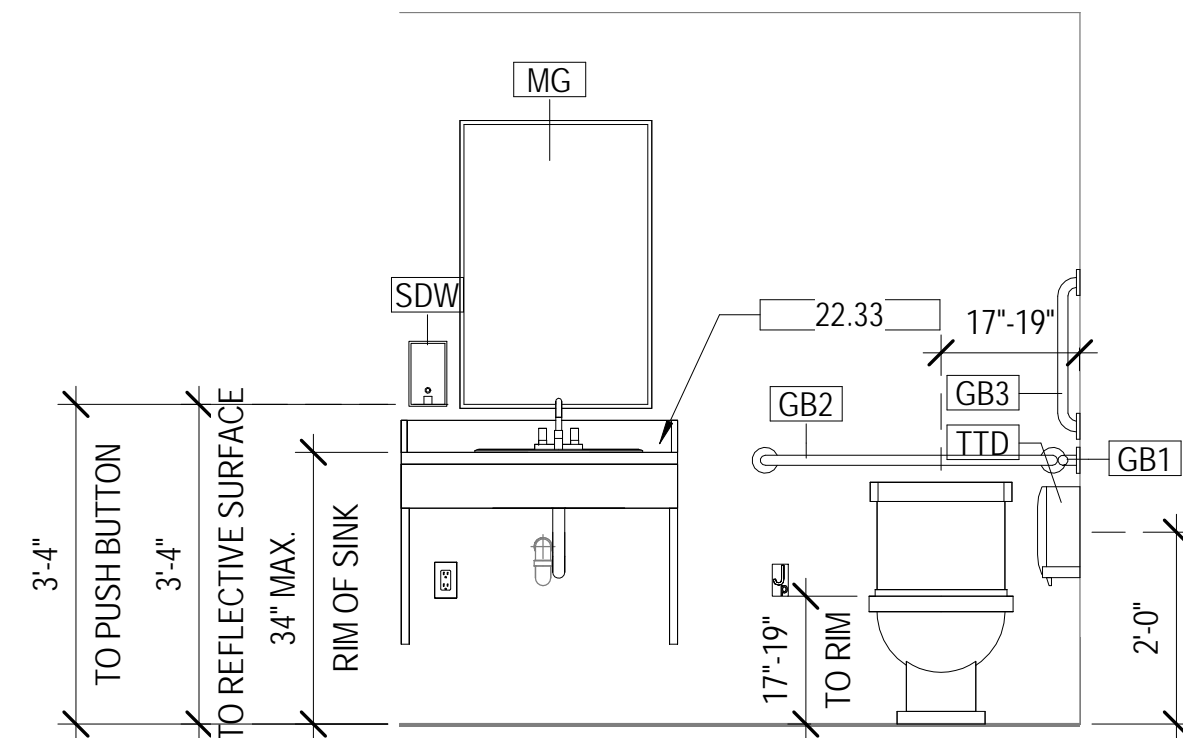
### TOILET ACCESSORIES SCHEDULE

MARK	DESCRIPTION	MODEL NO.	MANUFACTURER	COMMENTS
FEC				
GB1	42" STAINLESS STEEL GRAB BARS WITH SNAP FLANGE (1 1/4" DIA.)	B-5806	BOBRICK WASHROOM EQUIPEMENT, INC.	
GB2	36" STAINLESS STEEL GRAB BARS WITH SNAP FLANGE (1 1/4" DIA.)	B-5806	BOBRICK WASHROOM EQUIPEMENT, INC.	
GB3	18" STAINLESS STEEL GRAB BARS WITH SNAP FLANGE (1 1/4" DIA.)	B-5806	BOBRICK WASHROOM EQUIPEMENT, INC.	
MG	Glass Mirror with Stainless Steel Angle Frame	B-165 Series	Bobrick Washroom Equipment, Inc.	
PTD	SURFACE MOUNTED PAPER TOWEL DISPENSER	B-4262	BOBRICK WASHROOM EQUIPEMENT, INC.	
SDW	SURFACE MOUNTED SOAP DISPENSER	B-2111	BOBRICK WASHROOM EQUIPEMENT, INC.	
TTD	SURFACE MOUNTED TWIN JUMBO-ROLL TOILET TISSUE DISPENSER	B-2892	BOBRICK WASHROOM EQUIPEMENT, INC.	

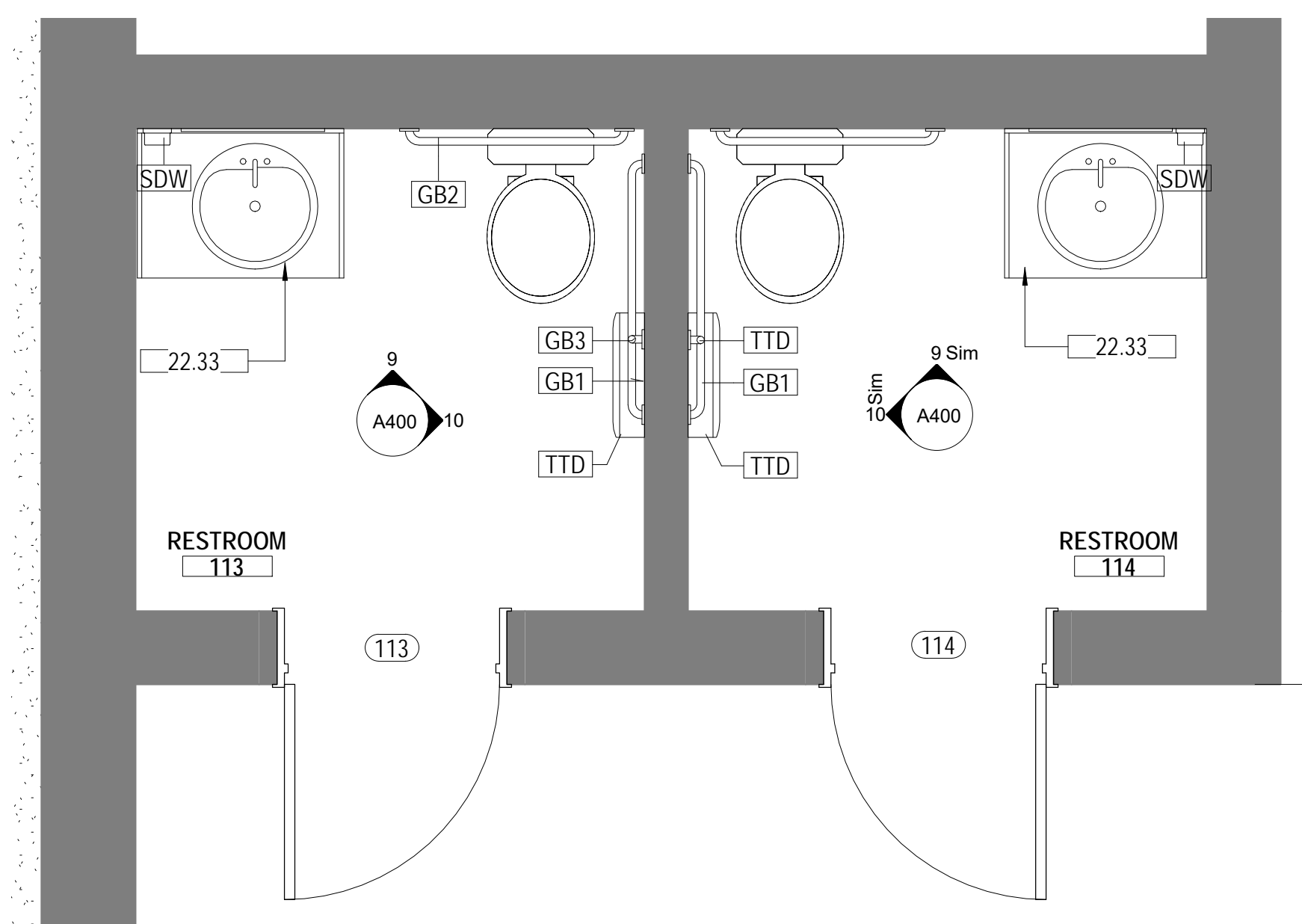
NOTE: COUNTY TO SUPPLY TOILET PAPER & PAPER TOWEL DISPENSER. CONTRACTOR TO INSTALL.



**10** RESTROOM 113/114  
SCALE: 1/2" = 1'-0"



**9** RESTROOM 113/114 - NORTH  
SCALE: 1/2" = 1'-0"



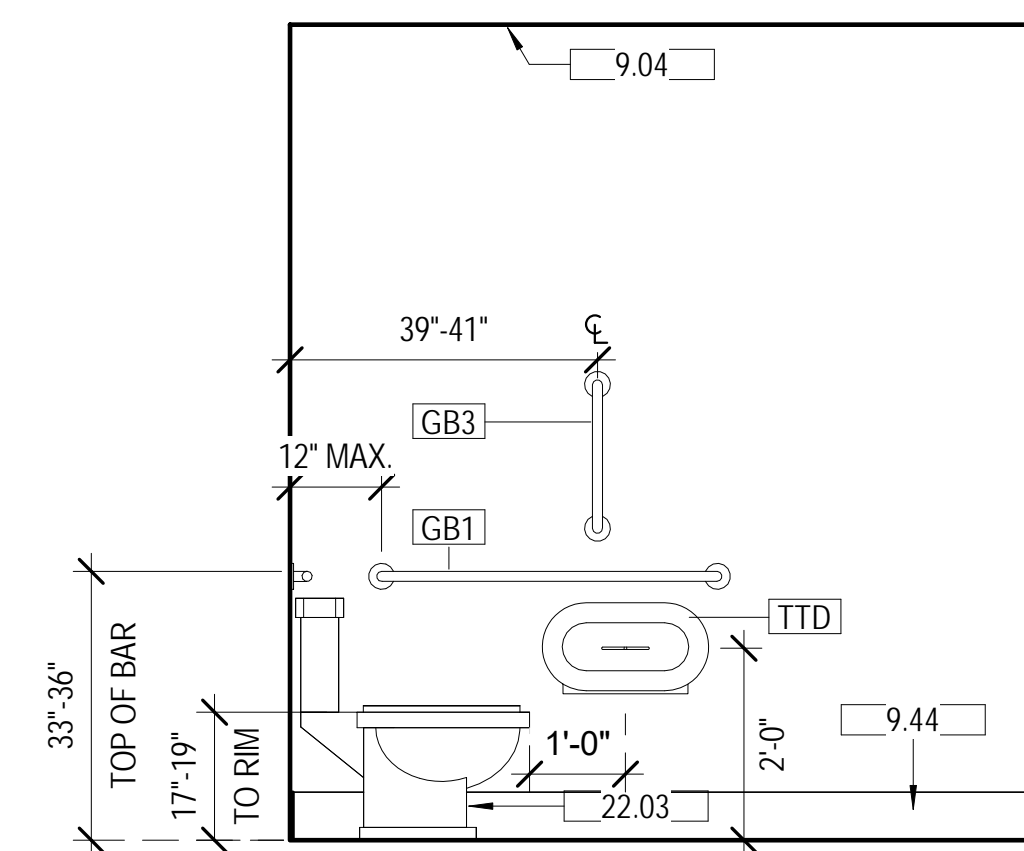
**8** FIRST FLOOR PLAN - Callout 1  
SCALE: 1/2" = 1'-0"

### ENLARGED PLAN NOTES

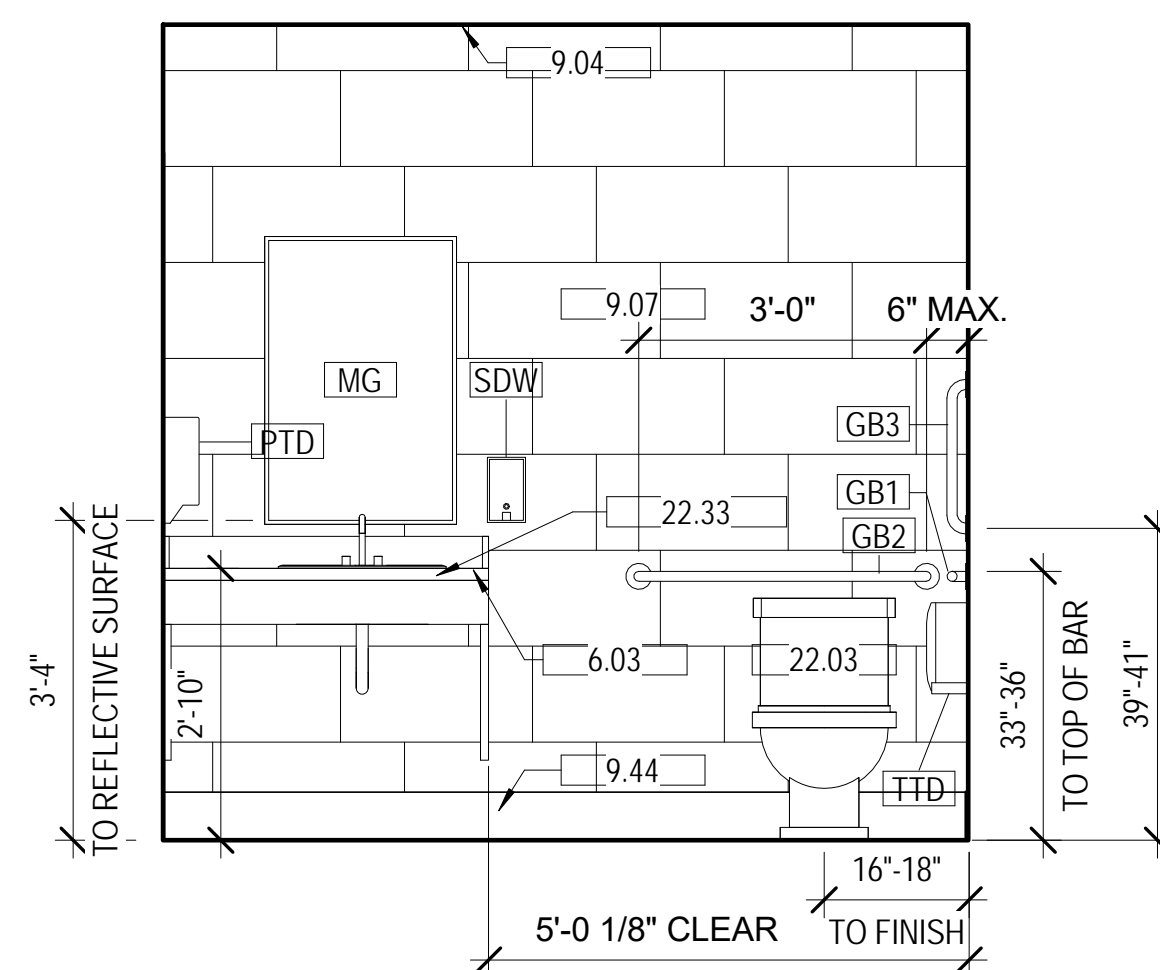
- 1 PROVIDE BLOCKING SUPPORT WITHIN STUD WALL FRAMING PRIOR TO COVERAGE WITH GYPSUM WALL BOARD.
- 2 REFER TO FINISH SCHEDULE ON SHEET A140 FOR COLOR AND MATERIAL.
- 3 TOILET ACCESSORY MODEL NO. AND MANUFACTURER ARE BASIS OF DESIGN. APPROVED EQUAL WILL BE CONSIDERED AND/OR APPROVED DURING THE SUBMITTAL REVIEW PROCESS.

### KEYNOTE LEGEND

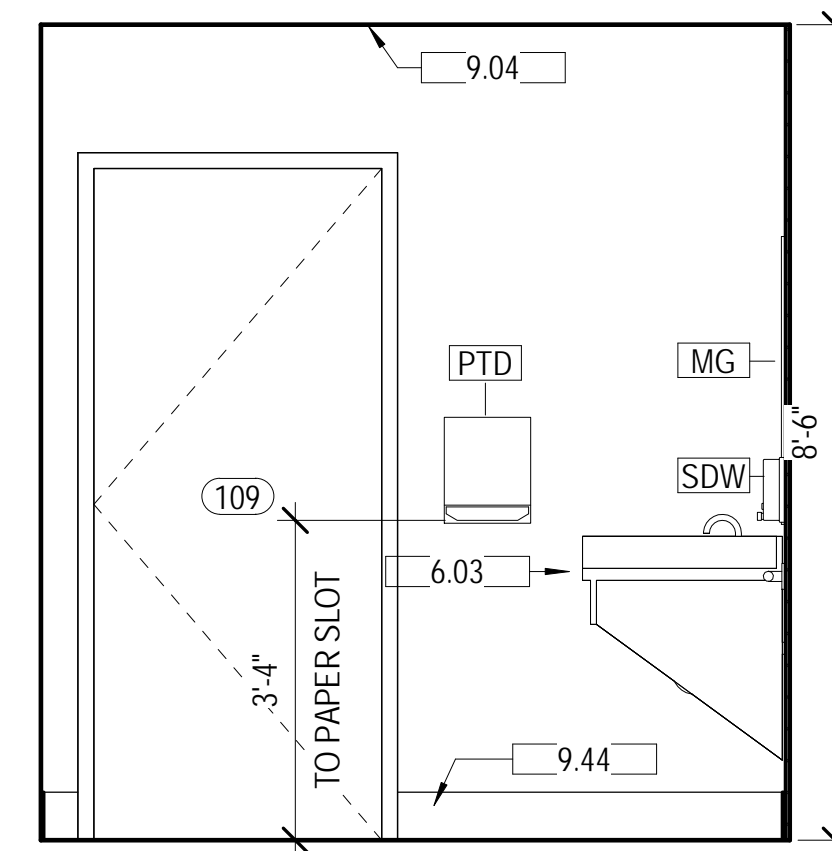
KEY VALUE	KEYNOTE TEXT
6.03	SOLID SURFACE COUNTERTOP, WITH BACKSPASH AS SHOWN
9.04	GYPSUM WALL BOARD
9.07	WALL TILE, RE: FINISH MATERIAL LEGEND ON A140
9.44	BASE TILE, RE: FINISH MATERIAL LEGEND ON A140
22.03	NEW TOILET, RE: PLUMBING
22.33	NEW UNDERMOUNT SINK, RE: PLUMBING



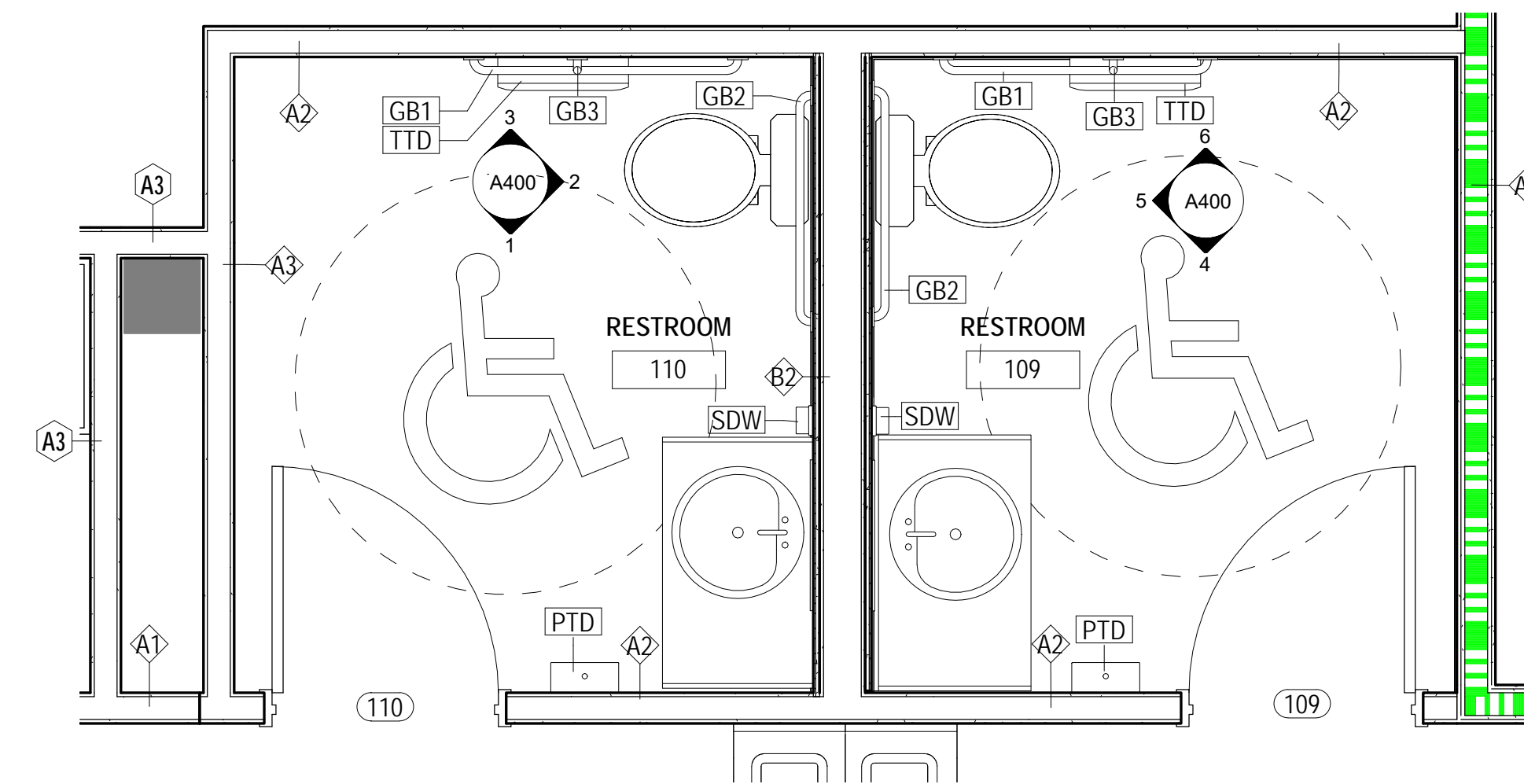
**6** INTERIOR ELEVATION  
SCALE: 1/2" = 1'-0"



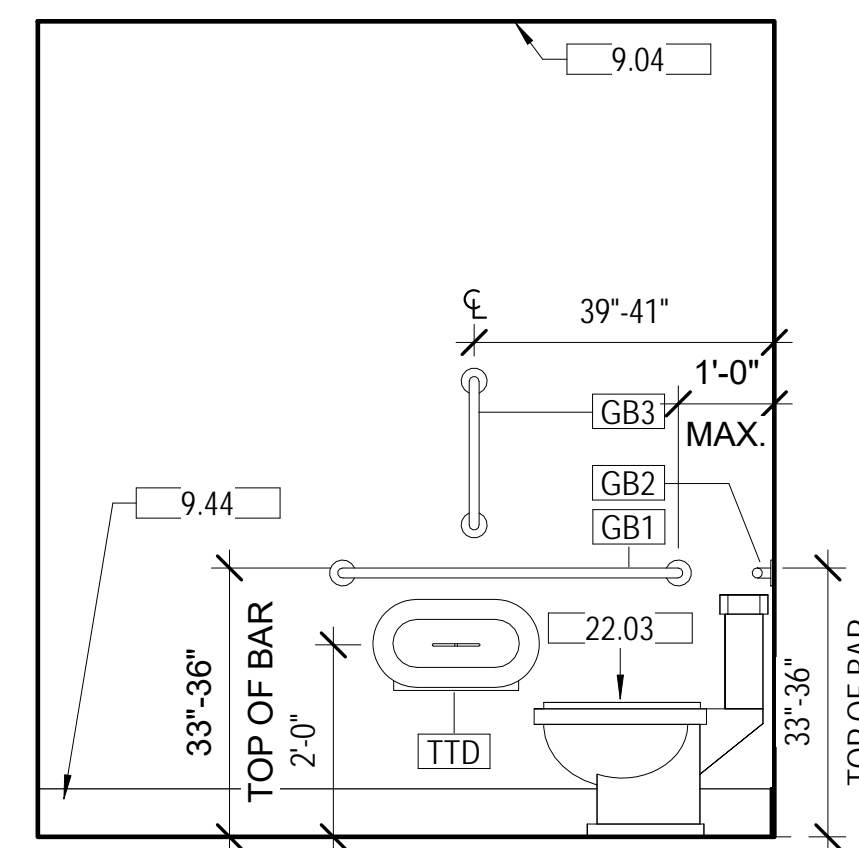
**5** INTERIOR ELEVATION  
SCALE: 1/2" = 1'-0"



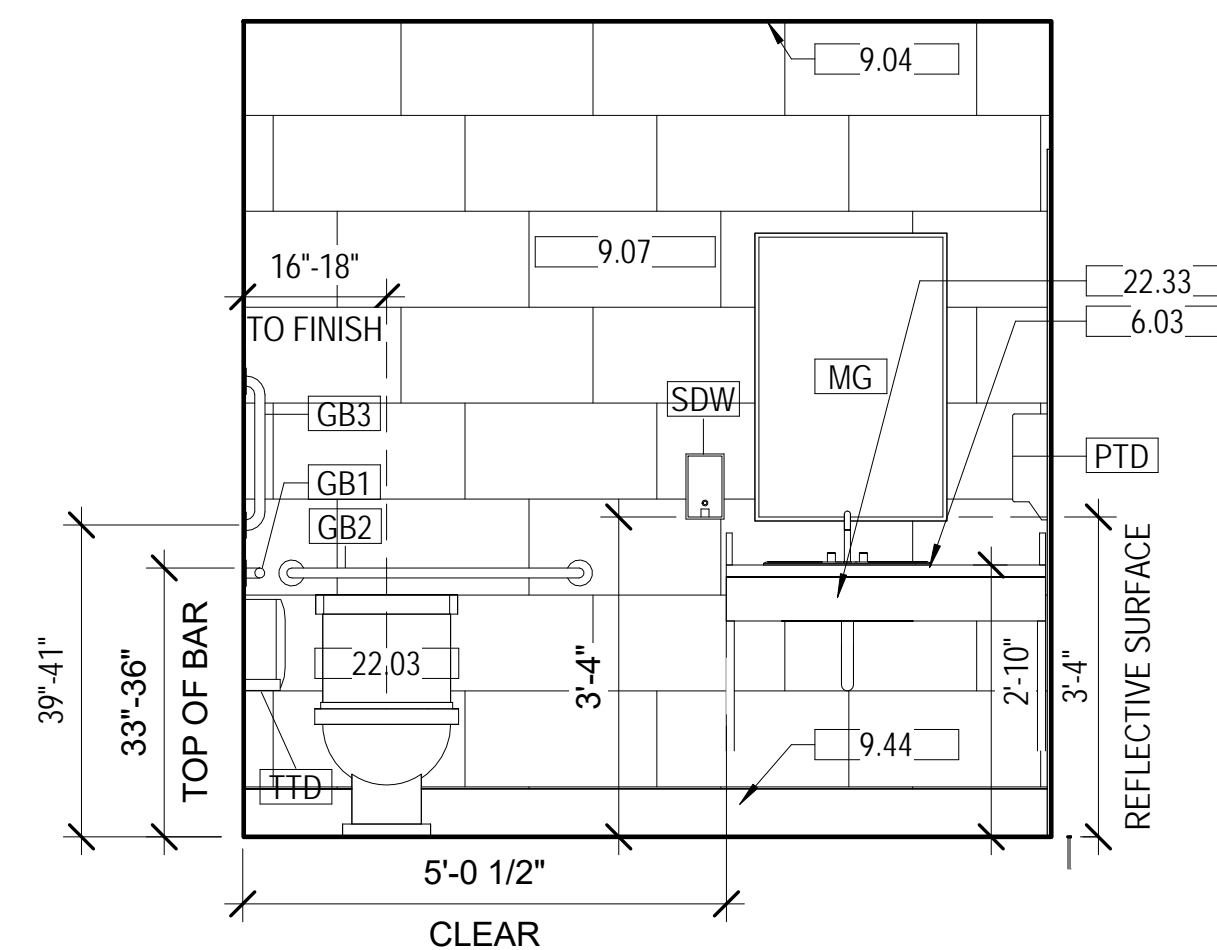
**4** INTERIOR ELEVATION  
SCALE: 1/2" = 1'-0"



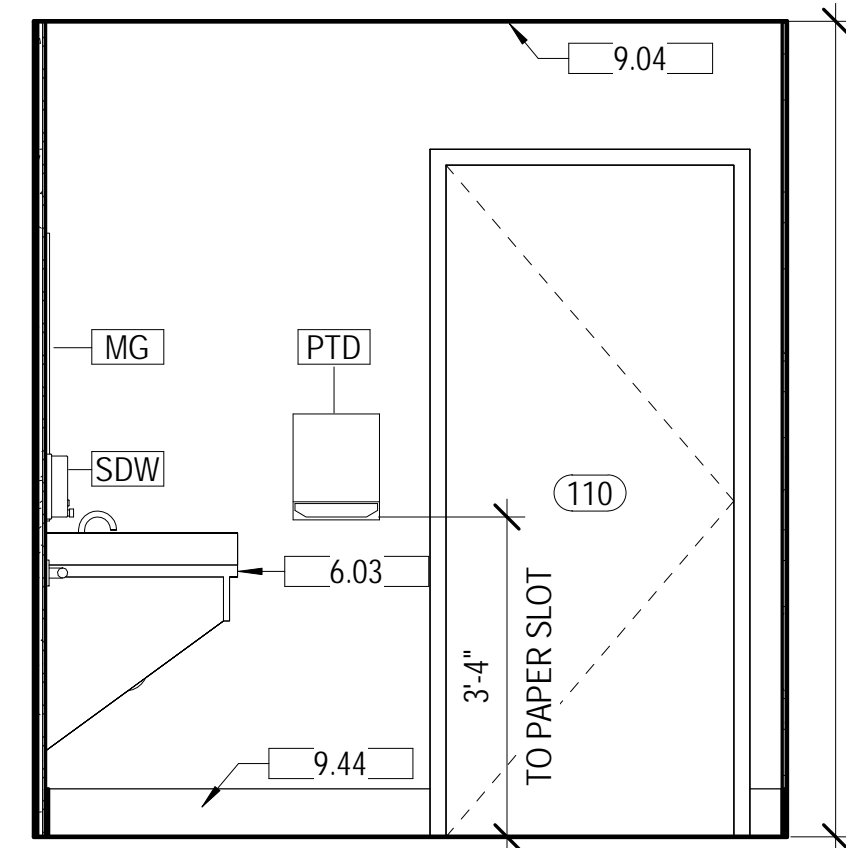
**7** RESTROOM FLOOR PLAN - 109 & 110  
SCALE: 1/2" = 1'-0"



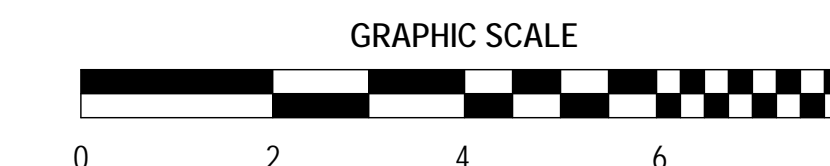
**3** INTERIOR ELEVATION  
SCALE: 1/2" = 1'-0"



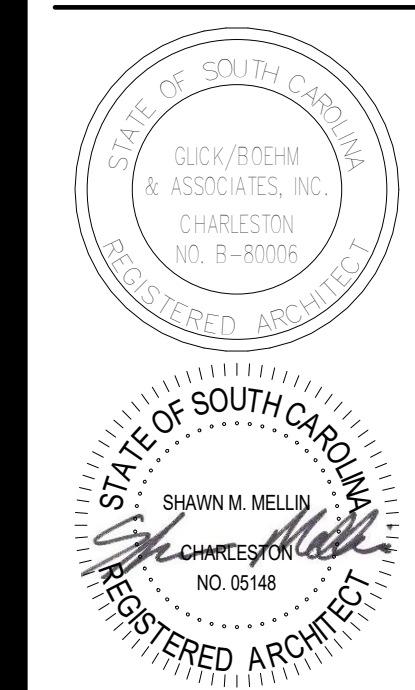
**2** INTERIOR ELEVATION  
SCALE: 1/2" = 1'-0"



**1** INTERIOR ELEVATION  
SCALE: 1/2" = 1'-0"



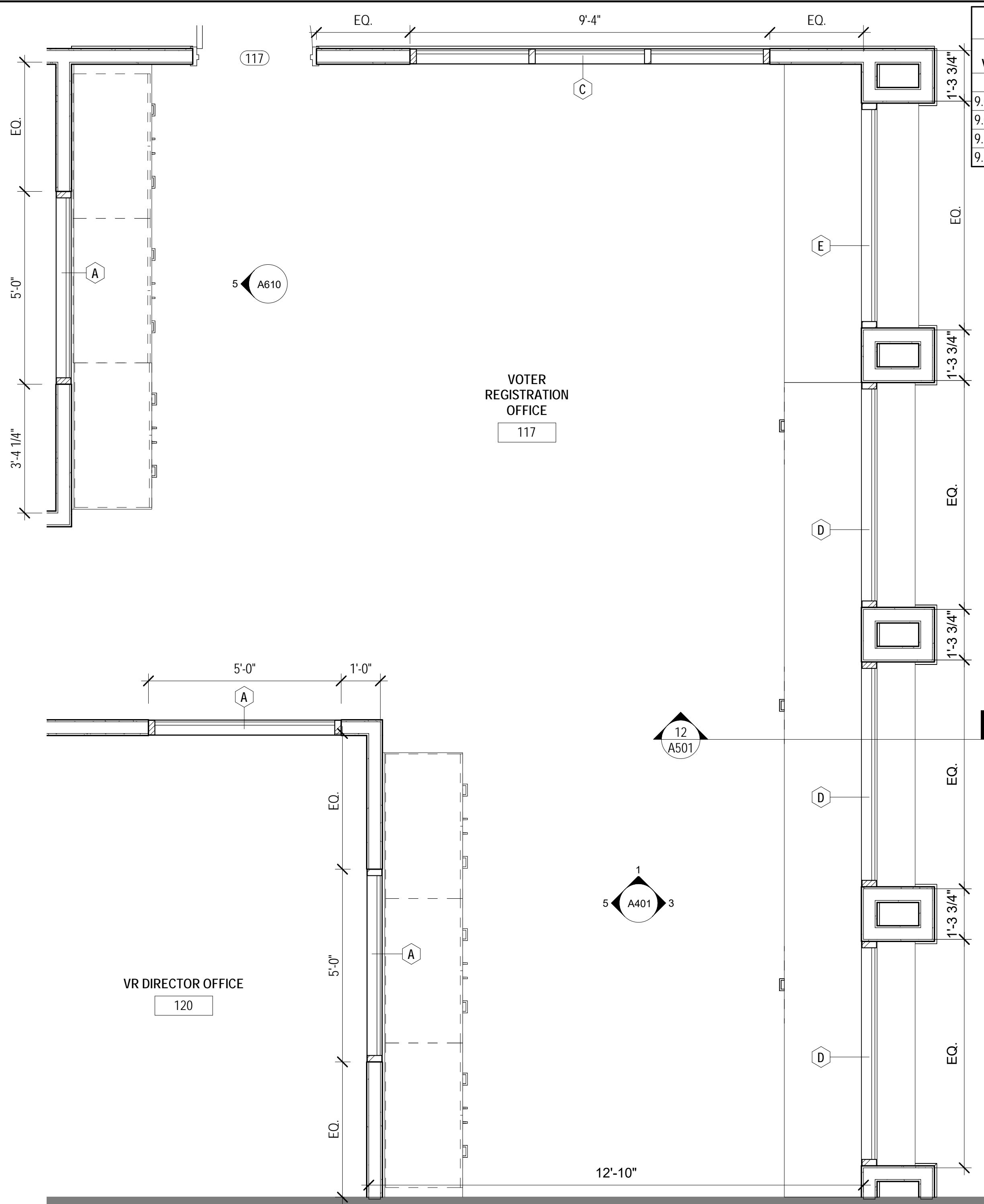
REVISION	DATE	DESCRIPTION



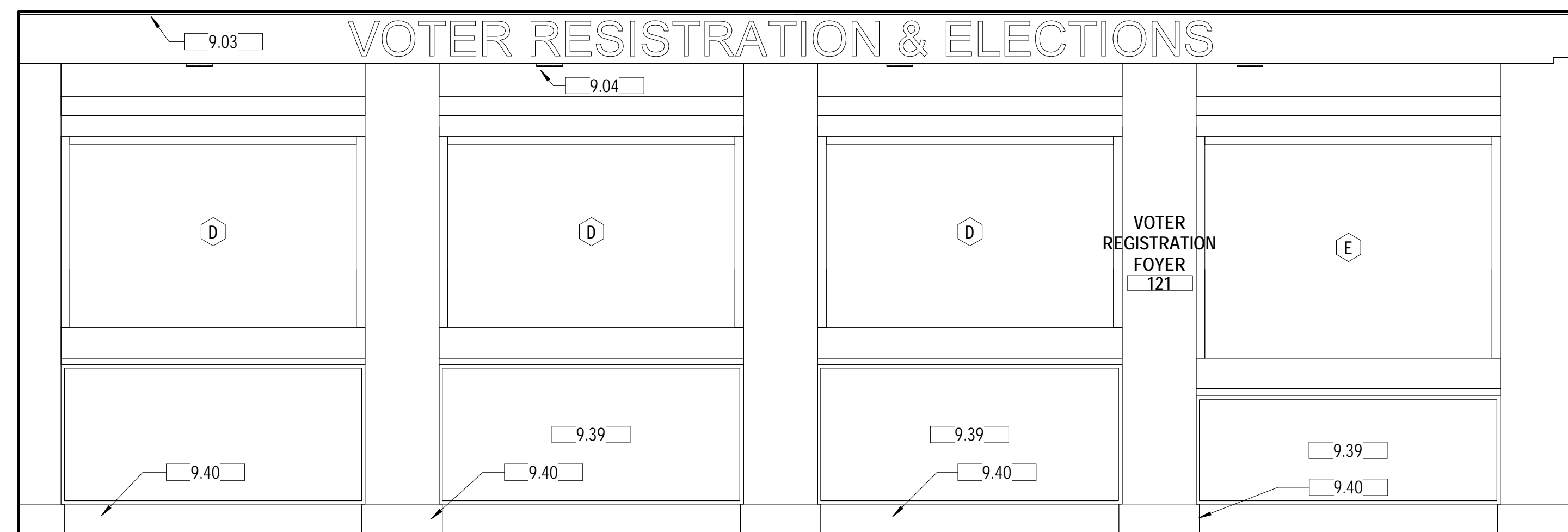
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CHECKED BY: DR  
APPROVED BY: SM  
DATE ISSUED FOR: CD'S

ENLARGED FLOOR PLANS - NEW CONSTRUCTION  
**A400**



**4** VOTER REGISTRATION OFFICE FLOOR PLAN  
SCALE: 1/2" = 1'-0"

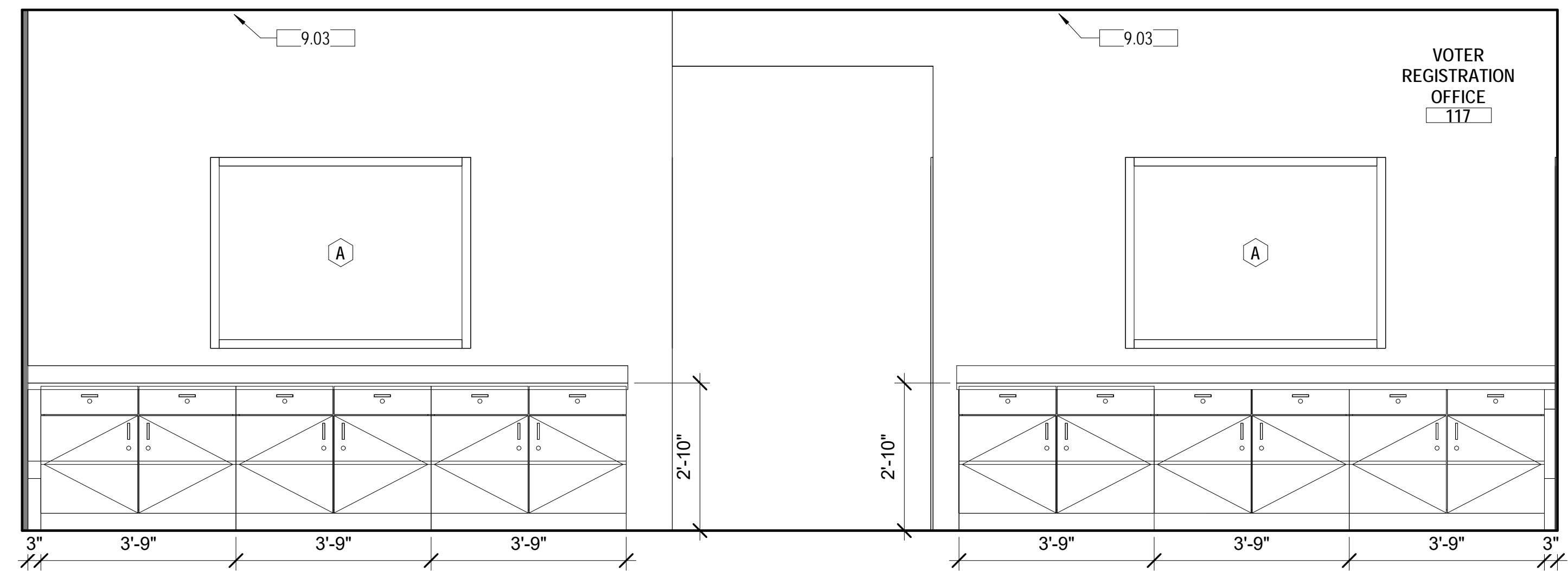


**2** REGISTRATION FOYER - WEST ELEVATION  
SCALE: 1/2" = 1'-0"

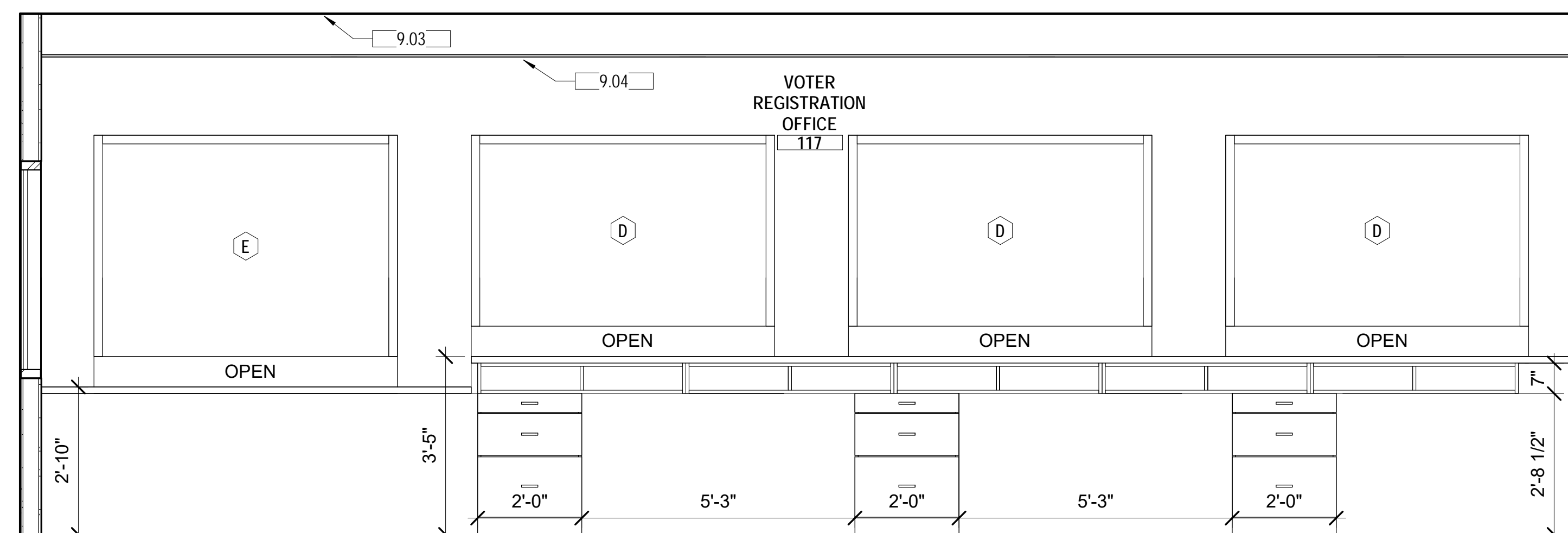
KEYNOTE LEGEND	
KEY VALUE	KEYNOTE TEXT
9.03	ACOUSTIC CEILING TILE
9.04	GYPSUM WALL BOARD
9.39	1/2" THICK PLASTIC LAMINATE PANEL
9.40	WOOD BASE, SEE 2/A140

ENLARGED PLAN NOTES	
1	PROVIDE BLOCKING SUPPORT WITHIN STUD WALL FRAMING PRIOR TO COVERAGE WITH GYPSUM WALL BOARD.
2	REFER TO FINISH SCHEDULE ON SHEET A140 FOR COLOR AND MATERIAL.
3	TOILET ACCESSORY MODEL NO. AND MANUFACTURER ARE BASIS OF DESIGN, APPROVED EQUAL WILL BE CONSIDERED AND/OR APPROVED DURING THE SUBMITTAL REVIEW PROCESS.

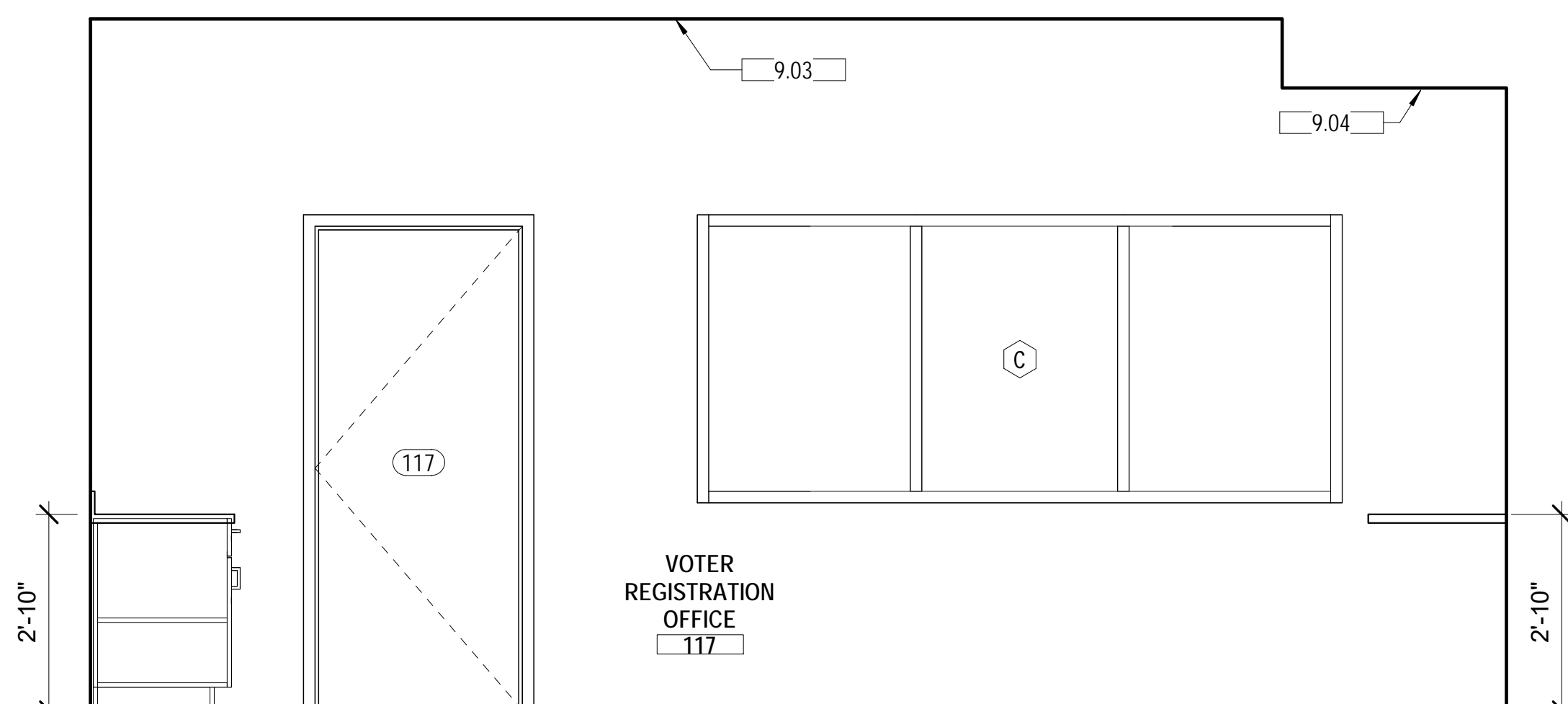
ENLARGED PLAN NOTES	



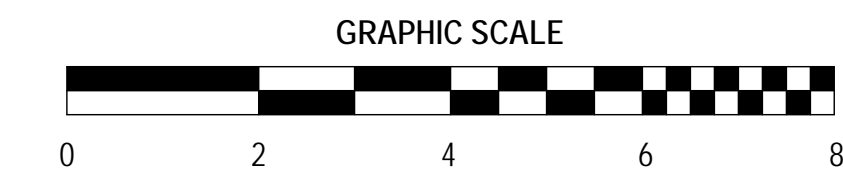
**5** VOTER REGISTRATION OFFICE - WEST ELEVATION  
SCALE: 1/2" = 1'-0"



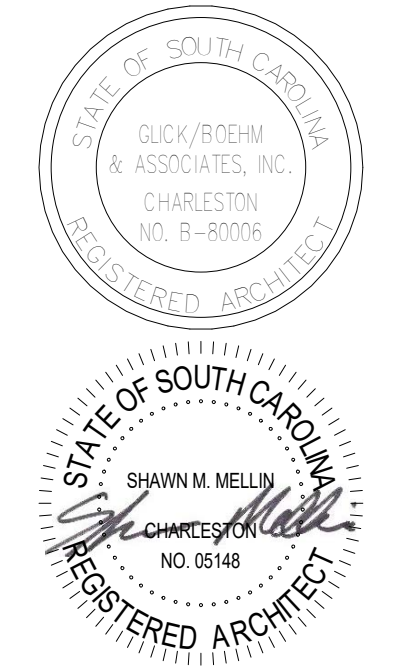
**3** VOTER REGISTRATION OFFICE - EAST ELEVATION  
SCALE: 1/2" = 1'-0"



**1** VOTER REGISTRATION - SOUTH ELEVATION  
SCALE: 1/2" = 1'-0"



REV.	DATE	DESCRIPTION

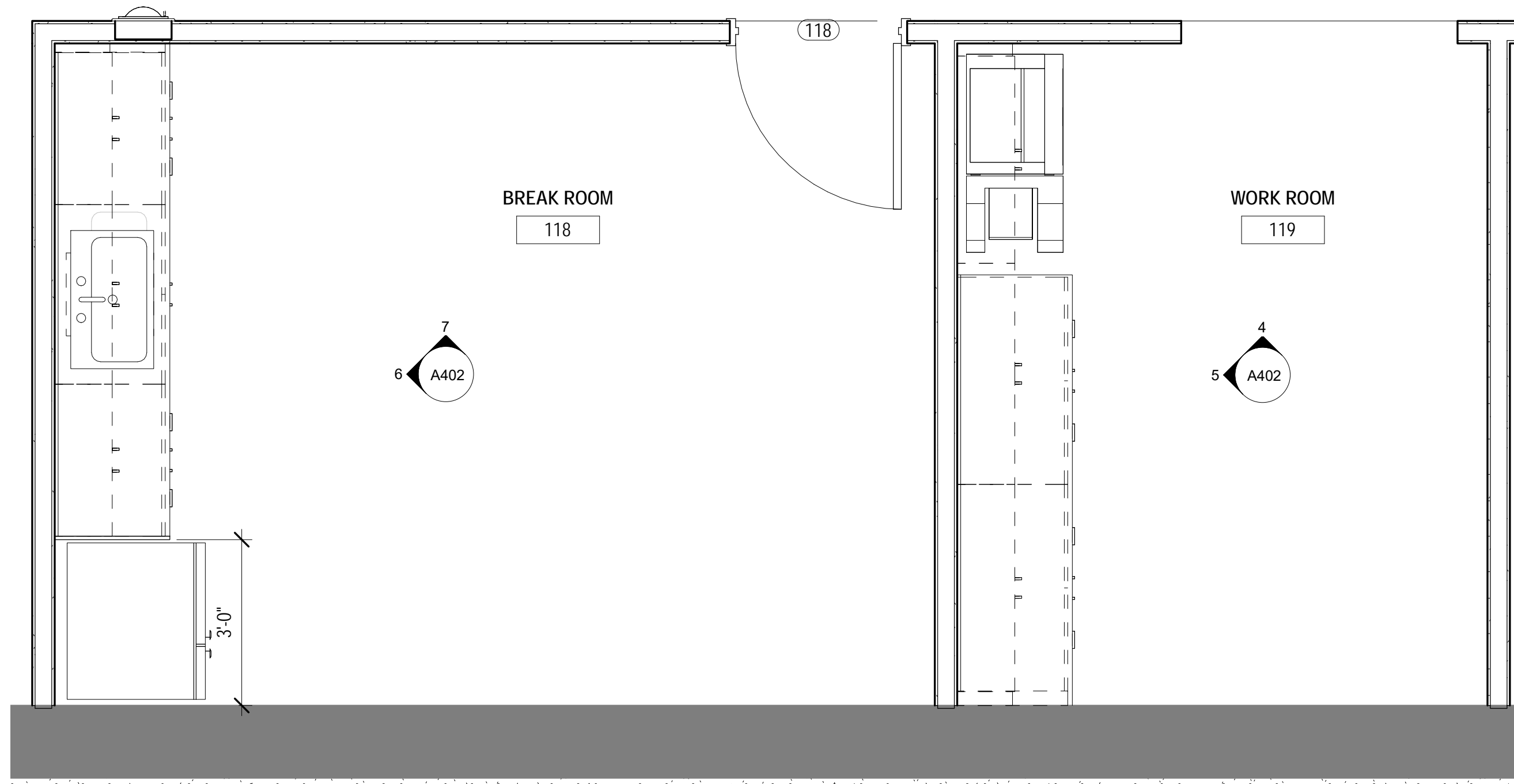


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APPROVED BY: SM  
DATE ISSUED FOR: CD'S 4-27-2023

ENLARGED FLOOR PLANS - NEW CONSTRUCTION  
**A401**



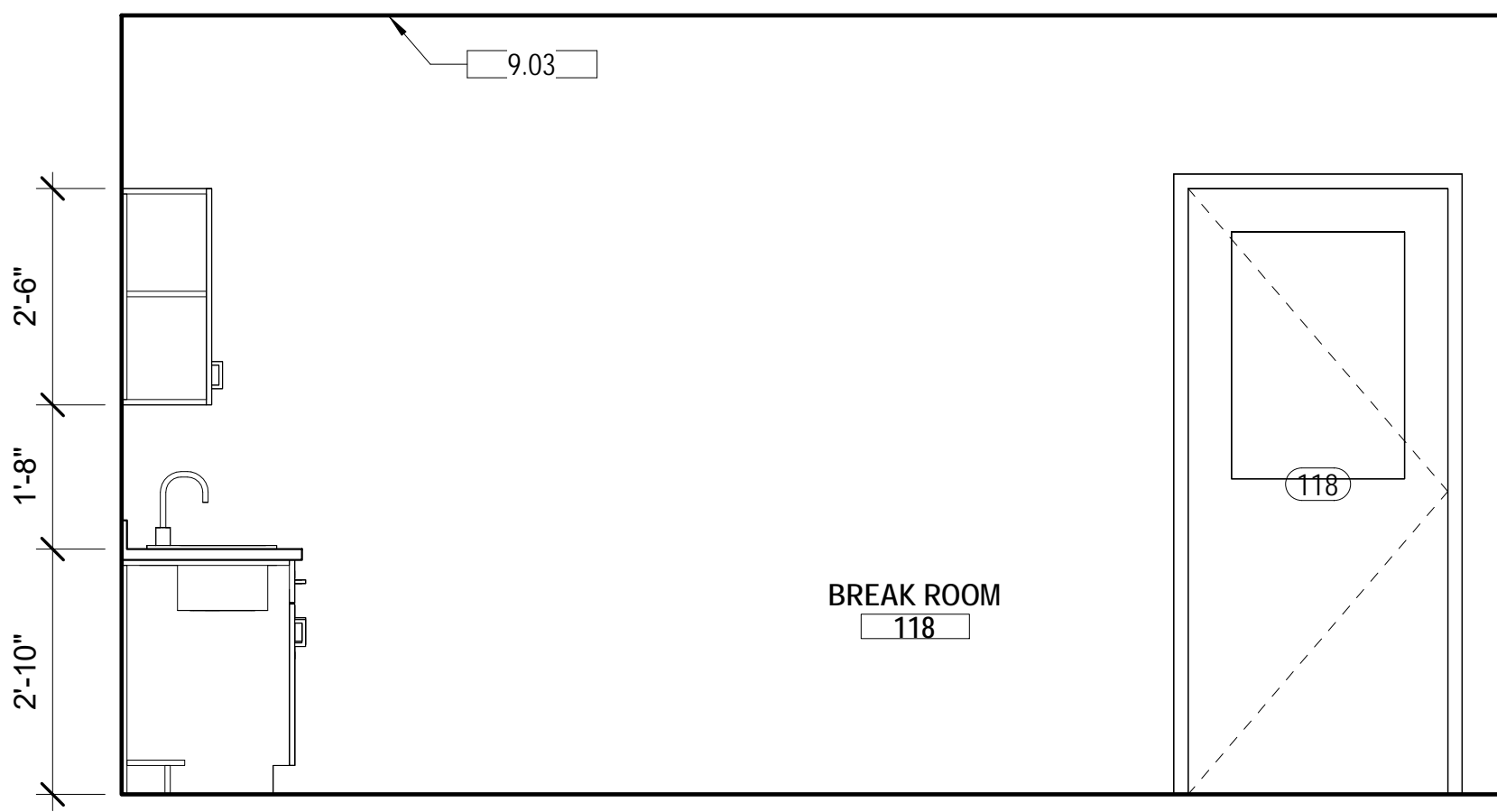


**8** BREAK & WORK ROOM FLOOR PLAN  
SCALE: 1/2" = 1'-0"

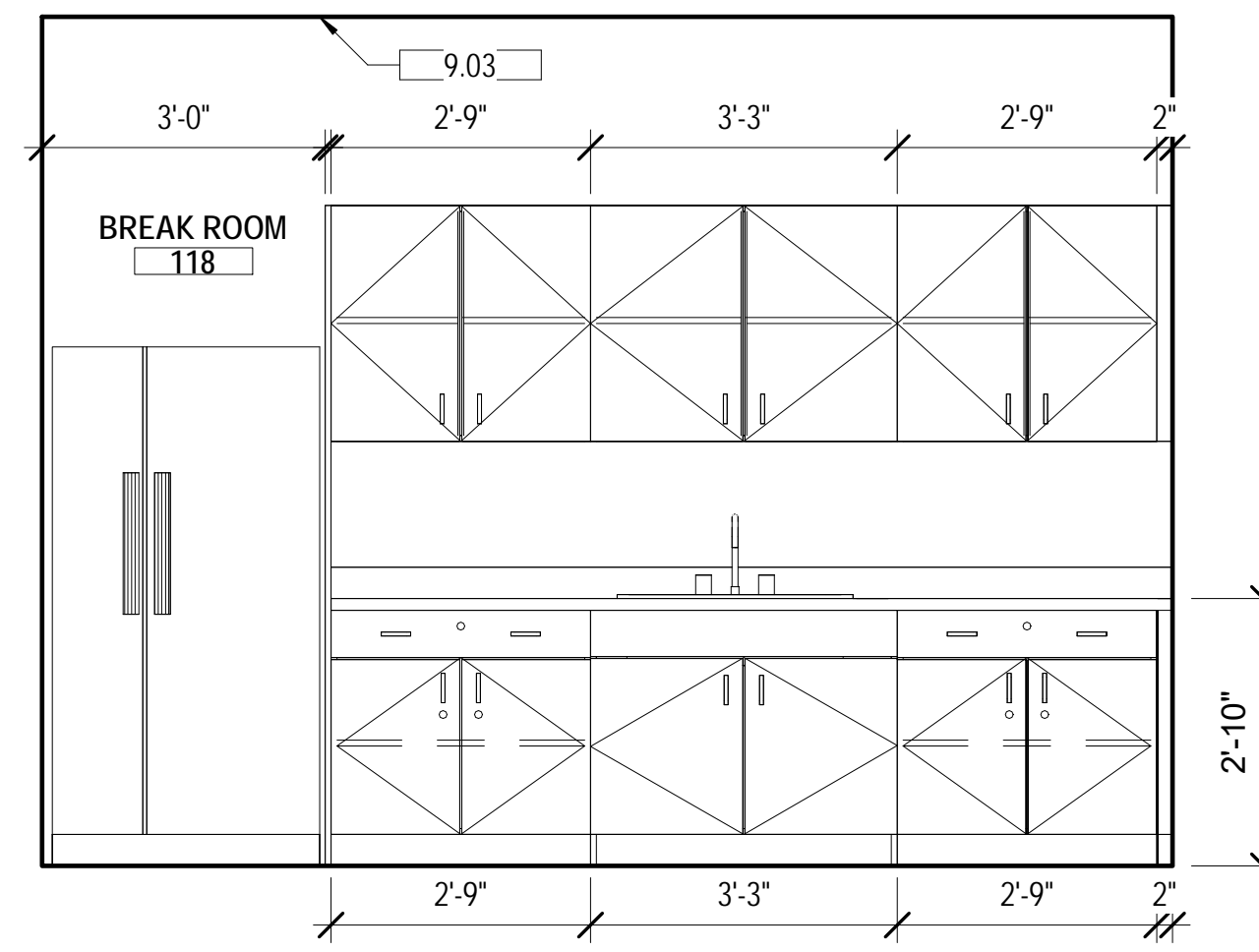
ENLARGED PLAN NOTES	
1	PROVIDE BLOCKING SUPPORT WITHIN STUD WALL FRAMING PRIOR TO COVERAGE WITH GYPSUM WALL BOARD.
2	REFER TO FINISH SCHEDULE ON SHEET A140 FOR COLOR AND MATERIAL.
3	TOILET ACCESSORY MODEL NO. AND MANUFACTURER ARE BASIS OF DESIGN, APPROVED EQUAL WILL BE CONSIDERED AND/OR APPROVED DURING THE SUBMITTAL REVIEW PROCESS.

KEYNOTE LEGEND	
KEY VALUE	KEYNOTE TEXT
9.03	ACOUSTIC CEILING TILE

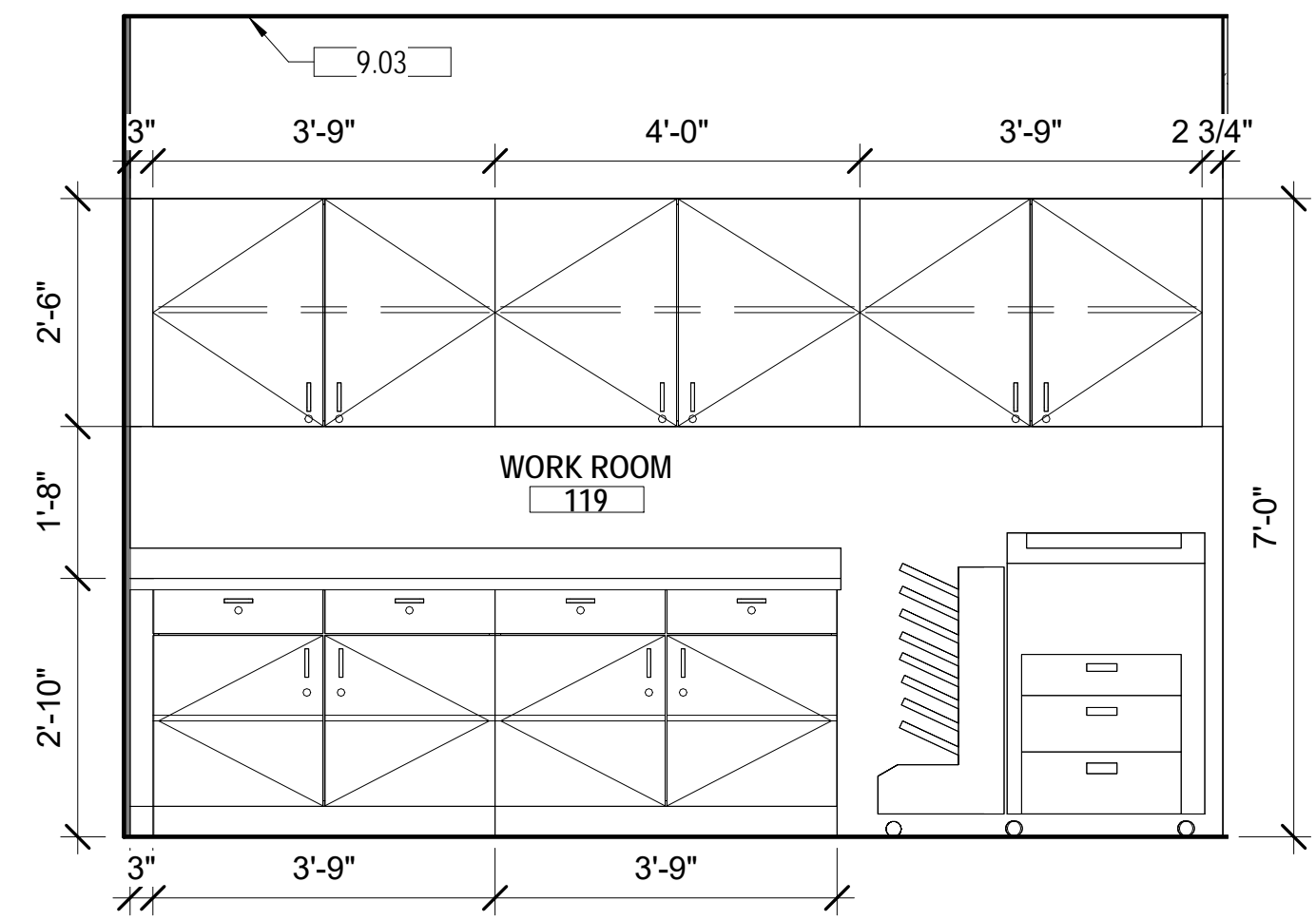
REV.	DATE	DESCRIPTION



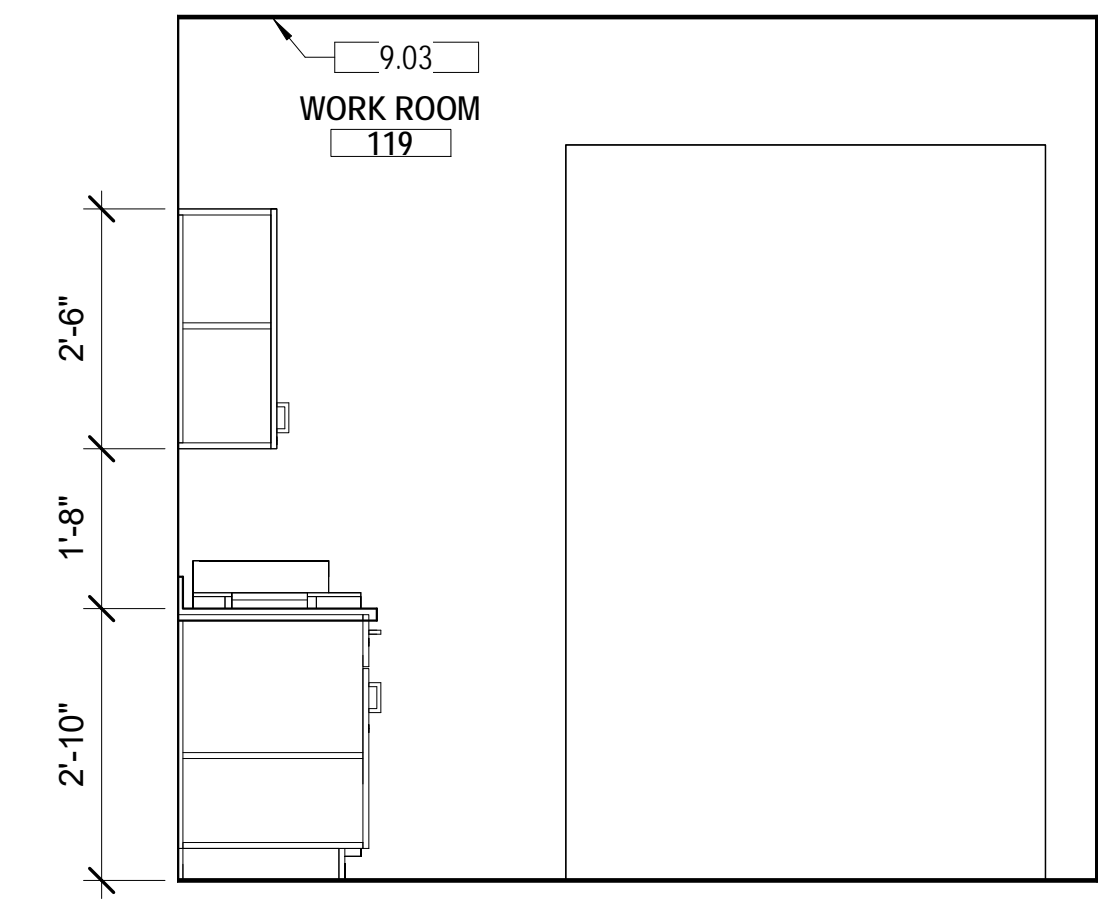
**7** BREAK ROOM - NORTH ELEVATION  
SCALE: 1/2" = 1'-0"



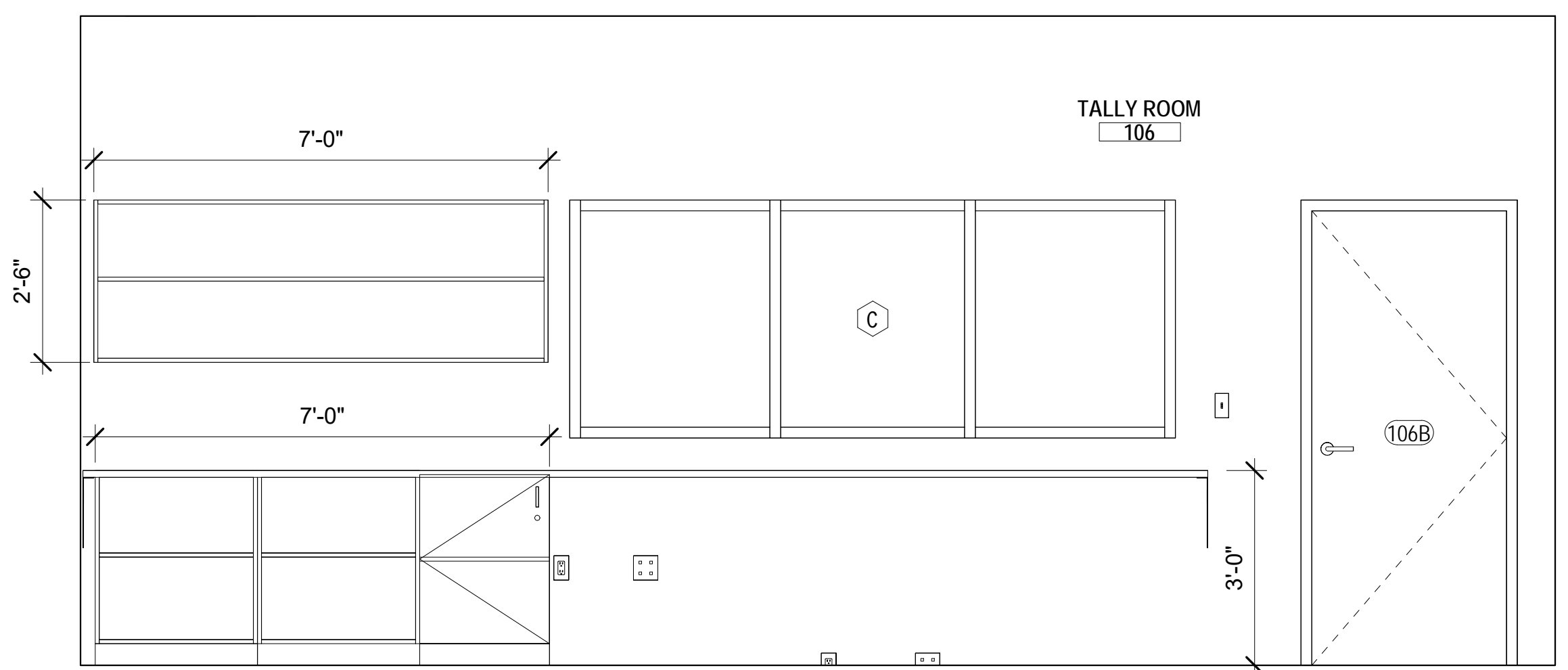
**6** BREAK ROOM - WEST ELEVATION  
SCALE: 1/2" = 1'-0"



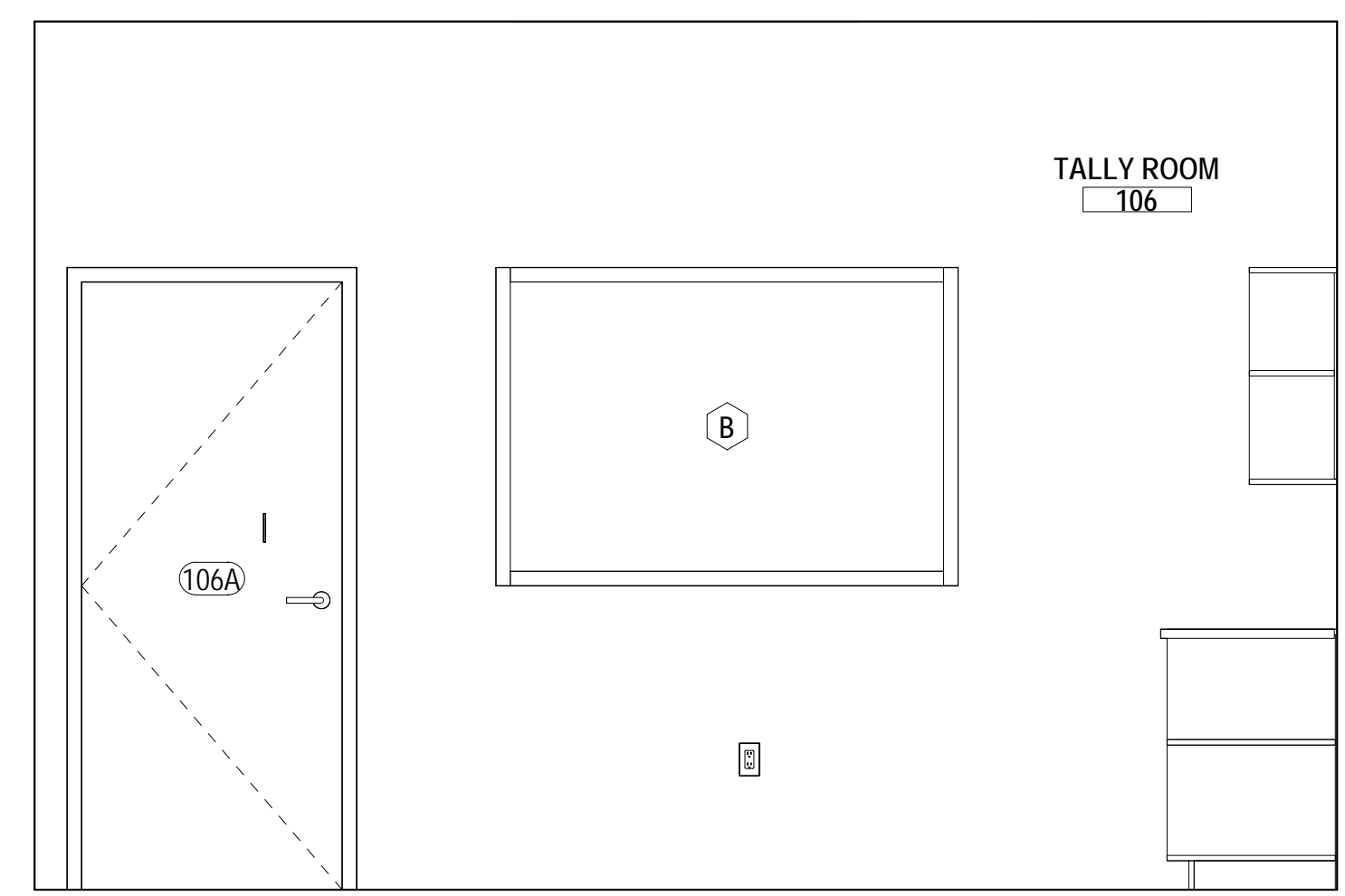
**5** WORK ROOM - WEST ELEVATION  
SCALE: 1/2" = 1'-0"



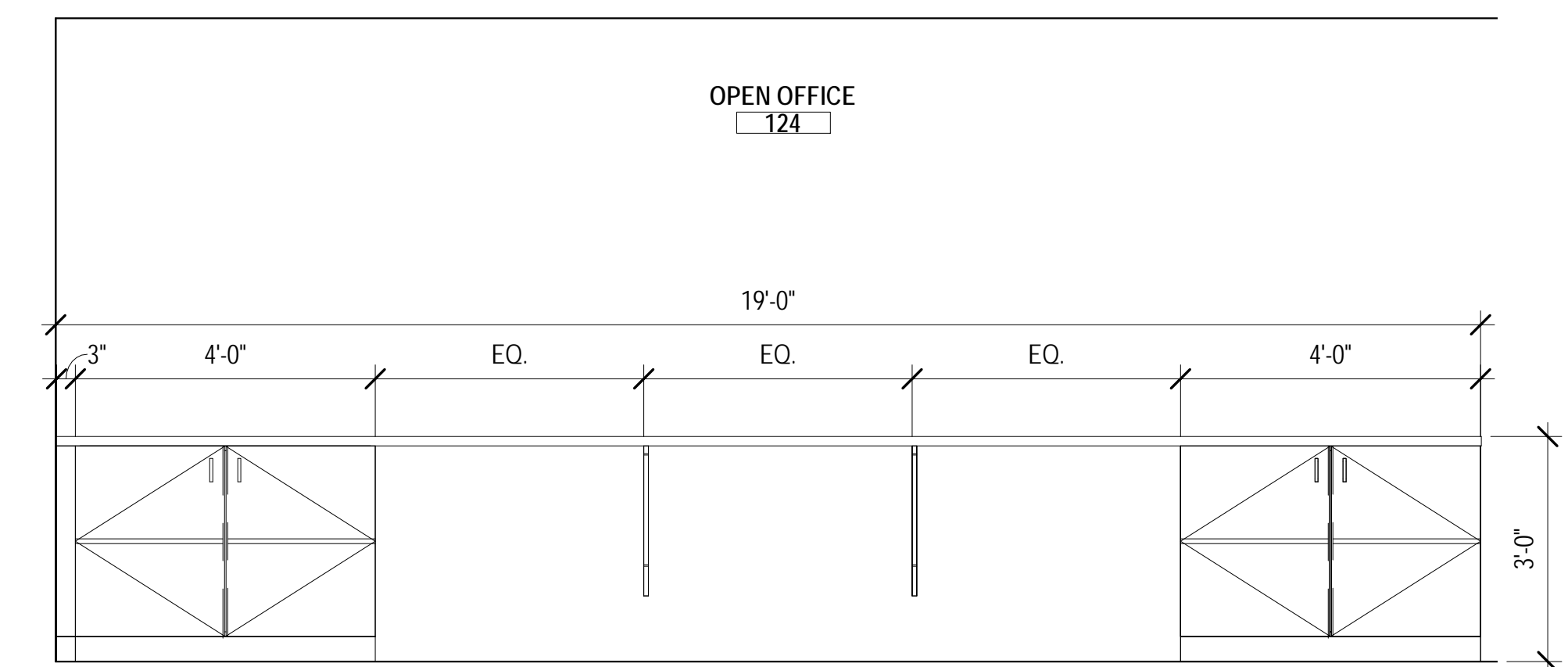
**4** WORK RM - NORTH ELEVATION  
SCALE: 1/2" = 1'-0"



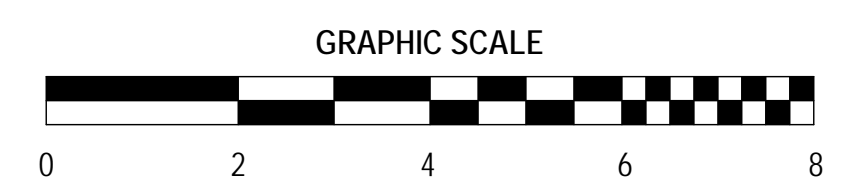
**3** TALLY ROOM - WEST ELEVATION  
SCALE: 1/2" = 1'-0"



**2** TALLY ROOM - SOUTH ELEVATION  
SCALE: 1/2" = 1'-0"



**1** OPEN OFFICE - WEST ELEVATION  
SCALE: 1/2" = 1'-0"



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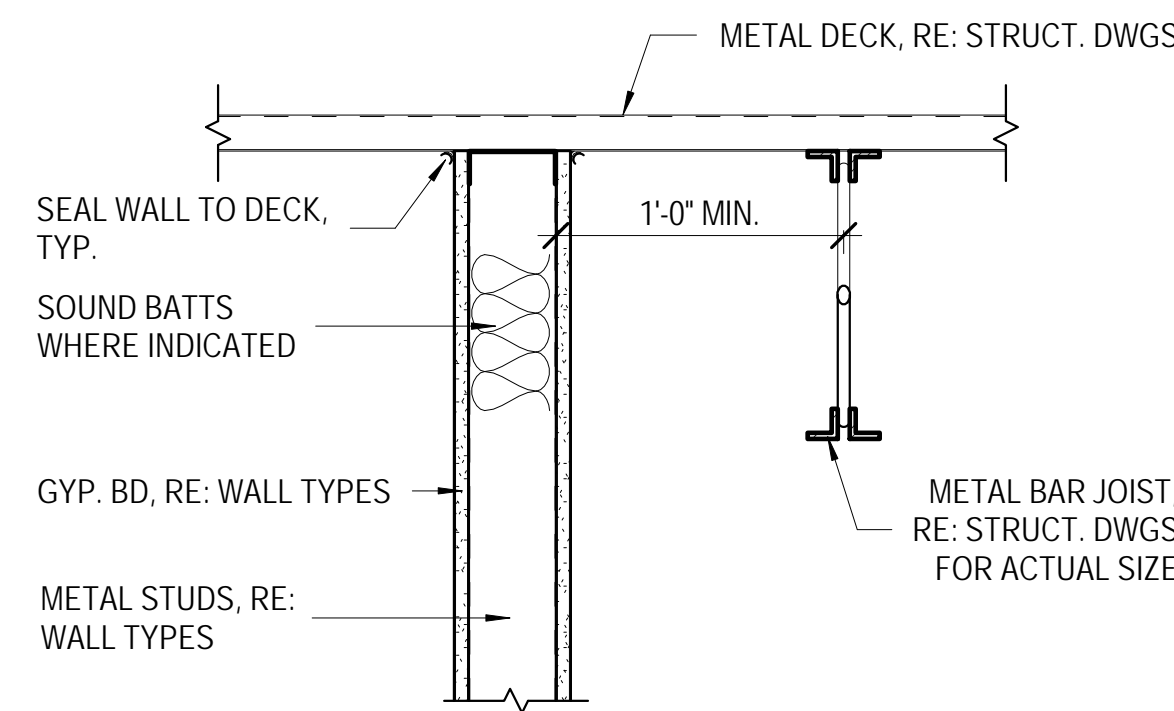
### WALL SIGNAGE - SMOKE RATED

1. SECURE ALL STUDS TO FLOOR SLAB AND STRUCTURE ABOVE.
2. PROVIDE FOR MOVEMENT OF STRUCTURE ABOVE WITH ADJUSTABLE PARTITION HEAD FRAMING AS SPECIFIED IN SECTION 09 20 00.
3. SEAL ALL VOIDS IN SMOKE RATED WALL CONSTRUCTION AS SPECIFIED IN SECTION 07 94 00.
4. PERMANENTLY IDENTIFY ALL SMOKE RATED WALLS BY PROVIDING EITHER A PERMANENTLY FIXED SIGN OR STENCIL IN ALL CONCEALED SPACES. REFER TO DETAIL BLOW.
5. REFER TO SHEET A\_\_\_ FOR TYPICAL SMOKE RATED DETAILS.

3" HIGH LETTERS IN A CONTRASTING COLOR

### SMOKE BARRIER PROTECT ALL OPENINGS

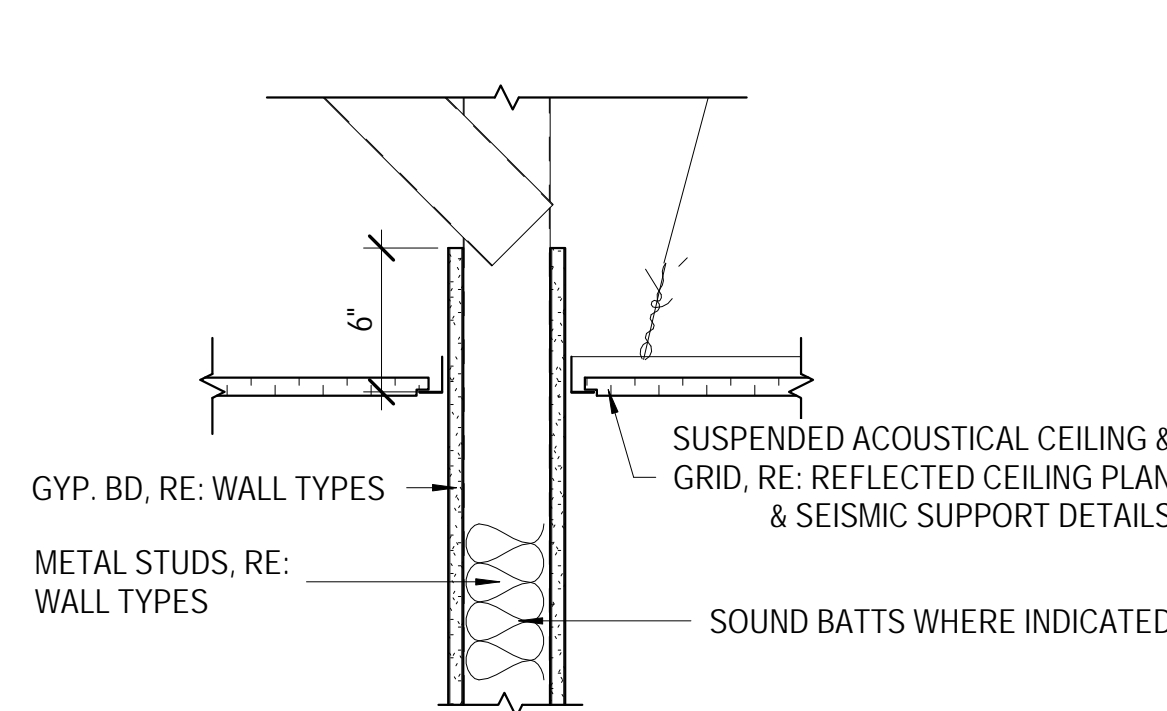
SPACE MAXIMUM 12" O.C. ON WALL



NOTE: WHEN SPACE BETWEEN STUD & JOIST IS LESS THAN 12", CONSTRUCT PER DETAIL OPTION "B" THIS SHEET.

### WALL TO STRUCTURE DETAIL

SCALE: 1 1/2" = 1'-0"



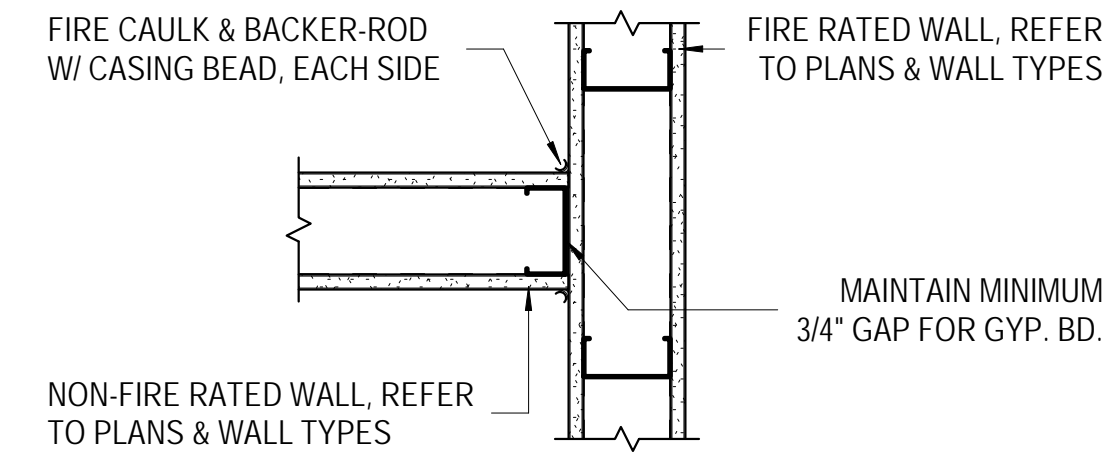
NOTE: TO BRACE WALL, EITHER EXTEND STUDS STRAIGHT UP TO DECK ABOVE OR KICK OUT STUDS AT 45 DEGREES EACH SIDE 32" o.c. STAGGERED

### T.O. WALL DETAIL - ABOVE CLG

SCALE: 1 1/2" = 1'-0"

### FIRE RATED WALL INSTALLATION GUIDE

- NOTES:
1. FRAME 1 HOUR WALLS BEFORE NON-RATED WALLS.
  2. FRAME 2 HOUR WALLS BEFORE 1 HOUR WALLS.
  3. FRAME 3 HOUR WALLS BEFORE 2 HOUR WALLS.
  4. FRAME 4 HOUR WALLS BEFORE 3 HOUR WALLS.
  5. FRAME FIRE RATED WALLS BEFORE SMOKE WALLS.
  6. FRAME SMOKE RATED WALLS BEFORE NON-RATED WALLS.



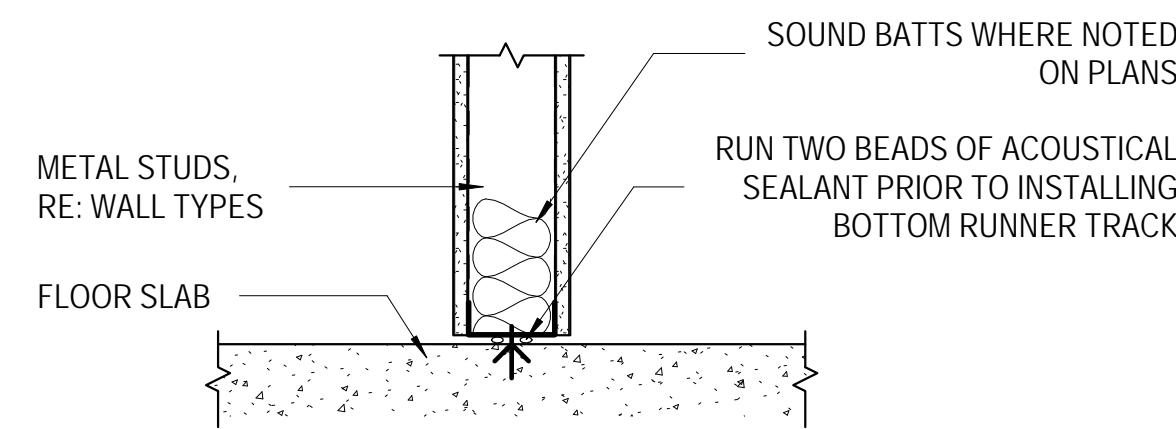
### WALL SIGNAGE - FIRE RATED

1. SECURE ALL STUDS TO FLOOR SLAB AND STRUCTURE ABOVE.
2. PROVIDE FOR MOVEMENT OF STRUCTURE ABOVE WITH ADJUSTABLE PARTITION HEAD FRAMING AS SPECIFIED IN SECTION 09 20 00.
3. SEAL ALL VOIDS IN SMOKE RATED WALL CONSTRUCTION AS SPECIFIED IN SECTION 07 94 00.
4. PERMANENTLY IDENTIFY ALL FIRE RATED WALLS, INCLUDING BUT NOT LIMITED TO FIRE WALLS, FIRE BARRIERS, FIRE PARTITIONS BY PROVIDING EITHER A PERMANENTLY FIXED SIGN OR STENCIL IN ALL CONCEALED SPACES. REFER TO DETAIL BLOW.
5. REFER TO SHEET A\_\_\_ FOR TYPICAL FIRE RATED DETAILS.

USE 2 FOR TWO HOUR RATED WALLS. USE 3 FOR THREE HOUR RATED WALLS, ETC.  
3" HIGH LETTERS IN A CONTRASTING COLOR

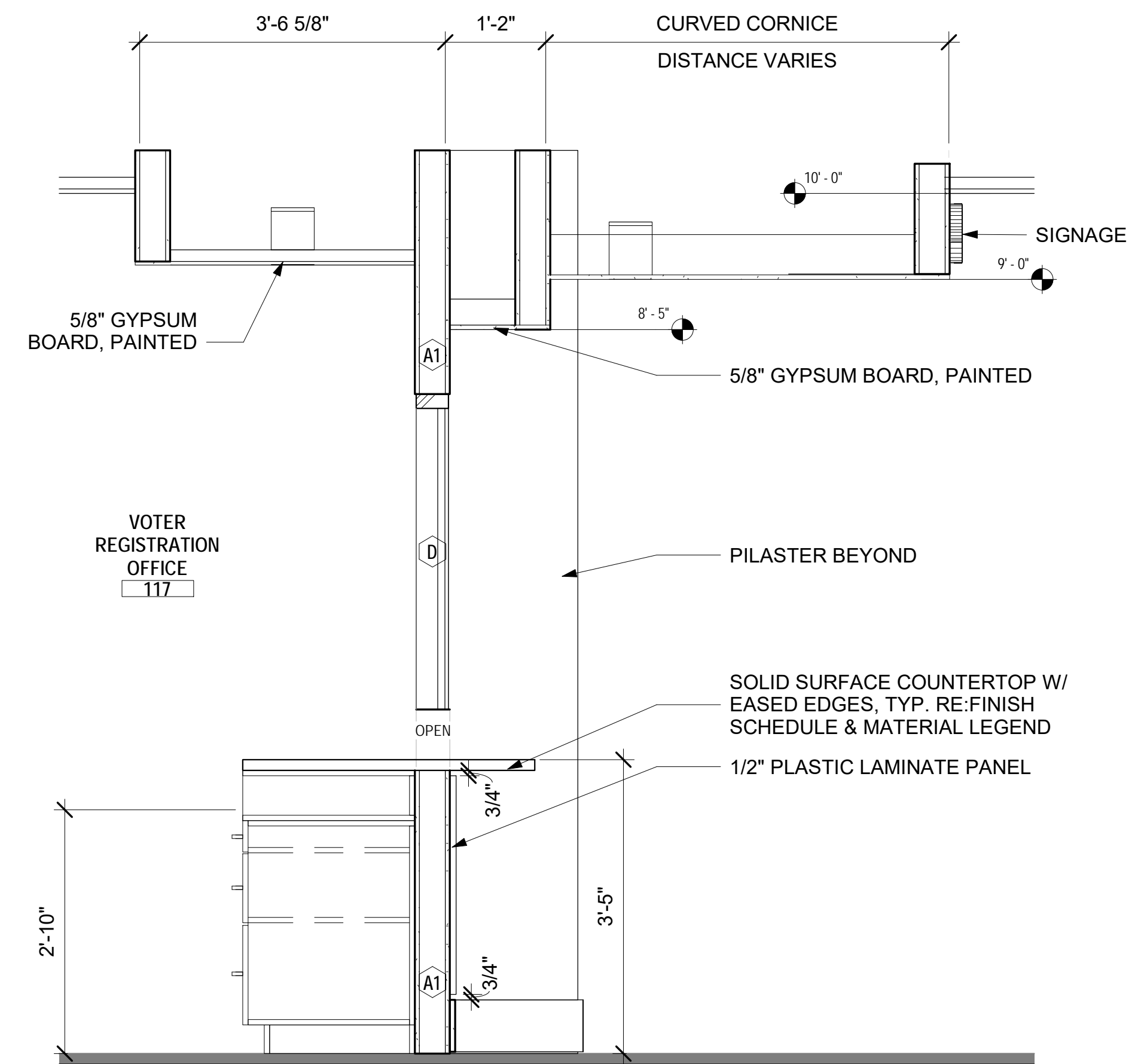
### 1 HOUR FIRE AND SMOKE BARRIER PROTECT ALL OPENINGS

SPACE MAXIMUM 12" O.C. ON WALL



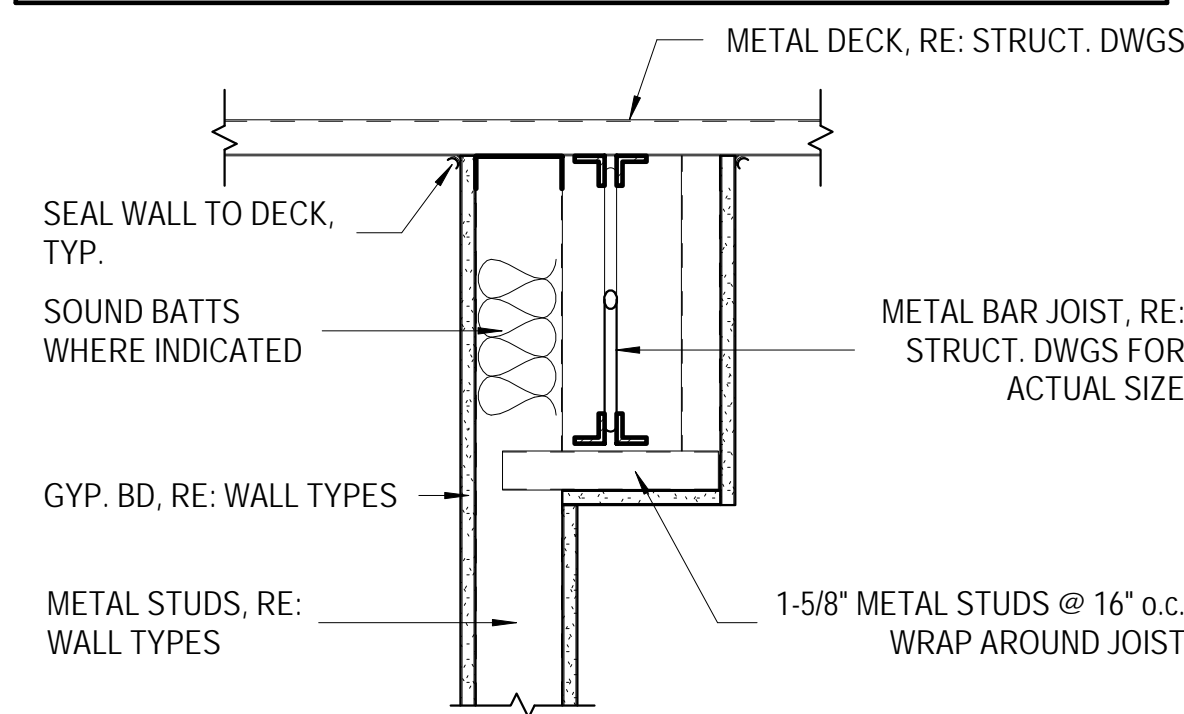
### TYP. WALL FLOOR INTERSECTION

SCALE: 1 1/2" = 1'-0"



### 12 WALL SECTION - REGISTRATION DESK

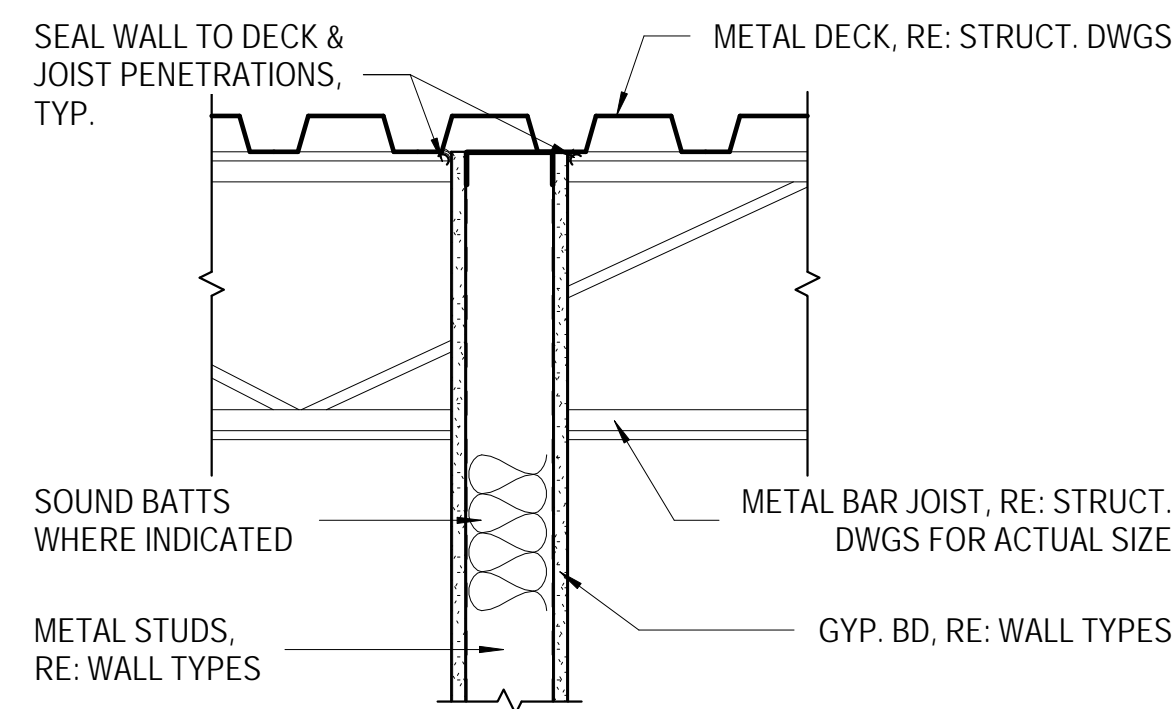
SCALE: 3/4" = 1'-0"



NOTE: DETAIL SIMILAR AT STRUCTURAL STEEL MEMBERS

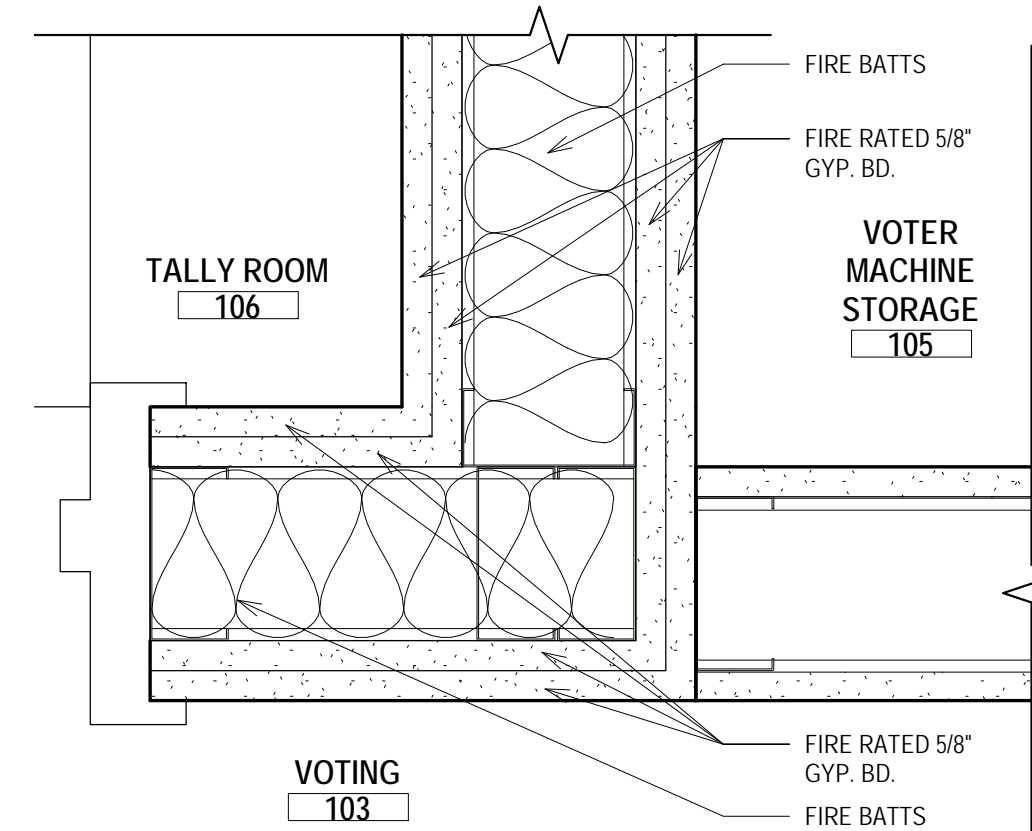
### WALL TO STRUCTURE DETAIL

SCALE: 1 1/2" = 1'-0"



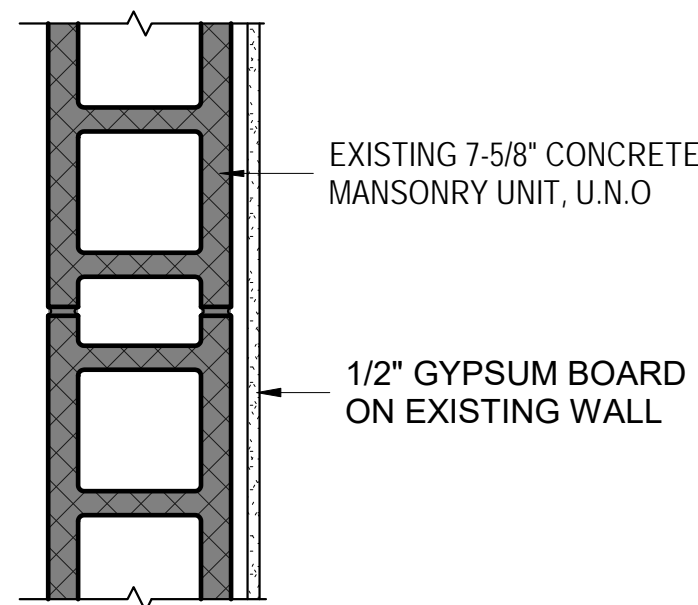
### WALL TO STRUCTURE DETAIL

SCALE: 1 1/2" = 1'-0"



### 9 RATED WALL JOINS NON-RATED WALL

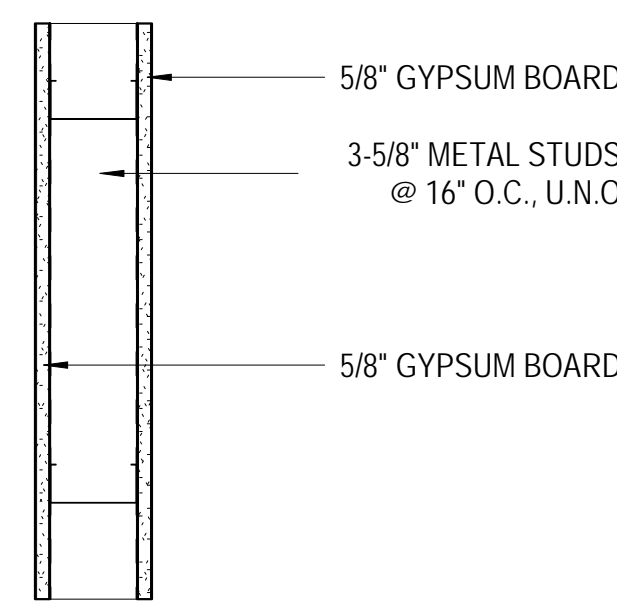
SCALE: 3" = 1'-0"



U1 NON-RATED CMU WALL EXTEND TO STRUCTURE ABOVE

### U1 WALL TYPE

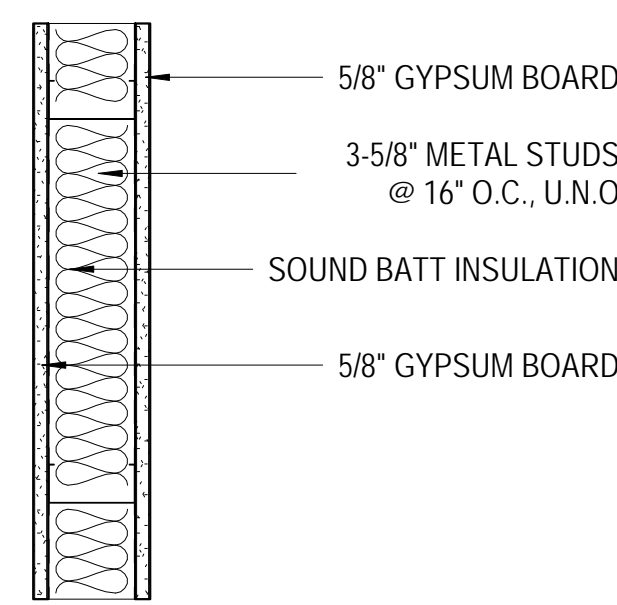
SCALE: 1 1/2" = 1'-0"



A1 NON-RATED METAL STUD WALL EXTEND TO 6" ABOVE CEILING

### A1 WALL TYPE

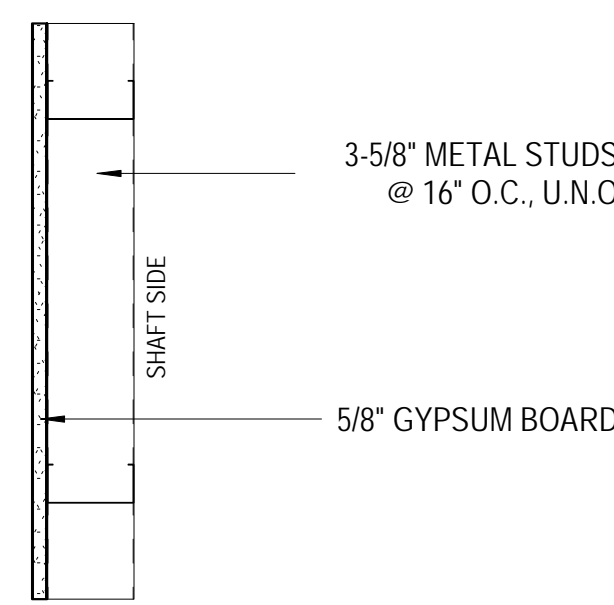
SCALE: 1 1/2" = 1'-0"



A2 NON-RATED METAL STUD WALL EXTEND TO 6" ABOVE CEILING

### A2 WALL TYPE

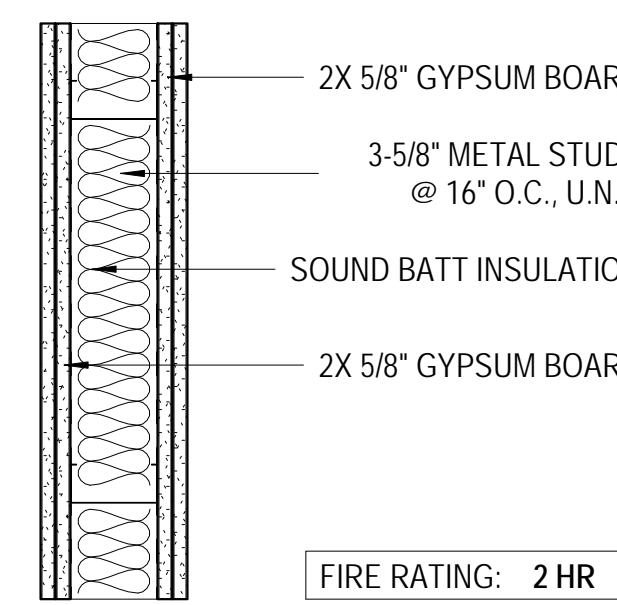
SCALE: 1 1/2" = 1'-0"



A3 NON-RATED METAL STUD WALL EXTEND TO 6" ABOVE CEILING

### A3 WALL TYPE

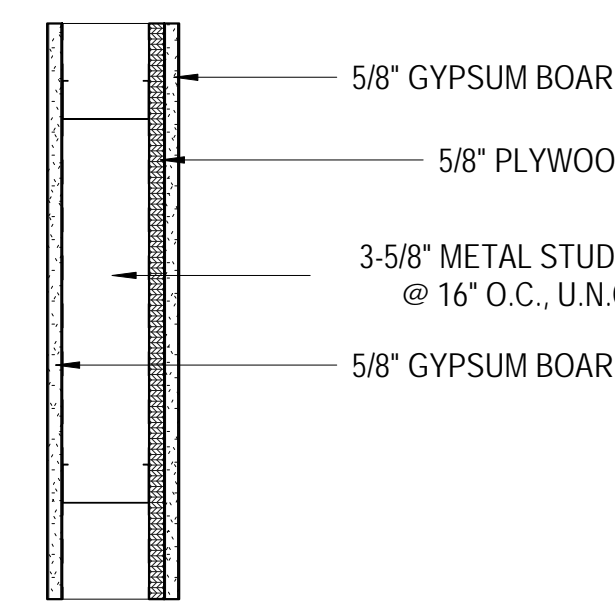
SCALE: 1 1/2" = 1'-0"



A4 2 HR RATED METAL STUD WALL EXTEND TO STRUCTURE ABOVE

### A4 FIRE RATED WALL

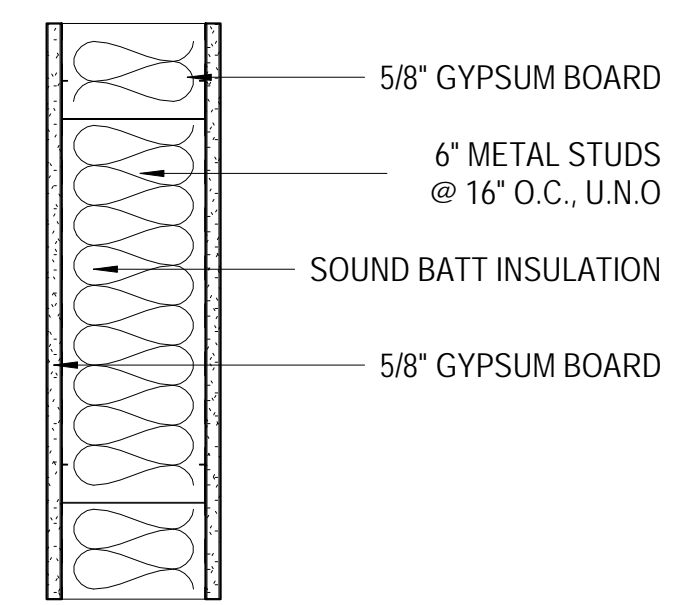
SCALE: 1 1/2" = 1'-0"



A5 NON-RATED METAL STUD WALL EXTEND TO 6" ABOVE CEILING

### A5 WALL TYPE

SCALE: 1 1/2" = 1'-0"

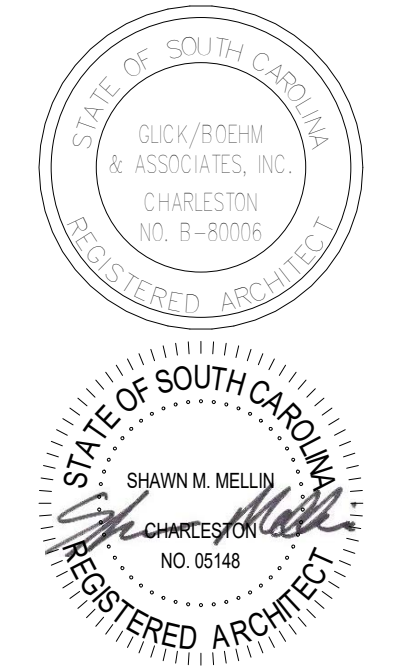


B2 NON-RATED METAL STUD WALL EXTEND TO 6" ABOVE CEILING

### B2 WALL TYPE

SCALE: 1 1/2" = 1'-0"

REV.	DATE	DESCRIPTION



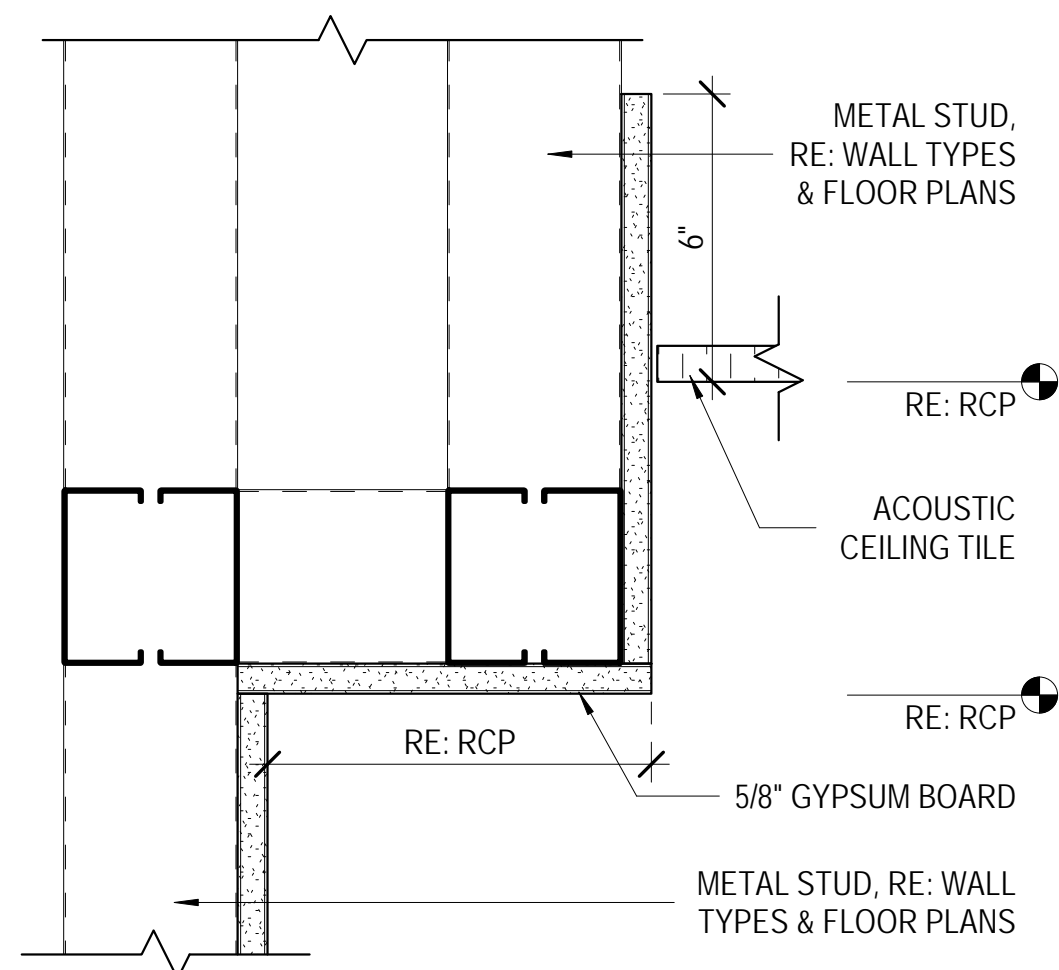
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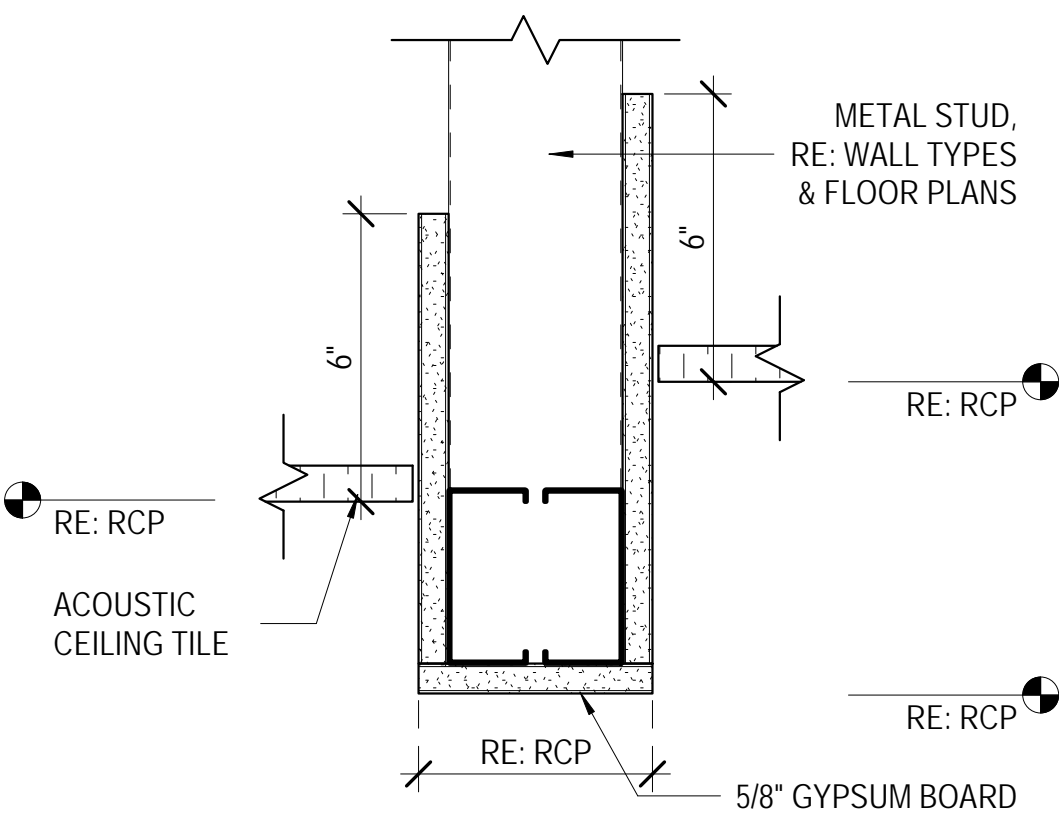
2023  
TYPICAL WALL TYPES & DETAILS

# A501

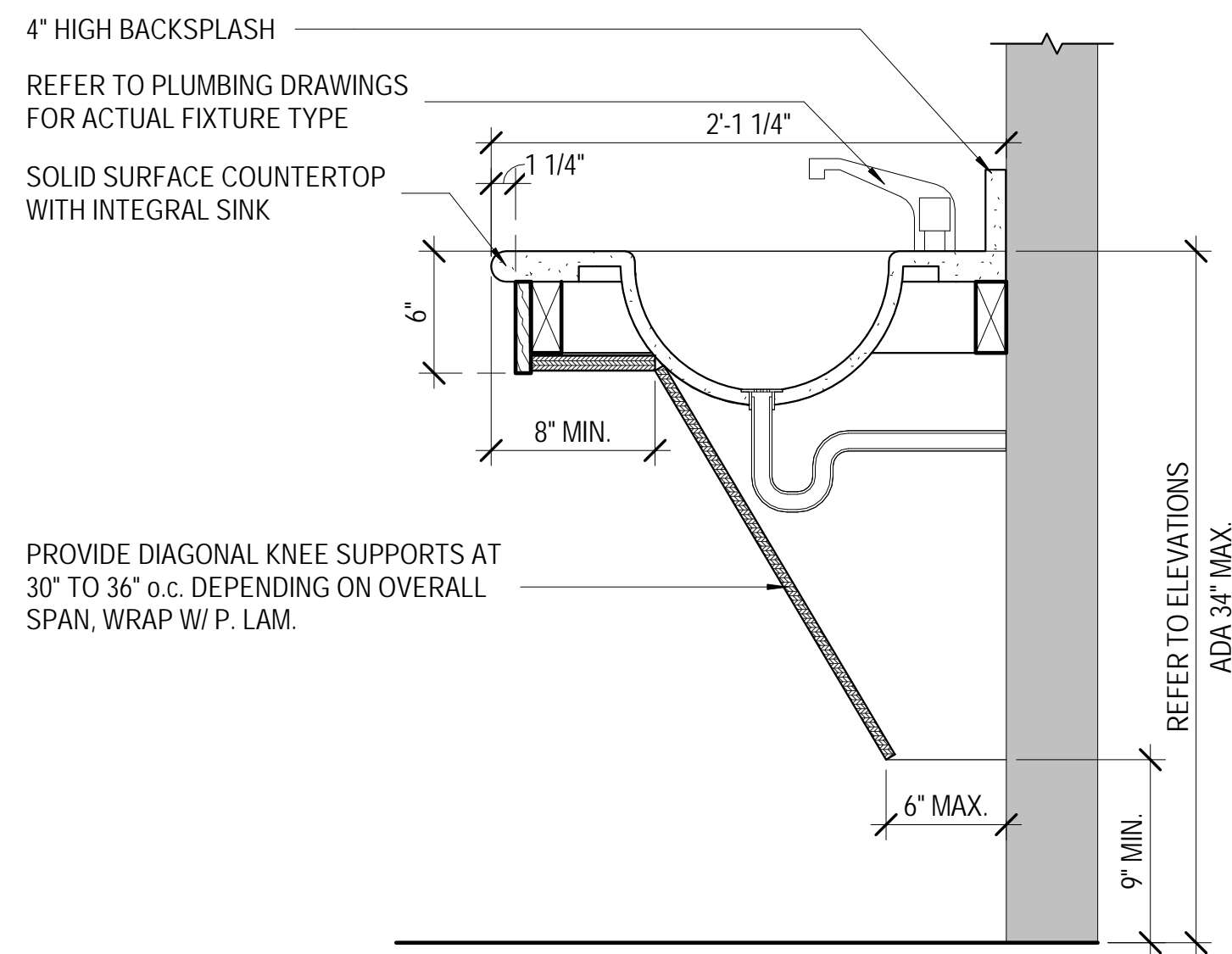




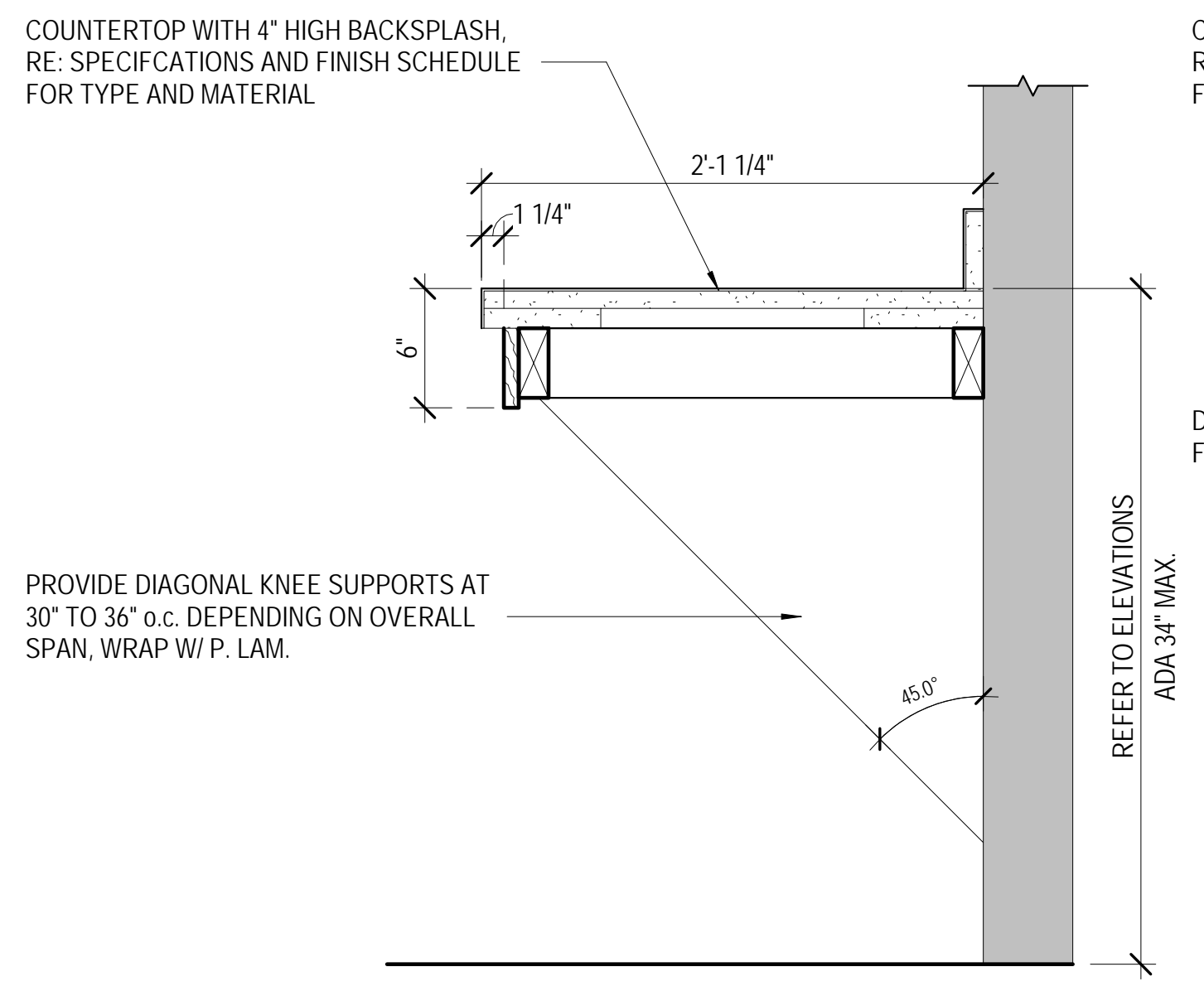
**6 CEILING - GYP BD SOFFIT**  
A550 SCALE: 3" = 1'-0"



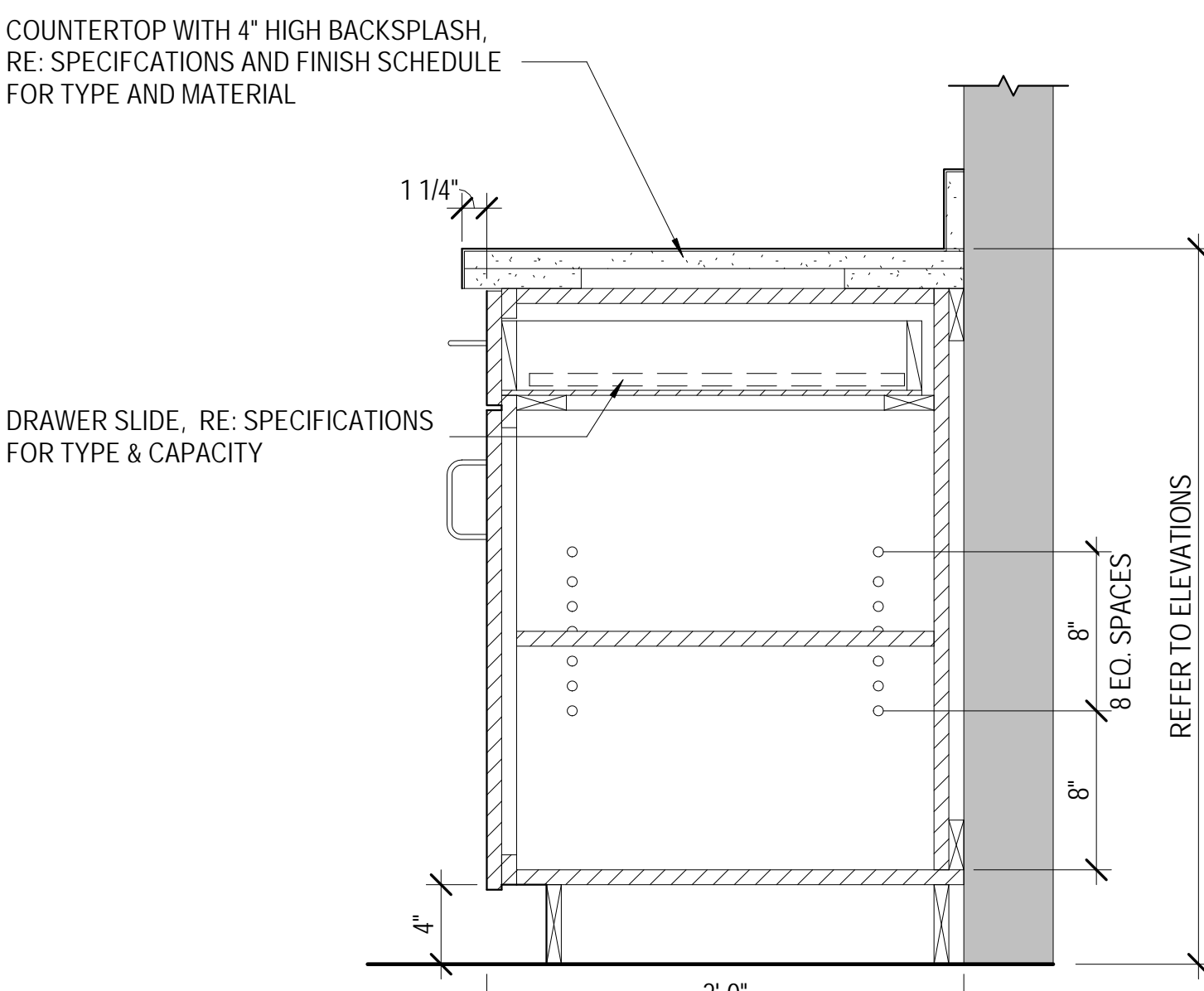
**4 CEILING - GYP BD BULKHEAD**  
A550 SCALE: 3" = 1'-0"



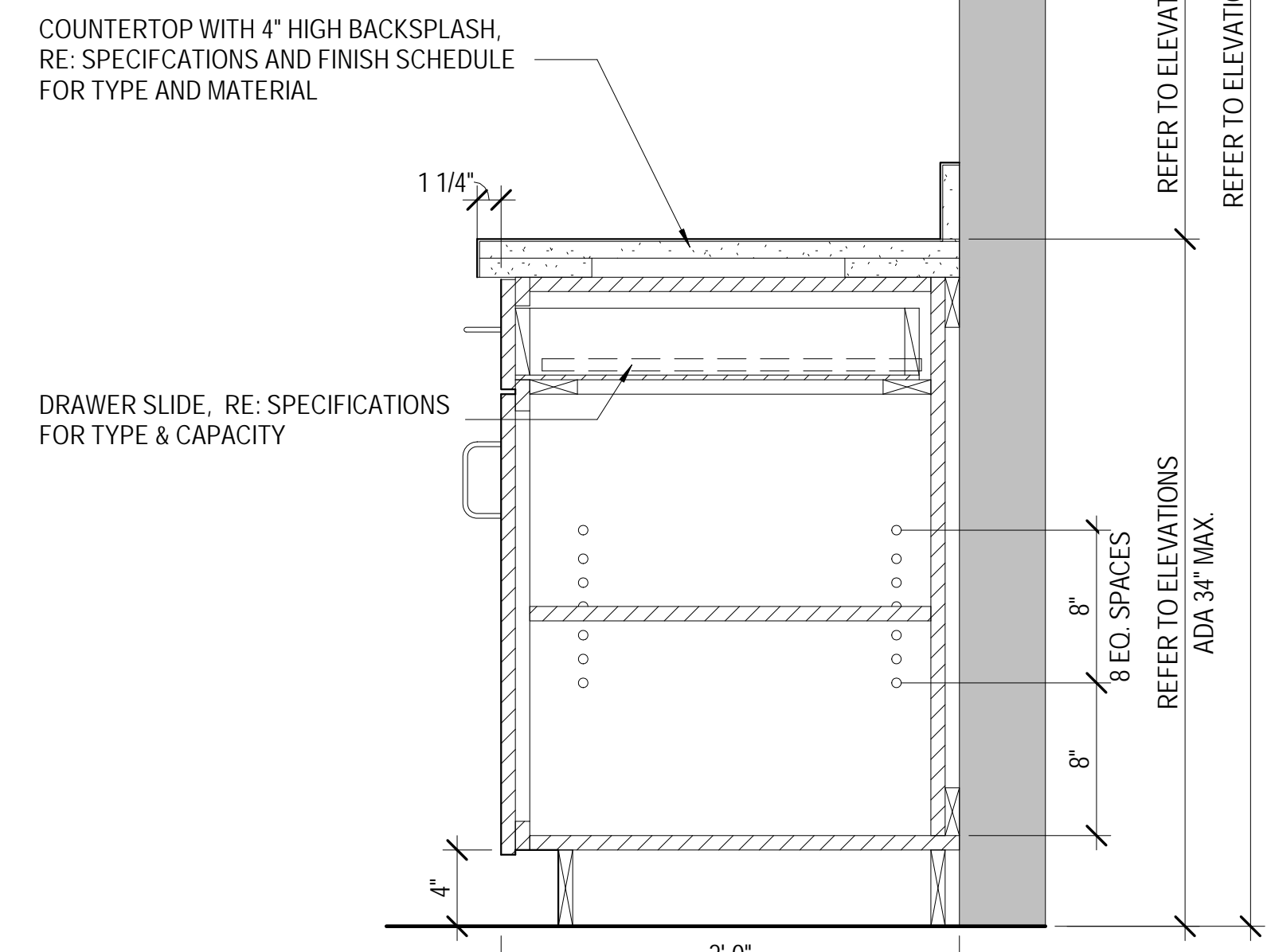
**5 DETAIL SECTION @ COUNTERTOP SINK**  
A550 SCALE: 1 1/2" = 1'-0"



**3 DETAIL SECTION @ COUNTERTOP**  
A550 SCALE: 1 1/2" = 1'-0"



**2 DETAIL SECTION @ BASE CABINET**  
A550 SCALE: 1 1/2" = 1'-0"



**1 DETAIL SECTION @ BASE / UPPER CABINET**  
A550 SCALE: 1 1/2" = 1'-0"

CASEWORK NOTES	
1	COLOR MATCH CAULK WITH EITHER PLASTIC LAMINATE OR WALL FINISH, WHICHEVER IS DARKER. CONFIRM WITH ARCHITECT
2	CAULK ALL EDGES OF PLASTIC LAMINATE AND COUNTERTOP MATERIALS WHERE MATERIALS ABUT OTHER SURFACES AND FINISHES, AT ALL INTERIOR AND EXTERIOR SEAMS AND CORNERS COMPLETE. PROVIDE BACKER ROD FOR ALL GAPS GREATER THAN 1/4".
3	PROVIDE GROMMETS IN COUNTERTOPS AS REQUIRED BY OWNER.
4	CONTRACTOR TO FIELD VERIFY ALL WALL DIMENSIONS AT CASEWORK LOCATIONS PRIOR TO FABRICATION
5	WALL CABINETS ARE 12" DEEP, UNLESS NOTED OTHERWISE
6	BASE AND STORAGE CABINETS ARE 24" DEEP, UNLESS NOTED OTHERWISE.
7	CABINETS TO RECEIVE BASE TO MATCH ADJACENT WALL BASE, UNLESS NOTED OTHERWISE.
8	ALL FILLERSTRIPS TO MATCH ADJACENT CABINETS. PROVIDE EQUAL FILLERSTRIP AT BOTH SIDES, UNLESS NOTED OTHERWISE.
9	PROVIDE FINISHED END PANELS WHERE EXPOSED AT BASE AND WALL CABINETS.
10	CONTRACTOR TO VERIFY ALL MEP AND DIMENSIONAL ROUGH-IN REQUIREMENTS OF ALL OWNER PROVIDED EQUIPMENT AND APPLIANCES.
11	COORDINATE ROUGH-IN FOR ELECTRICAL OUTLETS, SWITCHES AND UNDER CABINET LIGHTING WITH ELECTRICAL DRAWINGS.
12	COORDINATE ELECTRICAL AND DATA OUTLET LOCATIONS PRIOR TO ROUGHING IN ELECTRICAL AND/OR PREPARING CASEWORK SHOP DRAWINGS.
13	PROVIDE WALL BASE, WALL FINISH AND FLOOR FINISH PER FINISH SCHEDULE UNLESS NOTED OTHERWISE UNDER OPEN COUNTERTOP LOCATIONS.
14	PROVIDE 4" TOE-KICK, TYPICAL, U.N.O.
15	1-1/2" FILLER PANELS SHALL OCCUR AT THE WALL AT ALL CABINETS LOCATIONS ABUTTING A WALL, U.O.N.
16	WHEN FILLER PANELS ARE REQUIRED AT BOTH ENDS OF CASEWORK TERMINATION, BOTH FILLER PANELS SHALL BE EQUAL WIDTH.
17	PROVIDE 4" BACKSPLASH AND SIDE SPLASH AT ALL COUNTERTOPS WITH SINKS, U.O.N.
18	ALL COUNTER SHALL BE SS-1. ALL PLASTIC LAMINATE SHALL BE PL-1. PROVIDE SAMPLES FOR OWNER FINAL APPROVAL.

SECTION NOTES	
1	NOT ALL KEYNOTES WILL BE USED ON ALL SHEETS; REFER TO MASTER KEYNOTE LIST ON A000.
2	REFER TO SHEET A000 FOR GENERAL PROJECT NOTES.
3	REFER TO PLANS & ELEVATIONS FOR ADDITIONAL INFORMATION.



REV.	DATE	DESCRIPTION

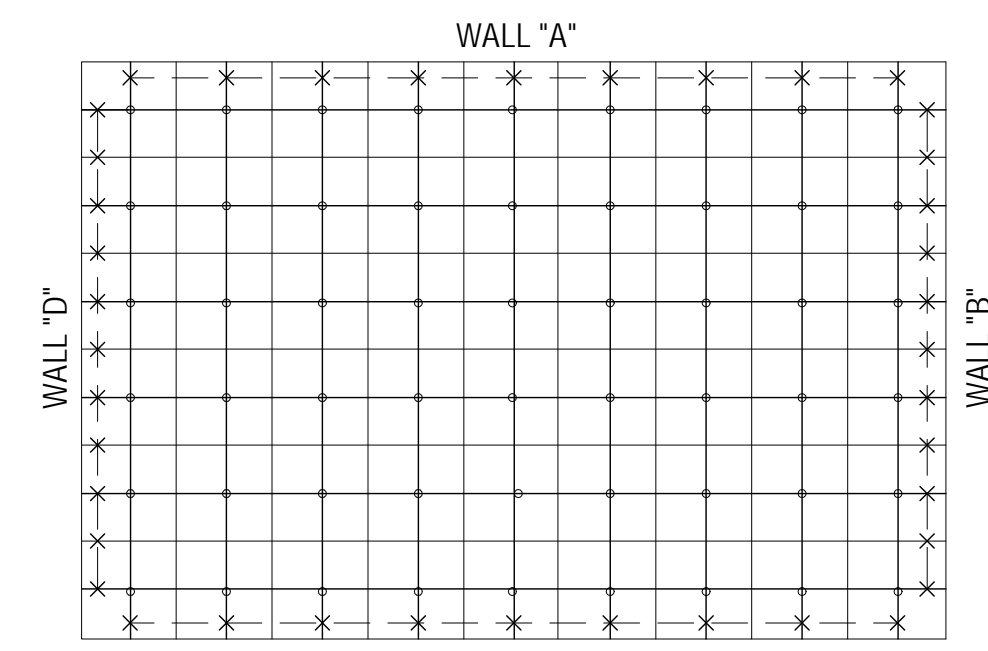


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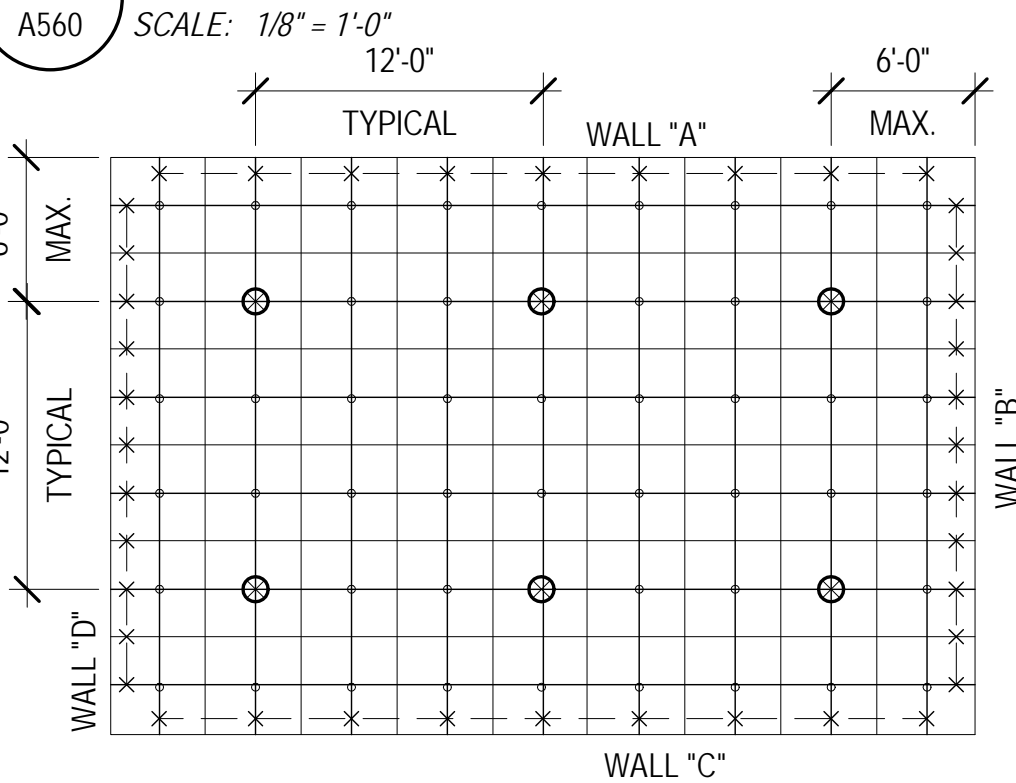
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**INTERIOR SECTION DETAILS**  
**A550**

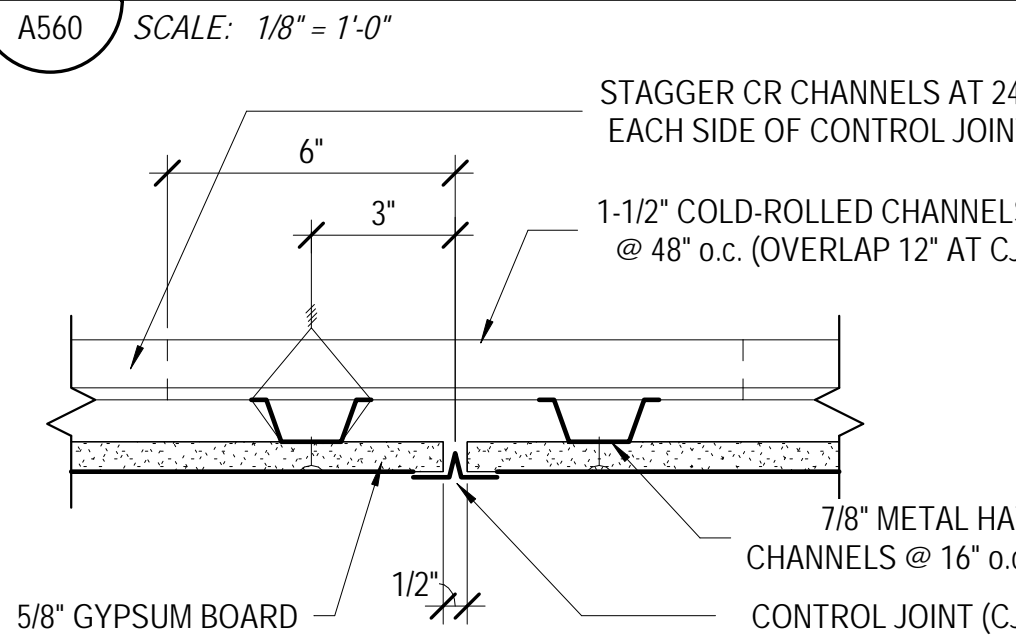




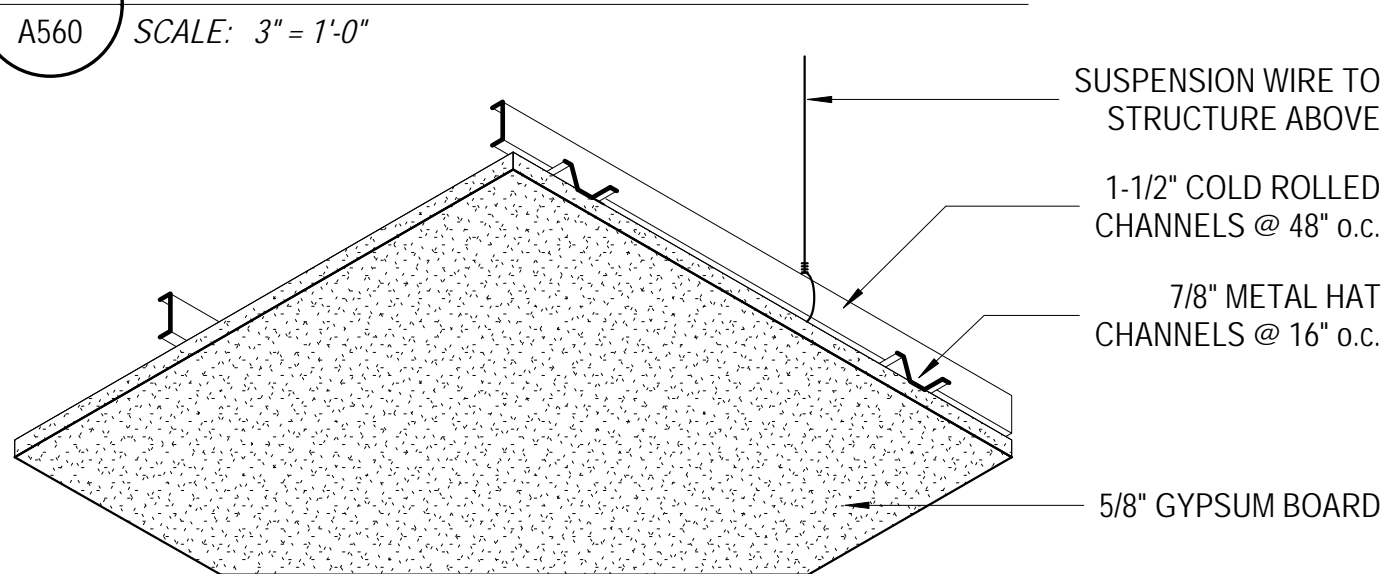
**1 GRID WHEN ROOM < 1,000 SF**



**2 GRID WHEN ROOM > 1,000 SF**

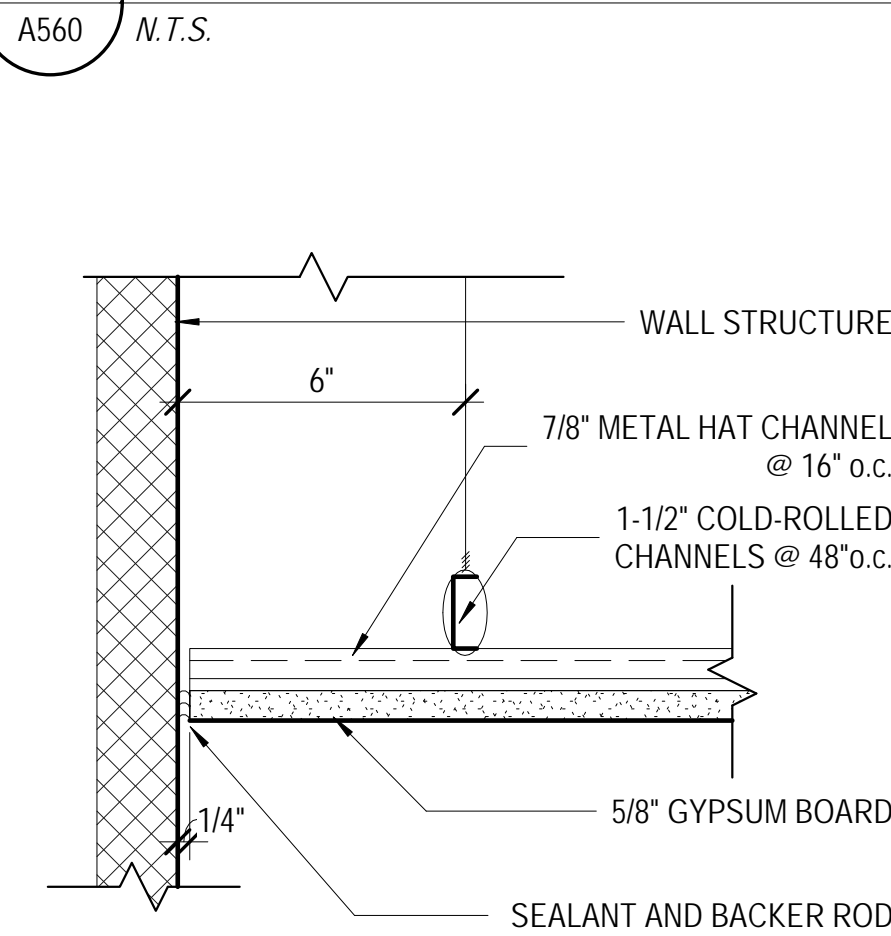


**3 GYP. BD. CLG CONTROL JOINT**



NOTE: FOLLOW MANUFACTURER'S RECOMMENDATIONS FOR GAGE OF METAL FRAMING & SUPPORT WIRE

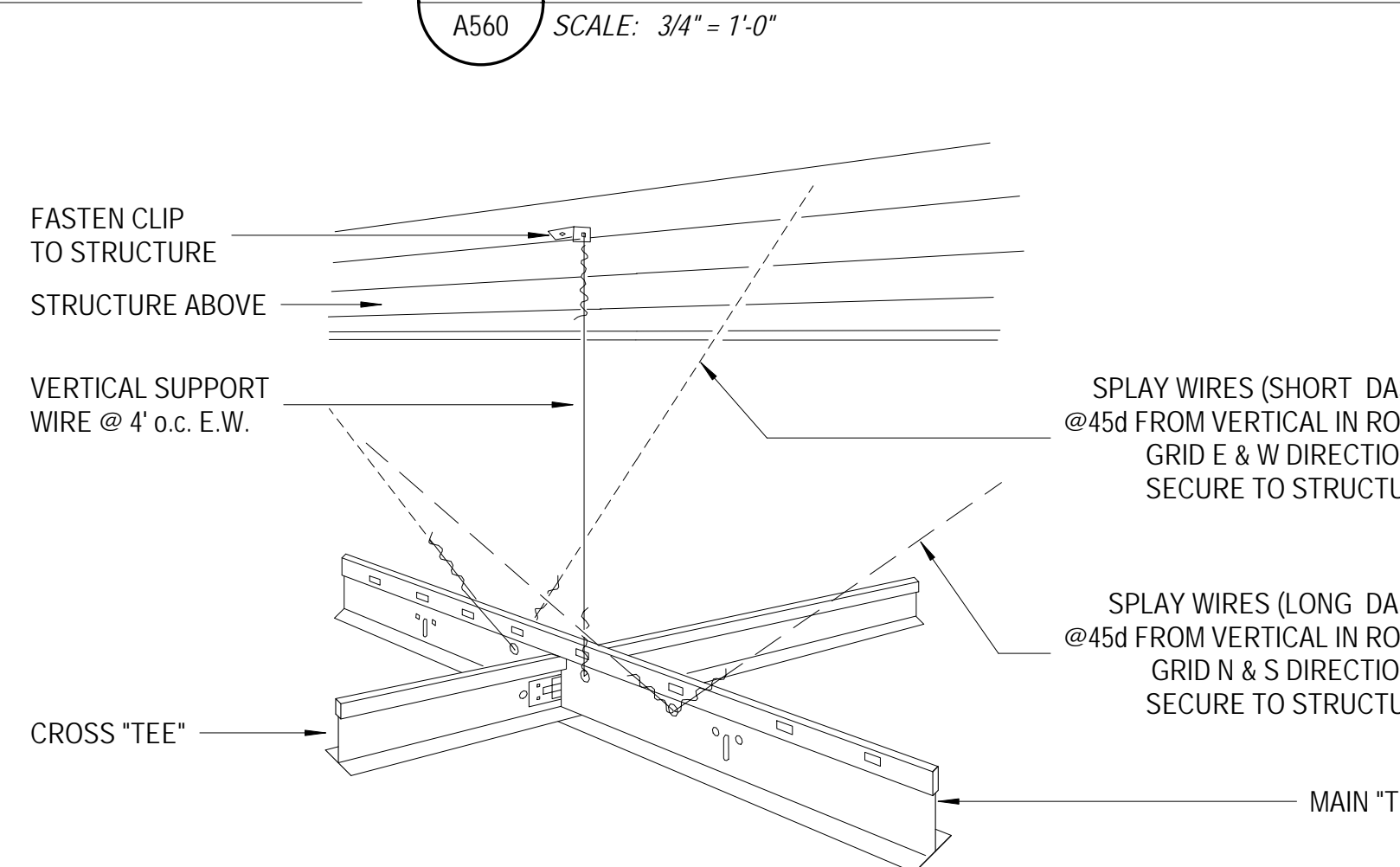
**4 SUP'D GYPSUM BD. CEILING DETAIL**



**5 WALL / CLG INTERSECTION**

A560 SCALE: 3" = 1'-0"

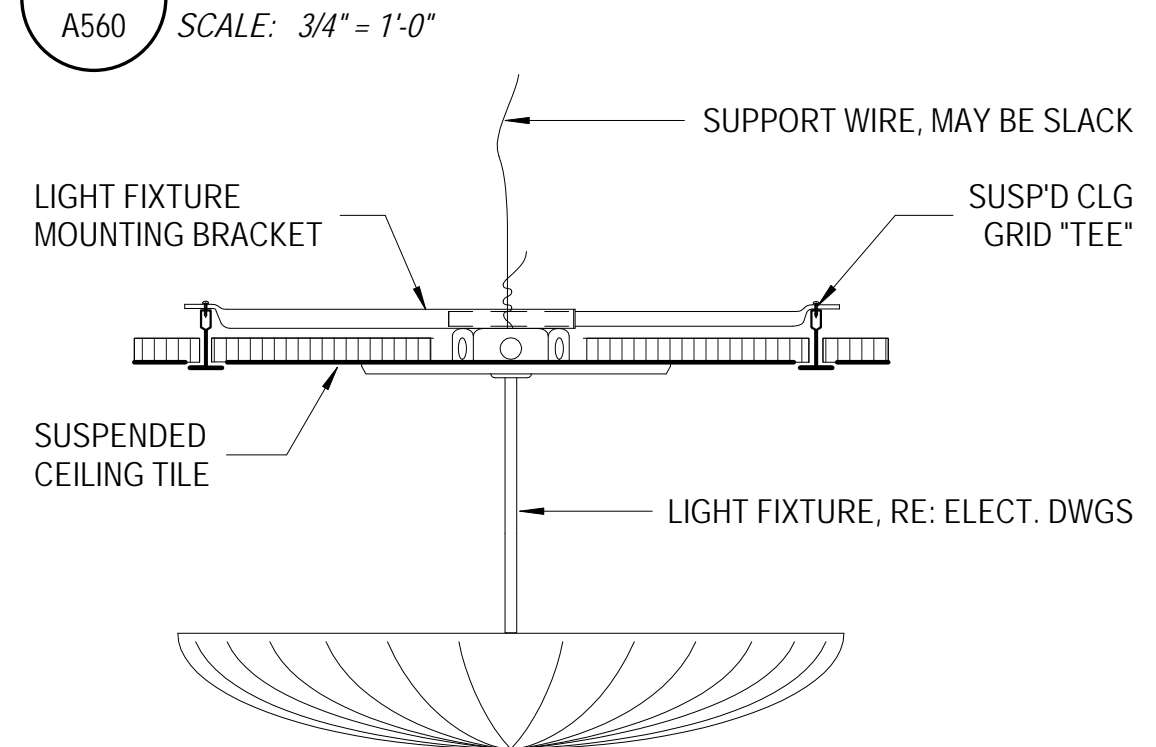
**7 PENDANT LIGHT ATTACHMENT**



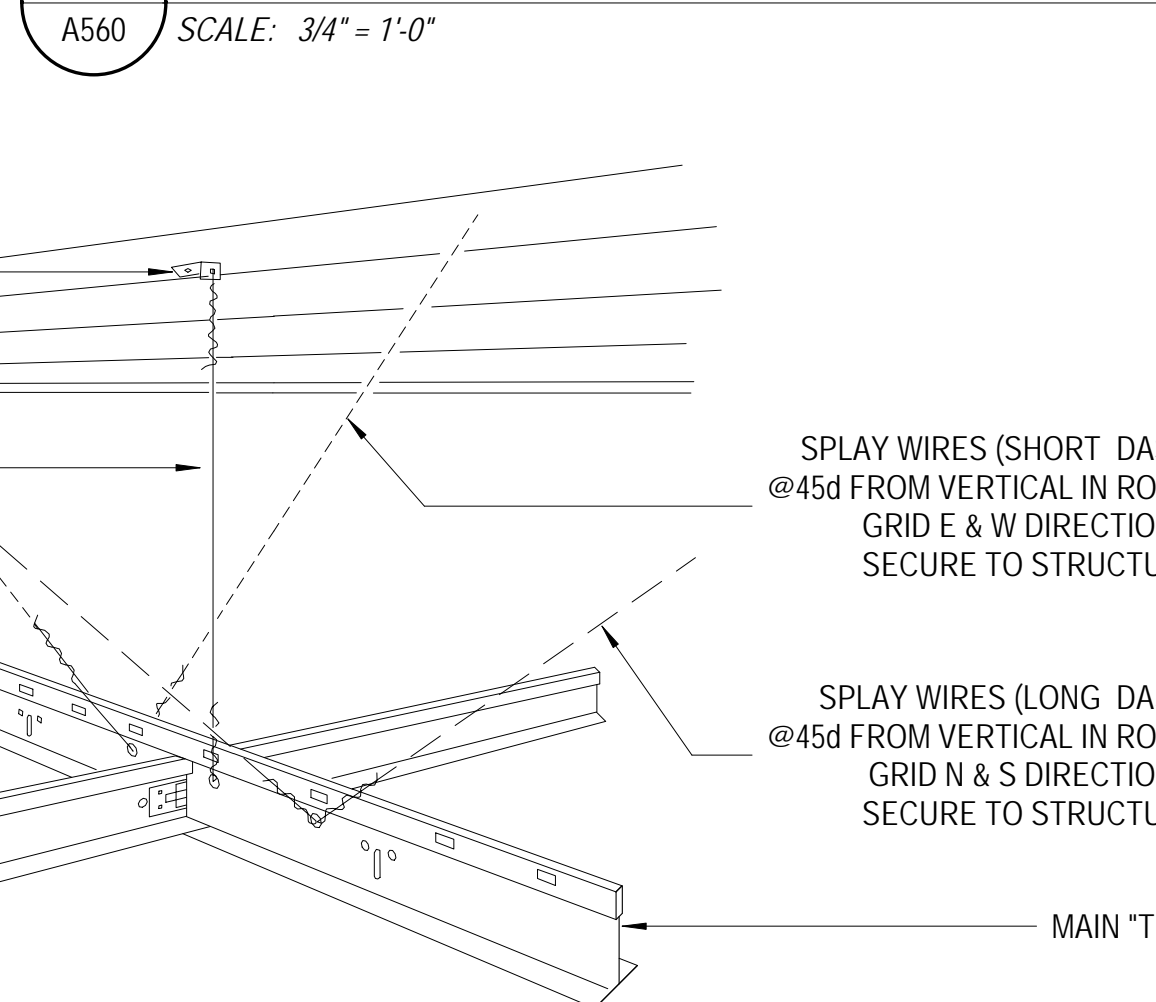
**6 ACT SEISMIC SPLAY WIRE LAYOUT**

A560 N.T.S.

**8 ACT EXPANSION JOINT**



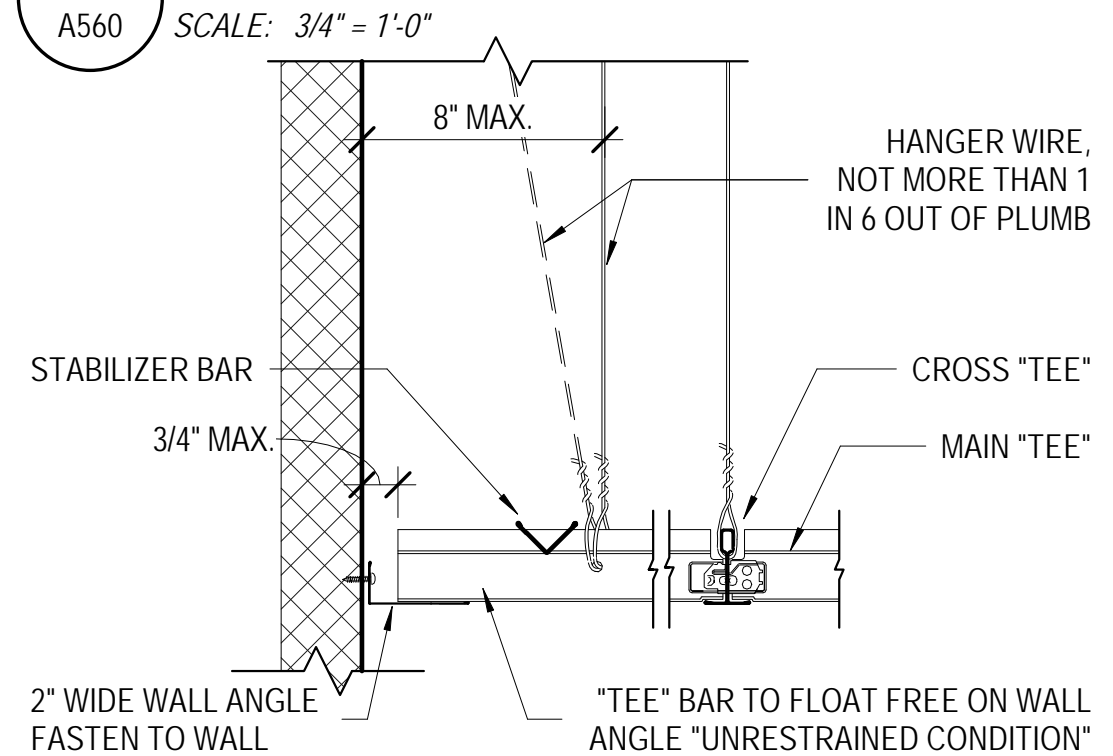
**10 UNRESTRAINED GRID / WALL**



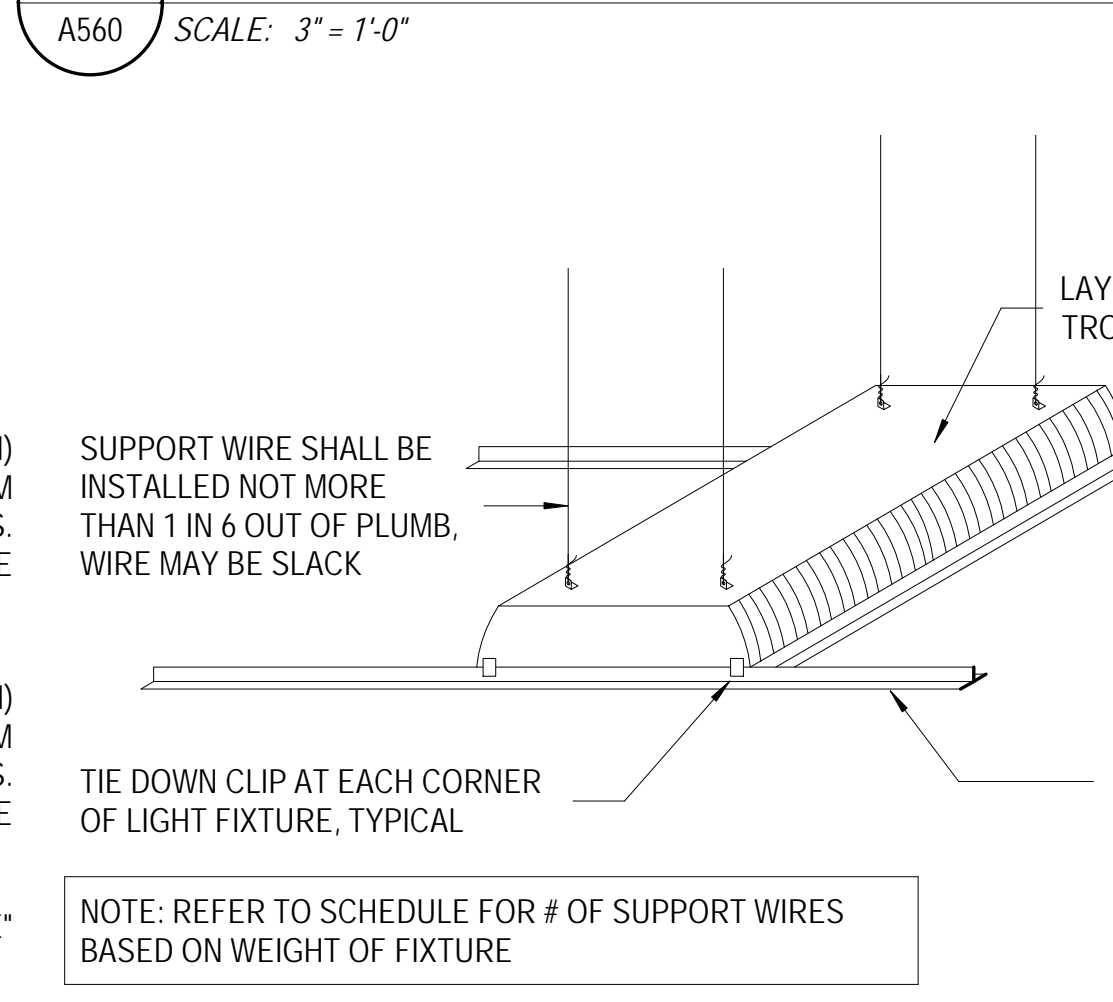
**11 LAY-IN TROFFER ATTACHMENT**

A560 N.T.S.

**9 CAN LIGHT ATTACHMENT**



**12 ACT GRID AT WALL**

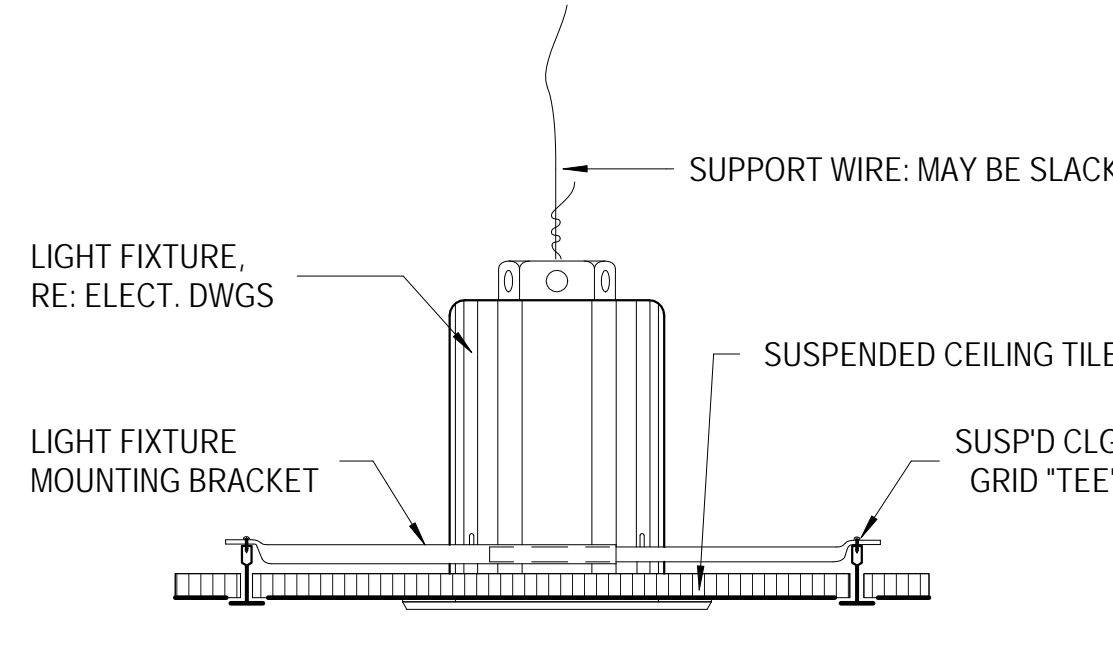
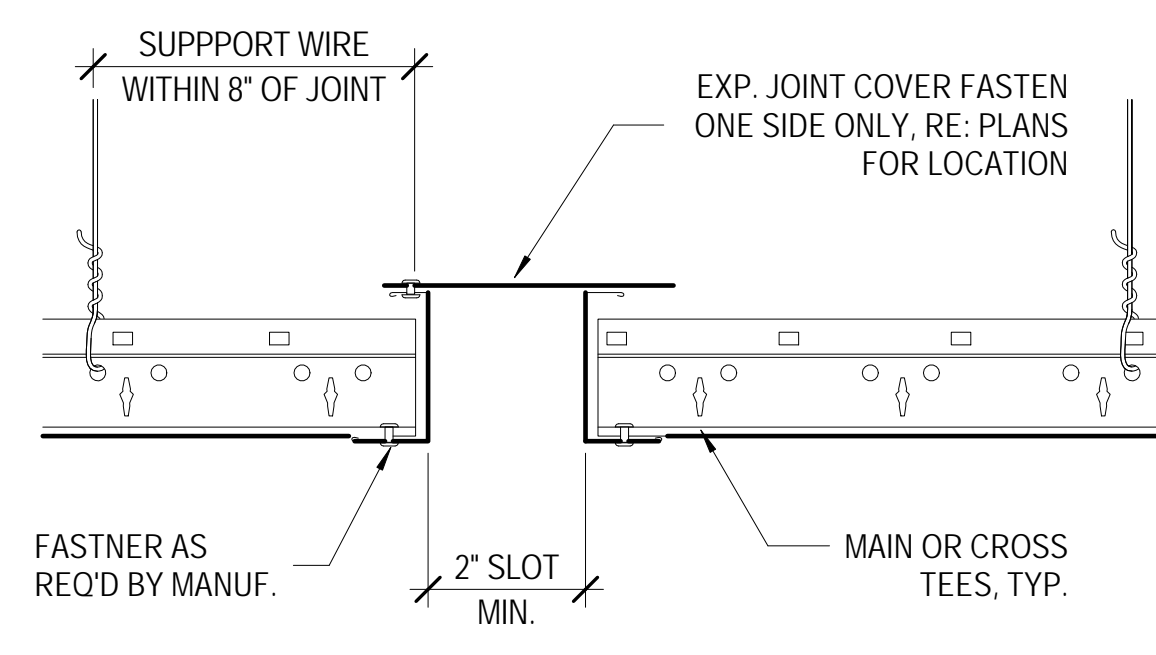


**14 AIR TERMINAL ATTACHMENT TO SUSP'D GRID**

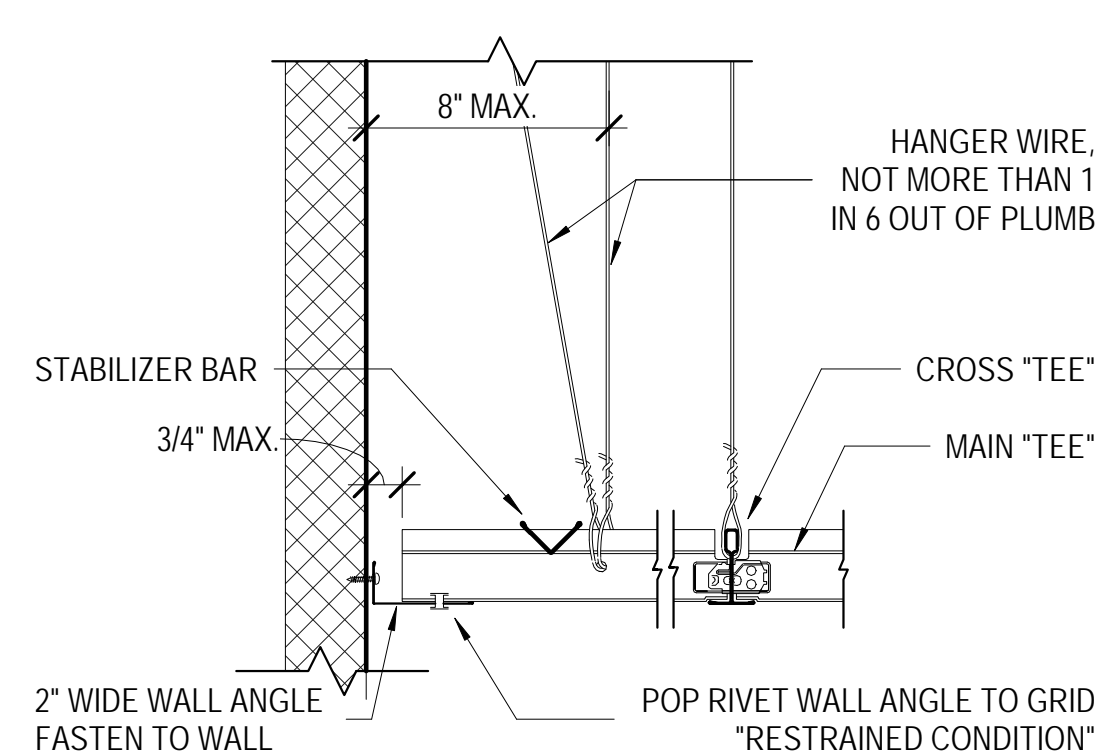
A560 N.T.S.

**SEISMIC CEILING SCHEDULE**

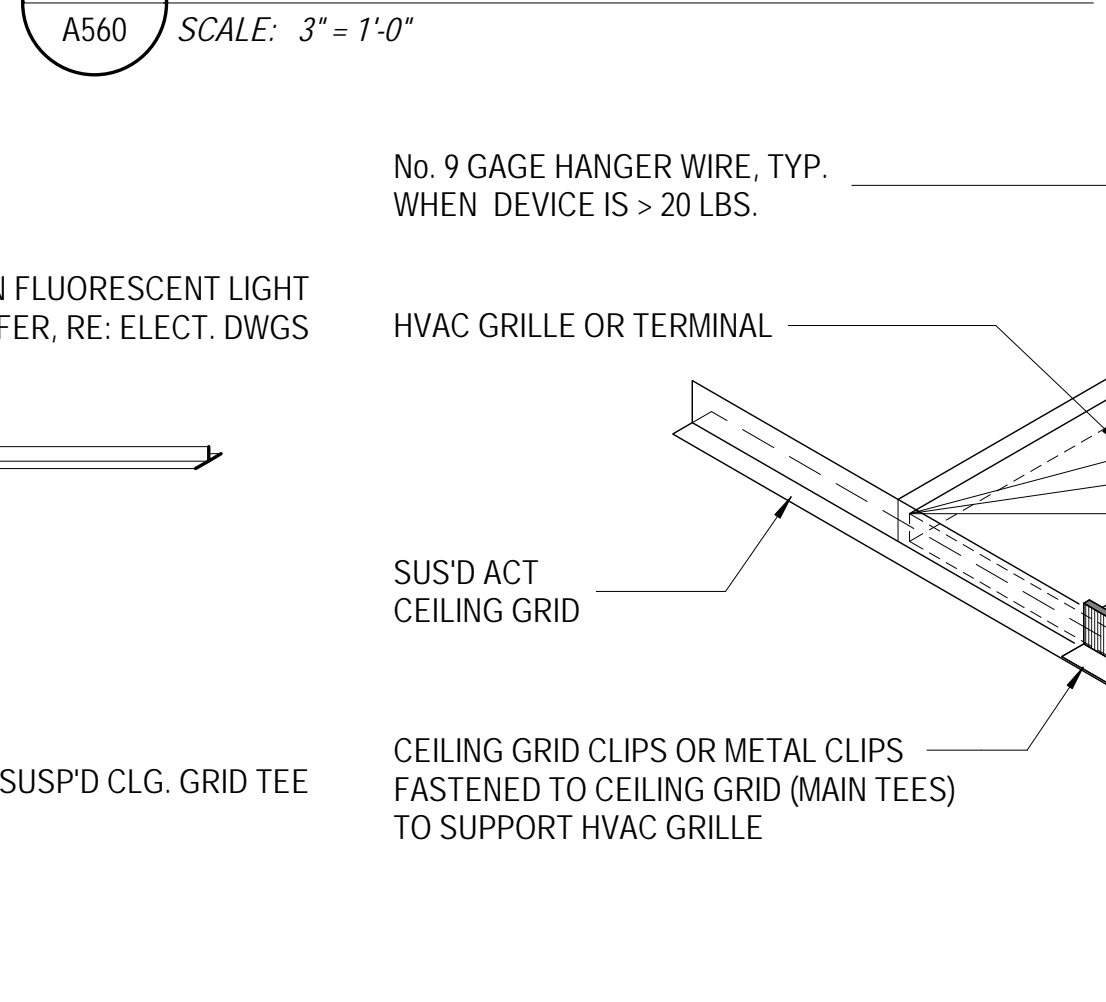
#	CEILING COMPONENT	IBC CATEGORY 'C' CISCA ZONES 0 - 2	IBC CATEGORY 'D', 'E', OR 'F' - CISCA ZONES 3 & 4		DETAIL NO.	SEISMIC REMARKS
			UP TO 1,000 SF	GREATER THAN 1,000 SF		
1	INTERSECTION STRENGTH AT MAIN / CROSS TEES	60 LBS.	180 LBS.	180 LBS.		
2	HANGER WIRE (MIN. OF 3 TWISTS)	12 GAUGE @ 4" O.C. EACH WAY	12 GAUGE @ 3" O.C. EACH WAY	12 GAUGE @ 4" O.C. EACH WAY		
3	CONNECTION @ WIRE / STRUCTURE ABOVE	NO MINIMUM REQUIREMENT	100 LBS. MINIMUM	100 LBS. MINIMUM		
4	MAIN TEE CLASSIFICATION	INTERMEDIATE DUTY OR HEAVY DUTY	HEAVY DUTY	HEAVY DUTY		
5	MAXIMUM OUT OF PLUMB	1 IN 6 MAXIMUM	1 IN 6 MAXIMUM	1 IN 6 MAXIMUM		
6	PERIMETER WIRE DISTANCE FROM WALLS	IF WALL ANGLE < 7/8" THEN 8" MAXIMUM	8" MAXIMUM	8" MAXIMUM		
7	GRID CONNECTION TO PERIMETER WALLS	NOT ALLOWED	ATTACHED TO TWO ADJACENT WALLS	ATTACHED TO TWO ADJACENT WALLS		
8	PERIMETER TEE ENDS TIED TOGETHER	YES, WITH STABILIZER BAR	YES, WITH STABILIZER BAR	YES, WITH STABILIZER BAR		
9	PERIMETER MOLDING WIDTH	7/8" MINIMUM	2" MINIMUM	2" MINIMUM		
10	GRID / WALL CLEARANCE	3/8" MINIMUM	3/4" MINIMUM	3/4" MINIMUM		
11	SPLAY BRACING 90 DEG. APART @ 45 DEG. ANGLES	NOT REQUIRED	NOT REQUIRED	REQUIRED WITHIN 2" OF TEE INTERSECTION @ 12'-0" O.C. EACH WAY		
12	SPLAY BRACING CONNECTION STRENGTH	N/A	N/A	GREATER OF 200 LBS. OR DESIGN LOAD		
13	COMPRESSION POSTS	NOT REQUIRED	NOT REQUIRED	REQUIRED @ 12'-0" O.C. EACH WAY, STARTING 6" FROM WALLS		
14	PARTITION ATTACHMENT	BRACE INDEPENDENT OF CEILING GRID	BRACE INDEPENDENT OF CEILING GRID	BRACE INDEPENDENT OF CEILING GRID		
15	SEISMIC SEPARATION JOINT	NOT REQUIRED	NOT REQUIRED	REQUIRED WHERE AREA IS > 2,500 SF		
16	RIGID BRACING AT CEILING PLANE CHANGES	NOT REQUIRED	YES	YES		
17	ALL LIGHT FIXTURES ATTACHED TO GRID, TYPICAL	AT 2 POINTS UNLESS INDEPENDENTLY SUPPORTED	AT 2 POINTS UNLESS INDEPENDENTLY SUPPORTED	AT 2 POINTS UNLESS INDEPENDENTLY SUPPORTED		
18	SURFACE MOUNTED LIGHT FIXTURE	ATTACH TO GRID	ATTACH TO GRID	ATTACH TO GRID		
19	PENDANT HUNG LIGHT FIXTURE	SUPPORT DIRECTLY FROM STRUCTURE W/ 9 GA. WIRE	SUPPORT DIRECTLY FROM STRUCTURE W/ 9 GA. WIRE	SUPPORT DIRECTLY FROM STRUCTURE W/ 9 GA. WIRE		
20	RECESSED LIGHT FIXTURE < 10 LBS.	SUPPORT WITH ONE WIRE TO STRUCTURE	SUPPORT WITH ONE WIRE TO STRUCTURE	SUPPORT WITH ONE WIRE TO STRUCTURE		
21	LAY-IN OR RECESSED LIGHT FIXTURE, 10 TO 56 LBS.	TWO WIRES TO STRUCTURE ON DIAGONAL	TWO WIRES TO STRUCTURE ON DIAGONAL	TWO WIRES TO STRUCTURE ON DIAGONAL		
22	LAY-IN OR RECESSED LIGHT FIXTURE, > 56 LBS.	SUPPORT INDEPENDENTLY FROM STRUCTURE	SUPPORT INDEPENDENTLY FROM STRUCTURE	SUPPORT INDEPENDENTLY FROM STRUCTURE		
23	AIR TERMINALS < 20 LBS.	POSITIVELY ATTACHED TO GRID	POSITIVELY ATTACHED TO GRID	POSITIVELY ATTACHED TO GRID		
24	AIR TERMINALS, 10 TO 56 LBS.	POSITIVELY ATTACH TO GRID + 2 WIRES TO STRUCTURE	POSITIVELY ATTACH TO GRID + 2 WIRES TO STRUCTURE	POSITIVELY ATTACH TO GRID + 2 WIRES TO STRUCTURE		
25	AIR TERMINALS > 56 LBS.	SUPPORT DIRECTLY FROM STRUCTURE	SUPPORT DIRECTLY FROM STRUCTURE	SUPPORT DIRECTLY FROM STRUCTURE		
26	SPRINKLER HEAD CLEARANCE	3/8" ON ALL SIDES	2" MINIMUM OPENING OR SWING JOINT	2" MINIMUM OPENING OR SWING JOINT		
27	MISC. PENETRATION CLEARANCE	3/8" ON ALL SIDES	2" MINIMUM OPENING OR FLEX JOINT	2" MINIMUM OPENING OR FLEX JOINT		
28	CABLE TRAYS	MAY BE SUPPORTED BY GRID OR STRUCTURE	SUPPORT DIRECTLY FROM STRUCTURE	SUPPORT DIRECTLY FROM STRUCTURE		
29	CONDUIT AND PIPING	MAY BE SUPPORTED BY GRID OR STRUCTURE	SUPPORT DIRECTLY FROM STRUCTURE	SUPPORT DIRECTLY FROM STRUCTURE		



**13 COMPRESSION POST**



**14 AIR TERMINAL ATTACHMENT TO SUSP'D GRID**



REV.	DATE	DESCRIPTION



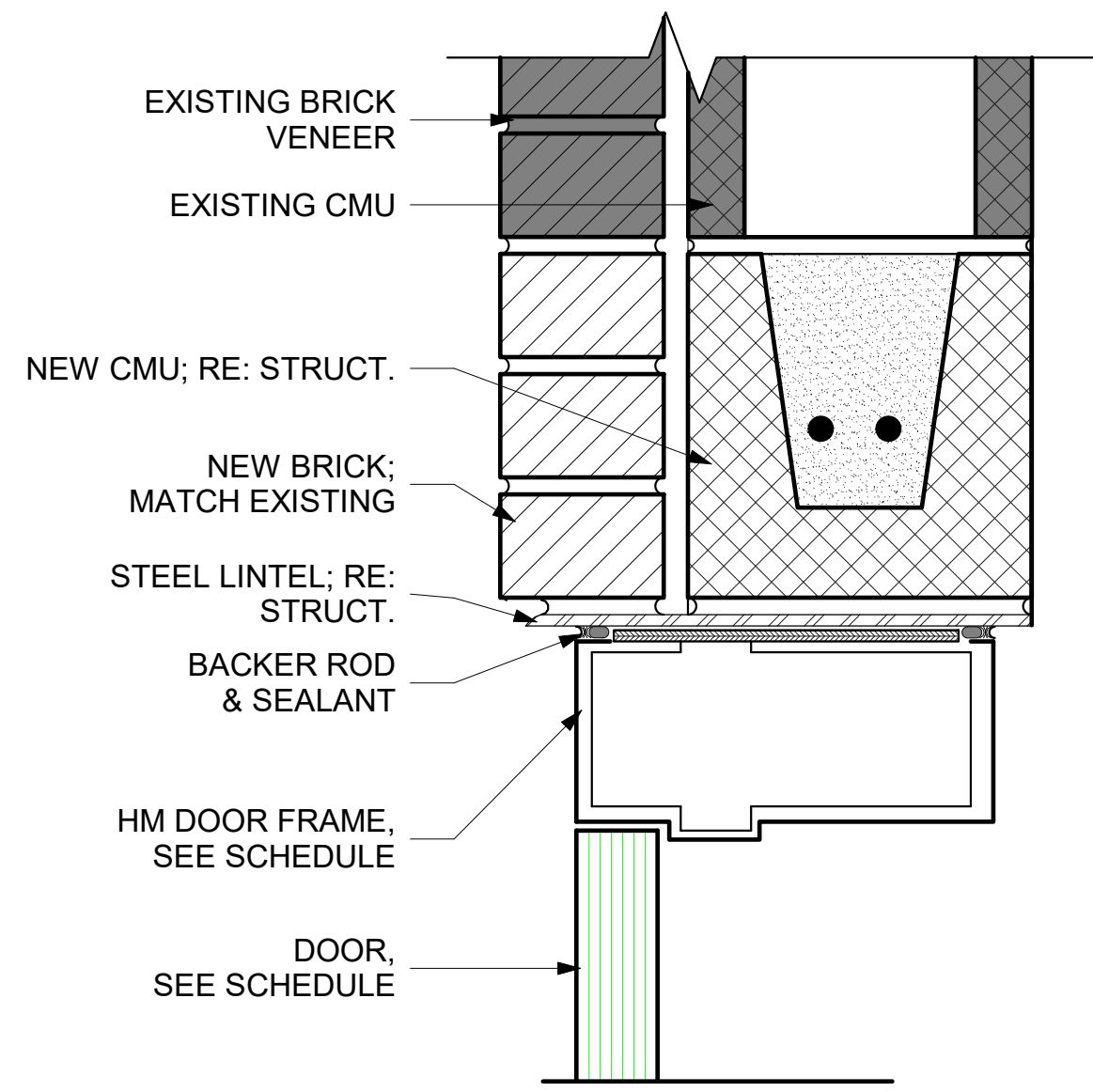
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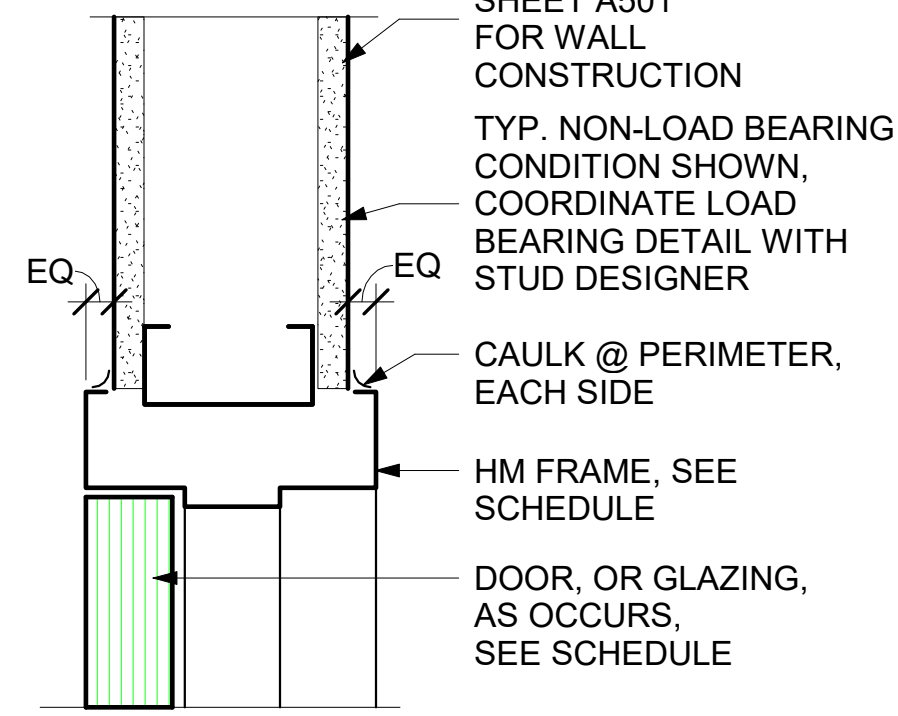
TYPICAL SEISMIC CEILING DETAILS

**A560**

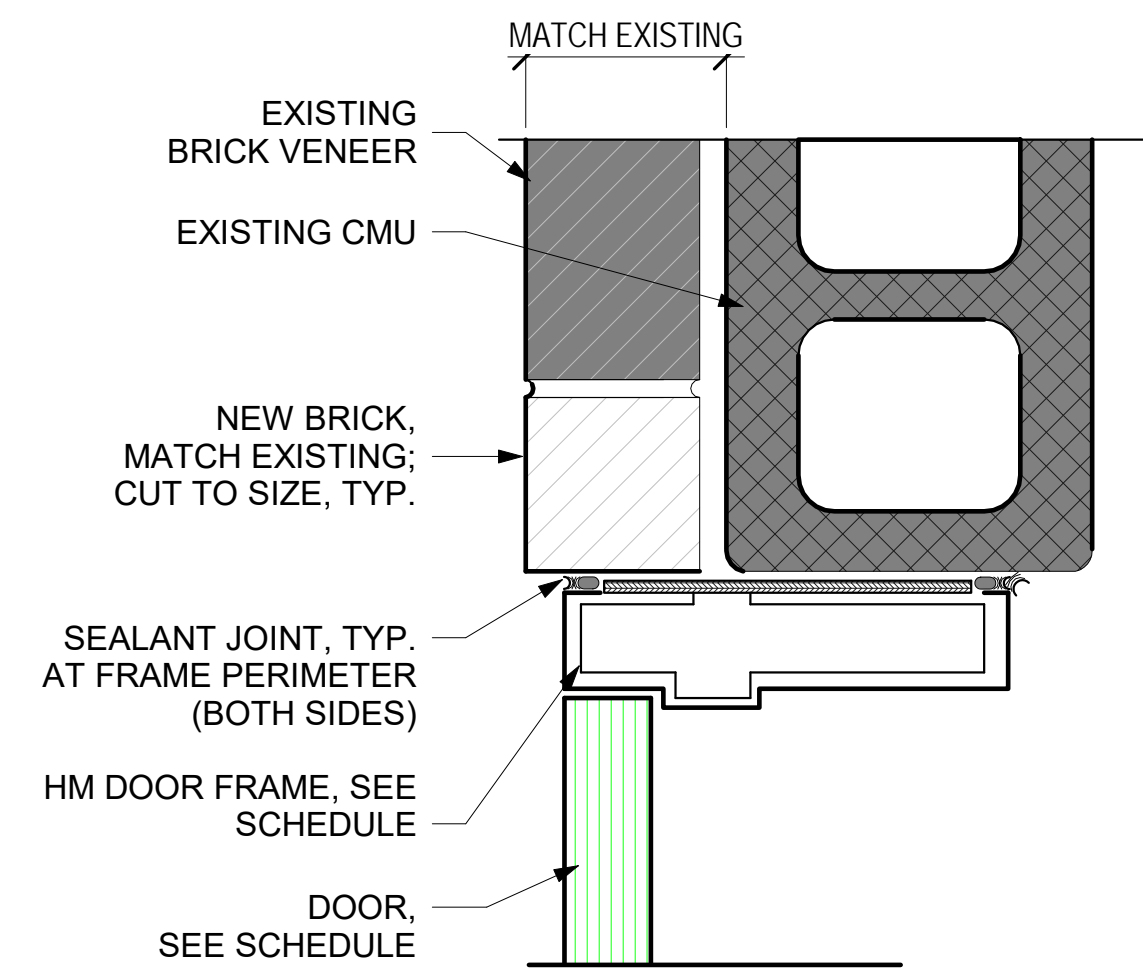




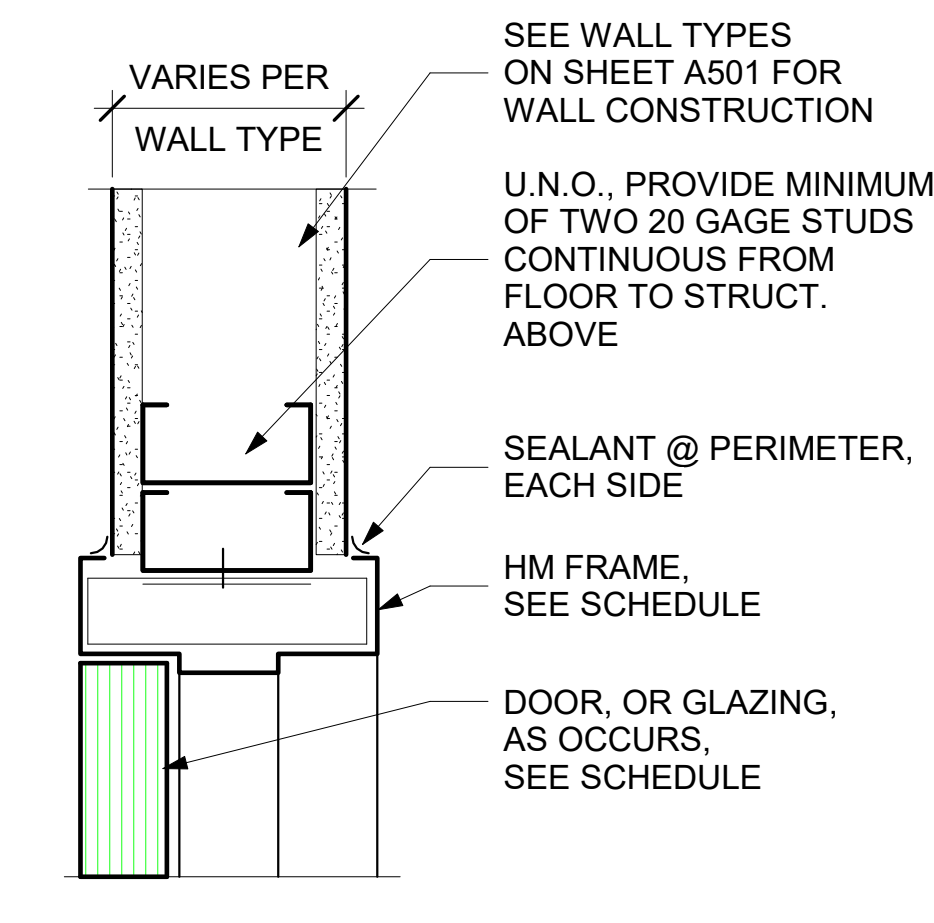
**3** EXTERIOR DOOR HEAD  
SCALE: 3" = 1'-0"



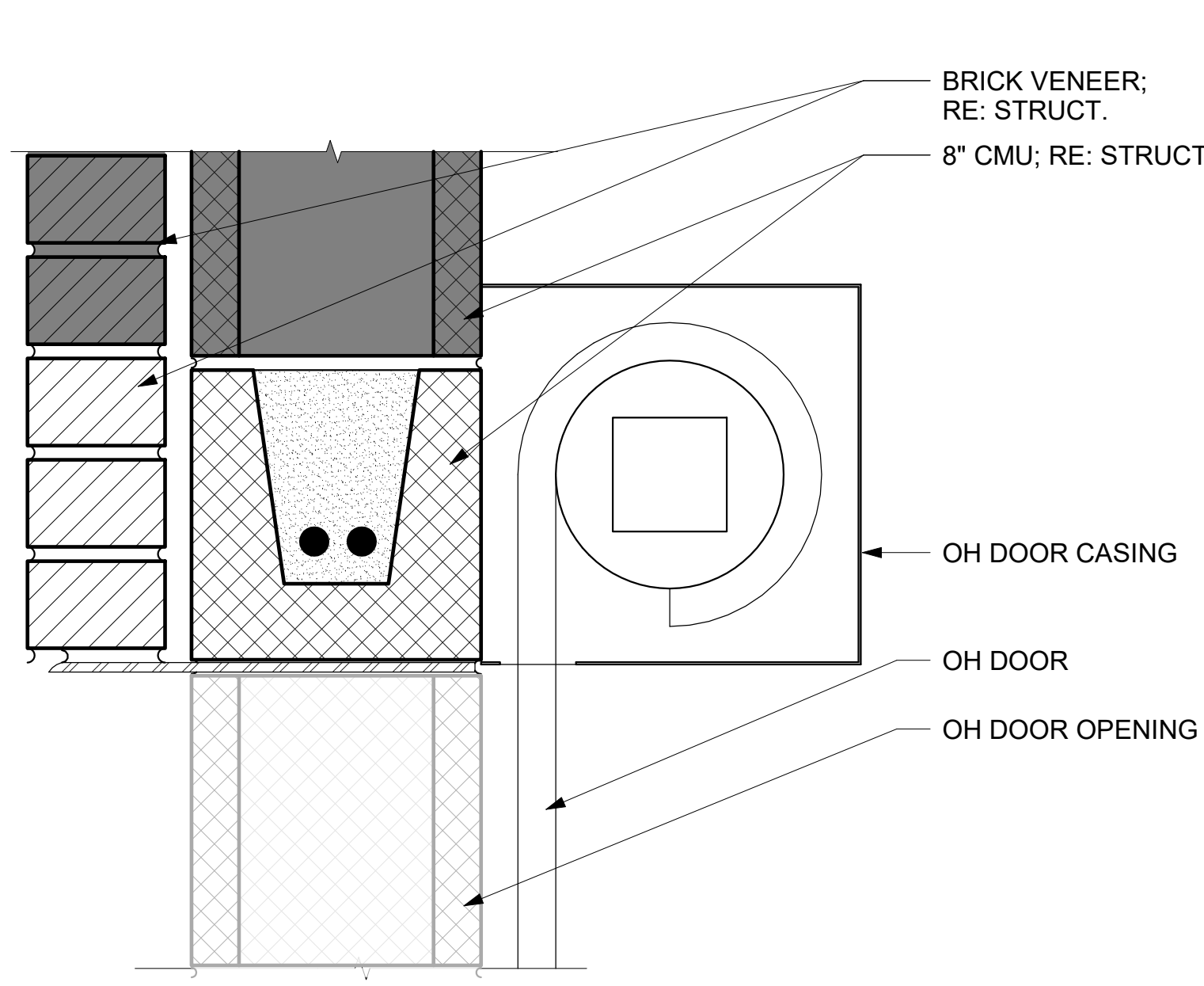
**5** INT DOOR HEAD  
SCALE: 3" = 1'-0"



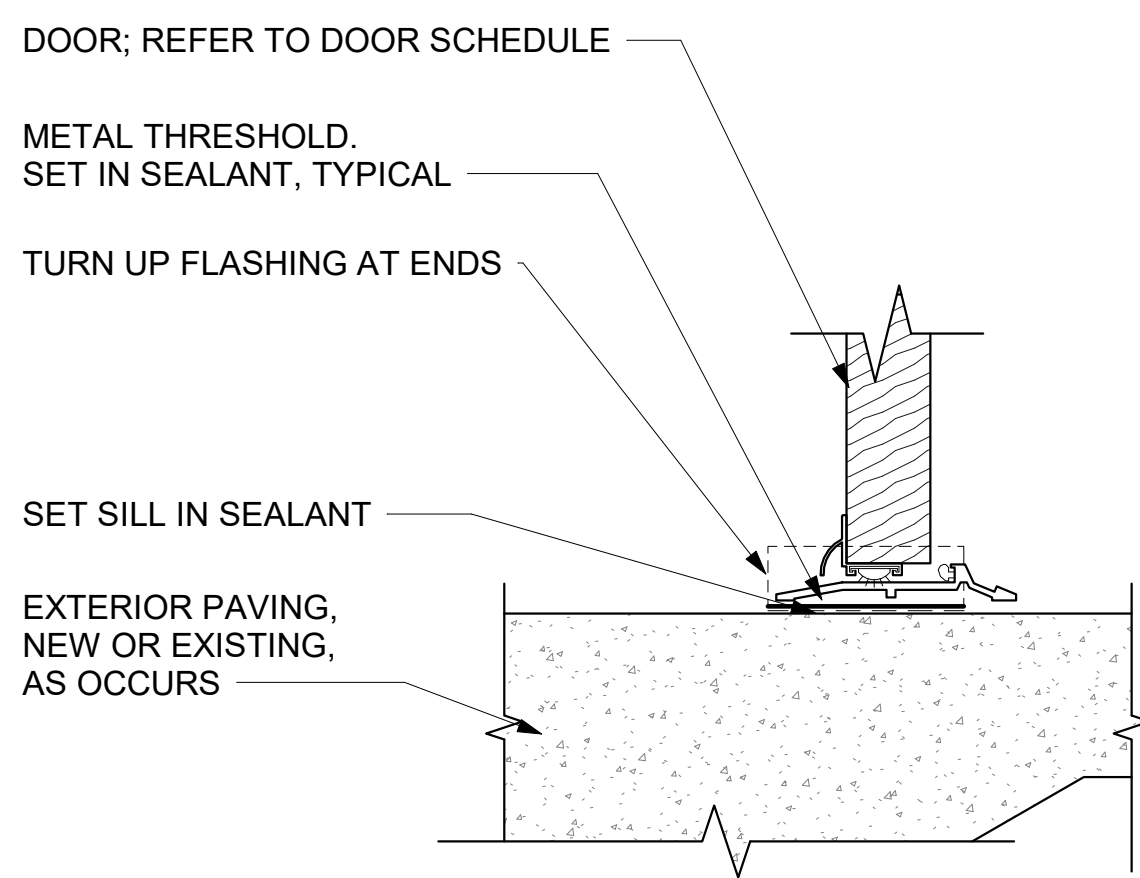
**2** EXTERIOR DOOR JAMB @ BRICK  
SCALE: 3" = 1'-0"



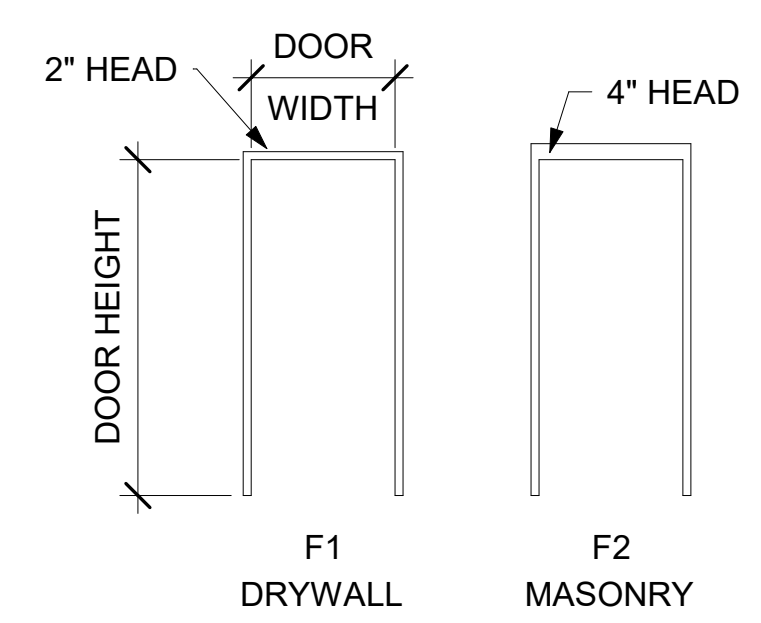
**4** INT DOOR JAMB  
SCALE: 3" = 1'-0"



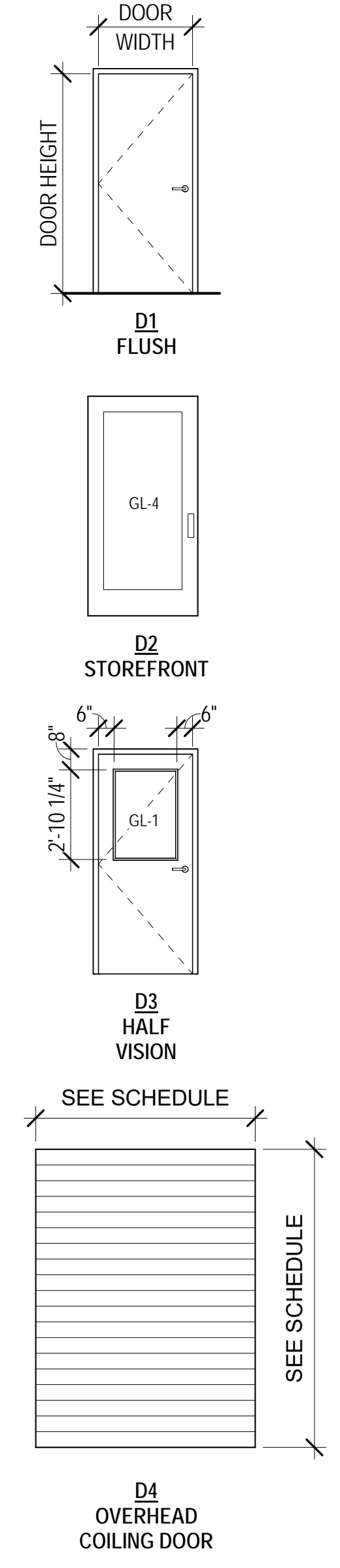
**7** OVERHEAD COILING DOOR  
SCALE: 3" = 1'-0"



**6** DOOR SILL DETAIL  
SCALE: 3" = 1'-0"



DOOR FRAME ELEVATIONS  
SCALE: 1/4" = 1'-0"



TYPE ELEVATIONS - DOORS  
SCALE: 1/4" = 1'-0"

DOOR & FRAME SCHEDULE																
TAG	DOOR							FRAME				DETAILS			NOTES	
	TYPE	HEIGHT	WIDTH	THICKNESS	MATERIAL	FINISH	GLAZING	TYPE	MATERIAL	FINISH	FIRE RATING	HARDWARE SET	HEAD	JAMB		SILL
101A	D1	7'-0"	3'-0"	0'-1 3/4"	HM	PNT		F2	HM	PNT		01	3/A600	2/A600	6/A600	
101B	D2	7'-0"	6'-0"	0'-2 1/4"	ALUM	FF		F2	ALUM	FF		02				
102	D2	7'-0"	5'-10"	0'-2 1/4"	ALUM	FF						19				
103	D2	7'-0"	6'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		04	5/A600	4/A600	6/A600	
103A	D2	7'-0"	6'-0"	0'-2 1/4"	ALUM	FF		F2	ALUM	FF		03				
104	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		05	5/A600	4/A600	6/A600	
104A	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		06	5/A600	4/A600	6/A600	
105A	D1	7'-0"	3'-0"	0'-1 3/4"	HM	PNT		F2	HM	PNT		07	3/A600	2/A600	6/A600	
105B	D4	8'-0"	10'-0"	0'-3"	BY MANUF	FF					BY MANUF	7/A600				
106A	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT	90 MIN.	09	5/A600	4/A600	6/A600	
106B	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		05	5/A600	4/A600	6/A600	
106C	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT	90 MIN.	10	5/A600	4/A600	6/A600	
107A	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT	90 MIN.	11	5/A600	4/A600	6/A600	
107B	D1	7'-0"	3'-0"	0'-1 3/4"	HM	PNT		F2	HM	PNT	90 MIN.	07	3/A600	2/A600	6/A600	
107C	D1	7'-0"	3'-0"	0'-1 3/4"	HM	PNT		F2	HM	PNT	90 MIN.	07	3/A600	2/A600	6/A600	
108A	D1	7'-0"	3'-0"	0'-1 3/4"	HM	PNT		F2	HM	PNT		07	3/A600	2/A600	6/A600	
108B	D4	8'-0"	10'-0"	0'-3"	BY MANUF						BY MANUF	7/A600				
108C	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		06	5/A600	4/A600	6/A600	
109	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		12	5/A600	4/A600	6/A600	
110	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		12	5/A600	4/A600	6/A600	
113	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		EXISTING	HM	PNT		13	5/A600	4/A600	6/A600	
114	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		EXISTING	HM	PNT		13	5/A600	4/A600	6/A600	
115	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		06	5/A600	4/A600	6/A600	
116	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		14	5/A600	4/A600	6/A600	
117	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		15	5/A600	4/A600	6/A600	
118	D3	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		16	5/A600	4/A600	6/A600	
120	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		14	5/A600	4/A600	6/A600	
121A	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1	HM	PNT		05	5/A600	4/A600	6/A600	
121B	D1	7'-0"	3'-0"	0'-1 3/4"	HM	PNT		F2	HM	PNT		17	3/A600	2/A600	6/A600	
122	D1	7'-0"	3'-0"	0'-1 3/4"	HM	PNT		F2	HM	PNT		07	3/A600	2/A600	6/A600	
123	D1	7'-0"	3'-0"	0'-1 3/4"	SCW	ST		F1				06	3/A600	2/A600	6/A600	
124	D2	7'-0"	3'-6"		ALUM	FF		F2	ALUM	FF		14	12/A610	11/A610		

**DOOR SCHEDULE NOTES**

- REFER TO DOOR PANEL TYPES FOR GLAZING TYPES AND LOCATIONS
- REFER TO FINISH SCHEDULE FOR PAINT COLORS, PAINT NOTES

**FINISH ABBREVIATIONS**

ACT	ACOUSTICAL CEILING TILE
ACW	ALUMINUM CLAD WOOD
ALUM	ALUMINUM
CONC.	CONCRETE
CP	CARPET
CT	CERAMIC TILE
FF	FACTORY FINISH
GYP BD	GYP SUM BOARD
LVT	LUXURY VINYL TILE
MFR	MANUFACTURER FINISH
PT	PAINT
SCW	SOLID CORE (WOOD DOOR)
ST	STAIN (FACTORY FINISH)
VCT	VINYL COMPOSITION TILE
WC	WAINSCOT
WD	WOOD

**FLASHING NOTES**

- INSTALL ALL WORK IN ACCORDANCE WITH LOCAL, STATE AND NATIONAL CODES AND ADJACENT MATERIAL MANUFACTURER'S PRINTED INSTALLATION INSTRUCTIONS.
- EXPOSED EDGES OF ALL FLASHING TYPES ARE TO BE HEMMED EXCEPT STEP FLASHING.
- REFER TO EXTERIOR MATERIAL SCHEDULE AND SEALANT NOTES FOR SEALANT INFORMATION.
- FLASHING IS TO MATCH COLOR OF ABUTTING OR ADJACENT MATERIALS.
- IF FLASHING IS ADJACENT TO MORE THAN ONE COLOR, MATCH WHITE FIRST, THEN DARKER COLOR.
- WHEN POSSIBLE, FLASHING IS TO BE CONTINUOUS, JOINTS TO BE OVERLAPPED A MINIMUM OF 4" AND SEALED WITH SEALANT. SEALANT SHOULD BE PLACED TO AVOID OOOZING OF EXCESSIVE MATERIAL.

**GLAZING TYPES**

TYPE	SIZE	DESCRIPTION
GL-1	1/4"	TEMPERED GLASS UNIT
GL-2	1 3/16"	90 MIN FIRE RATED GLASS UNIT
GL-3	1 5/16"	INSULATED GLASS UNIT
GL-4	9/16"	LAMINATED FULLY TEMPERED GLASS UNIT

DESCRIPTION

REV. DATE



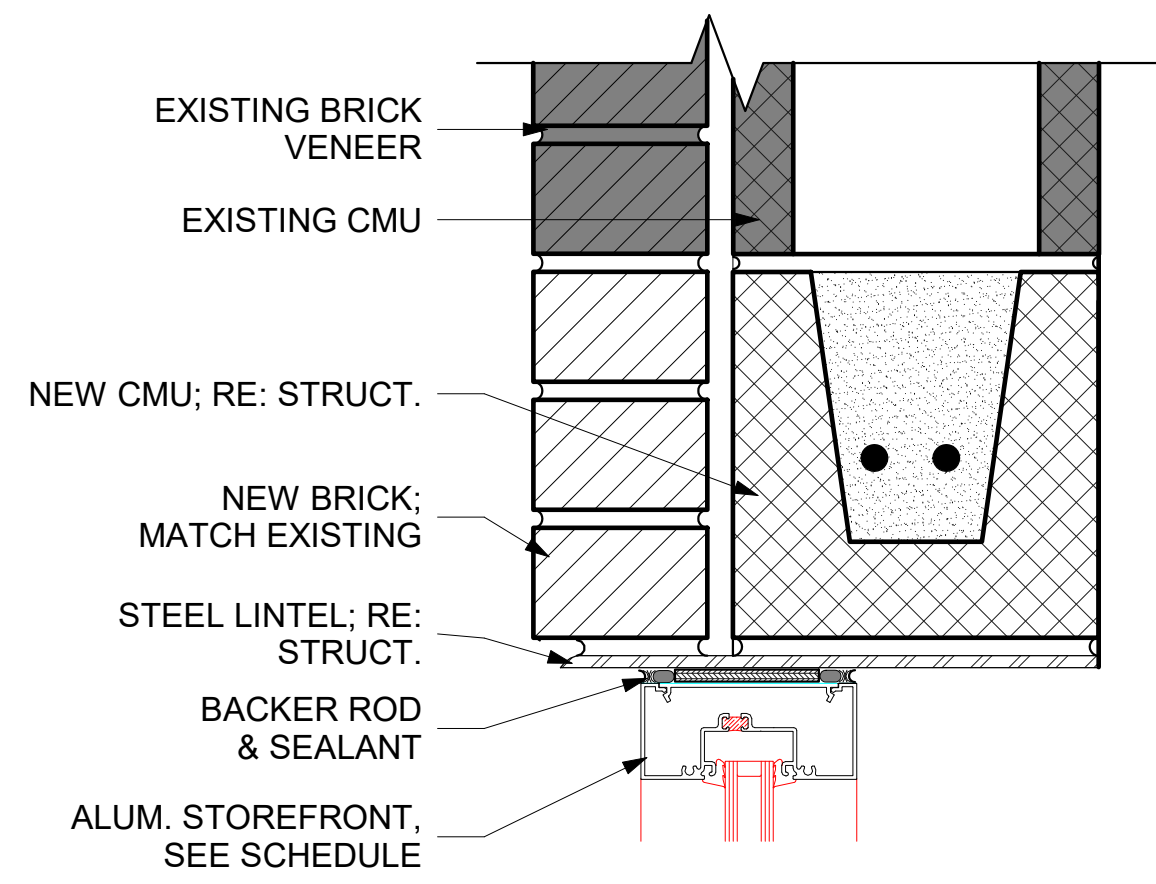
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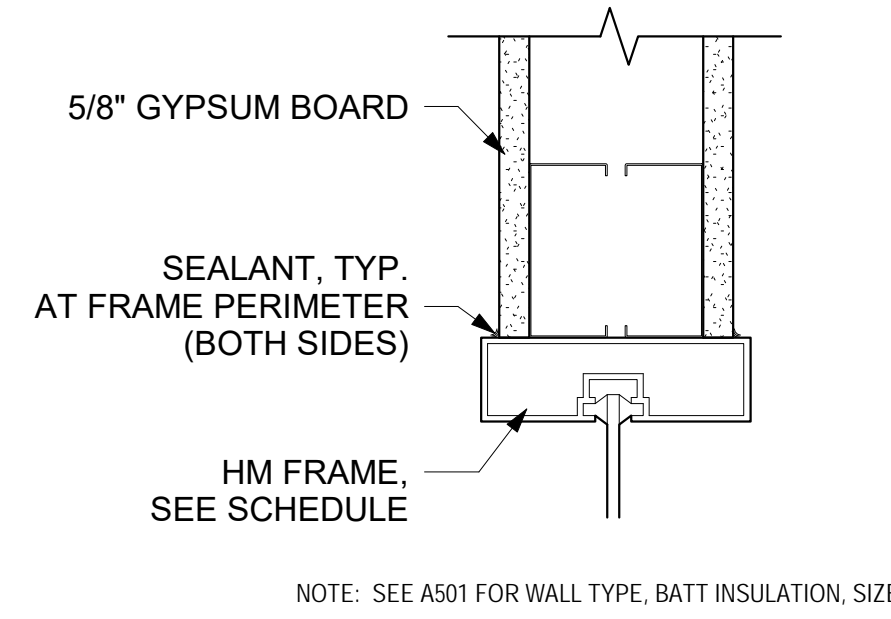
**DOOR TYPES, SCHEDULE & DETAILS**

**A600**

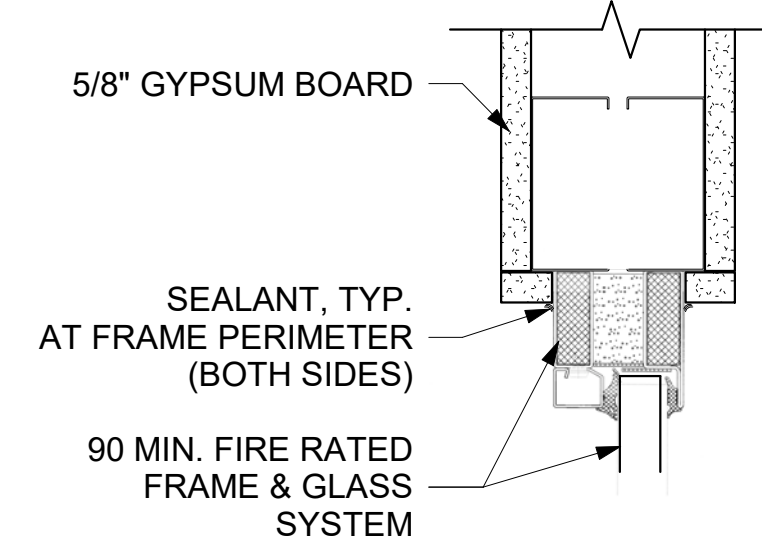




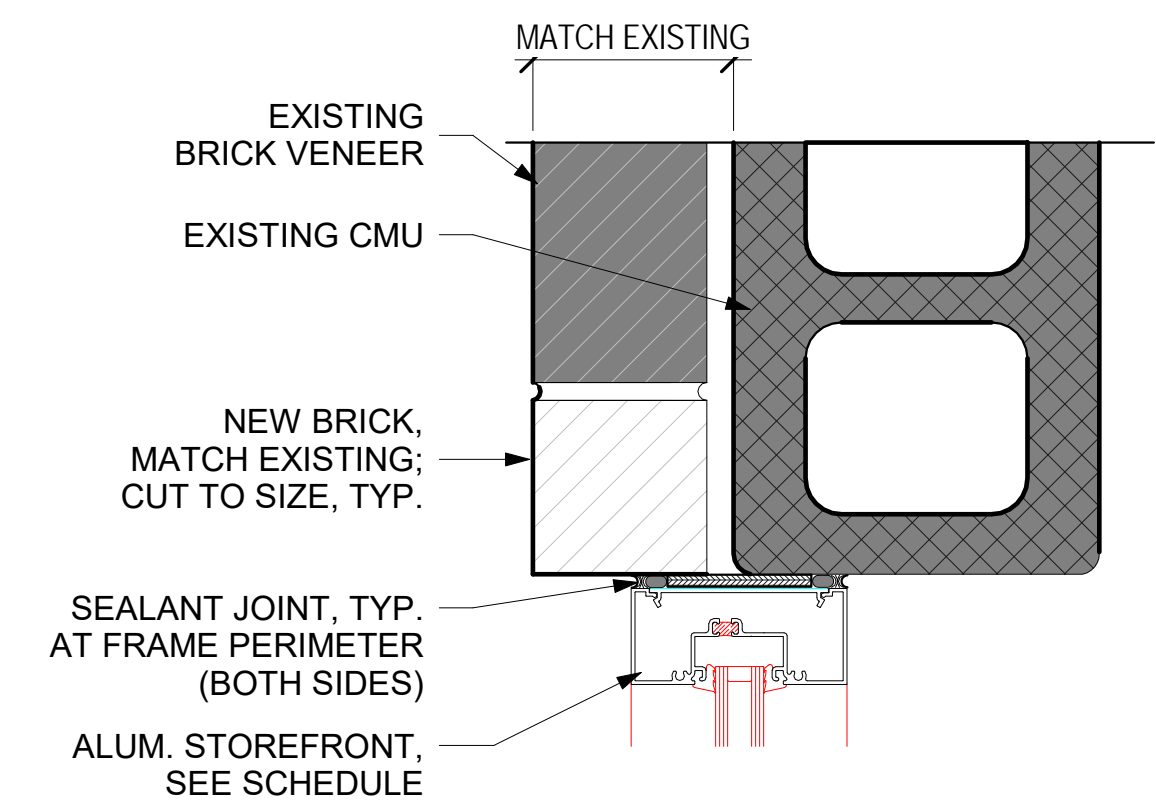
**12** EXTERIOR STOREFRONT HEAD  
SCALE: 3" = 1'-0"



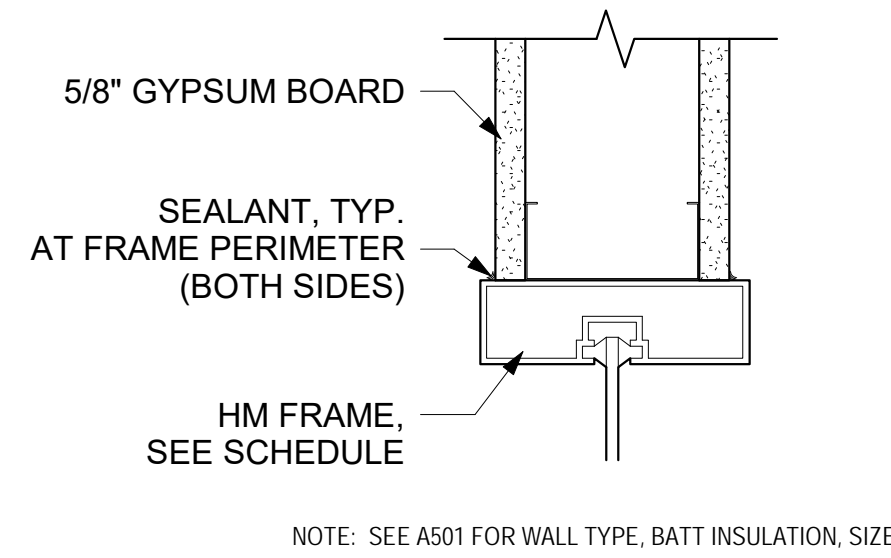
**10** INTERIOR GLAZING HEAD  
SCALE: 3" = 1'-0"



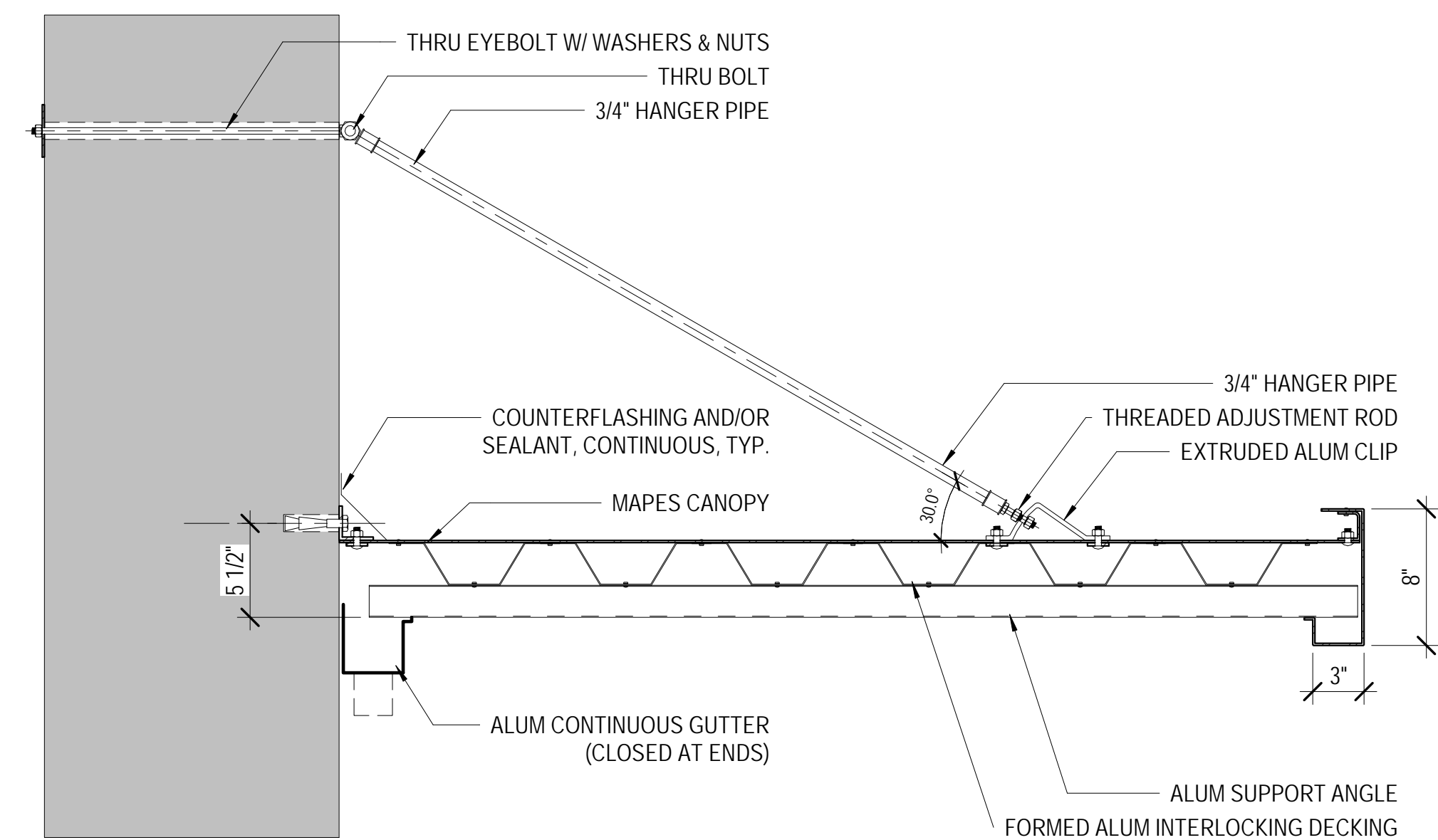
**14** 90 MIN. RATED FRAME SYSTEM  
SCALE: 3" = 1'-0"



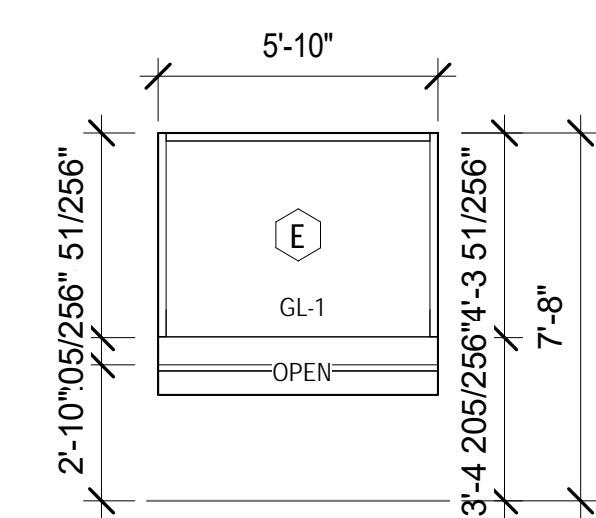
**11** EXTERIOR STOREFRONT JAMB  
SCALE: 3" = 1'-0"



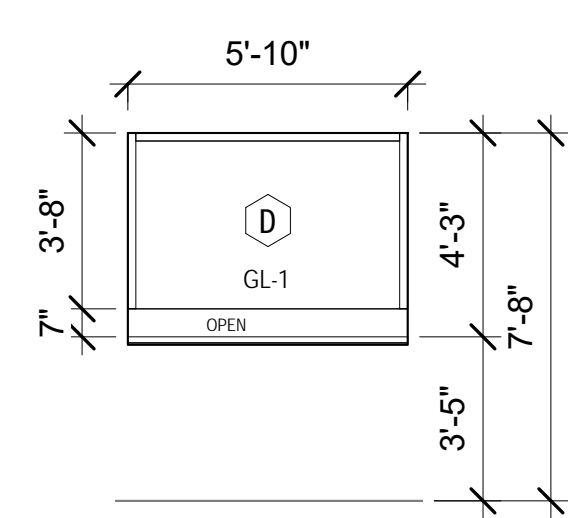
**13** INTERIOR GLAZING JAMB  
SCALE: 3" = 1'-0"



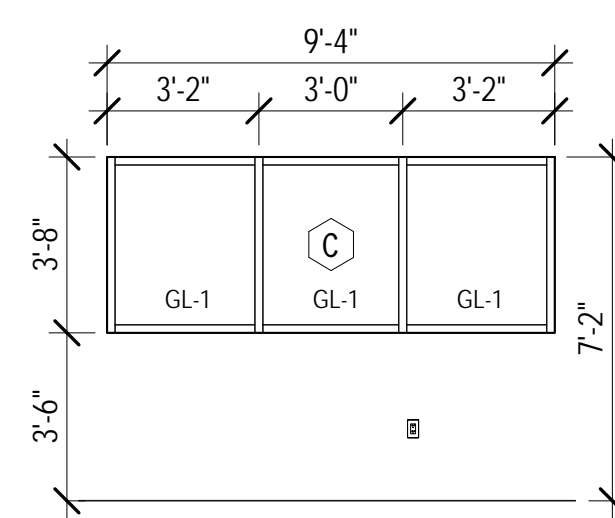
**9** DETAIL SECTION @ MAPES CANOPY  
SCALE: 1 1/2" = 1'-0"



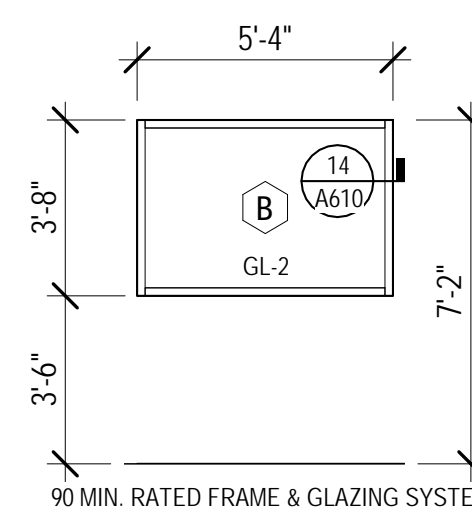
**INTERIOR GLAZING E**  
SCALE: 1/4" = 1'-0"



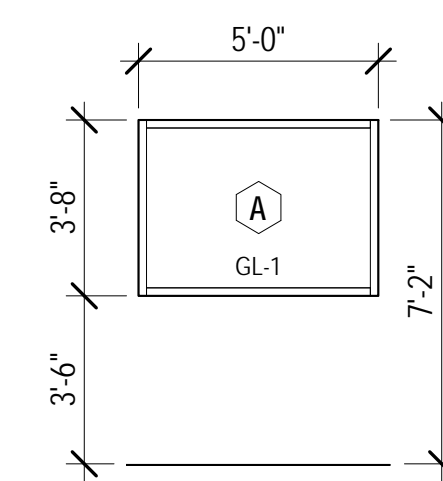
**INTERIOR GLAZING D**  
SCALE: 1/4" = 1'-0"



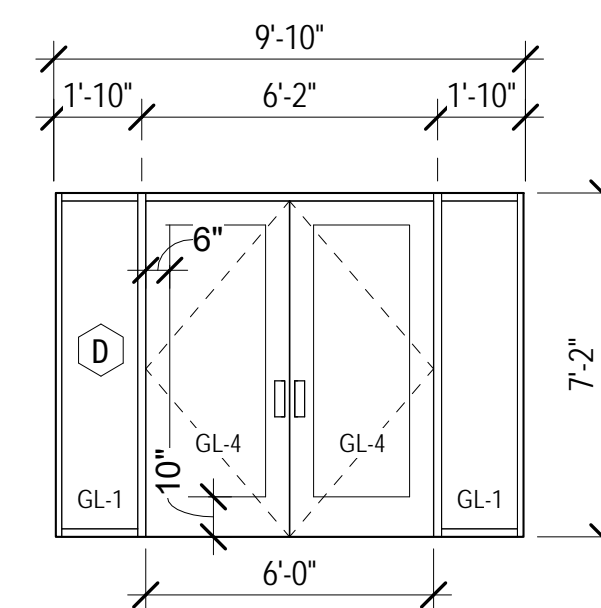
**INTERIOR GLAZING C**  
SCALE: 1/4" = 1'-0"



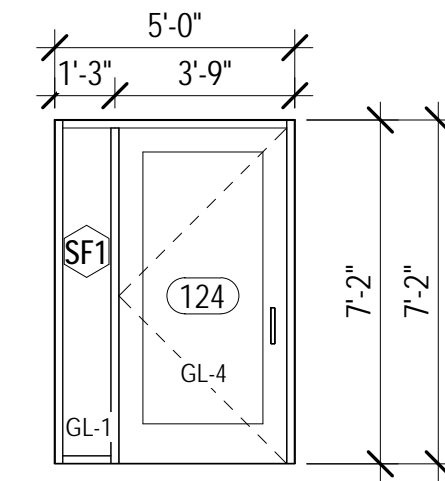
**INTERIOR GLAZING B**  
SCALE: 1/4" = 1'-0"



**INTERIOR GLAZING A**  
SCALE: 1/4" = 1'-0"



**STOREFRONT 2**  
SCALE: 1/4" = 1'-0"

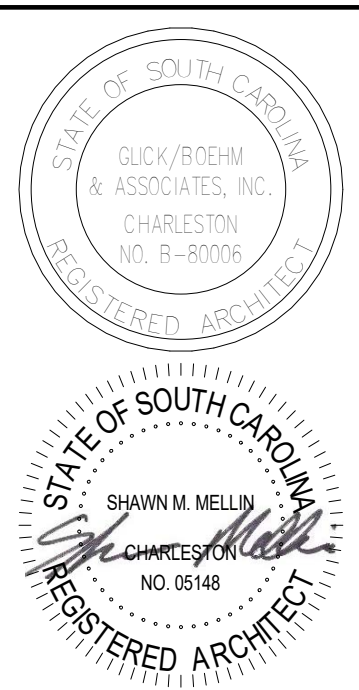


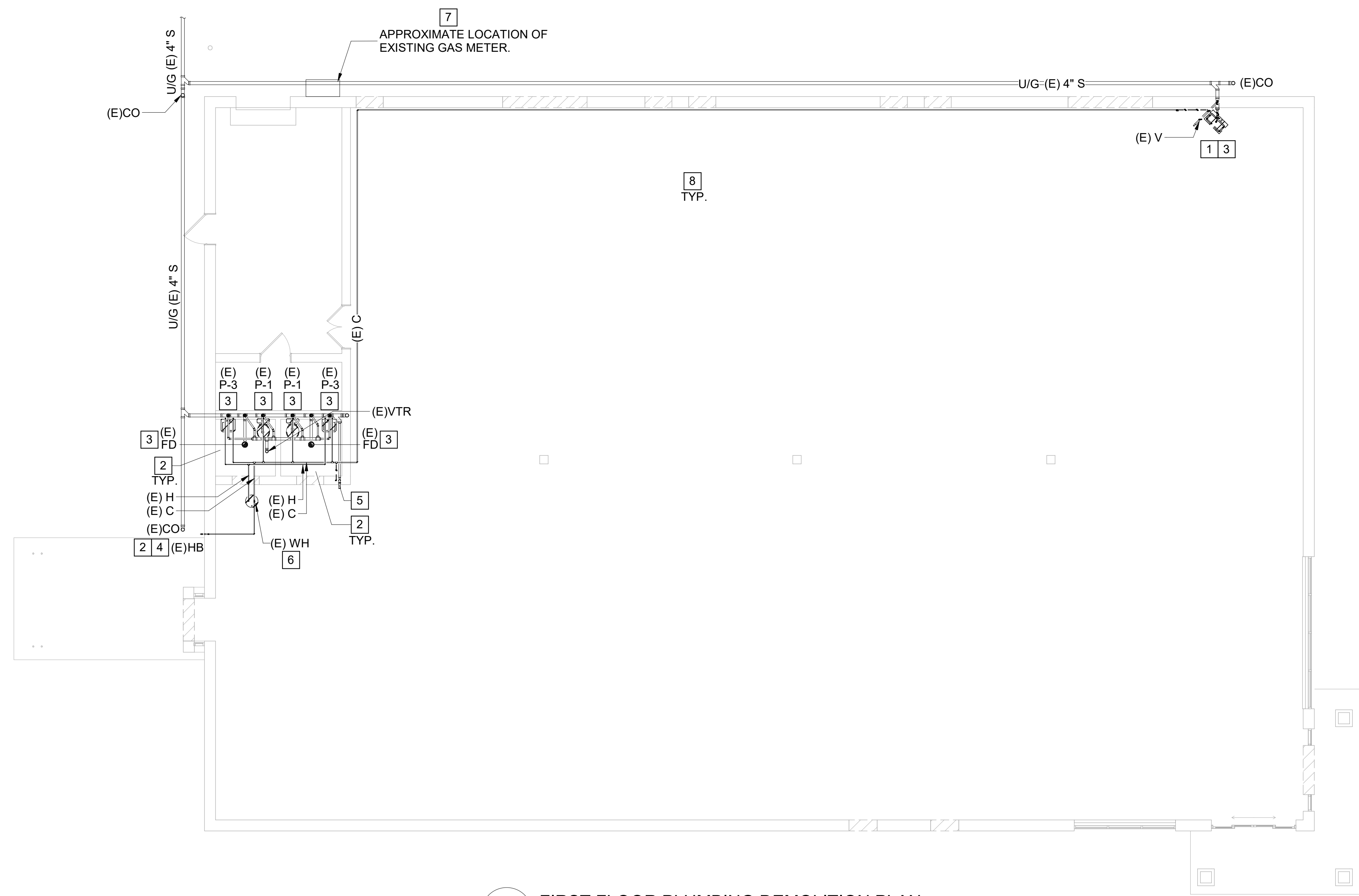
**STOREFRONT 1**  
SCALE: 1/4" = 1'-0"

STOREFRONT & WINDOW NOTES		
1	GLAZING SPECIFIED IN SECTION 08 80 00	
2	ALL EXTERIOR GLAZING SHALL BE GL-1 UNLESS NOTED OTHERWISE	
3	ALL INTERIOR GLAZING SHALL BE GL-7 UNLESS NOTED OTHERWISE	
4	REFER TO A610 FOR GLAZING AT STOREFRONT DOORS	
5	PROVIDE BRAKE METAL ENCLOSURE AT BOTH SIDE OF STOREFRONT	

GLAZING TYPES		
TYPE	SIZE	DESCRIPTION
GL-1	1/4"	TEMPERED GLASS UNIT
GL-2	1 3/16"	90 MIN FIRE RATED GLASS UNIT
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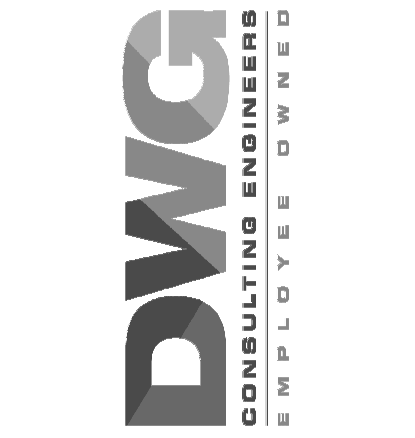
**2** FIRST FLOOR PLUMBING DEMOLITION PLAN  
 PD051 NOT TO SCALE

**GENERAL NOTES**

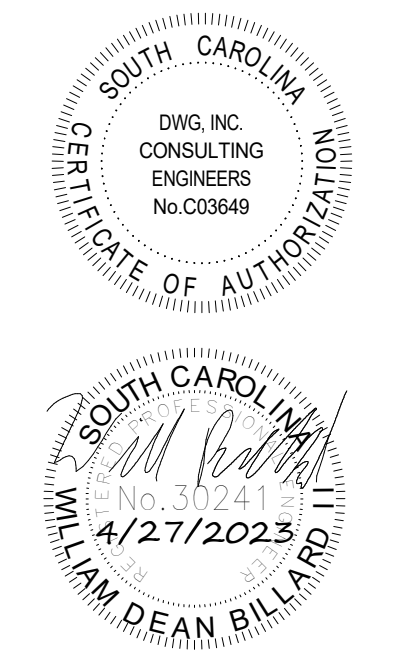
- EXISTING PLUMBING SYSTEM INDICATED IS DIAGRAMMATIC, BASED ON ASSUMPTIONS, AND HAS NOT BEEN FIELD VERIFIED. CONTRACTOR SHALL FIELD VERIFY AND MARK LOCATIONS AND PROVIDE RED-LINE DRAWING FOR SUBMISSION TO THE ENGINEER. NOTIFY A/E IF DISCREPANCY IS DISCOVERED.

**DEMOLITION KEYNOTES**

- CAP SANITARY LINE IN THE WALL AND PATCH WALL FOR NEW FINISHES. CAP DOMESTIC WATER PIPING ABOVE CEILING AND INSTALL SHUT-OFF VALVE ON END. DEMOLISH EXISTING VENT PIPING.
- PLUMBING FOR EXISTING FIXTURES TO REMAIN FOR RECONNECTION. FIELD VERIFY SIZE, LOCATION, INVERT, AND ELEVATION OF EXISTING SANITARY, VENT, AND DOMESTIC WATER PIPING.
- DEMOLISH EXISTING PLUMBING FIXTURE.
- EXISTING PLUMBING FIXTURE TO REMAIN.
- DEMOLISH EXISTING STUB OUT AND ASSOCIATED WATER LINE FOR EXISTING DRINKING FOUNTAIN STUB OUT. CAP SANITARY LINE IN WALL AND DEMOLISH EXISTING DOMESTIC AND VENT PIPING BACK TO MAIN.
- DEMOLISH EXISTING WATER HEATER LOCATED IN MEZZANINE. PREPARE DOMESTIC WATER CONNECTIONS FOR RECONNECTION TO NEW WATER HEATER.
- APPROXIMATE LOCATION OF EXISTING GAS METER. METER AND GAS PIPING TO REMAIN.
- ALL EXISTING STORM DRAIN PIPING TO REMAIN. CONTRACTOR SHALL CLEAR OUT EXISTING ROOF DRAINS AND RELATED PIPING.



REV.	DATE	DESCRIPTION



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 DATE ISSUED FOR: 4/27/23  
 CONSTRUCTION DOCUMENTS

**FIRST FLOOR PLUMBING DEMOLITION PLAN**

**PD051**



PLUMBING SYSTEMS SEISMIC AND WIND REQUIREMENTS

PER IBC-2021/ASCE 7-16

- A. PER THE 2021 INTERNATIONAL BUILDING CODE, MECHANICAL, PLUMBING AND ELECTRICAL EQUIPMENT AND COMPONENTS, INCLUDING THEIR SUPPORTS AND ATTACHMENTS, SHALL BE DESIGNED FOR SEISMIC FORCES IN ACCORDANCE WITH CHAPTER 13 OF ASCE 7-16

PLUMBING COMPONENT IMPORTANCE FACTOR (Ip) DESIGNATION

Ip = 1.0

Ip = 1.5

- ALL PLUMBING COMPONENTS EXCEPT AS LISTED UNDER Ip = 1.5 • NATURAL GAS PIPING & APPURTENANCES

SEISMIC DESIGN CATEGORIES D,E,F

COMPONENT IMPORTANCE FACTOR (Ip)

1.0

1.5

Table with 5 columns: COMPONENT IDENTIFICATION, SEISMIC RESTRAINT REQUIREMENT, NOTES, SEISMIC RESTRAINT REQUIREMENT, NOTES. Rows include ROOF MOUNTED, FLOOR MOUNTED, WALL MOUNTED, COMPONENT SUPPORTS, SUSPENDED EQUIPMENT, SUSPENDED DUCTILE PIPING, SUSPENDED NON DUCTILE PIPING, SUSPENDED PIPE ON TRAPEZE, COMPONENT CERTIFICATION.

NOTES:

- 1. EQUIPMENT 20 LBS. OR LESS IS EXEMPT IF THE COMPONENT IS POSITIVELY ATTACHED TO THE STRUCTURE AND FLEXIBLE CONNECTIONS ARE PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.

GENERAL PLUMBING NOTES

- 1. PROVIDE ALL MATERIALS AND LABOR NECESSARY FOR A COMPLETE PLUMBING SYSTEM. DO NOT SCALE DRAWINGS. OBTAIN ROUGH-IN DIMENSIONS FROM ARCHITECTURAL DRAWINGS OR FROM MANUFACTURERS PRINTED INSTRUCTIONS AND RECOMMENDATIONS ONLY.

PLUMBING SYMBOL LEGEND

Table with 4 columns: SYMBOL, DESCRIPTION, SYMBOL, DESCRIPTION. Includes BACKFLOW PREVENTER, PIPE UP, PIPE REDUCER, PIPE TEE DOWN, HOSE BIBB, VENT THRU ROOF, BALANCING VALVE, ISOLATION VALVE, PIPE DOWN, PIPE STRAIGHT TEE, FLOOR CLEANOUT, FLOOR DRAIN WITH FLOOR SLOPED TO DRAIN, TRAP PRIMER.

PLUMBING PIPING LEGEND

Table with 2 columns: PIPING TYPE, DESCRIPTION. Includes SANITARY AND WASTE PIPING, VENT PIPING, DOMESTIC COLD WATER PIPING, DOMESTIC HOT/TEMPERED WATER PIPING, DOMESTIC HOT/TEMPERED WATER RETURN PIPING.

PLUMBING FIXTURE SCHEDULE

Table with 10 columns: MARK, FIXTURE TYPE, FIXTURE DESCRIPTION, HOT WATER, COLD WATER, WASTE, VENT, MANUFACTURER, MODEL. Rows include FLOOR DRAIN, HOSE BIB, ICE MAKER BOX, FLOOR MOUNTED WATER CLOSET, BREAKROOM SINK WITH DISPOSAL, UNDERMOUNTED LAVATORY, MECHANICAL PUSHBAR ACTUATED WATER COOLER, CORNER MOP SINK.

- 1. PROVIDE STOP VALVES, SUPPLY TUBING, P-TRAPS, ESCUTCHEON PLATES, CARRIERS, ADA COVERS, AND ALL APPURTENANCES FOR COMPLETE INSTALLATION.

ELECTRIC WATER HEATER SCHEDULE

Table with 7 columns: MARK, STORAGE (GALLONS), RECOVERY @ 100°F (GPH), FUEL, MANUFACTURER, MODEL, COMMENTS. Row: WH, 20, 10, ELECTRIC, LOCHINVAR, EJJ-020-FD, 1, 2, 3, 4.

- 1. FACTORY INSTALLED ASME RELIEF VALVE, FOAM INSULATION, UL LISTED ENERGY CUT-OFF, DRAIN VALVE.

HAMMER ARRESTOR SCHEDULE

Table with 5 columns: UNIT I.D., PDI UNIT, FIXTURE UNIT, MANUFACTURER. Rows: HA A, HA B, HA C, HA D, HA E.

PLUMBING ABBREVIATIONS

Table with 2 columns: ABBR, DESCRIPTION. Includes A/C ABOVE CEILING, AFF ABOVE FINISHED FLOOR, AFG ABOVE FINISHED GRADE, BFP BACKFLOW PREVENTER, BV ISOLATION VALVE, C DOMESTIC COLD WATER SUPPLY, FCO FLOOR CLEANOUT, FT FEET, GPH GALLONS PER HOUR, GPM GALLONS PER MINUTE, H DOMESTIC HOT WATER SUPPLY, HA HAMMER ARRESTOR, HB HOSE BIBB, HCP HOT WATER RECIRCULATING PUMP, HR DOMESTIC HOT WATER RETURN, IN WG INCHES WATER GUAGE, S SANITARY/WASTE PIPING, TS TRAP SEAL, U/G UNDERGROUND, V VENT PIPING, VTR VENT THRU ROOF, WCO WALL CLEANOUT, WH WATER HEATER.

HOT WATER RECIRCULATING PUMP

Table with 7 columns: MARK, GPM, HEAD FT W.G., MAX MOTOR HP, MAX. RPM, MANUFACTURER, MODEL. Row: HWRP, 1 GPM, 1.0, 1/40, 2800, BELL & GOSSETT, NBF-8S/LW.

- 1. SEE ELECTRICAL DRAWINGS FOR VOLTAGE INFORMATION.

PLUMBING CODES AND STANDARDS (WITH ALL SOUTH CAROLINA MODIFICATIONS)

Table with 2 columns: CODE, DESCRIPTION. Includes IBC (2021) INTERNATIONAL BUILDING CODE, IECC (2009) INTERNATIONAL ENERGY CONSERVATION CODE, IFGC (2021) INTERNATIONAL FUEL GAS CODE, IPC (2021) INTERNATIONAL PLUMBING CODE.

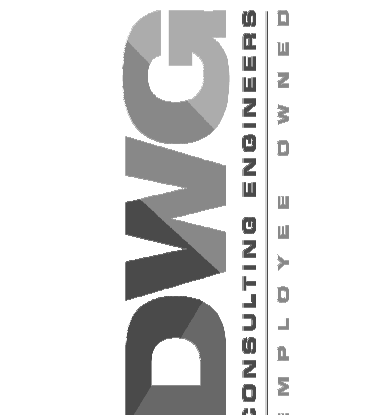
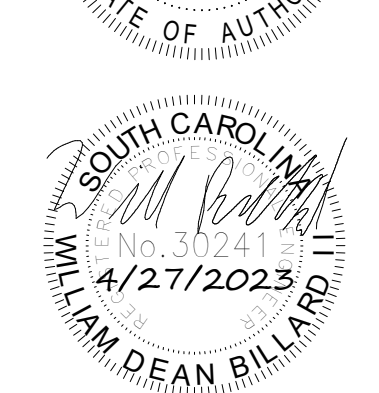
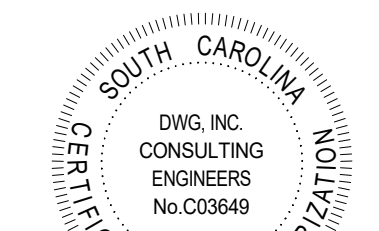


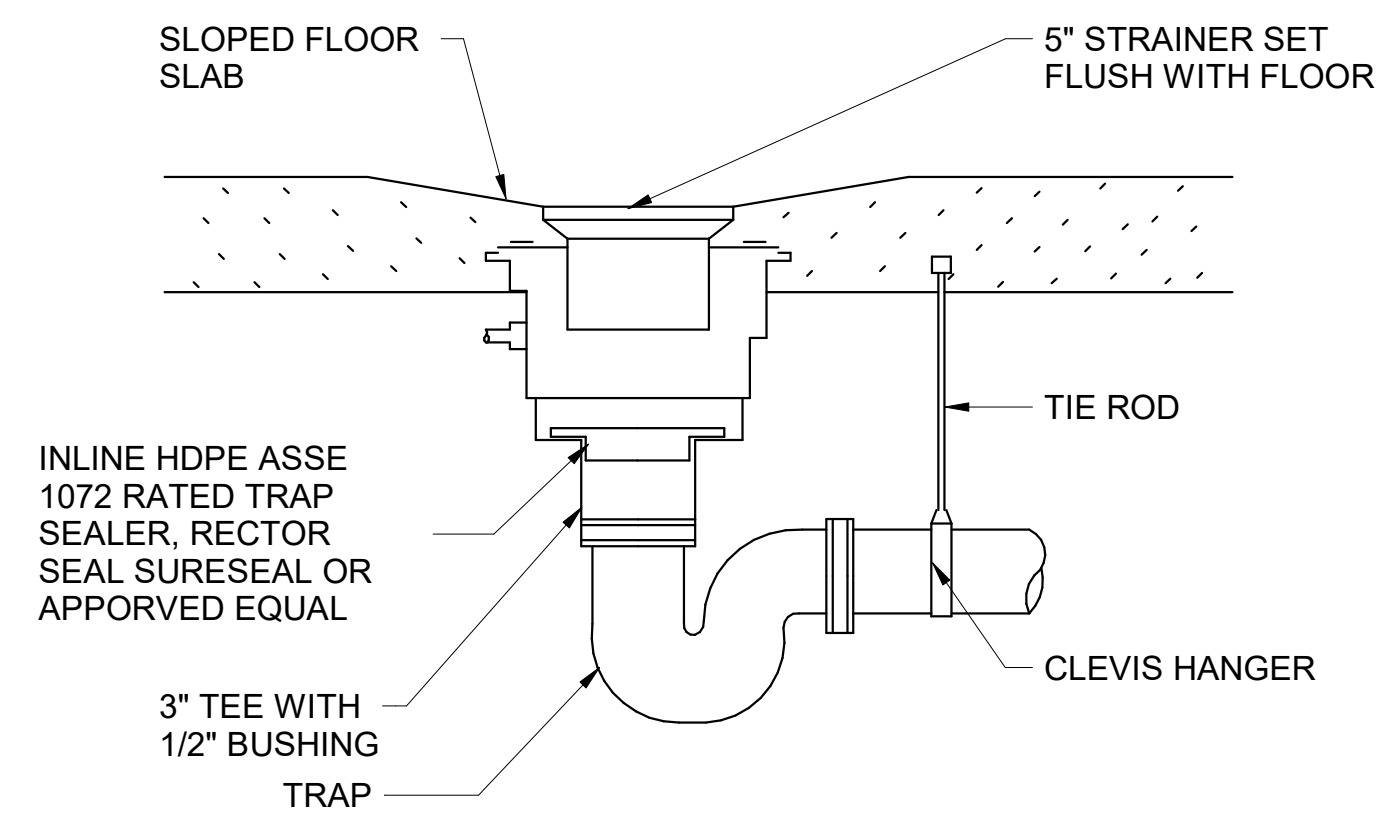
Table with 2 columns: REV. DATE, DESCRIPTION. Empty table for revision tracking.



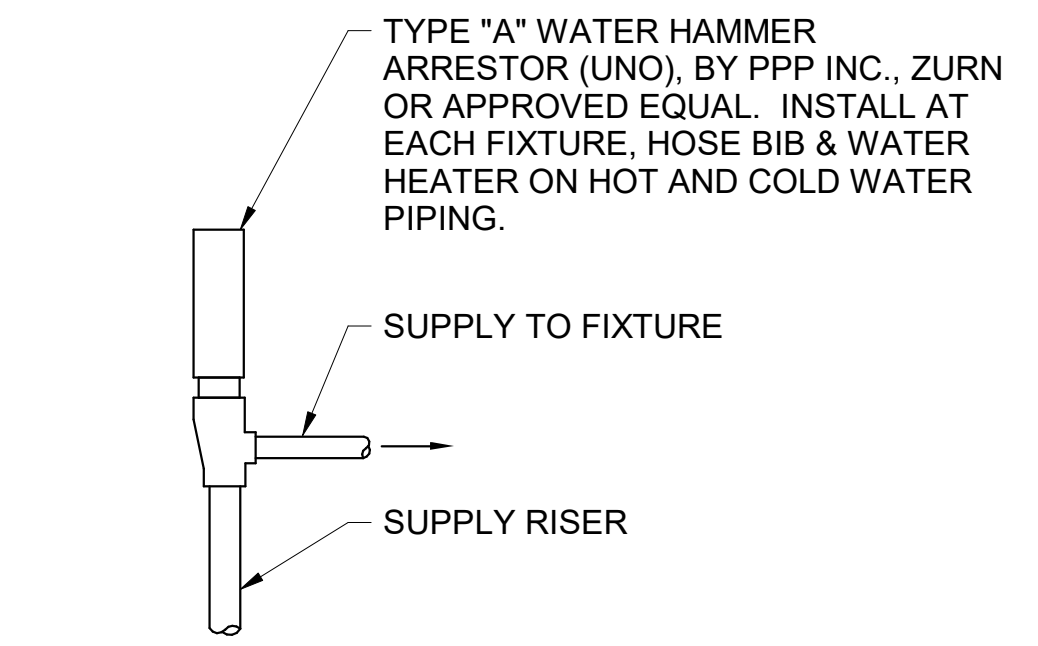
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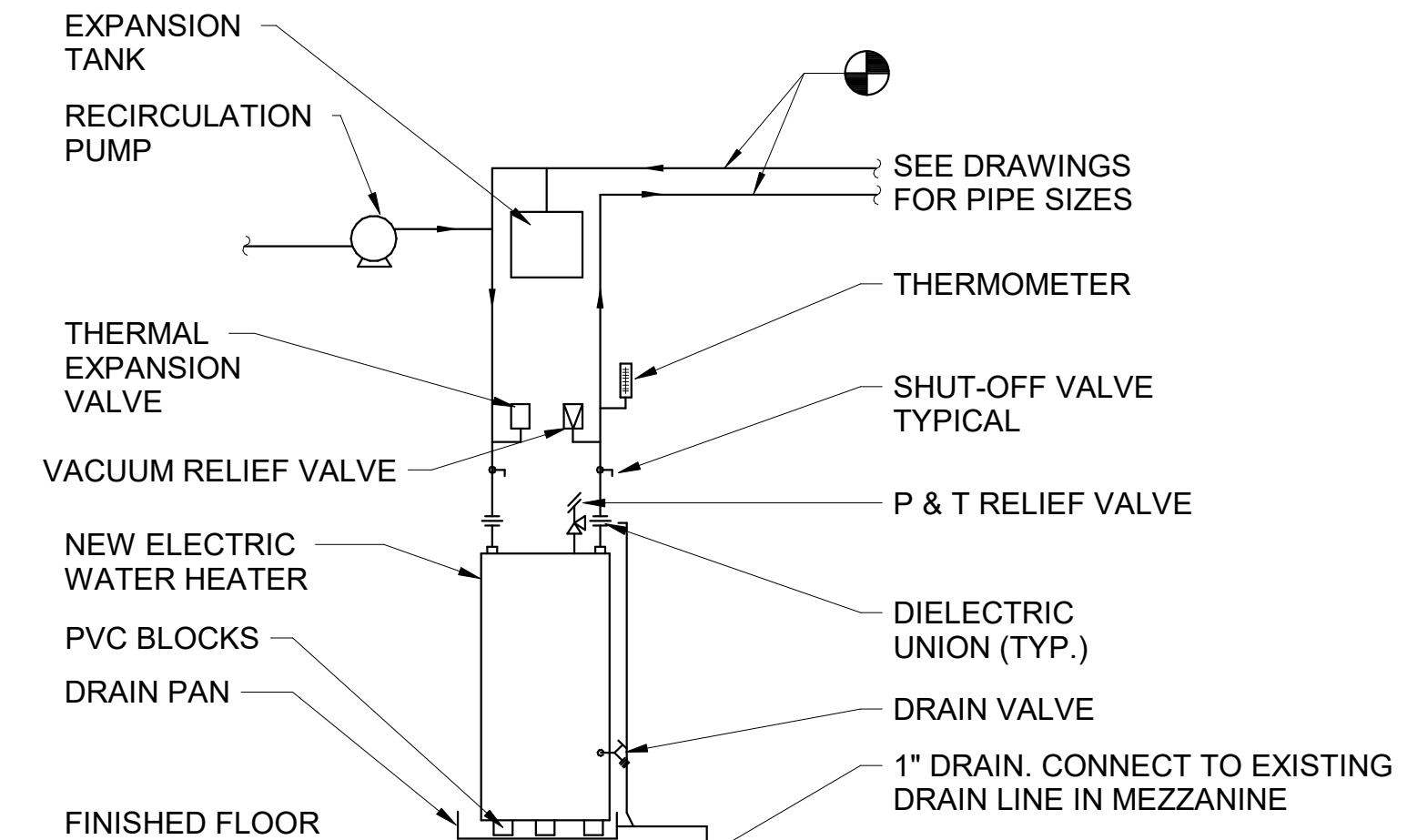
PLUMBING NOTES & LEGENDS



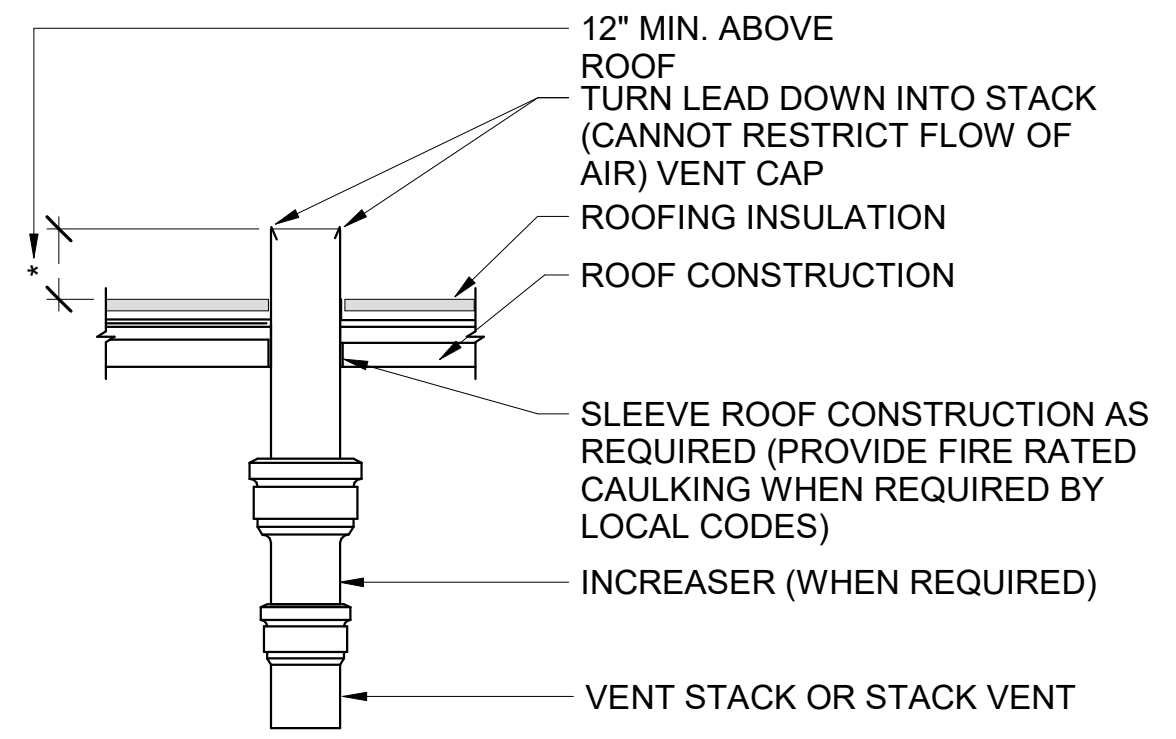
4 FLOOR DRAIN INSTALLATION DETAIL  
P002 NOT TO SCALE



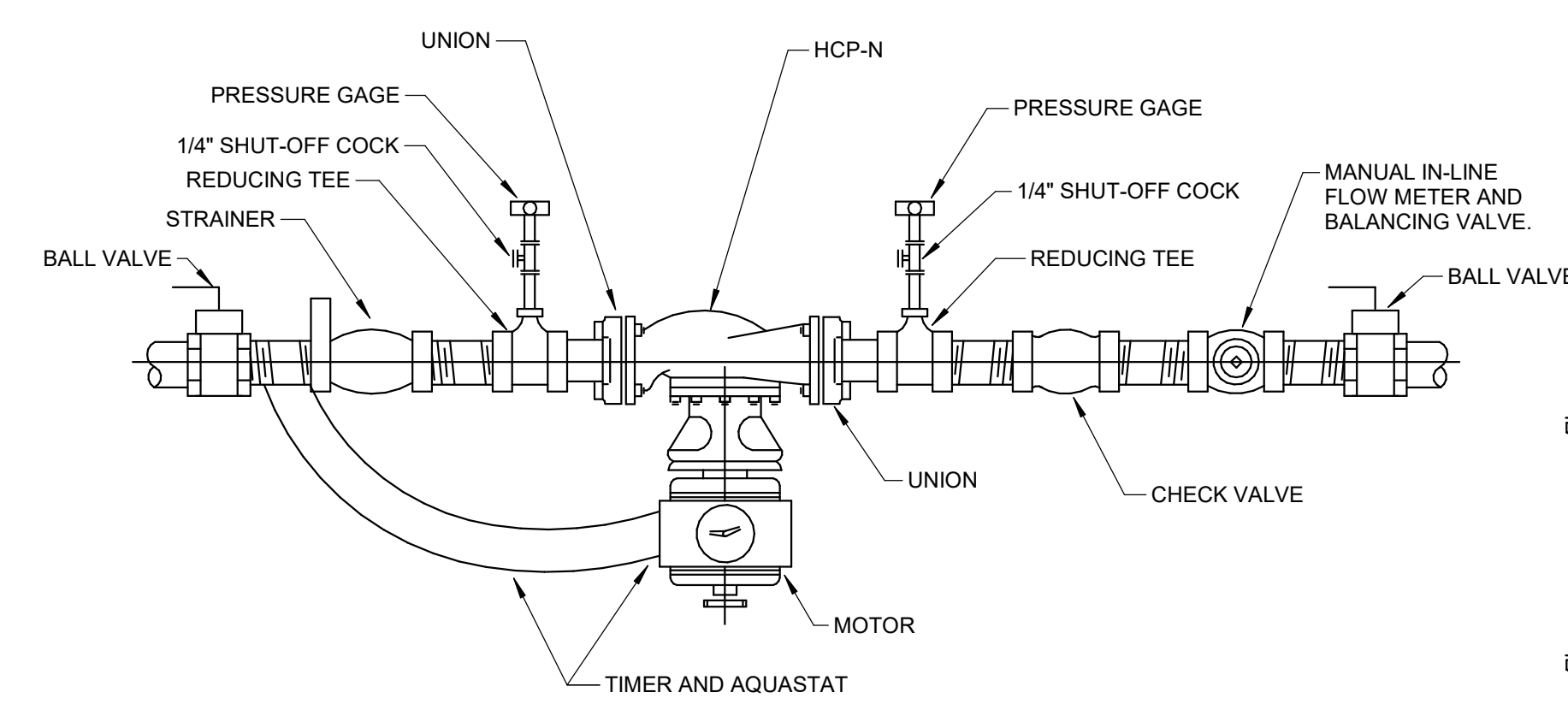
1 WATER HAMMER ARRESTOR DETAIL  
P002 NOT TO SCALE



5 WATER HEATER INSTALLATION DETAIL  
P002 NOT TO SCALE

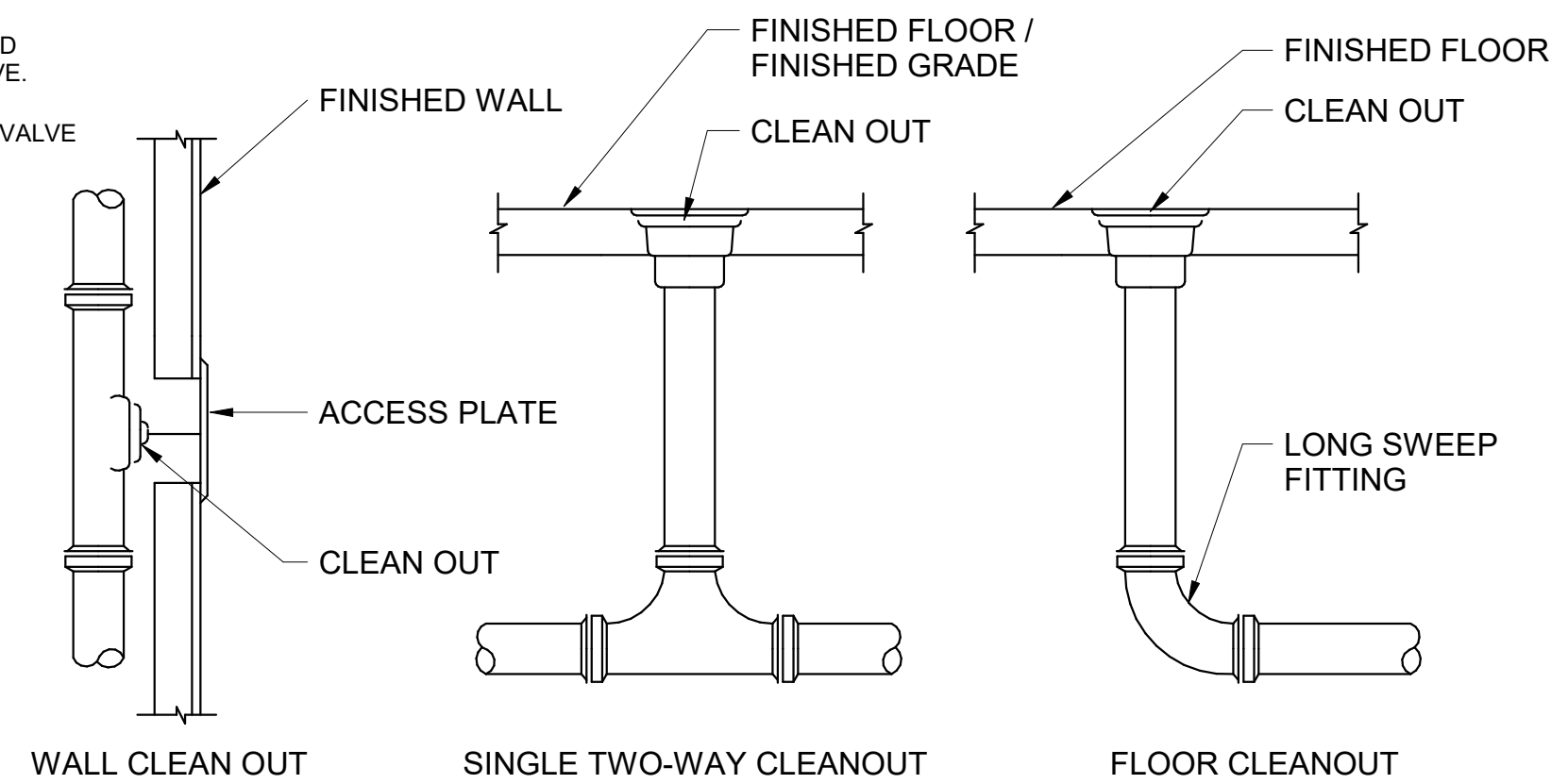


2 VTR DETAIL  
P002 NOT TO SCALE



- NOTE:
1. FACE OF PRESSURE GAUGES TO BE TURNED SO AS TO BE ABLE TO BE READ STANDING AT FLOOR LEVEL.
  2. COORDINATE TIMER SETTINGS WITH ON-SITE MAINTENANCE STAFF.
  3. SET AQUASTAT CONTROL FOR 15°F DROP IN RETURN LINE.

6 IN-LINE CIRCULATING PUMP DETAIL  
P002 NOT TO SCALE



3 CLEANOUT DETAIL  
P002 NOT TO SCALE

REV.	DATE	DESCRIPTION

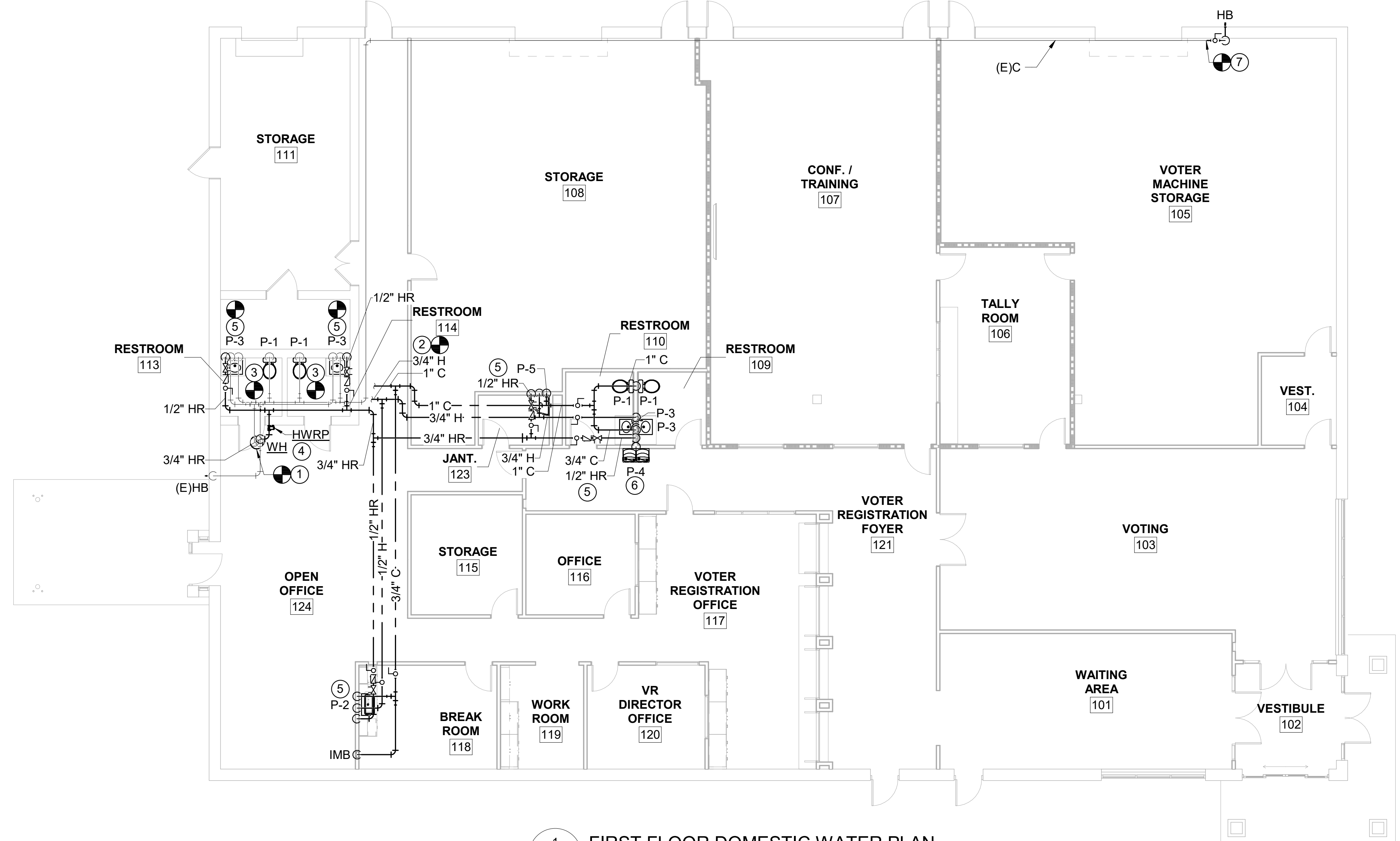


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**PLUMBING DETAILS**





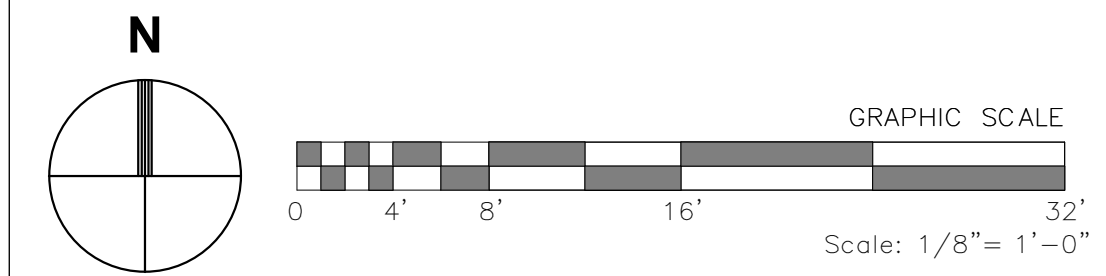
1 FIRST FLOOR DOMESTIC WATER PLAN  
 P101 NOT TO SCALE

GENERAL NOTES

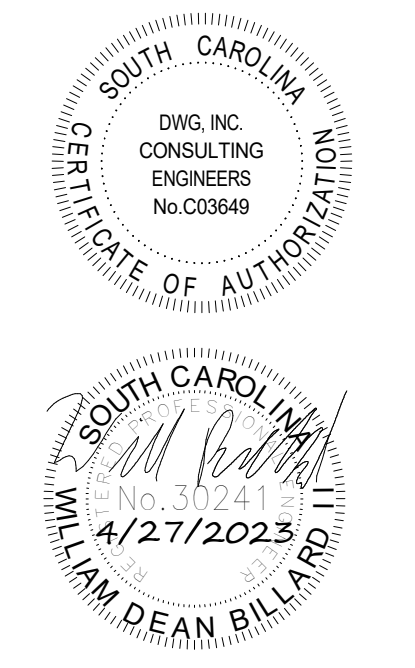
1. FIELD VERIFY SIZES, LOCATION, AND ELEVATIONS OF DOMESTIC WATER PIPING AND EXISTING PLUMBING FIXTURES. NOTIFY A/E IF DISCREPANCY IS DISCOVERED.
2. EXISTING DOMESTIC WATER PIPING IS DIAGRAMMATIC, BASED ON ASSUMPTIONS, AND HAS NOT BEEN FIELD VERIFIED. CONTRACTOR SHALL FIELD VERIFY AND MARK LOCATIONS AND PROVIDE RED-LINE DRAWING FOR SUBMISSION TO THE ENGINEER.

RENOVATION KEYNOTES

1. CONNECT NEW WATER HEATER TO EXISTING DOMESTIC WATER PIPING. INSTALL NEW WATER HEATER AT LOCATION OF EXISTING, ABOVE BATHROOM ON MEZZANINE PLATFORM. FIELD VERIFY LOCATION OF EXISTING WATER HEATER AND DOMESTIC WATER PIPING.
2. CONNECT TO EXISTING DOMESTIC WATER PIPING ABOVE BATHROOM.
3. CONNECT NEW PLUMBING FIXTURES TO EXISTING DOMESTIC PIPING.
4. PROVIDE NEW HOT WATER RECIRCULATION LINE, RECIRCULATION PUMP, AND TIMER & AQUASTAT. SEE DETAIL.
5. PROVIDE BALL VALVE, CHECK VALVE, AND MANUAL BALANCING VALVE ON HOT WATER RETURN PIPING ABOVE ACCESSIBLE CEILING. BALANCE HOT WATER RETURN PIPING FOR 1.0 GPM TO EACH RETURN BRANCH.
6. PROVIDE ACCESSORY CANE APRON FOR DRINKING FOUNTAIN.
7. PROVIDE NEW HOSE BIB AND CONNECT TO EXISTING WATER LINE.



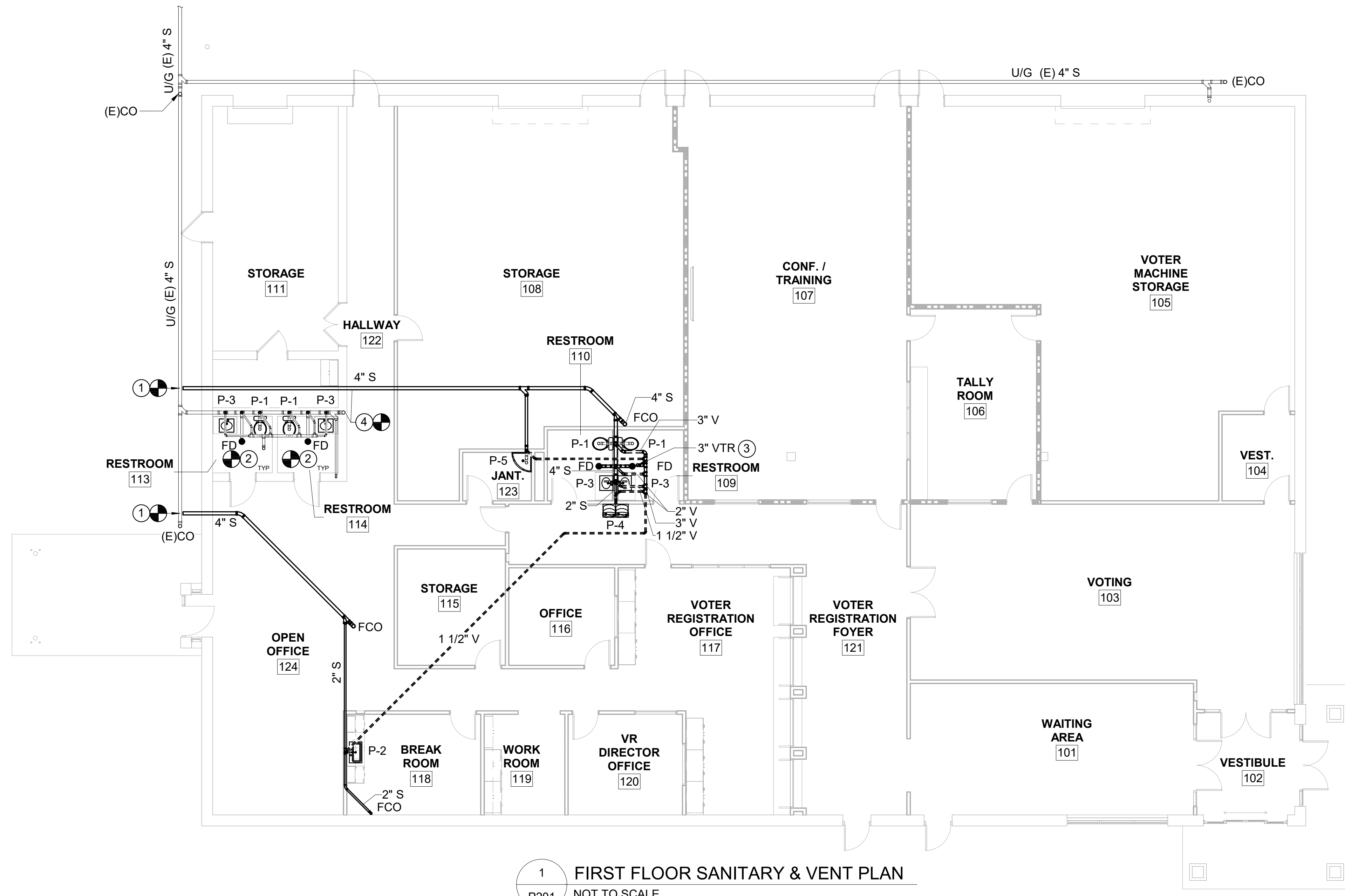
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**FIRST FLOOR DOMESTIC WATER PLAN**



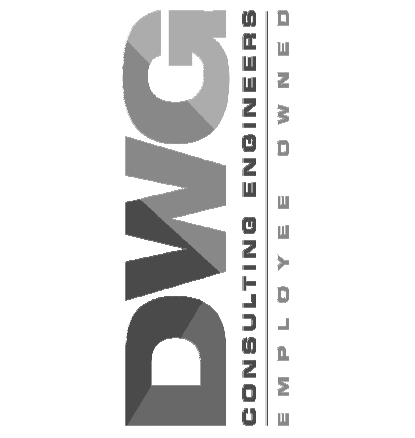
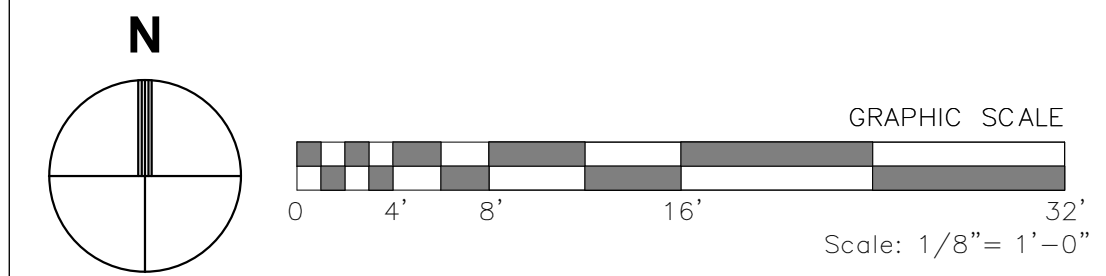
1 FIRST FLOOR SANITARY & VENT PLAN  
 P201 NOT TO SCALE

GENERAL NOTES

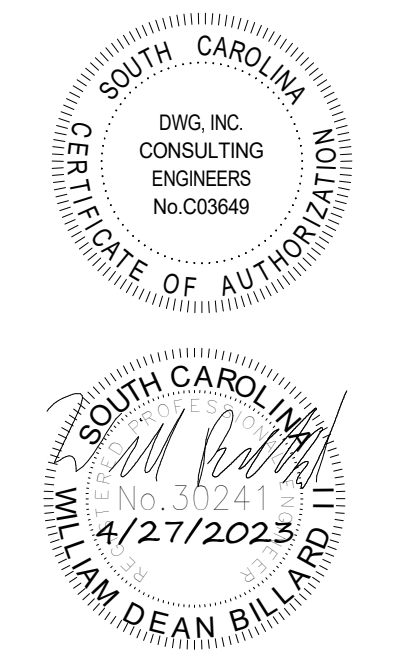
1. FIELD VERIFY SIZES, LOCATION, INVERT AND ELEVATIONS OF SANITARY PIPING AND EXISTING PLUMBING FIXTURES. NOTIFY A/E IF DISCREPANCY IS DISCOVERED.
2. EXISTING SEWER AND VENT IS DIAGRAMATIC, BASED ON ASSUMPTIONS, AND HAS NOT BEEN FIELD VERIFIED. CONTRACTOR SHALL FIELD VERIFY AND MARK LOCATIONS AND PROVIDE RED-LINE DRAWING FOR SUBMISSION TO THE ENGINEER
3. DEMOLISH EXISTING CONCRETE SLAB AND REPLACE AS REQUIRED FOR INSTALLATION OF SANITARY LINES.

RENOVATION KEYNOTES

1. CONNECT TO EXISTING SANITARY LINE OUTSIDE OF THE BUILDING THAT IS ESTIMATED TO BE AT LOCATION SHOWN ON PLAN. NOTIFY A/E IF INVERT OF EXISTING LINE IS TOO SHALLOW FOR CONNECTION OF IF EXISTING LINE IS UNDER 4".
2. CONNECT NEW PLUMBING FIXTURES TO EXISTING SANITARY AND VENT PIPING.
3. ENSURE VTR IS A MINIMUM OF 10 FEET AWAY FROM RTU UNIT INTAKE.
4. FIELD VERIFY SIZE AND LOCATION OF EXISTING WASTE LINE. IF EXISTING LINE IS AT LEAST 4" IN DIAMETER AND MEETS THE REQUIRED SLOPE CONTRACTOR CAN CONNECT NEW 4" SANITARY LINE TO EXISTING AT THIS POINT.



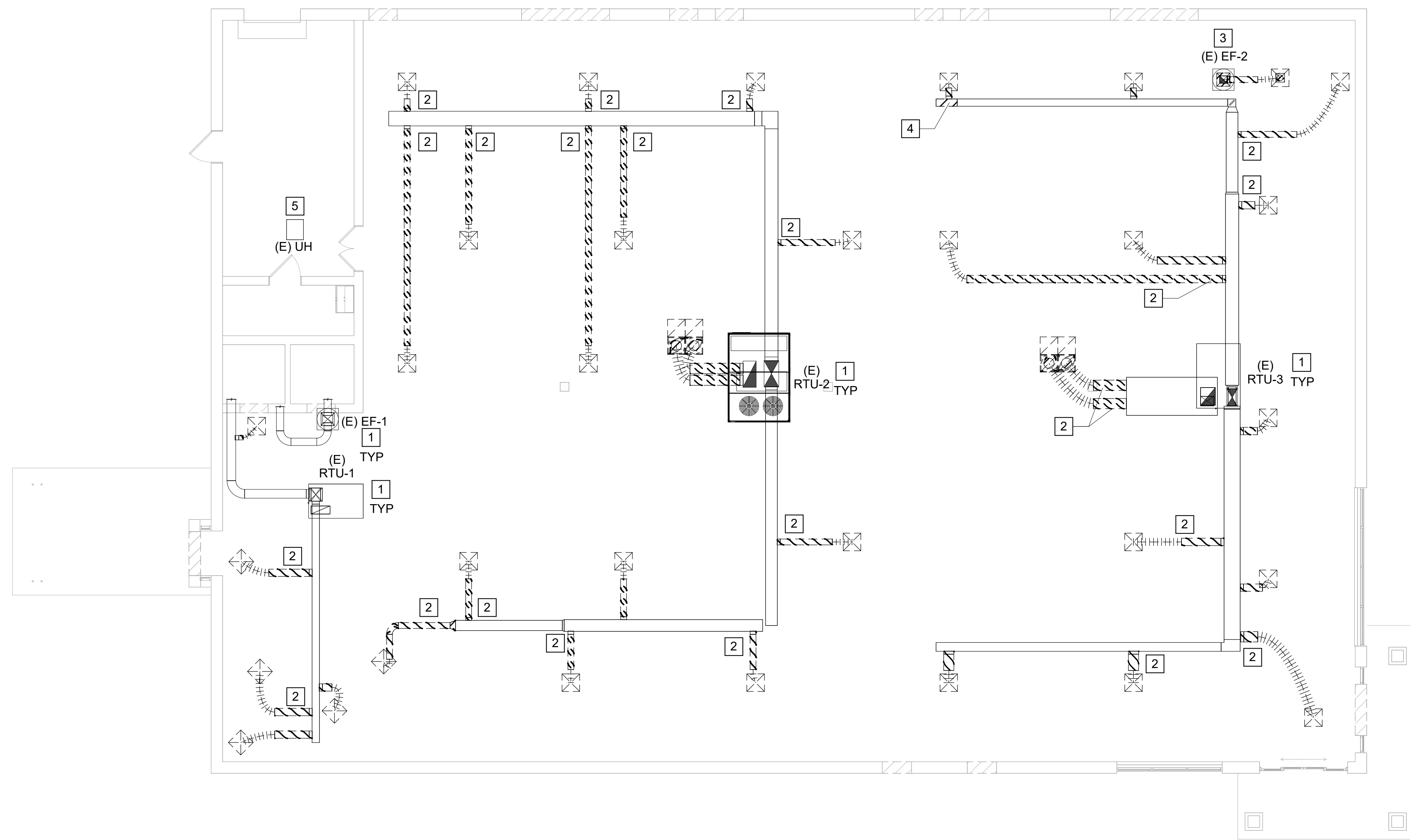
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FIRST FLOOR  
 SANITARY &  
 VENT PLAN



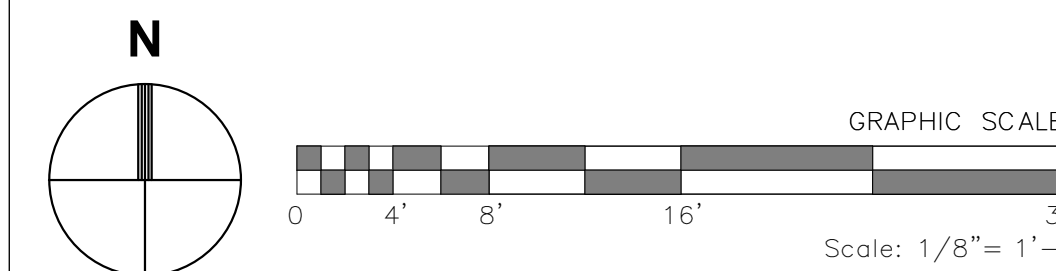
1 FIRST FLOOR HVAC DUCTWORK DEMO PLAN  
 MD051 NOT TO SCALE

### GENERAL NOTES

- EXISTING DUCTWORK AND MECHANICAL SYSTEMS INFORMATION IS BASED UPON ARCHIVE FACILITY DRAWINGS AVAILABLE FOR THIS PROJECT, AND A LIMITED VISUAL INSPECTION BY ENGINEER VIA FACILITY SITE VISIT. CONTACT EOR FOR ANY DEVIATION IN EXISTING CONDITIONS FROM THESE CONTRACT DRAWINGS.

### DEMOLITION KEYNOTES

- DEMOLISH EXISTING AIR DEVICE AND ASSOCIATED DUCTWORK BACK TO THE MAIN. PATCH AND SEAL DUCT MAIN TO MATCH EXISTING UNLESS NOTED OTHERWISE.
- TAP LOCATION TO BE REUSED DURING RENOVATION.
- DEMOLISH EXISTING AIR DEVICE AND ASSOCIATED DUCTWORK. EXHAUST FAN SHALL BE ABANDONED IN PLACE WITH THE DUCTWORK BENEATH THE ROOF DEMOLISHED, CAPPED, SEALED, AND INSULATED.
- CUT AND CAP DUCTWORK TO AVOID CONFLICT WITH NEW FIRE WALL AT BOTER MACHINE STORAGE ROOM #105.
- EXISTING GAS POWERED UNIT HEATER TO REMAIN.



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**FIRST FLOOR  
 MECHANICAL  
 DEMOLITION  
 PLAN**

**MD051**

**MECHANICAL SYSTEMS  
SEISMIC AND WIND REQUIREMENTS  
PER IBC-2021/ASCE 7-16**

- A. PER THE 2021 INTERNATIONAL BUILDING CODE, MECHANICAL, PLUMBING AND ELECTRICAL EQUIPMENT AND COMPONENTS, INCLUDING THEIR SUPPORTS AND ATTACHMENTS, SHALL BE DESIGNED FOR SEISMIC FORCES IN ACCORDANCE WITH CHAPTER 13 OF ASCE 7-16.
- B. EXTERIOR EQUIPMENT (INCLUDING ROOF CURBS, RAILS, SUPPORTS) EXPOSED TO WIND SHALL BE DESIGNED AND INSTALLED TO RESIST THE WIND PRESSURES DETERMINED IN ACCORDANCE WITH CHAPTER 26 TO 29 OF ASCE 7-16.
- C. WHERE DESIGN FOR SEISMIC AND WIND LOADS IS REQUIRED, THE MORE DEMANDING FORCE MUST BE USED.
- D. REFERENCE THE STRUCTURAL DRAWINGS FOR SITE SPECIFIC INFORMATION ON SEISMIC DESIGN CATEGORY, WIND SPEEDS, ETC.
- E. USE THE TABLE BELOW TO DETERMINE SEISMIC RESTRAINT REQUIREMENTS FOR EACH COMPONENT.
- F. FOR ALL COMPONENTS REQUIRING SEISMIC RESTRAINT, THE COMPONENT SUPPORTS AND ATTACHMENTS SHALL BE DESIGNED BY A REGISTERED DESIGN PROFESSIONAL REGISTERED IN THE STATE THE JOB IS LOCATED. SUBMITTALS MUST INCLUDE STAMPED AND SIGNED DRAWINGS AND CALCULATIONS.
- G. WHERE SEISMIC RESTRAINT IS REQUIRED, HOUSEKEEPING PADS NEEDED FOR THE INSTALLATION OF EQUIPMENT UNDER THIS CONTRACT MUST BE DESIGNED BY THE SEISMIC ENGINEER. DO NOT POUR ANY HOUSEKEEPING PADS PRIOR TO THE RECEIPT OF THE APPROVED SEISMIC SUBMITTAL.
- H. SEISMIC RESTRAINTS FOR DUCTWORK, PIPING, CONDUIT, CABLE TRAYS AND BUS DUCT MUST BE SHOWN ON LAYOUT DRAWINGS SHOWING SPECIFIC RESTRAINT LOCATIONS ALONG WITH ACCOMPANYING DETAILS AND CALCULATIONS.

**MECHANICAL COMPONENT IMPORTANCE FACTOR (Ip) DESIGNATION**

Ip = 1.0 Ip = 1.5

- **ALL HVAC COMPONENTS EXCEPT AS NOTED IN Ip=1.5**

**SEISMIC DESIGN CATEGORIES D,E,F**

**COMPONENT IMPORTANCE FACTOR (Ip)**

COMPONENT IDENTIFICATION	SEISMIC RESTRAINT REQUIREMENT	NOTES	1.5	
			SEISMIC RESTRAINT REQUIREMENT	NOTES
ROOF MOUNTED	RESTRAIN ALL	1	RESTRAIN ALL	-
FLOOR MOUNTED	RESTRAIN ALL	1, 2	RESTRAIN ALL	-
WALL MOUNTED	RESTRAIN ALL	1, 2	RESTRAIN ALL	-
COMPONENT SUPPORTS	RESTRAIN ALL	1	RESTRAIN ALL	-
SUSPENDED EQUIPMENT	INLINE W/ DUCT	RESTRAIN IF >75 LBS PROVIDE FLEX. CONN.	RESTRAIN IF >75 LBS PROVIDE FLEX. CONN.	3
	NOT INLINE W/ DUCT/PIPE	RESTRAIN ALL	RESTRAIN ALL	-
SUSPENDED DUCTILE PIPING (STEEL, ALUMINUM, COPPER, ETC.)	>3"	4	>1"	4
SUSPENDED NON DUCTILE PIPING (CAST IRON, PLASTIC, CERAMIC)	RESTRAIN ALL	4	RESTRAIN ALL	4
SUSPENDED PIPE ON TRAPEZE	RESTRAIN IF ANY PIPE ON TRAPEZE > 3" RESTRAIN IF TOTAL WEIGHT OF PIPES ON TRAPEZE >	4	RESTRAIN IF ANY PIPE ON TRAPEZE > 1" RESTRAIN IF TOTAL WEIGHT OF PIPES ON TRAPEZE > 10	4
DUCTWORK	6 SQ.FT. AND LARGER AND >17 LBS/FT	4,5	6 SQ.FT. AND LARGER AND > 17 LBS/FT	4,5
MULTIPLE DUCTS ON TRAPEZE	RESTRAIN IF TOTAL WEIGHT OF DUCTS ON TRAPEZE > 10 LBS/FT	4,5	RESTRAIN IF TOTAL WEIGHT OF DUCTS ON TRAPEZE > 10 LBS/FT	4,3
COMPONENT CERTIFICATION	NOT REQUIRED	-	REQUIRED	6

- NOTES:**
- EQUIPMENT 20 LBS. OR LESS IS EXEMPT IF THE COMPONENT IS POSITIVELY ATTACHED TO THE STRUCTURE AND FLEXIBLE CONNECTIONS ARE PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.
  - RESTRAINTS ARE NOT REQUIRED IF THE COMPONENT WEIGHS 400 LBS. OR LESS, IS MOUNTED WITH THE CENTER OF MASS LOCATED AT 4 FT. OR LESS ABOVE A FLOOR, IS POSITIVELY ATTACHED TO THE STRUCTURE AND HAS FLEXIBLE CONNECTIONS BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING, AND CONDUIT.
  - FLEXIBLE CONNECTIONS REQUIRED FOR PIPE CONNECTIONS ONLY.
  - RESTRAINT IS NOT REQUIRED IF THE PIPING / DUCTWORK IS SUPPORTED BY HANGERS AND EACH HANGER IN THE PIPING RUN IS 12 IN. OR LESS IN LENGTH FROM THE TOP OF THE PIPE TO THE SUPPORTING STRUCTURE. WHERE PIPES ARE SUPPORTED ON A TRAPEZE, THE TRAPEZE SHALL BE SUPPORTED BY HANGERS HAVING A LENGTH OF 12 IN. OR LESS. WHERE ROD HANGERS ARE USED, THEY SHALL BE EQUIPPED WITH SWIVELS, EYE NUTS OR OTHER DEVICES TO PREVENT BENDING IN THE ROD.
  - ALL DUCTWORK, REGARDLESS OF SIZE, DESIGNED TO CARRY TOXIC, HIGHLY TOXIC, OR EXPLOSIVE GASES OR USED FOR SMOKE CONTROL MUST BE RESTRAINED.
  - COMPONENT CERTIFICATION MUST BE SUPPLIED BY THE EQUIPMENT MANUFACTURER AT TIME OF SUBMITTAL FOR REVIEW BY ENGINEER OF RECORD.

**MECHANICAL ABBREVIATIONS**

ABBR	DESCRIPTION
(E)	EXISTING
BHP	BRAKE HORSE POWER
BOD	BASIS OF DESIGN
CFM	CUBIC FEET PER MINUTE
D	HVAC CONDENSATE
DIA	DIAMETER
DRN	DRAIN
EA	EXHAUST AIR
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EH	ELECTRIC HEATER
ESP	EXTERNAL STATIC PRESSURE
FD	FIRE DAMPER
FPM	FEET PER MINUTE
FT	FEET
HP	HORSEPOWER
IN	INCHES
MBH	THOUSANDS OF BTU'S PER HOUR
MC	MECHANICAL CONTRACTOR
MD	MANUAL DAMPER
NC	NOISE CRITERIA
OA	OUTSIDE AIR
PC	PLUMBING CONTRACTOR
RA	RETURN AIR
RH	RELATIVE HUMIDITY
RPM	ROTATIONS PER MINUTE
RTU	ROOF TOP UNIT
SA	SUPPLY AIR
TYP	TYPICAL
UH	UNIT HEATER
UNO	UNLESS NOTED OTHERWISE
W/	WITH
WMS	WIRE MESH SCREEN
*F	DEGREES FAHRENHEIT

**HVAC SYMBOL LEGEND**

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	AIR TERMINAL TAG, X=TYPE MARK, Y=CFM	---	COMPONENT TO BE DEMOLISHED
	AIR TERMINAL DIFFUSER (CEILING MOUNTED)		DUCTWORK (X" = WIDTH, Y" = HEIGHT)
	AIR TERMINAL RETURN GRILLE (CEILING MOUNTED)		TURNING VANES
	AIR TERMINAL EXHAUST GRILLE (CEILING MOUNTED)		ROOFTOP UNIT
	MANUAL DAMPER	+++++	PREINSULATED FLEXIBLE DUCT
	FLEXIBLE DUCT CONNECTION	— FD	FIRE DAMPER
	CONNECTION TO EXISTING SYSTEM		DUCT MOUNTED SMOKE DETECTOR (BY E.C.)

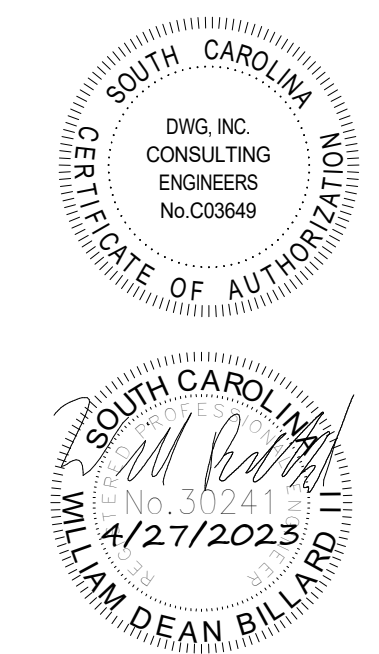
**MECHANICAL CODES AND STANDARDS  
(WITH ALL SOUTH CAROLINA MODIFICATIONS)**

CODE	DESCRIPTION
IBC (2021)	INTERNATIONAL BUILDING CODE
IECC (2009)	INTERNATIONAL ENERGY CONSERVATION CODE
IMC (2021)	INTERNATIONAL MECHANICAL CODE
NFPA 90A (2021)	STANDARD FOR THE INSTALLATION AIR-CONDITIONING & VENTILATING SYSTEMS
SMACNA (2005)	HVAC DUCT CONSTRUCTION STANDARDS MANUAL, THIRD EDITION

**GENERAL HVAC NOTES**

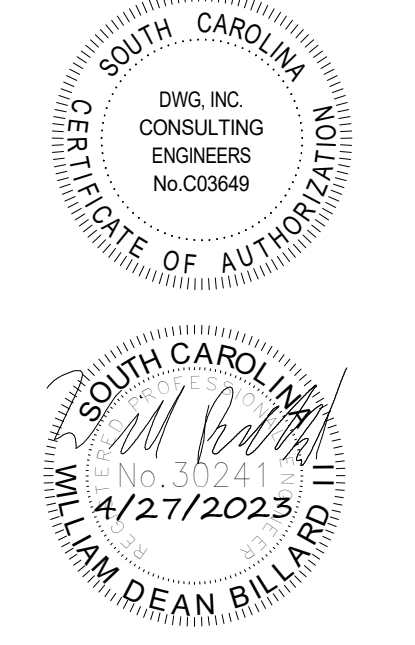
- THE DRAWINGS SHOW THE GENERAL ARRANGEMENT AND LOCATION OF EQUIPMENT, DUCTWORK, PIPING, ETC. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING THE MECHANICAL INSTALLATION W/ THE STRUCTURE AND OTHER TRADES AND SHALL PROVIDE ADDITIONAL OFFSETS AND FITTINGS AS NECESSARY.
- COORDINATE WORK WITH AUTHORITY HAVING JURISDICTION AND OBTAIN ALL PERMITS AND INSPECTIONS.
- PROVIDE OWNER WITH CERTIFICATES OF FINAL INSPECTION AND ACCEPTANCE FROM AUTHORITY HAVING JURISDICTION.
- THE HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS SHALL COMPLY WITH THE THE CODES LISTED ON THIS SHEET AS WELL AS ALL LOCAL CODE OFFICIAL REQUIREMENTS. IN THE EVENT OF A CONFLICT BETWEEN CODES, THE MOST STRINGENT SHALL ALWAYS GOVERN.
- DUCT DIMENSIONS ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS.
- THE CONTRACTOR SHALL CHECK AND VERIFY ALL CLEARANCES PRIOR TO FABRICATION OR INSTALLATION OF EQUIPMENT, DUCTWORK, AND PIPING SYSTEMS. WHERE CONDITIONS REQUIRE A CHANGE IN DUCT OR PIPE ROUTING, NOTIFY THE ARCHITECT FOR AN ACCEPTABLE ALTERNATIVE METHOD. AVOID ROUTING DUCTWORK DIRECTLY OVER LIGHT FIXTURES, DIFFUSERS, AND OTHER CEILING MTD. DEVICES. LOCATE ALL MECHANICAL EQUIPMENT SO THAT FILTERS AND COMPONENTS REQUIRING ACCESS (SERVICE AND MAINTENANCE) ARE FULLY ACCESSIBLE.
- PROVIDE CURVED RADIUS ELBOW AT FIRST SUPPLY & RETURN FITTING FOR ALL HVAC UNITS. PROVIDE TURNING VANES IN ALL 90 DEGREE ELBOWS IN ALL RECTANGULAR SUPPLY/RETURN/EXHAUST DUCT SYSTEMS. ANY OFFSETS REQUIRED IN DUCT SYSTEMS SHALL BE INSTALLED PER SMACNA 2005 3RD EDITION MANUAL. SHARP ANGLED TRANSITIONS OR OFFSETS 'WILL NOT BE ALLOWED'. PROVIDE DUCT ACCESS DOORS AS REQUIRED.
- INSTALL ALL DUCT MOUNTED DEVICES (DAMPERS, ACCESS DOORS, ETC.) AND PIPING SPECIALTIES IN EASILY ACCESSIBLE LOCATIONS. ADVISE THE ARCHITECT IN ADVANCE OF INSTALLATION IF ACCESS WILL BE HINDERED SO AN ALTERNATE LOCATION CAN BE SELECTED.
- ALL DUCT TAKE-OFFS SHALL BE INSTALLED AS SHOWN BY DETAILS ON THE PLANS WITH A MANUAL BALANCING DAMPER AT EVERY TAKE-OFF. WHERE DUCT RUN-OUT SIZE IS NOT SHOWN PROVIDE DUCT SAME SIZE AS GRILLE NECK SIZE. PRE-INSULATED FLEXIBLE DUCT MAY BE USED FOR FINAL CONNECTION TO SUPPLY GRILLES (MAX. LENGTH 5').
- ALL MECHANICAL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTALLATION INSTRUCTIONS WITH PRESCRIBED CLEARANCES FOR SERVICE AND MAINTENANCE. THE CONTRACTOR SHALL NOTIFY THE ARCHITECT IF RECOMMENDED CLEARANCES ARE NOT POSSIBLE BEFORE INSTALLING EQUIPMENT.
- ALL ROTATING MECHANICAL EQUIPMENT SHALL BE PROVIDED WITH VIBRATION ISOLATION. PROVIDE FLEXIBLE NEOPRENE DUCT CONNECTORS BETWEEN DUCTWORK AND ISOLATED MECHANICAL EQUIPMENT.
- THE CONTRACTOR SHALL FIRESTOP ALL PENETRATIONS OF FIRE RATED WALLS/FLOORS/CEILINGS BY DUCTWORK PIPING, ETC., WITH U.L. LISTED FIRE STOPPING MATERIAL TO MAINTAIN FIRE RATING OF THE BARRIER.
- SEISMIC PROTECTION OF EQUIPMENT, DUCTWORK, PIPING AND UTILITIES SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 16 OF THE INTERNATIONAL BUILDING CODE, 2018 EDITION. ALL SEISMIC RESTRAINT AND BRACING SHALL BE SUBSTANTIATED BY MANUFACTURER'S SUBMITTALS PER THE SPECIFICATIONS. FOR ADDITIONAL INFORMATION, SEE "MECHANICAL SYSTEMS SEISMIC AND WIND REQUIREMENTS" ON THIS SHEET. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATING INSTALLATION OF SEISMIC BRACING DEVICES WITH THE OWNER'S SEISMIC SPECIAL INSPECTOR. PROVIDE A MINIMUM OF SEVEN DAYS ADVANCE NOTICE OF INSTALLATION.
- BALANCE ALL AIR DISTRIBUTION DEVICES, EXHAUST FANS, AND OUTSIDE AIR QUANTITIES AS SCHEDULED OR SHOWN ON THE DRAWINGS. PROVIDE MARKERS AT ALL DAMPER LOCATIONS SHOWING FULL OPEN/CLOSED POSITIONS AND DAMPER SETTING FOR REQUIRED AIRFLOW. PROVIDE FINAL TEST AND BALANCE REPORT ALONG W/ SCHEMATIC DRAWINGS SHOWING DIFFUSER LOCATION W/ DESIGN AND ACTUAL CFM. THE DIFFUSER TAGS ON THE DRAWINGS SHALL CORRESPOND TO THE DIFFUSER TAGS ON THE REPORT. THIS REPORT SHALL BE SUBMITTED BEFORE THE FINAL INSPECTION IS PERFORMED. SEE SPECIFICATIONS FOR FURTHER INFORMATION.
- ALL CONTROL WIRING, CONDUIT AND CONTROLS ACCESSORIES NECESSARY TO IMPLEMENT THE OUTLINED SEQUENCES OF OPERATION SHALL BE PROVIDED BY THE CONTROLS CONTRACTOR.
- WIND LOAD PROTECTION OF ROOF MOUNTED EQUIPMENT AND DUCTWORK SHALL BE PROVIDED IN ACCORDANCE WITH SECTION 16 OF THE INTERNATIONAL BUILDING CODE, 2018 EDITION. ALL WIND LOAD RESTRAINT AND BRACING SHALL BE SUBSTANTIATED BY MANUFACTURER'S SUBMITTALS PER THE SPECIFICATIONS.
- ALL EXPOSED PIPING AND DUCTWORK SHALL BE PAINTED. COORDINATE W/ ARCHITECTURAL PLANS/SPECIFICATIONS FOR EXPOSED LOCATIONS AND PAINTING REQUIREMENTS.
- SEE ARCHITECTURAL DOCUMENTS FOR ROOF PENETRATION AND FLASHING REQUIREMENTS.
- WHERE "APPROXIMATELY" IS USED TO DEFINE INSTALLATION LOCATIONS, CONTRACTOR SHALL COORDINATE WITH ALL OTHER TRADES TO VERIFY THERE ARE NO CONFLICTS PRIOR TO INSTALLATION AT DIMENSION LISTED.

REV.	DATE	DESCRIPTION





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**COLLETON COUNTY VOTER REGISTRATION CENTER**  
COLLETON COUNTY  
72 BELLS HWY  
WALTERBORO, SC 29488

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JOB NUMBER: 22123  
PROJECT MGR.:  
DRAWN BY: FMS  
CHECKED BY: WDB  
APPROVED BY: WDB  
DATE ISSUED FOR: 4/27/23  
CONSTRUCTION DOCUMENTS

**MECHANICAL SCHEDULES AND DETAILS**

AIR DISTRIBUTION SCHEDULE						
TAG	MOUNTING TYPE	NECK SIZE	FACE SIZE	DESCRIPTION	BASIS OF DESIGN	MODEL
Supply Air						
A	CEILING LAY-IN	6"	24"X24"	PLAQUE FACE SUPPLY DIFFUSER	PRICE	ASCD
B	CEILING LAY-IN	8"	24"X24"	PLAQUE FACE SUPPLY DIFFUSER	PRICE	ASCD
C	CEILING LAY-IN	10"	24"X24"	PLAQUE FACE SUPPLY DIFFUSER	PRICE	ASCD
D	CEILING LAY-IN	12"	24"X24"	PLAQUE FACE SUPPLY DIFFUSER	PRICE	ASCD
Return Air						
R1	CEILING LAY-IN	22"X22"	24"X24"	PERFORATED FACE RETURN GRILLE	PRICE	10
Exhaust Air						
R2	CEILING LAY-IN	22"X22"	24"X24"	PERFORATED FACE RETURN GRILLE	PRICE	10

1. COORDINATE EXACT LOCATION OF AIR DISTRIBUTION DEVICES AND CEILING TYPE WITH ARCHITECTURAL REFLECTED CEILING PLAN.  
2. ALL AIR DISTRIBUTION DEVICES SHALL BE ALUMINUM CONSTRUCTION AND SHALL HAVE BAKED ENAMEL WHITE FINISH UNLESS NOTED OTHERWISE.  
3. ALL CEILING DIFFUSERS SHALL BE 4-WAY BLOW UNLESS OTHERWISE NOTED. RUNOUT SIZE SHALL MATCH DIFFUSER NECK SIZE UNLESS OTHERWISE NOTED.

LOUVER SCHEDULE							
MARK	AIR VELOCITY	CFM	DIMENSION FREE AREA	DIMENSION WIDTH	DIMENSION HEIGHT	BASIS OF DESIGN	MODEL
L-1 OUT	558 FPM	200	0.36 SF	12"	12"	RUSKIN	ELF6375DXD

1. EXTRUDED ALUMINUM, MILL FINISH, FLATTENED EXPANDED ALUMINUM BIRDSCREEN (MOUNTED DON INSIDE REAR OF LOUVER), EXTENDED SILL, LOUVER COLOR TO BE SELECTED BY ARCHITECT AND OWNER.

EXISTING ROOFTOP UNIT SCHEDULE					
SYMBOL	TOTAL	O/A (MIN)	NATURAL GAS IN (MBH)	MANUFACTURER	BASIS OF DESIGN
RTU-1	1200	90	80	RHEEM	EXISTING RRNL-B036JK08E
RTU-2	6000	500	180	ICP	EXISTING RGS180HDA0AATA---
RTU-3	5000	620	0	ICP	EXISTING RAS150H0CA0AAA---

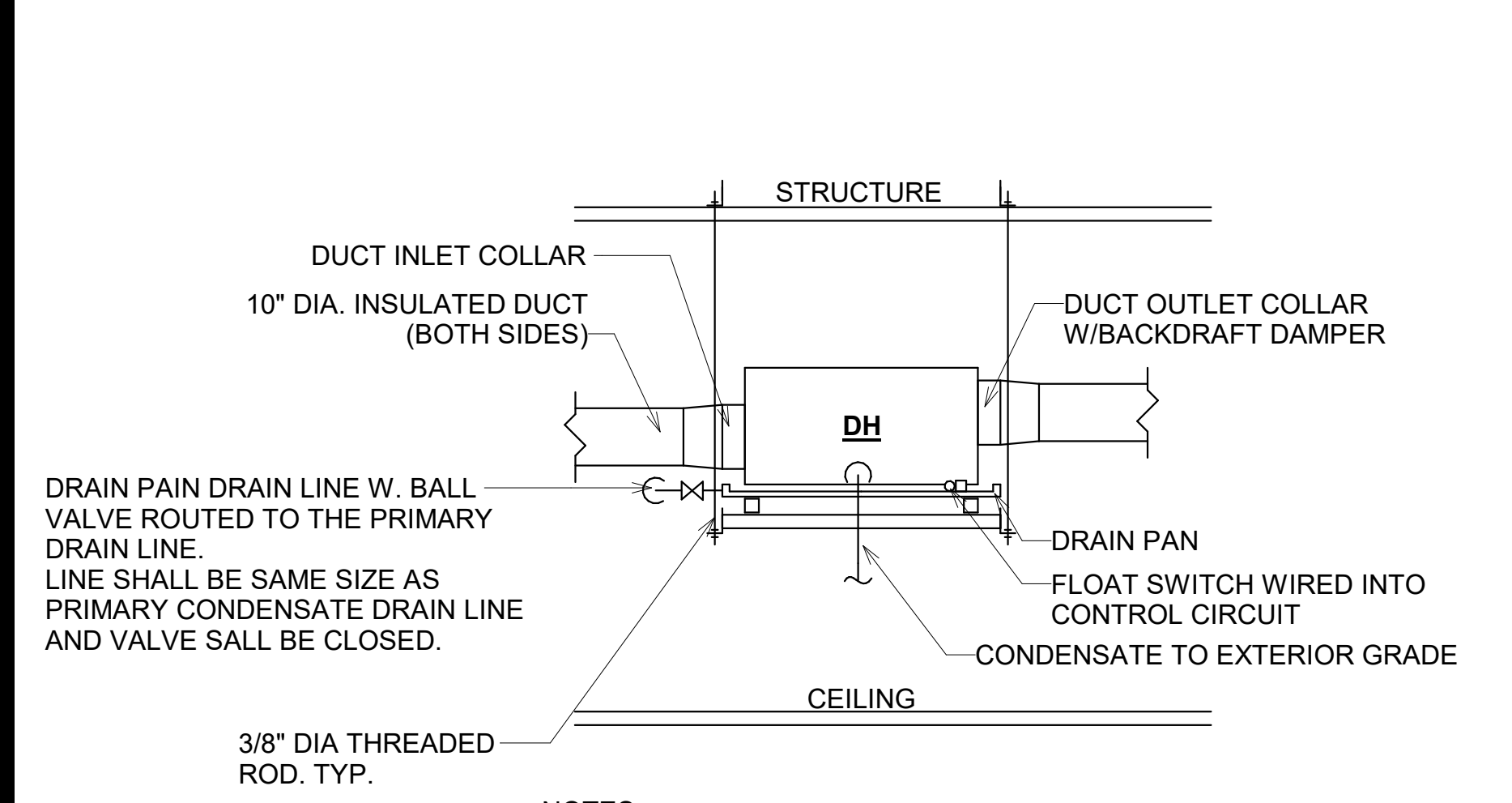
1. CONTRACTOR SHALL PROVIDE NEW OUTSIDE AIR HOOD FOR EXISTING RTU-1, 2, & 3 AND BALANCE TO SCHEDULED CFM.

DEHUMIDIFIER UNIT SCHEDULE				
MARK	MANUFACTURER	MODEL	CFM	E.S.P. IN. W.G.
DH-1	CARRIER	DEHXXCDA1095	230	0.2
DH-2	CARRIER	DEHXXCDA1095	230	0.2
DH-3	CARRIER	DEHXXCDA1095	230	0.2

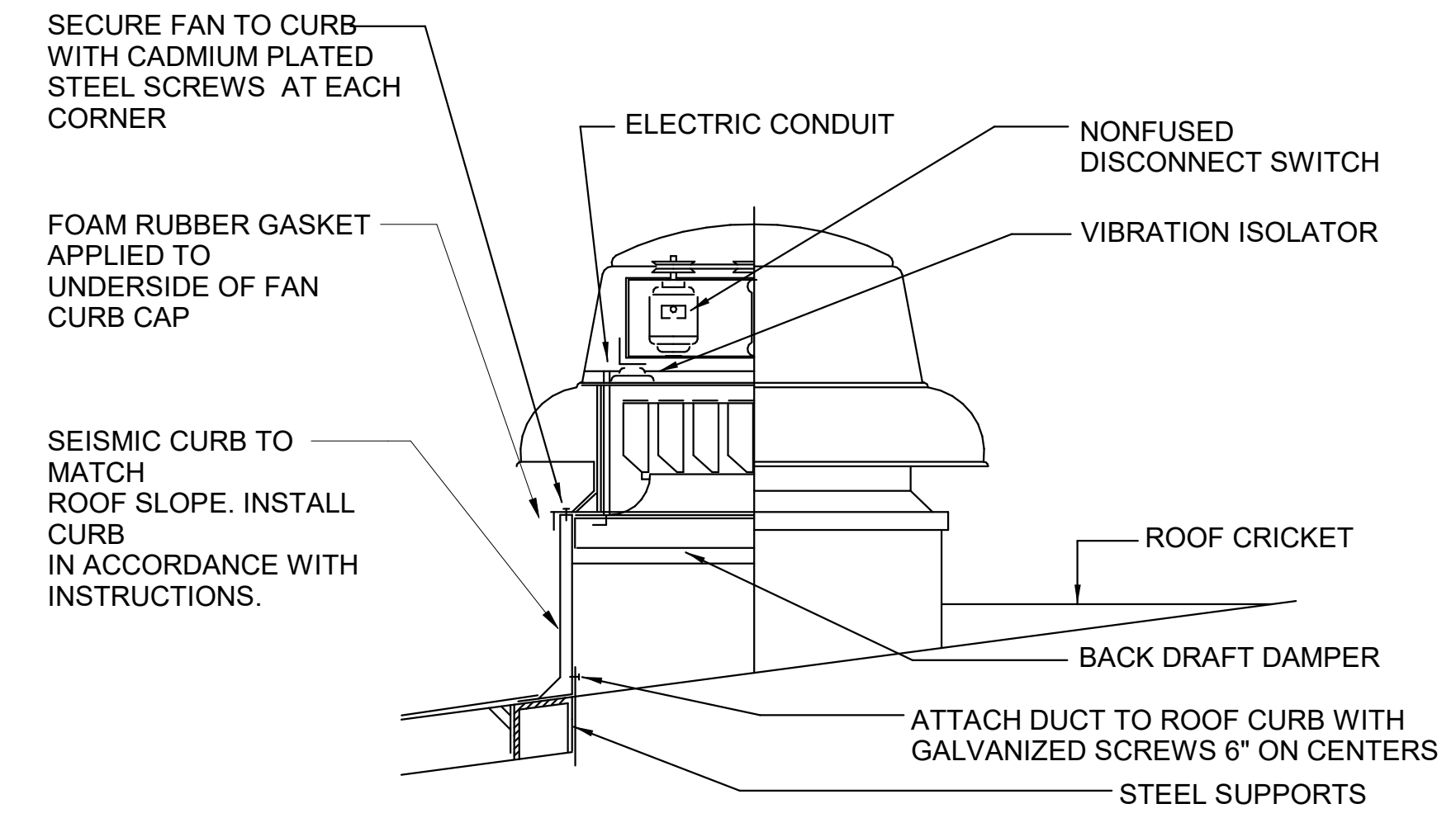
1. SEE ELECTRICAL DRAWINGS FOR VOLTAGE REQUIREMENTS. UNIT SHALL BE HARD WIRED.  
2. PROVIDE DRAIN PAN AND INSTALL PER MANUFACTURERS INSTRUCTIONS.

FAN SCHEDULE									
TAG	CAPACITY CFM	ESP INCHES WG	MOTOR (W)	MAXIMUM SOUND RATING (SONES)	TYPE	SYSTEM SERVED	FAN CONTROL	BASIS OF DESIGN	MODEL
EF-3	75	0.25	6	2.1	CEILING	RESTROOM	OCCUPANCY SENSOR	GREENHECK	SP-A50-90-VG
EF-4	75	0.25	6	2.1	CEILING	RESTROOM	OCCUPANCY SENSOR	GREENHECK	SP-A50-90-VG
EF-5	50	0.25	6	1.2	CEILING	JANT.	OCCUPANCY SENSOR	GREENHECK	SP-A50-90-VG

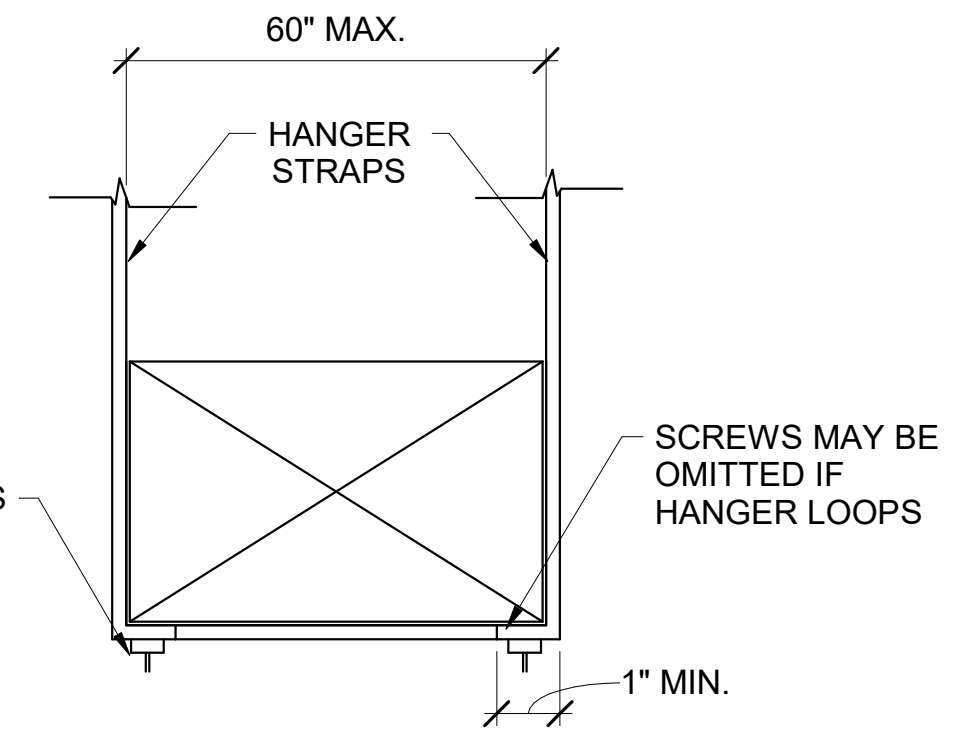
1. REFER TO ELECTRICAL DRAWINGS FOR MORE INFORMATION.  
2. EXHAUST FAN SHALL BE PROVIDED WITH INTEGRAL BACKDRAFT DAMPER, SPEED CONTROLLER AND SINGLE POINT POWER CONNECTION WITH INTEGRAL DISCONNECT.



- NOTES:
- ALLOW SUFFICIENT CLEARANCE FOR FILTER REMOVAL AND TO SERVICE THE SIDE OF THE UNIT.
  - PROVIDE DRAIN PAN.
  - INSTALL PER MANUFACTURERS INSTRUCTIONS.
  - UNIT SHALL BE HARD WIRED.

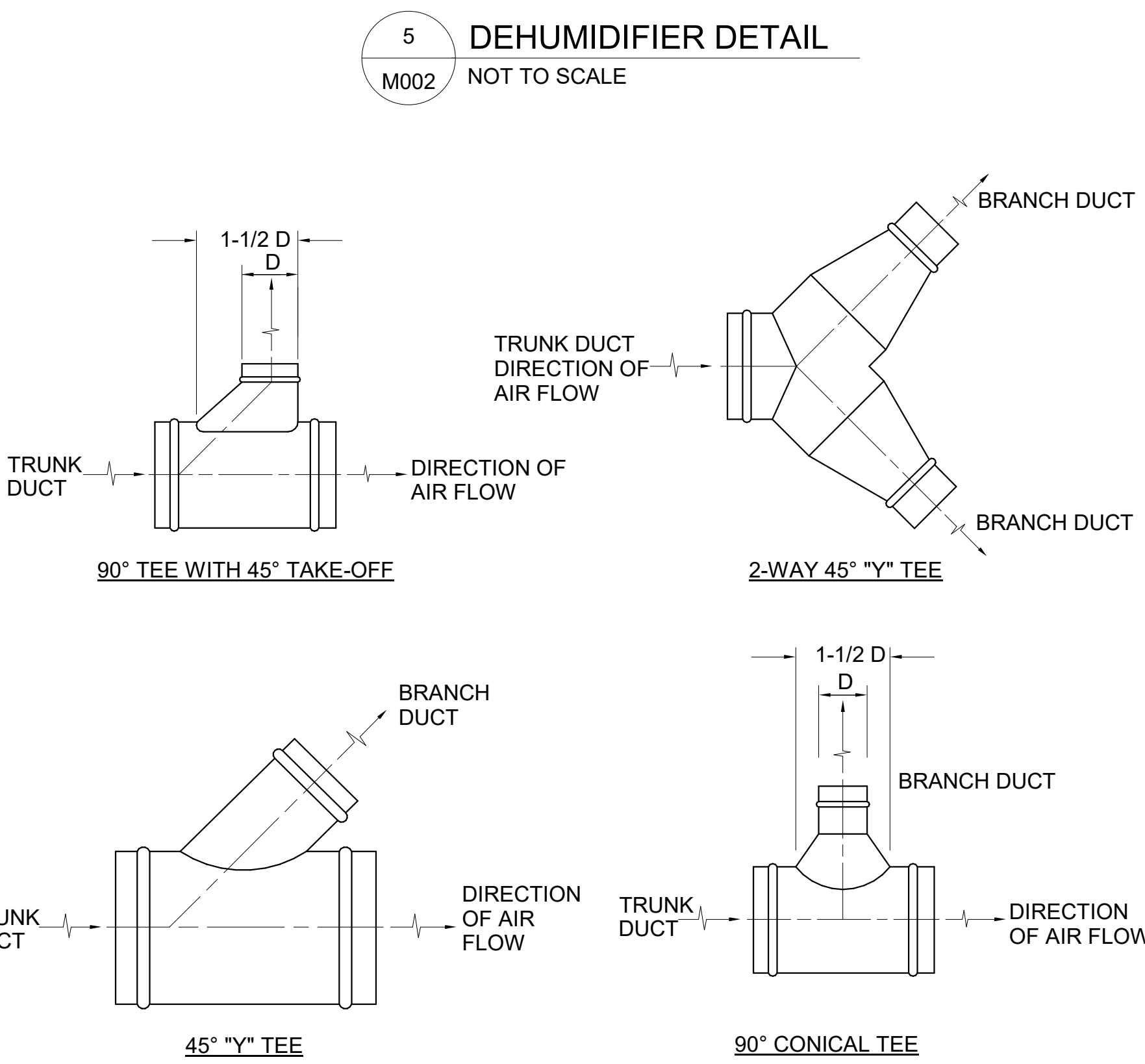


**3 ROOF EXHAUST FAN INSTALLATION DETAIL**  
M002 NOT TO SCALE

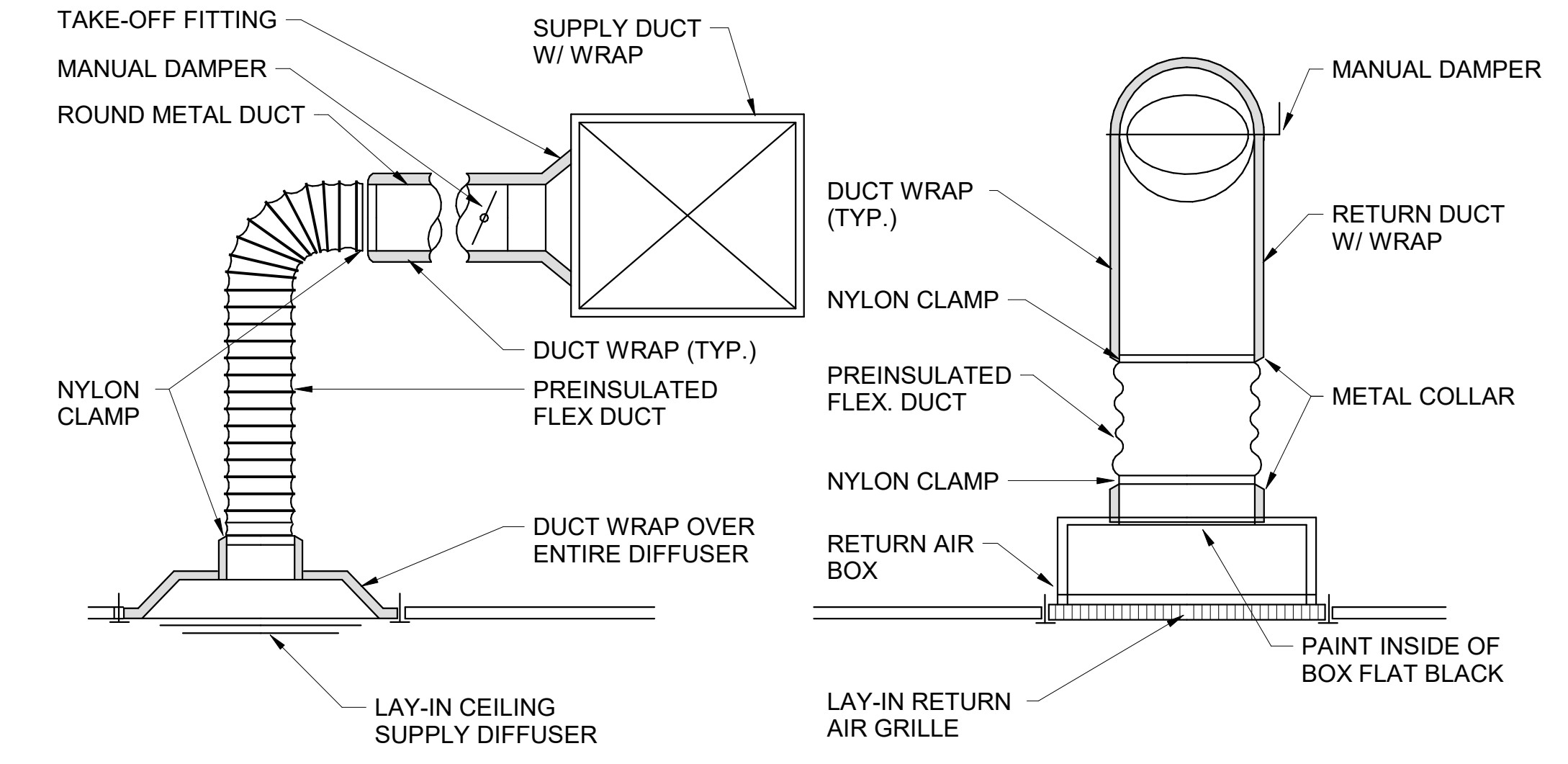


MAXIMUM HALF OF DUCT PERIMETER	TABLE 4-1 RECTANGULAR DUCT HANGERS MINIMUM SIZE								
	PAIR AT 10 FT. SPACING		PAIR AT 8 FT. SPACING		PAIR AT 5 FT. SPACING		PAIR AT 4FT. SPACING		
	STRAP	WIRE/ROD	STRAP	WIRE/ROD	STRAP	WIRE/ROD	STRAP	WIRE/ROD	
P/2= 30"	1" X 22 GA.	10 GA. (.135")	1" X 22 GA.	10 GA. (.135")	1" X 22 GA.	12 GA. (.106")	1" X 22 GA.	12 GA. (.106")	
P/2= 72"	1" X 18 GA.	3/8"	1" X 20 GA.	1/4"	1" X 22 GA.	1/4"	1" X 22 GA.	1/4"	
P/2= 96"	1" X 16 GA.	3/8"	1" X 18 GA.	3/8"	1" X 20 GA.	3/8"	1" X 22 GA.	1/4"	
P/2= 120"	1-1/2"X16GA.	1/2"	1" X 16 GA.	3/8"	1" X 18 GA.	3/8"	1" X 20 GA.	1/4"	
P/2= 168"	1-1/2"X16GA.	1/2"	1-1/2"X16GA.	1/2"	1" X 16 GA.	3/8"	1" X 18 GA.	3/8"	
P/2= 192"	NOT GIVEN	1/2"	1-1/2"X16GA.	1/2"	1" X 16 GA.	3/8"	1" X 16 GA.	3/8"	
P/2=193" UP	SPECIAL ANALYSIS REQUIRED								
WHEN STRAPS ARE LAP JOINED, USE THESE MINIMUM FASTENERS 1" X 18, 20, 22 GA. - TWO #10 OR ONE 1/4" BOLT 1" X 16 GA. - TWO 1/4" DIA. 1-1/2" X 16 GA. - TWO 3/8" DIA. PLACE FASTENERS IN SERIES, NOT SIDE BY SIDE.				SINGLE HANGER MAXIMUM ALLOWABLE LOAD					
				STRAP		WIRE OR ROD (DIA.)			
				1" X 22 GA. - 260 LBS.		1/4"-270 LBS.			
				1" X 20 GA. - 320 LBS.		3/8"-680 LBS.			
				1" X 18 GA. - 420 LBS.		1/2"-1250 LBS.			
				1" X 16 GA. - 700 LBS.		5/8"-2000 LBS.			
				1-1/2" X 16 GA. - 1100 LBS.		3/4"-3000 LBS.			

**4 SUPPORT DETAIL**  
M002 NOT TO SCALE

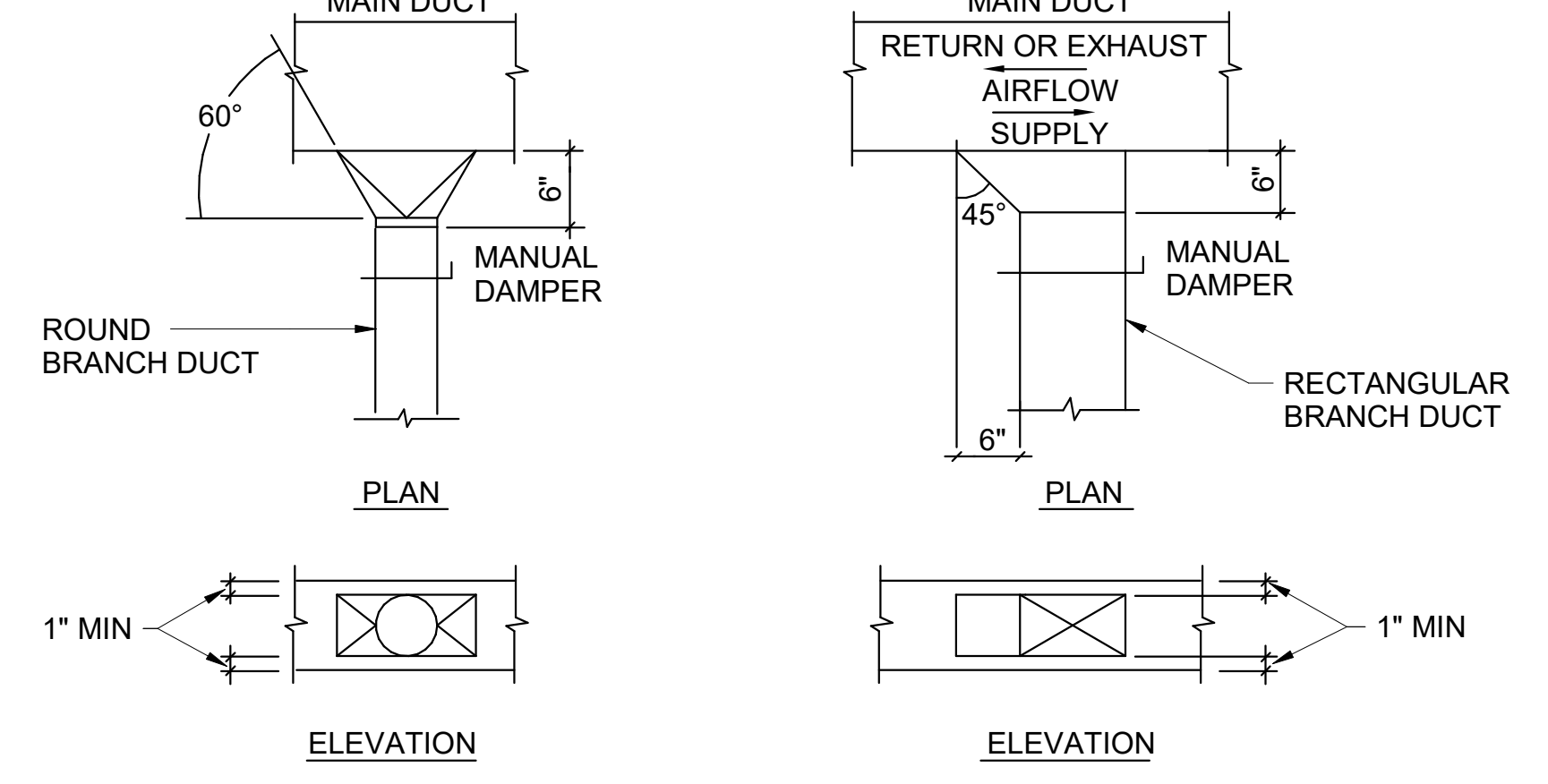


**5 DEHUMIDIFIER DETAIL**  
M002 NOT TO SCALE



- NOTES:
- INSTALL NYLON CLAMPS ON INNER FLEX DUCT LINER AND OUTER JACKET. TAPE ENDS OF PREINSULATED FLEX DUCT AT THE DIFFUSER AND THE BRANCH DUCT CONNECTION.
  - RETURN AIR BOX SHALL BE MINIMUM 12" HIGH. RETURN DUCT MAY TAP INTO THE SIDE OF THE BOX A MINIMUM OF 6" ABOVE GRILLE.
  - PROVIDE YOUNG REGULATOR REMOTE DAMPER CONTROLLER FOR EACH DIFFUSER AND GRILLE LOCATED IN AREAS WITH INACCESSIBLE CEILINGS. LOCATE CONTROLLER IN A CONCEALED, ACCESSIBLE LOCATION.

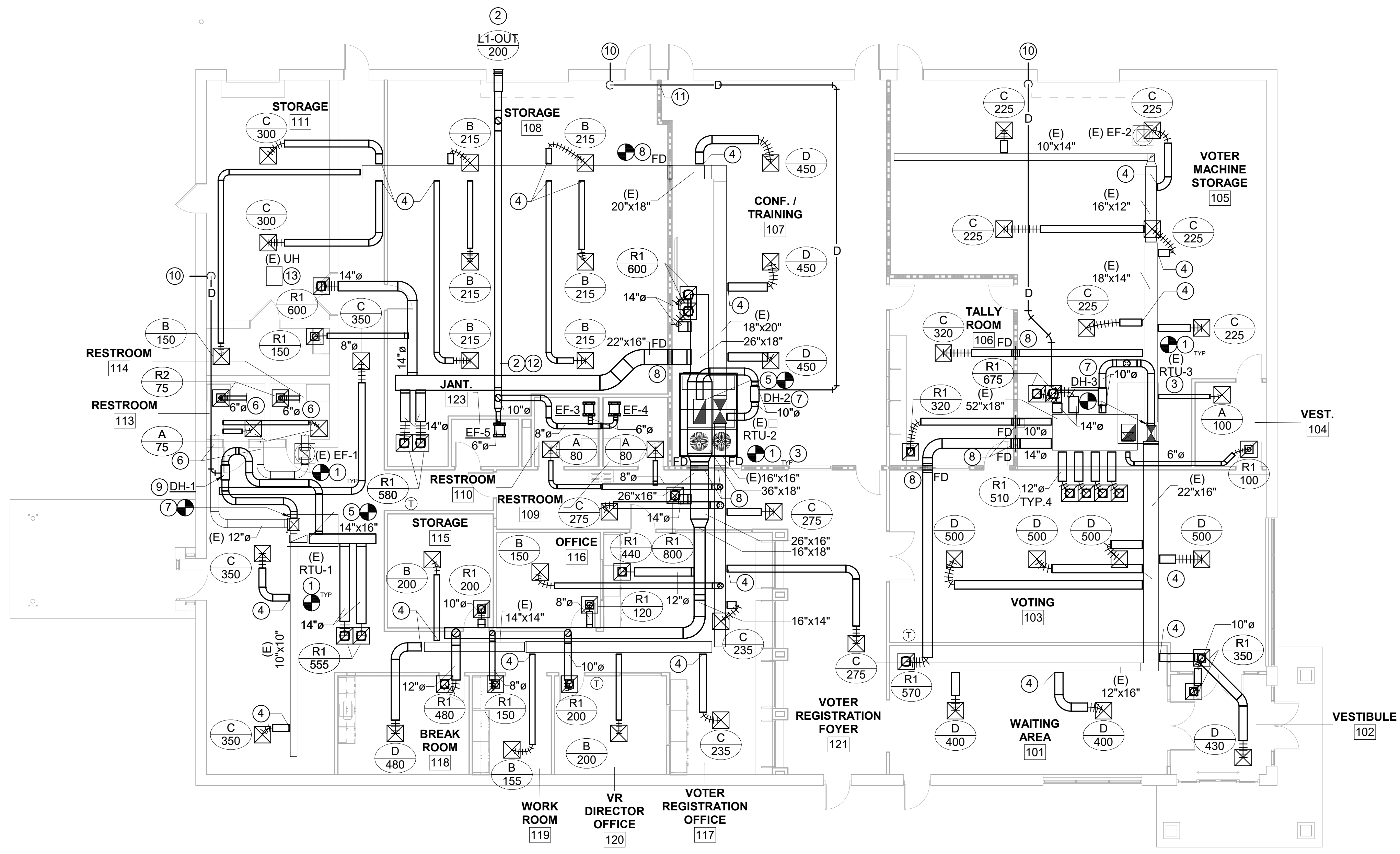
**1 TYPICAL DIFFUSER/GRILLE INSTALLATION DETAIL**  
M002 NOT TO SCALE



- NOTES:
- CONTRACTOR MAY SUBSTITUTE A MANUFACTURED FITTING FOR THE DETAILED TAKE-OFF ABOVE.
  - TAKE-OFFS IN MEDIUM PRESSURE DUCT SHALL HAVE AN OVERSIZED INTAKE.
  - SPIN-IN FITTINGS WITH INTEGRAL SCOOP AND DAMPER SHALL ONLY BE USED ON LOW PRESSURE DUCT.
  - FITTINGS SHALL BE SCREWED TO THE TRUNK DUCT AND SEALED WITH MASTIC. MASTIC TAPE IS NOT ACCEPTABLE, SEE SPECIFICATIONS.
  - IF VAV BOX IS LOCATED IN BRANCH DUCT, BALANCE DAMPER SHALL NOT BE INSTALLED IN TAKOFF FROM MAIN TRUNK DUCT.

**2 TYPICAL DUCT TAKE OFF INSTALLATION DETAIL**  
M002 NOT TO SCALE

**6 ROUND DUCT BRANCH TAKE OFF DETAIL**  
M002 NOT TO SCALE



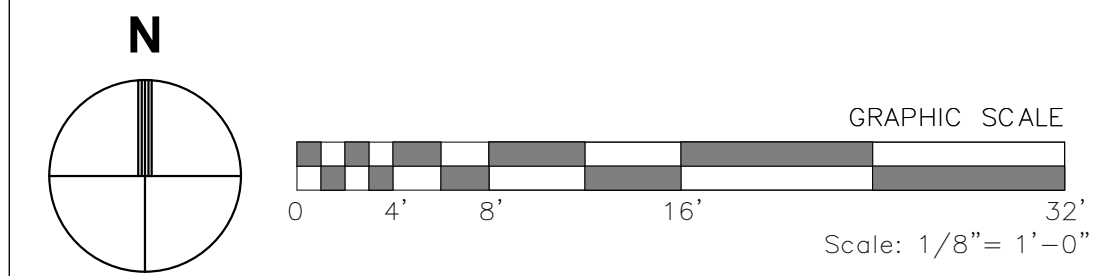
1 FIRST FLOOR HVAC DUCTWORK PLAN  
M101 NOT TO SCALE

GENERAL NOTES

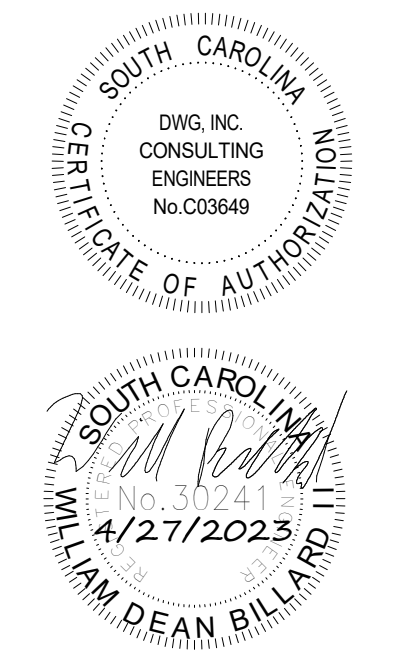
- INSPECT ALL HVAC EQUIPMENT TO REMAIN. PERFORM ANY REQUIRED MAINTENANCE TO MAINTAIN PROPER OPERATION.
- EXISTING DUCTWORK AND MECHANICAL SYSTEMS INFORMATION IS BASED UPON ARCHIVE FACILITY DRAWINGS AVAILABLE FOR THIS PROJECT, AND A LIMITED VISUAL INSPECTION BY ENGINEER VIA FACILITY SITE VISIT. CONTACT EOR FOR ANY DEVIATION IN EXISTING CONDITIONS FROM THESE CONTRACT DRAWINGS.

RENOVATION KEYNOTES

- CONNECT NEW AIR DEVICES TO EXISTING DUCTWORK AND REBALANCE AIR DEVICES AS SHOWN ON FLOORPLAN.
- ROUTE NEW EF-3, 4, 5 DUCTWORK TO NEW LOUVER. LOCATE LOUVER ABOVE ROLL-UP DOOR.
- MECHANICAL CONTRACTOR SHALL PROVIDE SMOKE DETECTORS IN RETURN DUCTS OF (E)RTU-2, 3. COORDINATE INSTALLATION WITH FIRE ALARM CONTRACTOR.
- REUSE EXISTING TAP LOCATION FOR NEW RUNOUT
- CONNECT NEW RETURN PLENUM TO EXISTING MAIN.
- ROUTING RTU-1 SUPPLY MAIN AND EF-1 EXHAUST DUCT IS UNKNOWN PAST THIS POINT. LOCATE SUPPLY AND EXHAUST DUCT IN FIELD AND CONNECT NEW RESTROOM SUPPLY RUNOUT TO RTU-1 SUPPLY MAIN AND NEW RESTROOM EXHAUST RUNOUT TO EXISTING EF-1 DUCTWORK.
- CONNECT NEW DEHUMIDIFIER TO SUPPLY AND RETURN MAIN. SEE DETAIL 5/M002 AND INSTALL PER MANUFACTURERS INSTRUCTIONS. ROUTE CONDENSATE TO EXTERIOR AND DRAIN TO GRADE.
- PROVIDE NEW FIRE DAMPER AT NEW FIRE WALL. WHERE FIRE DAMPER IS REQUIRED FOR A RUN OF EXISTING DUCT, FIELD VERIFY DAMPER / DUCT DIMENSIONS PRIOR TO INSTALLATION.
- LOCATE DH-1 ON MEZZANINE PLATFORM. ROUTE DH-1 INLET AND OUTLET DUCTS THROUGH MEZZANINE WALL AND CONNECT TO RTU-1 SUPPLY AND RETURN MAINS.
- ROUTE CONDENSATE DOWN INTERIOR WALL AND DRAIN TO GRADE.
- SEAL PENETRATION TO MAINTAIN WALL RATING.
- ROUTE DUCTWORK BETWEEN JOIST AND OVER TOP OF EXISTING SUPPLY MAIN.
- EXISTING GAS POWERED UNIT HEATER TO REMAIN.



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72 BELLS HWY  
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DATE ISSUED FOR: 4/27/23  
DOCUMENTS

**FIRST FLOOR MECHANICAL PLAN**



**ELECTRICAL SYSTEMS  
SEISMIC REQUIREMENTS  
PER IBC-2021/ASCE 7-16**

- A. PER THE 2021 INTERNATIONAL BUILDING CODE, MECHANICAL, PLUMBING AND ELECTRICAL EQUIPMENT AND COMPONENTS, INCLUDING THEIR SUPPORTS AND ATTACHMENTS, SHALL BE DESIGNED FOR SEISMIC FORCES IN ACCORDANCE WITH CHAPTER 13 OF ASCE 7-16.
- B. EXTERIOR EQUIPMENT (INCLUDING ROOF CURBS, RAILS, SUPPORTS) EXPOSED TO WIND SHALL BE DESIGNED AND INSTALLED TO RESIST THE WIND PRESSURES DETERMINED IN ACCORDANCE WITH CHAPTER 26 TO 29 OF ASCE 7-16.
- C. WHERE DESIGN FOR SEISMIC AND WIND LOADS IS REQUIRED, THE MORE DEMANDING FORCE MUST BE USED.
- D. REFERENCE THE STRUCTURAL DRAWINGS FOR SITE SPECIFIC INFORMATION ON SEISMIC DESIGN CATEGORY, WIND SPEEDS, ETC.
- E. USE THE TABLE BELOW TO DETERMINE SEISMIC RESTRAINT REQUIREMENTS FOR EACH COMPONENT.
- F. FOR ALL COMPONENTS REQUIRING SEISMIC RESTRAINT, THE COMPONENT SUPPORTS AND ATTACHMENTS SHALL BE DESIGNED BY A REGISTERED DESIGN PROFESSIONAL REGISTERED IN THE STATE THE JOB IS LOCATED. SUBMITTALS MUST INCLUDE STAMPED AND SIGNED DRAWINGS AND CALCULATIONS.
- G. WHERE SEISMIC RESTRAINT IS REQUIRED, HOUSEKEEPING PADS NEEDED FOR THE INSTALLATION OF EQUIPMENT UNDER THIS CONTRACT MUST BE DESIGNED BY THE SEISMIC ENGINEER. DO NOT POUR ANY HOUSEKEEPING PADS PRIOR TO THE RECEIPT OF THE APPROVED SEISMIC SUBMITTAL.
- H. SEISMIC RESTRAINTS FOR DUCTWORK, PIPING, CONDUIT, CABLE TRAYS AND BUS DUCT MUST BE SHOWN ON LAYOUT DRAWINGS SHOWING SPECIFIC RESTRAINT LOCATIONS ALONG WITH ACCOMPANYING DETAILS AND CALCULATIONS.

**ELECTRICAL COMPONENT IMPORTANCE FACTOR (Ip) DESIGNATION**

Ip = 1.0

- ALL ASSOCIATED ELECTRICAL WORK UNLESS NOTED OTHERWISE
- EMERGENCY LIGHTS
- EXIT LIGHTS
- FIRE ALARM

**SEISMIC DESIGN CATEGORIES D,E,F**

**COMPONENT IMPORTANCE FACTOR (Ip)**

1.0 1.5

COMPONENT IDENTIFICATION	SEISMIC RESTRAINT REQUIREMENT	NOTES	SEISMIC RESTRAINT REQUIREMENT	NOTES
ROOF MOUNTED	RESTRAIN ALL	1	RESTRAIN ALL	-
FLOOR MOUNTED	RESTRAIN ALL	1,2	RESTRAIN ALL	-
WALL MOUNTED	RESTRAIN ALL	1,2	RESTRAIN ALL	-
COMPONENT SUPPORTS	RESTRAIN ALL	1	RESTRAIN ALL	-
SUSPENDED EQUIPMENT	RESTRAIN ALL	1	RESTRAIN ALL	-
SINGLE CONDUIT	RESTRAIN IF > 2.5"	3	RESTRAIN IF > 2.5"	3
CABLE TRAY/BUS DUCT TRAPEZED CONDUIT	DO NOT DELETE ON TRAPEZE > 2.5". RESTRAIN IF TOTAL WEIGHT OF SUSPENDED COMPONENT > 10 LBS/FT	3	RESTRAIN IF ANY CONDUIT ON TRAPEZE > 2.5". RESTRAIN IF TOTAL WEIGHT OF SUSPENDED COMPONENT > 10 LBS/FT	3
COMPONENT CERTIFICATION	NOT REQUIRED	-	REQUIRED	5
PENDANT, LAY-IN AND CAN LIGHTS	REQUIRED	4	REQUIRED	4

- NOTES:**
- EQUIPMENT 20 LBS. OR LESS IS EXEMPT IF THE COMPONENT IS POSITIVELY ATTACHED TO THE STRUCTURE AND FLEXIBLE CONNECTIONS ARE PROVIDED BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING AND CONDUIT.
  - RESTRAINTS ARE NOT REQUIRED IF THE COMPONENT WEIGHS 400 LBS. OR LESS, IS MOUNTED WITH THE CENTER MASS AT 4' OR LESS ABOVE A FLOOR, IS POSITIVELY ATTACHED TO THE STRUCTURE, AND HAS FLEXIBLE CONNECTIONS BETWEEN THE COMPONENT AND ASSOCIATED DUCTWORK, PIPING AND CONDUIT.
  - RESTRAINT IS NOT REQUIRED IF THE CONDUIT IS SUPPORTED BY HANGERS AND EACH HANGER IN THE RUN IS 12" IN. OR LESS IN LENGTH FROM THE TOP OF THE PIPE TO THE SUPPORTING STRUCTURE. WHERE PIPES ARE SUPPORTED ON A TRAPEZE, THE TRAPEZE SHALL BE SUPPORTED BY HANGERS HAVING A LENGTH OF 12" IN. OR LESS. WHERE ROD HANGERS ARE USED, THEY SHALL BE EQUIPPED WITH SWIVELS, EYE NUTS OR OTHER DEVICES TO PREVENT BENDING IN THE ROD.
  - THE RESTRAINT OF PENDANT, LAY-IN AND CAN LIGHTS IS ADDRESSED IN ASTM C636 AND E580.
  - COMPONENT CERTIFICATION MUST BE SUPPLIED BY THE EQUIPMENT MANUFACTURER AT TIME OF SUBMITTAL FOR REVIEW BY ENGINEER OF RECORD.

**GENERAL EXISTING CONDITION NOTES**

- AREAS OF WORK EXIST FOR THIS PROJECT WHICH WERE NOT ACCESSIBLE OR HAD LIMITED ACCESS DURING DESIGN. AS SUCH, CONTRACTOR SHALL VERIFY ALL UTILITIES IN AREA OF WORK BEFORE DEMOLITION OF ANY SERVICE. ANY ELECTRICAL COMPONENTS NOT SHOWN SHALL BE IDENTIFIED AND THE ARCHITECT AND ENGINEER SHALL BE NOTIFIED AS SOON AS POSSIBLE. NO ELECTRICAL REWORK SHALL BE COMMENCED WITHOUT COORDINATION OF BOTH ARCHITECT AND ENGINEER. WHERE INFORMATION SHOWN ON THESE DRAWINGS CONFLICTS WITH VERIFIED FIELD CONDITIONS, IT SHALL BE BROUGHT TO THE ATTENTION OF THE ARCHITECT AND ENGINEER.
- IN AREAS WHERE THE EXISTING CEILING IS NOT SLATED TO BE REPLACED, THE CONTRACTOR SHALL WORK THROUGH THE EXISTING CEILING (SEE ARCHITECTURAL REFLECTED CEILING PLAN FOR AREA OF WORK). THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY DAMAGED TILE OR GRID THAT IS A RESULT OF THEIR WORK.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING A FIRESTOP SYSTEM IN ALL PENETRATIONS OF FIRE-RATED FLOORS AND WALLS CREATED BY THE REMOVAL OF EXISTING ELECTRICAL CONDUIT OR CABLES, AS WELL AS THOSE CREATED BY NEWLY INSTALLED CONDUITS AND SLEEVES.
- SUPPORT ALL EXISTING CONDUITS AND JUNCTION BOXES ABOVE THE CEILING IN THE CONSTRUCTION AREA PER NEC.
- REMOVE ALL ABANDONED CONDUIT, WIRE AND CABLES ABOVE THE CEILING IN THE CONSTRUCTION AREA. PROVIDE JUNCTION BOX COVERS ON ALL EXISTING JUNCTION BOXES ABOVE THE CEILING IN THE CONSTRUCTION AREA.
- SUPPORT ALL EXISTING CABLES ABOVE THE CEILING IN THE CONSTRUCTION AREA.

**GENERAL DEMOLITION NOTES**

- ALL ELECTRICAL EQUIPMENT TO BE REMOVED SHALL REMAIN THE PROPERTY OF THE OWNER. THE CONTRACTOR SHALL NOT DISPOSE OF ANY MATERIALS UNTIL RELEASED BY THE OWNER'S PROJECT MANAGER. MATERIALS THAT THE OWNER'S PROJECT MANAGER CHOOSES TO RETAIN SHALL BE DELIVERED BY THE CONTRACTOR TO A LOCATION DESIGNATED BY THE PROJECT MANAGER. ALL OTHER MATERIALS SHALL BE PROPERLY DISPOSED OF BY THE CONTRACTOR.

**GENERAL ELECTRICAL NOTES**

- BRANCH CIRCUIT WIRING FOR 20A CIRCUITS SHALL BE SIZED PER WIRE SIZING CHART. WHERE CONDUCTOR AND RACEWAY SIZE ARE SHOWN AT HOMERUN, SUCH SIZE SHALL BE USED FOR THE ENTIRE CIRCUIT. EXCEPTION: FINAL CONNECTION TO DEVICES IN OUTLET BOXES IS NOT REQUIRED TO BE LARGER THAN #12.
- BEFORE TOUGH-IN, COORDINATE THE LOCATION AND MOUNTING HEIGHT OF ALL WALL MOUNTED DEVICES WITH THE ARCHITECTURAL INTERIOR ELEVATIONS AND MILLWORK SHOP DRAWINGS. IN THE EVENT OF A CONFLICT, NOTIFY THE ARCHITECT. MINOR ADJUSTMENTS IN DEVICE LOCATION, SUCH AS 5'-0" IN ANY DIRECTION, SHALL BE DONE AT NO ADDITIONAL COST TO THE OWNER. UNDERCABINET LIGHT FIXTURES, RECEPTACLES AND OTHER DEVICES TO BE MOUNTED INSIDE CABINETS SHALL BE REVIEWED WITH THE ARCHITECT PRIOR TO ROUGH IN TO CONFIRM THE EXACT LOCATION OF FIXTURES AND DEVICES. OUTLET BOXES FOR SWITCHES, RECEPTACLES, ETC. MOUNTED ON OPPOSITE SIDES OF PARTITIONS SHALL NOT BE MOUNTED IN THE SAME WALL CAVITY. SEPARATE WALL PENETRATIONS BY MOUNTING ON OPPOSITE SIDES OF WALL STUDS OR OTHER VERTICAL STRUCTURAL MEMBERS IN THE WALL.
- RACEWAYS SHALL BE INSTALLED CONCEALED IN NEW WALL CONSTRUCTION, ABOVE CEILING, BELOW FLOOR AND IN OTHER CAVITIES TO THE GREATEST EXTENT POSSIBLE. EXPOSED RACEWAYS MAY BE USED IN UNFINISHED SPACES, WHERE EXPLICITLY NOTED ON PLANS AND WHERE APPROVED BY THE ARCHITECT AND ENGINEER. LAY OUT EXPOSED RACEWAYS TO MINIMIZE THE NUMBER OF VERTICAL RUNS.
- BRANCH CIRCUITS ROUTING SHALL COMPLY WITH DETAILS ON DRAWINGS AND SHALL BE COORDINATED WITH THE WORK OF OTHER TRADES BEFORE AND DURING CONSTRUCTION. COORDINATE THE ROUTING OF UNDERGROUND CONDUCTORS/CONDUITS WITH STRUCTURAL FOOTINGS OF BUILDING. BRANCH CIRCUITS SHALL BE ROUTED OVERHEAD UNLESS PRIOR APPROVAL HAS BEEN GRANTED BY THE ARCHITECT AND ENGINEER.
- WHERE LIGHT SWITCH AND ABOVE COUNTER RECEPTACLES ARE INDICATED TO BE MOUNTED ADJACENT TO EACH OTHER, THE DEVICES SHALL BE MOUNTED IN THE SAME BOX UNDER A COMMON DEVICE PLATE. A FIRESTOP SYSTEM SHALL BE USED TO SEAL ALL PENETRATIONS OF ELECTRICAL CONDUITS AND CABLES THROUGH FIRE-RATED PARTITIONS. THE FIRESTOP SYSTEM SHALL CONSIST OF A FIRE-RATED CAULK TYPE SUBSTANCE AND HIGH TEMPERATURE FIBER INSULATION BY STI OR APPROVED EQUAL. ONLY METAL CONDUIT SHALL BE USED TO PENETRATE FIRE-RATED PARTITIONS. SEE ARCHITECTURAL DRAWINGS FOR ALL LOCATIONS OF FIRE-RATED WALLS.
- THE USE OF MC CABLE IS ALLOWED ABOVE ACCESSIBLE CEILING AND IN STUD CONSTRUCTION ONLY. HOMERUNS TO PANEL SHALL BE WIRE IN RACEWAY ONLY, MC CABLE IS NOT ACCEPTABLE FOR HOMERUNS. MC CABLE IS ONLY ACCEPTABLE FOR 20A BRANCH CIRCUITS.
- WHEREVER THE WORD "PROVIDE" IS USED ON THE ELECTRICAL DRAWINGS, IT SHALL BE INFERRED TO MEAN "FURNISH AND INSTALL", UNLESS NOTED OTHERWISE.
- THE ARRANGEMENT, GROUPING, AND ROUTING OF BRANCH CIRCUITS SHALL BE PROVIDED AT THE CONTRACTOR'S DISCRETION IN ACCORDANCE WITH GENERALLY ACCEPTED PRACTICE FOR ELECTRICAL WORK, THE NATIONAL ELECTRICAL CODE REQUIREMENTS, LOCAL ORDINANCES, AND THE FOLLOWING: 1 - A COMMON NEUTRAL MAY BE INSTALLED IN A HOMERUN FOR 2 OR 3 BRANCH CIRCUITS ONLY IF A MEANS TO SIMULTANEOUSLY DISCONNECT ALL UNGROUNDED CONDUCTORS AT THE POINT OF ORIGIN IS PROVIDED PER NEC 210.4.B. 2 - MULTIPLE SINGLE-POLE BRANCH CIRCUITS (UP TO 3 HOTS, 3 NEUTRALS AND 1 GROUND) RATED FOR 30A OR LESS MAY BE PULLED INTO A SINGLE RACEWAY. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SIZING THE RACEWAYS AND DE-RATING CONDUCTORS PER NEC 310.15. 3 - A GROUND CONDUCTOR SHALL BE PROVIDED IN ALL RACEWAYS UNLESS NOTED OTHERWISE.

**GENERAL LIGHTING NOTES**

- SEE ARCHITECTURAL REFLECTED CEILING PLAN FOR THE EXACT LOCATION OF ALL CEILING MOUNTED LIGHTING FIXTURES. REFER TO ARCHITECTURAL DRAWINGS FOR MOUNTING DETAILS OF LIGHT FIXTURE TO ACOUSTICAL CEILING SYSTEM AND STRUCTURE.
- EXACT LOCATIONS OF LIGHTING FIXTURES IN MECHANICAL SPACES SHALL BE DETERMINED IN THE FIELD. DO NOT SUPPORT FIXTURES FROM DUCT OR PIPING. PROVIDE CHAIN OR TRAPEZE-TYPE HANGERS WHERE FIXTURES CANNOT BE MOUNTED DIRECTLY TO CEILING.
- LIGHTING FIXTURE CATALOG NUMBERS ARE INDICATIVE OF THE STYLE OF FIXTURE REQUIRED. CONTRACTOR SHALL PROVIDE FIXTURES WITH THE PROPER TRIM, VOLTAGE AND OPTIONS NECESSARY FOR INSTALLATION.
- DOUBLE-FACED EXIT FIXTURES SHALL BE OF THE SAME MANUFACTURER AND SERIES AS THE SINGLE-FACED EXIT FIXTURES.
- REGARDLESS OF CATALOG NUMBER INDICATED IN SCHEDULE, PROVIDE BATTERY BACK-UP FOR ALL FIXTURES INDICATED ON THE DRAWINGS TO BE EMERGENCY TYPE.
- REGARDLESS OF HOW NOTED ON PLANS, ALL EMERGENCY LIGHTING FIXTURES INDICATED IN PRIVATE SPACES SHALL BE WIRED SO AS TO BE SWITCHED "ON/OFF" WITHOUT OPERATING THE EMERGENCY BATTERY BACK-UP. ALL EMERGENCY LIGHTING FIXTURES INDICATED IN PUBLIC SPACES OR MEANS OF EGRESS (CORRIDORS, LOBBIES, BATHROOMS, AUDITORIUMS, STAIRWELLS, ETC.) SHALL BE WIRED AHEAD OF LOCAL SWITCH AS A NIGHT LIGHT AND SHALL NOT BE SWITCHED. EMERGENCY BATTERY BACK-UP SHALL NOT BE ACTIVATED UNLESS A LOSS OF NORMAL BUILDING POWER OCCURS.
- REGARDLESS OF CATALOG NUMBER INDICATED IN SCHEDULE, ALL EXIT SIGNS AND EMERGENCY LIGHTING UNITS SHALL BE PROVIDED WITH BATTERY BACK-UP, SHALL BE WIRED AHEAD OF LOCAL SWITCH AND SHALL NOT BE SWITCHED.

**GENERAL LOW VOLTAGE NOTES**

- EXTEND A 3/4" CONDUIT WITH PULL WIRE FROM EACH COMMUNICATION OUTLET TO ABOVE THE LAY-IN CEILING. TURN CONDUIT 12" INTO CEILING CAVITY A MINIMUM OF 6" ABOVE THE CEILING AND TERMINATE WITH AN INSULATED THROAT BUSHING.

**GENERAL FIRE ALARM SYSTEM NOTES**

- PROVIDE ALL DUCT SMOKE DETECTORS AND ACCESSORIES NECESSARY FOR INTERLOCKING WITH MECHANICAL EQUIPMENT. COORDINATE WITH MECHANICAL PLANS FOR LOCATIONS AND REQUIREMENTS. INSTALL DUCT SMOKE DETECTORS TO COMPLY WITH NFPA 72. WHERE TWO DETECTOR LOCATIONS ARE SHOWN AT A SINGLE PIECE OF EQUIPMENT, INSTALL ONE DETECTOR IN THE SUPPLY DUCTWORK AND ONE DETECTOR IN THE RETURN DUCTWORK. COORDINATE MOUNTING LOCATION WITH THE MECHANICAL CONTRACTOR. PROVIDE WEATHERPROOF ENCLOSURE FOR DUCT DETECTORS INSTALLED IN EXTERIOR DUCTWORK. LOCATION SHOWN IS FOR REFERENCE ONLY.

WIRE SIZING CHART 20 AMP BRANCH CIRCUITS	
DISTANCE, 120V	MINIMUM WIRE SIZE
0 - 90 FEET	#12 AWG
90 - 230 FEET	#10 AWG
230 - 446 FEET	#8 AWG

LINE LEGEND	
SYMBOL	DESCRIPTION
—	EXISTING TO REMAIN
—	NEW CONSTRUCTION
----	DEMOLISH

**ELECTRICAL ABBREVIATIONS**

ABBR	DESCRIPTION
(E)	EXISTING
AFC	ABOVE FINISHED CEILING
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
cd	CANDELA
CLG	CEILING
EF	EXHAUST FAN
FACP	FIRE ALARM CONTROL PANEL
FDS	FUSED DISCONNECT SWITCH
GFCI	GROUND-FAULT CIRCUIT-INTERRUPTING
GFI	GROUND-FAULT INTERRUPTING
J-BOX	JUNCTION BOX
KW	KILOWATTS
LCS	LIGHTING CONTROL SYSTEM
NEC	NATIONAL ELECTRICAL CODE
NFDS	NON-FUSED DISCONNECT SWITCH
OC	ON CENTER
RTU	ROOF TOP UNIT
SPD	SURGE PROTECTION DEVICE
UNO	UNLESS NOTED OTHERWISE
W/	WITH
WH	WATER HEATER
WP	WEATHERPROOF
XFMR	TRANSFORMER

CONTROL PANELS	DESCRIPTION
FACP	FIRE ALARM CONTROL PANEL
LCP	LIGHTING CONTROL PANEL
NAC	NOTIFICATION APPLIANCE CIRCUIT
SEC	SECURITY PANEL

JUNCTION BOX/SWITCH	DESCRIPTION
AC	ACCESS CONTROL
BS	BUILDING SIGNAGE
DW	DISHWASHER
EF	EXHAUST FAN
FD	FOOD DISPOSAL
FS	FAUCET SENSOR
HD	HAND DRYER
PB	PANIC BUTTON
SEC	SECURITY

LIGHT SWITCH	DESCRIPTION
3	THREE WAY
4	FOUR WAY
D	DIMMER
LV	LOW VOLTAGE (CONNECT TO LCS)
OD	COMBINATION OCCUPANCY SENSOR / DIMMER
OS	OCCUPANCY SENSOR
VD	COMBINATION VACANCY SENSOR / DIMMER
VS	VACANCY SENSOR

RECEPTACLE	DESCRIPTION
C	MOUNT ABOVE COUNTER
GD	GARBAGE DISPOSAL
M	MICROWAVE
R	REFRIGERATOR
SP	SUMP PUMP
U	RECEPTACLE WITH TWO USB PORTS
WC	WATER COOLER
WP	WEATHERPROOF

**ELECTRICAL CODES AND STANDARDS  
(WITH ALL SOUTH CAROLINA MODIFICATIONS)**

CODE	DESCRIPTION
IBC (2021)	INTERNATIONAL BUILDING CODE
IECC (2009)	INTERNATIONAL ENERGY CONSERVATION CODE
IFC (2021)	INTERNATIONAL FIRE CODE
NFPA 70 (2020)	NATIONAL ELECTRICAL CODE
NFPA 72 (2019)	NATIONAL FIRE ALARM AND SIGNALING CODE



REV.	DATE	DESCRIPTION



4/27/2023

**COLLETON COUNTY VOTER  
REGISTRATION CENTER**

COLLETON COUNTY  
72 BELLS HWY  
WAL TERBORO, SC 29488

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CONSTRUCTION DOCUMENTS

**ELECTRICAL NOTES**

E001

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**LIGHT FIXTURE SCHEDULE**

FIXTURE SPECIFICATIONS				LAMPING			ELECTRICAL		FIXTURE MOUNTING
TYPE	FIXTURE DESCRIPTION	MANUFACTURER	CAT. #	LAMP TYPE	TOTAL LUMENS	COLOR TEMP.	LOAD (VA)	VOLTS	
A1	2x4' TROFFER	COLUMBIA	CCL24-5040	LED	5191	4000 K	44	120 V	CEILING, RECESSED
A1E	2x4' TROFFER, EMERGENCY	COLUMBIA	CCL24-5040-ELL14	LED	5191	4000 K	44	120 V	CEILING, RECESSED
A2	2x2' TROFFER	COLUMBIA	CCL22-3340	LED	3223	4000 K	29	120 V	CEILING, RECESSED
A2E	2x2' TROFFER, EMERGENCY	COLUMBIA	CCL22-3340	LED	3223	4000 K	29	120 V	CEILING, RECESSED
D1	6" DOWNLIGHT	LITHONIA	WFS REG SWW6 90CRI MW M6	LED	950	4000 K	13	120 V	CEILING, RECESSED
J1	4' STRIP	COLUMBIA	CSL4-LSCS-4000K-38W	LED	5770	4000 K	40	120 V	CEILING, SUSPENDED
J1E	4' STRIP	COLUMBIA	CSL4-LSCS-4000K-38W	LED	5203	4000 K	40	120 V	CEILING, SUSPENDED
Q1	POLE MOUNTED AREA LIGHT - 1 ARM	ILP LIGHTING	SAM-50L-U-50-T3-JUMB	LED	48033	4000 K	339	120 V	EXTERIOR, PYLON
W1E	WALLPACK	ILP LIGHTING	WPSO-30WLED-UNIV-40	LED	4097	4000 K	30	120 V	WALL, FLUSH
X1	CEILING MOUNTED EXIT SIGN	COMPASS	CER	LED	N/A	N/A	2	120 V	WALL, FLUSH
X2	CEILING MOUNTED EXIT SIGN, DUAL FACED	COMPASS	CER	LED	N/A	N/A	2	120 V	CEILING, SUSPENDED
X3	WALL MOUNTED EXIT SIGN	COMPASS	CER	LED	N/A	N/A	2	120 V	CEILING, SUSPENDED

**LIGHT FIXTURE SCHEDULE NOTES:**

- BASIS OF DESIGN IS AS SCHEDULED ON DRAWINGS. ACCEPTABLE MANUFACTURERS, CONTINGENT UPON COMPLIANCE WITH THE CONTRACT DOCUMENTS, ARE AS FOLLOWS: COLUMBIA, PRESCOLITE, ILP LIGHTING, LITHONIA, COMPASS, GOTHAM, JUNO, WILLIAMS, ECLIPSE, AND SPECTRUM. EQUAL PRODUCTS BY OTHER MANUFACTURERS ARE ACCEPTABLE PROVIDING SUBSTITUTIONS ARE SUBMITTED IN ACCORDANCE WITH REQUIREMENTS LISTED ELSEWHERE IN THE BID DOCUMENTS AND APPROVED BY THE A/E.

**EQUIPMENT CONNECTION SCHEDULE**

UNIT I.D.	VOLTS	# OF POLES	LOAD (VA)	BRANCH CIRCUIT WIRING	DISCONNECT / STARTER
DH-1	120 V	1	1080	2#12, 1#12G IN 3/4" C	20A NFDS / 1P / NEMA 1
DH-2	120 V	1	1080	2#12, 1#12G IN 3/4" C	20A NFDS / 1P / NEMA 1
DH-3	120 V	1	1080	2#12, 1#12G IN 3/4" C	20A NFDS / 1P / NEMA 1
FANS					
EF-3	120 V	1	6	2#12, 1#12G IN 3/4" C	1-POLE MOTOR RATED SWITCH
EF-4	120 V	1	6	2#12, 1#12G IN 3/4" C	1-POLE MOTOR RATED SWITCH
EF-5	120 V	1	6	2#12, 1#12G IN 3/4" C	1-POLE MOTOR RATED SWITCH
RECIRCULATING PUMP					
HWRP	120 V	1	161	2#12, 1#12G IN 3/4" C	1-POLE MOTOR RATED SWITCH
WH					
WH	208 V	2	2500	2#12, 1#12G IN 3/4" C	30A NFDS / 2P / NEMA 1

**LIGHTING SYMBOL LEGEND**

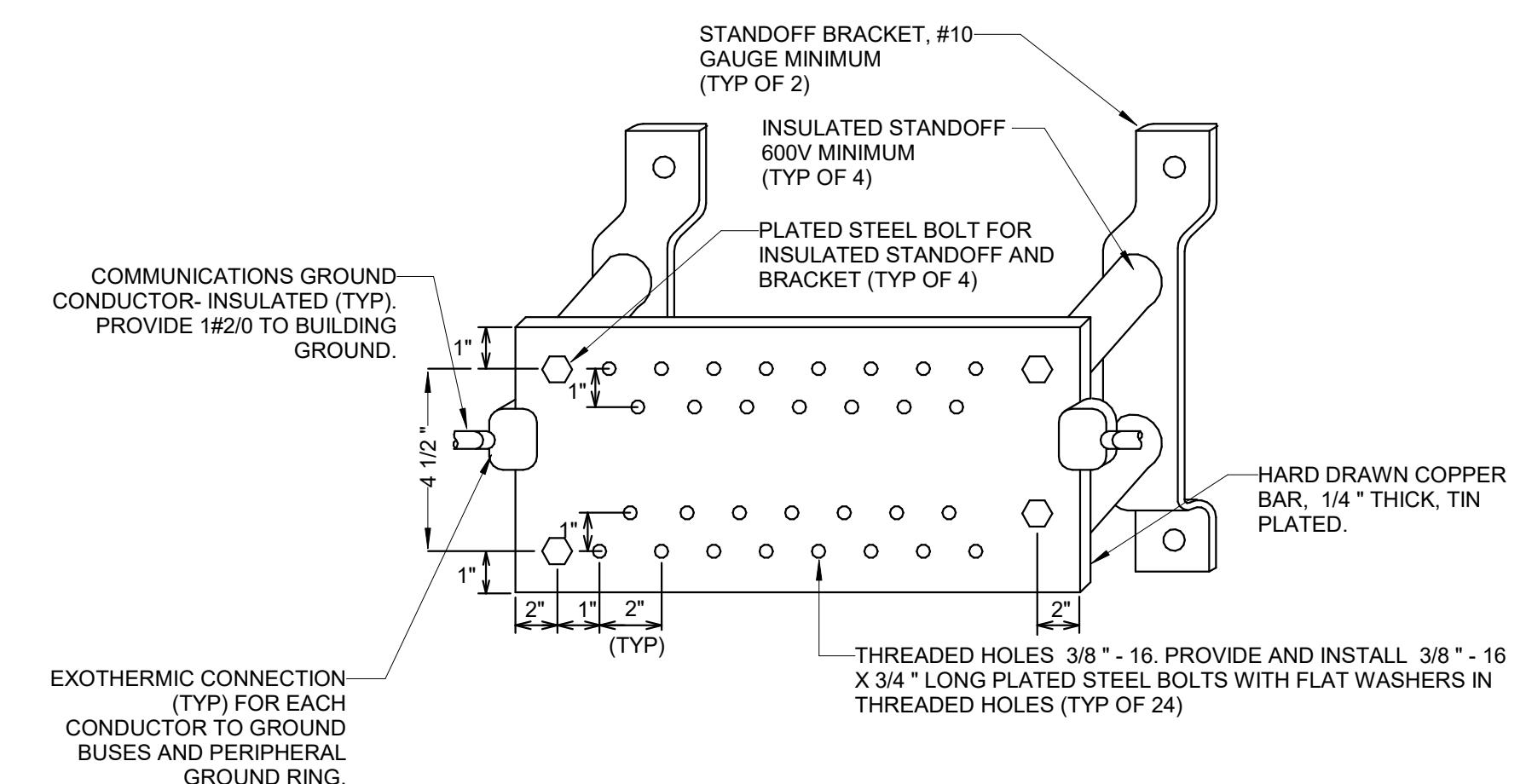
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	LIGHT FIXTURE (TYPICAL ALL DIMENSIONS)	§	LIGHT SWITCH, SINGLE POLE
	LIGHT FIXTURE (SHADING INDICATES EMERGENCY, TYPICAL ALL LIGHTING SYMBOLS)	§ <sup>x</sup>	LIGHT SWITCH, "X" INDICATES SWITCH TYPE
	STRIP LIGHT FIXTURE	§ <sup>a</sup>	LIGHT SWITCH, LOWERCASE LETTER INDICATES SWITCH LEG
	LIGHT FIXTURE (TYPICAL ALL DIMENSIONS)	Ⓞ	OCCUPANCY SENSOR (CEILING MOUNTED)
	LIGHT FIXTURE (TYPICAL ALL DIMENSIONS)	Ⓜ	OCCUPANCY SENSOR (WALL MOUNTED)
	EMERGENCY LIGHTING UNIT		EXIT SIGN, SINGLE SIDED (ARROWS INDICATE CHEVRON DIRECTION)
			EXIT SIGN, DOUBLE SIDED (ARROWS INDICATE CHEVRON DIRECTION)

**POWER AND TELECOMMUNICATIONS SYMBOL LEGEND**

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	DUPLEX RECEPTACLE "X" INDICATES RECEPTACLE TYPE	∇	COMMUNICATION OUTLET (ROUGH-IN ONLY)
	GFCI DUPLEX RECEPTACLE "X" INDICATES RECEPTACLE TYPE	TV	TELEVISION OUTLET (WALL MOUNTED, ROUGH-IN ONLY)
	QUADRUPLEX RECEPTACLE "X" INDICATES RECEPTACLE TYPE	WF	WI-FI ACCESS POINT (CEILING MOUNTED)
	GFCI QUADRUPLEX RECEPTACLE "X" INDICATES RECEPTACLE TYPE	T	THERMOSTAT (WALL MOUNTED, ROUGH-IN ONLY)
	CEILING MOUNTED RECEPTACLE (TYPICAL ALL TYPES)	H	HUMIDISTAT (WALL MOUNTED, ROUGH-IN ONLY)
	JUNCTION BOX (WALL MOUNTED) "X" INDICATES JUNCTION BOX TYPE	SPD	SURGE PROTECTION DEVICE
	JUNCTION BOX (CEILING MOUNTED) "X" INDICATES JUNCTION BOX TYPE		PANELBOARD - BRANCH, SURFACE MOUNTED
	PANELBOARD - DISTRIBUTION, SURFACE MOUNTED		PANELBOARD - BRANCH, FLUSH MOUNTED

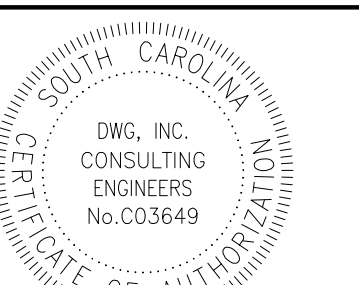
**SYSTEMS SYMBOL LEGEND**

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	CONTROL PANEL, "X" INDICATES TYPE	F	FIRE ALARM PULL STATION
	REMOTE FIRE ALARM ANNUNCIATOR	∇	FIRE ALARM STROBE NOTIFICATION APPLIANCE (WALL MOUNTED)
	SECURITY CAMERA (ROUGH-IN ONLY)	H	FIRE ALARM HORN/STROBE NOTIFICATION APPLIANCE (WALL MOUNTED)
	SECURITY CAMERA (ROUGH-IN ONLY)	∇	FIRE ALARM STROBE NOTIFICATION APPLIANCE (CEILING MOUNTED)
	ELECTRONIC DOOR STRIKE (ROUGH-IN ONLY)	H	FIRE ALARM HORN/STROBE NOTIFICATION APPLIANCE (CEILING MOUNTED)
	COMMUNICATIONS BACKBOARD	CR	SECURITY CARD READER (ROUGH-IN ONLY)
	TELECOMMUNICATIONS GROUNDING BUSBAR	SD	SMOKE DETECTOR (ROUGH-IN ONLY)



2 TELECOMMUNICATIONS GROUND BUS BAR  
E002 NOT TO SCALE

REV.	DATE	DESCRIPTION



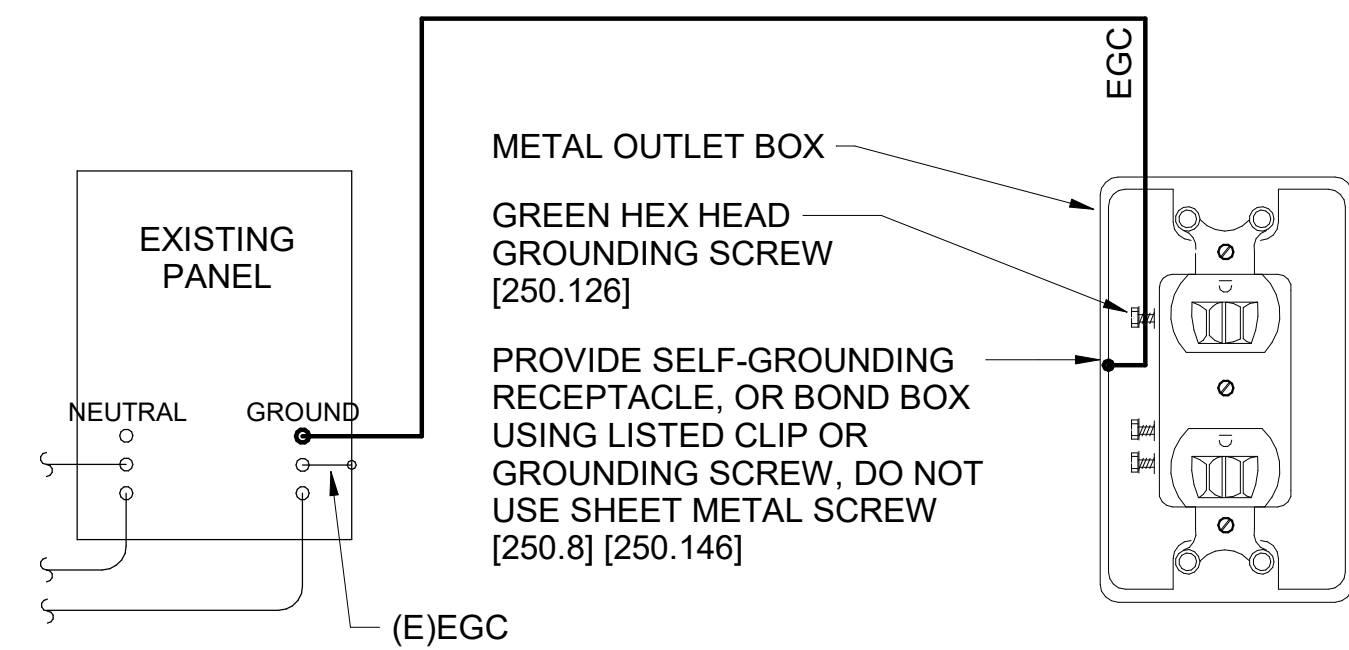
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**ELECTRICAL LEGENDS**





GROUNDING LEGEND		
ABBR.	DESCRIPTION	SIZE
EGC	EQUIPMENT GROUNDING CONDUCTOR	**
**	SIZE PER TABLE 250.122.	

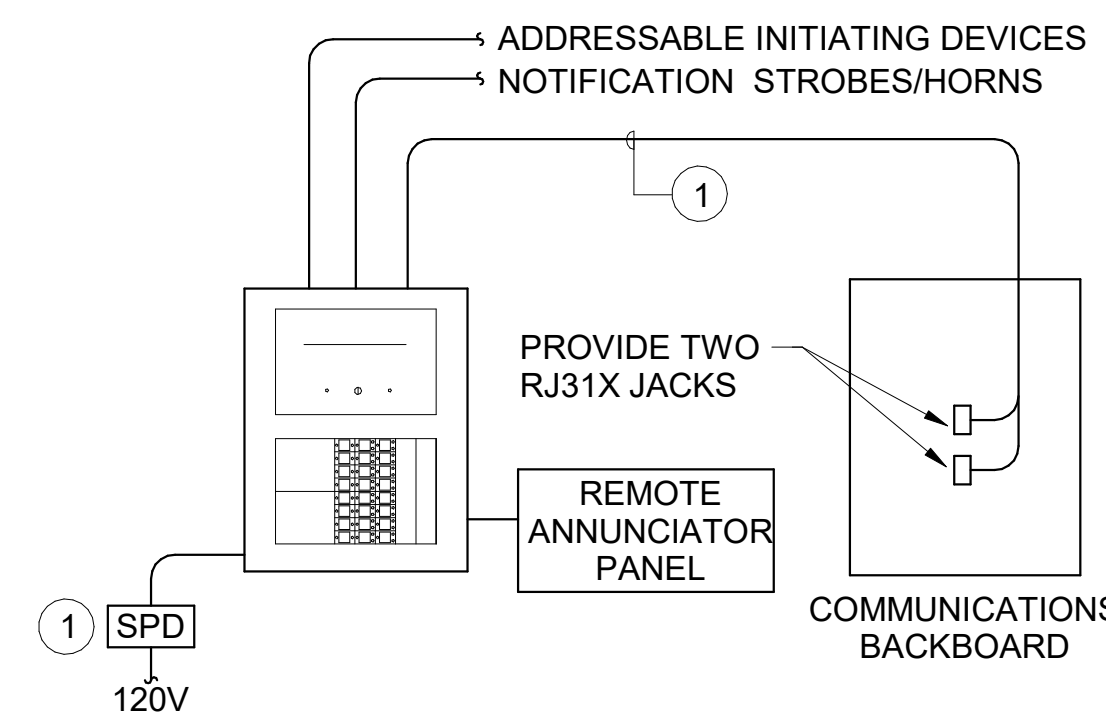
**GROUNDING NOTES:**

- NUMBERS IN BRACKETS REFER TO SPECIFIC SECTIONS OF THE NATIONAL ELECTRICAL CODE.
- PROVIDE A GROUND WIRE IN ALL CONDUITS.
- EARTH SHALL NOT BE USED AS THE SOLE GROUND RETURN PATH FOR ANY EQUIPMENT POWERED UNDER THIS PROJECT. OTHERWISE OVERCURRENT PROTECTION MIGHT NOT WORK, OR IT MIGHT CAUSE POWER QUALITY PROBLEMS.
- NO ALUMINUM SHALL BE USED FOR GROUNDING WORK WITHOUT THE SPECIFIC WRITTEN PERMISSION OF THE ENGINEER. EXCEPTION: ALUMINUM BUILDING STRUCTURAL MATERIALS SHALL BE BONDED WITH LISTED ALUMINUM EQUIPMENT WITH ALUMINUM TO COPPER CONNECTORS FOR ROUTING COPPER EGC'S.
- PROVIDE GROUNDING BUSHING ON BOTH ENDS OF ALL SERVICE ENTRANCE RACEWAYS IF METAL RACEWAY IS USED, SIZE AS A GEC [250.80]. THIS INCLUDES RIGID STEEL ELBOWS ON PVC CONDUIT.
- ALL METAL ENCLOSURES AND RACEWAYS SHALL BE BONDED TO GROUND [250.86]. FOR CIRCUITS OVER 250V PROVIDE BOND PER [250.97]. STANDARD LOCKNUTS ARE NOT ACCEPTABLE.
- PROVIDE EGC CONNECTED TO ANY JUNCTION BOX WHERE SPLICE IS MADE [250.148].
- PROVIDE BOND TO EXPOSED METAL ON ALL MOTORS, PUMPS, AND LIGHTING FIXTURES PER [250.112].

**1** GROUNDING DETAIL  
E010 NOT TO SCALE

**FIRE ALARM SINGLE-LINE NOTES**

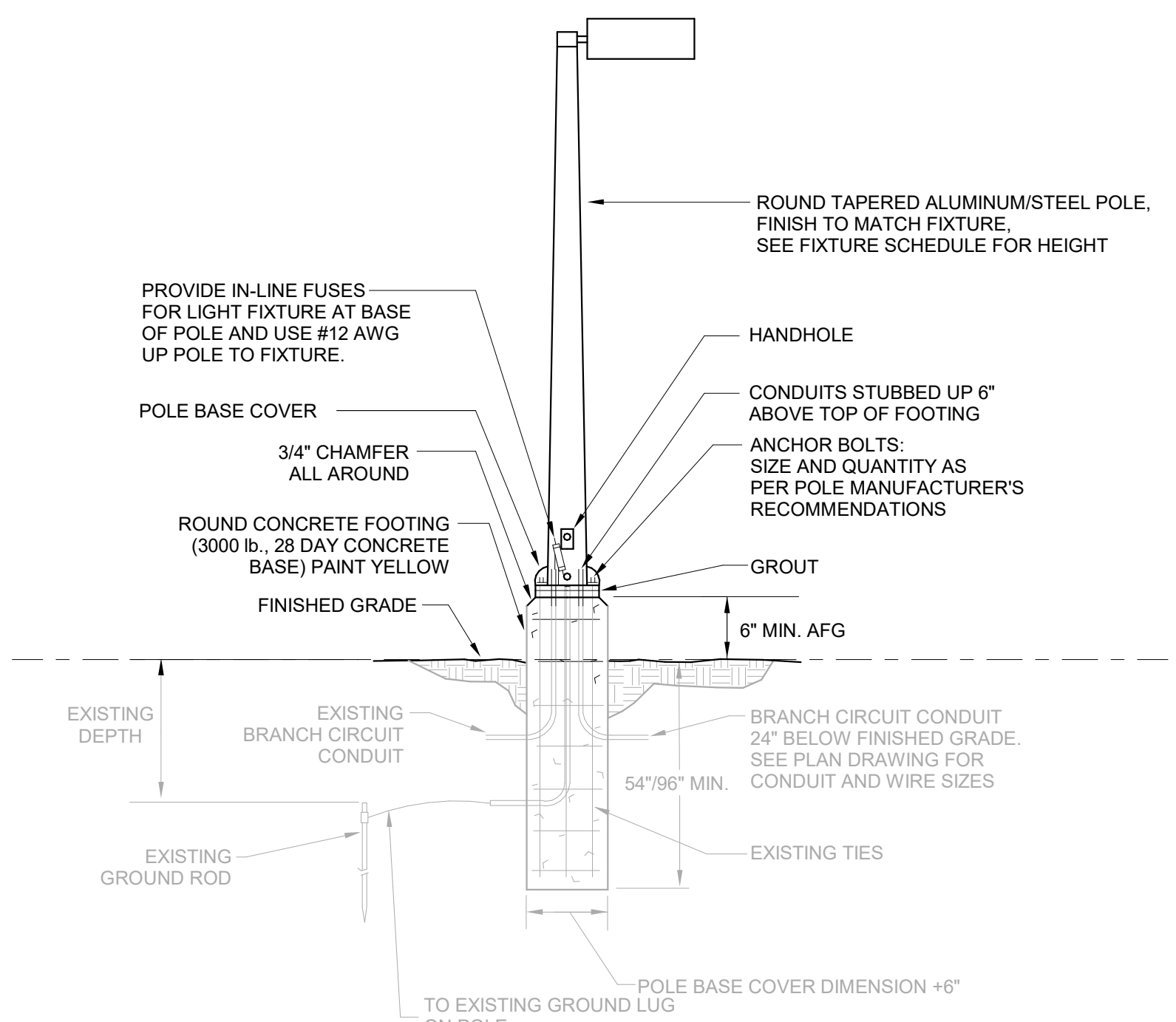
- PROVIDE SURGE PROTECTIVE DEVICES FOR ALL INCOMING POWER CONNECTIONS TO FIRE ALARM CONTROL PANELS, POWER SUPPLIES, AND BATTERY SYSTEMS.



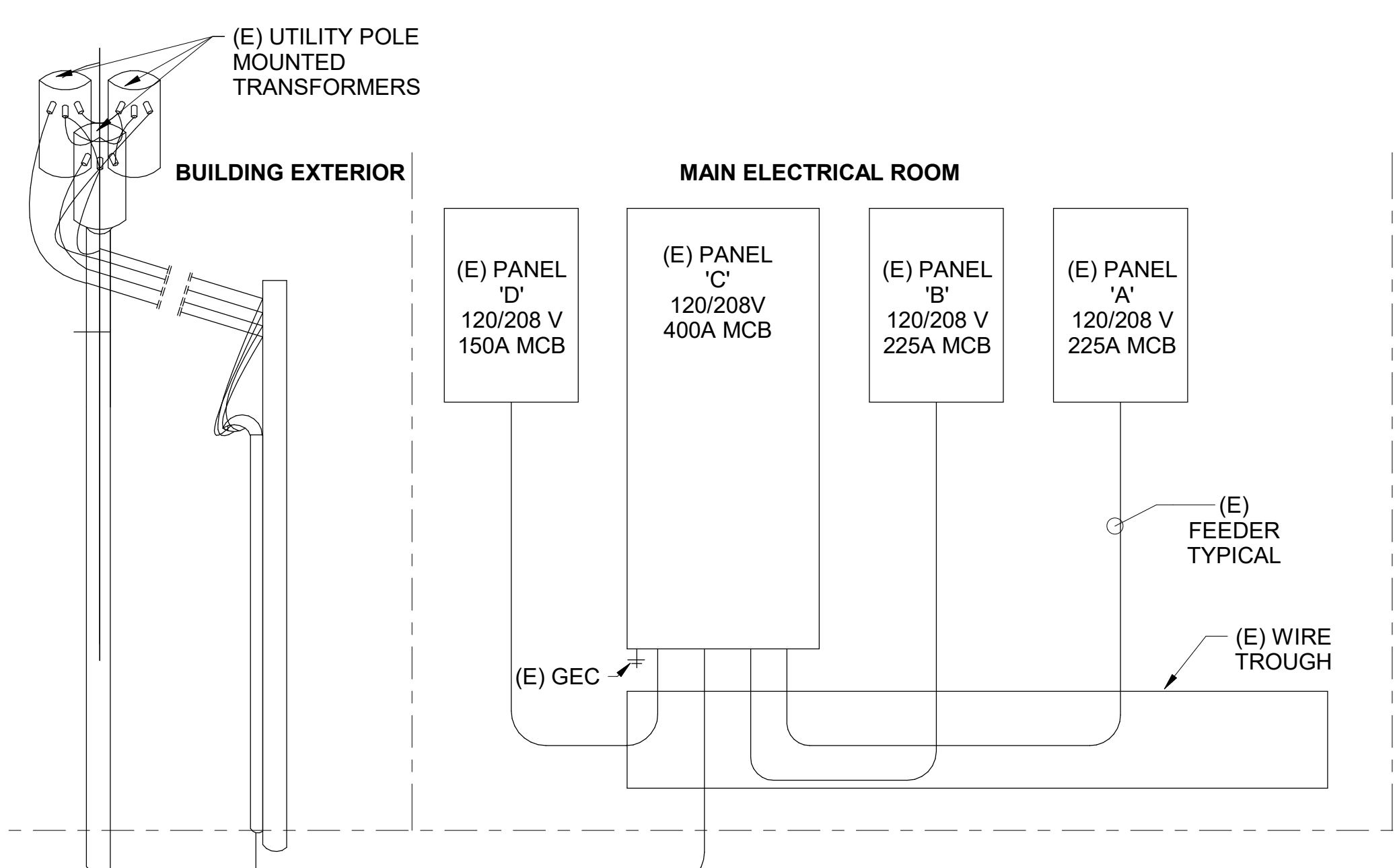
**2** FIRE ALARM RISER DIAGRAM  
E010 NOT TO SCALE

**FIRE ALARM SYSTEM GENERAL NOTES**

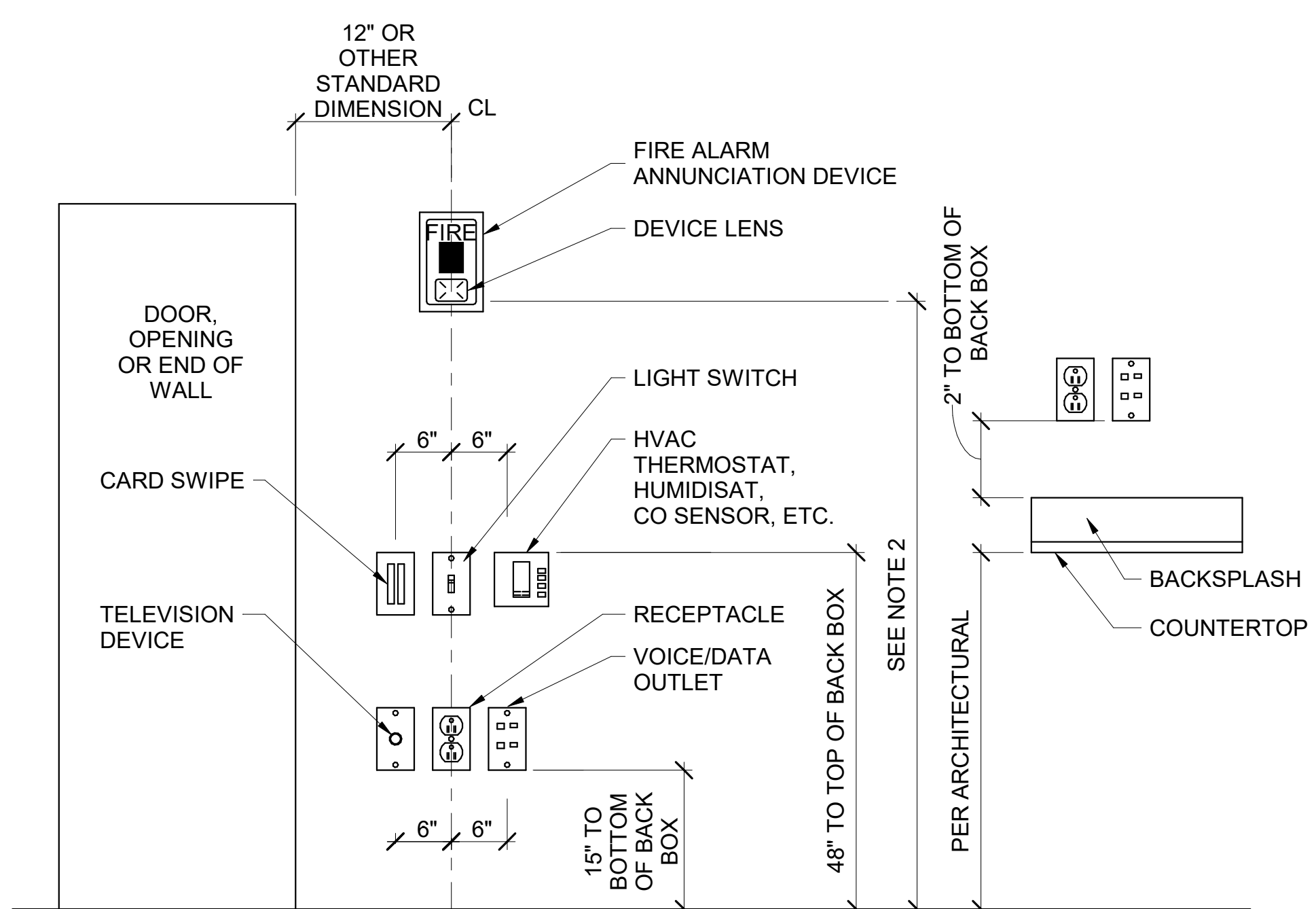
- SEE FLOOR PLANS FOR INTENDED COVERAGE OF FIRE ALARM SYSTEM.
- THE FOLLOWING SHALL OCCUR UPON ACTIVATION OF ANY INITIATING DEVICE:
  - SOUND ALL AUDIBLE DEVICES (CHIMES, HORNS, BELLS, ETC.) AND FLASH ALL VISUAL DEVICES (LIGHTS OR STROBES) THROUGHOUT THE ENTIRE FACILITY.
  - ALERT A CENTRAL STATION ALARM REPORTING SERVICE VIA DIGITAL COMMUNICATOR AND LEASED TELEPHONE LINES.
  - CLOSE ALL SMOKE DOORS THROUGHOUT THE FACILITY.
  - STOP AHU'S OR FANS.
  - INDICATE BY ZONE WITH AUDIO/VISUAL SIGNAL AT FACP AND ALL REMOTE ANNUNCIATORS.
- INITIATING DEVICES SHALL BE SMOKE DETECTORS, DUCT-MOUNTED SMOKE DETECTORS, HEAT DETECTORS, MANUAL PULL STATIONS.
- UPON ACTIVATION OF ANY VALVE SUPERVISORY (TAMPER) SWITCH, A DISTINCT SIGNAL ACCEPTABLE TO THE AUTHORITY HAVING JURISDICTION SHALL BE SENT TO THE FACP. VISUAL PORTION OF SIGNAL SHALL BE CONTINUOUS. TONE DURATION SHALL BE 3 SECONDS.
- SYSTEM TROUBLE (OPEN WIRING, SHORTED WIRING, OR GROUND FAULTS) SHALL BE ANNUNCIATED BOTH AUDIBLY AND VISUALLY AT THE FACP AND AT ALL ANNUNCIATORS.
- NOTIFICATION APPLIANCE CIRCUITS THAT PASS THROUGH A DIFFERENT ZONE THAN THE ZONE IN WHICH THEY ARE NOTIFYING SHALL BE INSTALLED IN A 2-HOUR RATED CABLE/CONDUIT ASSEMBLY.
- THE FIRE ALARM CONTRACTOR SHALL COORDINATE WITH THE OWNER AND LOCAL FIRE MARSHALL REGARDING THE REQUIRED NOTIFICATION ZONING REQUIREMENTS AND PROVIDE 2-HOUR RATED CABLE/CONDUIT ASSEMBLY FOR EACH REQUIRED ZONE. ALL SYSTEM WIRING SHALL BE CLASS B, NO T-TAPPING IS PERMITTED.
- PROVIDE BATTERY AND VOLTAGE DROP CALCULATIONS THAT INCLUDE ALL EXISTING AND NEW DEVICES AND APPLIANCES INSTALLED IN SYSTEM AND SUBMIT TO CONTRACTING OFFICER.
- THE LOCATION OF THE BRANCH CIRCUIT DISCONNECTING MEANS SHALL BE PERMANENTLY IDENTIFIED AT THE CONTROL UNIT. THIS INFORMATION SHALL INCLUDE THE PANELBOARD AND CIRCUIT BREAKER SERVING THE FACP, AS WELL AS THE ROOM WHERE THE PANELBOARD IS LOCATED.
- FIRE ALARM SYSTEM CONTROL EQUIPMENT, ALARM INITIATING DEVICES, POWER SOURCES, MUNICIPAL OR REMOTE STATION SIGNALING APPARATUS, SMOKE DOOR HOLD/RELEASE DEVICES, AND REMOTE ANNUNCIATION/CONTROL PANELS SHALL BE UNDERWRITER'S LABORATORIES LISTED FOR THE INSTALLED APPLICATION.



**3** POLE MOUNT DETAIL  
E010 NOT TO SCALE



**4** EXISTING ONE-LINE DIAGRAM  
E010 NOT TO SCALE

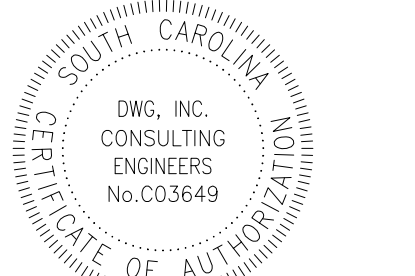


**NOTE 1:** DEVICES SHOWN WITHIN 48" OF EACH OTHER ON ALL ELECTRICAL PLANS SHALL BE ALIGNED PER THIS DETAIL. IF DEVICES ARE SHOWN IN MIDDLE OF WALL, THEN CENTER DEVICES ON WALL.

**NOTE 2:** MOUNT 80" ABOVE FINISHED FLOOR WHERE POSSIBLE. WHERE CEILING HEIGHTS DO NOT ALLOW THIS HEIGHT, MOUNT 6" BELOW CEILING. WHERE OBSTRUCTIONS DO NOT ALLOW THIS HEIGHT, MOUNT 80" TO 96" ABOVE FINISHED FLOOR. ALL MOUNTING HEIGHTS FOR NOTIFICATION DEVICES SHALL BE MEASURED TO THE BOTTOM OF THE LENS.

**5** DEVICE ALIGNMENT DETAIL  
E010 NOT TO SCALE

REV.	DATE	DESCRIPTION



4/27/2023

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DOCUMENTS

**ELECTRICAL ONE-LINE DIAGRAM**



**GENERAL PANEL SCHEDULE NOTES:**

1. PROVIDE NEW OR UPDATED PANEL SCHEDULE AT CONCLUSION OF WORK TO REFLECT INSTALLED AND EXISTING CONDITIONS

**EXISTING GE A-SERIES PANELBOARD SCHEDULE**

PANEL NAME: A LOCATION: STORAGE 111 SUPPLY FROM: SERVICE MOUNTING: SURFACE VOLTS: 120/208 Wye PHASES: 3 WIRES: 4 ENCLOSURE: TYPE 1 A.I.C. RATING: EXISTING MAINS RATING: 225 A MAINS TYPE: MAIN CIRCUIT BREAKER										
CKT NO.	CIRCUIT DESIGNATION	TRIP	POLES	A	B	C	POLES	TRIP	CIRCUIT DESIGNATION	CKT NO.
1	LTG - PUBLIC AREAS/W.C./STORAGE*	20 A	1	1360 VA / 1320 VA			1	20 A	LTG - STORAGE/TALLY/CONF*	2
3	LTG - STAFF AREAS*	20 A	1		1220 VA / 390 VA		1	20 A	LTG - EGRESS/EXIT SIGNS*	4
5	LTG - PARKING LOT*	20 A	1			2030 VA / 0 VA	1	20 A	SPARE MADE DURING DEMOLITION	6
7	SPARE MADE DURING DEMOLITION	20 A	1	0 VA / 0 VA			1	20 A	SPARE MADE DURING DEMOLITION	8
9	SPARE MADE DURING DEMOLITION	20 A	1		0 VA / 0 VA		1	20 A	SPARE MADE DURING DEMOLITION	10
11	SPARE MADE DURING DEMOLITION	20 A	1			0 VA / 0 VA	1	20 A	SPARE MADE DURING DEMOLITION	12
13	SPARE MADE DURING DEMOLITION	20 A	1	0 VA / 0 VA			1	20 A	SPARE MADE DURING DEMOLITION	14
15	SPARE MADE DURING DEMOLITION	20 A	1		0 VA / 0 VA		1	20 A	SPARE MADE DURING DEMOLITION	16
17	SPARE MADE DURING DEMOLITION	20 A	1			0 VA / 0 VA	1	20 A	SPARE MADE DURING DEMOLITION	18
19	SPARE MADE DURING DEMOLITION	20 A	1	0 VA / 0 VA			2	20 A	SPARE MADE DURING DEMOLITION	20
21	SPARE MADE DURING DEMOLITION	20 A	1		0 VA / 0 VA					22
23	WATER HEATER*	20 A	2			1250 VA / 0 VA	1	20 A	SPARE MADE DURING DEMOLITION	24
25				1250 VA / 0 VA			1	20 A	SPARE MADE DURING DEMOLITION	26
27	SPARE MADE DURING DEMOLITION	20 A	1		0 VA / 0 VA		1	20 A	(E) SPARE	28
29	SPARE MADE DURING DEMOLITION	20 A	1			0 VA / 0 VA	1	20 A	(E) SPARE	30
31	SPARE MADE DURING DEMOLITION	20 A	1	0 VA / 0 VA			1	20 A	SPARE MADE DURING DEMOLITION	32
33	SPARE MADE DURING DEMOLITION	20 A	1		0 VA / 0 VA		1	20 A	SPARE MADE DURING DEMOLITION	34
35	SPARE MADE DURING DEMOLITION	20 A	1			0 VA / 500 VA	1	20 A	(E) POWER DOOR	36
37	SPARE MADE DURING DEMOLITION	20 A	1	0 VA / 500 VA			1	20 A	(E) POWER DOOR	38
39	SPARE MADE DURING DEMOLITION	20 A	1		0 VA / 0 VA		1	20 A	SPARE MADE DURING DEMOLITION	40
41	SPARE MADE DURING DEMOLITION	20 A	1			0 VA / 0 VA	1	20 A	SPARE MADE DURING DEMOLITION	42
<b>TOTAL PHASE LOAD:</b>				4430 VA	1610	3784				
<b>TOTAL PHASE CURRENT:</b>				40 A	13 A	34 A				
<b>PANEL TOTALS</b>										
<b>TOTAL ADDITIONAL LOAD:</b> 9830 VA										
<b>TOTAL ADDITIONAL CURRENT:</b> 27 A										

**NOTES:**

(\* ) NEW LOAD ON EXISTING BREAKER. CIRCUIT TO SPACE INDICATED.

**EXISTING GE A-SERIES PANELBOARD SCHEDULE**

PANEL NAME: B LOCATION: STORAGE 111 SUPPLY FROM: SERVICE MOUNTING: SURFACE VOLTS: 120/208 Wye PHASES: 3 WIRES: 4 ENCLOSURE: TYPE 1 A.I.C. RATING: EXISTING MAINS RATING: 225 A MAINS TYPE: MAIN CIRCUIT BREAKER										
CKT NO.	CIRCUIT DESIGNATION	TRIP	POLES	A	B	C	POLES	TRIP	CIRCUIT DESIGNATION	CKT NO.
1	RCPT - 1/2 VOTING*	20 A	1	900 VA / 0 VA			1	20 A	(E) SPACE	2
3	RCPT - CONF/TRAINING RM.*	20 A	1		1080 VA / 720 VA		1	20 A	RCPT - TV/AV CONF. RM*	4
5	RCPT - REAR BATHROOM/STORAGE*	20 A	1			1440 VA / 900 VA	1	20 A	RCPT - OFFICE & STORAGE*	6
7	RCPT - BREAKROOM*	20 A	1	1080 VA / 1080 VA			1	20 A	RCPT - WORK ROOM/DIR OFFICE*	8
9	RCPT - VOTER REG. COUNTER*	20 A	1		900 VA / 900 VA		1	20 A	RCPT - PUBLIC RESTROOMS*	10
11	(E) SPACE	20 A	1			0 VA / 0 VA	1	20 A	(E) SPACE	12
13	RCPT - VOTER STORAGE*	20 A	1	1080 VA / 1080 VA			1	20 A	RCPT - VOTER STORAGE*	14
15	(E) SPACE	20 A	1		0 VA / 1080 VA		1	20 A	RCPT - VOTER STORAGE*	16
17	(E) SPACE	20 A	1			0 VA / 1080 VA	1	20 A	RCPT - VOTER STORAGE*	18
19	RCPT - VOTER STORAGE*	20 A	1	1080 VA / 0 VA			1	20 A	(E) SPACE	20
21	RCPT - VOTER STORAGE*	20 A	1		1080 VA / 1080 VA		1	20 A	RCPT - VOTER STORAGE*	22
23	RCPT - VOTER STORAGE*	20 A	1			1080 VA / 1440 VA	1	20 A	RCPT - EXTERIOR*	24
25	SPARE MADE DURING DEMOLITION	20 A	1	0 VA / 1180 VA			1	20 A	ACCESS CONTROL*	26
27	RCPT - MEZZANINE*	20 A	1		900 VA / 0 VA		1	20 A	(E) SPACE	28
29	RCPT - TALLY ROOM*	20 A	1			1080 VA / 900 VA	1	20 A	RCPT - 1/2 VOTING*	30
31	RCPT - VOTER STORAGE*	20 A	1	1080 VA / 1080 VA			1	20 A	RCPT - VESTIBULES*	32
33	RCPT - VOTER STORAGE*	20 A	1		1080 VA / 1290 VA		1	20 A	RCPT - VOTER STORAGE*	34
35	SPARE MADE DURING DEMOLITON	20 A	1			0 VA / 0 VA	1	20 A	SPARE MADE DURING DEMOLITON	36
37	SPARE MADE DURING DEMOLITON	20 A	1	0 VA / 0 VA			1	20 A	SPARE MADE DURING DEMOLITON	38
39	SPARE MADE DURING DEMOLITON	20 A	1		0 VA / 0 VA		1	20 A	SPARE MADE DURING DEMOLITON	40
41	SPARE MADE DURING DEMOLITON	20 A	1			0 VA / 0 VA	1	20 A	SPARE MADE DURING DEMOLITON	42
<b>TOTAL PHASE LOAD:</b>				9640 VA	10104	7920				
<b>TOTAL PHASE CURRENT:</b>				83 A	86 A	66 A				
<b>PANEL TOTALS</b>										
<b>TOTAL ADDITIONAL LOAD:</b> 27660 VA										
<b>TOTAL ADDITIONAL CURRENT:</b> 77 A										

**NOTES:**

(\* ) NEW LOAD ON EXISTING BREAKER. CIRCUIT TO SPACE INDICATED.

**EXISTING GE A-SERIES PANELBOARD SCHEDULE**

PANEL NAME: C LOCATION: STORAGE 111 SUPPLY FROM: SERVICE MOUNTING: SURFACE VOLTS: 120/208 Wye PHASES: 3 WIRES: 4 ENCLOSURE: TYPE 1 A.I.C. RATING: EXISTING MAINS RATING: 400 A MAINS TYPE: MAIN CIRCUIT BREAKER										
CKT NO.	CIRCUIT DESIGNATION	TRIP	POLES	A	B	C	POLES	TRIP	CIRCUIT DESIGNATION	CKT NO.
1	(E) SPARE	20 A	1	0 VA / 1920 VA			1	20 A	DEHUMIDIFIER 1*	2
3	REC - IT ROOM*	20 A	1		360 VA / 1920 VA		1	20 A	DEHUMIDIFIER 3*	4
5	(E) SPARE	20 A	1			0 VA / 360 VA	1	20 A	FACP**	6
7	(E) SPARE	20 A	1	0 VA / 540 VA			1	20 A	TIMECLOCK AND ALARMS*	8
9	SPARE MADE DURING DEMOLITON	20 A	1		0 VA / 100 VA		1	20 A	SECURITY PANEL*	10
11						1500 VA / 600 VA	1	20 A	(E) OVERHEAD DOOR	12
13	(E) RTU-1	90 A	3	1500 VA / 1750 VA			3	100 A	(E) RTU-2	14
15					1500 VA / 1750 VA					16
17						1000 VA / 1750 VA				18
19	(E) RTU-3	40 A	3	1000 VA / 20 VA			1	20 A	EXHAUST FANS 3,4,5*	20
21					1000 VA / 0 VA		1	20 A	SPARE MADE DURING DEMOLITON	22
23	DEHUMIDIFIER 2*	20 A	1			1920 VA / 360 VA	1	20 A	REC - IT ROOM (QUAD)*	24
25	HOT WATER PUMP*	20 A	1	160 VA / 360 VA			1	20 A	REC - IT ROOM (QUAD)*	26
27	RESTROOM FAUCET SENSORS*	20 A	1		400 VA / 360 VA		1	20 A	REC - IT ROOM (QUAD)*	28
29	BREAKROOM DISPOSAL*	20 A	1			100 VA / 0 VA	2	50 A	SPARE MADE DURING DEMOLITON	30
31				0 VA / 0 VA						32
33	SPARE MADE DURING DEMOLITON	30 A	2		0 VA / 0 VA		2	30 A	SPARE MADE DURING DEMOLITON	34
35	SPARE MADE DURING DEMOLITON	20 A	1			0 VA / 0 VA	1	--	(E) SPACE	36
37	SPARE MADE DURING DEMOLITON	20 A	1	0 VA / 0 VA			1	--	(E) SPACE	38
39	SPARE MADE DURING DEMOLITON	20 A	1		0 VA / 0 VA		1	--	(E) SPACE	40
41	EXISTING SPACE	--	1			0 VA / 0 VA	1	--	(E) SPACE	42
<b>TOTAL PHASE LOAD:</b>				7250 VA	7390	7590				
<b>TOTAL PHASE CURRENT:</b>				60 A	62 A	63 A				
<b>PANEL TOTALS</b>										
<b>TOTAL ADDITIONAL LOAD:</b> 22230 VA										
<b>TOTAL ADDITIONAL CURRENT:</b> 62 A										

**NOTES:**

(\* ) NEW LOAD ON EXISTING BREAKER. CIRCUIT TO SPACE INDICATED.  
(\*\* ) PROVIDE RED BREAKER WITH LOCK OUT CLIP.



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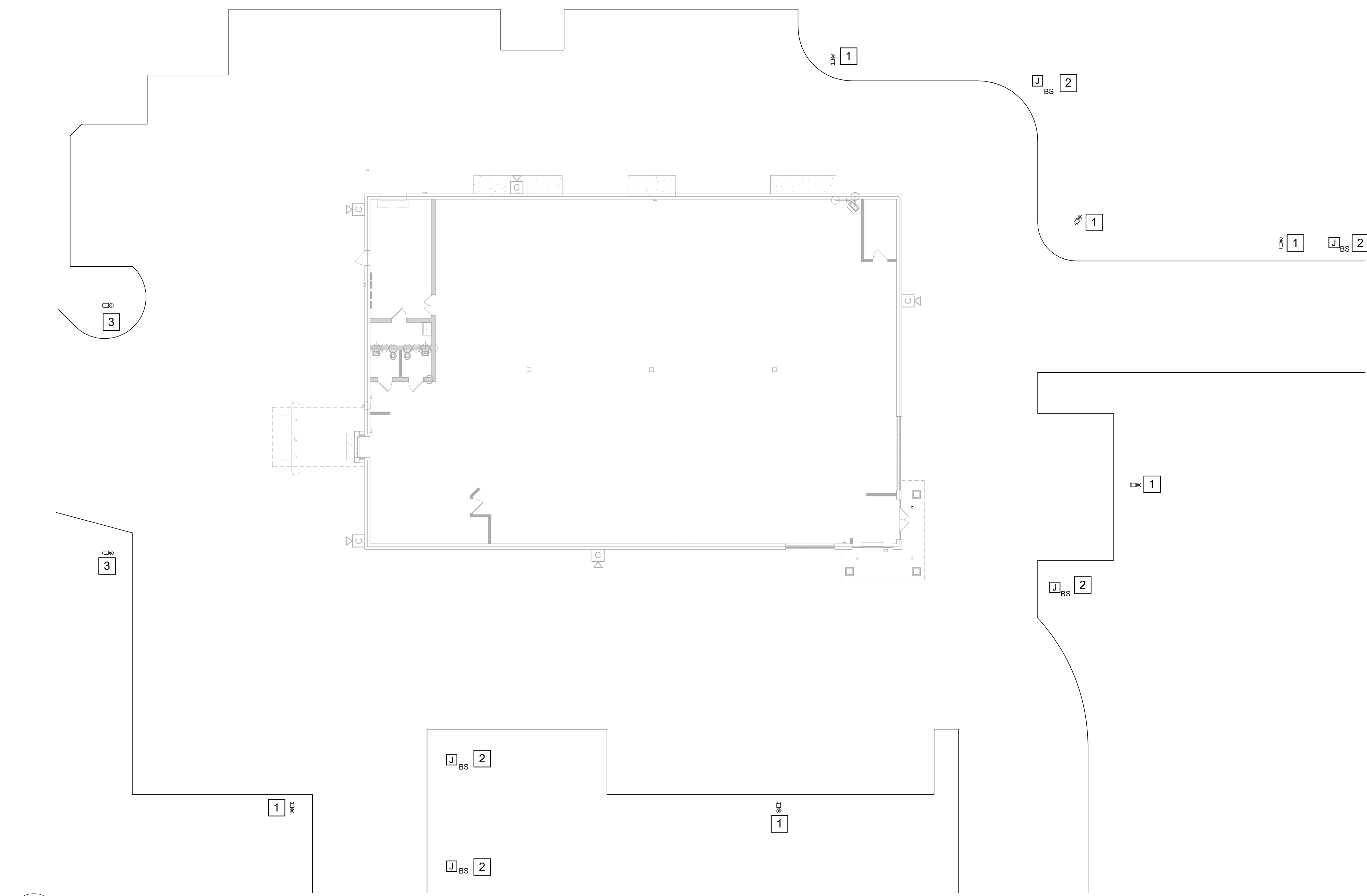


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**ELECTRICAL PANEL SCHEDULES**



1 SITE DEMOLITION PLAN  
E050 NOT TO SCALE

GENERAL NOTES

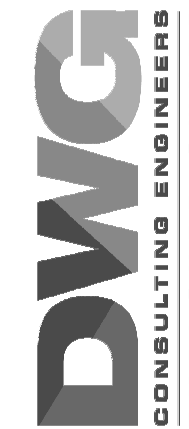
1. LOCATION OF EXISTING EXTERIOR LIGHTING AND BUILDING SIGNAGE IS APPROXIMATE. VERIFY IN FIELD EXACT LOCATION AND QUANTITY OF LIGHT FIXTURES. NOTIFY ENGINEER IMMEDIATELY IF QUANTITY OF EXISTING FIXTURES DIFFERS FROM WHAT IS SHOWN.
2. CONTRACTOR TO REMOVE ALL EXTERIOR SIGNAGE.

DEMOLITION KEYNOTES

- 1 DEMOLISH LIGHT POLE. CONCRETE BASE AND CONDUCTORS SHALL REMAIN.
- 2 EXISTING BUILDING SIGNAGE POWER SHALL BE DEMOLISHED. POWER SERVING EXISTING EXTERIOR LIGHTING FOR POLE TYPE LIGHTS SHALL REMAIN. IF BUILDING SIGNAGE IS CONNECTED TO PARKING LOT LIGHT, ONLY BUILDING SIGNAGE IS TO BE DEMOLISHED.
- 3 EXISTING POLE LIGHTS SERVE ADJACENT PARKING LOT TO REMAIN.

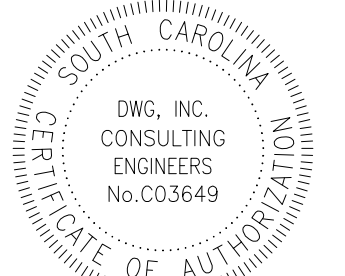


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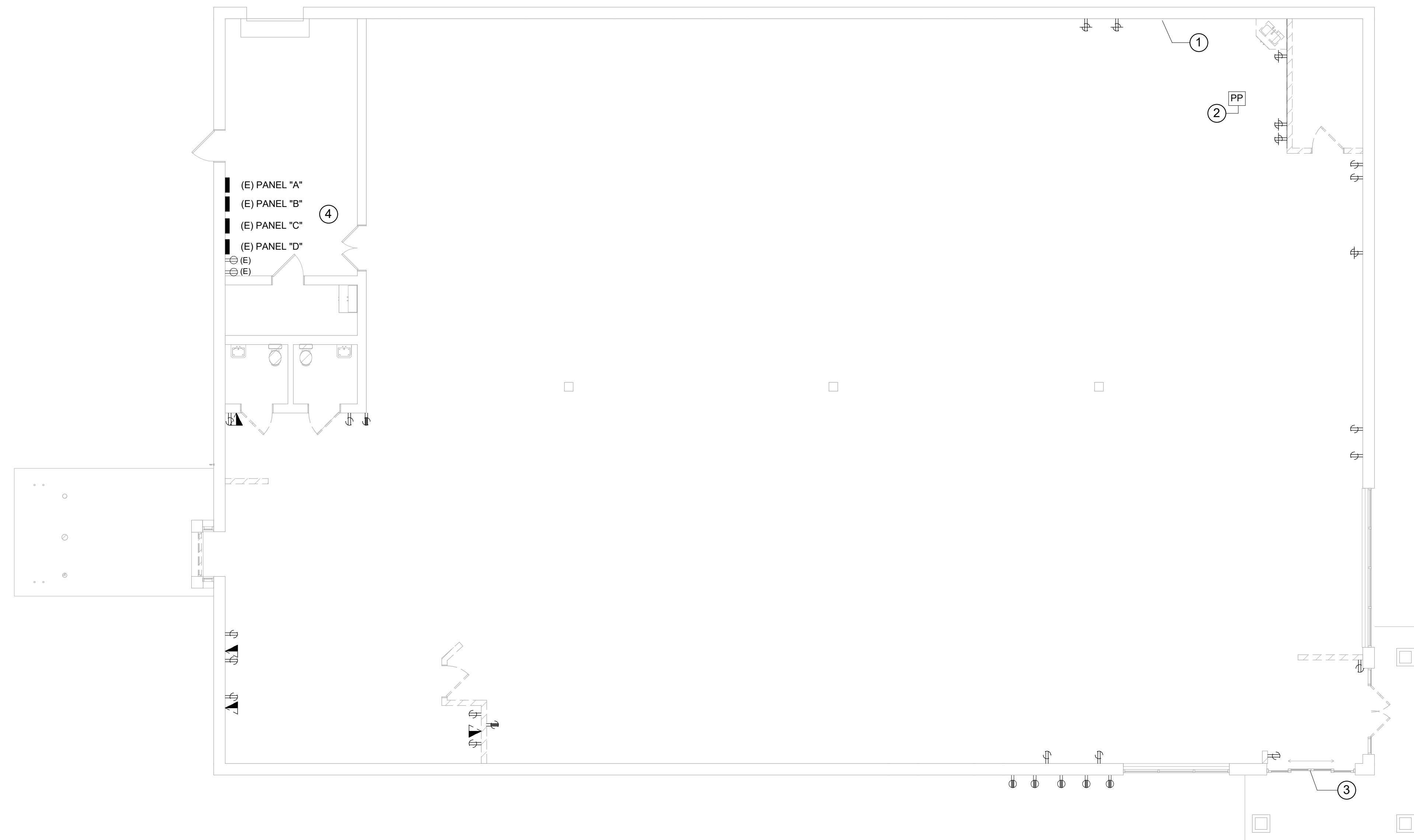
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SITE DEMOLITION  
PLAN





1 FIRST FLOOR POWER & TELECOMMUNICATIONS DEMO PLAN  
 E051 NOT TO SCALE

### GENERAL NOTES

1. VERIFY LOCATION AND QUANTITY OF EXISTING ELECTRICAL COMPONENTS.
2. EXCEPT NOTED ELSEWHERE, DEMOLISH AND REMOVE ALL INTERIOR AND EXTERIOR POWER DISTRIBUTION CIRCUITS, HANGERS, SUPPORTS, ETC. BACK TO SOURCE. POWER DISTRIBUTION DEMOLITION SCOPE INDICATED IS DIAGRAMMATIC IN NATURE. FIELD VERIFY.
3. WHERE EXTERIOR COMPONENTS ARE REMOVED, CONTRACTOR SHALL PATCH AND REPAIR EXTERIOR FACADE TO MATCH EXISTING AND/OR PER ARCHITECTURAL DRAWINGS.

### DEMOLITION KEYNOTES

1. EXISTING POWER POLE TO BE DEMOLISHED.
2. ELECTRICALLY DISCONNECT AUTOMATIC DOOR AND DEMOLISH CIRCUIT BACK TO SOURCE.
3. EQUIPMENT AND POWER SERVING EXISTING GAS HEATER IS TO REMAIN. COMPONENTS SHALL BE UNCIRCUITED, STORED, AND REUSED IF DESIRED. LOCATION INSIDE IS APPROXIMATE.

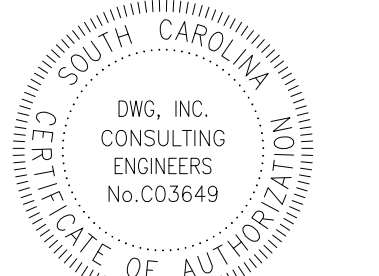


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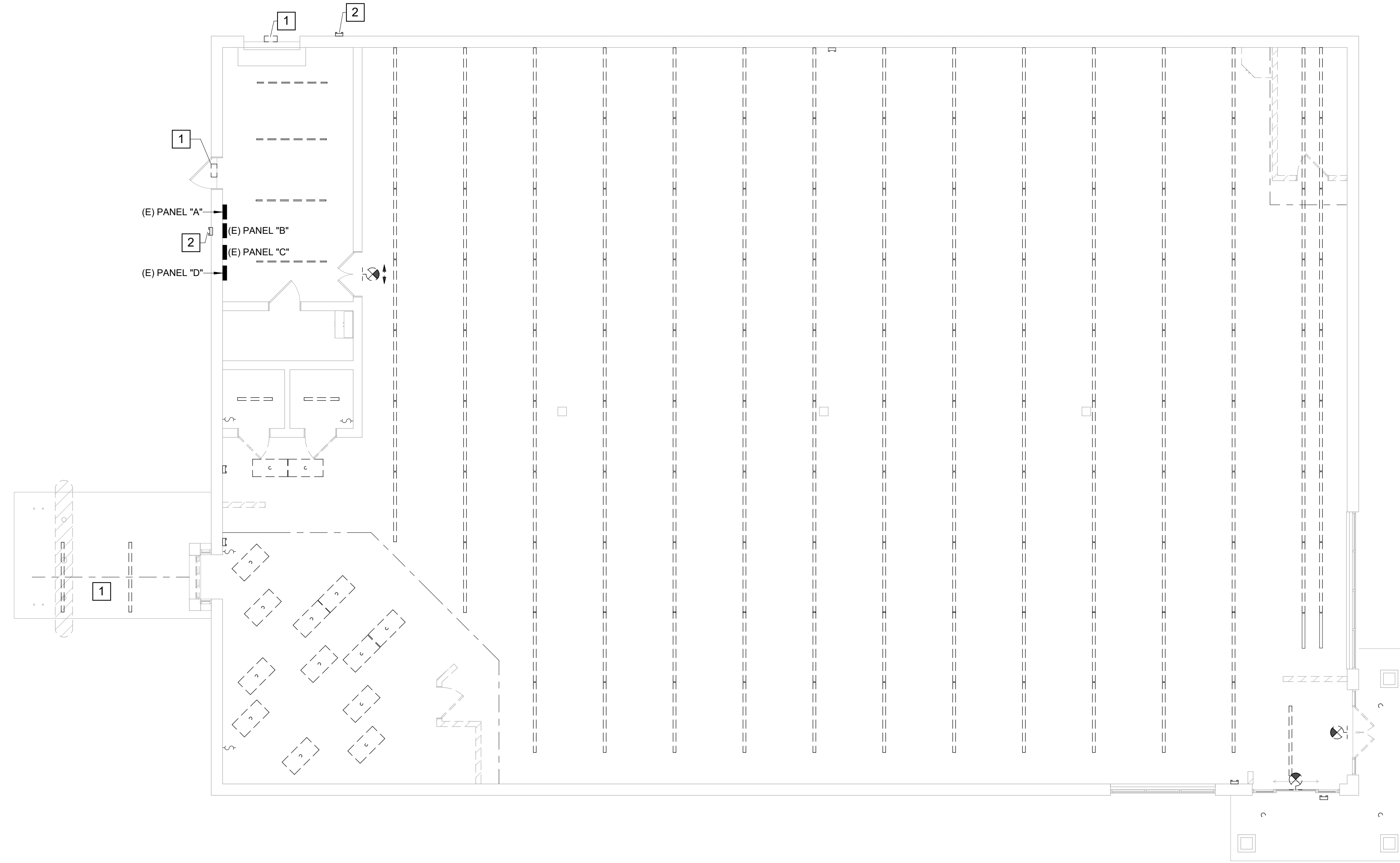
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**FIRST FLOOR  
 POWER &  
 TELECOM  
 DEMOLITION  
 PLAN**

**E051**





1 FIRST FLOOR LIGHTING DEMO PLAN  
E052 NOT TO SCALE

### GENERAL NOTES

1. DEMOLISH AND REMOVE ALL INTERIOR AND EXTERIOR LIGHTING, EXIT SIGNS AND ASSOCIATED CIRCUITS, HANGERS, SUPPORTS, ETC. BACK TO SOURCE. LIGHTING DEMOLITION SCOPE INDICATED IS DIAGRAMMATIC IN NATURE. FIELD VERIFY. WHERE EXTERIOR COMPONENTS ARE REMOVED, CONTRACTOR SHALL PATCH AND REPAIR EXTERIOR FACADE TO MATCH EXISTING AND/OR PER ARCHITECTURAL DRAWINGS.
- 2.

### DEMOLITION KEYNOTES

- 1 LIGHTS SHALL BE DEMOLISHED. MAINTAIN CIRCUITING FOR REUSE IN RENOVATION.
- 2 LIGHTS SHALL BE DEMOLISHED AND HAVE BLANK WEATHERPROOF COVERPLATE AND SEAL INSTALLED IN SPACE.



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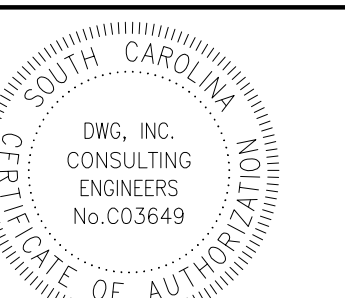


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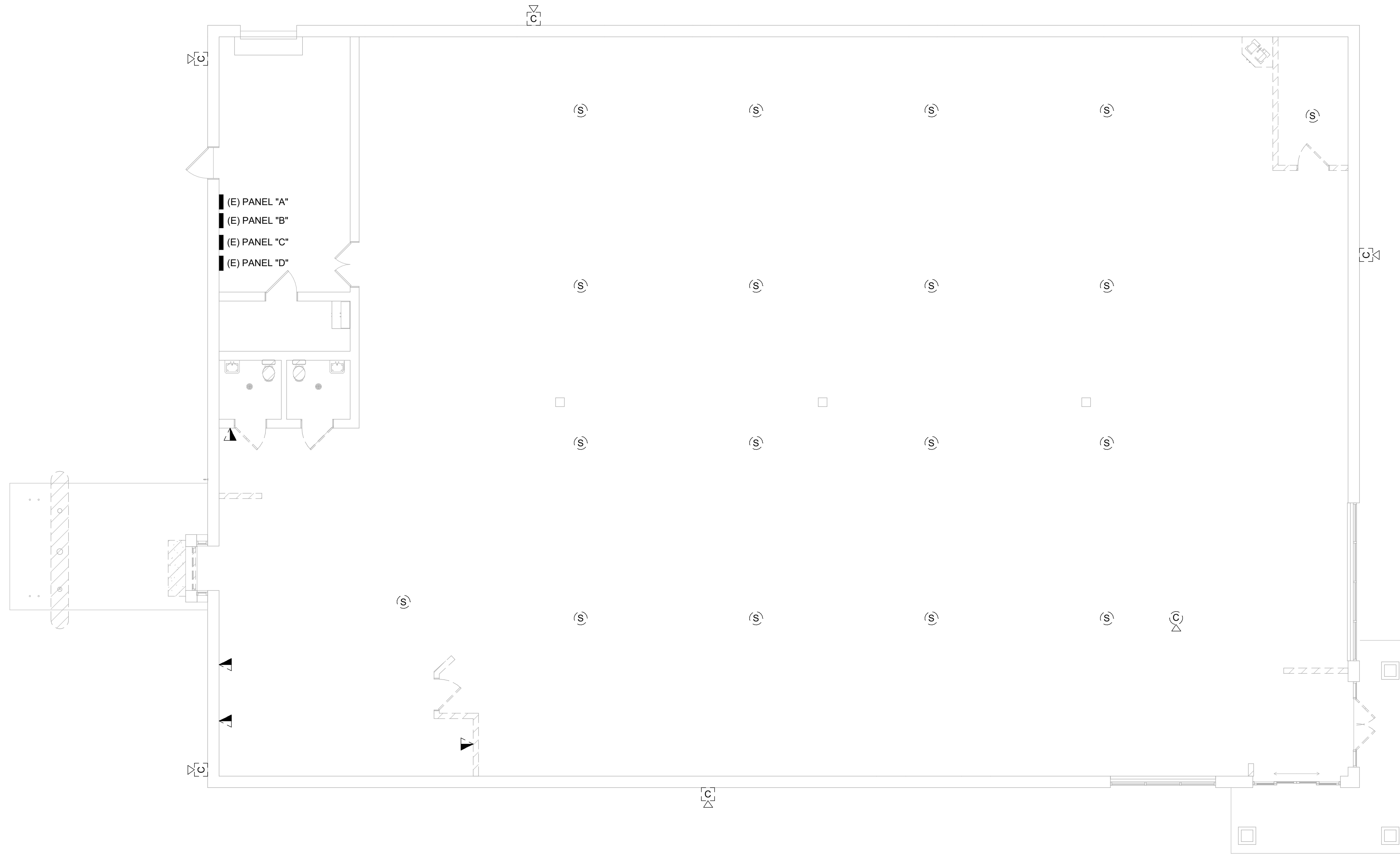
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FIRST FLOOR  
LIGHTING  
DEMOLITION  
PLAN

E052



1 FIRST FLOOR SYSTEMS DEMO PLAN  
 E053 NOT TO SCALE

### GENERAL NOTES

1. DEMOLISH AND REMOVE ALL EXISTING LOW VOLTAGE SYSTEMS INCLUDING DEVICES, WIRING, COVER PLATES, ROUGH-IN, CONDUITS, HANGERS, SUPPORTS, ETC. BACK TO SOURCE. SYSTEMS DEMOLITION SCOPE INDICATED IS DIAGRAMMATIC IN NATURE. FIELD VERIFY.
2. WHERE EXTERIOR COMPONENTS ARE REMOVED, CONTRACTOR SHALL PATCH AND REPAIR EXTERIOR FACADE TO MATCH EXISTING AND/OR PER ARCHITECTURAL DRAWINGS.
3. LOCATION OF EXISTING EXTERIOR MOUNTED CAMERAS SHALL BE REUSED. LOCATIONS THAT ARE NOT TO BE REUSED SHALL HAVE A BLANK, WEATHERPROOF, COVERPLATE, AND SEAL INSTALLED.

### DEMOLITION KEYNOTES



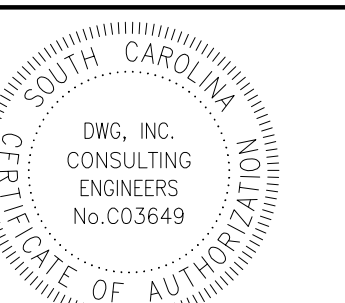
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FIRST FLOOR  
 SYSTEMS  
 DEMOLITION  
 PLAN

E053

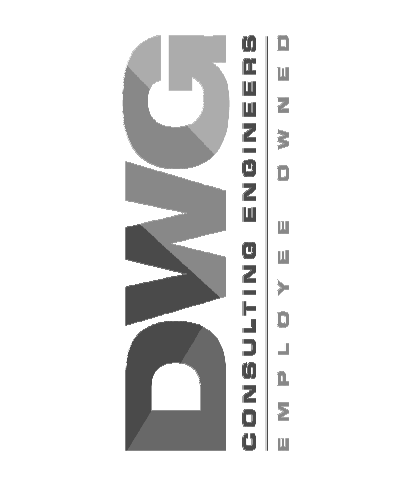


1 MEZZANINE ELECTRICAL DEMOLITION PLAN  
E061 NOT TO SCALE

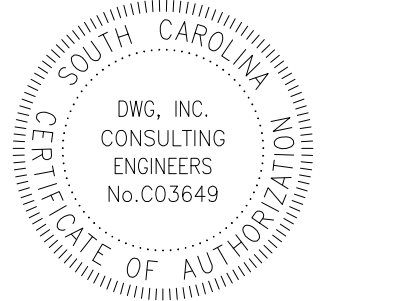
GENERAL NOTES

DEMOLITION KEYNOTES

- 1 DEMOLISH EXISTING WATER HEATER AND ASSOCIATED DISCONNECT ON MEZZANINE LEVEL BACK TO SOURCE.



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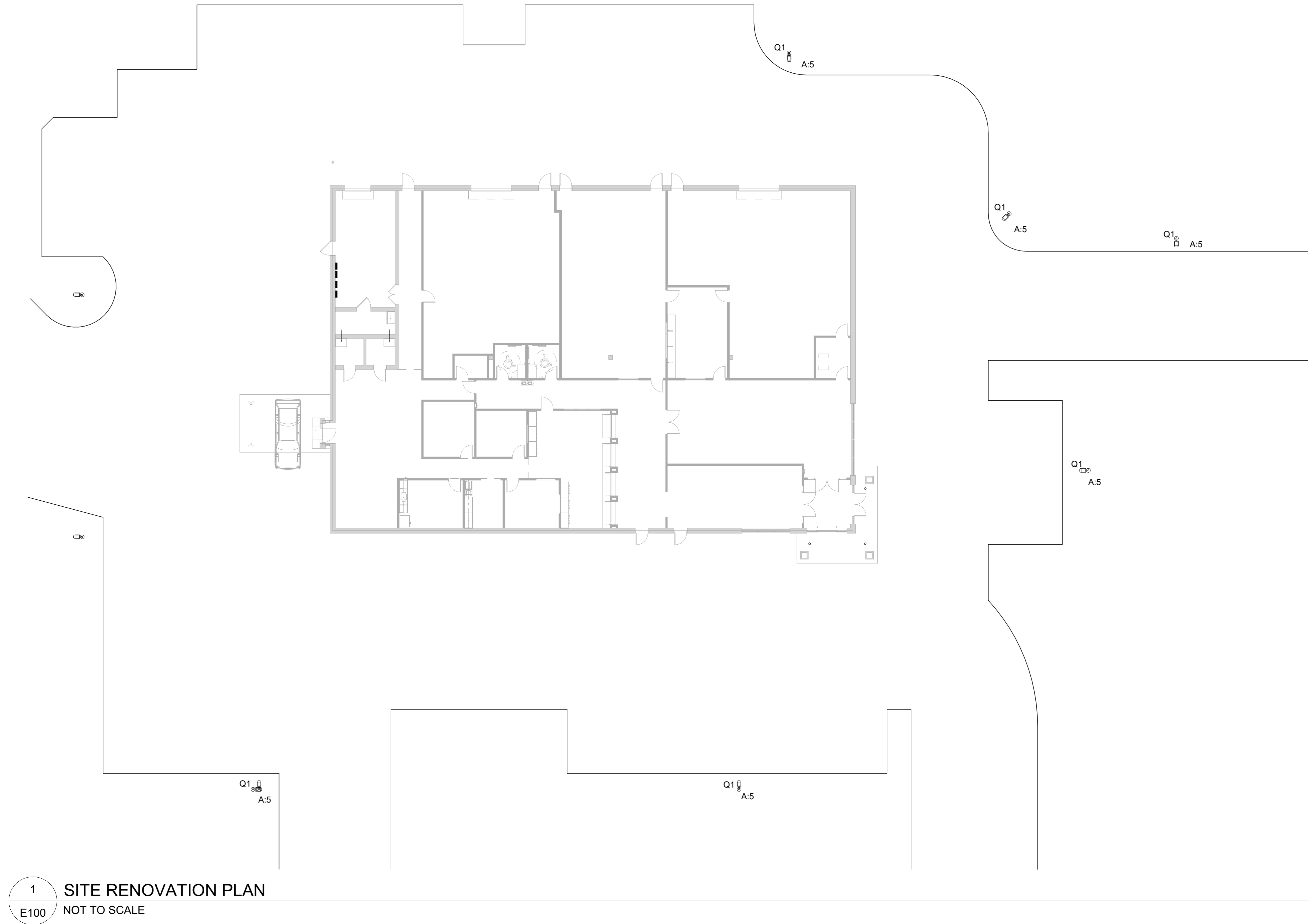
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**MEZZANINE ELECTRICAL DEMOLITION PLAN**

**E061**

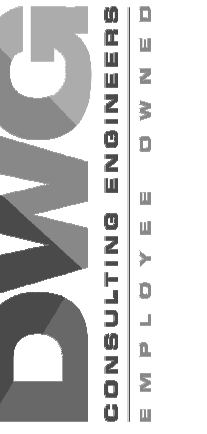


1 SITE RENOVATION PLAN  
E100 NOT TO SCALE

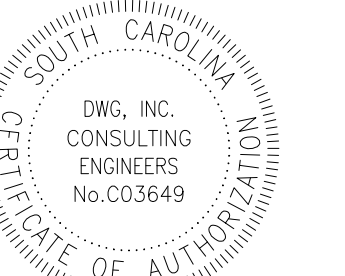
GENERAL NOTES

1. INSTALL NEW EXTERIOR POLE MOUNTED FIXTURES ON EXISTING POLE BASES.

RENOVATION KEYNOTES



REV.	DATE	DESCRIPTION



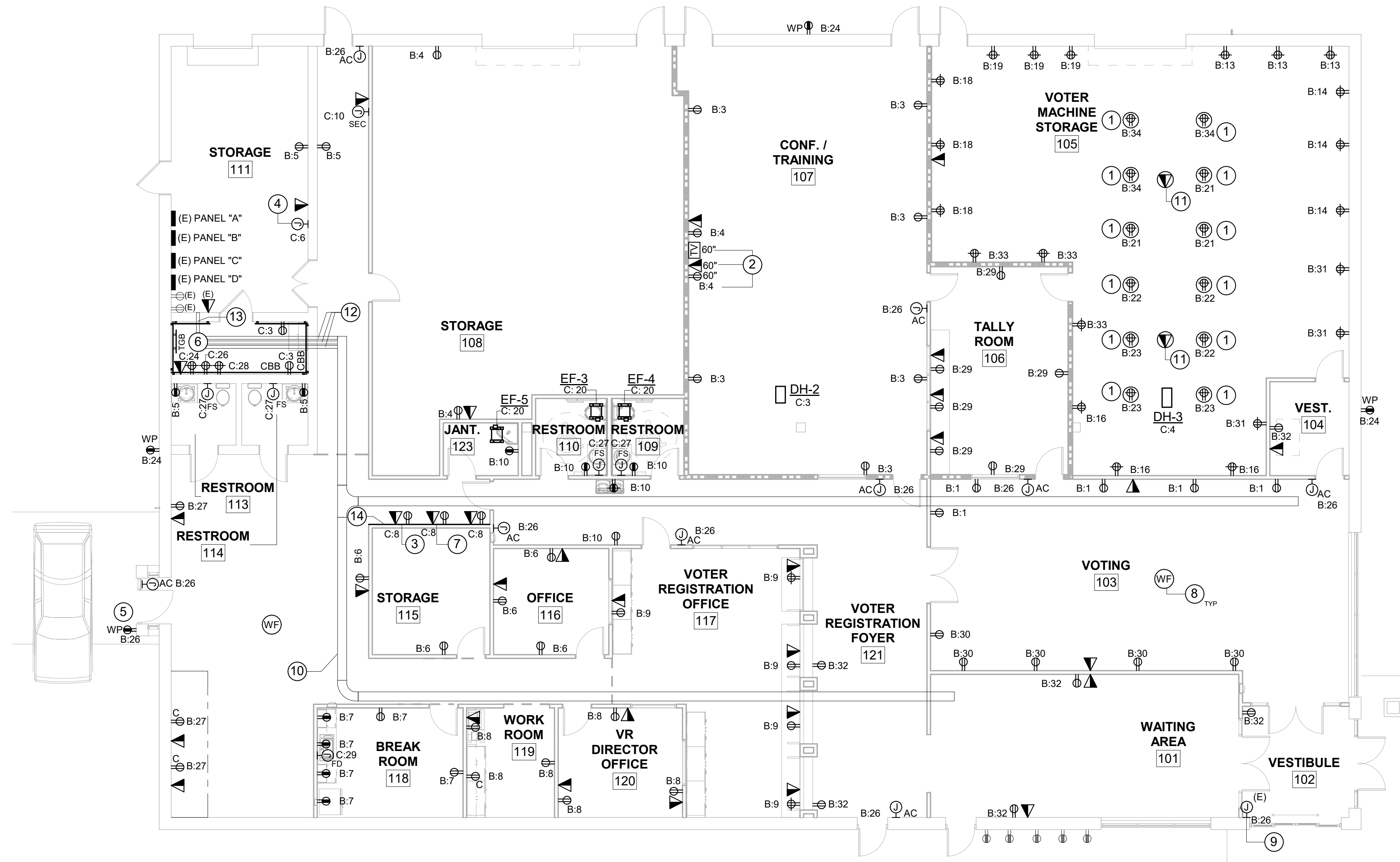
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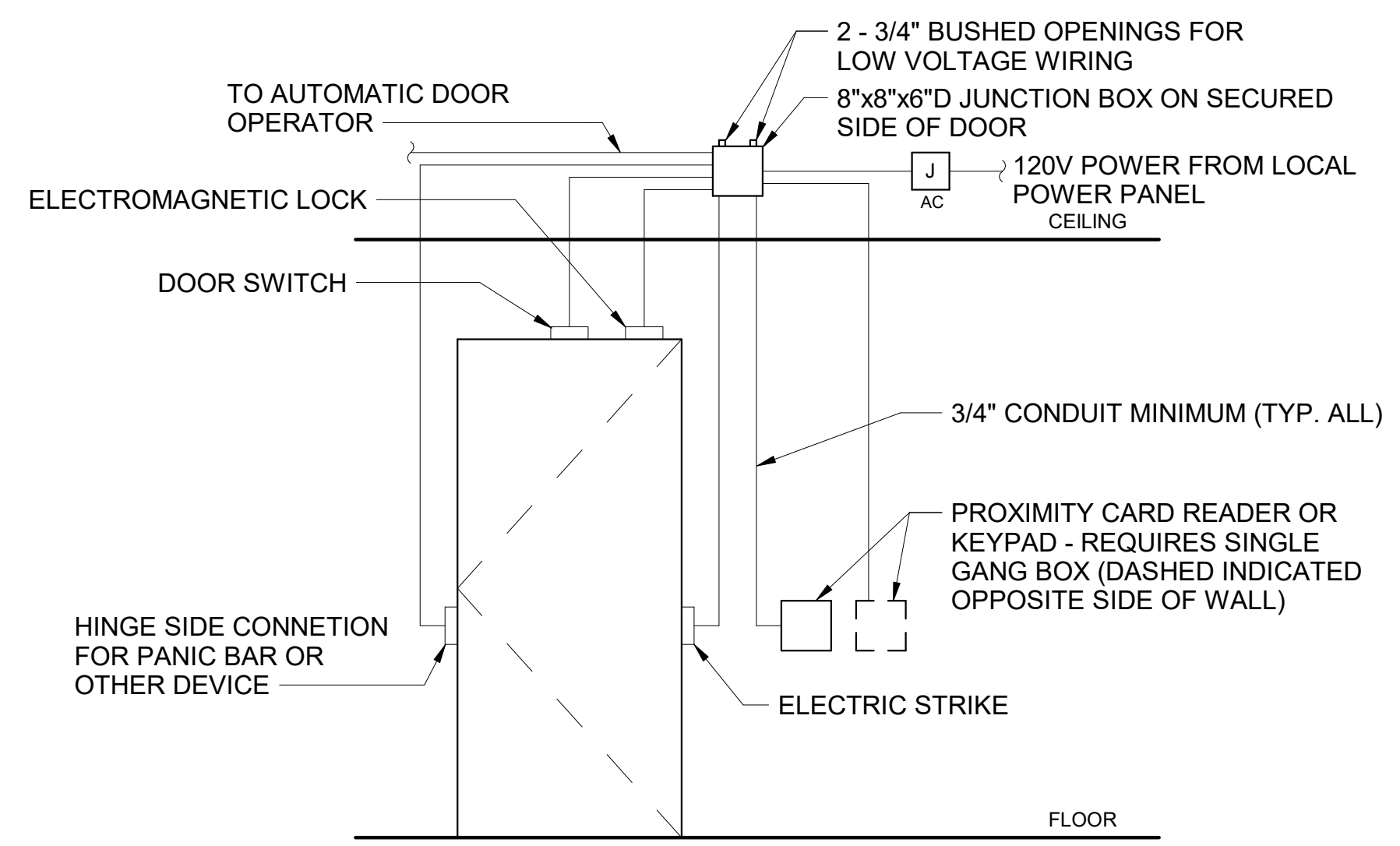
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**SITE ELECTRICAL  
RENOVATION  
PLAN**





**1** FIRST FLOOR POWER & TELECOMMUNICATIONS PLAN  
E101 NOT TO SCALE



**NOTES:**  
DOOR ACCESS EQUIPMENT AND LOW VOLTAGE WIRING BY OWNER. ACTUAL CONFIGURATION AT DOORS WILL VARY BY LOCATION. REFER TO GENERAL NOTES AND DOOR HARDWARE SPECIFICATION FOR EQUIPMENT AT EACH DOOR. ELECTRICAL CONTRACTOR TO PROVIDE NECESSARY ROUGH-IN: RACEWAYS, BOXES, CONDUCTORS, POWER, ETC. BASED UPON CONTRACTOR'S COORDINATION WITH ACCESS CONTROL HARDWARE PROVIDER AND DOOR HARDWARE PROVIDER TO PROVIDE A COMPLETE AND FULLY FUNCTIONAL SYSTEM.

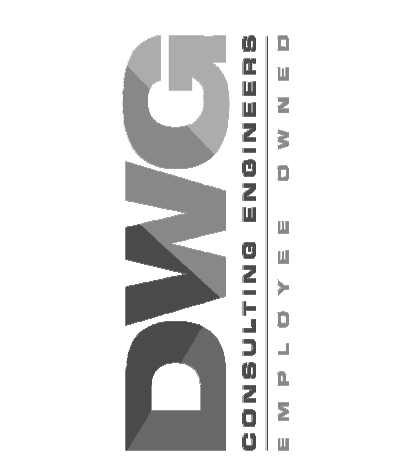
**2** ACCESS CONTROL DOOR ROUGH IN DETAIL  
E101 NOT TO SCALE

**GENERAL NOTES**

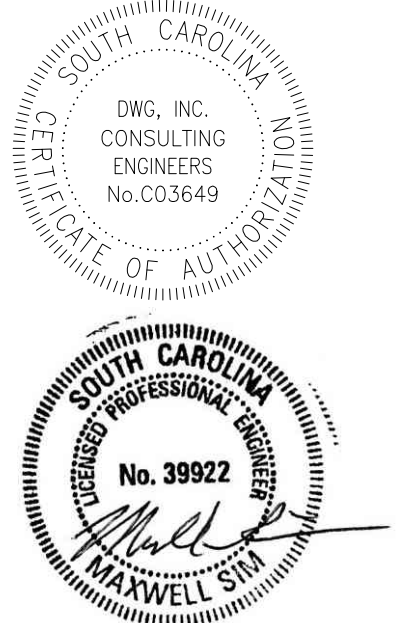
- COORDINATE WITH OWNER DATA LOCATIONS.
- ALL CONDUIT TO BE INSTALLED WITH PULL STRINGS.
- ACCESS CONTROLS SHALL BE DESIGNED AS FOLLOWS:  
ALL STANDARD INTERIOR DOOR FRAMES THAT DO NOT USE PANIC HARDWARE SHALL RECEIVE A ELECTRIC DOOR STRIKE, INSTALLED WITH 3/4" CONDUIT IN FRAME OR WALL TERMINATING AT ELECTRIC STRIKE. THE 3/4" CONDUIT SHALL EMPTY INTO THE CABLE TRAY IN CEILING AT DOOR, CARD READERS SHALL HAVE 3/4" CONDUIT INSTALLED IN WALL RUNNING FROM CEILING TO SINGLE GANG BOX MOUNTED AT DOOR. APPLIES AT DOORS THAT UTILIZE PANIC HARDWARE.
- ALL DOORS WITH PANIC HARDWARE SHALL HAVE ELECTRIFIED HINGES. WIRING FOR ELECTRIFIED HINGES SHALL RUN IN 3/4" CONDUIT DIRECTLY INTO CEILING.
- ALL DOORS SHALL HAVE A MANUAL KEYPAD OVERRIDE.
- GENERAL CONTRACTOR SHALL COORDINATE ALL ACCESS CONTROL INSTALLATION WITH DESIGNATED PROVIDER.
- WALLS SHALL BE EQUIPPED WITH SUITABLE WOOD BACKING AT TV LOCATIONS.

**RENOVATION KEYNOTES**

- PROVIDE CEILING MOUNTED, 20 AMP, 40-FOOT RETRACTABLE CORD REEL WITH (4) GROUNDED OUTLETS ON END AND RESETTABLE CIRCUIT BREAKER. COORDINATE INSTALLATION WITH CONTRACTOR, OR USE BASIS OF DESIGN: HUBBEL, HBLI45123R220M1.
- RECEPTACLES TO BE PROVIDED AT STANDARD HEIGHT AND AT TV HEIGHT. DATA POINTS TO BE PROVIDED AT TV HEIGHT AND STANDARD HEIGHT FOR AV USE AND ALSO SHALL BE PROVIDED FROM TV HEIGHT TO STANDARD HEIGHT FOR AV ACCESS TO THE TV. ROUGH-IN ALL.
- PROVIDE FINAL CONNECTION FOR TIMECLOCK AND SECURITY ALARM PANEL. COORDINATE LOCATION WITH OWNER.
- PROVIDE FINAL CONNECTION FOR FIRE ALARM CONTROL PANEL.
- DATA AND POWER SHALL SERVE PEDESTAL MOUNTED VIDEO DOOR BELL.
- LOCATION OF IT RACK AND DEVICES APPROXIMATE. COORDINATE WITH OWNER PRIOR TO ROUGH IN AND INSTALLATION OF IT EQUIPMENT.
- PROVIDE (2) SINGLE GANG BOXES WITH 1" CONDUIT STUBBED INTO ACCESSIBLE CEILING SPACE. LOCATE BOXES AT 3'8" AND 4'8" RESPECTIVELY. COORDINATE FINAL LOCATION WITH OWNER.
- WIRELESS ACCESS POINTS SHALL BE MOUNTED WITHIN CEILING TILES TO RECESSED JUNCTION BOX.
- PROVIDE FINAL CONNECTION TO EXISTING SLIDING DOOR.
- CABLE TRAY, REFER TO SPECIFICATIONS
- CEILING DATA DROP. ROUGH-IN ONLY. 50-FOOT CORD REEL TO BE PROVIDED BY CONTRACTOR, OR USE BASIS OF DESIGN: HUBBEL, HBLI50CAT6.
- (3) 4" CONDUIT RUN THROUGH WALL FROM IT-RACK TO CABLE TRAY.
- (1) 4" CONDUIT RUN THROUGH WALL FROM IT-RACK TO CABLE TRAY.
- PROVIDE BACKING BOARD IN HALF-CORRIDOR FROM FLOOR TO CEILING. COORDINATE INSTALLATION WITH CONTRACTOR.



REV.	DATE	DESCRIPTION



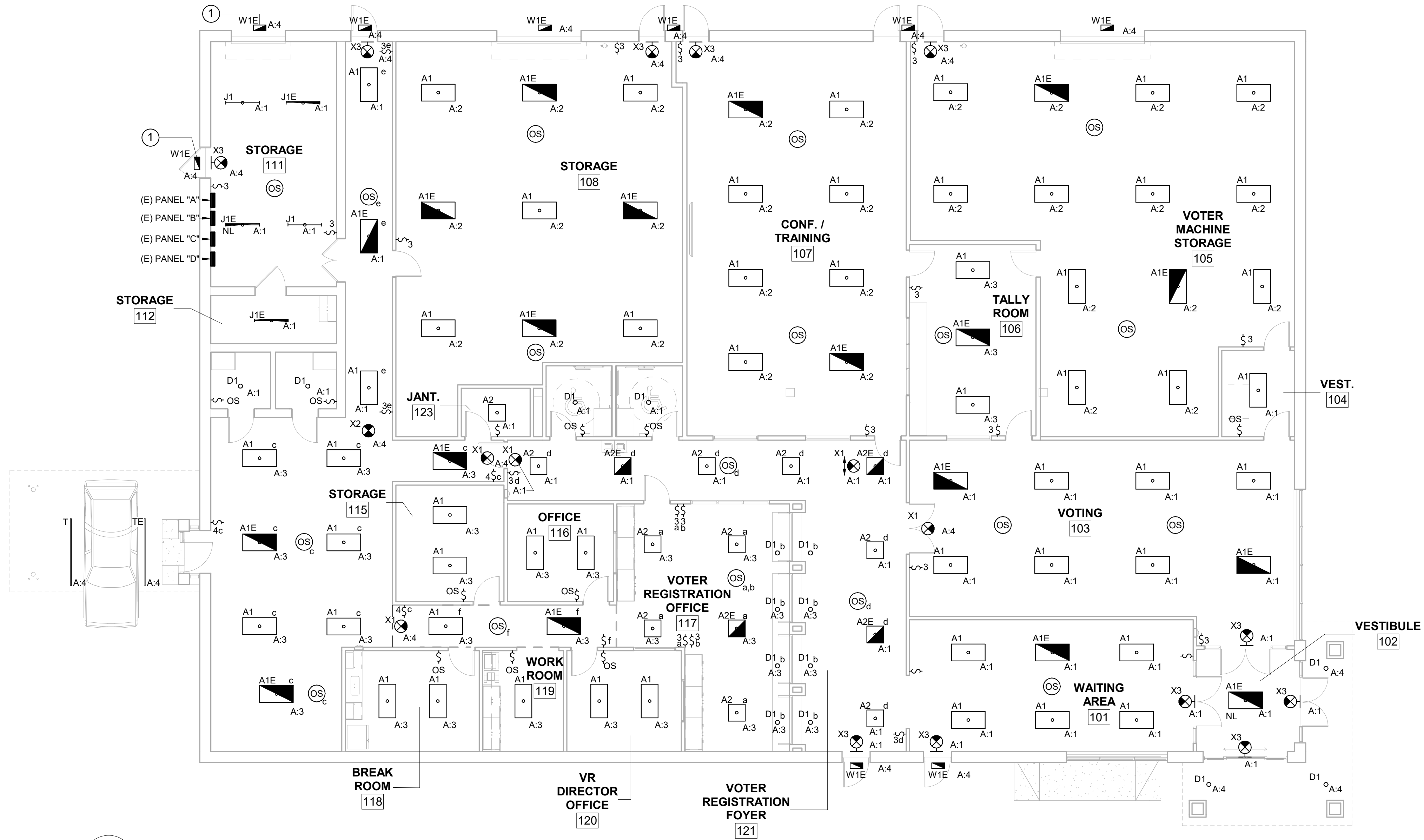
4/27/2023

**COLLETON COUNTY VOTER REGISTRATION CENTER**  
COLLETON COUNTY  
72 BELLS HWY  
WALTERBORO, SC 29488

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JOB NUMBER: 22123  
PROJECT MGR.:  
DRAWN BY: EMB  
CHECKED BY: WDB  
APPROVED BY: MHS  
DATE ISSUED FOR: 4/27/23  
DOCUMENTS

**FIRST FLOOR POWER & TELECOM RENOVATION PLAN**  
**E101**





1 FIRST FLOOR LIGHTING PLAN  
 E102 NOT TO SCALE

**LIGHT FIXTURE PLAN KEY**

SHADING INDICATES EMERGENCY FIXTURE SUPPLIED WITH EMERGENCY BATTERY BACKUP.

A1 d A1 = UPPERCASE LETTER / NUMBER INDICATE FIXTURE TYPE  
 d = LOWERCASE LETTER INDICATES SWITCH IDENTIFICATION  
 NL A:2 = INDICATES NON-SWITCHED "NIGHT LIGHT"  
 A:2 = DESIGNATES PANEL NAME: CIRCUIT NUMBER

ALL EMERGENCY FIXTURES INDICATED ON PLAN CONTAIN EMERGENCY BATTERY BACKUP. ALL EMERGENCY BACKUP FIXTURES REQUIRE AN EXTRA CONSTANT POWER CONDUCTOR TO BE CONNECTED TO THE EMERGENCY BACKUP FOR CHARGING. THIS CONDUCTOR MUST NOT BE CONTROLLED BY ANY LIGHTING SYSTEM OR HAVE POWER INTERRUPTED AT ANY TIME. "NL" FIXTURES SHALL HAVE ABSOLUTELY NO LIGHTING CONTROL AND SHALL BE OPERATIONAL AT ALL TIMES.

**GENERAL NOTES**

**RENOVATION KEYNOTES**

- 1 WALL MOUNTED EGRESS LIGHT TO BE INSTALLED IN EXISTING LOCATION.



REV.	DATE	DESCRIPTION

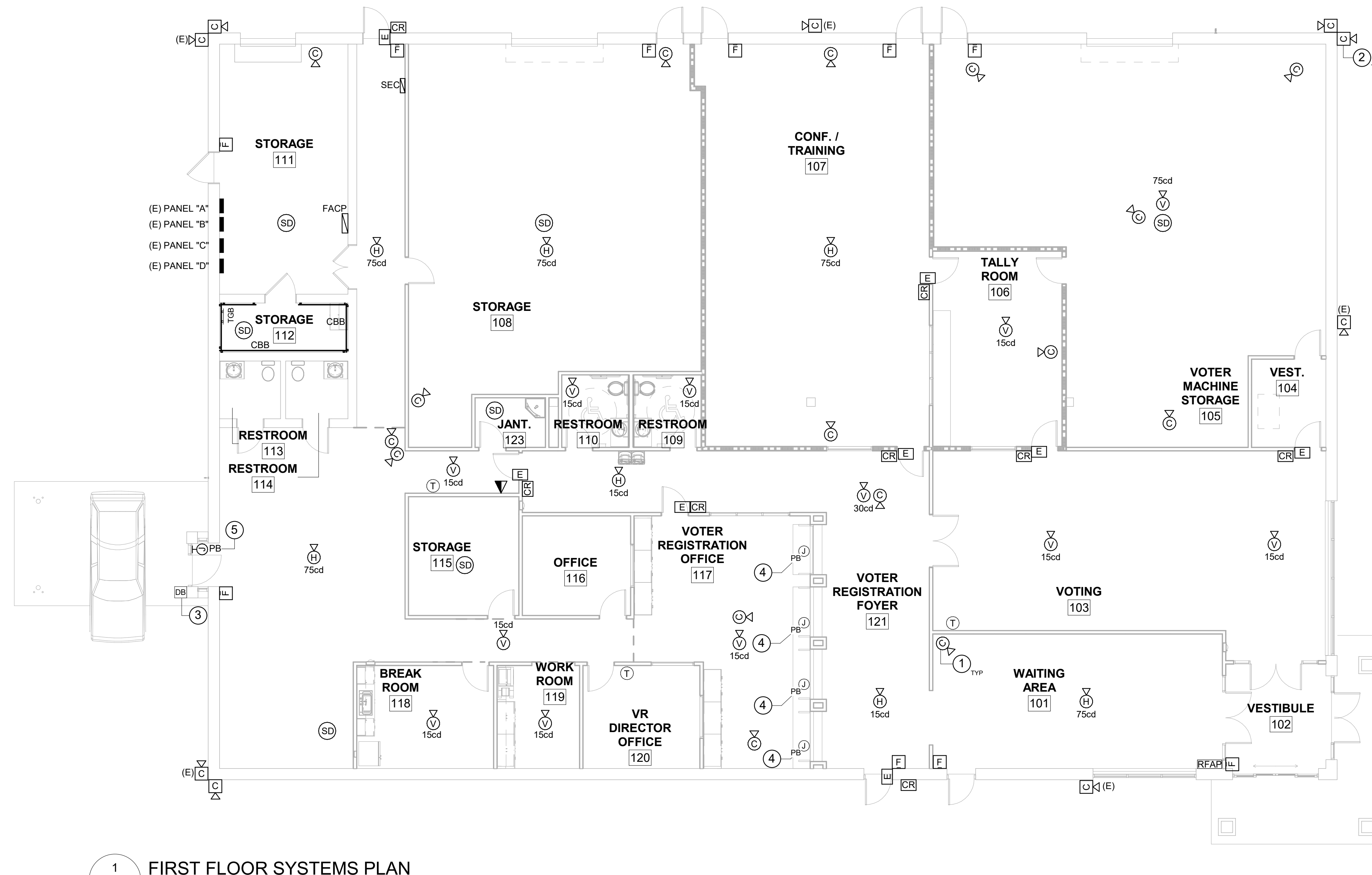


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 CONSTRUCTION DOCUMENTS

**FIRST FLOOR LIGHTING PLAN**



1 FIRST FLOOR SYSTEMS PLAN  
E103 NOT TO SCALE

GENERAL NOTES

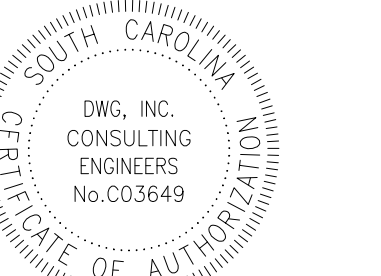
- SECURITY SYSTEMS INDICATED ARE ROUGH-IN ONLY. COORDINATE WITH OWNER PROVIDED SECURITY VENDOR.

RENOVATION KEYNOTES

- ROUGH-IN FOR INTERIOR CAMERAS SHALL BE MOUNTED WITHIN CEILING TILES TO RECESSED JUNCTION BOX.
- ROUGH-IN FOR EXTERIOR CAMERAS SHALL BE MOUNTED ON 4" ROUND JUNCTION BOX FLUSH TO WALL FACE APPROX 10' ABOVE GROUND.
- ROUGH IN FOR VIDEO DOORBELL. PROVIDE PEDESTAL FOR VIDEO DOORBELL. PROVIDE SINGLE GANG JUNCTION BOX WITH HEIGHT COORDINATED WITH OWNER. PROVIDE 1" CONDUIT STUBBED INTO ACCESSIBLE CEILING SPACE INSIDE.
- PROVIDE 2-GANG FLUSH MOUNTED JUNCTION BOX UNDER EACH COUNTER AT EACH WINDOW. PROVIDE 1" CONDUIT STUBBED INTO ACCESSIBLE CEILING SPACE FOR EACH BOX.
- PROVIDE 2-GANG FLUSH MOUNTED JUNCTION BOX AT 5' AFF PROVIDE 1" CONDUIT STUBBED INTO ACCESSIBLE CEILING SPACE FOR EACH BOX.



REV.	DATE	DESCRIPTION



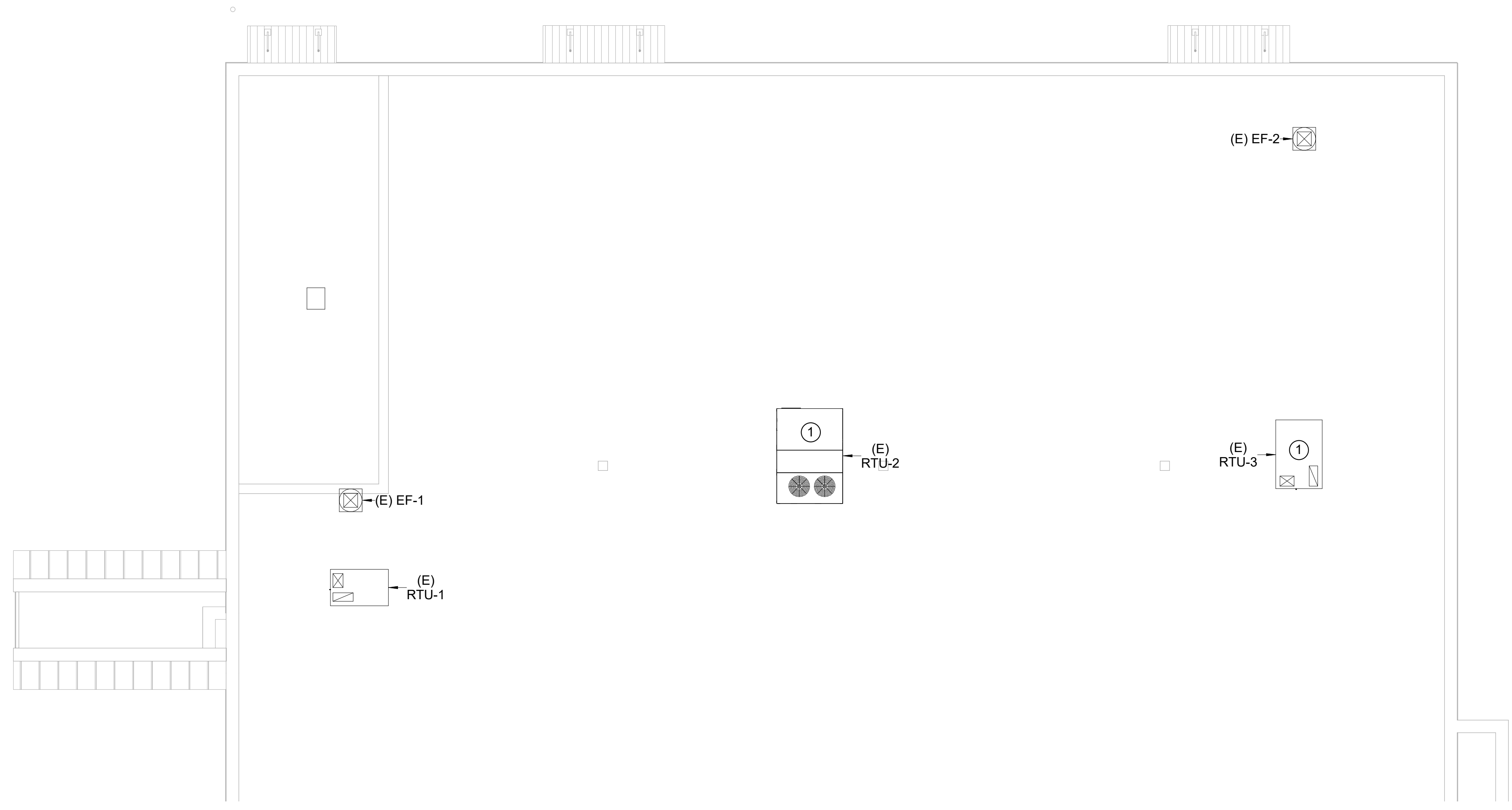
4/27/2023

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DRAWN BY: EMB  
CHECKED BY: WDB  
APPROVED BY: MHS  
DATE ISSUED FOR: 4/27/23  
CONSTRUCTION DOCUMENTS

**FIRST FLOOR SYSTEMS RENOVATION PLAN**

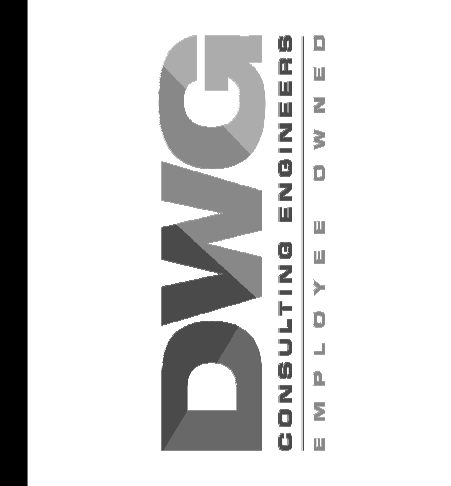




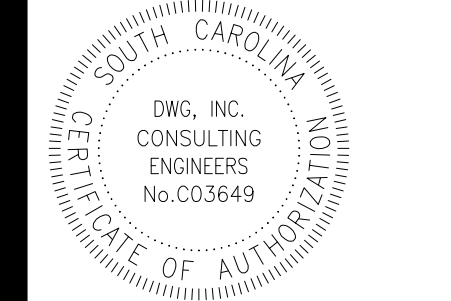
### GENERAL NOTES

### RENOVATION KEYNOTES

- ① PROVIDE ADDRESSABLE INTERFACE MODULE FOR FIRE ALARM INTERCONNECTION WITH COMPATIBLE NEW DUCT SMOKE DETECTORS.

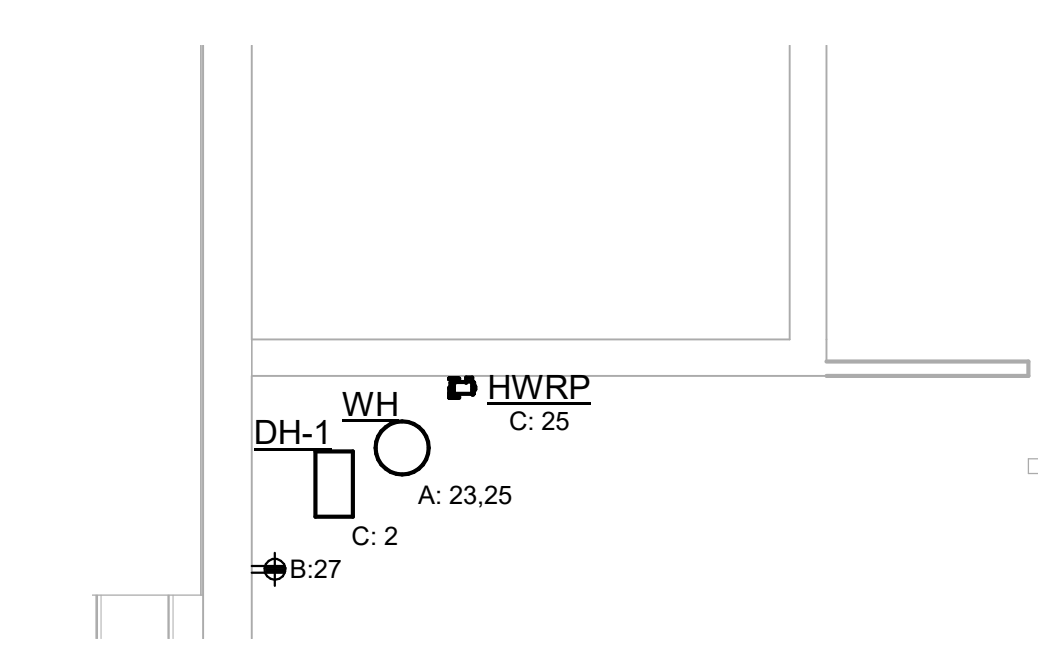


REV.	DATE	DESCRIPTION



4/27/2023

1 ROOF ELECTRICAL PLAN  
 E200 NOT TO SCALE



2 MEZZANINE ELECTRICAL PLAN  
 E200 NOT TO SCALE

**COLLETON COUNTY VOTER REGISTRATION CENTER**  
 COLLETON COUNTY  
 72 BELLS HWY  
 WALTERBORO, SC 29488

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 CONSTRUCTION DOCUMENTS

**ROOF ELECTRICAL PLAN**

# SPECIFICATIONS

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# COLLETON COUNTY VOTER REGISTRATION CENTER

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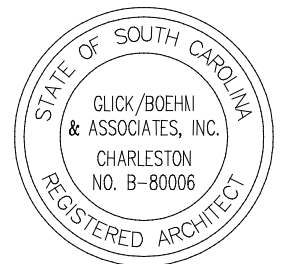
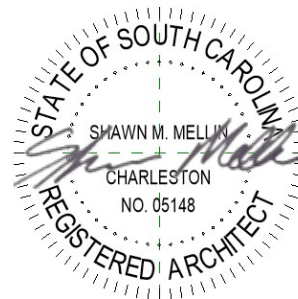
72 Bells Hwy  
Walterboro, SC 29488

For The Owner:

**Colleton County**

GBA PROJECT N<sup>o</sup>.: 2217

DATE: April 27, 2023



**ARCHITECTURE / PLANNING / INTERIOR DESIGN**

GLICK/BOEHM & ASSOCIATES, INC.

493 King Street, Suite 100

Charleston, South Carolina 29403

Telephone: 843.577.6377

Internet: [www.GBAarchitecture.com](http://www.GBAarchitecture.com)

**DOCUMENT 00 01 05**

**PROJECT DIRECTORY**

PROJECT: **Voter Registration Center**  
72 Bells Hwy  
Walterboro, SC 29488

OWNER: **Colleton County**

ARCHITECT: **Glick/Boehm & Associates, Inc.**  
493 King Street, Suite 100  
Charleston, SC 29403  
843-577-6377

STRUCTURAL CONSULTANT: **ADC Engineering**  
1226 Yeamans Hall Road  
Hanahan, SC 29410  
843-566-0161

MECHANICAL/ELECTRICAL/  
CONSULTANT: **DWG Consulting Engineers, Inc.**  
1009 Anna Knapp Blvd., Suite 202  
Mount Pleasant, SC 29464  
843-849-1141

**END OF PROJECT DIRECTORY**



00 01 10

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32 16 23 – CONCRETE SIDEWALKS

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NOT USED

**SECTION 02 41 00**  
**DEMOLITION****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Selective demolition of building elements for alteration purposes.

**1.02 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

**PART 3 EXECUTION****2.01 GENERAL PROCEDURES AND PROJECT CONDITIONS**

- A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
  - 1. Obtain required permits.
  - 2. Use of explosives is not permitted.
  - 3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
  - 4. Provide, erect, and maintain temporary barriers and security devices.
  - 5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
  - 6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
  - 7. Do not close or obstruct roadways or sidewalks without permit.
  - 8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
  - 9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
- B. Do not begin removal until receipt of notification to proceed from Owner.
- C. Do not begin removal until built elements to be salvaged or relocated have been removed.
- D. Protect existing structures and other elements that are not to be removed.
  - 1. Provide bracing and shoring.
  - 2. Prevent movement or settlement of adjacent structures.
  - 3. Stop work immediately if adjacent structures appear to be in danger.
- E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
- F. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.

**2.02 EXISTING UTILITIES**

- A. Protect existing utilities to remain from damage.

- B. Do not disrupt public utilities without permit from authority having jurisdiction.
- C. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.
- D. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

### **2.03 SELECTIVE DEMOLITION FOR ALTERATIONS**

- A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
  - 1. Verify that construction and utility arrangements are as shown.
  - 2. Report discrepancies to Architect before disturbing existing installation.
  - 3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.
- B. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
- C. Remove existing work as indicated and as required to accomplish new work.
  - 1. Remove items indicated on drawings.
  - 2. Patch walls flush with similar materials at intersections where existing walls have been demolished.
- D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
  - 1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
  - 2. Remove, store and protect existing mechanical equipment to be reinstalled as part of new construction.
  - 3. Verify that abandoned services serve only abandoned facilities before removal.
  - 4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.
- E. Protect existing work to remain.
  - 1. Prevent movement of structure; provide shoring and bracing if necessary.
  - 2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
  - 3. Repair adjacent construction and finishes damaged during removal work.
  - 4. Patch as specified for patching new work.

### **2.04 DEBRIS AND WASTE REMOVAL**

- A. Remove debris, junk, and trash from site.
- B. Leave site in clean condition, ready for subsequent work.
- C. Clean up spillage and wind-blown debris from public and private lands.

**END OF SECTION**



**SECTION 06 10 00  
ROUGH CARPENTRY****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Rough opening framing for doors, windows, and roof openings.
- B. Communications and electrical room mounting boards.
- C. Concealed wood blocking, nailers, and supports.

**1.02 REFERENCE STANDARDS**

- A. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2009.
- B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2013a.
- C. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology, Department of Commerce; 2010.

**1.03 DELIVERY, STORAGE, AND HANDLING**

- A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

**PART 2 PRODUCTS****2.01 GENERAL REQUIREMENTS**

- A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
  - 1. 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.
  - 2. 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.
- B. Lumber fabricated from old growth timber is not permitted.

**2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

- A. Sizes: Nominal sizes as indicated on drawings, S4S.
- B. Moisture Content: S-dry or MC19.
- C. 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.

**2.05 ACCESSORIES**

- A. Fasteners and Anchors:
  - 1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere.

**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 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.
  - 4. Size: 48 by 96 inches, installed horizontally at ceiling height.

### **3.04 TOLERANCES**

- A. Framing Members: 1/4 inch from true position, maximum.
- B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

**END OF SECTION**

**SECTION 06 20 00**  
**FINISH CARPENTRY****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Finish carpentry items.
- B. Wood casings and moldings.

**1.02 RELATED REQUIREMENTS**

- A. Section 09 90 00 - Painting and Coatings: Painting and finishing of finish carpentry items.

**1.03 REFERENCE STANDARDS**

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
  - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
  - 2. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).

**1.05 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect work from moisture damage.

**PART 2 PRODUCTS****2.01 FINISH CARPENTRY ITEMS**

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Interior Woodwork Items:
  - 1. Moldings, Bases, Casings, Sills and Miscellaneous Trim: Poplar; prepare for paint finish.

**2.02 WOOD-BASED COMPONENTS**

- A. Wood fabricated from old growth timber is not permitted.

**2.03 FASTENINGS**

- A. Adhesive for Purposes Other Than Laminate Installation: Suitable for the purpose; not containing formaldehyde or other volatile organic compounds.
- B. Fasteners: Of size and type to suit application.

**2.04 ACCESSORIES**

- A. Primer: Alkyd primer sealer.
- B. Wood Filler: Solvent base, tinted to match surface finish color.

**2.05 FABRICATION**

- A. Shop assemble work for delivery to site, permitting passage through building openings.

- B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify adequacy of backing and support framing.

#### **302 INSTALLATION**

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements for custom grade installation.
- B. Set and secure materials and components in place, plumb and level.
- C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

#### **303 PREPARATION FOR SITE FINISHING**

- A. Set exposed fasteners. Apply wood filler in exposed fastener indentations. Sand work smooth.
- B. Site Finishing: See Section 09 90 00.
- C. Before installation, prime paint surfaces of items or assemblies to be in contact with cementitious materials.

#### **304 TOLERANCES**

- A. Maximum Variation from True Position: 1/16 inch.
- B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

**END OF SECTION**

**SECTION 06 41 00**  
**ARCHITECTURAL WOOD CASEWORK****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Specially fabricated cabinet units.
- B. Cabinet hardware.
- C. Preparation for installing utilities.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 12 36 00 - Countertops.

**1.03 REFERENCE STANDARDS**

- A. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- B. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards, U.S. Version 3.0; 2016.
- C. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.
- D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- E. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories.
  - 1. Scale of Drawings: 1-1/2 inch to 1 foot, minimum.
  - 2. Provide the information required by AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS).
- C. Product Data: Provide data for hardware accessories.
- D. Samples: Wood finish samples.
- E. Mockup: Mockup one work station as identified in the drawings.

**1.05 QUALITY ASSURANCE**

- A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect units from moisture damage.

**1.07 FIELD CONDITIONS**

- A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

**PART 2 PRODUCTS****2.01 CABINETS**

- A. Quality Standard: Custom Grade, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
- B. Cabinets: Wood, Custom grade, Painted finish.
- C. Cabinets:
  - 1. Plastic Laminate Cabinet Style: Flush overlay.



**202 COUNTERTOPS**

- A. Solid Surfacing: Specified in Section 12 36 00.

**203 ACCESSORIES**

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Fasteners: Size and type to suit application.
- C. Grommets: Standard plastic grommets for cut-outs, in color to match adjacent surface.

**204 HARDWARE**

- A. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch spacing adjustments.
- B. Drawer and Door Pulls: "U" shaped wire pull, steel with satin finish, 4 inch centers.
- C. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with satin finish.
- D. Drawer Slides:
  - 1. Type: Full extension.
  - 2. Static Load Capacity: Commercial grade Heavy Duty grade.
  - 3. Mounting: Side mounted.
  - 4. Stops: Integral type.
  - 5. Features: Provide self closing/stay closed type.
- E. Hinges: European style concealed self-closing type, steel with polished finish.

**205 FABRICATION**

- A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.
- B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.
- C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.
- D. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Seal cut edges.

**PART 3 EXECUTION****301 EXAMINATION**

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

**302 INSTALLATION**

- A. Install work in accordance with AWI/AWMAC/WI (AWS) requirements of custom grade installation.
- B. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.
- C. Use concealed joint fasteners to align and secure adjoining cabinet units.
- D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- E. Secure cabinets to floor using appropriate angles and anchorages.

**303 ADJUSTING**

- A. Adjust moving or operating parts to function smoothly and correctly.

**304 CLEANING**

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

**END OF SECTION**

**SECTION 07 84 00**  
**FIRESTOPPING****PART 1 GENERAL****SECTION INCLUDES**

- A. Firestopping systems.
- B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies.

**RELATED REQUIREMENTS**

- A. Section 09 21 16 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

**REFERENCE STANDARDS**

- A. ASTM E814 - Standard Test Method for Fire Tests of Penetration Firestop Systems; 2013a.
- B. ASTM E1966 - Standard Test Method for Fire Resistive Joint Systems; 2007 (Reapproved 2011).
- C. ASTM E2307 - Standard Test Method for Determining Fire Resistance of Perimeter Fire Barriers Using Intermediate-Scale, Multi-story Test Apparatus; 2010.
- D. ASTM E2837 - Standard Test Method for Determining Fire Resistance of Continuity Head-of-Wall Joint Systems Installed Between Rated Wall Assemblies and Nonrated Horizontal Assemblies; 2011.
- E. SCAQMD 1168 - South Coast Air Quality Management District Rule No. 1168; current edition; [www.aqmd.gov](http://www.aqmd.gov).
- F. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Underwriters Laboratories Inc.; 2004.
- G. UL (FRD) - Fire Resistance Directory; Underwriters Laboratories Inc.; current edition.

**SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
- C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
- D. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.

**FIELD CONDITIONS**

- A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.

**PART 2 PRODUCTS****FIRESTOPPING - GENERAL REQUIREMENTS**

- A. Firestopping: Any material meeting requirements.
- B. Firestopping Materials with Volatile Content: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No. 1168.
- C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.
- D. Fire Ratings: See Drawings for required wall, floor and roof ratings.

**FIRESTOPPING ASSEMBLY REQUIREMENTS**

- A. Perimeter Fire Containment Firestopping: Use any system that has been tested according to ASTM E2307 to have fire resistance F Rating equal to required fire rating of the floor assembly.

- B. Head-of-Wall Firestopping at Joints Between Non-Rated Floor and Fire-Rated Wall: Use any system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
- C. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use any system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
- D. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.

**FIRESTOPPING SYSTEMS**

- A. Firestopping: Any material meeting requirements.
  - 1. Fire Ratings: Use any system listed by UL or tested in accordance with ASTM E814 that has F Rating equal to fire rating of penetrated assembly and T Rating Equal to F Rating and that meets all other specified requirements.

**PART 3 EXECUTION****EXAMINATION**

- A. Verify openings are ready to receive the work of this section.

**PREPARATION**

- A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
- B. Remove incompatible materials that could adversely affect bond.

**INSTALLATION**

- A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.

**CLEANING**

- A. Clean adjacent surfaces of firestopping materials.

**PROTECTION**

- A. Protect adjacent surfaces from damage by material installation.

**END OF SECTION**

**SECTION 07 90 05**  
**JOINT SEALERS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Sealants and joint backing.

**1.02 REFERENCE STANDARDS**

- A. ASTM C834 - Standard Specification for Latex Sealants; 2014.
- B. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2014.
- C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2013.

**1.03 ADMINISTRATIVE REQUIREMENTS**

- A. Coordinate the work with other sections referencing this section.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, and substrate preparation.
- C. Manufacturer's Installation Instructions: Indicate surface preparation.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

**1.06 FIELD CONDITIONS**

- A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

**1.07 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 which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

**PART 2 PRODUCTS****2.01 SEALANTS**

- A. General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25 minimum; Uses M, G, and A; single component.
  - 1. Color: Match adjacent finished surfaces.
- B. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
  - 1. Applications: Use for:
    - a. Concealed sealant bead in sheet metal work.
    - b. Concealed sealant bead in siding overlaps.
- C. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C834, Type OP, Grade NF single component, paintable.
  - 1. Color: Match adjacent finished surfaces.

**2.02 ACCESSORIES**

- A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
- B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
- C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.

- D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

### **PART 3 EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that substrate surfaces are ready to receive work.
- B. Verify that joint backing and release tapes are compatible with sealant.

#### **3.02 PREPARATION**

- A. Remove loose materials and foreign matter that could impair adhesion of sealant.
- B. Clean and prime joints in accordance with manufacturer's instructions.
- C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
- D. Protect elements surrounding the work of this section from damage or disfigurement.

#### **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 width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.
- D. Install bond breaker where joint backing is not used.
- E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
- F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- G. Tool joints concave.

#### **3.04 CLEANING**

- A. Clean adjacent soiled surfaces.

#### **3.05 PROTECTION**

- A. Protect sealants until cured.

**END OF SECTION**



**SECTION 08 11 13**  
**HOLLOW METAL DOORS & FRAMES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Non-fire-rated hollow metal frames.
- B. Hollow metal doors.
- C. Thermally insulated hollow metal doors with frames.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 71 00 - DOOR HARDWARE.
- B. Section 09 90 00 - Painting and Coating: Field painting.

**1.03 REFERENCE STANDARDS**

- A. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames and Frame Anchors; 2011.
- B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100); 2014.
- C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames; 2011.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2015.
- E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2015.
- F. 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; 2014.
- G. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames; 2007.

**1.04 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; and one copy of referenced standards/guidelines.
- C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and any indicated finish requirements.
- D. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- B. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes installation 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 FRAMES**

- A. Requirements for All Frames:
  - 1. Steel used for fabrication of doors and frames shall comply with one or more of the following requirements; Galvannealed steel conforming to ASTM A653/A653M, cold-rolled steel conforming to ASTM A1008/A1008M, or hot-rolled pickled and oiled (HRPO) steel conforming to ASTM A1011/A1011M, Commercial Steel (CS) Type B for each.
  - 2. Finish: Factory primed, for field finishing.

**2.02 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 3 - Extra Heavy-duty.
    - b. Physical Performance Level A, 1,000,000 cycles; in accordance with ANSI/SDI A250.4.
    - c. Model 1 - Full Flush.
    - d. Door Face Metal Thickness: 16 gage, 0.053 inch, minimum.
  - 2. Door Thickness: 1-3/4 inch, nominal.

**2.03 HOLLOW METAL FRAMES**

- A. Comply with standards and/or custom guidelines as indicated for corresponding door in accordance with applicable door frame requirements.
- B. General:
  - 1. Finish: Factory primed, for field finishing.
- C. Exterior Door Frames: Full profile/continuously welded type.
  - 1. Weatherstripping: Separate, see Section 08 71 00.
- D. Frames for Wood Doors: Comply with frame requirements in accordance with corresponding door.

**2.04 ACCESSORIES**

- A. Silencers: Resilient rubber, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.
- B. Temporary Frame Spreaders: Provide for factory- or shop-assembled frames.

**2.05 FINISHES**

- A. Primer: Rust-inhibiting, complying with ANSI/SDI A250.10, door manufacturer's standard.

**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 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. Coordinate frame anchor placement with wall construction.
- C. Coordinate installation of hardware.

**3.03 TOLERANCES**

- A. Clearances Between Door and Frame: Comply with related requirements of specified door and frame standards or custom guidelines indicated.
- B. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.

**3.04 ADJUSTING**

- A. Adjust for smooth and balanced door movement.

**END OF SECTION**

**SECTION 08 14 16**  
**FLUSH WOOD DOORS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Flush wood doors; flush configuration; fire rated and non-rated.

**1.02 RELATED REQUIREMENTS**

- A. Section 08 12 13 - Hollow Metal Frames.
- B. Section 08 71 00 - Door Hardware.

**1.03 REFERENCE STANDARDS**

- A. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2014.
- C. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.
- D. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2012.
- E. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.
- F. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

**1.04 SUBMITTALS**

- A. See Division 01 Specifications for submittal procedures.
- B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
- C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.
- D. Specimen warranty.
- E. Manufacturer's Installation Instructions: Indicate special installation instructions.
- F. Warranty, executed in Owner's name.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Package, deliver and store doors in accordance with specified quality standard.
- B. Accept doors on site in manufacturer's packaging. Inspect for damage.
- C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

**1.07 WARRANTY**

- A. Interior Doors: Provide manufacturer's warranty for the life of the installation.
- B. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

**PART 2 PRODUCTS****2.01 DOORS**

- A. All Doors:
  - 1. Quality Level: Premium Grade with A grade veneer, in accordance with AWI/AWMAC/WI Architectural Woodwork Standards.

2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.
- B. Interior Doors: 1-3/4 inches thick unless otherwise indicated; flush construction.
1. Provide solid core doors at all locations .
  2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with NFPA 252, UL 10B, or UBC Standard 7-2-94 ("neutral pressure"); UL or WH (ITS) labeled without any visible seals when door is open.
  3. Wood veneer facing with factory transparent finish .

## 2.02 DOOR AND PANEL CORES

- A. Non-Rated Solid Core and 20 Minute Rated Doors: Type staved lumber core (SLC), plies and faces as indicated.
- B. Fire Rated Doors: Mineral core, Type FD, plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

## 2.03 DOOR FACINGS

- A. Wood Veneer Facing for Transparent Finish: Natural birch, veneer grade as specified by quality standard, plain sliced, book veneer match, running assembly match; unless otherwise indicated.
1. Vertical Edges: Any option allowed by quality standard for grade.
  2. Pairs: Pair match each pair; set match pairs within 10 feet of each other when doors are closed.
- B. Facing Adhesive: Type I - waterproof.

## 2.04 ACCESSORIES

- A. Glazed Openings:

## 2.05 DOOR CONSTRUCTION

- A. Fabricate doors in accordance with door quality standard specified.
- B. Cores Constructed with stiles and rails:
1. Provide solid blocks at lock edge for hardware reinforcement.
  2. Provide solid blocking for other throughbolted hardware.
- C. Where supplementary protective edge trim is required, install trim after veneer facing has been applied full-width.
- D. Glazed Openings: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings.
- E. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.
- F. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.
1. Exception: Doors to be field finished.
- G. Provide edge clearances in accordance with the quality standard specified.
- H. Doors shall be urea formaldehyde free.

## 2.07 FACTORY FINISHING - WOOD VENEER DOORS

- A. Finish work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards, Section 5 - Finishing for Grade specified and as follows:
1. Transparent:



- a. System - 12, Polyurethane, Water-based.
  - b. Stain: Match existing doors.
  - c. Sheen: Satin.
- B. Factory finish doors in accordance with approved sample.
  - C. Seal door top edge with color sealer to match door facing.

**2.08 ACCESSORIES**

- A. Hollow Metal Door Frames: As specified in Section 08 12 13.
- B. Glazed Openings:
  - 1. Heat-Strengthened and Fully Tempered Glass: ASTM
  - 2. Glazing: Single vision units, 1/4 inch thick glass.
  - 3. Tint: Clear.
- C. Hardware: As specified in Section 08 71 00.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that opening sizes and tolerances are acceptable.
- C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

**3.02 INSTALLATION**

- A. Install doors in accordance with manufacturer's instructions and specified quality standard.
  - 1. Install fire-rated doors in accordance with NFPA 80 requirements.
- B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
- C. Use machine tools to cut or drill for hardware.
- D. Coordinate installation of doors with installation of frames and hardware.
- E. Install door louvers plumb and level.

**3.03 TOLERANCES**

- A. Conform to specified quality standard for fit and clearance tolerances.
- B. Conform to specified quality standard for telegraphing, warp, and squareness.

**3.04 ADJUSTING**

- A. Adjust doors for smooth and balanced door movement.
- B. Adjust closers for full closure.

**3.05 SCHEDULE - SEE DRAWINGS**

**END OF SECTION**

**SECTION 08 41 23****FIRE-RATED GLASS AND FRAMING SYSTEMS**

## PART 1 - GENERAL

## 1.1 SUMMARY

- A. Section Includes:
  - 1. Fire-rated framing systems for installation windows interior openings.
- B. Related Sections include the following:

## 1.2 REFERENCES

- A. American Architectural Manufacturers Association (AAMA)
  - 1. AAMA 2603: Voluntary Specification, Performance Requirements and Test Procedures for Pigmented Organic Coatings on Aluminum Extrusions and Panels.
  - 2. AAMA 2604: Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels.
  - 3. AAMA 2605: Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels.
- B. American Society for Testing and Materials (ASTM):
  - a. ASTM A1008/ A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength, Low Alloy, and High-Strength Low-Alloy with Improved Formability, Solution Hardened, and Bake Hardenable; 2007.
  - b. ASTM A1011/ A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2006b.
  - c. ASTM E90-04: Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements
  - d. ASTM E413-04: Standard Classification for Rating Sound Insulation
- C. American Welding Society (AWS)
  - 1. AWS D1.3 - Structural Welding Code - Sheet Steel
- D. Builders Hardware Manufacturers Association, Inc.
  - 1. BHMA A156 - American National Standards for door hardware (ANSI/BHMA A156).
- E. National Fire Protection Association (NFPA):
  - 1. NFPA 80: Standard for Fire Doors and Fire Windows.
  - 2. NFPA 252: Standard Methods of Fire Tests of Door Assemblies.
  - 3. NFPA 257: Standard on Fire Test for Window and Glass Block Assemblies.
- F. Intertek Testing Services, Inc. (UL):
  - 1. UL 9: Fire Tests of Window Assemblies.
  - 2. UL 10B: Fire Tests of Door Assemblies.

3. UL 10C: Positive Pressure Fire Tests of Door Assemblies.

G. American National Standards Institute (ANSI):

1. ANSI Z97.1: Standard for Safety Glazing Materials Used in Buildings.

H. Consumer Product Safety Commission (CPSC):

1. CPSC 16 CFR 1201 Categories I and II: Safety Standard for Architectural Glazing Materials.

I. American Society of Civil Engineers (ASCE)

1. ASCE 7 – Minimum Design Loads for Buildings and Other Structures; 2005

### 1.3 DEFINITIONS

A. Manufacturer: A firm that produces primary glass, fabricated glass or framing as defined in referenced glazing publications.

### 1.4 SUBMITTALS

A. Submit in accordance with Section <Insert Section #>.

B. Product Data:

1. Technical Information: Submit latest edition of manufacturer's product data providing product descriptions, technical data, Intertek Testing Services, Inc. listings and installation instructions.

C. Shop Drawings:

1. Include plans, elevations and details of product showing component dimensions; framed opening requirements, dimensions, tolerances, and attachment to structure

D. Samples (optional): For following products:

1. Glass sample-as provided by manufacturer
2. Sample of frame
3. Verification of sample of selected finish

E. Glazing Schedule: Use same designations indicated on drawings for glazed openings in preparing a schedule listing glass types and thicknesses for each size opening and location.

F. Warranties: Submit manufacturer's warranty.

G. Certificates of compliance from glass and glazing materials manufacturers attesting that glass and glazing materials furnished for project comply with requirements.

1. Separate certification will not be required for glazing materials bearing manufacturer's permanent label designating type and thickness of glass, provided labels represent a quality control program involving a recognized certification agency or independent testing laboratory acceptable to authority having jurisdiction.

### 1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to

1. International Accreditation Service for a Type A Third-Party Inspection Body (Field Services ICC-ES Third-Party Inspections Standard Operating Procedures, 00-BL-S0400 and S0401)

2. International Accreditation Service for Testing Body-Building Materials and Systems
  - a. Fire Testing
    - 1) ASTM Standard E119
    - 2) CPSC Standard 16 CFR 1201
    - 3) NFPA Standards 252, 257
    - 4) UL Standards 9, 10B, 10C, 1784
    - 5) EN 1634-1
    - 6) CAN Standards S101, S104, S106
  - B. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for this Project; whose work has resulted in glass installations with a record of successful in-service performance; and who employs glass installers for this Project who are certified under the National Glass Association Glazier Certification Program as Level 2 (Senior Glaziers) or Level 3 (Master Glaziers).
  - C. Installer Qualifications: An experienced installer who has completed glazing similar in material, design, and extent to that indicated for Project and whose work has resulted in construction with a record of successful in-service performance.
  - D. Source Limitations for Glazing Accessories: Obtain framing system, glazing and glazing accessories from one source for each product and installation method indicated.
  - E. Fire-Rated Window Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by Intertek, for fire ratings indicated, based on testing according to NFPA 257. Assemblies must be factory-welded or come complete with factory-installed mechanical joints and must not require job site fabrication.
  - F. Listings and Labels - Fire-rated Assemblies: Under current follow-up service by Intertek Testing Services maintaining a current listing or certification. Label assemblies in accordance with limits of manufacturer's listing.

#### 1.6 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle under provisions specified by manufacturer.

#### 1.7 PROJECT CONDITIONS

- A. Obtain field measurements prior to fabrication of frame units. If field measurements will not be available in a timely manner coordinate planned measurements with the work of other sections.
  1. Note whether field or planned dimensions were used in the creation of the shop drawings.
- B. Coordinate the work of this section with others effected including but not limited to: other interior and/or exterior envelope components and door hardware beyond that provided by this section

#### 1.8 WARRANTY

- A. Provide the forster presto by McGrory Glass standard five-year manufacturer warranty from the date of shipment.

### PART 2 - PRODUCTS

## 2.1 MANUFACTURERS - FIRE-RATED [DOOR ASSEMBLY] [WINDOW]

- A. Glass Material: AGC Pyrobel® by McGrory Glass 90 fire-rated glazing as fabricated and distributed by McGrory Glass, 1400 Grandview Avenue, Paulsboro, NJ 08066 phone (800.220.3749) e-mail [fire@mcgrory.com](mailto:fire@mcgrory.com), web site <http://www.mcgroryfire.com>.
- B. Frame System: "forster presto by McGrory Glass" fire-rated [steel] frame system as manufactured and supplied by McGrory Glass, 1400 Grandview Avenue, Paulsboro, NJ 08066 phone (800.220.3749) fax (425.396.8300) e-mail [fire@mcgrory.com](mailto:fire@mcgrory.com) web site <http://www.mcgroryfire.com>.
- C. Substitutions: Substitutions for Glazing Material and Frame System not permitted.

## 2.2 PERFORMANCE REQUIREMENTS

- A. Fire Rating Requirements
  - 1. Duration-- Window Assembly: Capable of providing a fire rating for 90 minutes.
  - 2. Duration--Opening Applications in fire partitions or area separation walls and corridors where opening protection is specified: Capable of providing 90 minute rating.
- B. Design Requirements:
  - 1. Dimensions -- Window Assembly:
    - a. Perimeter framing face dimension: 2 3/4-inch at head, sill and jamb.
    - b. Horizontal and/or vertical mullions: 3 9/16-inch on the face.
    - c. Depth of perimeter and mullion: 1 15/16-inch.
  - 2. Construction: Narrow-profile, roll-formed steel architectural grade specialty fire doors. Conventional break-shape type hollow metal steel fire-rated doors will not be considered an acceptable substitute for the forster presto by McGrory Glass doors specified in this section as they do not conform to the project design intent and/or aesthetic and quality standards.
    - a. Knock down frames are not permitted.

## 2.3 MATERIALS - GLASS

- A. Fire-rated Glazing: composed of [ceramic] [ceramic with surface applied fire-rated film] [laminated ceramic] [insulated ceramic] [specially tempered] [wired glass] [laminated glass with intumescent interlayers] glazing material.
- B. Thickness of Glazing Material:
  - 1. 1-3/8" AGC Pyrobel® 90 by McGrory Glass
- C. Approximate Visible Transmission: Varies with thickness.
- D. Logo: Each piece of fire-rated glazing shall be labeled with a permanent logo including name of product, manufacturer, testing laboratory Underwriters Laboratories (UL), fire rating period, safety glazing standards, and date of manufacture.
- E. Performance: Glass must be rated to stop fire from either direction and must meet all testing requirements including the required hose-stream test (where fire-rating exceeds 20 minutes).

## 2.4 MATERIALS – STEEL FRAMES AND DOORS



- A. Steel Framing System including 90-minute rated windows.
  - 1. Frame: Steel profiled formed tubing.
  - 2. Fasteners: As recommended by manufacturer
  - 3. Glazing Accessories: calcium silicate setting blocks.
  - 4. Glazing Compounds:
    - a. AGC Pyrobel® by McGrory Glass: Approved as supplied by manufacturer to meet fire rated assembly.

## 2.5 FABRICATION

- A. Furnish frame assemblies pre-welded.
  - 1. When necessary, splice frames too large for shop fabrication or shipping or to fit in available building openings.
  - 2. Fit with suitable fasteners.
  - 3. Knock-down frames are not permitted
- B. Furnish interior frame assemblies "K-D" (or welded upon request).
  - 1. When necessary, splice frames too large for shop fabrication or shipping or to fit in available building openings.
  - 2. Fit with suitable fasteners.
  - 3. Knock-down door perimeter frames are not permitted
- C. Frame assemblies: Field glazed.
- D. Factory prepare steel door assemblies and install all hardware.
- E. Fabrication Dimensions: Fabricate to fire-rated field dimensions.
- F. Obtain approved shop drawings prior to fabrication.

## 2.6 FINISHES, GENERAL

- A. Comply with NAAMM's (National Association of Architectural Metal Manufacturers) "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Finish frames after assembly.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.

## 2.7 POWDER COAT FINISHES

- A. Finish after fabrication.
- B. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.
- C. Interior and Exterior Steel Finishes
  - 1. Powder-Coat Finish: Polyester Super Durable, non-TGIC, powder coating which is formulated to meet AAMA 2604 for chalking and fading. Apply manufacturer's standard

- powder coating finish system applied to factory-assembled frames before shipping, complying with manufacturer's recommended instructions for surface preparation including pretreatment, application, and minimum final film thickness.
2. Color and Gloss: As selected by Architect from manufacturer's full range.
  3. Acceptable Manufacturers:
    - a. Axalta
    - b. Additional manufacturers as approved by McGrory Glass

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine substrates and members to which the work of this section attaches or adjoins prior to frame installation.
- B. Provide openings plumb, square and within allowable tolerances.
  1. Provide 3/8 inch shim space at all walls
- C. Notify Architect of any conditions which jeopardize the integrity of the proposed fire wall / door system.
- D. Do not proceed until such conditions are corrected.

#### 3.2 INSTALLATION

- A. See forster presto by McGrory Glass Installation Manual

#### 3.3 REPAIR AND TOUCH UP

- A. Limited to minor repair of small scratches. Use only manufacturer's recommended products.
  1. Such repairs shall match original finish for quality or material and view.
- B. Remove and replace glass that is broken, chipped, cracked, abraded, or damaged.

#### 3.4 ADJUSTING

- A. Adjust door function and hardware for smooth operation. Coordinate with other hardware suppliers for function and use of any other attached hardware.

#### 3.5 PROTECTION AND CLEANING

- A. Protect glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels, and clean surfaces.
  1. Do not clean with astringent cleaners. Use a clean "grit free" cloth and a small amount of mild soap and water or mild detergent.
  2. Do not use any of the following:
    - a. Steam jets
    - b. Abrasives

- c. Strong acidic or alkaline detergents, or surface-reactive agents
  - d. Detergents not recommended in writing by the manufacturer
  - e. Do not use any detergent above 77 degrees F (25 degrees C)
  - f. Organic solvents including but not limited to those containing ester, ketones, alcohols, aromatic compounds, glycol ether, or halogenated hydrocarbons.
  - g. Metal or hard parts of cleaning equipment must not touch the glass surface
- B. Protect glass from contact with contaminating substances resulting from construction operations, including weld splatter. If, despite such protection, contaminating substances do come into contact with glass, remove them immediately as recommended by glass manufacturer.
- C. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended by glass manufacturer.

END OF SECTION

**SECTION 08 71 00  
DOOR HARDWARE**

PART 1 - GENERAL

1.01 SUMMARY

A. Section includes:

1. Mechanical and electrified door hardware

B. Section excludes:

1. Windows
2. Cabinets (casework), including locks in cabinets
3. Signage
4. Toilet accessories
5. Overhead doors

C. Related Sections:

1. Division 01 Section "Alternates" for alternates affecting this section.
2. Division 06 Section "Rough Carpentry"
3. Division 06 Section "Finish Carpentry"
4. Division 07 Section "Joint Sealants" for sealant requirements applicable to threshold installation specified in this section.
5. Division 08 Sections:
  - a. "Metal Doors and Frames"
  - b. "Flush Wood Doors"
  - c. "Stile and Rail Wood Doors"
  - d. "Interior Aluminum Doors and Frames"
  - e. "Aluminum-Framed Entrances and Storefronts"
  - f. "Stainless Steel Doors and Frames"
  - g. "Special Function Doors"
  - h. "Entrances"
6. Division 26 "Electrical" sections for connections to electrical power system and for low-voltage wiring.
7. Division 28 "Electronic Safety and Security" sections for coordination with other components of electronic access control system and fire alarm system.

1.02 REFERENCES

A. UL LLC

1. UL 10B - Fire Test of Door Assemblies
2. UL 10C - Positive Pressure Test of Fire Door Assemblies
3. UL 1784 - Air Leakage Tests of Door Assemblies
4. UL 305 - Panic Hardware

B. DHI - Door and Hardware Institute

1. Sequence and Format for the Hardware Schedule

2. Recommended Locations for Builders Hardware
  3. Keying Systems and Nomenclature
  4. Installation Guide for Doors and Hardware
- C. NFPA – National Fire Protection Association
1. NFPA 70 – National Electric Code
  2. NFPA 80 – 2016 Edition – Standard for Fire Doors and Other Opening Protectives
  3. NFPA 101 – Life Safety Code
  4. NFPA 105 – Smoke and Draft Control Door Assemblies
  5. NFPA 252 – Fire Tests of Door Assemblies
- D. ANSI - American National Standards Institute
1. ANSI A117.1 – 2017 Edition – Accessible and Usable Buildings and Facilities
  2. ANSI/BHMA A156.1 - A156.29, and ANSI/BHMA A156.31 - Standards for Hardware and Specialties
  3. ANSI/BHMA A156.28 - Recommended Practices for Keying Systems
  4. ANSI/WDMA I.S. 1A - Interior Architectural Wood Flush Doors
  5. ANSI/SDI A250.8 - Standard Steel Doors and Frames

### 1.03 SUBMITTALS

A. General:

1. Submit in accordance with Conditions of Contract and Division 01 Submittal Procedures.
2. Prior to forwarding submittal:
  - a. Review drawings and Sections from related trades to verify compatibility with specified hardware.
  - b. Highlight, encircle, or otherwise specifically identify on submittals: deviations from Contract Documents, issues of incompatibility or other issues which may detrimentally affect the Work.

B. Action Submittals:

1. Product Data: Submit technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
2. Riser and Wiring Diagrams: After final approval of hardware schedule, submit details of electrified door hardware, indicating:
  - a. Wiring Diagrams: For power, signal, and control wiring and including:
    - 1) Details of interface of electrified door hardware and building safety and security systems.
    - 2) Schematic diagram of systems that interface with electrified door hardware.
    - 3) Point-to-point wiring.
    - 4) Risers.
3. Samples for Verification: If requested by Architect, submit production sample of requested door hardware unit in finish indicated and tagged with full description for coordination with schedule.
  - a. Samples will be returned to supplier. Units that are acceptable to Architect may, after final check of operations, be incorporated into Work, within limitations of key coordination requirements.
4. Door Hardware Schedule:

- a. Submit concurrent with submissions of Product Data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate fabrication of other work critical in Project construction schedule.
  - b. Submit under direct supervision of a Door Hardware Institute (DHI) certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) with hardware sets in vertical format as illustrated by Sequence of Format for the Hardware Schedule published by DHI.
  - c. Indicate complete designations of each item required for each opening, include:
    - 1) Door Index: door number, heading number, and Architect's hardware set number.
    - 2) Quantity, type, style, function, size, and finish of each hardware item.
    - 3) Name and manufacturer of each item.
    - 4) Fastenings and other pertinent information.
    - 5) Location of each hardware set cross-referenced to indications on Drawings.
    - 6) Explanation of all abbreviations, symbols, and codes contained in schedule.
    - 7) Mounting locations for hardware.
    - 8) Door and frame sizes and materials.
    - 9) Degree of door swing and handing.
    - 10) Operational Description of openings with electrified hardware covering egress, ingress (access), and fire/smoke alarm connections.
5. Key Schedule:
- a. After Keying Conference, provide keying schedule that includes levels of keying, explanations of key system's function, key symbols used, and door numbers controlled.
  - b. Use ANSI/BHMA A156.28 "Recommended Practices for Keying Systems" as guideline for nomenclature, definitions, and approach for selecting optimal keying system.
  - c. Provide 3 copies of keying schedule for review prepared and detailed in accordance with referenced DHI publication. Include schematic keying diagram and index each key to unique door designations.
  - d. Index keying schedule by door number, keyset, hardware heading number, cross keying instructions, and special key stamping instructions.
  - e. Provide one complete bitting list of key cuts and one key system schematic illustrating system usage and expansion. Forward bitting list, key cuts and key system schematic directly to Owner, by means as directed by Owner.
  - f. Prepare key schedule by or under supervision of supplier, detailing Owner's final keying instructions for locks.
- C. Informational Submittals:
1. Provide Qualification Data for Supplier, Installer and Architectural Hardware Consultant.
  2. Provide Product Data:
    - a. Certify that door hardware approved for use on types and sizes of labeled fire-rated doors complies with listed fire-rated door assemblies.
    - b. Include warranties for specified door hardware.
- D. Closeout Submittals:
1. Operations and Maintenance Data: Provide in accordance with Division 01 and include:
    - a. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
    - b. Catalog pages for each product.
    - c. Final approved hardware schedule edited to reflect conditions as installed.
    - d. Final keying schedule



- e. Copy of warranties including appropriate reference numbers for manufacturers to identify project.
- f. As-installed wiring diagrams for each opening connected to power, both low voltage and 110 volts.

E. Inspection and Testing:

1. Submit written reports to the Owner and Authority Having Jurisdiction (AHJ) of the results of functional testing and inspection for:
  - a. Fire door assemblies, in compliance with NFPA 80.
  - b. Required egress door assemblies, in compliance with NFPA 101.

#### 1.04 QUALITY ASSURANCE

A. Qualifications and Responsibilities:

1. Supplier: Recognized architectural hardware supplier with a minimum of 5 years documented experience supplying both mechanical and electromechanical door hardware similar in quantity, type, and quality to that indicated for this Project. Supplier to be recognized as a factory direct distributor by the manufacturer of the primary materials with a warehousing facility in the Project's vicinity. Supplier to have on staff, a certified Architectural Hardware Consultant (AHC) or Door Hardware Consultant (DHC) available to Owner, Architect, and Contractor, at reasonable times during the Work for consultation.
2. Installer: Qualified tradesperson skilled in the application of commercial grade hardware with experience installing door hardware similar in quantity, type, and quality as indicated for this Project.
3. Architectural Hardware Consultant: Person who is experienced in providing consulting services for door hardware installations that are comparable in material, design, and extent to that indicated for this Project and meets these requirements:
  - a. For door hardware: DHI certified AHC or DHC.
  - b. Can provide installation and technical data to Architect and other related subcontractors.
  - c. Can inspect and verify components are in working order upon completion of installation.
  - d. Capable of producing wiring diagram and coordinating installation of electrified hardware with Architect and electrical engineers.
4. Single Source Responsibility: Obtain each type of door hardware from single manufacturer.

B. Certifications:

1. Fire-Rated Door Openings:
  - a. Provide door hardware for fire-rated openings that complies with NFPA 80 and requirements of authorities having jurisdiction.
  - b. Provide only items of door hardware that are listed products tested by UL LLC, Intertek Testing Services, or other testing and inspecting organizations acceptable to authorities having jurisdiction for use on types and sizes of doors indicated, based on testing at positive pressure and according to NFPA 252 or UL 10C and in compliance with requirements of fire-rated door and door frame labels.
2. Smoke and Draft Control Door Assemblies:
  - a. Provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105

- b. Comply with the maximum air leakage of 0.3 cfm/sq. ft. (3 cu. m per minute/sq. m) at tested pressure differential of 0.3-inch wg (75 Pa) of water.
  3. Electrified Door Hardware
    - a. Listed and labeled as defined in NFPA 70, Article 100, by testing agency acceptable to authorities having jurisdiction.
  4. Accessibility Requirements:
    - a. Comply with governing accessibility regulations cited in "REFERENCES" article 087100, 1.02.D3 herein for door hardware on doors in an accessible route. This project must comply with all Federal Americans with Disability Act regulations and all Local Accessibility Regulations.
- C. Pre-Installation Meetings
  1. Keying Conference
    - a. Incorporate keying conference decisions into final keying schedule after reviewing door hardware keying system including:
      - 1) Function of building, flow of traffic, purpose of each area, degree of security required, and plans for future expansion.
      - 2) Preliminary key system schematic diagram.
      - 3) Requirements for key control system.
      - 4) Requirements for access control.
      - 5) Address for delivery of keys.
  2. Pre-installation Conference
    - a. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
    - b. Inspect and discuss preparatory work performed by other trades.
    - c. Inspect and discuss electrical roughing-in for electrified door hardware.
    - d. Review sequence of operation for each type of electrified door hardware.
    - e. Review required testing, inspecting, and certifying procedures.
    - f. Review questions or concerns related to proper installation and adjustment of door hardware.
  3. Electrified Hardware Coordination Conference:
    - a. Prior to ordering electrified hardware, schedule and hold meeting to coordinate door hardware with security, electrical, doors and frames, and other related suppliers.

#### 1.05 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up for hardware delivered to Project site. Promptly replace products damaged during shipping.
- B. Tag each item or package separately with identification coordinated with final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package. Deliver each article of hardware in manufacturer's original packaging.
- C. Maintain manufacturer-recommended environmental conditions throughout storage and installation periods.
- D. Provide secure lock-up for door hardware delivered to Project. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.

- E. Handle hardware in manner to avoid damage, marring, or scratching. Correct, replace or repair products damaged during Work. Protect products against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. Deliver keys to manufacturer of key control system for subsequent delivery to Owner.

#### 1.06 COORDINATION

- A. Coordinate layout and installation of floor-recessed door hardware with floor construction. Cast anchoring inserts into concrete.
- B. Installation Templates: Distribute for doors, frames, and other work specified to be factory or shop prepared. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing door hardware to comply with indicated requirements.
- C. Security: Coordinate installation of door hardware, keying, and access control with Owner's security consultant.
- D. Electrical System Roughing-In: Coordinate layout and installation of electrified door hardware with connections to power supplies and building safety and security systems.

#### 1.07 WARRANTY

- A. Manufacturer's standard form in which manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within published warranty period.
  - 1. Warranty does not cover damage or faulty operation due to improper installation, improper use or abuse.
  - 2. Warranty Period: Beginning from date of Substantial Completion, for durations indicated in manufacturer's published listings.
    - a. Mechanical Warranty
      - 1) Locks
        - a) Falcon: 10 years
      - 2) Exit Devices
        - a) Falcon: 10 years
      - 3) Closers
        - a) Falcon SC Series: 10 years
        - b) Falcon Concealed: 5 years
    - b. Electrical Warranty
      - 1) Exit Devices
        - a) Falcon: 1 year

#### 1.08 MAINTENANCE

- A. Furnish complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
- B. Turn over unused materials to Owner for maintenance purposes.

### PART 2 - PRODUCTS

## 2.01 MANUFACTURERS

- A. Approval of alternate manufacturers and/or products other than those listed as "Scheduled Manufacturer" or "Acceptable Manufacturers" in the individual article for the product category are only to be considered by official substitution request in accordance with section 01 25 00.
- B. Approval of products from manufacturers indicated in "Acceptable Manufacturers" is contingent upon those products providing all functions and features and meeting all requirements of scheduled manufacturer's product.
- C. Where specified hardware is not adaptable to finished shape or size of members requiring hardware, furnish suitable types having same operation and quality as type specified, subject to Architect's approval.

## 2.02 MATERIALS

- A. Fabrication
  - 1. Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. provide screws according to manufacturer's recognized installation standards for application intended.
  - 2. Finish exposed screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work including prepared for paint surfaces to receive painted finish.
  - 3. Provide concealed fasteners wherever possible for hardware units exposed when door is closed. Coordinate with "Metal Doors and Frames", "Flush Wood Doors", "Stile and Rail Wood Doors" to ensure proper reinforcements. Advise the Architect where visible fasteners, such as thru bolts, are required.
- B. Provide screws, bolts, expansion shields, drop plates and other devices necessary for hardware installation.
  - 1. Where fasteners are exposed to view: Finish to match adjacent door hardware material.
- C. Cable and Connectors:
  - 1. Where scheduled in the hardware sets, provide each item of electrified hardware and wire harnesses with number and gage of wires enough to accommodate electric function of specified hardware.
  - 2. Provide Molex connectors that plug directly into connectors from harnesses, electric locking and power transfer devices.
  - 3. Provide through-door wire harness for each electrified locking device installed in a door and wire harness for each electrified hinge, electrified continuous hinge, electrified pivot, and electric power transfer for connection to power supplies.

## 2.03 HINGES

- A. Manufacturers and Products:
  - 1. Scheduled Manufacturer and Product:
    - a. Ives 5BB series
  - 2. Acceptable Manufacturers and Products:
    - a. McKinney TB series

## b. Best FBB series

## B. Requirements:

1. Provide hinges conforming to ANSI/BHMA A156.1.
2. Provide five knuckle, ball bearing hinges.
3. 1-3/4 inch (44 mm) thick doors, up to and including 36 inches (914 mm) wide:
  - a. Exterior: Standard weight, bronze or stainless steel, 4-1/2 inches (114 mm) high
  - b. Interior: Standard weight, steel, 4-1/2 inches (114 mm) high
4. 1-3/4 inch (44 mm) thick doors over 36 inches (914 mm) wide:
  - a. Exterior: Heavy weight, bronze/stainless steel, 5 inches (127 mm) high
  - b. Interior: Heavy weight, steel, 5 inches (127 mm) high
5. Adjust hinge width for door, frame, and wall conditions to allow proper degree of opening.
6. Provide three hinges per door leaf for doors 90 inches (2286 mm) or less in height, and one additional hinge for each 30 inches (762 mm) of additional door height.
7. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
  - a. Steel Hinges: Steel pins
  - b. Non-Ferrous Hinges: Stainless steel pins
  - c. Out-Swinging Exterior Doors: Non-removable pins
  - d. Out-Swinging Interior Lockable Doors: Non-removable pins
  - e. Interior Non-lockable Doors: Non-rising pins
8. Provide hinges with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware. Locate electric hinge at second hinge from bottom or nearest to electrified locking component. Provide mortar guard for each electrified hinge specified.

## 2.04 ELECTRIC POWER TRANSFER

## A. Manufacturers:

1. Scheduled Manufacturer and Product:
  - a. Von Duprin EPT-10
2. Acceptable Manufacturers and Products:
  - a. ABH PT1000
  - b. Securitron CEPT-10
  - c. Security Door Controls PTM

## B. Requirements:

1. Provide power transfer with electrified options as scheduled in the hardware sets. Provide with number and gage of wires enough to accommodate electric function of specified hardware.
2. Locate electric power transfer per manufacturer's template and UL requirements, unless interference with operation of door or other hardware items.

## 2.05 FLUSH BOLTS

## A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Ives

2. Acceptable Manufacturers:
  - a. Burns
  - b. DCI
  - c. Trimco
  - d. Don-Jo

B. Requirements:

1. Provide automatic, constant latching, and manual flush bolts with forged bronze or stainless-steel face plates, extruded brass levers, and with wrought brass guides and strikes. Provide 12 inch (305 mm) steel or brass rods at doors up to 90 inches (2286 mm) in height. For doors over 90 inches (2286 mm) in height increase top rods by 6 inches (152 mm) for each additional 6 inches (152 mm) of door height. Provide dust-proof strikes at each bottom flush bolt.

## 2.06 COORDINATORS

A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Ives
2. Acceptable Manufacturers:
  - a. Burns
  - b. DCI
  - c. Trimco
  - d. Don-Jo

B. Requirements:

1. Where pairs of doors are equipped with automatic flush bolts, an astragal, or other hardware that requires synchronized closing of the doors, provide bar-type coordinating device, surface applied to underside of stop at frame head.
2. Provide filler bar of correct length for unit to span entire width of opening, and appropriate brackets for parallel arm door closers, surface vertical rod exit device strikes, or other stop mounted hardware. Factory-prepared coordinators for vertical rod devices as specified.

## 2.07 MORTISE LOCKS

A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
  - a. Falcon MA series
2. Acceptable Manufacturers and Products:
  - a. Accurate 9000/9100 series
  - b. Arrow BM series
  - c. Dormakaba ML9000 series

B. Requirements:

1. Provide mortise locks conforming to ANSI/BHMA A156.13 Series 1000, Grade 1, and UL Listed for 3-hour fire doors.



2. Provide locks manufactured from heavy gauge steel, containing components of steel with a zinc dichromate plating for corrosion resistance.
3. Provide lock case that is multi-function and field reversible for handing without opening case. Cylinders: Refer to "KEYING" article, herein.
4. Provide locks with standard 2-3/4 inches (70 mm) backset with full 3/4 inch (19 mm) throw stainless steel mechanical anti-friction latchbolt. Provide deadbolt with full 1-inch (25 mm) throw, constructed of stainless steel.
5. Provide standard ASA strikes unless extended lip strikes are necessary to protect trim.
6. Provide electrified options as scheduled in the hardware sets. Where scheduled, provide a request to exit (RX) switch that is actuated with rotation of inside lever.
7. Lever Trim: Solid brass, bronze, or stainless steel, cast or forged in design specified, with wrought roses and external lever spring cages. Provide thru-bolted levers with 2-piece spindles.

## 2.08 DEADBOLTS

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
  - a. Falcon D200 Series
2. Acceptable Manufacturers and Products:
  - a. Arrow E Series
  - b. Dormakaba D800/DB600 Series
  - c. Schlage B500 Series

### B. Requirements:

1. Provide grade 2 deadbolt series conforming to ANSI/BHMA A156.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide deadbolts with standard 2-3/4 inches (70 mm) backset. Provide 2-3/8 inches (60 mm) where noted or if door or frame detail requires. Provide deadbolt with full 1-inch (25 mm) throw, constructed of steel alloy.
4. Provide manufacturer's standard strike.

## 2.09 EXIT DEVICES

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
  - a. Falcon 24/25 series
2. Acceptable Manufacturers and Products:
  - a. Sargent 19-43-GL-80 series
  - b. Precision Apex series

### B. Requirements:

1. Provide exit devices tested to ANSI/BHMA A156.3 Grade 1 and UL listed for Panic Exit or Fire Exit Hardware.
2. Cylinders: Refer to "KEYING" article, herein.
3. Provide touchpad type exit devices, fabricated of brass, bronze, stainless steel, or aluminum, plated to standard architectural finishes to match balance of door hardware.

4. Touchpad must extend a minimum of one half of door width. No plastic inserts are allowed in touchpads.
5. Provide exit devices with deadlatching feature for security and for future addition of alarm kits and/or other electrified requirements.
6. Provide flush end caps for exit devices.
7. Provide exit devices with manufacturer's approved strikes.
8. Provide exit devices cut to door width and height. Install exit devices at height recommended by exit device manufacturer, allowable by governing building codes, and approved by Architect.
9. Mount mechanism case flush on face of doors or provide spacers to fill gaps behind devices. Where glass trim or molding projects off face of door, provide glass bead kits.
10. Provide cylinder or hex-key dogging as specified at non fire-rated openings.
11. Removable Mullions: 2 inches (51 mm) x 3 inches (76 mm) steel tube. Where scheduled as keyed removable mullion, provide type that can be removed by use of a keyed cylinder, which is self-locking when re-installed.
12. Provide factory drilled weep holes for exit devices used in full exterior application, highly corrosive areas, and where noted in hardware sets.
13. Provide electrified options as scheduled.
14. Provide exit devices with optional trim designs to match other lever and pull designs used on the project.

## 2.10 CYLINDERS

### A. Manufacturers:

1. Scheduled Manufacturer and Product:
  - a. As required to match Owner's Existing
2. Acceptable Manufacturers and Products:

### B. Requirements:

1. Provide cylinders/cores to match Owner's existing key system, compliant with ANSI/BHMA A156.5; latest revision; cylinder face finished to match lockset, manufacturer's series as indicated. Refer to "KEYING" article, herein.

## 2.11 KEYING

### A. Scheduled System:

1. Existing factory registered system:
  - a. Provide cylinders/cores keyed into Owner's existing factory registered keying system. Comply with guidelines in ANSI/BHMA A156.28, incorporating decisions made at keying conference.

### B. Requirements:

1. Construction Keying:
  - a. Temporary Construction Cylinder Keying.
    - 1) Provide construction cores that permit voiding construction keys without cylinder removal, furnished in accordance with the following requirements.
      - a) Split Key or Lost Ball Construction Keying System.
      - b) 3 construction control keys, and extractor tools or keys as required to void construction keying.

- c) 12 construction change (day) keys.
  - 2) Owner or Owner's Representative will void operation of temporary construction keys.
2. Permanent Keying:
- a. Provide permanent cylinders/cores keyed by the manufacturer according to the following key system.
    - 1) Master Keying system as directed by the Owner.
  - b. Forward bitting list and keys separately from cylinders, by means as directed by Owner. Failure to comply with forwarding requirements will be cause for replacement of cylinders/cores involved at no additional cost to Owner.
  - c. Provide keys with the following features:
    - 1) Material: Nickel silver; minimum thickness of .107-inch (2.3mm)
    - 2) Patent Protection: Keys and blanks protected by one or more utility patent(s).
  - d. Identification:
    - 1) Mark permanent cylinders/cores and keys with applicable blind code for identification. Do not provide blind code marks with actual key cuts.
    - 2) Identification stamping provisions must be approved by the Architect and Owner.
    - 3) Stamp cylinders/cores and keys with Owner's unique key system facility code as established by the manufacturer; key symbol and embossed or stamped with "DO NOT DUPLICATE" along with the "PATENTED" or patent number to enforce the patent protection.
    - 4) Failure to comply with stamping requirements will be cause for replacement of keys involved at no additional cost to Owner.
    - 5) Forward permanent cylinders/cores to Owner, separately from keys, by means as directed by Owner.
  - e. Quantity: Furnish in the following quantities.
    - 1) Change (Day) Keys: 3 per cylinder/core.
    - 2) Master Keys: 6.

## 2.12 KEY CONTROL SYSTEM

### A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Telkee
2. Acceptable Manufacturers:
  - a. HPC
  - b. Lund

### B. Requirements:

1. Provide key control system, including envelopes, labels, tags with self-locking key clips, receipt forms, 3-way visible card index, temporary markers, permanent markers, and standard metal cabinet, all as recommended by system manufacturer, with capacity for 150% of number of locks required for Project.
  - a. Provide complete cross index system set up by hardware supplier, and place keys on markers and hooks in cabinet as determined by final key schedule.
  - b. Provide hinged-panel type cabinet for wall mounting.

## 2.13 DOOR CLOSERS

### A. Manufacturers and Products:

1. Scheduled Manufacturer and Product:
    - a. Falcon SC80A series
  2. Acceptable Manufacturers and Products:
    - a. LCN 1450 series
    - b. Norton 8000 series
    - c. Yale 3000 series
- B. Requirements:
1. Provide door closers conforming to ANSI/BHMA A156.4 Grade 1 requirements by BHMA certified independent testing laboratory.
  2. Provide door closers with fully hydraulic, full rack and pinion action with aluminum cylinder.
  3. Closer Body: 1-1/4-inch (32 mm) diameter, with 5/8-inch (16 mm) diameter heat-treated pinion journal.
  4. Hydraulic Fluid: Fireproof, passing requirements of UL10C, and requiring no seasonal closer adjustment for temperatures ranging from 120 degrees F to -30 degrees F.
  5. Spring Power: Continuously adjustable over full range of closer sizes, and providing reduced opening force as required by accessibility codes and standards.
  6. Hydraulic Regulation: By tamper-proof, non-critical valves, with separate adjustment for latch speed, general speed, and backcheck.
  7. Pressure Relief Valve (PRV) Technology: Not permitted.
  8. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other door hardware items interfering with closer mounting.

## 2.14 DOOR TRIM

- A. Manufacturers:
1. Scheduled Manufacturer:
    - a. Ives
  2. Acceptable Manufacturers:
    - a. Elmes
    - b. Trimco
    - c. Burns
- B. Requirements:
1. Provide push plates, push bars, pull plates, pulls, and hands-free reversible door pulls with diameter and length as scheduled.

## 2.15 PROTECTION PLATES

- A. Manufacturers:
1. Scheduled Manufacturer:
    - a. Ives
  2. Acceptable Manufacturers:
    - a. Burns
    - b. Trimco

## B. Requirements:

1. Provide protection plates with a minimum of 0.050 inch (1 mm) thick, beveled four edges as scheduled. Furnish with sheet metal or wood screws, finished to match plates.
2. Sizes plates 2 inches (51 mm) less width of door on single doors, pairs of doors with a mullion, and doors with edge guards. Size plates 1 inch (25 mm) less width of door on pairs without a mullion or edge guards.
3. At fire rated doors, provide protection plates over 16 inches high with UL label.

## 2.16 DOOR STOPS AND HOLDERS

## A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Ives
2. Acceptable Manufacturers:
  - a. Trimco
  - b. Burns

## B. Provide door stops at each door leaf:

1. Provide wall stops wherever possible. Provide concave type where lockset has a push button of thumbturn.
2. Where a wall stop cannot be used, provide universal floor stops.
3. Where wall or floor stop cannot be used, provide overhead stop.
4. Provide roller bumper where doors open into each other and overhead stop cannot be used.

## 2.17 THRESHOLDS, SEALS, DOOR SWEEPS, AUTOMATIC DOOR BOTTOMS, AND GASKETING

## A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Zero International
2. Acceptable Manufacturers:
  - a. National Guard
  - b. Reese
  - c. Legacy
  - d. Pemko

## B. Requirements:

1. Provide thresholds, weather-stripping, and gasketing systems as specified and per architectural details. Match finish of other items.
2. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that meets requirements of assemblies tested according to UL 1784 and installed in compliance with NFPA 105.
3. Provide door sweeps, seals, astragals, and auto door bottoms only of type where resilient or flexible seal strip is easily replaceable and readily available.
4. Size thresholds 1/2 inch (13 mm) high by 5 inches (127 mm) wide by door width unless otherwise specified in the hardware sets or detailed in the drawings.

## 2.18 SILENCERS

### A. Manufacturers:

1. Scheduled Manufacturer:
  - a. Ives
2. Acceptable Manufacturers:
  - a. Burns
  - b. Rockwood
  - c. Trimco

### B. Requirements:

1. Provide "push-in" type silencers for hollow metal or wood frames.
2. Provide one silencer per 30 inches (762 mm) of height on each single frame, and two for each pair frame.
3. Omit where gasketing is specified.

## 2.19 FINISHES

### A. FINISH: BHMA 626/652 (US26D); EXCEPT:

1. Hinges at Exterior Doors: BHMA 630 (US32D)
2. Aluminum Geared Continuous Hinges: BHMA 628 (US28)
3. Push Plates, Pulls, and Push Bars: BHMA 630 (US32D)
4. Protection Plates: BHMA 630 (US32D)
5. Overhead Stops and Holders: BHMA 630 (US32D)
6. Door Closers: Powder Coat to Match
7. Wall Stops: BHMA 630 (US32D)
8. Latch Protectors: BHMA 630 (US32D)
9. Weatherstripping: Clear Anodized Aluminum
10. Thresholds: Mill Finish Aluminum

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Prior to installation of hardware, examine doors and frames, with Installer present, for compliance with requirements for installation tolerances, labeled fire-rated door assembly construction, wall and floor construction, and other conditions affecting performance. Verify doors, frames, and walls have been properly reinforced for hardware installation.
- B. Examine roughing-in for electrical power systems to verify actual locations of wiring connections before electrified door hardware installation.
- C. Submit a list of deficiencies in writing and proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION



- A. Mount door hardware units at heights to comply with the following, unless otherwise indicated or required to comply with governing regulations.
  - 1. Standard Steel Doors and Frames: ANSI/SDI A250.8.
  - 2. Custom Steel Doors and Frames: HMMA 831.
  - 3. Interior Architectural Wood Flush Doors: ANSI/WDMA I.S. 1A
  - 4. Installation Guide for Doors and Hardware: DHI TDH-007-20
- B. Install door hardware in accordance with NFPA 80, NFPA 101 and provide post-install inspection, testing as specified in section 1.03.E unless otherwise required to comply with governing regulations.
- C. Install each hardware item in compliance with manufacturer's instructions and recommendations, using only fasteners provided by manufacturer.
- D. Do not install surface mounted items until finishes have been completed on substrate. Protect all installed hardware during painting.
- E. Set units level, plumb and true to line and location. Adjust and reinforce attachment substrate as necessary for proper installation and operation.
- F. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors according to industry standards.
- G. Install operating parts so they move freely and smoothly without binding, sticking, or excessive clearance.
- H. Hinges: Install types and in quantities indicated in door hardware schedule but not fewer than quantity recommended by manufacturer for application indicated.
- I. Wiring: Coordinate with Division 26, ELECTRICAL and Division 28 ELECTRONIC SAFETY AND SECURITY sections for:
  - 1. Conduit, junction boxes and wire pulls.
  - 2. Connections to and from power supplies to electrified hardware.
  - 3. Connections to fire/smoke alarm system and smoke evacuation system.
  - 4. Connection of wire to door position switches and wire runs to central room or area, as directed by Architect.
  - 5. Connections to panel interface modules, controllers, and gateways.
  - 6. Testing and labeling wires with Architect's opening number.
- J. Key Control System: Tag keys and place them on markers and hooks in key control system cabinet, as determined by final keying schedule.
- K. Door Closers: Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Mount closers so they are not visible in corridors, lobbies and other public spaces unless approved by Architect.
- L. Thresholds: Set thresholds in full bed of sealant complying with requirements specified in Division 07 Section "Joint Sealants."
- M. Stops: Provide floor stops for doors unless wall or other type stops are indicated in door hardware schedule. Do not mount floor stops where they may impede traffic or present tripping hazard.

- N. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
- O. Meeting Stile Gasketing: Fasten to meeting stiles, forming seal when doors are closed.
- P. Door Bottoms and Sweeps: Apply to bottom of door, forming seal with threshold when door is closed.

### 3.03 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.
  - 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.
- B. Occupancy Adjustment: Approximately three to six months after date of Substantial Completion, examine and readjust each item of door hardware, including adjusting operating forces, as necessary to ensure function of doors and door hardware.

### 3.04 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items per manufacturer's instructions to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of Substantial Completion.

### 3.05 DOOR HARDWARE SCHEDULE









- A. The intent of the hardware specification is to specify the hardware for interior and exterior doors, and to establish a type, continuity, and standard of quality. However, it is the door hardware supplier's responsibility to thoroughly review existing conditions, schedules, specifications, drawings, and other Contract Documents to verify the suitability of the hardware specified.
- B. Discrepancies, conflicting hardware, and missing items are to 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.
- C. Hardware items are referenced in the following hardware schedule. Refer to the above specifications for special features, options, cylinders/keying, and other requirements.
- D. Hardware Sets:

84841 OPT0314078 Version 2

Hardware Group No. 01

For use on Door #(s):  
101A






Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	PANIC HARDWARE	LD-25-R-EO		626	FAL
1	EA	SURFACE CLOSER	SC81A SS		689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-226		A	ZER

Hardware Group No. 02

For use on Door #(s):  
101B






Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		652	IVE
2	EA	PUSH/PULL BAR	9190EZHD-12"-NO		630- 316	IVE
2	EA	SURFACE CLOSER	SC81A SS		689	FAL
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
2	EA	SILENCER	SR64/65 AS REQ		GRY	IVE

Hardware Group No. 03

For use on Door #(s):  
103A









Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
2	EA	PANIC HARDWARE	25-V-EO-LBR		626	FAL
2	EA	SURFACE CLOSER	SC81A SS		689	FAL
2	EA	KICK PLATE	8400 10" X 1" LDW B-CS		630	IVE
2	EA	SILENCER	SR64/65 AS REQ		GRY	IVE

Hardware Group No. 04

For use on Door #(s):  
103

Provide each door(s) with the following:










QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
2	EA	MANUAL FLUSH BOLT	FB458		626	IVE
1	EA	DUST PROOF STRIKE	DP2		626	IVE
1	EA	PASSAGE SET	MA101 LLL/LLL DG		626	FAL
1	EA	DBL CYL DEADBOLT	D231P		626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	SURFACE CLOSER	SC81A SSHO		689	FAL
2	EA	WALL STOP	WS406/407CCV		630	IVE
2	EA	SILENCER	SR64/65 AS REQ		GRY	IVE

DOOR FUNCTION: LEVER ON ROOM 121 SIDE. DEADBOLT CAN BE KEYED UNLOCKED FROM BOTH SIDES. NO ENTRY FROM ROOM 103

Hardware Group No. 05

For use on Door #(s):  
104                      106B                      121A

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	MA581L DG		626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	ELECTRIC STRIKE	(PROVIDED AND INSTALLED BY SECURITY PROVIDER)		626	VON
1	EA	SURFACE CLOSER	SC81A REG OR PA AS REQ		689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64/65 AS REQ		GRY	IVE
1	EA	CREDENTIAL READER	BY ACCESS CONTROL PROVIDER			
1	EA	WIRING DIAGRAM	AS REQUIRED			DLR

1. THE HARDWARE SUPPLIER SHALL COORDINATE THE ELECTRIFIED HARDWARE WITH ALL RELATED TRADES.

2. DOOR FUNCTION: DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL AT READER WILL RELEASE ELECTRIC STRIKE AND ALLOW FOR ENTRY. DOOR ALWAYS AVAILABLE FOR FREE EGRESS. KEY OVERRIDE AVAILABLE.





3. ELECTRIC STRIKE, POWER SUPPLY, CREDENTIALS, READER, AND CONNECTIONS TO THE OWNER'S NETWORK PROVIDED BY ACCESS CONTROL PROVIDER. ALL OTHER WORK PROVIDED BY ELECTRICAL CONTRACTOR.

Hardware Group No. 06

For use on Door #(s):

104A                      108C                      115

Provide each door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	CLASSROOM LOCK	MA561L DG		626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	SILENCER	SR64/65 AS REQ		GRY	IVE

Hardware Group No. 07

For use on Door #(s):

105A                      107B                      107C                      108A                      122

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 5 X 4.5 NRP		630	IVE
1	EA	PANIC HARDWARE	LD-25-R-NL		626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	SURFACE CLOSER	SC81A SS		689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-226		A	ZER

Hardware Group No. 08

For use on Door #(s):

105B                      108B







Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
1	EA	HARDWARE	BY MANUFACTURER			

Hardware Group No. 09

For use on Door #(s):  
106A

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	MA581L DG		626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	ELECTRIC STRIKE	(PROVIDED AND INSTALLED BY SECURITY PROVIDER)	⚡	626	VON
1	EA	SURFACE CLOSER	SC81A REG OR PA AS REQ		689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	CREDENTIAL READER	BY ACCESS CONTROL PROVIDER	⚡		
1	EA	WIRING DIAGRAM	AS REQUIRED	⚡		DLR

1. THE HARDWARE SUPPLIER SHALL COORDINATE THE ELECTRIFIED HARDWARE WITH ALL RELATED TRADES.







2. DOOR FUNCTION: DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL AT READER WILL RELEASE ELECTRIC STRIKE AND ALLOW FOR ENTRY. DOOR ALWAYS AVAILABLE FOR FREE EGRESS. KEY OVERRIDE AVAILABLE.

3. ELECTRIC STRIKE, POWER SUPPLY, CREDENTIALS, READER, AND CONNECTIONS TO THE OWNER'S NETWORK PROVIDED BY ACCESS CONTROL PROVIDER. ALL OTHER WORK PROVIDED BY ELECTRICAL CONTRACTOR.

Hardware Group No. 10

For use on Door #(s):  
106C

Provide each door(s) with the following:







QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	MA581L DG		626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	SURFACE CLOSER	SC81A REG OR PA AS REQ		689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER



Hardware Group No. 11

For use on Door #(s):  
107A

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	FIRE EXIT HARDWARE	F-25-R-NL		626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	ELECTRIC STRIKE	(PROVIDED AND INSTALLED BY SECURITY PROVIDER)	⚡	626	VON
1	EA	SURFACE CLOSER	SC81A REG OR PA AS REQ		689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	GASKETING	488SBK PSA		BK	ZER
1	EA	CREDENTIAL READER	BY ACCESS CONTROL PROVIDER	⚡		
1	EA	WIRING DIAGRAM	AS REQUIRED	⚡		DLR

1. THE HARDWARE SUPPLIER SHALL COORDINATE THE ELECTRIFIED HARDWARE WITH ALL RELATED TRADES.







2. DOOR FUNCTION: DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL AT READER WILL RELEASE ELECTRIC STRIKE AND ALLOW FOR ENTRY. DOOR ALWAYS AVAILABLE FOR FREE EGRESS. KEY OVERRIDE AVAILABLE.

3. ELECTRIC STRIKE, POWER SUPPLY, CREDENTIALS, READER, AND CONNECTIONS TO THE OWNER'S NETWORK PROVIDED BY ACCESS CONTROL PROVIDER. ALL OTHER WORK PROVIDED BY ELECTRICAL CONTRACTOR.

Hardware Group No. 12

For use on Door #(s):  
109                      110

Provide each door(s) with the following:






QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PRIVACY LOCK	MA301 DG		626	FAL
1	EA	SURFACE CLOSER	SC81A REG OR PA AS REQ		689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64/65 AS REQ		GRY	IVE

Hardware Group No. 13

For use on Door #(s):

113                      114

Provide each door(s) with the following:





QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	PRIVACY LOCK	MA301 DG		626	FAL
1	EA	SURFACE CLOSER	SC81A SS		689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
3	EA	SILENCER	SR64/65 AS REQ		GRY	IVE

Hardware Group No. 14

For use on Door #(s):

116                      120

Provide each door(s) with the following:





QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	OFFICE LOCK	MA571L DG		626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64/65 AS REQ		GRY	IVE

## Hardware Group No. 15

For use on Door #(s):

117

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5 NRP		652	IVE
1	EA	STOREROOM LOCK	MA581L DG		626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	ELECTRIC STRIKE	(PROVIDED AND INSTALLED BY SECURITY PROVIDER)	⚡	626	VON
1	EA	SURFACE CLOSER	SC81A SS		689	FAL
3	EA	SILENCER	SR64/65 AS REQ		GRY	IVE
1	EA	CREDENTIAL READER	BY ACCESS CONTROL PROVIDER	⚡		
1	EA	WIRING DIAGRAM	AS REQUIRED	⚡		DLR

1. THE HARDWARE SUPPLIER SHALL COORDINATE THE ELECTRIFIED HARDWARE WITH ALL RELATED TRADES.

2. DOOR FUNCTION: DOOR NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL AT READER WILL RELEASE ELECTRIC STRIKE AND ALLOW FOR ENTRY. DOOR ALWAYS AVAILABLE FOR FREE EGRESS. KEY OVERRIDE AVAILABLE.





3. ELECTRIC STRIKE, POWER SUPPLY, CREDENTIALS, READER, AND CONNECTIONS TO THE OWNER'S NETWORK PROVIDED BY ACCESS CONTROL PROVIDER. ALL OTHER WORK PROVIDED BY ELECTRICAL CONTRACTOR.

## Hardware Group No. 16

For use on Door #(s):

118

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1 4.5 X 4.5		652	IVE
1	EA	STOREROOM LOCK	MA581L DG		626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	WALL STOP	WS406/407CCV		630	IVE
3	EA	SILENCER	SR64/65 AS REQ		GRY	IVE

Hardware Group No. 17

For use on Door #(s):  
121B

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	POWER TRANSFER	EPT10	⚡	689	VON
1	EA	ELEC PANIC HARDWARE	RX-MEL-25-R-NL 24 VDC	⚡	626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	SURFACE CLOSER	SC81A SS		689	FAL
1	EA	KICK PLATE	8400 10" X 2" LDW B-CS		613	IVE
1	EA	RAIN DRIP	142AA		AA	ZER
1	EA	GASKETING	188SBK PSA		BK	ZER
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-226		A	ZER
1	EA	CREDENTIAL READER	BY ACCESS CONTROL PROVIDER		⚡	
1	EA	POWER SUPPLY	PS902 900-2RS 120/240 VAC	⚡	LGR	SCE
1	EA	WIRING DIAGRAM	AS REQUIRED		⚡	DLR








1. THE HARDWARE SUPPLIER SHALL COORDINATE THE ELECTRIFIED HARDWARE WITH ALL RELATED TRADES.
2. DOOR FUNCTION: DOORS NORMALLY CLOSED AND LOCKED. PRESENTING VALID CREDENTIAL AT READER WILL RETRACT LATCHBOLT AND ALLOW FOR ENTRY. DOOR ALWAYS AVAILABLE FOR FREE EGRESS. KEY OVERRIDE AVAILABLE.
3. CREDENTIALS, READER, AND CONNECTIONS TO THE OWNER'S NETWORK PROVIDED BY ACCESS CONTROL PROVIDER. ALL OTHER WORK PROVIDED BY ELECTRICAL CONTRACTOR.

## Hardware Group No. 18

For use on Door #(s):

124

Provide each door(s) with the following:









QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
3	EA	HINGE	5BB1HW 4.5 X 4.5		630	IVE
1		DEADBOLT	MS1850		628	ADA
1	EA	THUMBTURN	4066		628	ADA
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			FAL
1	EA	PUSH/PULL BAR	9190EZHD-12"-NO		630-316	IVE
1	EA	SURFACE CLOSER	SC81A REG OR PA AS REQ		689	FAL
1	EA	WALL STOP	WS406/407CCV		630	IVE
1	EA	WEATHER STRIPPING	BY DOOR MANUFACTURER			
1	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-226		A	ZER

## Hardware Group No. 19

For use on Door #(s):

102

Provide each door(s) with the following:

QTY		DESCRIPTION	CATALOG NUMBER		FINISH	MFR
6	EA	HINGE	5BB1HW 4.5 X 4.5 NRP		630	IVE
1	EA	PANIC HARDWARE	25-C-C-718		626	FAL
1	EA	PANIC HARDWARE	25-C-EO		626	FAL
1	EA	CYLINDER	AS REQUIRED TO MATCH EXISTING			
2	EA	90 DEG OFFSET PULL	8190EZHD 12" STD		630-316	IVE
2	EA	SURFACE CLOSER	SC81A SS		689	FAL
1	EA	WEATHER STRIPPING	BY DOOR MANUFACTURER			
2	EA	DOOR SWEEP	39A		A	ZER
1	EA	THRESHOLD	655A-223		A	ZER
2	EA	SILENCER	SR64/65 AS REQ		GRY	IVE

END OF SECTION

**SECTION 09 21 16**  
**GYPSUM BOARD ASSEMBLIES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Acoustic insulation.
- B. Gypsum wallboard.
- C. Joint treatment and accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- B. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
- C. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2012.
- D. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
- E. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2014.
- F. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.
- G. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2014.
- H. GA-216 - Application and Finishing of Gypsum Board; 2013.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on gypsum board, accessories, and joint finishing system.

**1.04 QUALITY ASSURANCE**

- A. Installer Qualifications: Company specializing in performing gypsum board installation and finishing, with minimum years of experience, with minimum 3 years of documented experience.

**PART 2 PRODUCTS****2.01 BOARD MATERIALS**

- A. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
  - 1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
  - 2. At Assemblies with Fire-Rating: Use type required by indicated tested assembly; if no tested assembly is indicated, use Type X board, UL listed.
  - 3. Thickness:
    - a. Vertical Surfaces: 5/8 inch.
    - b. Ceilings: 5/8 inch.
- B. Backing Board for Wall Tile: Water-resistant gypsum backing board as defined in ASTM C1396/C1396M; sizes to minimum joints in place; ends square cut.
  - 1. Application: Walls at bathrooms.
  - 2. Thickness: 5/8 inch.
  - 3. Edges: Tapered.

**2.02 ACCESSORIES**

- A. Acoustic Insulation: 1; preformed glass fiber, friction fit type, unfaced. Thickness: 3 1/2 inch.
- B. Acoustic Sealant: Non-hardening, non-skinning, for use in conjunction with gypsum board.
- C. Beads, Joint Accessories, and Other Trim: ASTM C1047, galvanized steel or rolled zinc, unless noted otherwise.
- D. Joint Materials: ASTM C475/C475M and as recommended by gypsum board manufacturer for



project conditions.

1. Tape: 2 inch wide, coated glass fiber tape for joints and corners.
  2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
  3. Ready-mixed vinyl-based joint compound.
- E. Screws for Fastening of Gypsum Panel Products to Cold-Formed Steel Studs Less than 0.033 inch in Thickness and Wood Members: ASTM C1002; self-piercing tapping screws, corrosion resistant.

### **PART 3 EXECUTION**

#### **301 EXAMINATION**

- A. Verify that project conditions are appropriate for work of this section to commence.

#### **302 ACOUSTIC ACCESSORIES INSTALLATION**

- A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.
- B. Acoustic Sealant: Install as follows:
1. Place continuous bead at base and top of wall on both sides of wall.
  2. Seal around all penetrations by conduit, pipe, ducts, and rough-in boxes, except where firestopping is provided.

#### **303 BOARD INSTALLATION**

- A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.
- B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
1. Exception: Tapered edges to receive joint treatment at right angles to framing.
- C. Installation on Wood Framing: For non-rated assemblies, install as follows:
1. Single-Layer Applications: Screw attachment.

#### **304 INSTALLATION OF TRIM AND ACCESSORIES**

- A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.
1. Not more than 30 feet apart on walls and ceilings over 50 feet long.
- B. Corner Beads: Install at external corners, using longest practical lengths.
- C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials.

#### **305 JOINT TREATMENT**

- A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.
- B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
- C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
1. Feather coats of joint compound so that camber is maximum 1/32 inch.

#### **306 TOLERANCES**

- A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

**END OF SECTION**

**SECTION 09 30 00**  
**TILING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Tile for floor applications.
- B. Tile for wall applications.
- C. Ceramic trim.
- D. Non-ceramic trim.
- E. Accessories.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 92 00 - Joint Sealants: Sealing joints between tile work and adjacent construction and fixtures.
- B. Section 09 21 16 - Gypsum Board Assemblies: Tile backer board.

**1.03 REFERENCE STANDARDS**

- A. ANSI A108/A118/A136.1 - American National Standard Specifications for the Installation of Ceramic Tile (Compendium); 2013.1.
- B. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2014.
- C. ANSI A108.1c - Specifications for Contractors Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Bed with Dry-Set or Latex-Portland Cement; 1999 (Reaffirmed 2010).
- D. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesives or Water Cleanable Tile-Setting Epoxy Adhesive; 2009 (Revised).
- E. ANSI A108.5 - American National Standard Specifications for Installation of Ceramic Tile with Dry-Set Portland Cement Mortar or Latex-Portland Cement Mortar; 1999 (Reaffirmed 2010).
- F. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 1999 (Reaffirmed 2010).
- G. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 1999 (Reaffirmed 2010).
- H. ANSI A118.4 - American National Standard Specifications for Modified Dry-Set Cement Mortar; 2012 (Revised).
- I. ANSI A118.6 - American National Standard Specifications for Standard Cement Grouts for Tile Installation; 2010 (Revised)
- J. ANSI A118.15 - American National Standard Specifications for Improved Modified Dry-Set Cement Mortar; 2012.
- K. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2015.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.
- C. Samples: Provide sample of each type of tile.

**1.05 QUALITY ASSURANCE**

- A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.
- B. Installer Qualifications: Company specializing in performing tile installation, with minimum of five years of documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Protect adhesives from freezing or overheating in accordance with manufacturer's instructions.

**1.07 FIELD CONDITIONS**

- A. Do not install solvent-based products in an unventilated environment.
- B. Maintain ambient and substrate temperature of 50 degrees F during installation of mortar materials.

**PART 2 PRODUCTS****2.01 TILE**

- A. Floor tile, tile base, wall tile and grout color as scheduled on the drawings.

**2.02 TRIM AND ACCESSORIES**

- A. Trim: Matching trim ceramic shapes in sizes coordinated with field tile.
  - 1. Manufacturers: Same as for tile.
- B. Non-Ceramic Trim: Brushed stainless steel, style and dimensions to suit application, for setting using tile mortar or adhesive.
  - 1. Applications:
    - a. Open edges of wall tile.
    - b. Open edges of floor tile.
    - c. Transition between floor finishes.
    - d. Thresholds at door openings.
    - e. Floor/wall intersection
    - f. Outsides corners, Inside corners
  - 2. Manufacturers:
    - a. Schluter-Systems: [www.schluter.com](http://www.schluter.com).

**2.03 SETTING MATERIALS**

- A. Latex-Portland Cement Mortar Bond Coat: ANSI A118.4 or ANSI A118.15.
  - 1. Products:
    - a. ARDEX Engineered Cements; ARDEX N 23 MICROTEC: [www.ardexamericas.com](http://www.ardexamericas.com).
    - b. AVM Industries, Inc; Thin-Set 780: [www.avmindustries.com](http://www.avmindustries.com).
    - c. LATICRETE International, Inc; LATICRETE 254 Platinum: [www.laticrete.com/#sle](http://www.laticrete.com/#sle).
    - d. Substitutions: Equal or better products are acceptable.

**2.04 GROUTS**

- A. Standard Grout: ANSI A118.6 standard cement grout.
  - 1. Applications: Use this type of grout where indicated .
  - 2. Use sanded grout for joints 1/8 inch wide and larger; use unsanded grout for joints less than 1/8 inch wide.
  - 3. Color(s): As selected by Architect from manufacturer's full line.

**2.05 THIN-SET ACCESSORY MATERIALS**

- A. Concrete Floor Slab Crack Isolation Membrane: Material complying with ANSI A118.12; not intended as waterproofing.
  - 1. Thickness: 20 mils, maximum.
  - 2. Crack Resistance: No failure at 1/16 inch gap, minimum.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.
- C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of

setting materials to sub-floor surfaces.

- D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.
- E. Verify that required floor-mounted utilities are in correct location.

### **3.02 PREPARATION**

- A. Protect surrounding work from damage.
- B. Vacuum clean surfaces and damp clean.
- C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

### **3.03 INSTALLATION - GENERAL**

- A. Install tile and grout in accordance with applicable requirements of ANSI A108.1A thru A108.13, manufacturer's instructions, and TCNA (HB) recommendations.
- B. Lay tile off center line of room in both directions. Do not interrupt tile pattern through openings.
- C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.
- D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.
- E. Form internal angles square and external angles square.
- F. Install Schuler profiles in accordance with manufacturer's instructions.
- G. Sound tile after setting. Replace hollow sounding units.
- H. Keep control and expansion joints free of mortar, grout, and adhesive.
- I. Prior to grouting, allow installation to completely cure; minimum of 48 hours.
- J. Grout tile joints unless otherwise indicated. Use standard grout unless otherwise indicated.
- K. At changes in plane and tile-to-tile control joints, use tile sealant instead of grout, with either bond breaker tape or backer rod as appropriate to prevent three-sided bonding.

### **3.04 INSTALLATION - FLOORS - THIN-SET METHODS**

- A. Over interior concrete substrates, install in accordance with TCNA (HB) Method F113, dry-set or latex-Portland cement bond coat, with standard grout.

### **3.05 INSTALLATION - WALL TILE**

- A. Over gypsum wallboard on wood or metal studs install in accordance with TCNA (HB) Method W243, thin-set with dry-set or latex-Portland cement bond coat, unless otherwise indicated.

### **3.06 CLEANING**

- A. Clean tile and grout surfaces.

### **3.07 PROTECTION**

- A. Do not permit traffic over finished floor surface for 4 days after installation.

**END OF SECTION**

**SECTION 09 51 00**  
**ACOUSTICAL CEILINGS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Suspended metal grid ceiling system.
- B. Acoustical units.

**1.02 REFERENCE STANDARDS**

- A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2013a.
- B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2013.
- C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2014.

**1.03 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide data on suspension system components.
- C. Samples: Submit two samples 6" by 6" inch in size illustrating material and finish of acoustical units.
- D. Samples: Submit two samples each, 6" inches long, of suspension system main runner.
- E. Manufacturer's Installation Instructions: Indicate special procedures.

**1.04 QUALITY ASSURANCE**

- A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**PART 2 PRODUCTS****2.01 ACOUSTICAL UNITS**

- A. Manufacturers:
  - 1. USG: [www.usg.com](http://www.usg.com).
  - 2. Armstrong: [www.armstrongceilings.com](http://www.armstrongceilings.com)
  - 3. Substitutions: Permitted if products meet the requirements of this specification.
- B. ACT-1 Acoustical Units – Mars High-NRC SLT 87200 by USG.
  - 1. Size: 24 by 24 inches.
  - 2. Thickness: 1 inches.
  - 3. Edge: Beveled.
  - 4. Surface Color: White.
- B. ACT-2 Acoustical Units – Radar by USG.
  - 1. Size: 24 by 24 inches.
  - 2. Thickness: 5/8 inches.
  - 3. Edge: Square.
  - 4. Surface Color: White.

**2.02 SUSPENSION SYSTEM(S)**

- A. Suspension Systems - General: Complying with ASTM C635/C635M; die cut and interlocking components, with clips, splices, and perimeter moldings as required.
- B. Exposed Steel Suspension System: Formed steel, commercial quality cold rolled; heavy-duty.
  - 1. Profile: Tee; 15/16 inch wide face.
  - 2. Construction: Double web.
  - 3. Finish: White painted.

**2.03 ACCESSORIES**

- A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.
- B. Perimeter Moldings: Same material and finish as grid.
  - 1. At Exposed Grid: Provide L-shaped molding for mounting at same elevation as face of grid.
- C. Touch-up Paint: Type and color to match acoustical and grid units.

**PART 3 EXECUTION****3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify that layout of hangers will not interfere with other work.

**3.02 INSTALLATION - SUSPENSION SYSTEM**

- A. Install suspension system in accordance with ASTM C636/C636M, ASTM E580/E580M, and manufacturer's instructions and as supplemented in this section.
- B. Install suspension system in accordance with ASTM E 580 for Areas Subject to Severe Severe Seismic Disturbance.
- C. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.
- D. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.
- E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
- F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.
- G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.
- H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.
- I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.
- J. Do not eccentrically load system or induce rotation of runners.
- K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
  - 1. Use longest practical lengths.
  - 2. Overlap and rivet corners.

**3.03 INSTALLATION - ACOUSTICAL UNITS**

- A. Install acoustical units in accordance with manufacturer's instructions.
- B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.
- C. Fit border trim neatly against abutting surfaces.
- D. Install units after above-ceiling work is complete.
- E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.
- F. Cutting Acoustical Units:
  - 1. Make field cut edges of same profile as factory edges.
  - 2. Double cut and field paint exposed reveal edges.



**3.04 TOLERANCES**

- A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.
- B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**

**SECTION 09 65 00  
RESILIENT FLOORING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Resilient tile flooring.
- B. Installation accessories.

**1.02 REFERENCE STANDARDS**

- A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2011.
- B. ASTM F1700 - Standard Specification for Solid Vinyl Tile; 2013a.

**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. Verification Samples: Submit two samples, 12 by 12 inch in size illustrating color and pattern for each resilient flooring product specified.
- D. Concrete Testing Standard: Submit a copy of ASTM F710.
- E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

**1.04 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. Store all materials off of the floor in an acclimatized, weather-tight space.
- C. Maintain temperature in storage area between 55 degrees F and 90 degrees F.

**PART 2 PRODUCTS****2.01 TILE FLOORING**

- A. High Performance Luxury Vinyl Tile.
  - 1. Manufacturer: Mohawk Group
    - a. Hot & Heavy Collection.
    - b. See drawings for color selections
  - 2. Minimum Requirements: Comply with ASTM F1700, of Class corresponding to type specified.
  - 3. Plank Size: 9 inches x 59 inches
  - 4. Wear Layer Thickness: 20 mil
  - 5. Total Thickness: 5mm

**2.02 RESILIENT BASE**

- A. Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove, and as follows:
  - 1. Height: 4 inch.
  - 2. Thickness: 0.125 inch thick.
  - 3. Finish: Satin.
  - 4. Color: Color as selected from manufacturer's standards.

**2.03 ACCESSORIES**

- A. Subfloor Filler: White premix latex; type recommended by adhesive material manufacturer.
- B. Adhesives: Type recommended by flooring manufacturer.

**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.
- B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive resilient base.
- C. Cementitious Sub-floor Surfaces: Verify that substrates are dry enough and ready for resilient flooring installation by testing for moisture and pH.
  - 1. Test in accordance with ASTM F710.
  - 2. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.
- D. Verify that required floor-mounted utilities are in correct location.

**3.02 PREPARATION**

- A. Prepare floor substrates as recommended by flooring and adhesive manufacturers.
- B. Clean substrate.

**3.03 INSTALLATION - GENERAL**

- A. Starting installation constitutes acceptance of sub-floor conditions.
- B. Install in accordance with manufacturer's written instructions.
- C. Luxury vinyl flooring shall be installed with adhesive. Spread only enough adhesive to permit installation of materials before initial set.
- D. Fit joints and butt seams tightly.
- E. Set flooring in place, press with heavy roller to attain full adhesion.
- F. Where type of floor finish, pattern, or color are different on opposite sides of door, terminate flooring under centerline of door.
- G. Install edge strips at unprotected or exposed edges, where flooring terminates, and where indicated.
  - 1. Metal Strips: Attach to substrate before installation of flooring using stainless steel screws.
- H. Scribe flooring to walls, columns, cabinets, floor outlets, and other appurtenances to produce tight joints.

**3.04 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.

**3.05 CLEANING**

- A. Remove excess adhesive from floor, base, and wall surfaces without damage.
- B. Clean in accordance with manufacturer's written instructions.

**3.06 PROTECTION**

- A. Prohibit traffic on resilient flooring for 48 hours after installation.

**END OF SECTION**

**SECTION 09 90 00**  
**PAINTING AND COATING****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Surface preparation.
- B. Field application of paints.
- C. Scope: Finish all exterior and interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
- D. Do Not Paint or Finish the Following Items:
  - 1. Items fully factory-finished unless specifically so 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. Glass.
  - 6. Concealed pipes, ducts, and conduits.

**1.02 RELATED REQUIREMENTS**

- A. Section 07 46 46 - Fiber Cement Siding: Factory applied primer for siding, trim and soffit panels.

**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 D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Base Materials; 2007.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide complete list of all 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.
- C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches in size, illustrating range of colors available for each finishing product specified.
  - 1. Where sheen is specified, submit samples in only that sheen.

**1.05 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum five years documented experience.

**1.06 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.

**1.07 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. Do not apply exterior coatings during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.
- D. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

**PART 2 PRODUCTS****2.01 MANUFACTURERS**

- A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.
- B. Provide all paint and coating products from the same manufacturer to the greatest extent possible.
- C. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 PAINTS AND COATINGS - GENERAL**

- A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
  - 1. Provide paints and coatings 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. Supply each coating material in quantity required to complete entire project's work from a single production run.
  - 3. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
- B. Volatile Organic Compound (VOC) Content:
  - 1. Provide coatings 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.

**2.03 PAINT SYSTEMS - EXTERIOR**

- A. Paint ME-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:
  - 1. Touch-up with rust-inhibitive primer recommended by top coat manufacturer.
  - 2. Semi-gloss: Two coats of latex enamel.

**2.04 PAINT SYSTEMS - INTERIOR**

- A. Paint WI-OP-3L - Wood, Opaque, Latex, 3 Coat:
  - 1. One coat of latex primer sealer.
  - 2. Semi-gloss: Two coats of latex enamel.
- B. Paint WI-TR-VS - Wood, Transparent, Varnish, Stain:
  - 1. One coat of stain.
  - 2. One coat of sealer.
  - 3. Satin: One coat of varnish
- C. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
  - 1. One coat of latex primer.
  - 2. Semi-gloss: Two coats of latex enamel.

- D. Paint MI-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:
  - 1. Touch-up with latex primer.
  - 2. Semi-gloss: Two coats of latex enamel.
- E. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
  - 1. One coat of alkyd primer sealer.
  - 2. Satin: Two coats of latex enamel; Walls.
  - 3. Flat: Two coats of latex enamel; Ceilings.

## 2.05 ACCESSORY MATERIALS

- A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
- B. Patching Material: Latex filler.
- C. Fastener Head Cover Material: Latex filler.

## PART 3 EXECUTION

### 3.01 EXAMINATION

- A. Do not begin application of coatings until substrates have been properly prepared.
- B. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
- C. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.
- D. Test shop-applied primer for compatibility with subsequent cover materials.
- E. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
  - 1. Gypsum Wallboard: 12 percent.
  - 2. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
  - 3. Exterior Wood: 15 percent, measured in accordance with ASTM D4442.

### 3.02 PREPARATION

- A. Clean surfaces thoroughly and correct defects prior to coating 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 or 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. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.
- G. Shop-Primed Steel Surfaces to be Finish Painted: 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.
- H. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.
- I. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.
- J. Exterior Wood/Fiber Cement Surfaces to Receive Opaque Finish: Remove dust, grit, and foreign matter. Seal knots, pitch streaks, and sappy sections. Fill nail holes with tinted exterior caulking compound after prime coat has been applied. Back prime concealed surfaces before installation.



**3.03 APPLICATION**

- A. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.
- B. Apply products in accordance with manufacturer's instructions.
- C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.
- D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.
- E. Apply each coat to uniform appearance.
- F. Sand wood and metal surfaces lightly between coats to achieve required finish.
- G. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
- H. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface
- I. 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 finished coatings until completion of project.
- B. Touch-up damaged coatings after Substantial Completion.

**END OF SECTION**

**SECTION 10 28 00**  
**TOILET ACCESSORIES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Commercial toilet accessories.
- B. Utility room accessories.
- C. Grab bars.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Concealed blocking support.

**1.03 REFERENCE STANDARDS**

- A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.
- B. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015.
- C. ASTM C1036 - Standard Specification for Flat Glass; 2011.
- D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.
- E. ASTM F2285 - Standard Consumer Safety Performance Specification for Diaper Changing Tables for Commercial Use; 2004 (Reapproved 2010).

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.
- C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

**PART 2 PRODUCTS****2.01 MATERIALS**

- A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
- B. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.
- C. Mirror Glass: Tempered safety glass, ASTM C1048; and ASTM C1036 Type I, Class 1, Quality Q2, with silvering as required.
- D. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

**2.02 FINISHES**

- A. Stainless Steel: No. 4 Brushed finish.

**2.03 COMMERCIAL TOILET ACCESSORIES**

- A. Grab Bars: Stainless steel, nonslip grasping surface finish.
  - 1. Standard Duty Grab Bars:
    - a. Push/Pull Point Load: 250 pound-force, minimum.
    - b. Dimensions: 1-1/4 inch outside diameter, minimum 0.05 inch wall thickness, exposed flange mounting, 1-1/2 inch clearance between wall and inside of grab bar.
    - c. Length and Configuration: As indicated on drawings.
- B. See drawings for other toilet accessories.

**2.04 UTILITY ROOM ACCESSORIES**

- A. Mop and Broom Holder: 0.05 inch thick stainless steel, Type 304, hat-shaped channel.
  - 1. Install in Janitor closet/room

2. Holders: 3 spring-loaded rubber cam holders.
3. Length: 24 inches.
4. Products:
  - a. Bobrick; B-233.
  - b. Substitutions: Section 01 60 00 - Product Requirements.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

- A. Verify existing conditions before starting work.
- B. Verify exact location of accessories for installation.
- C. For electrically-operated accessories, verify that electrical power connections are ready and in the correct locations.
- D. Verify that field measurements are as indicated on drawings.

**3.02 PREPARATION**

- A. Deliver inserts and rough-in frames to site for timely installation.
- B. Provide templates and rough-in measurements as required.

**3.03 INSTALLATION**

- A. Install accessories in accordance with manufacturers' instructions in locations indicated on the drawings.
- B. Install plumb and level, securely and rigidly anchored to substrate.
- C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

**3.04 PROTECTION**

- A. Protect installed accessories from damage due to subsequent construction operations.

**END OF SECTION**

**SECTION 10 44 00**  
**FIRE PROTECTION SPECIALTIES****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Fire extinguishers.
- B. Fire extinguisher cabinets.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.

**1.03 REFERENCE STANDARDS**

- A. FM (AG) - FM Approval Guide; current edition.
- B. NFPA 10 - Standard for Portable Fire Extinguishers; 2013.
- C. UL (DIR) - Online Certifications Directory; current listings at database.ul.com.

**1.04 SUBMITTALS**

- A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
- B. Product Data: Provide extinguisher operational features.
- C. Shop Drawings: Indicate locations of cabinets and cabinet physical dimensions.
- D. Product Data: Provide extinguisher operational features.
- E. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

**PART 2 PRODUCTS****2.01 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 gage.
  - 1. Stored Pressure Operated: Deep Drawn.
  - 2. Class: A:B:C type.
  - 3. Size: 10 pound.
  - 4. Finish: Polished chrome.
  - 5. Temperature range: Minus 40 degrees F to 120 degrees F.

**2.02 FIRE EXTINGUISHER CABINETS**

- A. Cabinet Configuration: Semi-Recessed type.
  - 1. Size to accommodate accessories.
  - 2. Trim: Flat square edge, with 1 1/2 inch max. wide face.
  - 3. Provide cabinet enclosure with right angle inside corners and seams, and with formed perimeter trim and door stiles.
- B. Door: 0.036 inch metal thickness, reinforced for flatness and rigidity with nylon catch. Hinge doors for 180 degree opening with two butt hinge.
- C. Door Glazing: Acrylic plastic, clear, 1/8 inch thick, flat shape and set in resilient channel glazing gasket.
- D. Cabinet Mounting Hardware: Appropriate to cabinet, with pre-drilled holes for placement of anchors.
- E. Weld, fill, and grind components smooth.
- F. Finish of Cabinet Exterior Trim and Door: Baked enamel, color as selected.

- G. Finish of Cabinet Interior: White colored enamel.

**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. Install cabinet plumb and level.
- C. Installation Height: Fire extinguisher handle shall be 3'-10" above finished floor.
- D. Secure rigidly in place.

**END OF SECTION**

**SECTION 12 36 00**  
**COUNTERTOPS****PART 1 GENERAL****1.01 SECTION INCLUDES**

- A. Countertops for architectural cabinet work.

**1.02 RELATED REQUIREMENTS**

- A. Section 06 41 00 - Architectural Wood Casework.
- B. Section 22 40 00 – Plumbing Fixtures: Under mount sinks.

**1.03 REFERENCE STANDARDS**

- A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.
- B. IAPMO Z124 - Plastic Plumbing Fixtures; 2012.
- C. ISFA 2-01 - Classification and Standards for Solid Surfacing Material; 2013.

**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. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Specimen warranty.
- C. Shop Drawings: Complete details of materials and installation; combine with shop drawings of cabinets and casework specified in other sections.
- D. Verification Samples: For each finish product specified, minimum size 6 inches square, representing actual product, color, and patterns.
- E. Test Reports: Chemical resistance testing, showing compliance with specified requirements.
- F. Installation Instructions: Manufacturer's installation instructions and recommendations.
- G. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

**1.05 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

**PART 2 PRODUCTS****2.01 COUNTERTOPS**

- A. Solid Surfacing Countertops: Solid surfacing sheet or plastic resin casting self-supporting over structural members.
  - 1. Flat Sheet Thickness: 1/2 inch, minimum.
  - 2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
    - a. Surface Burning Characteristics: Flame spread index of 25, maximum; smoke developed index of 450, maximum; when tested in accordance with ASTM E84.
    - b. Finish on Exposed Surfaces: Matte, gloss rating of 5 to 20.
    - c. Color and Pattern: As indicated on drawings.
  - 3. Other Components Thickness: 1/2 inch, minimum.



4. Exposed Edge Treatment: Built up to minimum 1-1/4 inch thick; radiused edge.
5. Back and End Splashes: Same sheet material, square top; minimum 4 inches high.

## 2.02 MATERIALS

- A. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.
- B. Joint Sealant: Mildew-resistant silicone sealant, white.

## 2.03 FABRICATION

- A. Fabricate tops and splashes in the largest sections practicable, with top surface of joints flush.
  1. Join lengths of tops using best method recommended by manufacturer.
  2. Fabricate to overhang fronts and ends of cabinets 1 inch except where top butts against cabinet or wall.
  3. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes.
- B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
  1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
  2. Height: 4 inches, unless otherwise indicated.
- C. Solid Surfacing: Fabricate tops up to 144 inches long in one piece; join pieces with adhesive sealant in accordance with manufacturer's recommendations and instructions.
  1. Integral sinks: Shop-mount securely to countertop with adhesives, using flush configuration, as per manufacturer's instructions.

## 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.
- C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

### 3.02 PREPARATION

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.03 INSTALLATION

- A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.
- B. Seal joint between back/end splashes and vertical surfaces.

### 3.04 TOLERANCES

- A. Variation From Horizontal: 1/8 inch in 10 feet, maximum.
- B. Offset From Wall, Countertops: 1/8 inch maximum; 1/16 inch minimum.
- C. Field Joints: 1/8 inch wide, maximum.

### 3.05 CLEANING

- A. Clean countertops surfaces thoroughly.

### 3.06 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION**

**SECTION 22 00 00**  
**BASIC PLUMBING MATERIALS AND METHODS****PART 1 - GENERAL****1.01 IMPOSED REGULATIONS:**

- A. Applicable provisions of the State and Local Codes and codes and standards in addition to those listed elsewhere in the contract documents are hereby imposed on a general basis for plumbing work.

**1.02 SCOPE OF WORK:**

- A. Provide all labor, materials, equipment and supervision to construct complete and operable plumbing systems as indicated on the drawings and specified herein. All materials and equipment used shall be new, undamaged and free from any defects.

**1.03 RELATED DOCUMENTS AND OTHER INFORMATION:**

- A. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the portions of work specified in each and every Section of this Division, individually and collectively.

**1.04 EXISTING SERVICES AND FACILITIES:**

- A. Damage to Existing Services: Existing services and facilities damaged by the Contractor through negligence or through use of faulty materials or workmanship shall be promptly repaired, replaced, or otherwise restored to previous conditions by the Contractor without additional cost to the Owner.
- B. Interruption of Services: Interruptions of services necessary for connection to or modification of existing systems or facilities shall occur only at prearranged times approved by the Owner. Contractor shall provide no less than 14 days notice to owner when scheduling outages. Interruptions shall only occur after the provision of all temporary work and the availability of adequate labor and materials will assure that the duration of the interruption will not exceed the time agreed upon.

**1.05 PRODUCT WARRANTIES:**

- A. Provide manufacturer's standard printed commitment in reference to a specific product and normal application, stating that certain acts of restitution will be performed for the Purchaser or Owner by the manufacturer, when and if the product fails within certain operational conditions and time limits. Where the warranty requirements of a specific specification section exceeds the manufacturer's standard warranty, the more stringent requirements will apply and modified manufacturer's warranty shall be provided. In no case shall the manufacturer's warranty be less than one (1) year.

**1.06 PRODUCT SUBSTITUTIONS:**

- A. General: Materials specified by manufacturer's name shall be used unless prior approval of

an alternate is given by addenda. Requests for substitutions must be received in the office of the Architect at least 14 days prior to opening of bids. Refer to the general conditions for the substitution request form and required documentation.

**PART 2 - NOT USED**

**PART 3 - EXECUTION**

**3.01 PRODUCT INSTALLATION, GENERAL:**

- A. Except where more stringent requirements are indicated, comply with the product manufacturer's installation instructions and recommendations, including handling, anchorage, assembly, connections, cleaning and testing, charging, lubrication, startup, test operation and shut-down of operating equipment. Consult with manufacturer's technical experts, for specific instructions on unique product conditions and unforeseen problems.
- B. Protection and Identification: Deliver products to project properly identified with names, models numbers, types, grades, compliance labels and similar information needed for distinct identifications; adequately packaged or protected to prevent deterioration during shipment, storage and handling. Store in a dry, well ventilated, indoor space, except where prepared and protected by the manufacturer specifically for exterior storage.
- C. Permits and Tests: Provide labor, material and equipment to perform all tests required by the governing agencies and submit a record of all tests to the Owner or his representative. Notify the Architect five days in advance of any testing.

**END OF SECTION**

**SECTION 22 05 10  
PLUMBING COORDINATION****PART 1 - GENERAL****1.01 QUALITY ASSURANCE:**

- A. Plumbing Coordination Drawings: Prepare a set of coordination drawings showing the coordination of the major elements, components, and systems of the Plumbing work, and showing the coordination of Plumbing work with other work. Prepare drawings at accurate scale and sufficiently large to show locations of every item, including clearances for installing, maintaining, insulating, breaking down equipment, replacing motors and similar requirements. Drawings shall indicate coordination with all other trades including, but not limited to, lighting, structural, plumbing, and architectural items. Prepare drawings to include plans, elevations, sections and details as needed to conclusively show successful coordination and integration of the work. Submit drawings for review by the Architect/Engineer and Owner.
1. Plans shall include dimensioned locations of all Floor Drains
  2. Plans shall include locations of all ceiling and wall access panels required for equipment access (valves, for example).
- B. Record Drawings: During construction operations, the Plumbing contractor shall faithfully make a record of all approved changes from the contract drawings, including accurate dimensions where applicable, and shall also record accurate dimensions locating all below-grade outside Plumbing utilities (whether changed or not) with reference to permanent above-grade objects. A minimum of two (2) dimensions from building reference points shall be provided and a bury depth indicated. At completion of the work, all such changes shall be recorded neatly with red ink by the Plumbing contractor on an unused set of the Plumbing contract drawings supplied by the architect.
- C. Photographs: For all below-grade plumbing piping, photograph installation of trenches before backfilling. Submit to A/E for review and include in closeout documents to the Owner.

**1.02 RELATED DOCUMENTS AND OTHER INFORMATION:**

- A. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the portions of work specified in each and every Section of this Division, individually and collectively.
- B. Section 019100 - General Commissioning Requirements.
- C. Commissioning Plan.

**PART 2 - PRODUCTS****2.01 PLUMBING PRODUCT COORDINATION:**

- A. Power Characteristics: Refer to the electrical sections of the specifications and the electrical drawings for the power characteristics available for the operation of each power driven item of Plumbing equipment. The electrical design was based on the power requirements of the Plumbing equipment manufacturer scheduled or specified as "basis of design." Any

modifications to the electrical system that are required due to the use of an approved equivalent manufacturer shall be made at no additional cost to the owner. All changes must be clearly documented and submitted for review by the Architect/Engineer prior to purchasing equipment. Coordinate purchases to ensure uniform interface with electrical work. Refer to Division 26 specifications for additional coordination requirements.

- B. Coordination of Options and Substitutions: When the contract documents permit the selection from several product options and it becomes necessary to authorize a substitution, do not proceed with purchase until coordination of interface to equipment has been checked and satisfactorily established.

### **PART 3 - EXECUTION**

#### **3.01 INSPECTION AND PREPARATION:**

- A. Substrate Examination: The Installer of each element of the Plumbing work must examine the condition of the substrate to receive the work, the conditions under which the work will be performed, and must notify the Contractor in writing of conditions detrimental to the proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- B. Do not proceed with the installation of sleeves, anchors, hangers, roof penetrations and similar work until Plumbing coordination drawings have been processed and released for construction. Where work must be installed prior to that time in order to avoid a project delay, review proposed installation in a project coordination meeting including all parties involved with the interfacing of the work.

#### **3.02 CUTTING AND PATCHING:**

- A. Structural Limitations: Do not cut structural framing, walls, floors, decks and other members intended to withstand stress, except with the Architect's or Engineer's written authorization. Authorization will be granted only where there is no other reasonable method for completing the Plumbing work, and where the proposed cutting clearly does not materially weaken the structure.
- B. Where authorized, cut opening through concrete (for pipe penetrations and similar services) by core drilling or sawing. Do not cut by hammer-driven chisel or drill.
- C. Other work: Do not endanger or damage other work through the procedures and processes of cutting to accommodate Plumbing work. Review the proposed cutting with the Installer of the work to be cut, and comply with his recommendations to minimize damage. Where necessary, engage the original Installer or other specialists to execute the cutting in the recommended manner.
- D. Where patching is required to restore other work, because of either cutting or other damage inflicted during the installation of Plumbing work, execute the patching in the manner recommended by the original Installer. Restore the other work in every respect, including the elimination of visual defects in exposed finishes, as judged by the Architect. Engage the original Installer to complete patching of the following categories of work:
  - 1. Exposed concrete finishes.
  - 2. Exposed masonry.
  - 3. Waterproofing and vapor barriers.
  - 4. Roofing, flashing and accessories.
  - 5. Interior exposed finishes and casework, where judged by the Architect to be difficult to achieve an acceptable match by other means

**3.03 COORDINATION OF PLUMBING INSTALLATION:**

- A. General: Sequence, coordinate and integrate the various elements of Plumbing work so that the Plumbing system will perform as indicated and be in harmony with the other work of the building. The Architect/Engineer will not supervise the coordination, which is the exclusive responsibility of the Contractor. Comply with the following requirements:
1. Install piping and similar services straight and true, aligned with other work and with overhead structures and allowing for insulation. Conceal where possible.
  2. Arrange work to facilitate maintenance and repair or replacement of equipment. Locate services requiring maintenance on valves and similar units in front of services requiring less maintenance. Connect equipment for ease of disconnecting, with minimum of interference with other work.
  3. Give the right-of way to piping systems required to slope for drainage (over other service lines). Piping shall be located to avoid interference with ductwork and light fixtures.
- B. Drawings: Conform with the arrangement indicated by the contract documents to the greatest extent possible, recognizing that portions of the work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, comply with the Architect's decision on resolution of the conflict.
- C. Electrical Work: Coordinate the Plumbing work with electrical work, and properly interface with the electrical service. In general, and except as otherwise indicated, install Plumbing equipment ready for electrical connection. Refer to the electrical sections of the specifications for electrical connection of Plumbing equipment.
- D. Utility Connections: Coordinate the connection of Plumbing systems with exterior underground utilities and services. Comply with the requirements of governing regulations, franchised service companies and controlling agencies.
1. Provide a single connection for each service except where multiple connections are indicated. Water, tap, meter, and vault cost shall be incurred by the Contractor.

**3.04 COORDINATION OF PLUMBING START-UP:**

- A. Seasonal Requirements: Adjust and coordinate the timing of Plumbing system start-ups with seasonal variations, so that demonstration and testing of specified performance can be observed and recorded. Exercise proper care in off-season start-ups to ensure that systems and equipment will not be damaged by the operation.

**END OF SECTION**

**SECTION 22 05 17**  
**SLEEVES AND SLEEVE SEALS FOR PLUMBING 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. Sleeves.
  2. Stack-sleeve fittings.
  3. Sleeve-seal systems.
  4. Sleeve-seal fittings.
  5. Grout.

**PART 2 - PRODUCTS****2.01 SLEEVES**

- A. Cast-Iron Wall Pipes: Cast or fabricated of cast or ductile iron and equivalent to ductile-iron pressure pipe, with plain ends and integral waterstop unless otherwise indicated.
- B. Galvanized-Steel Wall Pipes: ASTM A 53/A 53M, Schedule 40, with plain ends and welded steel collar; zinc coated.
- C. Galvanized-Steel-Pipe Sleeves: ASTM A 53/A 53M, Type E, Grade B, Schedule 40, zinc coated, with plain ends.
- D. PVC-Pipe Sleeves: ASTM D 1785, Schedule 40.

**2.02 STACK-SLEEVE FITTINGS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Smith, Jay R. Mfg. Co.
  2. Zurn Specification Drainage Operation; Zurn Plumbing Products Group.
  3. Approved equal.
- B. Description: Manufactured, cast-iron sleeve with integral clamping flange. Include clamping ring, bolts, and nuts for membrane flashing.
1. Underdeck Clamp: Clamping ring with setscrews.

**2.03 SLEEVE-SEAL SYSTEMS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Retain option in first paragraph below if manufacturer's name and model number are indicated in schedules or plans on Drawings; delete option and insert manufacturer's name and model number if not included on Drawings.
  2. Advance Pro=ducts & Systems, Inc.
  3. CALPICO, Inc.
  4. GPT (Link-Seal).
  5. Metraflex Company (The).
  6. Pipeline Seal and Insulator, Inc.



7. Proco Products, Inc.
8. Approved equal.

- B. Description: Modular sealing-element unit, designed for field assembly, for filling annular space between piping and sleeve.
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, Stainless steel of length required to secure pressure plates to sealing elements.

#### **2.04 WALL SLEEVE FITTING**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. Presealed Systems.
  2. Approved equal.
- B. Description: Manufactured plastic, sleeve-type, waterstop assembly made for imbedding in concrete slab or wall. Unit has plastic or rubber waterstop collar with center opening to match piping OD.

#### **2.05 GROUT**

- A. Standard: ASTM C 1107/C 1107M, Grade B, post-hardening and volume-adjusting, dry, hydraulic-cement grout.
- B. Characteristics: Nonshrink; recommended for interior and exterior applications.
- C. Design Mix: 5000-psi, 28-day compressive strength.
- D. Packaging: Premixed and factory packaged.

### **PART 3 - EXECUTION**

#### **3.01 SLEEVE INSTALLATION**

- A. Install sleeves for piping passing through penetrations in floors, partitions, roofs, and walls.
- B. For sleeves that will have sleeve-seal system installed, select sleeves of size large enough to provide 1-inch annular clear space between piping and concrete slabs and walls.
1. Sleeves are not required for core-drilled holes.
- C. Pipes passing through interior partitions.
1. Cut sleeves to length for mounting flush with both surfaces.
  2. Install sleeves that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  3. Seal annular space between sleeve and piping or piping insulation; use joint sealants appropriate for size, depth, and location of joint.

#### **3.02 STACK-SLEEVE-FITTING INSTALLATION**

- A. Install stack-sleeve fittings in new slabs as slabs are constructed.
1. Install fittings that are large enough to provide 1/4-inch annular clear space between sleeve and pipe or pipe insulation.
  2. Secure flashing between clamping flanges for pipes penetrating floors with membrane waterproofing. Coordinate flashing with Architect/general contractor. Install section of cast-iron soil pipe to extend sleeve to 2 inches above finished floor level.
  3. Extend cast-iron sleeve fittings below floor slab as required to secure clamping ring.
  4. Using grout, seal the space around outside of stack-sleeve fittings.

**3.04 SLEEVE-SEAL-SYSTEM INSTALLATION**

- A. Install sleeve-seal systems in sleeves in exterior concrete walls and slabs-on-grade at service piping entries into building.
- B. Select type, size, and number of sealing elements required for piping material and size for sleeve ID or hole size. Position piping in center of sleeve. Center piping in penetration, assemble sleeve-seal system components, and install in annular space between piping and sleeve. Tighten bolts against pressure plates that cause sealing elements to expand and make a watertight seal.

**3.05 WALL SLEEVE FITTING INSTALLATION**

- A. Install sleeve-seal fittings in new walls and slabs as they are constructed.
- B. Assemble fitting components of length to be flush with both surfaces of concrete slabs and walls. Position waterstop flange to be centered in concrete slab or wall.
- C. Secure nailing flanges to concrete forms.
- D. Using grout, seal the space around outside of sleeve-seal fittings.

**END OF SECTION**

**SECTION 22 05 19**  
**METERS AND GAGES FOR PLUMBING 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. Liquid-in-glass thermometers.
  2. Thermowells.
  3. Dial-type pressure gages.
  4. Gage attachments.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Product Certificates: For each type of meter and gage, from manufacturer.

**1.05 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For meters and gages to include in operation and maintenance manuals.

**PART 2 - PRODUCTS****2.01 LIQUID-IN-GLASS THERMOMETERS**

- A. Metal-Case, Industrial-Style, Liquid-in-Glass Thermometers:
  1. Standard: ASME B40.200.
  2. Case: Cast aluminum; 7-inch nominal size unless otherwise indicated.
  3. Tube: Glass with magnifying lens and blue or red organic liquid.
  4. Tube Background: Nonreflective aluminum with permanently etched scale markings graduated in deg F and deg C.
  5. Connector: 1-1/4 inches, with ASME B1.1 screw threads.
  6. Accuracy: Plus or minus 1 percent of scale range or one scale division, to a maximum of 1.5 percent of scale range.

**2.02 THERMOWELLS**

- A. Thermowells:
1. Standard: ASME B40.200.
  2. Description: Pressure-tight, socket-type fitting made for insertion into piping tee fitting.
  3. Type: Stepped shank unless straight or tapered shank is indicated.
  4. External Threads: NPS 1/2, NPS 3/4, or NPS 1, ASME B1.20.1 pipe threads.
  5. Internal Threads: 1/2, 3/4, and 1 inch, with ASME B1.1 screw threads.
  6. Bore: Diameter required to match thermometer bulb or stem.
  7. Insertion Length: Length required to match thermometer bulb or stem.
  8. Lagging Extension: Include on thermowells for insulated piping and tubing.
  9. Bushings: For converting size of thermowell's internal screw thread to size of thermometer connection.

**2.03 PRESSURE GAGES**

- A. Direct-Mounted, Metal-Case, Dial-Type Pressure Gages:
1. Standard: ASME B40.100.
  2. Case: Liquid-filled; cast aluminum or drawn steel; 6-inch nominal diameter.
  3. Pressure-Element Assembly: Bourdon tube unless otherwise indicated.
  4. Pressure Connection: Brass, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and bottom-outlet type unless back-outlet type is indicated.
  5. Movement: Mechanical, with link to pressure element and connection to pointer.
  6. Dial: Nonreflective aluminum with permanently etched scale markings graduated in psi and kPa.
  7. Pointer: Dark-colored metal.
  8. Window: Glass.
  9. Ring: Metal.
  10. Accuracy: Grade B, plus or minus 2 percent of middle half of scale range.

**2.04 GAGE ATTACHMENTS**

- A. Snubbers: ASME B40.100, brass; with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads and piston-type surge-dampening device. Include extension for use on insulated piping.
- B. Valves: Brass or stainless-steel needle, with NPS 1/4 or NPS 1/2, ASME B1.20.1 pipe threads.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Install thermowells with socket extending one-third of pipe diameter and in vertical position in piping tees.
- B. Install thermowells of sizes required to match thermometer connectors. Include bushings if required to match sizes.
- C. Install thermowells with extension on insulated piping.

- D. Fill thermowells with heat-transfer medium.
- E. Install direct-mounted thermometers in thermowells and adjust vertical and tilted positions.
- F. Install direct-mounted pressure gages in piping tees with pressure gage located on pipe at the most readable position.
- G. Install valve and snubber in piping for each pressure gage for fluids.
- H. Install test plugs in piping tees.
- I. Install thermometers in the following locations:
  - 1. Inlet and outlet of each water heater.
  - 2. Inlet and outlet of each circulating pump.
  - 3. Additional locations indicated in the documents.
- J. Install pressure gages in the following locations:
  - 1. Building water service entrance into building.
  - 2. Suction and discharge of each domestic water pump.

### **3.02 CONNECTIONS**

- A. Install meters and gages adjacent to machines and equipment to allow service and maintenance of meters, gages, machines, and equipment.

### **3.03 ADJUSTING**

- A. Adjust faces of meters and gages to proper angle for best visibility.

### **3.04 THERMOMETER SCHEDULE**

- A. Thermometers shall be the following:
  - 1. Industrial-style, liquid-in-glass type.
- B. Thermometer stems shall be of length to match thermowell insertion length.

### **3.05 THERMOMETER SCALE-RANGE SCHEDULE**

- A. Scale Range for Domestic Cold-Water Piping: 0 to 150 deg F and minus 20 to plus 70 deg C.
- B. Scale Range for Domestic Hot-Water Piping: 20 to 240 deg F and 0 to 150 deg C.

### **3.06 PRESSURE-GAGE SCHEDULE**

- A. Pressure gages shall be the following:
  - 1. Liquid-filled, direct-mounted, metal case.

**3.07 PRESSURE-GAGE SCALE-RANGE SCHEDULE**

- A. Scale Range for Domestic Water Piping: 0 to 200 psi and 0 to 1400 kPa.

**END OF SECTION 22 05 19**

**SECTION 22 05 23**  
**GENERAL-DUTY VALVES FOR PLUMBING 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. Brass ball valves.
  - 2. Bronze ball valves.
  - 3. Bronze gate valves.
- B. Related Sections:
  - 1. Section 220553 "Identification for Plumbing Piping and Equipment" for valve tags and schedules.
  - 2. Section 221116 "Domestic Water Piping" for valves applicable only to this piping.

**1.03 DEFINITIONS**

- A. CWP: Cold working pressure.
- B. EPDM: Ethylene propylene copolymer rubber.
- C. NBR: Acrylonitrile-butadiene, Buna-N, or nitrile rubber.
- D. NRS: Nonrising stem.
- E. OS&Y: Outside screw and yoke.
- F. RS: Rising stem.
- G. SWP: Steam working pressure.

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each type of valve indicated.

**1.05 QUALITY ASSURANCE**

- A. Source Limitations for Valves: Obtain each type of valve from single source from single manufacturer.
- B. ASME Compliance:
  - 1. ASME B16.10 and ASME B16.34 for ferrous valve dimensions and design criteria.
  - 2. ASME B31.1 for power piping valves.
  - 3. ASME B31.9 for building services piping valves.



- C. NSF/ANSI Compliance: NSF 61 for valve materials for potable-water service.
- D. NSF/ANSI Compliance: NSF 372 for low lead construction for potable-water service.

#### **1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Prepare valves for shipping as follows:
  - 1. Protect internal parts against rust and corrosion.
  - 2. Protect threads, flange faces, and weld ends.
  - 3. Set gate and globe valves closed to prevent rattling.
  - 4. Set ball valves open to minimize exposure of functional surfaces.
  - 5. Set butterfly valves closed or slightly open.
  - 6. Block check valves in either closed or open position.
- B. Use the following precautions during storage:
  - 1. Maintain valve end protection.
  - 2. Store valves indoors and maintain at higher than ambient dew point temperature. If outdoor storage is necessary, store valves off the ground in watertight enclosures.
- C. Use sling to handle large valves; rig sling to avoid damage to exposed parts. Do not use handwheels or stems as lifting or rigging points.

### **PART 2 - PRODUCTS**

#### **2.01 GENERAL REQUIREMENTS FOR VALVES**

- A. Refer to valve schedule articles for applications of valves.
- B. Standards: NSF/ANSI 61 & 372.
- C. Valve Pressure and Temperature Ratings: Not less than indicated and as required for system pressures and temperatures.
- D. Valve Sizes: Same as upstream piping unless otherwise indicated.
- E. Valve Actuator Types:
  - 1. Handwheel: For valves other than quarter-turn types.
  - 2. Handlever: For quarter-turn valves NPS 6 and smaller.
- F. Valves in Insulated Piping: With 2-inch stem extensions and the following features:
  - 1. Gate Valves: With rising stem.
  - 2. Ball Valves: With extended operating handle of non-thermal-conductive material, and protective sleeve that allows operation of valve without breaking the vapor seal or disturbing insulation.
- G. Valve-End Connections:
  - 1. Flanged: With flanges according to ASME B16.1 for iron valves.
  - 2. Solder Joint: With sockets according to ASME B16.18.
  - 3. Threaded: With threads according to ASME B1.20.1.
- H. Valve Bypass and Drain Connections: MSS SP-45.

**2.02 BRASS BALL VALVES**

- A. Two-Piece, Full-Port, Brass Ball Valves with Stainless-Steel Trim:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Co.; Crane Valve Group; Crane Valves.
    - b. Crane Co.; Crane Valve Group; Jenkins Valves.
    - c. Flow-Tek, Inc.; a subsidiary of Bray International, Inc.
    - d. Hammond Valve.
    - e. Jamesbury; a subsidiary of Metso Automation.
    - f. Kitz Corporation.
    - g. Marwin Valve; a division of Richards Industries.
    - h. Milwaukee Valve Company.
    - i. RuB Inc.
  2. Description:
    - a. Standard: MSS SP-110.
    - b. SWP Rating: 150 psig.
    - c. CWP Rating: 600 psig.
    - d. Body Design: Two piece.
    - e. Body Material: Forged brass.
    - f. Ends: Threaded.
    - g. Seats: PTFE or TFE.
    - h. Stem: Stainless steel.
    - i. Ball: Stainless steel, vented.
    - j. Port: Full.

**2.03 BRONZE BALL VALVES**

- A. Two-Piece, Full-Port, Bronze Ball Valves with Stainless-Steel Trim:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Apollo Valves.
    - b. Crane Valves.
    - c. Hammond Valve.
    - d. Lance Valves; a division of Advanced Thermal Systems, Inc.
    - e. Milwaukee Valve Company.
    - f. NIBCO INC.
    - g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  2. Description:
    - a. Standard: MSS SP-110.
    - b. SWP Rating: 150 psig.
    - c. CWP Rating: 600 psig.
    - d. Body Design: Two piece.
    - e. Body Material: Bronze.
    - f. Ends: Threaded.
    - g. Seats: PTFE or TFE.
    - h. Stem: Stainless steel.
    - i. Ball: Stainless steel, vented.
    - j. Port: Full.

**2.04 BRONZE GATE VALVES**

- A. Class 125, NRS Bronze Gate Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. American Valve, Inc.
    - b. Crane Co.; Crane Valve Group; Crane Valves.

- c. Crane Co.; Crane Valve Group; Jenkins Valves.
  - d. Crane Co.; Crane Valve Group; Stockham Division.
  - e. Hammond Valve.
  - f. Kitz Corporation.
  - g. Milwaukee Valve Company.
  - h. NIBCO INC.
  - i. Powell Valves.
  - j. Red-White Valve Corporation.
  - k. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - l. Zy-Tech Global Industries, Inc.
2. Description:
- a. Standard: MSS SP-80, Type 1.
  - b. CWP Rating: 200 psig.
  - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
  - d. Ends: Threaded or solder joint.
  - e. Stem: Bronze.
  - f. Disc: Solid wedge; bronze.
  - g. Packing: Asbestos free.
  - h. Handwheel: Malleable iron, bronze, or aluminum.
- B. Class 125, RS Bronze Gate Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- a. American Valve, Inc.
  - b. Crane Co.; Crane Valve Group; Crane Valves.
  - c. Crane Co.; Crane Valve Group; Jenkins Valves.
  - d. Crane Co.; Crane Valve Group; Stockham Division.
  - e. Hammond Valve.
  - f. Kitz Corporation.
  - g. Milwaukee Valve Company.
  - h. NIBCO INC.
  - i. Powell Valves.
  - j. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
  - k. Zy-Tech Global Industries, Inc.
2. Description:
- a. Standard: MSS SP-80, Type 2.
  - b. CWP Rating: 200 psig.
  - c. Body Material: ASTM B 62, bronze with integral seat and screw-in bonnet.
  - d. Ends: Threaded[ or solder joint].
  - e. Stem: Bronze.
  - f. Disc: Solid wedge; bronze.
  - g. Packing: Asbestos free.
  - h. Handwheel: Malleable iron[, bronze, or aluminum].
- C. Class 150, NRS Bronze Gate Valves:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
- a. Hammond Valve.
  - b. Kitz Corporation.
  - c. Milwaukee Valve Company.
  - d. NIBCO INC.
  - e. Powell Valves.
  - f. Red-White Valve Corporation.
  - g. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
2. Description:
- a. Standard: MSS SP-80, Type 1.

- b. CWP Rating: 300 psig.
  - c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
  - d. Ends: Threaded.
  - e. Stem: Bronze.
  - f. Disc: Solid wedge; bronze.
  - g. Packing: Asbestos free.
  - h. Handwheel: Malleable iron, bronze, or aluminum.
- D. Class 150, RS Bronze Gate Valves:
- 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Crane Co.; Crane Valve Group; Crane Valves.
    - b. Crane Co.; Crane Valve Group; Stockham Division.
    - c. Hammond Valve.
    - d. Kitz Corporation.
    - e. Milwaukee Valve Company.
    - f. NIBCO INC.
    - g. Powell Valves.
    - h. Watts Regulator Co.; a division of Watts Water Technologies, Inc.
    - i. Zy-Tech Global Industries, Inc.
  - 2. Description:
    - a. Standard: MSS SP-80, Type 2.
    - b. CWP Rating: 300 psig.
    - c. Body Material: ASTM B 62, bronze with integral seat and union-ring bonnet.
    - d. Ends: Threaded.
    - e. Stem: Bronze.
    - f. Disc: Solid wedge; bronze.
    - g. Packing: Asbestos free.
    - h. Handwheel: Malleable iron, bronze, or aluminum.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine valve interior for cleanliness, freedom from foreign matter, and corrosion. Remove special packing materials, such as blocks, used to prevent disc movement during shipping and handling.
- B. Operate valves in positions from fully open to fully closed. Examine guides and seats made accessible by such operations.
- C. Examine threads on valve and mating pipe for form and cleanliness.
- D. Examine mating flange faces for conditions that might cause leakage. Check bolting for proper size, length, and material. Verify that gasket is of proper size, that its material composition is suitable for service, and that it is free from defects and damage.
- E. Do not attempt to repair defective valves; replace with new valves.

**3.02 VALVE INSTALLATION**

- A. Install valves with unions or flanges at each piece of equipment arranged to allow service, maintenance, and equipment removal without system shutdown.
- B. Locate valves for easy access and provide separate support where necessary.
- C. Install valves in horizontal piping with stem at or above center of pipe.
- D. Install valves in position to allow full stem movement.

**3.03 ADJUSTING**

- A. Adjust or replace valve packing after piping systems have been tested and put into service but before final adjusting and balancing. Replace valves if persistent leaking occurs.

**3.04 GENERAL REQUIREMENTS FOR VALVE APPLICATIONS**

- A. If valve applications are not indicated, use the following:
  - 1. Shutoff Service: Ball or gate valves.
- B. If valves with specified SWP classes or CWP ratings are not available, the same types of valves with higher SWP classes or CWP ratings may be substituted.
- C. Select valves, except wafer types, with the following end connections:
  - 1. For Copper Tubing, NPS 2 and Smaller: Threaded ends except where solder-joint valve-end option is indicated in valve schedules below.

**3.05 DOMESTIC, HOT- AND COLD-WATER VALVE SCHEDULE**

- A. Pipe NPS 2 and Smaller:
  - 1. Bronze and Brass Valves: May be provided with solder-joint ends instead of threaded ends.
  - 2. Ball Valves: Two piece, regular port, brass or bronze with brass or bronze trim.
  - 3. Bronze Gate Valves Class 150

**END OF SECTION**

**22 05 29****HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT****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. Metal pipe hangers and supports.
2. Trapeze pipe hangers.
3. Thermal-hanger shield inserts.
4. Fastener systems.
5. Pipe positioning systems.
6. Equipment supports.

- B. Related Sections:

1. Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment" for vibration isolation devices.

**1.03 DEFINITIONS**

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

**1.04 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for plumbing piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE 7.
  1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
  2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
  3. Design seismic-restraint hangers and supports for piping and equipment.

**1.05 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show fabrication and installation details and include calculations for the following; include Product Data for components:
  1. Trapeze pipe hangers.
  2. Pipe stands.
  3. Equipment supports.

**PART 2 - PRODUCTS****2.01 METAL PIPE HANGERS AND SUPPORTS**

## A. Carbon-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel .

## B. Stainless-Steel Pipe Hangers and Supports:

1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
2. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel .

## C. Copper Pipe Hangers:

1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel.

**2.02 TRAPEZE PIPE HANGERS**

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made from structural carbon-steel shapes with MSS SP-58 carbon-steel hanger rods, nuts, saddles, and U-bolts.

**2.03 THERMAL-HANGER SHIELD INSERTS**

- A. Manufacturers: Subject to compliance with requirements available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Carpenter & Paterson, Inc.
2. Clement Support Services.
3. ERICO International Corporation.
4. National Pipe Hanger Corporation.
5. PHS Industries, Inc.
6. Pipe Shields, Inc.; a subsidiary of Piping Technology & Products, Inc.
7. Piping Technology & Products, Inc.
8. Rilco Manufacturing Co., Inc.
9. Value Engineered Products, Inc.

- B. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.

- C. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.

- D. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

**2.04 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.



- B. Mechanical-Expansion Anchors: Insert-wedge-type, anchors to match pipe material, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

## **2.05 PIPE POSITIONING SYSTEMS**

- A. Description: IAPMO PS 42, positioning system of metal brackets, clips, and straps for positioning piping in pipe spaces; for plumbing fixtures in commercial applications.

## **2.06 EQUIPMENT SUPPORTS**

- A. Description: Welded, shop- or field-fabricated equipment support made from structural carbon-steel shapes.

## **2.07 MISCELLANEOUS MATERIALS**

- A. Structural Steel: ASTM A 36/A 36M, carbon-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.

## **PART 3 - Execution**

### **3.01 HANGER AND SUPPORT INSTALLATION**

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
  - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
  - 2. Field fabricate from ASTM A 36/A 36M, carbon-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
  - 3. Where insulated pipe is installed on top of trapeze, provide 12" long, 16 gauge galvanized steel saddle for the bottom half of insulation circumference between insulation and trapeze. Individual pipe clamps, if used on the trapeze, shall be sized to fit around the insulation and saddle outer diameter.
  - 4. Where uninsulated copper pipe is installed on a trapeze hanger, the pipe shall be wrapped with an elastomer material and a unistrut p-2600 clamp or similar clamp containing an elastomer material. This shall be used to isolate the copper from contacting dissimilar material.
- C. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- D. Fastener System Installation:
  - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
  - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.

- E. Pipe Positioning-System Installation: Install support devices to make rigid supply and waste piping connections to each plumbing fixture.
- F. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- G. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- H. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- I. All hangers shall be braced per seismic specification.
- J. Install lateral bracing with pipe hangers and supports to prevent swaying.
- K. 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. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- L. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- N. Insulated Piping:
  - 1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
  - 2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  - 4. Shield Dimensions for Pipe: Not less than the following:
    - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
    - b. NPS 4: 12 inches long and 0.06 inch thick.
    - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
    - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
    - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
  - 5. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### **3.02 EQUIPMENT SUPPORTS**

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

**3.03 METAL FABRICATIONS**

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
  - 1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  - 2. Obtain fusion without undercut or overlap.
  - 3. Remove welding flux immediately.
  - 4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

**3.04 ADJUSTING**

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

**3.05 PAINTING**

- A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

**3.06 HANGER AND SUPPORT SCHEDULE**

- A. Comply with MSS SP-69 for pipe-hanger selections and applications unless otherwise specified.
- B. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- C. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- D. Use carbon-steel pipe hangers and supports and metal trapeze pipe hangers and attachments for general service applications.
- E. Use copper-plated pipe hangers and copper attachments for uninsulated copper piping and tubing.
- F. For any other uninsulated pipe material, use elastomeric linings between the pipe and hangers or clamp if of dissimilar metal.
- G. Use padded hangers for piping that is subject to scratching.
- H. Use thermal-hanger shield inserts for insulated piping and tubing.
- I. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of uninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
  - 2. Pipe Hangers (MSS Type 5): For suspension of pipes NPS 1/2 to NPS 4, to allow off-center closure for hanger installation before pipe erection.
  - 3. Adjustable, Swivel-Ring Band Hangers (MSS Type 10): For suspension of uninsulated, stationary pipes NPS 1/2 to NPS 8.
- J. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:

1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
  2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- K. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
  2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
  3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  4. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- L. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
  2. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  3. C-Clamps (MSS Type 23): For structural shapes.
  4. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
  5. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
  6. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Light (MSS Type 31): 750 lb.
    - b. Medium (MSS Type 32): 1500 lb.
    - c. Heavy (MSS Type 33): 3000 lb.
  7. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
  8. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.
- M. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- N. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- O. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- P. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.
- Q. Use pipe positioning systems in pipe spaces behind plumbing fixtures to support supply and waste piping for plumbing fixtures.

**END OF SECTION**

**SECTION 22 05 48**  
**VIBRATION AND SEISMIC CONTROLS FOR PLUMBING PIPING AND EQUIPMENT**

**PART 1 - GENERAL**

**1.01 SUBMITTALS**

- A. Submit signed and sealed shop drawings from a professional engineer. Shop drawings to include project specific details, sketches, product data cut sheets.
- B. See drawings for additional requirements.

**PART 2 - NOT USED.**

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Refer to the details and notes on the construction documents.

**3.02 FIELD QUALITY CONTROL**

- A. Inspect installation after installation and submit report.

**END OF SECTION**

**SECTION 22 05 53  
IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT****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. Equipment labels.
  - 2. Warning signs and labels.
  - 3. Pipe labels.
  - 4. Valve tags.
  - 5. Warning tags.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

**1.04 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****2.01 EQUIPMENT LABELS**

- A. Plastic Labels for Equipment:
1. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
  2. Letter Color: Black .
  3. Background Color: White.
  4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
  5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
  6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch 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.
  7. Fasteners: Stainless-steel rivets or self-tapping screws.
  8. 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 Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

**2.02 WARNING SIGNS AND LABELS**

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Black.
- 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: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch 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 rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.



- I. Label Content: Include caution and warning information, plus emergency notification instructions.

### **2.03 PIPE LABELS**

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- C. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.
  1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
  2. Lettering Size: At least 1-1/2 inches high.

### **2.04 VALVE TAGS**

- A. Valve Tags: Stamped or engraved with 1/4-inch letters for piping system abbreviation and 1/2-inch numbers.
  1. Tag Material: Brass, 0.032-inch minimum thickness, and having predrilled or stamped holes for attachment hardware.
  2. Fasteners: Brass beaded chain.
- B. Valve Schedules: For each piping system, on 8-1/2-by-11-inch bond paper. Tabulate valve number, piping system, system abbreviation (as shown on valve tag), location of valve (room or space), normal-operating position (open, closed, or modulating), and variations for identification. Mark valves for emergency shutoff and similar special uses.
  1. Valve-tag schedule shall be included in operation and maintenance data.

### **2.05 WARNING TAGS**

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
  1. Size: 3 by 5-1/4 inches minimum.
  2. Fasteners: Brass grommet and wire.
  3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
  4. Color: Yellow background with black lettering.

**PART 3 - EXECUTION****3.01 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.

**3.02 EQUIPMENT LABEL INSTALLATION**

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

**3.03 PIPE LABEL INSTALLATION**

- A. 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:
  - 1. Near each valve and control device.
  - 2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  - 3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
  - 4. At access doors, manholes, and similar access points that permit view of concealed piping.
  - 5. Near major equipment items and other points of origination and termination.
  - 6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
  - 7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Pipe Label Color Schedule:
  - 1. Domestic Cold, Hot, and Return Water Piping:
    - a. Background Color: Green.
    - b. Letter Color: White.
  - 2. Sanitary Waste and Storm Drainage and Vent Piping:
    - a. Background Color: Green.
    - b. Letter Color: White.

**3.04 VALVE-TAG INSTALLATION**

- A. Install tags on valves and control devices in piping systems, except check valves; valves within factory-fabricated equipment units; shutoff valves; faucets; convenience and lawn-watering hose connections; and similar roughing-in connections of end-use fixtures and units. List tagged valves in a valve schedule.

- B. Valve-Tag Application Schedule: Tag valves according to size, shape, and color scheme and with captions similar to those indicated in the following subparagraphs:
  - 1. Valve-Tag Size and Shape: 1-1/2 inches round
  - 2. Valve-Tag Color: Natural
  - 3. Letter Color: Black

**3.05 WARNING-TAG INSTALLATION**

- A. Write required message on, and attach warning tags to, equipment and other items where required.

**END OF SECTION**

**22 07 19**  
**PLUMBING PIPING INSULATION****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 insulating the following plumbing piping services:
  - 1. Domestic cold-water piping.
  - 2. Domestic hot-water piping.

**1.03 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, if any).
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
  - 2. Detail attachment and covering of heat tracing inside insulation.
  - 3. Detail insulation application at pipe expansion joints for each type of insulation.
  - 4. Detail insulation application at elbows, fittings, flanges, valves, and specialties for each type of insulation.
  - 5. Detail removable insulation at piping specialties, equipment connections, and access panels.
  - 6. Detail application of field-applied jackets.
  - 7. Detail application at linkages of control devices.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Field quality-control reports.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- 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: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
- C. Comply with the following applicable standards and other requirements specified for miscellaneous components:
  - 1. Supply and Drain Protective Shielding Guards: ICC A117.1.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

**1.07 COORDINATION**

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
- B. Coordinate clearance requirements with piping Installer for piping insulation application. Before preparing piping Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.
- C. Coordinate installation and testing of heat tracing.

**1.08 SCHEDULING**

- A. Schedule insulation application after pressure testing systems and, where required, after installing and testing heat tracing. Insulation application may begin on segments that have satisfactory test results.
- B. Complete installation and concealment of plastic materials as rapidly as possible in each area of construction.

**PART 2 - Products****2.01 INSULATION MATERIALS**

- A. Comply with requirements in "Piping Insulation Schedule, General," "Indoor Piping Insulation Schedule," "Outdoor, Aboveground Piping Insulation Schedule," and "Outdoor, Underground Piping Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Cellular Glass: Inorganic, incombustible, foamed or cellulated glass with annealed, rigid, hermetically sealed cells. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  - 1. Products: Subject to compliance with requirements,
    - a. Pittsburgh Corning Corporation; Foamglas.
  - 2. Block Insulation: ASTM C 552, Type I.
  - 3. Special-Shaped Insulation: ASTM C 552, Type III.
  - 4. Preformed Pipe Insulation without Jacket: Comply with ASTM C 552, Type II, Class 1.
  - 5. Preformed Pipe Insulation with Factory-Applied ASJ, ASJ-SSL: Comply with ASTM C 552, Type II, Class 2.
  - 6. Factory fabricate shapes according to ASTM C 450 and ASTM C 585.
- G. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials.
  - 1. Products: Subject to compliance with requirements, provide one of the following
    - a. Aeroflex USA, Inc.; Aerocel.
    - b. Armacell LLC; AP Armaflex.

- c. K-Flex USA; Insul-Lock, Insul-Tube, and K-FLEX LS.

H. Mineral-Fiber, Preformed Pipe Insulation:

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Fibrex Insulations Inc.; Coreplus 1200.
  - b. Johns Manville; Micro-Lok.
  - c. Knauf Insulation; 1000-Degree Pipe Insulation.
  - d. Manson Insulation Inc.; Alley-K.
  - e. Owens Corning; Fiberglas Pipe Insulation.
2. Type I, 850 Deg F Materials: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 547, Type I, Grade A, with factory-applied ASJ-SSL. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.

**2.02 ADHESIVES**

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated, unless otherwise indicated.

- B. Flexible Elastomeric and Polyolefin Adhesive: Comply with MIL-A-24179A, Type II, Class I.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Aeroflex USA, Inc.; Aeroseal.
  - b. Armacell LLC;
  - c. Foster Brand
  - d. K-Flex USA; R-373 Conta
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).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.
  - b. Eagle Bridges - Marathon Industries; 225.
  - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-60/85-70.
  - d. Mon-Eco Industries, Inc.; 22-25.
2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

- D. ASJ Adhesive, and FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.

1. Products: Subject to compliance with requirements, provide one of the following:

- a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-82.
  - b. Eagle Bridges - Marathon Industries; 225.
  - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-20.
  - d. Mon-Eco Industries, Inc.; 22-25.
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).
  3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- E. PVC Jacket Adhesive: Compatible with PVC jacket.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Dow Corning Corporation; 739, Dow Silicone.
    - b. Johns Manville; Zeston Perma-Weld, CEEL-TITE Solvent Welding Adhesive.
    - c. P.I.C. Plastics, Inc.; Welding Adhesive.
    - d. Speedline Corporation; Polyco VP Adhesive.
  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).
  3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

### 2.03 MASTICS

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below-ambient services.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
    - b. Vimasco Corporation; 749.
  2. Water-Vapor Permeance: ASTM E 96/E 96M, 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, 58 percent by volume and 70 percent by weight.
  5. Color: White.
- C. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below-ambient services.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Encacel.
    - b. Eagle Bridges - Marathon Industries; 570.



- c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 60-95/60-96.
2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
3. Service Temperature Range: Minus 50 to plus 220 deg F .
4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
5. Color: White.

## 2.04 SEALANTS

### A. FSK and Metal Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
  - b. Eagle Bridges - Marathon Industries; 405.
  - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
  - d. Mon-Eco Industries, Inc.; 44-05.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg F (Minus 40 to plus 121 deg C).
5. Color: Aluminum.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

### B. ASJ Flashing Sealants, and Vinyl, PVDC, and PVC Jacket Flashing Sealants:

1. Products: Subject to compliance with requirements, provide one of the following:
  - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.
2. Materials shall be compatible with insulation materials, jackets, and substrates.
3. Fire- and water-resistant, flexible, elastomeric sealant.
4. Service Temperature Range: Minus 40 to plus 250 deg.
5. Color: White.
6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

## 2.05 FACTORY-APPLIED JACKETS

### A. Insulation system schedules indicate factory-applied jackets on various applications. When factory-applied jackets are indicated, comply with the following:

1. ASJ: White, kraft-paper, fiberglass-reinforced scrim with aluminum-foil backing; complying with ASTM C 1136, Type I.
2. ASJ-SSL: ASJ with self-sealing, pressure-sensitive, acrylic-based adhesive covered by a removable protective strip; complying with ASTM C 1136, Type I.

**2.06 FIELD-APPLIED JACKETS**

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. PVC Jacket: High-impact-resistant, UV-resistant PVC complying with ASTM D 1784, Class 16354-C; thickness as scheduled; roll stock ready for shop or field cutting and forming. Thickness is indicated in field-applied jacket schedules.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Johns Manville; Zeston.
    - b. P.I.C. Plastics, Inc.; FG Series.
    - c. Proto Corporation; LoSmoke.
    - d. Speedline Corporation; SmokeSafe.
  2. Adhesive: As recommended by jacket material manufacturer.
  3. Color: White.
  4. Factory-fabricated fitting covers to match jacket if available; otherwise, field fabricate.
    - a. Shapes: 45- and 90-degree, short- and long-radius elbows, tees, valves, flanges, unions, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories.
- C. Metal Jacket:
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H.B. Fuller Company; Metal Jacketing System.
    - b. ITW Insulation Systems; Aluminum and Stainless Steel Jacketing.
    - c. RRR Products, Inc.; Insul-Mate.
  2. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
    - a. Sheet and roll stock ready for shop or field sizing.
    - b. Finish and thickness are indicated in field-applied jacket schedule.
    - c. Moisture Barrier for Indoor Applications: 1-mil thick, heat-bonded polyethylene and kraft paper.
    - d. Moisture Barrier for Outdoor Applications: 3-mil-thick, heat-bonded polyethylene and kraft paper.
    - e. Factory-Fabricated Fitting Covers:
      1. Same material, finish, and thickness as jacket.
      2. Preformed 2-piece or gore, 45- and 90-degree, short- and long-radius elbows.
      3. Tee covers.
      4. Flange and union covers.
      5. End caps.
      6. Beveled collars.
      7. Valve covers.
      8. Field fabricate fitting covers only if factory-fabricated fitting covers are not available.
  3. Removable Insulation Jacket: Company specializing in manufacturing the products specified in this section with minimum two years documented experience.
    - a. Products: Subject to compliance with requirements; provide ThermaXX LLC 16 Hamilton Street West Haven CT 06516.
    - b. Insulation

- 1) For Box Type Jackets:
    - a) High / Low-temperature insulation blanket formed of silica Aerogel and reinforced with a non-woven, glass-fiber batting.
    - b) Insulation must be hydrophobic
    - c) Estimation of Maximum Use Temperature 1200°F (650°C)
  - 2) For Non Box Type Jackets
    - a) Glass mat, type E needle fiber. ¼", ½" @ 9 LB/CF & 1" @ 11.3 LB/CF.
    - b) Estimation of Maximum Use Temperature 1200°F (650°C)
  - 3) All insulation material shall be Non-Asbestos
- c. Jacket:
- 1) Pipe Side
    - a) PTFE Fiberglass Composite Jacketing. 16.5 oz/sq. yd minimum
    - b) Estimation of Maximum Use Temperature 600°F (315°C)
  - 2) Exterior Side
    - a) PTFE Fiberglass Composite Jacketing. 16.5 oz/sq. yd minimum
    - b) Estimation of Maximum Use Temperature 600°F (315°C)
- d. Thread:
- 1) Begins to decompose at about 800°F (400°C)
  - 2) Does not melt
  - 3) Diameter – 0.0114
  - 4) Break Point – 35 LBS

## 2.07 TAPES

- A. ASJ Tape: White vapor-retarder tape matching factory-applied jacket with acrylic adhesive, complying with ASTM C 1136.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. ABI, Ideal Tape Division; 428 AWF ASJ.
    - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0836.
    - c. Compac Corporation; 104 and 105.
    - d. Venture Tape; 1540 CW Plus, 1542 CW Plus, and 1542 CW Plus/SQ.
  2. Width: 3 inches.
  3. Thickness: 11.5 mils.
  4. Adhesion: 90 ounces force/inch in width.
  5. Elongation: 2 percent.
  6. Tensile Strength: 40 lbf/inch in width.
  7. ASJ Tape Disks and Squares: Precut disks or squares of ASJ tape.
- B. PVC Tape: White vapor-retarder tape matching field-applied PVC jacket with acrylic adhesive; suitable for indoor and outdoor applications.
1. Products: Subject to compliance with requirements, provide one of the following:

- a. ABI, Ideal Tape Division; 370 White PVC tape.
  - b. Compac Corporation; 130.
  - c. Venture Tape; 1506 CW NS.
2. Width: 2 inches.
  3. Thickness: 6 mils.
  4. Adhesion: 64 ounces force/inch in width.
  5. Elongation: 500 percent.
  6. Tensile Strength: 18 lbf/inch in width.
- C. Aluminum-Foil Tape: Vapor-retarder tape with acrylic adhesive.
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. ABI, Ideal Tape Division; 488 AWF.
    - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0800.
    - c. Compac Corporation; 120.
    - d. Venture Tape; 3520 CW.
  2. Width: 2 inches.
  3. Thickness: 3.7 mils.
  4. Adhesion: 100 ounces force/inch in width.
  5. Elongation: 5 percent.
  6. Tensile Strength: 34 lbf/inch in width.

## 2.08 SECUREMENTS

- A. Bands:
1. Products: Subject to compliance with requirements, provide one of the following:
    - a. ITW Insulation Systems; Gerrard Strapping and Seals.
    - b. RPR Products, Inc.; Insul-Mate Strapping and Seals.
  2. Stainless Steel: ASTM A 167 or ASTM A 240/A 240M, Type 304; 0.015 inch thick, 1/2 inch wide with closed seal.
  3. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 1/2 inch wide with closed seal.
- B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.

## PART 3 - Execution

### 3.01 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.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

**3.03 GENERAL INSTALLATION REQUIREMENTS**

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of piping including fittings, valves, and specialties.
- B. Install insulation materials, forms, vapor barriers or retarders, jackets, and thicknesses required for each item of pipe system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- G. Keep insulation materials dry during application and finishing.
- H. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- I. Install insulation with least number of joints practical.
- J. 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.
- K. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- L. Install insulation with factory-applied jackets as follows:
  - 1. Draw jacket tight and smooth.
  - 2. Cover circumferential joints with 3-inch-wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
  - 3. Overlap jacket longitudinal seams at least 1-1/2 inches. Install insulation with longitudinal seams at bottom of pipe. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
    - a. For below-ambient services, apply vapor-barrier mastic over staples.
  - 4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
  - 5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to pipe flanges and fittings.
- M. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- N. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- O. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.
- P. For above-ambient services, do not install insulation to the following:
  - 1. Vibration-control devices.

2. Testing agency labels and stamps.
3. Nameplates and data plates.
4. Cleanouts.

### **3.04 PENETRATIONS**

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
  4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Aboveground Exterior Wall Penetrations: Install insulation continuously through wall penetrations.
1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation inside wall surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside wall flashing and overlap wall flashing at least 2 inches.
  4. Seal jacket to wall flashing with flashing sealant.
- C. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- D. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Install insulation continuously through penetrations of fire-rated walls and partitions.
1. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping and fire-resistive joint sealers.
- E. Insulation Installation at Floor Penetrations:
1. Pipe: Install insulation continuously through floor penetrations.
  2. Seal penetrations through fire-rated assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

### **3.05 GENERAL PIPE INSULATION INSTALLATION**

- A. Requirements in this article generally apply to all insulation materials except where more specific requirements are specified in various pipe insulation material installation articles.
- B. Insulation Installation on Fittings, Valves, Strainers, Flanges, and Unions:
1. Install insulation over fittings, valves, strainers, flanges, unions, and other specialties with continuous thermal and vapor-retarder integrity unless otherwise indicated.
  2. Insulate pipe elbows using preformed fitting insulation or mitered fittings made from same material and density as adjacent pipe insulation. Each piece shall be butted tightly against adjoining piece and bonded with adhesive. Fill joints, seams, voids, and irregular surfaces with insulating cement finished to a smooth, hard, and uniform contour that is uniform with adjoining pipe insulation.

3. Insulate tee fittings with preformed fitting insulation or sectional pipe insulation of same material and thickness as used for adjacent pipe. Cut sectional pipe insulation to fit. Butt each section closely to the next and hold in place with tie wire. Bond pieces with adhesive.
  4. Insulate valves using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. For valves, insulate up to and including the bonnets, valve stuffing-box studs, bolts, and nuts. Fill joints, seams, and irregular surfaces with insulating cement.
  5. Insulate strainers using preformed fitting insulation or sectional pipe insulation of same material, density, and thickness as used for adjacent pipe. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker. Fill joints, seams, and irregular surfaces with insulating cement. Insulate strainers so strainer basket flange or plug can be easily removed and replaced without damaging the insulation and jacket. Provide a removable reusable insulation cover. For below-ambient services, provide a design that maintains vapor barrier.
  6. Insulate flanges and unions using a section of oversized preformed pipe insulation. Overlap adjoining pipe insulation by not less than two times the thickness of pipe insulation, or one pipe diameter, whichever is thicker.
  7. Cover segmented insulated surfaces with a layer of finishing cement and coat with a mastic. Install vapor-barrier mastic for below-ambient services and a breather mastic for above-ambient services. Reinforce the mastic with fabric-reinforcing mesh. Trowel the mastic to a smooth and well-shaped contour.
  8. For services not specified to receive a field-applied jacket except for flexible elastomeric and polyolefin, install fitted PVC cover over elbows, tees, strainers, valves, flanges, and unions. Terminate ends with PVC end caps. Tape PVC covers to adjoining insulation facing using PVC tape.
  9. Stencil or label the outside insulation jacket of each union with the word "union." Match size and color of pipe labels.
- C. Insulate instrument connections for thermometers, pressure gages, pressure temperature taps, test connections, flow meters, sensors, switches, and transmitters on insulated pipes. Shape insulation at these connections by tapering it to and around the connection with insulating cement and finish with finishing cement, mastic, and flashing sealant.
- D. Install removable insulation covers at locations indicated. Installation shall conform to the following:
1. Make removable flange and union insulation from sectional pipe insulation of same thickness as that on adjoining pipe. Install same insulation jacket as adjoining pipe insulation.
  2. When flange and union covers are made from sectional pipe insulation, extend insulation from flanges or union long at least two times the insulation thickness over adjacent pipe insulation on each side of flange or union. Secure flange cover in place with stainless-steel or aluminum bands. Select band material compatible with insulation and jacket.
  3. Construct removable valve insulation covers in same manner as for flanges, except divide the two-part section on the vertical center line of valve body.
  4. When covers are made from block insulation, make two halves, each consisting of mitered blocks wired to stainless-steel fabric. Secure this wire frame, with its attached insulation, to flanges with tie wire. Extend insulation at least 2 inches (50 mm) over adjacent pipe insulation on each side of valve. Fill space between flange or union cover and pipe insulation with insulating cement. Finish cover assembly with insulating cement applied in two coats. After first coat is dry, apply and trowel second coat to a smooth finish.
  5. Unless a PVC jacket is indicated in field-applied jacket schedules, finish exposed surfaces with a metal jacket.



**3.06 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION**

- A. 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.
- B. Insulation Installation on Pipe Flanges:
  - 1. Install pipe insulation to outer diameter of pipe flange.
  - 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
  - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with cut sections of sheet insulation of same thickness as pipe insulation.
  - 4. Secure insulation to flanges and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- C. Insulation Installation on Pipe Fittings and Elbows:
  - 1. Install mitered sections of pipe insulation.
  - 2. Secure insulation materials and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.
- D. Insulation Installation on Valves and Pipe Specialties:
  - 1. Install preformed valve covers manufactured of same material as pipe insulation when available.
  - 2. When preformed valve covers are not available, install cut sections of pipe and sheet insulation to valve body. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
  - 3. Install insulation to flanges as specified for flange insulation application.
  - 4. Secure insulation to valves and specialties and seal seams with manufacturer's recommended adhesive to eliminate openings in insulation that allow passage of air to surface being insulated.

**3.07 INSTALLATION OF MINERAL-FIBER INSULATION**

- A. Insulation Installation on Straight Pipes and Tubes:
  - 1. Secure each layer of preformed pipe insulation to pipe with wire or bands and tighten bands without deforming insulation materials.
  - 2. Where vapor barriers are indicated, seal longitudinal seams, end joints, and protrusions with vapor-barrier mastic and joint sealant.
  - 3. For insulation with factory-applied jackets on above-ambient surfaces, secure laps with outward clinched staples at 6 inches o.c.
  - 4. For insulation with factory-applied jackets on below-ambient surfaces, do not staple longitudinal tabs. Instead, secure tabs with additional adhesive as recommended by insulation material manufacturer and seal with vapor-barrier mastic and flashing sealant.
- B. Insulation Installation on Pipe Flanges:
  - 1. Install preformed pipe insulation to outer diameter of pipe flange.
  - 2. Make width of insulation section same as overall width of flange and bolts, plus twice the thickness of pipe insulation.
  - 3. Fill voids between inner circumference of flange insulation and outer circumference of adjacent straight pipe segments with mineral-fiber blanket insulation.
  - 4. Install jacket material with manufacturer's recommended adhesive, overlap seams at least 1 inch, and seal joints with flashing sealant.

- C. Insulation Installation on Pipe Fittings and Elbows:
1. Install preformed sections of same material as straight segments of pipe insulation when available.
  2. When preformed insulation elbows and fittings are not available, install mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire or bands.
- D. Insulation Installation on Valves and Pipe Specialties:
1. Install preformed sections of same material as straight segments of pipe insulation when available.
  2. When preformed sections are not available, install mitered sections of pipe insulation to valve body.
  3. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation.
  4. Install insulation to flanges as specified for flange insulation application.

### **3.08 FIELD-APPLIED JACKET INSTALLATION**

- A. Where PVC jackets are indicated, install with 1-inch overlap at longitudinal seams and end joints. Seal with manufacturer's recommended adhesive.
1. Apply two continuous beads of adhesive to seams and joints, one bead under lap and the finish bead along seam and joint edge.
- B. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

### **3.09 REMOVABLE INSULATION JACKET INSTALLATION**

- A. Double sewn lock stitch with a minimum 4 to 6 stitches per inch. Jackets shall be sewn with two (2) parallel rows of stitching using thread in section 1.3D. The thread must be able to withstand the skin temperatures without degradation.
- B. Hog rings, staples and wire are not acceptable methods of closure.
- C. No raw cut jacket edges shall be exposed.
- D. Jackets shall be fastened using hook and loop (Velcro) straps and 1" Slide Buckles.
- E. All stitching will be done with thread in section 1.3D.
- F. Provide a permanently attached Aluminum or stainless steel nameplate on each jacket to identify its location, size and tag number.
- G. Provide a stainless steel or brass grommet at the low point of each jacket, in wet areas for moisture drain (on horizontal jackets as required).
- H. The insulation shall be designed to prevent sweating in the space between the cold metal surface and the inner layer of insulation. To this end, during jacket fabrication, the layers of insulating mat shall be placed in an overlapping pattern.
- I. All jacket pieces which match mating seams must include an extended 2" flap constructed from the exterior fabric and shall be secured using hook & loop closure (i.e. Velcro™) parallel to the seam.
- J. Insulation must be sewn as integral part of the jacket to prevent shifting of the insulation.

### **3.10 FINISHES**

- A. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.

**3.11 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
  - 1. Inspect pipe, fittings, strainers, and valves, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to three locations of straight pipe, three locations of threaded fittings, three locations of welded fittings, two locations of threaded strainers, two locations of welded strainers, three locations of threaded valves, and three locations of flanged valves for each pipe service defined in the "Piping Insulation Schedule, General" Article.
- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

**3.12 PIPING INSULATION SCHEDULE, GENERAL**

- A. 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. Items Not Insulated: Unless otherwise indicated, do not install insulation on the following:
  - 1. Chrome-plated pipes and fittings unless there is a potential for personnel injury.

**3.13 INDOOR PIPING INSULATION SCHEDULE**

- A. Domestic Cold Water:
  - 1. NPS 1 and Smaller: Insulation shall be one of the following:
    - a. Flexible Elastomeric: 3/4 inch thick.
    - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
  - 2. NPS 1-1/4 and Larger: Insulation shall be one of the following:
    - a. Flexible Elastomeric: 1 inch thick.
    - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- B. Domestic Hot and Recirculated Hot Water:
  - 1. NPS 1-1/4 and Smaller: Insulation shall be one of the following:
    - a. Flexible Elastomeric: 3/4 inch thick.
    - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
  - 2. NPS 1-1/2 and Larger: Insulation shall be one of the following:
    - a. Flexible Elastomeric: 1 inch thick.
    - b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.
- C. Exposed Sanitary Drains, Domestic Water, Domestic Hot Water, and Stops for Plumbing Fixtures for People with Disabilities:
  - 1. All Pipe Sizes: Insulation shall be one of the following:

- a. Flexible Elastomeric: 3/4 inch thick.
- b. Mineral-Fiber, Preformed Pipe Insulation, Type I: 1 inch thick.

**3.14 INDOOR, FIELD-APPLIED JACKET SCHEDULE**

- A. Install jacket over insulation material. For insulation with factory-applied jacket, install the field-applied jacket over the factory-applied jacket.
- B. Piping, Concealed:
  - 1. None.
- C. Piping, Exposed:
  - 1. Aluminum, Corrugated 0.024 inch thick.

**3.15 REMOVABLE INSULATION JACKET SCHEDULE**

- A. Install removable insulation jacket over all valves, steam traps, wye strainer, check valves and unions for size 1 ½ inches and larger.

**END OF SECTION**

**22 11 16**  
**DOMESTIC WATER 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. Aboveground domestic water pipes, tubes, and fittings inside buildings.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.

**1.04 INFORMATIONAL SUBMITTALS**

- A. System purging and disinfecting activities report.
- B. Field quality-control reports.

**1.05 FIELD CONDITIONS**

- A. Interruption of Existing Water Service: Do not interrupt water service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary water service according to requirements indicated:
  - 1. Notify Architect/ Owner no fewer than five days in advance of proposed interruption of water service.
  - 2. Do not interrupt water service without Architect/ Owner's written permission.

**PART 2 - PRODUCTS****2.01 PIPING MATERIALS**

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.
- B. Potable-water piping and components shall comply with NSF 14 and NSF 61.

**2.02 COPPER TUBE AND FITTINGS**

- A. Hard Copper Tube: ASTM B 88, Type L water tube, drawn temper.
- B. Soft Copper Tube: ASTM B 88, Type K and ASTM B 88, Type L water tube, annealed temper.
- C. Cast-Copper, Solder-Joint Fittings: ASME B16.18, pressure fittings.
- D. Wrought-Copper, Solder-Joint Fittings: ASME B16.22, wrought-copper pressure fittings.
- E. Bronze Flanges: ASME B16.24, Class 150, with solder-joint ends.
- F. Copper Unions:
  - 1. MSS SP-123.
  - 2. Cast-copper-alloy, hexagonal-stock body.
  - 3. Ball-and-socket, metal-to-metal seating surfaces.
  - 4. Solder-joint or threaded ends.

**2.02 PIPING JOINING MATERIALS**

- A. Pipe-Flange Gasket Materials:
  - 1. AWWA C110/A21.10, rubber, flat face, 1/8 inch thick or ASME B16.21, nonmetallic and asbestos free unless otherwise indicated.
  - 2. Full-face or ring type unless otherwise indicated.
- B. Metal, Pipe-Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.
- C. Solder Filler Metals: ASTM B 32, lead-free alloys.
- D. Flux: ASTM B 813, water flushable.
- E. Brazing Filler Metals: AWS A5.8/A5.8M, BCuP Series, copper-phosphorus alloys for general-duty brazing unless otherwise indicated.

**2.03 TRANSITION FITTINGS**

- A. General Requirements:
  - 1. Same size as pipes to be joined.
  - 2. Pressure rating at least equal to pipes to be joined.
  - 3. End connections compatible with pipes to be joined.
- B. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
- C. Sleeve-Type Transition Coupling: AWWA C219.
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Cascade Waterworks Manufacturing.
    - b. Dresser, Inc.; Piping Specialties Products.
    - c. Ford Meter Box Company, Inc. (The).
    - d. JCM Industries.
    - e. Romac Industries, Inc.
    - f. Smith-Blair, Inc.; a Sensus company.
    - g. Viking Johnson.
    - h. Or approved equal.

**2.04 DIELECTRIC FITTINGS**

- A. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
- B. Dielectric Unions:
  - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Capitol Manufacturing Company; member of the Phoenix Forge Group.
    - b. Central Plastics Company.
    - c. Hart Industries International, Inc.
    - d. Jomar International.
    - e. Matco-Norca.
    - f. McDonald, A. Y. Mfg. Co.
    - g. Watts; a division of Watts Water Technologies, Inc.
    - h. Wilkins; a Zurn company.
    - i. Or approved equal.
  - 2. Standard: ASSE 1079.

3. Pressure Rating: 250 psig minimum at 180 deg F.
4. End Connections: Solder-joint copper alloy and threaded ferrous.

### **PART 3 - EXECUTION**

#### **3.01 EARTHWORK**

- A. Comply with requirements in Section 312000 "Earth Moving" for excavating, trenching, and backfilling.

#### **3.02 PIPING INSTALLATION**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of domestic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install copper tubing under building slab according to CDA's "Copper Tube Handbook."
- C. Install ductile-iron piping under building slab with restrained joints according to AWWA C600 and AWWA A 674 or AWWA C105/A21.5.
- D. Install underground copper tube in PE encasement according to ASTM A 674 or AWWA C105/A21.5.
- E. Install shutoff valve immediately upstream of each dielectric fitting.
- F. Install domestic water piping level and plumb. Provide drain with hose fitting at all low points where possible.
- G. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- H. Install piping concealed from view and protected from physical contact by building occupants unless otherwise indicated and except in equipment rooms and service areas.
- I. 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.
- J. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal, and coordinate with other services occupying that space.
- K. Install piping to permit valve servicing.
- L. Install nipples, unions, special fittings, and valves with pressure ratings the same as or higher than the system pressure rating used in applications below unless otherwise indicated.
- M. Install piping free of sags and bends.
- N. Install fittings for changes in direction and branch connections.
- O. Install unions in copper tubing at final connection to each piece of equipment, machine, and specialty.
- P. Install thermometers on inlet and outlet piping from each water heater.
- Q. Install sleeves for piping penetrations of walls, ceilings, and floors.
- R. Install sleeve seals for piping penetrations of concrete walls and slabs.
- S. Install escutcheons for piping penetrations of walls, ceilings, and floors.

#### **3.03 JOINT CONSTRUCTION**

- A. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- B. Remove scale, slag, dirt, and debris from inside and outside of pipes, tubes, 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.
  2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged.



- D. Brazed Joints for Copper Tubing: Comply with CDA's "Copper Tube Handbook," "Braze Joints" chapter.
- E. Soldered Joints for Copper Tubing: Apply ASTM B 813, water-flushable flux to end of tube. Join copper tube and fittings according to ASTM B 828 or CDA's "Copper Tube Handbook."
- F. Flanged Joints: Select appropriate asbestos-free, nonmetallic gasket material in size, type, and thickness suitable for domestic water service. Join flanges with gasket and bolts according to ASME B31.9.
- G. Joints for Dissimilar-Material Piping: Make joints using adapters compatible with materials of both piping systems.

### **3.04 TRANSITION FITTING INSTALLATION**

- A. Install transition couplings at joints of dissimilar piping.

### **3.05 DIELECTRIC FITTING INSTALLATION**

- A. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
- B. Dielectric Fittings for NPS 2 and Smaller: Use dielectric unions.

### **3.06 HANGER AND SUPPORT INSTALLATION**

- A. Comply with requirements for seismic-restraint devices in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Comply with requirements for pipe hanger, support products, and installation in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
  - 1. Vertical Piping: MSS Type 8 or 42, clamps.
  - 2. Individual, Straight, Horizontal Piping Runs:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
  - 3. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
  - 4. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support vertical piping and tubing at base and at each floor.
- D. Rod diameter may be reduced one size for double-rod hangers, to a minimum of 3/8 inch.
- E. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 3/4 and Smaller: 60 inches with 3/8-inch rod.
  - 2. NPS 1 and NPS 1-1/4: 72 inches with 3/8-inch rod.
  - 3. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
- F. Install supports for vertical copper tubing every 10 feet.
- G. Support piping and tubing not listed in this article according to MSS SP-69 and manufacturer's written instructions.

### **3.07 CONNECTIONS**

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. When installing piping adjacent to equipment and machines, allow space for service and maintenance.
- C. Connect domestic water piping to exterior water-service piping. Use transition fitting to join dissimilar piping materials.

- D. Connect domestic water piping to water-service piping with shutoff valve; extend and connect to the following:
1. Water Heaters: Cold-water inlet and hot-water outlet piping in sizes indicated, but not smaller than sizes of water heater connections.
  2. Plumbing Fixtures: Cold- and hot-water-supply piping in sizes indicated, but not smaller than that required by plumbing code.

### 3.08 IDENTIFICATION

- A. Identify system components. Comply with requirements for identification materials and installation in Section 220553 "Identification for Plumbing Piping and Equipment."
- B. Label pressure piping with system operating pressure.

### 3.09 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
  1. Piping Inspections:
    - a. Do not enclose, cover, or put piping into operation until it has been inspected and approved by authorities having jurisdiction.
    - b. During installation, notify authorities having jurisdiction at least one day before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction:
      - 1) Roughing-in Inspection: Arrange for inspection of piping before concealing or closing in after roughing in and before setting fixtures.
      - 2) Final Inspection: Arrange for authorities having jurisdiction to observe tests specified in "Piping Tests" Subparagraph below and to ensure compliance with requirements.
    - c. Reinspection: If authorities having jurisdiction find that piping will not pass tests or inspections, make required corrections and arrange for reinspection.
    - d. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
  2. Piping Tests:
    - a. Fill domestic water piping. Check components to determine that they are not air bound and that piping is full of water.
    - b. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit a separate report for each test, complete with diagram of portion of piping tested.
    - c. Leave new, altered, extended, or replaced domestic water piping uncovered and unconcealed until it has been tested and approved. Expose work that was covered or concealed before it was tested.
    - d. Cap and subject piping to static water pressure of 50 psig above operating pressure, without exceeding pressure rating of piping system materials. Isolate test source and allow it to stand for four hours. Leaks and loss in test pressure constitute defects that must be repaired.
    - e. Repair leaks and defects with new materials, and retest piping or portion thereof until satisfactory results are obtained.
    - f. Prepare reports for tests and for corrective action required.
- B. Domestic water piping will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

**3.10 ADJUSTING**

- A. Perform the following adjustments before operation:
1. Close drain valves, hydrants, and hose bibbs.
  2. Open shutoff valves to fully open position.
  3. Open throttling valves to proper setting.
  4. Remove plugs used during testing of piping and for temporary sealing of piping during installation.
  5. Remove and clean strainer screens. Close drain valves and replace drain plugs.
  6. Remove filter cartridges from housings and verify that cartridges are as specified for application where used and are clean and ready for use.
  7. Check plumbing specialties and verify proper settings, adjustments, and operation.

**3.11 CLEANING**

- A. Clean interior of domestic water piping system. Remove dirt and debris as work progresses.
- B. Clean and disinfect potable domestic water piping as follows:
1. Purge new piping and parts of existing piping that have been altered, extended, or repaired before using.
  2. Use purging and disinfecting procedures prescribed by authorities having jurisdiction; if methods are not prescribed, use procedures described in either AWWA C651 or AWWA C652 or follow procedures described below:
    - a. Flush piping system with clean, potable water until dirty water does not appear at outlets.
    - b. Fill and isolate system according to either of the following:
      - 1) Fill system or part thereof with water/chlorine solution with at least 50 ppm of chlorine. Isolate with valves and allow to stand for 24 hours.
      - 2) Fill system or part thereof with water/chlorine solution with at least 200 ppm of chlorine. Isolate and allow to stand for three hours.
    - c. Flush system with clean, potable water until no chlorine is in water coming from system after the standing time.
    - d. Repeat procedures if biological examination shows contamination.
    - e. Submit water samples in sterile bottles to authorities having jurisdiction.
- C. Prepare and submit reports of purging and disinfecting activities. Include copies of water-sample approvals from authorities having jurisdiction.

**3.12 PIPING SCHEDULE**

- A. Transition and special fittings with pressure ratings at least equal to piping rating may be used in applications below unless otherwise indicated.
- B. Flanges and unions may be used for aboveground piping joints unless otherwise indicated.
- C. Aboveground domestic water piping shall be the following:
1. Hard copper tube, ASTM B 88, Type L; cast- or wrought-copper, solder-joint fittings; and soldered joints.
- D. Under-building-slab, domestic water, building-service piping, NPS 2-1/2 and smaller, shall be the following:
1. Soft copper tube, ASTM B 88, Type K; wrought-copper, solder-joint fittings; and brazed joints.

**3.13 VALVE SCHEDULE**

- A. Drawings indicate valve types to be used. Where specific valve types are not indicated, the following requirements apply:
  - 1. Shutoff Duty: Use ball or gate valves for piping NPS 2 and smaller. Use butterfly, ball, or gate valves with flanged ends for piping NPS 2-1/2 and larger.
  - 2. Throttling Duty: Use ball or globe valves for piping NPS 2 and smaller.
  - 3. Drain Duty: Hose-end drain valves.
  
- B. Use check valves to maintain correct direction of domestic water flow to and from equipment.

**END OF SECTION**

**22 11 19**  
**DOMESTIC WATER PIPING SPECIALTIES**

**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. Drain valves.
2. Water-hammer arresters.
3. Trap-seal primer valves.

- B. Product Data: For each type of product.

1. Standard: MSS SP-110 for standard-port, two-piece ball valves.
2. Pressure Rating: 400-psig minimum CWP.
3. Size: NPS 3/4.
4. Body: Copper alloy.
5. Ball: Chrome-plated brass.
6. Seats and Seals: Replaceable.
7. Handle: Vinyl-covered steel.
8. Inlet: Threaded or solder joint.
9. Standard: MSS SP-110 for ball valves or MSS SP-80 for gate valves.
10. Pressure Rating: 200-psig minimum CWP or Class 125.
11. Size: NPS 3/4.
12. Body: Copper alloy or ASTM B 62 bronze.

- a. AMTROL, Inc.
- b. Josam Company.
- c. MIFAB, Inc.
- d. Precision Plumbing Products, Inc.
- e. Sioux Chief Manufacturing Company, Inc.
- f. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.
- g. Tyler Pipe; Wade Div.
- h. Watts Drainage Products.

13. Standard: ASSE 1010 or PDI-WH 201.
14. Type: Metal bellows or Copper tube with piston.

- a. MIFAB, Inc.
- b. Precision Plumbing Products, Inc.
- c. Sioux Chief Manufacturing Company, Inc.
- d. Smith, Jay R. Mfg. Co.; Division of Smith Industries, Inc.

15. Standard: ASSE 1018.
16. Pressure Rating: 125 psig minimum.
17. Body: Bronze.
18. Inlet and Outlet Connections: NPS 1/2 threaded, union, or solder joint.
19. Gravity Drain Outlet Connection: NPS 1/2 threaded or solder joint.

- C. Install water-hammer arresters in water piping according to PDI-WH 201.

1. Flexible connectors.

### **1.03 ACTION SUBMITTALS**

- A. Shop Drawings: For domestic water piping specialties.
  1. Include diagrams for power, signal, and control wiring.

### **1.04 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

### **1.05 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For domestic water piping specialties to include in emergency, operation, and maintenance manuals.

## **PART 2 - PRODUCTS**

### **2.01 GENERAL REQUIREMENTS FOR PIPING SPECIALTIES**

- A. Potable-water piping and components shall comply with NSF 61

### **2.02 PERFORMANCE REQUIREMENTS**

- A. Minimum Working Pressure for Domestic Water Piping Specialties: 125 psig unless otherwise indicated.

### **2.03 DRAIN VALVES**

- A. Ball-Valve-Type, Hose-End Drain Valves:
  1. Outlet: Threaded, short nipple with garden-hose thread complying with ASME B1.20.7 and cap with brass chain.
- B. Stop-and-Waste Drain Valves:
  1. Drain: NPS 1/8 side outlet with cap.

### **2.04 WATER-HAMMER ARRESTERS**

- A. Water-Hammer Arresters:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. Zurn Industries, LLC; Plumbing Products Group; Specification Drainage Products.
  2. Size: ASSE 1010, Sizes AA and A through F, or PDI-WH 201, Sizes A through F.

### **2.05 TRAP-SEAL PRIMER DEVICE**

- A. Supply-Type, Trap-Seal Primer Device:
  1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Watts; a division of Watts Water Technologies, Inc.; Watts Regulator Company.
2. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

### **PART 3 - EXECUTION**

#### **3.01 INSTALLATION**

- A. Install supply-type, trap-seal primer valves with outlet piping pitched down toward drain trap a minimum of 1 percent, and connect to floor-drain body, trap, or inlet fitting. Adjust valve for proper flow.

#### **3.02 CONNECTIONS**

- A. Comply with requirements for ground equipment in Section 260526 "Grounding and Bonding
- B. Fire-retardant-treated-wood blocking is specified in Section 260519 "Low-Voltage Electrical Power Conductors and Cables" for electrical connections.

#### **3.03 LABELING AND IDENTIFYING**

- A. Equipment Nameplates and Signs: Install engraved plastic-laminate equipment nameplate or sign on or near each of the following:
  1. Supply-type, trap-seal primer valves.
- B. Distinguish among multiple units, inform operator of operational requirements, indicate safety and emergency precautions, and warn of hazards and improper operations, in addition to identifying unit. Nameplates and signs are specified in Section 220553 "Identification for Plumbing Piping and Equipment."

**END OF SECTION**



**22 13 16****SANITARY, STORM, WASTE AND VENT 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, tube, and fittings.
  - 2. Specialty pipe fittings.
  - 3. Encasement for underground metal piping.
- B. Related Sections:
  - 1. Section 221313 "Facility Sanitary Sewers" for sanitary sewerage piping and structures outside the building.

**1.03 PERFORMANCE REQUIREMENTS**

- A. Components and installation shall be capable of withstanding the following minimum working pressure unless otherwise indicated:
  - 1. Soil, Storm, Waste, and Vent Piping: 10-foot head of water.
- B. Seismic Performance: Soil, storm, waste, and vent piping and support and installation shall withstand the effects of earthquake motions determined according to ASCE 7-10.

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: For coordination. Include plans, elevations, sections, and details.

**1.05 INFORMATIONAL SUBMITTALS**

- A. Seismic Qualification Certificates: For waste and vent piping, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Detailed description of piping anchorage devices on which the certification is based and their installation requirements.
- B. Field quality-control reports.

**1.06 QUALITY ASSURANCE**

- A. Piping materials shall bear label, stamp, or other markings of specified testing agency.

**1.07 PROJECT CONDITIONS**

- A. Interruption of Existing Sanitary Waste 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 Architect/Owner no fewer than two days in advance of proposed interruption of sanitary waste service.
  2. Do not proceed with interruption of sanitary waste service without Architect's/ Owner's written permission.

**PART 2 - PRODUCTS****2.01 PIPING MATERIALS**

- A. Comply with requirements in "Piping Schedule" Article for applications of pipe, tube, fitting materials, and joining methods for specific services, service locations, and pipe sizes.

**2.02 HUB-AND-SPIGOT, CAST-IRON SOIL PIPE AND FITTINGS**

- A. Pipe and Fittings: ASTM A 74, Service class.  
B. Gaskets: ASTM C 564, rubber.  
C. Caulking Materials: ASTM B 29, pure lead and oakum or hemp fiber.

**2.03 HUBLESS, CAST-IRON SOIL PIPE AND FITTINGS**

- A. Pipe and Fittings: ASTM A 888 or CISPI 301.  
B. Heavy-Duty, Hubless-Piping Couplings:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - a. ANACO-Husky.
    - b. Charlotte Pipe & Foundry.
    - c. MIFAB, Inc.
    - d. Mission Rubber Company; a division of MCP Industries, Inc.
    - e. Tyler Pipe.
    - f. Or approved equal.
  2. Standards: ASTM C 1540.
  3. Description: Stainless-steel shield with stainless-steel bands and tightening devices; and ASTM C 564, rubber sleeve with integral, center pipe stop.

**2.04 COPPER TUBE AND FITTINGS**

- A. Copper DWV Tube: ASTM B 306, drainage tube, drawn temper.  
B. Copper Drainage Fittings: ASME B16.23, cast copper or ASME B16.29, wrought copper, solder-joint fittings.  
C. Hard Copper Tube: ASTM B 88, Type L, water tube, drawn temper.  
D. Copper Pressure Fittings:
1. Copper Fittings: ASME B16.18, cast-copper-alloy or ASME B16.22, wrought-copper, solder-joint fittings. Furnish wrought-copper fittings if indicated.
  2. Copper Unions: MSS SP-123, copper-alloy, hexagonal-stock body with ball-and-socket, metal-to-metal seating surfaces, and solder-joint or threaded ends.
- E. Copper Flanges: ASME B16.24, Class 150, cast copper with solder-joint end.

1. Flange Gasket Materials: ASME B16.21, full-face, flat, nonmetallic, asbestos-free, 1/8-inch maximum thickness unless thickness or specific material is indicated.
2. Flange Bolts and Nuts: ASME B18.2.1, carbon steel unless otherwise indicated.

F. Solder: ASTM B 32, lead free with ASTM B 813, water-flushable flux.

## 2.05 SPECIALTY PIPE FITTINGS

A. Transition Couplings:

1. General Requirements: Fitting or device for joining piping with small differences in OD's or of different materials. Include end connections same size as and compatible with pipes to be joined.
2. Fitting-Type Transition Couplings: Manufactured piping coupling or specified piping system fitting.
3. Unshielded, Nonpressure Transition Couplings:
  - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Dallas Specialty & Mfg. Co.
    - 2) Fernco Inc.
    - 3) Mission Rubber Company; a division of MCP Industries, Inc.
    - 4) Plastic Oddities; a division of Diverse Corporate Technologies, Inc.
    - 5) Or approved equal.
  - b. Standard: ASTM C 1173.
  - c. Description: Elastomeric, sleeve-type, reducing or transition pattern. Include shear ring and corrosion-resistant-metal tension band and tightening mechanism on each end.
  - d. Sleeve Materials:
    - 1) For Cast-Iron Soil Pipes: ASTM C 564, rubber.
    - 2) For Dissimilar Pipes: ASTM D 5926, PVC or other material compatible with pipe materials being joined.

B. Dielectric fittings:

1. General Requirements: Assembly of copper alloy and ferrous materials with separating nonconductive insulating material. Include end connections compatible with pipes to be joined.
2. Dielectric Unions:
  - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Capitol Manufacturing Company.
    - 2) Central Plastics Company.
    - 3) Hart Industries International, Inc.
    - 4) Jomar International Ltd.
    - 5) Matco-Norca, Inc.
    - 6) McDonald, A. Y. Mfg. Co.
    - 7) Watts Regulator Co.; a division of Watts Water Technologies, Inc.
    - 8) Wilkins; a Zurn company.
    - 9) Or approved equal.
  - b. Description:

- 1) Standard: ASSE 1079.
  - 2) Pressure Rating: 125 psig minimum at 180 deg F.
  - 3) End Connections: Solder-joint copper alloy and threaded ferrous.
3. Dielectric Flanges:
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Capitol Manufacturing Company.
    - 2) Central Plastics Company.
    - 3) Matco-Norca, Inc.
    - 4) Watts Regulator Co.; a division of Watts Water Technologies, Inc.
    - 5) Wilkins; a Zurn company.
    - 6) Or approved equal.
  - b. Description:
    - 1) Standard: ASSE 1079.
    - 2) Factory-fabricated, bolted, companion-flange assembly.
    - 3) Pressure Rating: 125 psig minimum at 180 deg F.
    - 4) End Connections: Solder-joint copper alloy and threaded ferrous; threaded solder-joint copper alloy and threaded ferrous.
4. Dielectric-Flange Insulating Kits:
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Advance Products & Systems, Inc.
    - 2) Calpico, Inc.
    - 3) Central Plastics Company.
    - 4) Pipeline Seal and Insulator, Inc.
    - 5) Or approved equal.
  - b. Description:
    - 1) Nonconducting materials for field assembly of companion flanges.
    - 2) Pressure Rating: 150 psig
    - 3) Gasket: Neoprene or phenolic.
    - 4) Bolt Sleeves: Phenolic or polyethylene.
    - 5) Washers: Phenolic with steel backing washers.
5. Dielectric Nipples:
- a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Elster Perfection.
    - 2) Grinnell Mechanical Products.
    - 3) Matco-Norca, Inc.
    - 4) Precision Plumbing Products, Inc.
    - 5) Victaulic Company.
    - 6) Or approved equal.
  - b. Description:
    - 1) Standard: IAPMO PS 66

- 2) Electroplated steel nipple.
- 3) Pressure Rating: 300 psig at 225 deg F.
- 4) End Connections: Male threaded or grooved.
- 5) Lining: Inert and noncorrosive, propylene.

### **PART 3 - EXECUTION**

#### **3.01 EARTH MOVING**

- A. Comply with requirements for excavating, trenching, and backfilling specified in Section "Earth Moving."

#### **3.02 PIPING INSTALLATION**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of piping systems. Indicated locations and arrangements were used to size pipe and calculate friction loss, expansion, pump sizing, and other design considerations. Install piping as indicated unless deviations to layout are approved on coordination drawings.
- B. Install piping in concealed locations unless otherwise indicated and except in equipment rooms and service areas.
- 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 above accessible ceilings to allow sufficient space for ceiling panel removal.
- E. Install piping to permit valve servicing.
- F. Install piping at indicated slopes.
- G. Install piping free of sags and bends.
- H. Install fittings for changes in direction and branch connections.
- I. Install piping to allow application of insulation.
- J. Install seismic restraints on piping. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- K. Make changes in direction for soil, storm and waste drainage and vent piping using appropriate branches, bends, and long-sweep bends. Sanitary tees and short-sweep 1/4 bends may be used on vertical stacks if change in direction of flow is from horizontal to vertical. Use long-turn, double Y-branch and 1/8-bend fittings if two fixtures are installed back to back or side by side with common drain pipe. Straight tees, elbows, and crosses may be used on vent lines. Do not change direction of flow more than 90 degrees. Use proper size of standard increasers and reducers if pipes of different sizes are connected. Reducing size of drainage piping in direction of flow is prohibited.
- L. Lay buried building drainage piping beginning at low point of each system. Install true to grades and alignment indicated, with unbroken continuity of invert. Place hub ends of piping upstream. Install required gaskets according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab in piping and pull past each joint as completed.
- M. Install soil, storm and waste drainage and vent piping at the following minimum slopes unless otherwise indicated:
  1. Sanitary Drainage Piping: 1/4" per foot downward in direction of flow for piping NPS 2 and smaller; 1/8" per foot downward in direction of flow for piping NPS 3 and larger.
  2. Storm drainage piping: 1/4" per foot downward in direction of flow.
  3. Vent Piping: 1/8" per 1' down toward vertical fixture vent or toward vent stack.
- N. Install cast-iron soil piping according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook," Chapter IV, "Installation of Cast Iron Soil Pipe and Fittings."
- O. Install aboveground copper tubing according to CDA's "Copper Tube Handbook."
- P. Install engineered soil and waste drainage and vent piping systems as follows:

1. Combination Waste and Vent: Comply with standards of authorities having jurisdiction.

Q. Plumbing Specialties:

1. Install cleanouts at grade and extend to where building sanitary drains connect to building sanitary sewers in sanitary drainage gravity-flow piping. Comply with requirements for cleanouts specified in Section 221319 "Sanitary Waste Piping Specialties."
2. Install drains in sanitary drainage gravity-flow piping. Comply with requirements for drains specified in Section 221319 "Sanitary Waste Piping Specialties."

R. Do not enclose, cover, or put piping into operation until it is inspected and approved by authorities having jurisdiction.

S. Install sleeves for piping penetrations of walls, ceilings, and floors. Comply with requirements for sleeves specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

T. Install sleeve seals for piping penetrations of concrete walls and slabs. Comply with requirements for sleeve seals specified in Section 220517 "Sleeves and Sleeve Seals for Plumbing Piping."

U. Install escutcheons for piping penetrations of walls, ceilings, and floors. Comply with requirements for escutcheons specified in Section 220518 "Escutcheons for Plumbing Piping."

### 3.03 JOINT CONSTRUCTION

A. Join hub-and-spigot, cast-iron soil piping with gasket joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for compression joints.

B. Join hub-and-spigot, cast-iron soil piping with caulked joints according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for lead-and-oakum caulked joints.

C. Join hubless, cast-iron soil piping according to CISPI 310 and CISPI's "Cast Iron Soil Pipe and Fittings Handbook" for hubless-piping coupling joints.

D. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:

1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
2. Damaged Threads: Do not use pipe or pipe fittings with threads that are corroded or damaged. Do not use pipe sections that have cracked or open welds.

E. Join copper tube and fittings with soldered joints according to ASTM B 828. Use ASTM B 813, water-flushable, lead-free flux and ASTM B 32, lead-free-alloy solder.

F. Grooved Joints: Cut groove ends of pipe according to AWWA C606. Lubricate and install gasket over ends of pipes or pipe and fitting. Install coupling housing sections, over gasket, with keys seated in piping grooves. Install and tighten housing bolts.

G. Flanged Joints: Align bolt holes. Select appropriate gasket material, size, type, and thickness. Install gasket concentrically positioned. Use suitable lubricants on bolt threads. Torque bolts in cross pattern.

### 3.04 SPECIALTY PIPE FITTING INSTALLATION

A. Transition Couplings:

1. Install transition couplings at joints of piping with small differences in OD's.
2. In Drainage Piping: Unshielded, nonpressure transition couplings.

B. Dielectric Fittings:

1. Install dielectric fittings in piping at connections of dissimilar metal piping and tubing.
2. Dielectric Fittings for NPS 2 and Smaller: Use dielectric nipples or unions.
3. Dielectric Fittings for NPS 2-1/2 to NPS 4: Use dielectric flanges or flange kits or nipples.

**3.05 HANGER AND SUPPORT INSTALLATION**

- A. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- B. Comply with requirements for pipe hanger and support devices and installation specified in Section 220529 "Hangers and Supports for Plumbing Piping and Equipment."
  - 1. Install carbon-steel pipe hangers for horizontal piping in noncorrosive environments.
  - 2. Install stainless-steel or fiberglass pipe hangers for horizontal piping in corrosive environments.
  - 3. Install carbon-steel pipe support clamps for vertical piping in noncorrosive environments.
  - 4. Install stainless-steel pipe support clamps for vertical piping in corrosive environments.
  - 5. Vertical Piping: MSS Type 8 or Type 42, clamps.
  - 6. Install individual, straight, horizontal piping runs:
    - a. 100 Feet and Less: MSS Type 1, adjustable, steel clevis hangers.
    - b. Longer Than 100 Feet: MSS Type 43, adjustable roller hangers.
    - c. Longer Than 100 Feet if Indicated: MSS Type 49, spring cushion rolls.
  - 7. Multiple, Straight, Horizontal Piping Runs 100 Feet or Longer: MSS Type 44, pipe rolls. Support pipe rolls on trapeze.
  - 8. Base of Vertical Piping: MSS Type 52, spring hangers.
- C. Support horizontal piping and tubing within 12 inches of each fitting and coupling.
- D. Support vertical piping and tubing at base and at each floor.
- E. Rod diameter may be reduced one size for double-rod hangers, with 3/8-inch minimum rods.
- F. Install hangers for cast-iron soil piping with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/2 and NPS 2: 60 inches with 3/8-inch rod.
  - 2. NPS 3: 60 inches with 1/2-inch rod.
  - 3. NPS 4 and NPS 5: 60 inches with 5/8-inch rod.
  - 4. Spacing for 10-foot lengths may be increased to 10 feet. Spacing for fittings is limited to 60 inches.
- G. Install supports for vertical cast-iron soil piping every 15 feet.
- H. Install hangers for copper tubing with the following maximum horizontal spacing and minimum rod diameters:
  - 1. NPS 1-1/4: 72 inches with 3/8-inch rod.
  - 2. NPS 1-1/2 and NPS 2: 96 inches with 3/8-inch rod.
  - 3. NPS 2-1/2: 108 inches with 1/2-inch rod.
  - 4. NPS 3: 10 feet with 1/2-inch rod.
  - 5. NPS 4 and NPS 5: 48 inches with 5/8-inch rod.
  - 6. NPS 6 and NPS 8: 48 inches with 3/4-inch rod.
- I. Install supports for vertical copper tubing every 10 feet.
- J. Support piping and tubing not listed above according to MSS SP-69 and manufacturer's written instructions.

**3.06 CONNECTIONS**

- A. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Connect soil, storm and waste piping to existing sanitary sewerage piping. Use transition fitting to join dissimilar piping materials.
- C. Connect drainage and vent piping to the following:

1. Plumbing Fixtures: Connect drainage piping in sizes indicated, but not smaller than required by plumbing code.
  2. Plumbing Fixtures and Equipment: Connect atmospheric vent piping in sizes indicated, but not smaller than required by authorities having jurisdiction.
  3. Plumbing Specialties: Connect drainage and vent piping in sizes indicated, but not smaller than required by plumbing code.
  4. Install test tees (wall cleanouts) in conductors near floor and floor cleanouts with cover flush with floor.
  5. Comply with requirements for cleanouts and drains specified in Section 221319 "Sanitary Waste Piping Specialties."
  6. Equipment: Connect drainage piping as indicated. Provide shutoff valve if indicated and union for each connection. Use flanges instead of unions for connections NPS 2-1/2 and larger.
- D. Where installing piping adjacent to equipment, allow space for service and maintenance of equipment.
- E. Make connections according to the following unless otherwise indicated:
1. Install unions, in piping NPS 2 and smaller, adjacent to each valve 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.

### **3.07 IDENTIFICATION**

- A. Identify exposed sanitary waste and vent piping. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

### **3.08 FIELD QUALITY CONTROL**

- A. During installation, notify authorities having jurisdiction at least 24 hours before inspection must be made. Perform tests specified below in presence of authorities having jurisdiction.
1. Roughing-in Inspection: Arrange for inspection of piping before concealing or closing-in after roughing-in and before setting fixtures.
  2. Final Inspection: Arrange for final inspection by authorities having jurisdiction to observe tests specified below and to ensure compliance with requirements.
- B. Reinspection: If authorities having jurisdiction find that piping will not pass test or inspection, make required corrections and arrange for reinspection.
- C. Reports: Prepare inspection reports and have them signed by authorities having jurisdiction.
- D. Test sanitary drainage and vent piping according to procedures of authorities having jurisdiction or, in absence of published procedures, as follows:
1. Test for leaks and defects in new piping and parts of existing piping that have been altered, extended, or repaired. If testing is performed in segments, submit separate report for each test, complete with diagram of portion of piping tested.
  2. Leave uncovered and unconcealed new, altered, extended, or replaced drainage and vent piping until it has been tested and approved. Expose work that was covered or concealed before it was tested.
  3. Roughing-in Plumbing Test Procedure: Test drainage and vent piping except outside leaders on completion of roughing-in. Close openings in piping system and fill with water to point of overflow, but not less than 10-foot head of water. From 15 minutes before inspection starts to completion of inspection, water level must not drop. Inspect joints for leaks.
  4. Finished Plumbing Test Procedure: After plumbing fixtures have been set and traps filled with water, test connections and prove they are gastight and watertight. Plug vent-stack openings on roof and building drains where they leave building. Introduce air into piping



system equal to pressure of 1-inch wg. Use U-tube or manometer inserted in trap of water closet to measure this pressure. Air pressure must remain constant without introducing additional air throughout period of inspection. Inspect plumbing fixture connections for gas and water leaks.

5. Repair leaks and defects with new materials and retest piping, or portion thereof, until satisfactory results are obtained.
6. Prepare reports for tests and required corrective action.

### **3.09 CLEANING AND PROTECTION**

- A. Clean interior of piping. Remove dirt and debris as work progresses.
- B. Protect drains during remainder of construction period to avoid clogging with dirt and debris and to prevent damage from traffic and construction work.
- C. Place plugs in ends of uncompleted piping at end of day and when work stops.

### **3.10 PIPING SCHEDULE**

- A. Flanges and unions may be used on aboveground pressure piping unless otherwise indicated.
- B. Aboveground, soil, storm and waste piping shall be any of the following:
  1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
  2. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.
  3. Copper DWV tube, copper drainage fittings, and soldered joints.
  4. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- C. Aboveground, vent piping shall be any of the following:
  1. Service class, cast-iron soil pipe and fittings; gaskets; and gasketed joints.
  2. Hubless, cast-iron soil pipe and fittings; heavy-duty hubless-piping couplings; and coupled joints.
  3. Copper DWV tube, copper drainage fittings, and soldered joints.
  4. Dissimilar Pipe-Material Couplings: Unshielded, nonpressure transition couplings.
- D. Underground, soil, waste, storm and vent piping shall be any of the following:
  1. Service class, cast-iron soil piping; gaskets; and gasketed joints.
  2. Dissimilar Pipe-Material Couplings: Shielded, nonpressure transition couplings.

**END OF SECTION**

**22 13 19**  
**SANITARY WASTE PIPING SPECIALTIES**

**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. Cleanouts.
  - 2. Through-penetration firestop assemblies.
  - 3. Miscellaneous sanitary drainage piping specialties.
  - 4. Flashing materials.

**1.03 DEFINITIONS**

- A. ABS: Acrylonitrile-butadiene-styrene plastic.
- B. FRP: Fiberglass-reinforced plastic.
- C. HDPE: High-density polyethylene plastic.
- D. PE: Polyethylene plastic.
- E. PP: Polypropylene plastic.
- F. PVC: Polyvinyl chloride plastic.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Field quality-control reports.

**1.05 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For drainage piping specialties to include in emergency, operation, and maintenance manuals.

**1.06 QUALITY ASSURANCE**

- A. Drainage piping specialties shall bear label, stamp, or other markings of specified testing agency.
- 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. Comply with NSF 14, "Plastics Piping Components and Related Materials," for plastic sanitary piping specialty components.

**PART 2 - Products****2.01 CLEANOUTS**

- A. Exposed Metal Cleanouts :
  - 1. ASME A112.36.2M, Cast-Iron Cleanouts:
    - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1) Josam Company.
  - 2) MIFAB, Inc.
  - 3) Smith, Jay R. Mfg. Co.
  - 4) Tyler Pipe.
  - 5) Watts Drainage Products.
  - 6) Zurn Plumbing Products Group.
2. Standard: ASME A112.36.2M for cast iron and ASME A112.3.1 for stainless steel for cleanout test tee.
  3. Size: Same as connected drainage piping
  4. Body Material: Hubless, cast-iron soil pipe test tee or Stainless-steel tee with side cleanout as required to match connected piping.
  5. Closure: Countersunk, brass plug.
  6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
  7. Closure: Stainless-steel plug with seal.

B. Metal Floor Cleanouts :

1. ASME A112.36.2M, Cast-Iron Cleanouts:
  - a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    - 1) Josam Company.
    - 2) Smith, Jay R. Mfg. Co.
    - 3) Watts Drainage Products.
    - 4) Zurn Plumbing Products Group.
2. Standard: ASME A112.36.2M for adjustable housing, cast-iron soil pipe with cast-iron ferrule, or threaded, adjustable housing cleanout.
3. Size: Same as connected branch.
4. Type: Adjustable housing, Cast-iron soil pipe with cast-iron ferrule, or Threaded, adjustable housing.
5. Body or Ferrule: Cast iron or Stainless steel
6. Clamping Device: Required.
7. Outlet Connection: Inside calk, Spigot, or Threaded.
8. Closure: Brass plug with straight threads and gasket, Brass plug with tapered threads, Cast-iron plug, or Plastic plug.
9. Adjustable Housing Material: Cast iron or Plastic with threads, set-screws or other device.
10. Frame and Cover Material and Finish: Coordinate finish with Architect
11. Frame and Cover Shape: Square in tile floor finishes; Round everywhere else.
12. Top Loading Classification: Light Duty.
13. Riser: ASTM A 74, Service class, cast-iron drainage pipe fitting and riser to cleanout.
14. Standard: ASME A112.3.1.
15. Size: Same as connected branch.
16. Housing: Stainless steel.
17. Closure: Stainless steel with seal.
18. Riser: Stainless-steel drainage pipe fitting to cleanout.

C. Cast-Iron Wall Cleanouts :

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. Josam Company; Josam Div.
  - b. MIFAB, Inc.
  - c. Smith, Jay R. Mfg. Co.

- d. Tyler Pipe; Wade Div.
  - e. Watts Drainage Products.
  - f. Zurn Plumbing Products Group.
2. Standard: ASME A112.36.2M. Include wall access.
  3. Size: Same as connected drainage piping.
  4. Body: Hubless, cast-iron soil pipe test tee as required to match connected piping.
  5. Closure: Countersunk or raised-head, drilled-and-threaded, or brass or cast-iron plug.
  6. Closure Plug Size: Same as or not more than one size smaller than cleanout size.
  7. Wall Access: Round, flat, chrome-plated brass or stainless-steel cover plate with screw.
  8. Finish: Coordinate shape and finish with architect.

## **2.02 THROUGH-PENETRATION FIRESTOP ASSEMBLIES**

### **A. Through-Penetration Firestop Assemblies :**

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - a. ProSet Systems Inc.
  - b. Or approved equal
2. Standard: UL 1479 assembly of sleeve and stack fitting with firestopping plug.
3. Size: Same as connected soil, waste, or vent stack.
4. Sleeve: Molded PVC plastic, of length to match slab thickness and with integral nailing flange on one end for installation in cast-in-place concrete slabs.
5. Stack Fitting: ASTM A 48/A 48M, gray-iron, hubless-pattern, wye branch with neoprene O-ring at base and gray-iron plug in thermal-release harness. Include PVC protective cap for plug.
6. Special Coating: Corrosion resistant on interior of fittings.

## **2.03 MISCELLANEOUS SANITARY DRAINAGE PIPING SPECIALTIES**

### **A. Open Drains :**

1. Description: Shop or field fabricate from ASTM A 74, Service class, hub-and-spigot, cast-iron, soil-pipe fittings. Include P-trap, hub-and-spigot riser section; and where required, increaser fitting joined with ASTM C 564, rubber gaskets.
2. Size: Same as connected waste piping with increaser fitting of size indicated.

### **B. Floor-Drain, Trap-Seal Primer Fittings :**

1. Description: Cast iron, with threaded inlet and threaded or spigot outlet, and trap-seal primer valve connection.
2. Size: Same as floor drain outlet with NPS 1/2 side inlet.

### **C. Sleeve Flashing Device :**

1. Description: Manufactured, cast-iron fitting, with clamping device, that forms sleeve for pipe floor penetrations of floor membrane. Include galvanized-steel pipe extension in top of fitting that will extend 2 inches above finished floor and galvanized-steel pipe extension in bottom of fitting that will extend through floor slab.
2. Size: As required for close fit to riser or stack piping.

### **D. Stack Flashing Fittings :**

1. Description: Counterflashing-type, cast-iron fitting, with bottom recess for terminating roof membrane, and with threaded or hub top for extending vent pipe.

2. Size: Same as connected stack vent or vent stack.

E. Expansion Joints :

1. Standard: ASME A112.21.2M.
2. Body: Cast iron with bronze sleeve, packing, and gland.
3. End Connections: Matching connected piping.
4. Size: Same as connected soil, waste, or vent piping.

## 2.04 FLASHING MATERIALS

- A. Lead Sheet: ASTM B 749, Type L51121, copper bearing, with the following minimum weights and thicknesses, unless otherwise indicated:
1. General Use: 4.0-lb/sq. ft., 0.0625-inch thickness.
  2. Vent Pipe Flashing: 3.0-lb/sq. ft., 0.0469-inch thickness.
  3. Burning: 6-lb/sq. ft., 0.0938-inch thickness.
- B. Copper Sheet: ASTM B 152/B 152M, of the following minimum weights and thicknesses, unless otherwise indicated:
1. General Applications: 12 oz./sq. ft..
  2. Vent Pipe Flashing: 8 oz./sq. ft..
- C. Zinc-Coated Steel Sheet: ASTM A 653/A 653M, with 0.20 percent copper content and 0.04-inch minimum thickness, unless otherwise indicated. Include G90 hot-dip galvanized, mill-phosphatized finish for painting if indicated.
- D. Elastic Membrane Sheet: ASTM D 4068, flexible, chlorinated polyethylene, 40-mil minimum thickness.
- E. Fasteners: Metal compatible with material and substrate being fastened.
- F. Metal Accessories: Sheet metal strips, clamps, anchoring devices, and similar accessory units required for installation; matching or compatible with material being installed.
- G. Solder: ASTM B 32, lead-free alloy.
- H. Bituminous Coating: SSPC-Paint 12, solvent-type, bituminous mastic.

## PART 3 - Execution

### 3.01 INSTALLATION

- A. Install cleanouts in aboveground piping and building drain piping according to the following, unless otherwise indicated:
1. Size same as drainage piping up to NPS 4. Use NPS 4 for larger drainage piping unless larger cleanout is indicated.
  2. Locate at each change in direction of piping greater than 45 degrees.
  3. Locate at minimum intervals of 50 feet for piping NPS 4 and smaller and 100 feet for larger piping.
  4. Locate at base of each vertical soil and waste stack.
- B. For floor cleanouts for piping below floors, install cleanout deck plates with top flush with finished floor.
- C. For cleanouts located in concealed piping, install cleanout wall access covers, of types indicated, with frame and cover flush with finished wall.
- D. Install through-penetration firestop assemblies in plastic conductors and stacks at floor penetrations.
- E. Assemble open drain fittings and install with top of hub 2 inches above floor.
- F. Install floor-drain, trap-seal primer fittings on inlet to floor drains that require trap-seal primer connection.

1. Exception: Fitting may be omitted if trap has trap-seal primer connection.
2. Size: Same as floor drain inlet.

- G. Install sleeve flashing device with each riser and stack passing through floors with waterproof membrane.
- H. Install expansion joints on vertical stacks and conductors. Position expansion joints for easy access and maintenance.
- I. Install wood-blocking reinforcement for wall-mounting-type specialties.
- J. Install traps on plumbing specialty drain outlets. Omit traps on indirect wastes unless trap is indicated.

### **3.02 CONNECTIONS**

- A. Comply with requirements in Section 221316 "Sanitary Waste and Vent Piping" for piping installation requirements. Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Install piping adjacent to equipment to allow service and maintenance.
- C. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- D. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."

### **3.03 FLASHING INSTALLATION**

- A. Fabricate flashing from single piece unless large pans, sumps, or other drainage shapes are required. Join flashing according to the following if required:
  1. Lead Sheets: Burn joints of lead sheets 6.0-lb/sq. ft., 0.0938-inch thickness or thicker. Solder joints of lead sheets 4.0-lb/sq. ft., 0.0625-inch thickness or thinner.
  2. Copper Sheets: Solder joints of copper sheets.
- B. Install sheet flashing on pipes, sleeves, and specialties passing through or embedded in floors and roofs with waterproof membrane.
  1. Pipe Flashing: Sleeve type, matching pipe size, with minimum length of 10 inches, and skirt or flange extending at least 8 inches around pipe.
  2. Sleeve Flashing: Flat sheet, with skirt or flange extending at least 8 inches around sleeve.
  3. Embedded Specialty Flashing: Flat sheet, with skirt or flange extending at least 8 inches around specialty.
- C. Set flashing on floors and roofs in solid coating of bituminous cement.
- D. Secure flashing into sleeve and specialty clamping ring or device.
- E. Install flashing for piping passing through roofs with counterflashing or commercially made flashing fittings, according to Section 076200 "Sheet Metal Flashing and Trim."
- F. Extend flashing up vent pipe passing through roofs and turn down into pipe, or secure flashing into cast-iron sleeve having calking recess.
- G. Fabricate and install flashing and pans, sumps, and other drainage shapes.

### **3.04 FIELD QUALITY CONTROL**

- A. Tests and Inspections:
  1. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  2. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

**3.05 PROTECTION**

- A. Protect drains during remainder of construction period to avoid clogging with dirt or debris and to prevent damage from traffic or construction work.
- B. Place plugs in ends of uncompleted piping at end of each day or when work stops.

**END OF SECTION**

**22 33 00**  
**ELECTRIC, DOMESTIC-WATER HEATERS****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. Commercial, electric, storage, domestic-water heaters.
  - 2. Domestic-water heater accessories.

**1.03 PERFORMANCE REQUIREMENTS**

- A. Seismic Performance: Commercial domestic-water heaters shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
  - 1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each type and size of domestic-water heater indicated. Include rated capacities, operating characteristics, electrical characteristics, and furnished specialties and accessories.
- B. Shop Drawings:
  - 1. Wiring Diagrams: For power, signal, and control wiring.

**1.05 INFORMATIONAL SUBMITTALS**

- A. Seismic Qualification Certificates: For commercial domestic-water heaters, accessories, and components, from manufacturer.
  - 1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.
  - 2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
  - 3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.
- B. Product Certificates: For each type of commercial, electric, domestic-water heater, from manufacturer.
- C. Domestic-Water Heater Labeling: Certified and labeled by testing agency acceptable to authorities having jurisdiction.
- D. Source quality-control reports.
- E. Field quality-control reports.
- F. Warranty: Sample of special warranty.



**1.06 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For electric, domestic-water heaters to include in emergency, operation, and maintenance manuals.

**1.07 QUALITY ASSURANCE**

- 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. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1.
- C. ASME Compliance: Where ASME-code construction is indicated, fabricate and label commercial, domestic-water heater storage tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
- D. NSF Compliance: Fabricate and label equipment components that will be in contact with potable water to comply with NSF 61, "Drinking Water System Components - Health Effects."

**1.08 COORDINATION**

- A. Coordinate sizes and locations of concrete bases with actual equipment provided.

**1.09 WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of electric, domestic-water heaters that fail in materials or workmanship within specified warranty period.
  - 1. Failures include, but are not limited to, the following:
    - a. Structural failures including storage tank and supports.
    - b. Faulty operation of controls.
    - c. Deterioration of metals, metal finishes, and other materials beyond normal use.
  - 2. Warranty Periods: From date of Substantial Completion.
    - a. Commercial, Electric, Storage, Domestic-Water Heaters:
      - 1) Storage Tank: Five years.
      - 2) Controls and Other Components: Three years.
    - b. Compression Tanks: Five years.

**PART 2 - PRODUCTS****2.01 COMMERCIAL, ELECTRIC, DOMESTIC-WATER HEATERS**

- A. Commercial, Electric, Storage, Domestic-Water Heaters:
  - 1. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on Drawings or comparable product by one of the following:
    - a. Bradford White Corporation.
    - b. Cemline Corporation.
    - c. Lochinvar Corporation.
    - d. PVI Industries, LLC.
    - e. Rheem Manufacturing Company.
    - f. Smith, A. O. Water Products Co.; a division of A. O. Smith Corporation.
    - g. State Industries.

2. Standard: UL 1453.
3. Storage-Tank Construction: ASME-code, steel vertical arrangement.
  - a. Tappings: Factory fabricated of materials compatible with tank and piping connections. Attach tappings to tank before testing.
    - 1) NPS 2 and Smaller: Threaded ends according to ASME B1.20.1.
    - 2) NPS 2-1/2 and Larger: Flanged ends according to ASME B16.5 for steel and stainless-steel flanges, and according to ASME B16.24 for copper and copper-alloy flanges.
  - b. Pressure Rating: 150 psig.
  - c. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending lining material into tappings.
4. Factory-Installed Storage-Tank Appurtenances:
  - a. Anode Rod: Replaceable magnesium.
  - b. Drain Valve: Corrosion-resistant metal complying with ASSE 1005.
  - c. Insulation: Comply with ASHRAE/IESNA 90.1.
  - d. Jacket: Steel with enameled finish.
  - e. Heating Elements: Electric, screw-in or bolt-on immersion type arranged in multiples of three.
  - f. Temperature Control: Adjustable thermostat.
  - g. Safety Controls: High-temperature-limit and low-water cutoff devices or systems.
  - h. Relief Valves: ASME rated and stamped for combination temperature-and-pressure relief valves. Include one or more relief valves with total relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select one relief valve with sensing element that extends into storage tank.
5. Special Requirements: NSF 5 construction.

## 2.02 DOMESTIC-WATER HEATER ACCESSORIES

### A. Domestic-Water Compression Tanks:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following
  - a. AMTROL Inc.
  - b. Smith, A. O. Water Products Co.; a division of A. O. Smith Corporation.
  - c. State Industries.
  - d. Taco, Inc.
2. Description: Steel pressure-rated tank constructed with welded joints and factory-installed butyl-rubber diaphragm. Include air precharge to minimum system-operating pressure at tank.
3. Construction:
  - a. Tappings: Factory-fabricated steel, welded to tank before testing and labeling. Include ASME B1.20.1 pipe thread.
  - b. Interior Finish: Comply with NSF 61 barrier materials for potable-water tank linings, including extending finish into and through tank fittings and outlets.
  - c. Air-Charging Valve: Factory installed.

- B. Drain Pans: Corrosion-resistant metal with raised edge. Comply with ANSI/CSA LC 3. Include dimensions not less than base of domestic-water heater, and include drain outlet not less than NPS 3/4 with ASME B1.20.1 pipe threads or with ASME B1.20.7 garden-hose threads.
- C. Piping-Type Heat Traps: Field-fabricated piping arrangement according to ASHRAE/IESNA 90.1
- D. Heat-Trap Fittings: ASHRAE 90.2.
- E. Manifold Kits: Domestic-water heater manufacturer's factory-fabricated inlet and outlet piping for field installation, for multiple domestic-water heater installation. Include ball-, butterfly-, or gate-type shutoff valves to isolate each domestic-water heater and [calibrated] [memory-stop] balancing valves to provide balanced flow through each domestic-water heater.
  - 1. Comply with requirements for ball-, butterfly-, or gate-type shutoff valves specified in Section 220523 "General-Duty Valves for Plumbing Piping."
  - 2. Comply with requirements for balancing valves specified in Section 221119 "Domestic Water Piping Specialties."
- F. Pressure-Reducing Valves: ASSE 1003 for water. Set at 25-psig- maximum outlet pressure unless otherwise indicated.
- G. Combination Temperature-and-Pressure Relief Valves: ASME rated and stamped. Include relieving capacity at least as great as heat input, and include pressure setting less than domestic-water heater working-pressure rating. Select relief valves with sensing element that extends into storage tank.
- H. Pressure Relief Valves: ASME rated and stamped. Include pressure setting less than domestic-water heater working-pressure rating.
- I. Vacuum Relief Valves: ANSI Z21.22/CSA 4.4.
- J. Shock Absorbers: ASSE 1010 or PDI-WH 201, Size A water hammer arrester.
- K. Domestic-Water Heater Stands: Manufacturer's factory-fabricated steel stand for floor mounting, capable of supporting domestic-water heater and water. Include dimension that will support bottom of domestic-water heater a minimum of 18 inches above the floor.
- L. Domestic-Water Heater Mounting Brackets: Manufacturer's factory-fabricated steel bracket for wall mounting, capable of supporting domestic-water heater and water.

### **2.03 SOURCE QUALITY CONTROL**

- A. Factory Tests: Test and inspect domestic-water heaters specified to be ASME-code construction, according to ASME Boiler and Pressure Vessel Code.
- B. Hydrostatically test commercial domestic-water heaters to minimum of one and one-half times pressure rating before shipment.
- C. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and reinspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.
- D. Prepare test and inspection reports.

## **PART 3 - EXECUTION**

### **3.01 DOMESTIC-WATER HEATER INSTALLATION**

- A. Commercial, Electric, Domestic-Water Heater Mounting: Install commercial, electric, domestic-water heaters on concrete base. Comply with requirements for concrete bases specified in Section 033000 "Cast-in-Place Concrete."
  - 1. Exception: Omit concrete bases for commercial, electric, domestic-water heaters if installation on stand, bracket, suspended platform, or directly on floor is indicated.
  - 2. Maintain manufacturer's recommended clearances.
  - 3. Arrange units so controls and devices that require servicing are accessible.

4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
  5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete floor.
  6. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  7. Install anchor bolts to elevations required for proper attachment to supported equipment.
  8. Anchor domestic-water heaters to substrate.
  9. Maintain manufacturer's recommended clearances.
  10. Arrange units so controls and devices that require servicing are accessible.
  11. Place and secure anchorage devices. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
  12. Install anchor bolts to elevations required for proper attachment to supported equipment.
  13. Anchor domestic-water heaters to substrate.
- B. Install electric, domestic-water heaters level and plumb, according to layout drawings, original design, and referenced standards. Maintain manufacturer's recommended clearances. Arrange units so controls and devices needing service are accessible.
1. Install shutoff valves on domestic-water-supply piping to domestic-water heaters and on domestic-hot-water outlet piping. Comply with requirements for shutoff valves specified in Section 220523 "General-Duty Valves for Plumbing Piping."
- C. Install commercial, electric, domestic-water heaters with seismic-restraint devices. Comply with requirements for seismic-restraint devices specified in Section 220548 "Vibration and Seismic Controls for Plumbing Piping and Equipment."
- D. Install combination temperature-and-pressure relief valves in top portion of storage tanks. Use relief valves with sensing elements that extend into tanks. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- E. Install combination temperature-and-pressure relief valves in water piping for electric, domestic-water heaters without storage. Extend commercial-water-heater relief-valve outlet, with drain piping same as domestic-water piping in continuous downward pitch, and discharge by positive air gap onto closest floor drain.
- F. Install water-heater drain piping as indirect waste to spill by positive air gap into open drains or over floor drains. Install hose-end drain valves at low points in water piping for electric, domestic-water heaters that do not have tank drains. Comply with requirements for hose-end drain valves specified in Section 221119 "Domestic Water Piping Specialties."
- G. Install thermometers on outlet piping of electric, domestic-water heaters. Comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."
- H. Install thermometers on inlet and outlet piping of domestic-water heaters. Comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."
- I. Assemble and install inlet and outlet piping manifold kits for multiple electric, domestic-water heaters. Fabricate, modify, or arrange manifolds for balanced water flow through each electric, domestic-water heater. Include shutoff valve and thermometer in each domestic-water heater inlet and outlet, and throttling valve in each electric, domestic-water heater outlet. Comply with requirements for valves specified in Section 220523 "General-Duty Valves for Plumbing Piping," and comply with requirements for thermometers specified in Section 220519 "Meters and Gages for Plumbing Piping."
- J. Install pressure-reducing valve with integral bypass relief valve in electric, domestic-water booster-heater inlet piping and water hammer arrester in booster-heater outlet piping. Set pressure-reducing valve for outlet pressure of 25 psig. Comply with requirements for pressure-reducing valves and water hammer arresters specified in Section 221119 "Domestic Water Piping Specialties."

- K. Install piping-type heat traps on inlet and outlet piping of electric, domestic-water heater storage tanks without integral or fitting-type heat traps.
- L. Fill electric, domestic-water heaters with water.
- M. Charge domestic-water compression tanks with air.

### **3.02 CONNECTIONS**

- A. Comply with requirements for piping specified in Section 221116 "Domestic Water Piping." Drawings indicate general arrangement of piping, fittings, and specialties.
- B. Where installing piping adjacent to electric, domestic-water heaters, allow space for service and maintenance of water heaters. Arrange piping for easy removal of domestic-water heaters.

### **3.03 IDENTIFICATION**

- A. Identify system components. Comply with requirements for identification specified in Section 220553 "Identification for Plumbing Piping and Equipment."

### **3.04 FIELD QUALITY CONTROL**

- A. Perform tests and inspections.
  - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
  - 2. Leak Test: After installation, charge system and test for leaks. Repair leaks and retest until no leaks exist.
  - 3. Operational Test: After electrical circuitry has been energized, start units to confirm proper operation.
  - 4. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- B. Electric, domestic-water heaters will be considered defective if they do not pass tests and inspections. Comply with requirements in Section 014000 "Quality Requirements" for retesting and re-inspecting requirements and Section 017300 "Execution" for requirements for correcting the Work.
- C. Prepare test and inspection reports.

### **3.05 DEMONSTRATION**

- A. Train Owner's maintenance personnel to adjust, operate, and maintain commercial, electric, domestic-water heaters.

**END OF SECTION**

**22 40 00**  
**PLUMBING FIXTURES**

**Part 1 - General****1.01 SUBMITTALS**

- A. Product Data: Provide catalog illustrations of fixtures, sizes, rough-in dimensions, utility sizes, trim, and finishes.
- B. Manufacturer's Instructions: Indicate installation methods and procedures.
- C. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.02 QUALITY ASSURANCE**

- A. ANSI Standards: Comply with ANSI Standards pertaining to plumbing fixtures and systems.
- B. ANSI Standards: Comply with ANSI A117.1 standard pertaining to plumbing fixtures for handicapped.
- C. PDI Compliance: Comply with standards established by Plumbing and Drainage institute (PDI) pertaining to plumbing fixture supports.
- D. Federal Standards: Comply with applicable Federal Standard FS WW-P-541/Series sections pertaining to plumbing fixtures.

**Part 2 - Products****2.01 PLUMBING FIXTURES**

- A. General: Provide factory-fabricated fixtures of the type, style and material indicated. For each type of fixture, unless otherwise specified, provide fixture manufacturer's standard trim, carrier seats and valves as indicated by their published product information, either as designed and constructed, or as recommended by the manufacturer, and as required for a complete installation. Where more than one type or manufacturer is indicated, selection is Installer's option.

**2.02 MATERIALS**

- A. General: Unless otherwise specified, comply with applicable Federal Specification WW-P-541/series sections pertaining to plumbing fixtures, fittings, trim, metals and finishes. Comply with requirements of WW-P-541/specification relative to quality of ware, glazing, enamel, composition and finish of metals, air gaps and vacuum breakers, even though some plumbing fixtures specified in this section are not described in WW-P-541.
- B. Provide materials that have been selected for their surface flatness and smoothness. Exposed surface which exhibit pitting, seam marks, roller marks, foundry sand holes, stains, discoloration or other surface imperfections on finished units are not acceptable.
- C. Where fittings, trim and accessories are exposed or semi-exposed, provide bright chrome-plated or polished stainless steel units.
- D. Comply with additional fixture requirements contained in the fixture schedule.

**Part 3 - EXECUTION****3.01 INSTALLATION**

- A. Install plumbing fixtures of types indicated where shown and at indicated heights or where not shown in accordance with manufacturer's written instruction, roughing-in drawings and with recognized industry practices.
- B. Fasten plumbing fixtures securely to indicated supports or building structure, and ensure that fixtures are level and plumb and tight against mounting surface.

**3.02 FIELD QUALITY CONTROL**

- A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test and adjust fixtures for proper operation.

**END OF SECTION**

**SECTION 230000**  
**BASIC MECHANICAL MATERIALS AND METHODS****PART 1 GENERAL****1.01 IMPOSED REGULATIONS**

- A. Applicable provisions of the State and Local Codes and of the following codes and standards in addition to those listed elsewhere in the specifications are hereby imposed on a general basis for mechanical work: codes and standards listed on the mechanical drawings.

**1.02 SCOPE OF WORK**

- A. Provide all labor, materials, equipment and supervision to construct complete and operable mechanical systems as indicated on the drawings and specified herein. All materials and equipment used shall be new, undamaged and free from any defects.

**1.03 RELATED DOCUMENTS AND OTHER INFORMATION**

- A. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the portions of work specified in each and every Section of this Division, individually and collectively.
- B. It is recognized that separate sub-contracts may be instituted by THIS CONTRACT'S GENERAL CONTRACTOR with others. It is the responsibility of THIS CONTRACT'S GENERAL CONTRACTOR to completely inform, coordinate and advise those sub-contractors as to all of the requirements, conditions and information associated with providing and installing their portion of the total job.

**1.04 EXISTING SERVICES AND FACILITIES**

- A. **Damage to Existing Services:** Existing services and facilities damaged by the Contractor through negligence or through use of faulty materials or workmanship shall be promptly repaired, replaced, or otherwise restored to previous conditions by the Contractor without additional cost to the Owner.
- B. **Interruption of Services:** Interruptions of services necessary for connection to or modification of existing systems or facilities shall occur only at prearranged times approved by the Owner. Interruptions shall only occur after the provision of all temporary work and the availability of adequate labor and materials will assure that the duration of the interruption will not exceed the time agreed upon.
- C. **Removed Materials:** Existing materials made unnecessary by the new installation shall be stored on site. They shall remain the property of the Owner and shall be stored at a location and in a manner as directed by the Owner. If classified by the Owner's authorized representative as unsuitable for further use, the material shall become the property of the Contractor and shall be removed from the site at no additional cost to the owner.

**1.05 PRODUCT WARRANTIES**

- A. Provide manufacturer's standard printed commitment in reference to a specific product and normal application, stating that certain acts of restitution will be performed for the Purchaser or Owner by the manufacturer, when and if the product fails within certain operational conditions and time limits. Where the warranty requirements of a specific specification section exceeds the manufacturer's standard warranty, the more stringent requirements will apply and modified manufacturer's warranty shall be provided. In no case shall the manufacturer's warranty be less than one (1) year.



**1.06 PRODUCT SUBSTITUTIONS**

- A. General: Materials specified by manufacturer's name shall be used unless prior approval of an alternate is given by addenda. Requests for substitutions must be received in the office of the Architect at least 10 days prior to opening of bids. Refer to the general conditions for the substitution request form and required documentation.

**PART 2 PRODUCTS****2.01 GENERAL MECHANICAL PRODUCT REQUIREMENTS**

- A. Standard Products: Provide not less (quality) than manufacturer's standard products, as specified by their published product data. In addition to the indication that a particular product/model number is acceptable, comply with the specified requirements. Do not assume that the available off-the-shelf condition of a product complies with the requirements; as an example, a specific finish or color may be required.
- B. Uniformity: Where multiple units of a general product are required for the mechanical work, provide identical products by the same manufacturer, without variations except for sizes and similar variations as indicated.
- C. Product Compatibility, Options: Where more than one product selection is specified, either generically or proprietarily, selection is Purchaser's or Installer's option. Provide mechanical adaptations as needed for interfacing of selected products in the work.
- D. Equipment Nameplates: Provide a permanent operational data nameplate on each item of power operated mechanical equipment, indicating the manufacturer, product name, model number, serial number, speed, capacity, power characteristics, labels of tested compliance, and similar essential operating data.
- E. Locate nameplates in easy-to-read locations. When product is visually exposed in an occupied area of the building, locate nameplate in a concealed position (where possible) which is accessible for reading by service personnel.

**PART 3 EXECUTION****3.01 PRODUCT INSTALLATION, GENERAL**

- A. Except where more stringent requirements are indicated, comply with the product manufacturer's installation instructions and recommendations, including handling, anchorage, assembly, connections, cleaning and testing, charging, lubrication, startup, test operation and shut-down of operating equipment. Consult with manufacturer's technical experts, for specific instructions on unique product conditions and unforeseen problems.
- B. Protection and Identification: Deliver products to project properly identified with names, models numbers, types, grades, compliance labels and similar information needed for distinct identifications; adequately packaged or protected to prevent deterioration during shipment, storage and handling. Store in a dry, well ventilated, indoor space, except where prepared and protected by the manufacturer specifically for exterior storage.
- C. Permits and Tests: Provide labor, material and equipment to perform all tests required by the governing agencies and submit a record of all tests to the Owner or his representative. Notify the Architect five days in advance of any testing.
- D. Where components such as duct, pipe, conduit, etc. pass through non-fire-rated, interior partitions, fill void between component and opening in wall with fiberglass insulation and sealant for acoustical separation.

**END OF SECTION**

**SECTION 23 05 10  
MECHANICAL COORDINATION****PART 1 GENERAL****1.01 QUALITY ASSURANCE**

- A. Mechanical Coordination Drawings: Prepare a set of coordination drawings showing the coordination of the major elements, components and systems of the mechanical work, and showing the coordination of mechanical work with other work. Prepare drawings at accurate scale and sufficiently large to show locations of every item, including clearances for installing, maintaining, insulating, breaking down equipment, replacing motors and similar requirements. Drawings shall indicate coordination with all other trades including, but not limited to, lighting, structural, plumbing and architectural items. Prepare drawings to include plans, elevations, sections and details as needed to conclusively show successful coordination and integration of the work. Submit drawings for review by the Architect/Engineer.

**PART 2 PRODUCTS****2.01 MECHANICAL PRODUCT COORDINATION:**

- A. Power Characteristics: Refer to the electrical sections of the specifications and the electrical drawings for the power characteristics available for the operation of each power driven item of mechanical equipment. The electrical design was based on the power requirements of the mechanical equipment manufacturer scheduled or specified as "basis of design." Any modifications to the electrical system that are required due to the use of an approved equivalent manufacturer shall be made at no additional cost to the owner. All changes must be clearly documented and submitted for review by the Architect/Engineer prior to purchasing equipment. Coordinate purchases to ensure uniform interface with electrical work. Refer to specification Div 26 for additional coordination requirements.
- B. Coordination of Options and Substitutions: When the contract documents permit the selection from several product options and it becomes necessary to authorize a substitution, do not proceed with purchase until coordination of interface to equipment has been checked and satisfactorily established.

**PART 3 EXECUTION****3.01 INSPECTION AND PREPARATION:**

- A. Substrate Examination: The Installer of each element of the mechanical work must examine the condition of the substrate to receive the work, the conditions under which the work will be performed, and must notify the Contractor in writing of conditions detrimental to the proper completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to the Installer.
- B. Do not proceed with the installation of sleeves, anchors, hangers, roof penetrations and similar work until mechanical coordination drawings have been processed and released for construction. Where work must be installed prior to that time in order to avoid a project delay, review proposed installation in a project coordination meeting including all parties involved with the interfacing of the work.

**3.02 CUTTING AND PATCHING:**

- A. Structural Limitations: Do not cut structural framing, walls, floors, decks and other members intended to withstand stress, except with the Architect's or Engineer's written authorization. Authorization will be granted only where there is not other reasonable method for completing the mechanical work, and where the proposed cutting clearly does not materially weaken the structure.
- B. Where authorized, cut opening through concrete (for pipe penetrations and similar services) by core drilling or sawing. Do not cut by hammer-driven chisel or drill.

- C. Other work: Do not endanger or damage other work through the procedures and processes of cutting to accommodate mechanical work. Review the proposed cutting with the Installer of the work to be cut, and comply with his recommendations to minimize damage. Where necessary, engage the original Installer or other specialists to execute the cutting in the recommended manner.
- D. Where patching is required to restore other work, because of either cutting or other damage inflicted during the installation of mechanical work, execute the patching in the manner recommended by the original Installer. Restore the other work in every respect, including the elimination of visual defects in exposed finishes, as judged by the Architect. Engage the original Installer to complete patching of the following categories of work:
  - 1. Exposed concrete finishes.
  - 2. Exposed masonry.
  - 3. Waterproofing and vapor barriers.
  - 4. Roofing, flashing and accessories.
  - 5. Interior exposed finishes and casework, where judged by the Architect to be difficult to achieve an acceptable match by other means.

### 3.03 COORDINATION OF MECHANICAL INSTALLATION:

- A. General: Sequence, coordinate and integrate the various elements of mechanical work so that the mechanical plant will perform as indicated and be in harmony with the other work of the building. The Architect/Engineer will not supervise the coordination, which is the exclusive responsibility of the Contractor. Comply with the following requirements:
- B. Install piping, ductwork and similar services straight and true, aligned with other work and with overhead structures and allowing for insulation. Conceal where possible.
- C. Arrange work to facilitate maintenance and repair or replacement of equipment. Locate services requiring maintenance on valves and similar units in front of services requiring less maintenance. Connect equipment for ease of disconnecting, with minimum of interference with other work.
- D. Give the right-of way to piping systems required to slope for drainage (over other service lines). Piping shall be located to avoid interference with ductwork and light fixtures.
- E. Piping shall be located to avoid interference with ductwork and light fixtures.
- F. Drawings: Conform with the arrangement indicated by the contract documents to the greatest extent possible, recognizing that portions of the work are shown only in diagrammatic form. Where coordination requirements conflict with individual system requirements, comply with the Architect's decision on resolution of the conflict.
- G. Electrical Work: Coordinate the mechanical work with electrical work, and properly interface with the electrical service. In general, and except as otherwise indicated, install mechanical equipment ready for electrical connection. Refer to the electrical sections of the specifications for electrical connection of mechanical equipment.
- H. Utility Connections: Coordinate the connection of mechanical systems with exterior underground utilities and services. Comply with the requirements of governing regulations, franchised service companies and controlling agencies. Provide a single connection for each service except where multiple connections are indicated.

### 3.04 COORDINATION OF MECHANICAL START-UP:

- A. Seasonal Requirements: Adjust and coordinate the timing of mechanical system start-ups with seasonal variations, so that demonstration and testing of specified performance can be observed and recorded. Exercise proper care in off-season start-ups to ensure that systems and equipment will not be damaged.

- B. Painting and Air Distribution: Coordinate the initial cleaning and start-up of the HVAC air distribution system, to occur prior to preparatory cleaning and general interior painting and decorating on the project.

**END OF SECTION**

**SECTION 23 05 13**  
**COMMON MOTOR REQUIREMENTS FOR HVAC EQUIPMENT****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 general requirements for single-phase and polyphase, 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.

**1.03 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****2.01 GENERAL MOTOR REQUIREMENTS**

- A. Comply with NEMA MG 1 unless otherwise indicated.
- B. Comply with IEEE 841 for severe-duty motors.

**2.02 MOTOR CHARACTERISTICS**

- A. Duty: Continuous duty at ambient temperature of 10440 deg FC 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.

**2.03 POLYPHASE MOTORS**

- A. Description: NEMA MG 1, Design B, medium induction motor.
- B. Efficiency: Energy efficient, as defined in NEMA MG 1.
- C. Service Factor: 1.15.
- D. Multispeed Motors: Variable torque.
  - 1. For motors with 2:1 speed ratio, consequent pole, single winding.
  - 2. For motors with other than 2:1 speed ratio, separate winding for each speed.
- E. Multispeed Motors: Separate winding for each speed.
- F. Rotor: Random-wound, squirrel cage.
- G. Bearings: Regreasable, shielded, antifriction ball bearings suitable for radial and thrust loading.
- H. Temperature Rise: Match insulation rating.
- I. Insulation: Class F.

- J. Code Letter Designation:
  - 1. Motors 15 HP and Larger: NEMA starting Code F or Code G.
  - 2. Motors Smaller than 15 HP: Manufacturer's standard starting characteristic.
- K. Enclosure Material: Cast iron for motor frame sizes 324T -and larger; rolled steel for motor frame sizes smaller than 324T.

#### **2.04 POLYPHASE MOTORS WITH ADDITIONAL REQUIREMENTS**

- A. Motors Used with Reduced-Voltage and Multispeed Controllers: Match wiring connection requirements for controller with required motor leads. Provide terminals in motor terminal box, suited to control method.
- B. Motors Used with Variable Frequency Controllers: Ratings, characteristics, and features coordinated with and approved by controller manufacturer.
  - 1. Windings: Copper magnet wire with moisture-resistant insulation varnish, designed and tested to resist transient spikes, high frequencies, and short time rise pulses produced by pulse-width modulated inverters.
  - 2. Energy- and Premium-Efficient Motors: Class B temperature rise; Class F insulation.
  - 3. Inverter-Duty Motors: Class F temperature rise; Class H insulation.
  - 4. Thermal Protection: Comply with NEMA MG 1 requirements for thermally protected motors.
- C. Severe-Duty Motors: Comply with IEEE 841, with 1.15 minimum service factor.

#### **2.05 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:
  - 1. Permanent-split capacitor.
  - 2. Split phase.
  - 3. Capacitor start, inductor run.
  - 4. Capacitor start, capacitor run.
- B. Multispeed Motors: Variable-torque, permanent-split-capacitor type.
- C. Bearings: Prelubricated, antifriction ball bearings or sleeve bearings suitable for radial and thrust loading.
- D. Motors 1/20 HP and Smaller: Shaded-pole type.
- E. 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**

**SECTION 23 05 29**  
**HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT****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. Metal pipe hangers and supports.
  2. Trapeze pipe hangers.
  3. Metal framing systems.
  4. Thermal-hanger shield inserts.
  5. Fastener systems.
  6. Pipe stands.
  7. Equipment supports.
- B. Related Sections:
1. Section 230548 "Vibration and Seismic Controls for HVAC" for vibration isolation devices.
  2. Section 233113 "Metal Ducts" for duct hangers and supports.

**1.03 DEFINITIONS**

- A. MSS: Manufacturers Standardization Society of The Valve and Fittings Industry Inc.

**1.04 PERFORMANCE REQUIREMENTS**

- A. Delegated Design: Design trapeze pipe hangers and equipment supports, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.
- B. Structural Performance: Hangers and supports for HVAC piping and equipment shall withstand the effects of gravity loads and stresses within limits and under conditions indicated according to ASCE/SEI 7.
1. Design supports for multiple pipes, including pipe stands, capable of supporting combined weight of supported systems, system contents, and test water.
  2. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.
  3. Design seismic-restraint hangers and supports for piping and equipment and obtain approval from authorities having jurisdiction.

**1.05 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Signed and sealed by a qualified professional engineer. Show fabrication and installation details and include calculations for the following; include Product Data for components:
1. Trapeze pipe hangers.
  2. Metal framing systems.
  3. Pipe stands.
  4. Equipment supports.
- C. Delegated-Design Submittal: For trapeze hangers indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
1. Detail fabrication and assembly of trapeze hangers.
  2. Design Calculations: Calculate requirements for designing trapeze hangers.

**1.06 INFORMATIONAL SUBMITTALS**

- A. Welding certificates.

**1.07 QUALITY ASSURANCE**

- A. Structural Steel Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- B. Pipe Welding Qualifications: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code.

**PART 2 PRODUCTS****2.1 METAL PIPE HANGERS AND SUPPORTS**

- A. Stainless-Steel Pipe Hangers and Supports:
1. Description: MSS SP-58, Types 1 through 58, factory-fabricated components.
  2. Padded Hangers: Hanger with pipe insulation pad or cushion to support bearing surface of piping.
  3. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.
- B. Copper Pipe Hangers:
1. Description: MSS SP-58, Types 1 through 58, copper-coated-steel, factory-fabricated components.
  2. Hanger Rods: Continuous-thread rod, nuts, and washer made of copper-coated steel or stainless steel.
- C. Carbon-Steel Pipe Hangers and Supports:
1. Description: MSS sp-58, Types 1 through 58, factory-fabricated components.
  2. Galvanized Metallic Coatings: Pregalvanized or hot dipped.
  3. Nonmetallic Coatings: Plastic coating, jacket, or liner.
  4. Padded Hangers: Hanger with fiberglass or other pipe insulation pad or cushion to support bearing surface of piping.
  5. Hanger Rods: Continuous-thread rod, nuts, and washer made of stainless steel.

**2.02 METAL FRAMING SYSTEMS**

- A. MFMA Manufacturer Metal Framing Systems:
1. Description: Shop or field-fabricated pipe-support assembly for supporting multiple parallel pipes.
  2. Standard: MFMA-4.
  3. Channels: Continuous slotted steel channel with inturred lips.
  4. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
  5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
  6. Metallic coating: Hot-dipped galvanized.
- B. Non-MFMA Manufacturer Metal Framing Systems:
1. Description: Shop or field-fabricated pipe-support assembly made of steel channels, accessories, fittings, and other components for supporting multiple parallel pipes.
  2. Standard: Comply with MFMA-4.
  3. Channels: Continuous slotted steel channel with inturred lips.
  4. Channel Nuts: Formed or stamped steel nuts or other devices designed to fit into channel slot and, when tightened, prevent slipping along channel.
  5. Hanger Rods: Continuous-thread rod, nuts, and washer made of carbon steel.
  6. Metallic coating: Zinc.

**2.03 TRAPEZE PIPE HANGERS**

- A. Description: MSS SP-69, Type 59, shop- or field-fabricated pipe-support assembly made



from structural stainless-steel shapes with MSS SP-58 stainless-steel hanger rods, nuts, saddles, and U-bolts.

#### **2.04 THERMAL-HANGER SHIELD INSERTS**

- A. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with 100-psig or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength and vapor barrier.
- B. Insulation-Insert Material for Hot Piping: Water-repellent treated, ASTM C with 100-psig, or ASTM C 591, Type VI, Grade 1 polyisocyanurate with 125-psig minimum compressive strength.
- C. For Trapeze or Clamped Systems: Insert and shield shall cover entire circumference of pipe.
- D. For Clevis or Band Hangers: Insert and shield shall cover lower 180 degrees of pipe.
- E. Insert Length: Extend 2 inches beyond sheet metal shield for piping operating below ambient air temperature.

#### **2.05 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.
- B. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated or stainless- steel anchors, for use in hardened portland cement concrete; with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

#### **2.06 PIPE STANDS**

- A. General Requirements for Pipe Stands: Shop- or field-fabricated assemblies made of manufactured corrosion-resistant components to support piping.
- B. Compact Pipe Stand: One-piece plastic unit with integral-rod roller, pipe clamps, or V-shaped cradle to support pipe.
- C. Low-Type, Single-Pipe Stand: One-piece plastic or stainless-steel base unit with rubber base.
- D. Curb-Mounted-Type Pipe Stands: Shop- or field-fabricated pipe supports made from structural-steel shapes, continuous-thread rods, and rollers, for mounting on permanent stationary roof curb.

#### **2.07 EQUIPMENT SUPPORTS**

- A. Description: Welded, shop- or field-fabricated equipment support made from structural stainless-steel shapes.

#### **2.08 MISCELLANEOUS MATERIALS**

- A. Structural Steel: ASTM A 36/A 36M, stainless-steel plates, shapes, and bars; black and galvanized.
- B. Grout: ASTM C 1107, factory-mixed and -packaged, dry, hydraulic-cement, nonshrink and nonmetallic grout; suitable for interior and exterior applications.
  - 1. Properties: Nonstaining, noncorrosive, and nongaseous.
  - 2. Design Mix: 5000-psi, 28-day compressive strength.

**PART 3 EXECUTION****3.01 HANGER AND SUPPORT INSTALLATION**

- A. Metal Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from the building structure.
- B. Metal Trapeze Pipe-Hanger Installation: Comply with MSS SP-69 and MSS SP-89. Arrange for grouping of parallel runs of horizontal piping, and support together on field-fabricated trapeze pipe hangers.
  - 1. Pipes of Various Sizes: Support together and space trapezes for smallest pipe size or install intermediate supports for smaller diameter pipes as specified for individual pipe hangers.
  - 2. Field fabricate from ASTM A 36/A 36M, stainless-steel shapes selected for loads being supported. Weld steel according to AWS D1.1/D1.1M.
- C. Metal Framing System Installation: Arrange for grouping of parallel runs of piping, and support together on field-assembled metal framing systems.
- D. Thermal-Hanger Shield Installation: Install in pipe hanger or shield for insulated piping.
- E. Fastener System Installation:
  - 1. Install powder-actuated fasteners for use in lightweight concrete or concrete slabs less than 4 inches thick in concrete after concrete is placed and completely cured. Use operators that are licensed by powder-actuated tool manufacturer. Install fasteners according to powder-actuated tool manufacturer's operating manual.
  - 2. Install mechanical-expansion anchors in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- F. Pipe Stand Installation:
  - 1. Pipe Stand Types except Curb-Mounted Type: Assemble components and mount on smooth roof surface. Do not penetrate roof membrane.
  - 2. Curb-Mounted-Type Pipe Stands: Assemble components or fabricate pipe stand and mount on permanent, stationary roof curb. See Section 077200 "Roof Accessories" for curbs.
- G. Install hangers and supports complete with necessary attachments, inserts, bolts, rods, nuts, washers, and other accessories.
- H. Equipment Support Installation: Fabricate from welded-structural-steel shapes.
- I. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
- J. Install lateral bracing with pipe hangers and supports to prevent swaying.
- K. 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. Install concrete inserts before concrete is placed; fasten inserts to forms and install reinforcing bars through openings at top of inserts.
- L. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

- M. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and to not exceed maximum pipe deflections allowed by ASME B31.9 for building services piping.
- N. Insulated Piping:
1. Attach clamps and spacers to piping.
    - a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
    - b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
    - c. Do not exceed pipe stress limits allowed by ASME B31.9 for building services piping.
  2. Install MSS SP-58, Type 39, protection saddles if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  3. Install MSS SP-58, Type 40, protective shields on cold piping with vapor barrier. Shields shall span an arc of 180 degrees.
    - a. Option: Thermal-hanger shield inserts may be used. Include steel weight-distribution plate for pipe NPS 4 and larger if pipe is installed on rollers.
  4. Shield Dimensions for Pipe: Not less than the following:
    - a. NPS 1/4 to NPS 3-1/2: 12 inches long and 0.048 inch thick.
    - b. NPS 4: 12 inches long and 0.06 inch thick.
    - c. NPS 5 and NPS 6: 18 inches long and 0.06 inch thick.
    - d. NPS 8 to NPS 14: 24 inches long and 0.075 inch thick.
    - e. NPS 16 to NPS 24: 24 inches long and 0.105 inch thick.
  5. Pipes NPS 8 and Larger: Include wood or reinforced calcium-silicate-insulation inserts of length at least as long as protective shield.
  6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

### 3.02 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure overhead or to support equipment above floor.
- B. Grouting: Place grout under supports for equipment and make bearing surface smooth.
- C. Provide lateral bracing, to prevent swaying, for equipment supports.

### 3.03 METAL FABRICATIONS

- A. Cut, drill, and fit miscellaneous metal fabrications for trapeze pipe hangers and equipment supports.
- B. Fit exposed connections together to form hairline joints. Field weld connections that cannot be shop welded because of shipping size limitations.
- C. Field Welding: Comply with AWS D1.1/D1.1M procedures for shielded, metal arc welding; appearance and quality of welds; and methods used in correcting welding work; and with the following:
  1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
  2. Obtain fusion without undercut or overlap.
  3. Remove welding flux immediately.
  4. Finish welds at exposed connections so no roughness shows after finishing and so contours of welded surfaces match adjacent contours.

### 3.04 ADJUSTING

- A. Hanger Adjustments: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.
- B. Trim excess length of continuous-thread hanger and support rods to 1-1/2 inches.

### 3.05 PAINTING

- A. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

### 3.06 HANGER AND SUPPORT SCHEDULE

- A. Specific hanger and support requirements are in Sections specifying piping systems and equipment.
- B. Comply with MSS SP-69 for pipe-hanger selections and applications that are not specified in piping system Sections.
- C. Use hangers and supports with galvanized metallic coatings for piping and equipment that will not have field-applied finish.
- D. Use nonmetallic coatings on attachments for electrolytic protection where attachments are in direct contact with copper tubing.
- E. Use carbon-steel pipe hangers and supports, metal trapeze pipe hangers, and metal framing systems and attachments for general service applications.
- F. Use stainless-steel pipe hangers and stainless steel or corrosion resistant attachments for hostile environment applications or outside the building.
- G. Use copper-plated pipe hangers and copper or stainless-steel attachments for copper piping and tubing.
- H. Use padded hangers for piping that is subject to scratching.
- I. Use thermal-hanger shield inserts for insulated piping and tubing.
- J. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
  - 1. Adjustable, Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated, stationary pipes NPS 1/2 to NPS 30.
  - 2. U-Bolts (MSS Type 24): For support of heavy pipes NPS 1/2 to NPS 30.
  - 3. Pipe Saddle Supports (MSS Type 36): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or stainless-steel plate.
  - 4. Pipe Stanchion Saddles (MSS Type 37): For support of pipes NPS 4 to NPS 36, with steel-pipe base stanchion support and cast-iron floor flange or stainless-steel plate, and with U-bolt to retain pipe.
  - 5. Adjustable Pipe Saddle Supports (MSS Type 38): For stanchion-type support for pipes NPS 2-1/2 to NPS 36 if vertical adjustment is required, with steel-pipe base stanchion support and cast-iron floor flange.
  - 6. Single-Pipe Rolls (MSS Type 41): For suspension of pipes NPS 1 to NPS 30, from two rods if longitudinal movement caused by expansion and contraction might occur.
  - 7. Adjustable Roller Hangers (MSS Type 43): For suspension of pipes NPS 2-1/2 to NPS 24, from single rod if horizontal movement caused by expansion and contraction might occur.
  - 8. Complete Pipe Rolls (MSS Type 44): For support of pipes NPS 2 to NPS 42 if longitudinal movement caused by expansion and contraction might occur but

- vertical adjustment is not necessary.
9. Pipe Roll and Plate Units (MSS Type 45): For support of pipes NPS 2 to NPS 24 if small horizontal movement caused by expansion and contraction might occur and vertical adjustment is not necessary.
  10. Adjustable Pipe Roll and Base Units (MSS Type 46): For support of pipes NPS 2 to NPS 30 if vertical and lateral adjustment during installation might be required in addition to expansion and contraction.
- K. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers NPS 3/4 to NPS 24.
  2. Stainless-Steel Riser Clamps (MSS Type 42): For support of pipe risers NPS 3/4 to NPS 24 if longer ends are required for riser clamps.
- L. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches for heavy loads.
  2. Steel Clevises (MSS Type 14): For 120 to 450 deg F piping installations.
  3. Swivel Turnbuckles (MSS Type 15): For use with MSS Type 11, split pipe rings.
  4. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
  5. Steel Weldless Eye Nuts (MSS Type 17): For 120 to 450 deg F piping installations.
- M. Building Attachments: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel or Malleable Concrete Inserts (MSS Type 18): For upper attachment to suspend pipe hangers from concrete ceiling.
  2. Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joint construction, to attach to top flange of structural shape.
  3. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
  4. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
  5. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
  6. C-Clamps (MSS Type 23): For structural shapes.
  7. Top-Beam Clamps (MSS Type 25): For top of beams if hanger rod is required tangent to flange edge.
  8. Side-Beam Clamps (MSS Type 27): For bottom of steel I-beams.
  9. Steel-Beam Clamps with Eye Nuts (MSS Type 28): For attaching to bottom of steel I-beams for heavy loads.
  10. Linked-Steel Clamps with Eye Nuts (MSS Type 29): For attaching to bottom of steel I-beams for heavy loads, with link extensions.
  11. Malleable-Beam Clamps with Extension Pieces (MSS Type 30): For attaching to structural steel.
  12. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    - a. Light (MSS Type 31): 750 lb.
    - b. Medium (MSS Type 32): 1500 lb.
    - c. Heavy (MSS Type 33): 3000 lb.
  13. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
  14. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

15. Horizontal Travelers (MSS Type 58): For supporting piping systems subject to linear horizontal movement where headroom is limited.
- N. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Steel-Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
  2. Protection Shields (MSS Type 40): Of length recommended in writing by manufacturer to prevent crushing insulation.
  3. Thermal-Hanger Shield Inserts: For supporting insulated pipe.
- O. Spring Hangers and Supports: Unless otherwise indicated and except as specified in piping system Sections, install the following types:
1. Restraint-Control Devices (MSS Type 47): Where indicated to control piping movement.
  2. Spring Cushions (MSS Type 48): For light loads if vertical movement does not exceed 1-1/4 inches.
  3. Spring-Cushion Roll Hangers (MSS Type 49): For equipping Type 41, roll hanger with springs.
  4. Spring Sway Braces (MSS Type 50): To retard sway, shock, vibration, or thermal expansion in piping systems.
  5. Variable-Spring Hangers (MSS Type 51): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from hanger.
  6. Variable-Spring Base Supports (MSS Type 52): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from base support.
  7. Variable-Spring Trapeze Hangers (MSS Type 53): Preset to indicated load and limit variability factor to 25 percent to allow expansion and contraction of piping system from trapeze support.
  8. Constant Supports: For critical piping stress and if necessary to avoid transfer of stress from one support to another support, critical terminal, or connected equipment. Include auxiliary stops for erection, hydrostatic test, and load-adjustment capability. These supports include the following types:
    - a. Horizontal (MSS Type 54): Mounted horizontally.
    - b. Vertical (MSS Type 55): Mounted vertically.
    - c. Trapeze (MSS Type 56): Two vertical-type supports and one trapeze member.
- P. Comply with MSS SP-69 for trapeze pipe-hanger selections and applications that are not specified in piping system Sections.
- Q. Comply with MFMA-103 for metal framing system selections and applications that are not specified in piping system Sections.
- R. Use powder-actuated fasteners or mechanical-expansion anchors instead of building attachments where required in concrete construction.

**END OF SECTION**

**SECTION 23 05 48**  
**VIBRATION AND SEISMIC CONTROLS FOR HVAC****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. Elastomeric isolation pads.
  2. Elastomeric isolation mounts.
  3. Restrained elastomeric isolation mounts.
  4. Open-spring isolators.
  5. Housed-spring isolators.
  6. Restrained-spring isolators.
  7. Housed-restrained-spring isolators.
  8. Pipe-riser resilient supports.
  9. Resilient pipe guides.
  10. Elastomeric hangers.
  11. Spring hangers.
  12. Snubbers.
  13. Restraint channel bracings.
  14. Restraint cables.
  15. Seismic-restraint accessories.
  16. Mechanical anchor bolts.
  17. Adhesive anchor bolts.
- B. Related Requirements:
1. Section 220548 "Vibration and Seismic Controls for Plumbing" for devices for plumbing equipment and systems.

**1.03 DEFINITIONS**

- A. IBC: International Building Code.
- B. ICC-ES: ICC-Evaluation Service.
- C. OSHPD: Office of Statewide Health Planning & Development (for the State of California).

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
1. Include rated load, rated deflection, and overload capacity for each vibration isolation device.
  2. Illustrate and indicate style, material, strength, fastening provision, and finish for each type and size of vibration isolation device and seismic-restraint component required.
    - a. Tabulate types and sizes of seismic restraints, complete with report numbers and rated strength in tension and shear as evaluated by an evaluation service member of ICC-ES or OSHPD or an agency acceptable to authorities having jurisdiction.
    - b. Annotate to indicate application of each product submitted and compliance with requirements.
  3. Interlocking Snubbers: Include ratings for horizontal, vertical, and combined loads.

- B. Shop Drawings:
  - 1. Detail fabrication and assembly of equipment bases. Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
  - 2. Vibration Isolation Base Details: Detail fabrication including anchorages and attachments to structure and to supported equipment. Include adjustable motor bases, rails, and frames for equipment mounting.
- C. Delegated-Design Submittal: For each vibration isolation and seismic-restraint device.
  - 1. Include design calculations and details for selecting vibration isolators, seismic restraints, and vibration isolation bases complying with performance requirements, design criteria, and analysis data signed and sealed by the qualified professional engineer responsible for their preparation.
  - 2. Design Calculations: Calculate static and dynamic loading due to equipment weight, operation, and seismic and wind forces required to select vibration isolators and seismic and wind restraints and for designing vibration isolation bases.
    - a. Coordinate design calculations with wind load calculations required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.
  - 3. Riser Supports: Include riser diagrams and calculations showing anticipated expansion and contraction at each support point, initial and final loads on building structure, spring deflection changes, and seismic loads. Include certification that riser system was examined for excessive stress and that none exists.
  - 4. Seismic- and Wind-Restraint Details:
    - a. Design Analysis: To support selection and arrangement of seismic and wind restraints. Include calculations of combined tensile and shear loads.
    - b. Details: Indicate fabrication and arrangement. Detail attachments of restraints to the restrained items and to the structure. Show attachment locations, methods, and spacings. Identify components, list their strengths, and indicate directions and values of forces transmitted to the structure during seismic events. Indicate association with vibration isolation devices.
    - c. Coordinate seismic-restraint and vibration isolation details with wind-restraint details required for equipment mounted outdoors. Comply with requirements in other Sections for equipment mounted outdoors.
    - d. Preapproval and Evaluation Documentation: By an evaluation service member of ICC-ES or OSHPD or an agency acceptable to authorities having jurisdiction, showing maximum ratings of restraint items and the basis for approval (tests or calculations).

#### 1.05 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Show coordination of vibration isolation device installation and seismic bracing for HVAC piping and equipment with other systems and equipment in the vicinity, including other supports and restraints, if any.
- B. Qualification Data: For professional engineer and testing agency.
- C. Welding certificates.
- D. Field quality-control reports.

#### 1.06 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data



**1.07 QUALITY ASSURANCE**

- A. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is an NRTL as defined by OSHA in 29 CFR 1910.7 and that is acceptable to authorities having jurisdiction.
- B. Comply with seismic-restraint requirements in the IBC unless requirements in this Section are more stringent.
- C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."
- D. Seismic-restraint devices shall have horizontal and vertical load testing and analysis and shall bear anchorage preapproval OPA number from OSHPD, preapproval by ICC-ES, or preapproval by another agency acceptable to authorities having jurisdiction, showing maximum seismic-restraint ratings. Ratings based on independent testing are preferred to ratings based on calculations. If preapproved ratings are unavailable, submittals based on independent testing are preferred. Calculations (including combining shear and tensile loads) to support seismic-restraint designs must be signed and sealed by a qualified professional engineer.

**PART 2 - PRODUCTS****2.01 ELASTOMERIC ISOLATION PADS**

- A. Elastomeric Isolation Pads:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Ace Mountings Co., Inc.
    - b. California Dynamics Corporation.
    - c. Isolation Technology, Inc.
    - d. Kinetics Noise Control, Inc.
    - e. Mason Industries, Inc.
    - f. Vibration Eliminator Co., Inc.
    - g. Vibration Isolation.
    - h. Vibration Mountings & Controls, Inc.
  - 2. Fabrication: Single or multiple layers of sufficient durometer stiffness for uniform loading over pad area.
  - 3. Size: Factory or field cut to match requirements of supported equipment.
  - 4. Pad Material: Oil and water resistant with elastomeric properties.
  - 5. Surface Pattern: Smooth or Ribbed or Waffle pattern.
  - 6. Infused nonwoven cotton or synthetic fibers.
  - 7. Load-bearing metal plates adhered to pads.
  - 8. Sandwich-Core Material: Resilient and elastomeric.
    - a. Surface Pattern: Smooth or Ribbed or Waffle pattern.
    - b. Infused nonwoven cotton or synthetic fibers.

**2.02 ELASTOMERIC ISOLATION MOUNTS**

- A. Double-Deflection, Elastomeric Isolation Mounts:
  - 1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Ace Mountings Co., Inc.
    - b. California Dynamics Corporation.
    - c. Isolation Technology, Inc.
    - d. Kinetics Noise Control, Inc.
    - e. Mason Industries, Inc.
    - f. Vibration Eliminator Co., Inc.
    - g. Vibration Isolation.
    - h. Vibration Mountings & Controls, Inc.

2. Mounting Plates:
  - a. Top Plate: Encapsulated steel load transfer top plates, factory drilled and threaded with threaded studs or bolts.
  - b. Baseplate: Encapsulated steel bottom plates with holes provided for anchoring to support structure.
3. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

### 2.03 RESTRAINED ELASTOMERIC ISOLATION MOUNTS

- A. Restrained Elastomeric Isolation Mounts:
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Ace Mountings Co., Inc.
    - b. California Dynamics Corporation.
    - c. Isolation Technology, Inc.
    - d. Kinetics Noise Control, Inc.
    - e. Mason Industries, Inc.
    - f. Vibration Eliminator Co., Inc.
    - g. Vibration Isolation.
    - h. Vibration Mountings & Controls, Inc.
  2. Description: All-directional isolator with seismic restraints containing two separate and opposing elastomeric elements that prevent central threaded element and attachment hardware from contacting the housing during normal operation.
    - a. Housing: Cast-ductile iron or welded steel.
    - b. Elastomeric Material: Molded, oil-resistant rubber, neoprene, or other elastomeric material.

### 2.04 OPEN-SPRING ISOLATORS

- A. Freestanding, Laterally Stable, Open-Spring Isolators:
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Ace Mountings Co., Inc.
    - b. California Dynamics Corporation.
    - c. Isolation Technology, Inc.
    - d. Kinetics Noise Control, Inc.
    - e. Mason Industries, Inc.
    - f. Vibration Eliminator Co., Inc.
    - g. Vibration Isolation.
    - h. Vibration Mountings & Controls, Inc.
  2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  6. Baseplates: Factory-drilled steel plate for bolting to structure with an elastomeric isolator pad attached to the underside. Baseplates shall limit floor load to 500 psig.
  7. Top Plate and Adjustment Bolt: Threaded top plate with adjustment bolt and cap screw to fasten and level equipment.

### 2.05 HOUSED-SPRING ISOLATORS

- A. Freestanding, Laterally Stable, Open-Spring Isolators in Two-Part Telescoping Housing:
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

- a. Ace Mountings Co., Inc.
  - b. California Dynamics Corporation.
  - c. Isolation Technology, Inc.
  - d. Kinetics Noise Control, Inc.
  - e. Mason Industries, Inc.
  - f. Vibration Eliminator Co., Inc.
  - g. Vibration Isolation.
  - h. Vibration Mountings & Controls, Inc.
2. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  6. Two-Part Telescoping Housing: A steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators.
    - a. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig.
    - b. Top housing with attachment and leveling bolt or threaded mounting holes and internal leveling device or elastomeric pad.

## 2.06 RESTRAINED-SPRING ISOLATORS

- A. Freestanding, Laterally Stable, Open-Spring Isolators with Vertical-Limit Stop Restraint:
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Ace Mountings Co., Inc.
    - b. California Dynamics Corporation.
    - c. Isolation Technology, Inc.
    - d. Kinetics Noise Control, Inc.
    - e. Mason Industries, Inc.
    - f. Vibration Eliminator Co., Inc.
    - g. Vibration Isolation.
    - h. Vibration Mountings & Controls, Inc.
  2. Housing: Steel housing with vertical-limit stops to prevent spring extension due to weight being removed.
    - a. Base with holes for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig.
    - b. Top plate with threaded mounting holes or elastomeric pad.
    - c. Internal leveling bolt that acts as blocking during installation.
  3. Restraint: Limit stop as required for equipment and authorities having jurisdiction.
  4. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  5. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  6. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  7. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

## 2.07 HOUSED-RESTRAINED-SPRING ISOLATORS

- A. Freestanding, Steel, Open-Spring Isolators with Vertical-Limit Stop Restraint in Two-Part Telescoping Housing:
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Ace Mountings Co., Inc.
    - b. California Dynamics Corporation.
    - c. Isolation Technology, Inc.

- d. Kinetics Noise Control, Inc.
  - e. Mason Industries, Inc.
  - f. Vibration Eliminator Co., Inc.
  - g. Vibration Isolation.
  - h. Vibration Mountings & Controls, Inc.
2. Two-Part Telescoping Housing: A steel top and bottom frame separated by an elastomeric material and enclosing the spring isolators. Housings are equipped with adjustable or non-adjustable snubbers to limit vertical movement.
    - a. Drilled base housing for bolting to structure with an elastomeric isolator pad attached to the underside. Bases shall limit floor load to 500 psig.
    - b. Threaded top housing with adjustment bolt and cap screw to fasten and level equipment.
  3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.

## 2.08 PIPE-RISER RESILIENT SUPPORT

- A. Description: All-directional, acoustical pipe anchor consisting of two steel tubes separated by a minimum 1/2-inch- thick neoprene.
  1. Vertical-Limit Stops: Steel and neoprene vertical-limit stops arranged to prevent vertical travel in both directions.
  2. Maximum Load Per Support: 500 psig on isolation material providing equal isolation in all directions.

## 2.09 RESILIENT PIPE GUIDES

- A. Description: Telescopic arrangement of two steel tubes or post and sleeve arrangement separated by a minimum 1/2-inch- thick neoprene.
  1. Factory-Set Height Guide with Shear Pin: Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of motion to meet location requirements.

## 2.10 ELASTOMERIC HANGERS

- A. Elastomeric Mount in a Steel Frame with Upper and Lower Steel Hanger Rods:
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Ace Mountings Co., Inc.
    - b. California Dynamics Corporation.
    - c. Isolation Technology, Inc.
    - d. Kinetics Noise Control, Inc.
    - e. Mason Industries, Inc.
    - f. Vibration Eliminator Co., Inc.
    - g. Vibration Mountings & Controls, Inc.
  2. Frame: Steel, fabricated with a connection for an upper threaded hanger rod and an opening on the underside to allow for a maximum of 30 degrees of angular lower hanger-rod misalignment without binding or reducing isolation efficiency.
  3. Dampening Element: Molded, oil-resistant rubber, neoprene, or other elastomeric material with a projecting bushing for the underside opening preventing steel to steel contact.

**2.11 SPRING HANGERS**

- A. Combination Coil-Spring and Elastomeric-Insert Hanger with Spring and Insert in Compression:
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Ace Mountings Co., Inc.
    - b. California Dynamics Corporation.
    - c. Kinetics Noise Control, Inc.
    - d. Mason Industries, Inc.
    - e. Vibration Eliminator Co., Inc.
    - f. Vibration Isolation.
    - g. Vibration Mountings & Controls, Inc.
  2. Frame: Steel, fabricated for connection to threaded hanger rods and to allow for a maximum of 30 degrees of angular hanger-rod misalignment without binding or reducing isolation efficiency.
  3. Outside Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
  4. Minimum Additional Travel: 50 percent of the required deflection at rated load.
  5. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
  6. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
  7. Elastomeric Element: Molded, oil-resistant rubber or neoprene. Steel-washer-reinforced cup to support spring and bushing projecting through bottom of frame.
  8. Adjustable Vertical Stop: Steel washer with neoprene washer "up-stop" on lower threaded rod.
  9. Self-centering hanger-rod cap to ensure concentricity between hanger rod and support spring coil.

**2.12 SNUBBERS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Kinetics Noise Control, Inc.
  2. Mason Industries, Inc.
  3. Vibration Mountings & Controls, Inc.
- B. Description: Factory fabricated using welded structural-steel shapes and plates, anchor bolts, and replaceable resilient isolation washers and bushings.
1. Anchor bolts for attaching to concrete shall be seismic-rated, drill-in, and stud-wedge or female-wedge type.
  2. Resilient Isolation Washers and Bushings: Oil- and water-resistant neoprene.
  3. Maximum 1/4-inch air gap, and minimum 1/4-inch- thick resilient cushion.

**2.13 RESTRAINT CHANNEL BRACINGS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Cooper B-Line, Inc.
  2. Hilti, Inc.
  3. Mason Industries, Inc.
  4. Unistrut.
- B. Description: MFMA-4, shop- or field-fabricated bracing assembly made of slotted steel channels with accessories for attachment to braced component at one end and to building structure at the other end and other matching components and with corrosion-resistant coating; rated in tension, compression, and torsion forces.

**2.14 RESTRAINT CABLES**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Kinetics Noise Control, Inc.
  2. Loos & Co., Inc.
  3. Vibration Mountings & Controls, Inc.
- B. Restraint Cables: ASTM A 603 galvanized or ASTM A 492 stainless-steel cables. End connections made of steel assemblies with thimbles, brackets, swivel, and bolts designed for restraining cable service; with a minimum of two clamping bolts for cable engagement.

**2.15 SEISMIC-RESTRAINT ACCESSORIES**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Cooper B-Line, Inc.
  2. Kinetics Noise Control, Inc.
  3. Mason Industries, Inc.
  4. TOLCO.
- B. Hanger-Rod Stiffener: Steel tube or steel slotted-support-system sleeve with internally bolted connections or Reinforcing steel angle clamped to hanger rod.
- C. Hinged and Swivel Brace Attachments: Multifunctional steel connectors for attaching hangers to rigid channel bracings and restraint cables.
- D. Bushings for Floor-Mounted Equipment Anchor Bolts: Neoprene bushings designed for rigid equipment mountings, and matched to type and size of anchor bolts and studs.
- E. Bushing Assemblies for Wall-Mounted Equipment Anchorage: Assemblies of neoprene elements and steel sleeves designed for rigid equipment mountings, and matched to type and size of attachment devices used.
- F. Resilient Isolation Washers and Bushings: One-piece, molded, oil- and water-resistant neoprene, with a flat washer face.

**2.16 MECHANICAL ANCHOR BOLTS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Cooper B-Line, Inc.
  2. Hilti, Inc.
  3. Kinetics Noise Control, Inc.
  4. Mason Industries, Inc.
- B. Mechanical Anchor Bolts: Drilled-in and stud-wedge or female-wedge type in zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

**2.17 ADHESIVE ANCHOR BOLTS**

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Hilti, Inc.
  2. Kinetics Noise Control, Inc.
  3. Mason Industries, Inc.

- B. Adhesive Anchor Bolts: Drilled-in and capsule anchor system containing PVC or urethane methacrylate-based resin and accelerator, or injected polymer or hybrid mortar adhesive. Provide anchor bolts and hardware with zinc-coated steel for interior applications and stainless steel for exterior applications. Select anchor bolts with strength required for anchor and as tested according to ASTM E 488.

## 2.18 VIBRATION ISOLATION EQUIPMENT BASES

- A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - 1. California Dynamics Corporation.
  - 2. Kinetics Noise Control.
  - 3. Mason Industries, Inc.
  - 4. Vibration Eliminator Co., Inc.
  - 5. Vibration Isolation.
  - 6. Vibration Mountings & Controls, Inc.
- B. Steel Rails: Factory-fabricated, welded, structural-steel rails.
  - 1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide rails.
    - a. Include supports for suction and discharge elbows for pumps.
  - 2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Rails shall have shape to accommodate supported equipment.
  - 3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.
- C. Steel Bases: Factory-fabricated, welded, structural-steel bases and rails.
  - 1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.
    - a. Include supports for suction and discharge elbows for pumps.
  - 2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
  - 3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.
- D. Concrete Inertia Base: Factory-fabricated or field-fabricated, welded, structural-steel bases and rails ready for placement of cast-in-place concrete.
  - 1. Design Requirements: Lowest possible mounting height with not less than 1-inch clearance above the floor. Include equipment anchor bolts and auxiliary motor slide bases or rails.
    - a. Include supports for suction and discharge elbows for pumps.
  - 2. Structural Steel: Steel shapes, plates, and bars complying with ASTM A 36/A 36M. Bases shall have shape to accommodate supported equipment.
  - 3. Support Brackets: Factory-welded steel brackets on frame for outrigger isolation mountings and to provide for anchor bolts and equipment support.
  - 4. Fabrication: Fabricate steel templates to hold equipment anchor-bolt sleeves and anchors in place during placement of concrete. Obtain anchor-bolt templates from supported equipment manufacturer.

## PART 3 - EXECUTION

### 3.01 EXAMINATION

- A. Examine areas and equipment to receive vibration isolation and seismic- and wind-control devices for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

- B. Examine roughing-in of reinforcement and cast-in-place anchors to verify actual locations before installation.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 APPLICATIONS

- A. Multiple Pipe Supports: Secure pipes to trapeze member with clamps approved for application by an evaluation service member of ICC-ES or OSHPD or an agency acceptable to authorities having jurisdiction.
- B. Hanger-Rod Stiffeners: Install hanger-rod stiffeners where indicated or scheduled on Drawings to receive them and where required to prevent buckling of hanger rods due to seismic forces.
- C. Strength of Support and Seismic-Restraint Assemblies: Where not indicated, select sizes of components so strength is adequate to carry present and future static and seismic loads within specified loading limits.

### 3.03 VIBRATION CONTROL AND SEISMIC-RESTRAINT DEVICE INSTALLATION

- A. Coordinate the location of embedded connection hardware with supported equipment attachment and mounting points and with requirements for concrete reinforcement and formwork specified in Section 033000 "Cast-in-Place Concrete." Section 033053 "Miscellaneous Cast-in-Place Concrete."
- B. Installation of vibration isolators must not cause any change of position of equipment, piping, or ductwork resulting in stresses or misalignment.
- C. Equipment Restraints:
  - 1. Install seismic snubbers on HVAC equipment mounted on vibration isolators. Locate snubbers as close as possible to vibration isolators and bolt to equipment base and supporting structure.
  - 2. Install resilient bolt isolation washers on equipment anchor bolts where clearance between anchor and adjacent surface exceeds 0.125 inch.
  - 3. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES or OSHPD or an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- D. Piping Restraints:
  - 1. Comply with requirements in MSS SP-127.
  - 2. Space lateral supports a maximum of 40 feet o.c., and longitudinal supports a maximum of 80 feet o.c.
  - 3. Brace a change of direction longer than 12 feet.
- E. Install cables so they do not bend across edges of adjacent equipment or building structure.
- F. Install seismic-restraint devices using methods approved by an evaluation service member of ICC-ES or OSHPD or an agency acceptable to authorities having jurisdiction that provides required submittals for component.
- G. Install bushing assemblies for anchor bolts for floor-mounted equipment, arranged to provide resilient media between anchor bolt and mounting hole in concrete base.
- H. Install bushing assemblies for mounting bolts for wall-mounted equipment, arranged to provide resilient media where equipment or equipment-mounting channels are attached to wall.



- I. Attachment to Structure: If specific attachment is not indicated, anchor bracing to structure at flanges of beams, at upper truss chords of bar joists, or at concrete members.
- J. Drilled-in Anchors:
  - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcing or embedded items during coring or drilling. Notify the structural engineer if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
  - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
  - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
  - 4. Adhesive Anchors: Clean holes to remove loose material and drilling dust prior to installation of adhesive. Place adhesive in holes proceeding from the bottom of the hole and progressing toward the surface in such a manner as to avoid introduction of air pockets in the adhesive.
  - 5. Set anchors to manufacturer's recommended torque, using a torque wrench.
  - 6. Install zinc-coated steel anchors for interior and stainless-steel anchors for exterior applications.

### **3.04 ACCOMMODATION OF DIFFERENTIAL SEISMIC MOTION**

- A. Install flexible connections in piping where they cross seismic joints, where adjacent sections or branches are supported by different structural elements, and where the connections terminate with connection to equipment that is anchored to a different structural element from the one supporting the connections as they approach equipment. Comply with requirements in Section 232113 "Hydronic Piping" for piping flexible connections.

### **3.05 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Perform tests and inspections.
- C. Tests and Inspections:
  - 1. Provide evidence of recent calibration of test equipment by a testing agency acceptable to authorities having jurisdiction.
  - 2. Schedule test with Owner, through Architect, before connecting anchorage device to restrained component (unless post connection testing has been approved), and with at least seven days' advance notice.
  - 3. Obtain Architect's approval before transmitting test loads to structure. Provide temporary load-spreading members.
  - 4. Test at least four of each type and size of installed anchors and fasteners selected by Architect.
  - 5. Test to 90 percent of rated proof load of device.
  - 6. Measure isolator restraint clearance.
  - 7. Measure isolator deflection.
  - 8. Verify snubber minimum clearances.
- D. Remove and replace malfunctioning units and retest as specified above.
- E. Prepare test and inspection reports.

### **3.06 ADJUSTING**

- A. Adjust isolators after piping system is at operating weight.

- B. Adjust limit stops on restrained-spring isolators to mount equipment at normal operating height. After equipment installation is complete, adjust limit stops so they are out of contact during normal operation.

**END OF SECTION**

**SECTION 23 05 53**  
**IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT****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. Equipment labels.
  - 2. Warning signs and labels.
  - 3. Pipe labels.
  - 4. Stencils.
  - 5. Warning tags.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated.
- B. Samples: For color, letter style, and graphic representation required for each identification material and device.
- C. Equipment Label Schedule: Include a listing of all equipment to be labeled with the proposed content for each label.
- D. Valve numbering scheme.
- E. Valve Schedules: For each piping system to include in maintenance manuals.

**1.04 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****2.01 EQUIPMENT LABELS**

- A. Metal Labels for Equipment:
  - 1. Material and Thickness: Stainless steel, 0.025-inch, Aluminum, 0.032-inch and having predrilled or stamped holes for attachment hardware.
  - 2. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
  - 3. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch 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.
  - 4. Fasteners: Stainless-steel rivets or self-tapping screws.
  - 5. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. 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. Letter Color: White.
  - 3. Background Color: Black.

4. Maximum Temperature: Able to withstand temperatures up to 160 deg F.
  5. Minimum Label Size: Length and width vary for required label content, but not less than 2-1/2 by 3/4 inch.
  6. Minimum Letter Size: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch 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.
  7. Fasteners: Stainless-steel rivets or self-tapping screws.
  8. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- B. Label Content: Include equipment's Drawing designation or unique equipment number, Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified.
- C. Equipment Label Schedule: For each item of equipment to be labeled, on 8-1/2-by-11-inch bond paper. Tabulate equipment identification number and identify Drawing numbers where equipment is indicated (plans, details, and schedules), plus the Specification Section number and title where equipment is specified. Equipment schedule shall be included in operation and maintenance data.

## 2.02 WARNING SIGNS AND LABELS

- A. Material and Thickness: Multilayer, multicolor, plastic labels for mechanical engraving, 1/8 inch thick, and having predrilled holes for attachment hardware.
- B. Letter Color: Black.
- C. Background Color: White.
- 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: 1/4 inch for name of units if viewing distance is less than 24 inches, 1/2 inch 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 rivets or self-tapping screws.
- H. Adhesive: Contact-type permanent adhesive, compatible with label and with substrate.
- I. Label Content: Include caution and warning information, plus emergency notification instructions.

## 2.03 PIPE LABELS

- A. General Requirements for Manufactured Pipe Labels: Preprinted, color-coded, with lettering indicating service, and showing flow direction.
- B. Pretensioned Pipe Labels: Precoiled, semirigid plastic formed to cover full circumference of pipe and to attach to pipe without fasteners or adhesive.
- C. Self-Adhesive Pipe Labels: Printed plastic with contact-type, permanent-adhesive backing.
- D. Pipe Label Contents: Include identification of piping service using same designations or abbreviations as used on Drawings, pipe size, and an arrow indicating flow direction.

1. Flow-Direction Arrows: Integral with piping system service lettering to accommodate both directions, or as separate unit on each pipe label to indicate flow direction.
2. Lettering Size: At least 1-1/2 inches high.

#### **2.04 DUCT LABELS**

- A. Self-Adhesive Duct Labels: Printed plastic with contact-type, permanent-adhesive backing.
- B. Duct Label Contents: Include identification of duct service using same designations or abbreviations as used on Drawings, duct size, equipment name (i.e. AHU-1, etc.), and an arrow indicating flow direction.
  1. Flow-Direction Arrows: Integral with duct system service lettering to accommodate both directions, or as separate unit on each duct label to indicate flow direction.
  2. Lettering Size: At least 1-1/2 inches high.

#### **2.05 STENCILS**

- A. Stencils: Prepared with letter sizes according to ASME A13.1 for piping; minimum letter height of 1-1/4 inches for ducts; and minimum letter height of 3/4 inch for access panel and door labels, equipment labels, and similar operational instructions.
  1. Stencil Material: Aluminum, Brass, Fiberboard, or metal.
  2. Stencil Paint: Exterior, gloss, alkyd enamel or acrylic enamel black unless otherwise indicated. Paint may be in pressurized spray-can form.
  3. Identification Paint: Exterior, alkyd enamel or acrylic enamel in colors according to ASME A13.1 unless otherwise indicated.

#### **2.06 WARNING TAGS**

- A. Warning Tags: Preprinted or partially preprinted, accident-prevention tags, of plasticized card stock with matte finish suitable for writing.
  1. Size: 3 by 5-1/4 inches minimum, Approximately 4 by 7 inches.
  2. Fasteners: Brass grommet and wire.
  3. Nomenclature: Large-size primary caption such as "DANGER," "CAUTION," or "DO NOT OPERATE."
  4. Color: Yellow background with black lettering.

### **PART 3 EXECUTION**

#### **3.01 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.

#### **3.02 EQUIPMENT LABEL INSTALLATION**

- A. Install or permanently fasten labels on each major item of mechanical equipment.
- B. Locate equipment labels where accessible and visible.

#### **3.03 PIPE LABEL INSTALLATION**

- A. 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:
  1. Near each valve and control device.
  2. Near each branch connection, excluding short takeoffs for fixtures and terminal units. Where flow pattern is not obvious, mark each pipe at branch.
  3. Near penetrations through walls, floors, ceilings, and inaccessible enclosures.
  4. At access doors, manholes, and similar access points that permit view of concealed piping.

5. Near major equipment items and other points of origination and termination.
  6. Spaced at maximum intervals of 50 feet along each run. Reduce intervals to 25 feet in areas of congested piping and equipment.
  7. On piping above removable acoustical ceilings. Omit intermediately spaced labels.
- B. Pipe Label Color Schedule:
1. Condensate Piping:
    - a. Background Color: Green.
    - b. Letter Color: White.

### **3.04 DUCT LABEL INSTALLATION**

- A. Install self-adhesive duct labels with permanent adhesive on air ducts in the following color codes:
1. Blue: For supply ducts.
  2. Yellow: For return ducts.
  3. Green : For exhaust-, outside-, relief-air ducts.
- B. Locate labels near points where ducts enter into concealed spaces and at maximum intervals of 50 feet in each space where ducts are exposed or concealed by removable ceiling system.

### **3.05 WARNING-TAG INSTALLATION**

- A. Write required message on, and attach warning tags to, equipment and other items where required.

**END OF SECTION**

**SECTION 23 05 93**  
**TESTING, ADJUSTING, AND BALANCING FOR HVAC****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. Balancing Air Systems:
    - a. Constant-volume air systems.
    - b. Variable-air-volume systems.

**1.03 DEFINITIONS**

- A. AABC: Associated Air Balance Council.
- B. NEBB: National Environmental Balancing Bureau.
- C. TAB: Testing, adjusting, and balancing.
- D. TABB: Testing, Adjusting, and Balancing Bureau.
- E. TAB Specialist: An entity engaged to perform TAB Work.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: Within 30 days of Contractor's Notice to Proceed, submit documentation that the TAB contractor and this Project's TAB team members meet the qualifications specified in "Quality Assurance" Article.
- B. Contract Documents Examination Report: Within 30 days of Contractor's Notice to Proceed, submit the Contract Documents review report as specified in Part 3.
- C. Strategies and Procedures Plan: Within 30 days of Contractor's Notice to Proceed, submit TAB strategies and step-by-step procedures as specified in "Preparation" Article.
- D. Certified TAB reports.
- E. Sample report forms.
- F. Instrument calibration reports, to include the following:
  - 1. Instrument type and make.
  - 2. Serial number.
  - 3. Application.
  - 4. Dates of use.
  - 5. Dates of calibration.

**1.05 QUALITY ASSURANCE**

- A. TAB Contractor Qualifications: Engage a TAB entity certified by AABC, NEBB, or TABB.
  - 1. TAB Field Supervisor: Employee of the TAB contractor and certified by AABC, NEBB, or TABB.
  - 2. TAB Technician: Employee of the TAB contractor and who is certified by AABC, NEBB, or TABB as a TAB technician.
- B. Certify TAB field data reports and perform the following:
  - 1. Review field data reports to validate accuracy of data and to prepare certified TAB reports.

2. Certify that the TAB team complied with the approved TAB plan and the procedures specified and referenced in this Specification.
- C. TAB Report Forms: Use standard TAB contractor's forms approved by Architect or Engineer.
- D. Instrumentation Type, Quantity, Accuracy, and Calibration: As described in ASHRAE 111, Section 5, "Instrumentation."
- E. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- F. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.7.2.3 - "System Balancing."

#### **1.06 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.

#### **1.07 COORDINATION**

- A. Notice: Provide seven days' advance notice for each test. Include scheduled test dates and times.
- B. Perform TAB after leakage and pressure tests on air distribution systems have been satisfactorily completed.

#### **PART 2 - PRODUCTS (Not Applicable)**

#### **PART 3 - EXECUTION**

##### **3.01 EXAMINATION**

- A. Examine the Contract Documents to become familiar with Project requirements and to discover conditions in systems' designs that may preclude proper TAB of systems and equipment.
- B. Examine systems for installed balancing devices, such as test ports, gage cocks, thermometer wells, flow-control devices, and manual volume dampers. Verify that locations of these balancing devices are accessible.
- C. Examine the approved submittals for HVAC systems and equipment.
- D. Examine design data including HVAC system descriptions, statements of design assumptions for environmental conditions and systems' output, and statements of philosophies and assumptions about HVAC system and equipment controls.
- E. Examine equipment performance data including fan curves.
  1. Relate performance data to Project conditions and requirements, including system effects that can create undesired or unpredicted conditions that cause reduced capacities in all or part of a system.
  2. Calculate system-effect factors to reduce performance ratings of HVAC equipment when installed under conditions different from the conditions used to rate equipment performance. To calculate system effects for air systems, use tables and charts found in AMCA 201, "Fans and Systems," or in SMACNA's "HVAC Systems - Duct Design." Compare results with the design data and installed conditions.



- F. Examine system and equipment installations and verify that field quality-control testing, cleaning, and adjusting specified in individual Sections have been performed.
- G. Examine test reports specified in individual system and equipment Sections.
- H. Examine HVAC equipment and filters and verify that bearings are greased, belts are aligned and tight, and equipment with functioning controls is ready for operation.
- I. Examine operating safety interlocks and controls on HVAC equipment.
- J. 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.

### 3.02 PREPARATION

- A. Prepare a TAB plan that includes strategies and step-by-step procedures.
- B. Complete system-readiness checks and prepare reports. Verify the following:
  - 1. Permanent electrical-power wiring is complete.
  - 2. Automatic temperature-control systems are operational.
  - 3. Equipment and duct access doors are securely closed.
  - 4. Balance, smoke, and fire dampers are open.
  - 5. Isolating and balancing valves are open and control valves are operational.
  - 6. Ceilings are installed in critical areas where air-pattern adjustments are required and access to balancing devices is provided.
  - 7. Windows and doors can be closed so indicated conditions for system operations can be met.

### 3.03 GENERAL 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 Total System Balance", ASHRAE 111, NEBB's "Procedural Standards for Testing, Adjusting, and Balancing of Environmental Systems", SMACNA's "HVAC Systems - Testing, Adjusting, and Balancing" and in this Section.
  - 1. Comply with requirements in ASHRAE 62.1, Section 7.2.2 - "Air Balancing."
- B. Cut insulation, ducts, pipes, and equipment cabinets for installation of test probes to the minimum extent necessary for TAB procedures.
  - 1. After testing and balancing, patch probe holes in ducts with same material and thickness as used to construct ducts.
  - 2. After testing and balancing, install test ports and duct access doors that comply with requirements in Section 233300 "Air Duct Accessories."
  - 3. Install and join new insulation that matches removed materials. Restore insulation, coverings, vapor barrier, and finish according to Section 230713 "Duct Insulation," Section 230716 "HVAC Equipment Insulation," and Section 230719 "HVAC Piping Insulation."
- C. Mark equipment and balancing devices, including damper-control positions, valve position indicators, fan-speed-control levers, and similar controls and devices, with paint or other suitable, permanent identification material to show final settings.
- D. Take and report testing and balancing measurements in inch-pound (IP) units.

### 3.04 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. Prepare schematic diagrams of systems' "as-built" duct layouts.
- C. Determine the best locations in main and branch ducts for accurate duct-airflow measurements.
- D. Check airflow patterns from the outdoor-air louvers and dampers and the return- and exhaust-air dampers through the supply-fan discharge and mixing dampers.
- E. Locate start-stop and disconnect switches, electrical interlocks, and motor starters.
- F. Verify that motor starters are equipped with properly sized thermal protection.
- G. Check dampers for proper position to achieve desired airflow path.
- H. Check for airflow blockages.
- I. Check condensate drains for proper connections and functioning.
- J. Check for proper sealing of air-handling-unit components.
- K. Verify that air duct system is sealed as specified in Section 233113 "Metal Ducts."

### **3.05 PROCEDURES FOR CONSTANT-VOLUME AIR SYSTEMS**

- A. Adjust fans to deliver total indicated airflows within the maximum allowable fan speed listed by fan manufacturer.
  - 1. Measure total airflow.
    - a. Where sufficient space in ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow.
  - 2. Measure fan static pressures as follows to determine actual static pressure:
    - a. Measure outlet static pressure as far downstream from the fan as practical and upstream from restrictions in ducts such as elbows and transitions.
    - b. Measure static pressure directly at the fan outlet or through the flexible connection.
    - c. Measure inlet static pressure of single-inlet fans in the inlet duct as near the fan as possible, upstream from the flexible connection, and downstream from duct restrictions.
    - d. Measure inlet static pressure of double-inlet fans through the wall of the plenum that houses the fan.
  - 3. Measure static pressure across each component that makes up an air-handling unit, rooftop unit, and other air-handling and -treating equipment.
    - a. Report the cleanliness status of filters and the time static pressures are measured.
  - 4. Measure static pressures entering and leaving other devices, such as sound traps, heat-recovery equipment, and air washers, under final balanced conditions.
  - 5. Review Record Documents to determine variations in design static pressures versus actual static pressures. Calculate actual system-effect factors. Recommend adjustments to accommodate actual conditions.
  - 6. Do not make fan-speed adjustments that result in motor overload. Consult equipment manufacturers about fan-speed safety factors. Modulate dampers and measure fan-motor amperage to ensure that no overload will occur. Measure amperage in full-cooling, full-heating, economizer, and any other operating mode to determine the maximum required brake horsepower.
- B. Adjust volume dampers for main duct, submain ducts, and major branch ducts to indicated airflows within specified tolerances.

1. Measure airflow of submain and branch ducts.
    - a. Where sufficient space in submain and branch ducts is unavailable for Pitot-tube traverse measurements, measure airflow at terminal outlets and inlets and calculate the total airflow for that zone.
  2. Measure static pressure at a point downstream from the balancing damper, and adjust volume dampers until the proper static pressure is achieved.
  3. Remeasure each submain and branch duct after all have been adjusted. Continue to adjust submain and branch ducts to indicated airflows within specified tolerances.
- C. Measure air outlets and inlets without making adjustments.
1. Measure terminal outlets using a direct-reading hood or outlet manufacturer's written instructions and calculating factors.
- D. Adjust air outlets and inlets for each space to indicated airflows within specified tolerances of indicated values. Make adjustments using branch volume dampers rather than extractors and the dampers at air terminals.
1. Adjust each outlet in same room or space to within specified tolerances of indicated quantities without generating noise levels above the limitations prescribed by the Contract Documents.
  2. Adjust patterns of adjustable outlets for proper distribution without drafts.

### 3.06 PROCEDURES FOR MOTORS

- A. Motors, 1/2 HP and Larger: Test at final balanced conditions and record the following data:
1. Manufacturer's name, model number, and serial number.
  2. Motor horsepower rating.
  3. Motor rpm.
  4. Efficiency rating.
  5. Nameplate and measured voltage, each phase.
  6. Nameplate and measured amperage, each phase.
  7. Starter thermal-protection-element rating.
- B. Motors Driven by Variable-Frequency Controllers: Test for proper operation at speeds varying from minimum to maximum. Test the manual bypass of the controller to prove proper operation. Record observations including name of controller manufacturer, model number, serial number, and nameplate data.

### 3.07 PROCEDURES FOR CONDENSING UNITS

- A. Verify proper rotation of fans.
- B. Measure entering- and leaving-air temperatures.
- C. Record compressor data.

### 3.08 PROCEDURES FOR HEAT-TRANSFER COILS

- A. Measure, adjust, and record the following data for each electric heating coil:
1. Nameplate data.
  2. Airflow.
  3. Entering- and leaving-air temperature at full load.
  4. Voltage and amperage input of each phase at full load and at each incremental stage.
  5. Calculated kilowatt at full load.
  6. Fuse or circuit-breaker rating for overload protection.
- B. Measure, adjust, and record the following data for each refrigerant coil:
1. Dry-bulb temperature of entering and leaving air.
  2. Wet-bulb temperature of entering and leaving air.

3. Airflow.
4. Air pressure drop.
5. Refrigerant suction pressure and temperature.

**3.09 TOLERANCES**

- A. Set HVAC system's air flow rates within the following tolerances:
  1. Supply, Return, and Exhaust Fans and Equipment with Fans: Plus or minus 10 percent.
  2. Air Outlets and Inlets: Plus or minus 10 percent.

**3.10 REPORTING**

- A. Initial Construction-Phase Report: Based on examination of the Contract Documents as specified in "Examination" Article, prepare a report on the adequacy of design for systems' balancing devices. Recommend changes and additions to systems' balancing devices to facilitate proper performance measuring and balancing. Recommend changes and additions to HVAC systems and general construction to allow access for performance measuring and balancing devices.

**3.11 FINAL REPORT**

- A. General: Prepare a certified written report; tabulate and divide the report into separate sections for tested systems and balanced systems.
  1. Include a certification sheet at the front of the report's binder, signed and sealed by the certified testing and balancing engineer.
  2. Include a list of instruments used for procedures, along with proof of calibration.
- B. Final Report Contents: In addition to certified field-report data, include the following:
  1. Fan curves.
  2. Manufacturers' test data.
  3. Field test reports prepared by system and equipment installers.
  4. Other information relative to equipment performance; do not include Shop Drawings and product data.
- C. General Report Data: In addition to form titles and entries, include the following data:
  1. Title page.
  2. Name and address of the TAB contractor.
  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 supervisor who certifies the report.
  10. Table of Contents with the total number of pages defined for each section of the report. Number each page in the report.
  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's name, type, size, and fittings.
  14. Notes to explain why certain final data in the body of reports vary from indicated values.
  15. Test conditions for fan performance forms including the following:
    - a. Settings for outdoor-, return-, and exhaust-air dampers.
    - b. Conditions of filters.
    - c. Cooling coil, wet- and dry-bulb conditions.

- d. Face and bypass damper settings at coils.
  - e. Fan drive settings including settings and percentage of maximum pitch diameter.
  - f. Settings for supply-air, static-pressure controller.
  - g. 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 outdoor, supply, return, and exhaust airflows.
  - 2. Duct, outlet, and inlet sizes.
  - 3. Terminal units.
  - 4. Balancing stations.
  - 5. Position of balancing devices.
- E. Air-Handling-Unit Test Reports: For air-handling units with coils, include the following:
- 1. Unit Data:
    - a. Unit identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and unit size.
    - e. Manufacturer's serial number.
    - f. Unit arrangement and class.
    - g. Discharge arrangement.
    - h. Sheave make, size in inches, and bore.
    - i. Center-to-center dimensions of sheave, and amount of adjustments in inches.
    - j. Number, make, and size of belts.
    - k. Number, type, and size of filters.
  - 2. Motor Data:
    - a. Motor 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. Center-to-center dimensions of sheave, and amount of adjustments in inches.
  - 3. Test Data (Indicated and Actual Values):
    - a. Total air flow rate in cfm.
    - b. Total system static pressure in inches wg.
    - c. Fan rpm.
    - d. Discharge static pressure in inches wg.
    - e. Filter static-pressure differential in inches wg.
    - f. Preheat-coil static-pressure differential in inches wg.
    - g. Cooling-coil static-pressure differential in inches wg.
    - h. Heating-coil static-pressure differential in inches wg.
    - i. Outdoor airflow in cfm.
    - j. Return airflow in cfm.
    - k. Outdoor-air damper position.
    - l. Return-air damper position.
    - m. Vortex damper position.
    - n. Outdoor-air, wet and dry-bulb temperatures in deg F.
    - o. Return-air, wet and dry-bulb temperatures in deg F.
    - p. Entering-air, wet and dry-bulb temperatures in deg F.
    - q. Leaving-air, wet and dry-bulb temperatures in deg F.
    - r. Refrigerant expansion valve and refrigerant types.
    - s. Refrigerant suction pressure in psig.
    - t. Refrigerant suction temperature in deg F.u.
    - u. Average face velocity in fpm.

- F. Apparatus-Coil Test Reports:
1. Coil Data:
    - a. System identification.
    - b. Location.
    - c. Coil type.
    - d. Number of rows.
    - e. Fin spacing in fins per inch o.c.
    - f. Make and model number.
    - g. Face area in sq. ft.
    - h. Tube size in NPS.
    - i. Tube and fin materials.
    - j. Circuiting arrangement.
  2. Test Data (Indicated and Actual Values):
    - a. Air flow rate in cfm.
    - b. Average face velocity in fpm.
    - c. Air pressure drop in inches wg.
    - d. Outdoor-air, wet- and dry-bulb temperatures in deg F.
    - e. Return-air, wet- and dry-bulb temperatures in deg F.
    - f. Entering-air, wet- and dry-bulb temperatures in deg F.
    - g. Leaving-air, wet- and dry-bulb temperatures in deg F.
    - h. Refrigerant expansion valve and refrigerant types.
    - i. Refrigerant suction pressure in psig.
    - j. Refrigerant suction temperature in deg F.
    - k. Inlet steam pressure in psig.
- G. Electric-Coil Test Reports: For electric furnaces, duct coils, and electric coils installed in central-station air-handling units, include the following:
1. Unit Data:
    - a. System identification.
    - b. Location.
    - c. Coil identification.
    - d. Capacity in Btu/h.
    - e. Number of stages.
    - f. Connected volts, phase, and hertz.
    - g. Rated amperage.
    - h. Air flow rate in cfm.
    - i. Face area in sq. ft..
    - j. Minimum face velocity in fpm.
  2. Test Data (Indicated and Actual Values):
    - a. Heat output in Btu/h.
    - b. Air flow rate in cfm.
    - c. Air velocity in fpm.
    - d. Entering-air temperature in deg F.
    - e. Leaving-air temperature in deg F.
    - f. Voltage at each connection.
    - g. Amperage for each phase.
- H. Fan Test Reports: For supply, return, and exhaust fans, include the following:
1. Fan Data:
    - a. System identification.
    - b. Location.
    - c. Make and type.
    - d. Model number and size.
    - e. Manufacturer's serial number.
    - f. Arrangement and class.
    - g. Sheave make, size in inches, and bore.
    - h. Center-to-center dimensions of sheave, and amount of adjustments in

- inches.
- 2. Motor Data:
  - a. Motor 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. Center-to-center dimensions of sheave, and amount of adjustments in inches.
  - g. Number, make, and size of belts.
- 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.
- I. Round and Rectangular Duct Traverse Reports: Include a diagram with a grid representing the duct cross-section and record the following:
  - 1. Report Data:
    - a. System and air-handling-unit number.
    - b. Location and zone.
    - c. Traverse air temperature in deg F.
    - d. Duct static pressure in inches wg.
    - e. Duct size in inches.
    - f. Duct area in sq. ft..
    - g. Indicated air flow rate in cfm.
    - h. Indicated velocity in fpm.
    - i. Actual air flow rate in cfm.
    - j. Actual average velocity in fpm.
    - k. Barometric pressure in psig.
- J. Air-Terminal-Device Reports:
  - 1. Unit Data:
    - a. System and air-handling unit identification.
    - b. Location and zone.
    - c. Apparatus used for test.
    - d. Area served.
    - e. Make.
    - f. Number from system diagram.
    - g. Type and model number.
    - h. Size.
    - i. Effective area in sq. ft.
  - 2. Test Data (Indicated and Actual Values):
    - a. Air flow rate in cfm.
    - b. Air velocity in fpm.
    - c. Preliminary air flow rate as needed in cfm.
    - d. Preliminary velocity as needed in fpm.
    - e. Final air flow rate in cfm.
    - f. Final velocity in fpm.
    - g. Space temperature in deg F.
- K. System-Coil Reports: For reheat coils include the following:
  - 1. Unit Data:
    - a. System and air-handling-unit identification.
    - b. Location and zone.
    - c. Room or riser served.
    - d. Coil make and size.

- e. Flowmeter type.
- 2. Test Data (Indicated and Actual Values):
  - a. Air flow rate in cfm.
  - b. Entering-air temperature in deg F.
  - c. Leaving-air temperature in deg F.
- L. Instrument Calibration Reports:
  - 1. Report Data:
    - a. Instrument type and make.
    - b. Serial number.
    - c. Application.
    - d. Dates of use.
    - e. Dates of calibration.

### 3.12 INSPECTIONS

- A. Initial Inspection:
  - 1. After testing and balancing are complete, operate each system and randomly check measurements to verify that the system is operating according to the final test and balance readings documented in the final report.
  - 2. Check the following for each system:
    - a. Measure airflow of at least 10 percent of air outlets.
    - b. Measure room temperature at each thermostat/temperature sensor. Compare the reading to the set point.
    - c. Verify that balancing devices are marked with final balance position.
    - d. Note deviations from the Contract Documents in the final report.
- B. Final Inspection:
  - 1. After initial inspection is complete and documentation by random checks verifies that testing and balancing are complete and accurately documented in the final report, request that a final inspection be made by Architect or Engineer.
    - 2. The TAB contractor's test and balance engineer shall conduct the inspection in the presence of Architect or Engineer shall randomly select measurements, documented in the final report, to be rechecked. 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.
  - 3. If 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."
  - 4. 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.
- C. TAB Work will be considered defective if it does not pass final inspections. If TAB Work fails, proceed as follows:
  - 1. Recheck all measurements and make adjustments. Revise the final report and balancing device settings to include all changes; resubmit the final report and request a second final inspection.
  - 2. If the second final inspection also fails, Owner may contract the services of another TAB contractor to complete TAB Work according to the Contract Documents and deduct the cost of the services from the original TAB contractor's final payment.
- D. Prepare test and inspection reports.

### 3.13 ADDITIONAL TESTS

- A. Within 90 days of completing TAB, perform additional TAB to verify that balanced



conditions are being maintained throughout and to correct unusual conditions.

- B. Seasonal Periods: If initial TAB procedures were not performed during near-peak summer and winter conditions, perform additional TAB during near-peak summer and winter conditions.

**END OF SECTION**

**SECTION 23 07 13  
DUCT INSULATION****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 insulating the following duct services:
  - 1. Indoor, concealed exhaust and outdoor air.
  - 2. Indoor, exposed and outdoor air.
  - 3. Outdoor.
  - 4. Duct Liner.
- B. Related Sections:
  - 1. Section 230719 "HVAC Piping Insulation."
  - 2. Section 233113 "Metal Ducts".

**1.03 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 if any).
- B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.
  - 1. Detail application of protective shields, saddles, and inserts at hangers for each type of insulation and hanger.
  - 2. Detail insulation application at elbows, fittings, dampers, specialties and flanges for each type of insulation.
  - 3. Detail application of field-applied jackets.
  - 4. Detail application at linkages of control devices.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Qualification Data: For qualified Installer.
- B. Material Test Reports: From a qualified testing agency acceptable to authorities having jurisdiction indicating, interpreting, and certifying test results for compliance of insulation materials, sealers, attachments, cements, and jackets, with requirements indicated. Include dates of tests and test methods employed.
- C. Field quality-control reports.

**1.05 QUALITY ASSURANCE**

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the Department of Labor, Bureau of Apprenticeship and Training.
- 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. Flame-spread index of 25 or less, and smoke-developed index of 50 or less.

**1.06 DELIVERY, STORAGE, AND HANDLING**

- A. Packaging: Insulation material containers shall be marked by manufacturer with appropriate ASTM standard designation, type and grade, and maximum use temperature.

**1.07 COORDINATION**

- A. Coordinate sizes and locations of supports, hangers, and insulation shields specified in Section 230529 "Hangers and Supports for HVAC Piping and Equipment."
- B. Coordinate clearance requirements with duct Installer for duct insulation application. Before preparing ductwork Shop Drawings, establish and maintain clearance requirements for installation of insulation and field-applied jackets and finishes and for space required for maintenance.

**1.08 SCHEDULING**

- A. Schedule insulation application after pressure testing systems. Insulation application may begin on segments that have satisfactory test results.

**PART 2 PRODUCTS****2.01 INSULATION MATERIALS**

- A. Comply with requirements in "Duct Insulation Schedule, General," "Indoor Duct and Plenum Insulation Schedule," and "Aboveground, Outdoor Duct and Plenum Insulation Schedule" articles for where insulating materials shall be applied.
- B. Products shall not contain asbestos, lead, mercury, or mercury compounds.
- C. Products that come in contact with stainless steel shall have a leachable chloride content of less than 50 ppm when tested according to ASTM C 871.
- D. Insulation materials for use on austenitic stainless steel shall be qualified as acceptable according to ASTM C 795.
- E. Foam insulation materials shall not use CFC or HCFC blowing agents in the manufacturing process.
- F. Flexible Elastomeric Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type II for sheet materials.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Aeroflex USA, Inc.; Aerocel.
    - b. Armacell LLC; AP Armaflex.
    - c. K-Flex USA; Insul-Sheet, K-Flex Gray Duct Liner, and KFLEX LS.
- G. Mineral-Fiber Blanket Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 553, Type II and ASTM C 1290, Type III with factory-applied FSK jacket or Type III with factory-applied FSP jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. CertainTeed Corp.; SoftTouch Duct Wrap.
    - b. Johns Manville; Microlite.
    - c. Knauf Insulation; Friendly Feel Duct Wrap.
    - d. Manson Insulation Inc.; Alley Wrap.
    - e. Owens Corning; SOFTR All-Service Duct Wrap.
- H. Mineral-Fiber Board Insulation: Mineral or glass fibers bonded with a thermosetting resin. Comply with ASTM C 612, Type IA or Type IB. For duct and plenum applications, provide insulation with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. CertainTeed Corp.; Commercial Board.
    - b. Fibrex Insulations Inc.; FBX.

- c. Johns Manville; 800 Series Spin-Glas.
- d. Knauf Insulation; Insulation Board.
- e. Manson Insulation Inc.; AK Board.
- f. Owens Corning; Fiberglas 700 Series.

## 2.02 FIRE RATED INSULATION SYSTEMS

- A. Fire-Rated Board: Structural-grade, press-molded, xonolite calcium silicate, fireproofing board suitable for operating temperatures up to 1700 deg F. Comply with ASTM C 656, Type II, Grade 6. Tested and certified to provide a 2-hour fire rating by an NRTL acceptable to authorities having jurisdiction.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Johns Manville; Super Firetemp M.
    - b. Or Approved Equal.
- B. Fire-Rated Blanket: High-temperature, flexible, blanket insulation with FSK jacket that is tested and certified to provide a 2-hour fire rating by an NRTL acceptable to authorities having jurisdiction.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. CertainTeed Corp.; FlameChek.
    - b. Johns Manville; Firetemp Wrap.
    - c. Nelson Fire Stop Products; Nelson FSB Flameshield Blanket.
    - d. Thermal Ceramics; FireMaster Duct Wrap.
    - e. 3M; Fire Barrier Wrap Products.
    - f. Unifrax Corporation; FyreWrap.

## 2.02 ADHESIVES

- A. Materials shall be compatible with insulation materials, jackets, and substrates and for bonding insulation to itself and to surfaces to be insulated unless otherwise indicated.
- B. Flexible Elastomeric Adhesive: Comply with MIL-A-24179A, Type II, Class I.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Aeroflex USA, Inc.; Aerocel.
    - b. Armacell LLC; AP Armaflex.
    - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-75.K-Flex USA; R-373 Contact Adhesive.
- C. Mineral-Fiber Adhesive: Comply with MIL-A-3316C, Class 2, Grade A.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-127.Eagle Bridges - Marathon Industries; 225.
    - b. Foster Brand, Specialty Construction Brands, Inc., a business of H.B. Fuller Company; 85-60/85-70.Mon-Eco Industries, Inc.; 22-25.
  - 2. For indoor applications, adhesive shall have a VOC content of 80 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  - 3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- D. FSK Jacket Adhesive: Comply with MIL-A-3316C, Class 2, Grade A for bonding insulation jacket lap seams and joints.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B.

- Fuller Company; CP-82.
- b. Eagle Bridges - Marathon Industries; 225.
- c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 85-50. Mon-Eco Industries, Inc.; 22-25.
- 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).
- 3. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

**2.03 MASTICS**

- A. Materials shall be compatible with insulation materials, jackets, and substrates; comply with MIL-PRF-19565C, Type II.
  - 1. For indoor applications, use mastics that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Vapor-Barrier Mastic: Water based; suitable for indoor use on below ambient services.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-80/30-90.
    - b. Vimasco Corporation; 749.
  - 2. Water-Vapor Permeance: ASTM E 96/E 96M, 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, 58 percent by volume and 70 percent by weight.
  - 5. Color: White.
- C. Vapor-Barrier Mastic: Solvent based; suitable for outdoor use on below ambient services.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Encacel.
    - b. Eagle Bridges - Marathon Industries; 570.
    - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 60-95/60-96.
  - 2. Water-Vapor Permeance: ASTM F 1249, 0.05 perm at 30-mil dry film thickness.
  - 3. Service Temperature Range: Minus 50 to plus 220 deg F.
  - 4. Solids Content: ASTM D 1644, 33 percent by volume and 46 percent by weight.
  - 5. Color: White.
- D. Breather Mastic: Water based; suitable for indoor and outdoor use on above ambient services.
  - 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-10.
    - b. Eagle Bridges - Marathon Industries; 550.
    - c. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 46-50.
    - d. Mon-Eco Industries, Inc.; 55-50.
    - e. Vimasco Corporation; WC-1/WC-5.
  - 2. Water-Vapor Permeance: ASTM F 1249, 1.8 perms at 0.0625-inch dry film thickness.
  - 3. Service Temperature Range: Minus 20 to plus 180 deg F.
  - 4. Solids Content: 60 percent by volume and 66 percent by weight.

5. Color: White.

#### 2.04 LAGGING ADHESIVES

- A. Description: Comply with MIL-A-3316C, Class I, Grade A and shall be compatible with insulation materials, jackets, and substrates.
  1. For indoor applications, use lagging adhesives that have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  2. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-50 AHV2.Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 30-36.
    - b. Vimasco Corporation; 713 and 714.
  3. Fire-resistant, water-based lagging adhesive and coating for use indoors to adhere fire-resistant lagging cloths over duct insulation.
  4. Service Temperature Range: 0 to plus 180 deg F.
  5. Color: White.

#### 2.05 SEALANTS

- A. FSK and Metal Jacket Flashing Sealants:
  1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Childers Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; CP-76.Eagle Bridges - Marathon Industries; 405.
    - b. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; 95-44.
      - c. Mon-Eco Industries, Inc.; 44-05.
  2. Materials shall be compatible with insulation materials, jackets, and substrates.
  3. Fire- and water-resistant, flexible, elastomeric sealant.
  4. Service Temperature Range: Minus 40 to plus 250 deg F.
  5. Color: Aluminum.
  6. For indoor applications, sealants shall have a VOC content of 420 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  7. Sealants shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

#### 2.06 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
  1. Aluminum Jacket: Comply with ASTM B 209, Alloy 3003, 3005, 3105, or 5005, Temper H-14.
    - a. Factory cut and rolled to size.
    - b. Finish and thickness are indicated in field-applied jacket schedules.
    - c. Moisture Barrier for Outdoor Applications: 2.5-mil- thick polysurlyn.

#### 2.07 TAPES

- A. FSK Tape: Foil-face, vapor-retarder tape matching factory-applied jacket with acrylic adhesive; complying with ASTM C 1136.
  1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. ABI, Ideal Tape Division; 491 AWF FSK.
    - b. Avery Dennison Corporation, Specialty Tapes Division; Fasson 0827.
    - c. Compac Corporation; 110 and 111.
    - d. Venture Tape; 1525 CW NT, 1528 CW, and 1528 CW/SQ.
  2. Width: 3 inches.
  3. Thickness: 6.5 mils.
  4. Adhesion: 90 ounces force/inch in width.

5. Elongation: 2 percent.
6. Tensile Strength: 40 lbf/inch in width.
7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.

**2.08 SECUREMENTS**

- A. Bands:
  1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - a. ITW Insulation Systems; Gerrard Strapping and Seals.
    - b. RPR Products, Inc.; Insul-Mate Strapping, Seals, and Springs.
  2. Aluminum: ASTM B 209, Alloy 3003, 3005, 3105, or 5005; Temper H-14, 0.020 inch thick, 3/4 inch wide with wing seal or closed seal.
  3. Springs: Twin spring set constructed of stainless steel with ends flat and slotted to accept metal bands. Spring size determined by manufacturer for application.
- B. Insulation Pins and Hangers:
  1. Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- or 0.135-inch- diameter shank, length to suit depth of insulation indicated.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) AGM Industries, Inc.; CWP-1.
      - 2) GEMCO; CD.
      - 3) Midwest Fasteners, Inc.; CD.
      - 4) Nelson Stud Welding; TPA, TPC, and TPS.
  2. Cupped-Head, Capacitor-Discharge-Weld Pins: Copper- or zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.106-inch- or 0.135-inch-diameter shank, length to suit depth of insulation indicated with integral 1-1/2-inch galvanized carbon-steel washer.
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) AGM Industries, Inc.; CHP-1.
      - 2) GEMCO; Cupped Head Weld Pin.
      - 3) Midwest Fasteners, Inc.; Cupped Head.
      - 4) Nelson Stud Welding; CHP.
  3. Metal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
    - a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
      - 1) AGM Industries, Inc.; Tactoo Perforated Base Insul-Hangers.
      - 2) GEMCO; Perforated Base.
      - 3) Midwest Fasteners, Inc.; Spindle.
    - b. Baseplate: Perforated, galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
    - c. Spindle: Copper- or zinc-coated, low-carbon steel, Aluminum, Stainless steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
    - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
  4. Nonmetal, Adhesively Attached, Perforated-Base Insulation Hangers: Baseplate fastened to projecting spindle that is capable of holding insulation, of thickness

indicated, securely in position indicated when self-locking washer is in place.

Comply with the following requirements:

- a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) GEMCO; Nylon Hangers.
    - 2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.
  - b. Baseplate: Perforated, nylon sheet, 0.030 inch thick by 1-1/2 inches in diameter.
  - c. Spindle: Nylon, 0.106-inch- diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches.
  - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
5. Self-Sticking-Base Insulation Hangers: Baseplate welded to projecting spindle that is capable of holding insulation, of thickness indicated, securely in position indicated when self-locking washer is in place. Comply with the following requirements:
- a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) AGM Industries, Inc.; Tactoo Self-Adhering Insul-Hangers.
    - 2) GEMCO; Peel & Press.
    - 3) Midwest Fasteners, Inc.; Self Stick.
  - b. Baseplate: Galvanized carbon-steel sheet, 0.030 inch thick by 2 inches square.
  - c. Spindle: Copper- or zinc-coated, low-carbon steel, Aluminum, Stainless steel, fully annealed, 0.106-inch- diameter shank, length to suit depth of insulation indicated.
  - d. Adhesive-backed base with a peel-off protective cover.
6. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch-thick, galvanized-steel, aluminum, stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) AGM Industries, Inc.; RC-150.
    - 2) GEMCO; R-150.
    - 3) Midwest Fasteners, Inc.; WA-150.
    - 4) Nelson Stud Welding; Speed Clips.
  - b. Protect ends with capped self-locking washers incorporating a spring steel insert to ensure permanent retention of cap in exposed locations.
7. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.
- a. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - 1) GEMCO.
    - 2) Midwest Fasteners, Inc.
- C. Staples: Outward-clinching insulation staples, nominal 3/4-inch- wide, stainless steel or Monel.
- D. Wire: 0.080-inch nickel-copper alloy, 0.062-inch soft-annealed, stainless steel, or 0.062-inch soft-annealed, galvanized steel.



1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
  - a. C & F Wire.

## 2.09 DUCT LINER

- A. Fibrous duct liner in the airstream shall not be acceptable.
- B. Flexible Elastomeric Duct Liner: Preformed, cellular, closed-cell, sheet materials complying with ASTM C 534, Type II, Grade 1; and with NFPA 90A or NFPA 90B.
  1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Aeroflex USA Inc.
    - b. Armacell LLC.
    - c. Rubatex International, LLC
  2. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
  3. Liner Adhesive: As recommended by insulation manufacturer and complying with NFPA 90A or NFPA 90B.
    - a. 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).
    - b. Adhesive shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."
- C. Shop Application of Duct Liner: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 7-11, "Flexible Duct Liner Installation."
  1. Adhere a single layer of indicated thickness of duct liner with at least 90 percent adhesive coverage at liner contact surface area. Attaining indicated thickness with multiple layers of duct liner is prohibited.
  2. Apply adhesive to transverse edges of liner facing upstream that do not receive metal nosing.
  3. Butt transverse joints without gaps, and coat joint with adhesive.
  4. Fold and compress liner in corners of rectangular ducts or cut and fit to ensure butted-edge overlapping.
  5. Do not apply liner in rectangular ducts with longitudinal joints, except at corners of ducts, unless duct size and dimensions of standard liner make longitudinal joints necessary.
  6. Apply adhesive coating on longitudinal seams in ducts with air velocity of 2500 fpm.
  7. Secure liner with mechanical fasteners 4 inches from corners and at intervals not exceeding 12 inches transversely; at 3 inches from transverse joints and at intervals not exceeding 18 inches longitudinally.
  8. Secure transversely oriented liner edges facing the airstream with metal nosings that have either channel or "Z" profiles or are integrally formed from duct wall. Fabricate edge facings at the following locations:
    - a. Fan discharges.
    - b. Intervals of lined duct preceding unlined duct.
    - c. Upstream edges of transverse joints in ducts where air velocities are higher than 2500 fpm or where indicated.
  9. Secure insulation between perforated sheet metal inner duct of same thickness as specified for outer shell. Use mechanical fasteners that maintain inner duct at uniform distance from outer shell without compressing insulation.
    - a. Sheet Metal Inner Duct Perforations: 3/32-inch diameter, with an overall

- open area of 23 percent.
10. Terminate inner ducts with buildouts attached to fire-damper sleeves, dampers, turning vane assemblies, or other devices. Fabricated buildouts (metal hat sections) or other buildout means are optional; when used, secure buildouts to duct walls with bolts, screws, rivets, or welds.

### **PART 3 EXECUTION**

#### **3.01 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.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 PREPARATION**

- A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

#### **3.03 GENERAL INSTALLATION REQUIREMENTS**

- A. Install insulation materials, accessories, and finishes with smooth, straight, and even surfaces; free of voids throughout the length of ducts and fittings.
- B. Install insulation materials, vapor barriers or retarders, jackets, and thicknesses required for each item of duct system as specified in insulation system schedules.
- C. Install accessories compatible with insulation materials and suitable for the service. Install accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Install insulation with longitudinal seams at top and bottom of horizontal runs.
- E. Install multiple layers of insulation with longitudinal and end seams staggered.
- F. Keep insulation materials dry during application and finishing.
- G. Install insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by insulation material manufacturer.
- H. Install insulation with least number of joints practical.
- I. 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.
- J. Apply adhesives, mastics, and sealants at manufacturer's recommended coverage rate and wet and dry film thicknesses.
- K. Install insulation with factory-applied jackets as follows:
  1. Draw jacket tight and smooth.
  2. Cover circumferential joints with 3-inch- wide strips, of same material as

- insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches o.c.
3. Overlap jacket longitudinal seams at least 1-1/2 inches. Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches o.c.
    - a. For below ambient services, apply vapor-barrier mastic over staples.
  4. Cover joints and seams with tape, according to insulation material manufacturer's written instructions, to maintain vapor seal.
  5. Where vapor barriers are indicated, apply vapor-barrier mastic on seams and joints and at ends adjacent to duct flanges and fittings.
- L. Cut insulation in a manner to avoid compressing insulation more than 75 percent of its nominal thickness.
- M. Finish installation with systems at operating conditions. Repair joint separations and cracking due to thermal movement.
- N. Repair damaged insulation facings by applying same facing material over damaged areas. Extend patches at least 4 inches beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

### 3.04 PENETRATIONS

- A. Insulation Installation at Roof Penetrations: Install insulation continuously through roof penetrations.
1. Seal penetrations with flashing sealant.
  2. For applications requiring only indoor insulation, terminate insulation above roof surface and seal with joint sealant. For applications requiring indoor and outdoor insulation, install insulation for outdoor applications tightly joined to indoor insulation ends. Seal joint with joint sealant.
  3. Extend jacket of outdoor insulation outside roof flashing at least 2 inches below top of roof flashing.
  4. Seal jacket to roof flashing with flashing sealant.
- B. Insulation Installation at Interior Wall and Partition Penetrations (That Are Not Fire Rated): Install insulation continuously through walls and partitions.
- C. Insulation Installation at Fire-Rated Wall and Partition Penetrations: Terminate insulation at fire damper sleeves for fire-rated wall and partition penetrations. Externally insulate damper sleeves to match adjacent insulation and overlap duct insulation at least 2 inches.
1. Comply with requirements in Section 078413 "Penetration Firestopping" and fire-resistive joint sealers.

### 3.05 INSTALLATION OF FLEXIBLE ELASTOMERIC INSULATION

- A. 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.

### 3.06 INSTALLATION OF MINERAL-FIBER INSULATION

- A. Blanket Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
  2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
  3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
    - a. On duct sides with dimensions 18 inches and smaller, place pins along

- longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
      - b. On duct sides with dimensions larger than 18 inches, place pins 16 inches o.c. each way, and 3 inches maximum from insulation joints. Install additional pins to hold insulation tightly against surface at cross bracing.
      - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
      - d. Do not over compress insulation during installation.
      - e. Impale insulation over pins and attach speed washers.
      - f. Cut excess portion of pins extending beyond speed washers or bend parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
  4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
    - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
  5. Overlap unfaced blankets a minimum of 2 inches on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches o.c.
  6. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
  7. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.
- B. Board Insulation Installation on Ducts and Plenums: Secure with adhesive and insulation pins.
  1. Apply adhesives according to manufacturer's recommended coverage rates per unit area, for 100 percent coverage of duct and plenum surfaces.
  2. Apply adhesive to entire circumference of ducts and to all surfaces of fittings and transitions.
  3. Install either capacitor-discharge-weld pins and speed washers or cupped-head, capacitor-discharge-weld pins on sides and bottom of horizontal ducts and sides of vertical ducts as follows:
    - a. On duct sides with dimensions 18 inches and smaller, place pins along longitudinal centerline of duct. Space 3 inches maximum from insulation end joints, and 16 inches o.c.
    - b. On duct sides with dimensions larger than 18 inches, space pins 16 inches o.c. each way, and 3 inches maximum from joints. Install additional pins to hold insulation tightly against surface at cross bracing.
    - c. Pins may be omitted from top surface of horizontal, rectangular ducts and plenums.
    - d. Do not over compress insulation during installation.
    - e. Cut excess portion of pins extending beyond speed washers or bend

- parallel with insulation surface. Cover exposed pins and washers with tape matching insulation facing.
4. For ducts and plenums with surface temperatures below ambient, install a continuous unbroken vapor barrier. Create a facing lap for longitudinal seams and end joints with insulation by removing 2 inches from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch outward-clinching staples, 1 inch o.c. Install vapor barrier consisting of factory- or field-applied jacket, adhesive, vapor-barrier mastic, and sealant at joints, seams, and protrusions.
    - a. Repair punctures, tears, and penetrations with tape or mastic to maintain vapor-barrier seal.
    - b. Install vapor stops for ductwork and plenums operating below 50 deg F at 18-foot intervals. Vapor stops shall consist of vapor-barrier mastic applied in a Z-shaped pattern over insulation face, along butt end of insulation, and over the surface. Cover insulation face and surface to be insulated a width equal to two times the insulation thickness, but not less than 3 inches.
  5. Install insulation on rectangular duct elbows and transitions with a full insulation section for each surface. Groove and score insulation to fit as closely as possible to outside and inside radius of elbows. Install insulation on round and flat-oval duct elbows with individually mitered gores cut to fit the elbow.
  6. Insulate duct stiffeners, hangers, and flanges that protrude beyond insulation surface with 6-inch- wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches o.c.

### **3.07 FIELD-APPLIED JACKET INSTALLATION**

- A. Where metal jackets are indicated, install with 2-inch overlap at longitudinal seams and end joints. Overlap longitudinal seams arranged to shed water. Seal end joints with weatherproof sealant recommended by insulation manufacturer. Secure jacket with stainless-steel bands 12 inches o.c. and at end joints.

### **3.08 FIRE-RATED INSULATION SYSTEM INSTALLATION**

- A. Where fire-rated insulation system is indicated, secure system to ducts and duct hangers and supports to maintain a continuous fire rating.
- B. Insulate duct access panels and doors to achieve same fire rating as duct.
- C. Install firestopping at penetrations through fire-rated assemblies. Fire-stop systems are specified in Section 078413 "Penetration Firestopping."

### **3.09 FINISHES**

- A. Insulation with Paintable Jacket Material: Paint jacket with paint system identified below and as specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
  1. Flat Acrylic Finish: Two finish coats over a primer that is compatible with jacket material and finish coat paint. Add fungicidal agent to render fabric mildew proof.
    - a. Finish Coat Material: Interior, flat, latex-emulsion size.
- B. Flexible Elastomeric Thermal Insulation: After adhesive has fully cured, apply two coats of insulation manufacturer's recommended protective coating.
- C. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- D. Do not field paint aluminum or stainless-steel jackets.

### **3.10 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

- B. Perform tests and inspections.
- C. Tests and Inspections:
  - 1. Inspect ductwork, randomly selected by Architect, by removing field-applied jacket and insulation in layers in reverse order of their installation. Extent of inspection shall be limited to one location(s) for each duct system defined in the "Duct Insulation Schedule, General" Article.
- D. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

### 3.11 DUCT INSULATION SCHEDULE, GENERAL

- A. Plenums and Ducts Requiring Insulation:
  - 1. All supply, return, and outdoor air.
  - 2. Exhaust between isolation damper and penetration of building exterior.
- B. Items Not Insulated:
  - 1. Fibrous-glass ducts.
  - 2. Metal ducts with duct liner of sufficient thickness to comply with energy code and ASHRAE/IESNA 90.1.
  - 3. Factory-insulated flexible ducts.
  - 4. Factory-insulated plenums and casings.
  - 5. Flexible connectors.
  - 6. Vibration-control devices.
  - 7. Factory-insulated access panels and doors.
  - 8. Environmental air exhaust where energy recovery wheel is not present
  - 9. Where energy recovery wheel is present, environmental air exhaust after the wheel.

### 3.12 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed exhaust, supply, return, and outdoor-air duct and plenum insulation shall be the following:
  - 1. Mineral-Fiber Blanket: 2.2 inches thick and 0.75-lb/cu. ft. nominal density.
- B. Exposed exhaust supply, return, and outdoor-air duct in Utility and/or Spaces Below 8' Above Finished Floor, insulation shall be the following:
  - 1. Mineral-Fiber Board: 2 inches thick and 2-lb/cu. ft. nominal density.
- D. Exposed supply, return, and outdoor-air duct where indicated on the drawings or Metal Duct Specification to have single wall duct, insulation shall be the following:
  - 1. Mineral-Fiber Blanket: 2.2 inches thick and 0.75-lb/cu. ft. nominal density. Surface of insulation shall be prepared for painting to match adjacent surfaces, coordinate with architectural plans.
- E. Exposed supply, return, and outdoor-air duct where indicated on the drawings or Metal Duct Specifications to have double wall duct, liner shall be the following:
  - 1. If perforated inner duct is used: Flexible Elastomeric: 1 inch thick.
  - 2. If solid wall inner duct is used: Mineral-Fiber Blanket: 1 inches thick and 0.75-lb/cu. ft nominal density.

### 3.15 DUCT LINER

- A. Duct Liner:
  - 1. Return Air and Transfer Air Ducts: Flexible elastomeric, 1 inch thick.

**END OF SECTION**

**SECTION 233113  
METAL DUCTS****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. Single-wall rectangular ducts and fittings.
  2. Single-wall round ducts and fittings.
  3. Sheet metal materials.
  6. Sealants and gaskets.
  7. Hangers and supports.
  8. Seismic-restraint devices.
- B. Related Sections:
1. Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing requirements for metal ducts.
  2. Section 233300 "Air Duct Accessories" for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

**1.03 PERFORMANCE REQUIREMENTS**

- A. Delegated Duct Design: Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. Structural Performance: Duct hangers and supports and seismic restraints shall withstand the effects of gravity and seismic loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and ASCE/SEI 7. And SMACNA's "Seismic Restraint Manual: Guidelines for Mechanical Systems."
1. Seismic Hazard Level as stated on contract documents.
- C. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

**1.04 ACTION SUBMITTALS**

- A. Product Data: For each type of the following products:
1. Sealants and gaskets.
  2. Seismic-restraint devices.
- B. Shop Drawings:
1. Fabrication, assembly, and installation, including plans, elevations, sections, components, and attachments to other work.
  2. Factory- and shop-fabricated ducts and fittings.
  3. Duct layout indicating sizes, configuration, liner material, and static-pressure classes.
  4. Elevation of top of ducts.
  5. Dimensions of main duct runs from building grid lines.
  6. Fittings.
  7. Reinforcement and spacing.
  8. Seam and joint construction.
  9. Penetrations through fire-rated and other partitions.
  10. Equipment installation based on equipment being used on Project.
  11. Locations for duct accessories, including dampers, turning vanes, and access

- doors and panels.
12. Hangers and supports, including methods for duct and building attachment, seismic restraints, and vibration isolation.

### 1.05 INFORMATIONAL SUBMITTALS

- A. Coordination Drawings: Plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:
1. Duct installation in congested spaces, indicating coordination with general construction, building components, and other building services. Indicate proposed changes to duct layout.
  2. Suspended ceiling components.
  3. Structural members to which duct will be attached.
  4. Size and location of initial access modules for acoustical tile.
  5. Penetrations of smoke barriers and fire-rated construction.
  6. Items penetrating finished ceiling including the following:
    - a. Lighting fixtures.
    - b. Air outlets and inlets.
    - c. Speakers.
    - d. Sprinklers.
    - e. Access panels.
    - f. Perimeter moldings.
- B. Welding certificates.
- C. Field quality-control reports.

### 1.06 QUALITY ASSURANCE

- A. ASHRAE Compliance: Applicable requirements in ASHRAE 62.1, Section 5 - "Systems and Equipment" and Section 7 - "Construction and System Start-up."
- B. ASHRAE/IESNA Compliance: Applicable requirements in ASHRAE/IESNA 90.1, Section 6.4.4 - "HVAC System Construction and Insulation."

## PART 2 - PRODUCTS

### 2.01 SINGLE-WALL RECTANGULAR DUCTS AND FITTINGS

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" based on indicated static-pressure class unless otherwise indicated.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-1, "Rectangular Duct/Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 2-2, "Rectangular Duct/Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- D. Elbows, Transitions, Offsets, Branch Connections, and Other Duct Construction: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 4, "Fittings and Other Construction," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."



**2.02 SINGLE-WALL ROUND DUCTS AND FITTINGS**

- A. General Fabrication Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 3, "Round, Oval, and Flexible Duct," based on indicated static-pressure class unless otherwise indicated.
1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Lindab Inc.
    - b. McGill AirFlow LLC.
    - c. SEMCO Incorporated.
    - d. Sheet Metal Connectors, Inc.
    - e. Spiral Manufacturing Co., Inc.
    - f. Eastern Sheet Metal.
    - g. Hamlin Sheet Metal.
    - h. Turn Key Duct Systems.
- B. Transverse Joints: Select joint types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-1, "Round Duct Transverse Joints," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
1. Transverse Joints in Ducts Larger Than 60 Inches in Diameter: Flanged.
- C. Longitudinal Seams: Select seam types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-2, "Round Duct Longitudinal Seams," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
1. Fabricate round ducts larger than 90 inches in diameter with butt-welded longitudinal seams.
  2. Fabricate flat-oval ducts larger than 72 inches in width (major dimension) with butt-welded longitudinal seams.
- D. Tees and Laterals: Select types and fabricate according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees," for static-pressure class, applicable sealing requirements, materials involved, duct-support intervals, and other provisions in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."

**2.03 SHEET METAL MATERIALS**

- A. General Material Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.
- B. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
1. Galvanized Coating Designation: G60 or G90.
  2. Finishes for Surfaces Exposed to View: Mill phosphatized.
- C. Carbon-Steel Sheets: Comply with ASTM A 1008/A 1008M, with oiled, matte finish for exposed ducts.
- D. Stainless-Steel Sheets: Comply with ASTM A 480/A 480M, Type 304 or 316, as indicated in the "Duct Schedule" Article; cold rolled, annealed, sheet. Exposed surface finish shall be No. 2B, No. 2D, No. 3, or No. 4 as indicated in the "Duct Schedule" Article.
- E. Aluminum Sheets: Comply with ASTM B 209 Alloy 3003, H14 temper; with mill finish for concealed ducts, and standard, one-side bright finish for duct surfaces exposed to view.

- F. Factory- or Shop-Applied Antimicrobial Coating:
1. Apply to the surface of sheet metal that will form the interior surface of the duct. An untreated clear coating shall be applied to the exterior surface.
  2. Antimicrobial compound shall be tested for efficacy by an NRTL and registered by the EPA for use in HVAC systems.
  3. Coating containing the antimicrobial compound shall have a hardness of 2H, minimum, when tested according to ASTM D 3363.
  4. Surface-Burning Characteristics: Maximum flame-spread index of 25 and maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
  5. Shop-Applied Coating Color: Black or White.
  6. Antimicrobial coating on sheet metal is not required for duct containing liner treated with antimicrobial coating.
- G. Reinforcement Shapes and Plates: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
1. Where black- and galvanized-steel shapes and plates are used to reinforce aluminum ducts, isolate the different metals with butyl rubber, neoprene, or EPDM gasket materials.
- H. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

## 2.04 SEALANT AND GASKETS

- A. General Sealant and Gasket Requirements: Surface-burning characteristics for sealants and gaskets shall be a maximum flame-spread index of 25 and a maximum smoke-developed index of 50 when tested according to UL 723; certified by an NRTL.
- B. Two-Part Tape Sealing System:
1. Tape: Woven cotton fiber impregnated with mineral gypsum and modified acrylic/silicone activator to react exothermically with tape to form hard, durable, airtight seal.
  2. Tape Width: 3 inches.
  3. Sealant: Modified styrene acrylic.
  4. Water resistant.
  5. Mold and mildew resistant.
  6. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
  7. Service: Indoor and outdoor.
  8. Service Temperature: Minus 40 to plus 200 deg F.
  9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum.
  10. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- C. Water-Based Joint and Seam Sealant:
1. Application Method: Brush on.
  2. Solids Content: Minimum 65 percent.
  3. Shore A Hardness: Minimum 20.
  4. Water resistant.
  5. Mold and mildew resistant.
  6. VOC: Maximum 75 g/L (less water).
  7. Maximum Static-Pressure Class: 10-inch wg, positive and negative.
  8. Service: Indoor or outdoor.
  9. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- D. Solvent-Based Joint and Seam Sealant:

1. Application Method: Brush on.
  2. Base: Synthetic rubber resin.
  3. Solvent: Toluene and heptane.
  4. Solids Content: Minimum 60 percent.
  5. Shore A Hardness: Minimum 60.
  6. Water resistant.
  7. Mold and mildew resistant.
  8. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
  9. VOC: Maximum 395 g/L.
  11. Maximum Static-Pressure Class: 10-inch wg, positive or negative.
  12. Service: Indoor or outdoor.
  13. Substrate: Compatible with galvanized sheet steel (both PVC coated and bare), stainless steel, or aluminum sheets.
- E. Flanged Joint Sealant: Comply with ASTM C 920.
1. General: Single-component, acid-curing, silicone, elastomeric.
  2. Type: S.
  3. Grade: NS.
  4. Class: 25.
  5. Use: O.
  6. For indoor applications, sealant shall have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- F. Flange Gaskets: Butyl rubber, neoprene, or EPDM polymer with polyisobutylene plasticizer.
- G. Round Duct Joint O-Ring Seals:
1. Seal shall provide maximum leakage class of 3 cfm/100 sq. ft. at 1-inch wg and shall be rated for 10-inch wg static-pressure class, positive or negative.
  2. EPDM O-ring to seal in concave bead in coupling or fitting spigot.
  3. Double-lipped, EPDM O-ring seal, mechanically fastened to factory-fabricated couplings and fitting spigots.

## 2.05 HANGERS AND SUPPORTS

- A. Hanger Rods for Noncorrosive Environments: Cadmium-plated steel rods and nuts.
- B. Hanger Rods for Corrosive Environments: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.
- C. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct."
- D. Steel Cables for Galvanized-Steel Ducts: Galvanized steel complying with ASTM A 603.
- E. Steel Cables for Stainless-Steel Ducts: Stainless steel complying with ASTM A 492.
- F. Steel Cable End Connections: Cadmium-plated steel assemblies with brackets, swivel, and bolts designed for duct hanger service; with an automatic-locking and clamping device.
- G. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- H. Trapeze and Riser Supports:
1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
  2. Supports for Stainless-Steel Ducts: Stainless-steel shapes and plates.

3. Supports for Aluminum Ducts: Aluminum or galvanized steel coated with zinc chromate.

### **PART 3 EXECUTION**

#### **3.01 DUCT INSTALLATION**

- A. Drawing plans, schematics, and diagrams indicate general location and arrangement of duct system. Indicated duct locations, configurations, and arrangements were used to size ducts and calculate friction loss for air-handling equipment sizing and for other design considerations. Install duct systems as indicated unless deviations to layout are approved on Shop Drawings and Coordination Drawings.
- B. Install ducts according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" unless otherwise indicated.
- C. Install round and flat-oval ducts in maximum practical lengths.
- D. Install ducts with fewest possible joints.
- E. Install factory- or shop-fabricated fittings for changes in direction, size, and shape and for branch connections.
- F. Unless otherwise indicated, install ducts vertically and horizontally, and parallel and perpendicular to building lines.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Install ducts with a clearance of 1 inch, plus allowance for insulation thickness.
- I. Route ducts to avoid passing through transformer vaults and electrical equipment rooms and enclosures.
- J. Where ducts pass through non-fire-rated interior partitions and exterior walls and are exposed to view, cover the opening between the partition and duct or duct insulation with sheet metal flanges of same metal thickness as the duct. Overlap openings on four sides by at least 1-1/2 inches.
- K. Where ducts pass through non-fire-rated, interior partitions, fill void between duct and opening in wall with fiberglass insulation and sealant for acoustical separation.
- L. Where ducts pass through fire-rated interior partitions and exterior walls, install fire dampers. Comply with requirements in Section 233300 "Air Duct Accessories" for fire and smoke dampers.
- M. Protect duct interiors from moisture, construction debris and dust, and other foreign materials.

#### **3.02 INSTALLATION OF EXPOSED DUCTWORK**

- A. Protect ducts exposed in finished spaces from being dented, scratched, or damaged.
- B. Trim duct sealants flush with metal. Create a smooth and uniform exposed bead. Do not use two-part tape sealing system.
- C. Grind welds to provide smooth surface free of burrs, sharp edges, and weld splatter. When welding stainless steel with a No. 3 or 4 finish, grind the welds flush, polish the exposed welds, and treat the welds to remove discoloration caused by welding.
- D. Maintain consistency, symmetry, and uniformity in the arrangement and fabrication of

fittings, hangers and supports, duct accessories, and air outlets.

- E. Repair or replace damaged sections and finished work that does not comply with these requirements.

### 3.03 DUCT SEALING

- A. Seal ducts for duct static-pressure, seal classes, and leakage classes specified in "Duct Schedule" Article according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible."
- B. Seal ducts to the following seal classes according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible": See Schedule

### 3.04 HANGER AND SUPPORT INSTALLATION

- A. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Chapter 5, "Hangers and Supports."
- B. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
  - 1. Where practical, install concrete inserts before placing concrete.
  - 2. Install powder-actuated concrete fasteners after concrete is placed and completely cured.
  - 3. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches thick.
  - 4. Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches thick.
  - 5. Do not use powder-actuated concrete fasteners for seismic restraints.
- C. Hanger Spacing: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 5-1, "Rectangular Duct Hangers Minimum Size," and Table 5-2, "Minimum Hanger Sizes for Round Duct," for maximum hanger spacing; install hangers and supports within 24 inches of each elbow and within 48 inches of each branch intersection.
- D. Hangers Exposed to View: Threaded rod and angle or channel supports.
- E. Support vertical ducts with steel angles or channel secured to the sides of the duct with welds, bolts, sheet metal screws, or blind rivets; support at each floor and at a maximum intervals of 16 feet.
- F. Install upper attachments to structures. Select and size upper attachments with pull-out, tension, and shear capacities appropriate for supported loads and building materials where used.

### 3.05 SEISMIC-RESTRAINT-DEVICE INSTALLATION

- A. Install ducts with hangers and braces designed to support the duct and to restrain against seismic forces required by applicable building codes. Comply with requirements indicated in Seismic Specification.
- B. Select seismic-restraint devices with capacities adequate to carry present and future static and seismic loads.
- C. Install cables so they do not bend across edges of adjacent equipment or building structure.
- D. Install cable restraints on ducts that are suspended with vibration isolators.

- E. Attachment to Structure: If specific attachment is not indicated, anchor bracing and restraints to structure, to flanges of beams, to upper truss chords of bar joists, or to concrete members.
- F. Drilling for and Setting Anchors:
  - 1. Identify position of reinforcing steel and other embedded items prior to drilling holes for anchors. Do not damage existing reinforcement or embedded items during drilling. Notify the Architect if reinforcing steel or other embedded items are encountered during drilling. Locate and avoid prestressed tendons, electrical and telecommunications conduit, and gas lines.
  - 2. Do not drill holes in concrete or masonry until concrete, mortar, or grout has achieved full design strength.
  - 3. Wedge Anchors: Protect threads from damage during anchor installation. Heavy-duty sleeve anchors shall be installed with sleeve fully engaged in the structural element to which anchor is to be fastened.
  - 4. Set anchors to manufacturer's recommended torque, using a torque wrench.
  - 5. Install zinc-coated steel anchors for interior applications and stainless-steel anchors for applications exposed to weather.

### 3.06 CONNECTIONS

- A. Make connections to equipment with flexible connectors complying with Section 233300 "Air Duct Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

### 3.07 PAINTING

- A. Paint interior of metal ducts that are visible through registers and grilles and that do not have duct liner. Apply one coat of flat, black, latex paint over a compatible galvanized-steel primer. Paint materials and application requirements are specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

### 3.08 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. Leakage Tests:
  - 1. Comply with SMACNA's "HVAC Air Duct Leakage Test Manual." Submit a test report for each test.
  - 2. Test the following systems:
    - a. Ducts with a Pressure Class of 2-Inch wg or Higher: Test representative duct sections totaling no less than 50 percent of total installed duct area for each designated pressure class.
  - 3. Disassemble, reassemble, and seal segments of systems to accommodate leakage testing and for compliance with test requirements.
  - 4. Test for leaks before applying external insulation.
  - 5. Conduct tests at static pressures equal to maximum design pressure of system or section being tested. If static-pressure classes are not indicated, test system at maximum system design pressure. Do not pressurize systems above maximum design operating pressure.
  - 6. Give five days' advance notice for testing.
- C. Duct System Cleanliness Tests:
  - 1. Visually inspect duct system to ensure that no visible contaminants are present.
- D. Duct system will be considered defective if it does not pass tests and inspections.
- E. Prepare test and inspection reports.

**3.09 DUCT CLEANING**

- A. Clean new and existing duct system(s) before testing, adjusting, and balancing.
- B. Use service openings for entry and inspection.
  - 1. Create new openings and install access panels appropriate for duct static-pressure class if required for cleaning access. Provide insulated panels for insulated or lined duct. Patch insulation and liner as recommended by duct liner manufacturer. Comply with Section 233300 "Air Duct Accessories" for access panels and doors.
  - 2. Disconnect and reconnect flexible ducts as needed for cleaning and inspection.
  - 3. Remove and reinstall ceiling to gain access during the cleaning process.
- C. Particulate Collection and Odor Control:
  - 1. When venting vacuuming system inside the building, use HEPA filtration with 99.97 percent collection efficiency for 0.3-micron-size (or larger) particles.
  - 2. When venting vacuuming system to outdoors, use filter to collect debris removed from HVAC system, and locate exhaust downwind and away from air intakes and other points of entry into building.
- D. Clean the following components by removing surface contaminants and deposits:
  - 1. Air outlets and inlets (registers, grilles, and diffusers).
  - 2. Supply, return, and exhaust fans including fan housings, plenums (except ceiling supply and return plenums), scrolls, blades or vanes, shafts, baffles, dampers, and drive assemblies.
  - 3. Air-handling unit internal surfaces and components including mixing box, coil section, air wash systems, spray eliminators, condensate drain pans, humidifiers and dehumidifiers, filters and filter sections, and condensate collectors and drains.
  - 4. Coils and related components.
  - 5. Return-air ducts, dampers, actuators, and turning vanes except in ceiling plenums and mechanical equipment rooms.
  - 6. Supply-air ducts, dampers, actuators, and turning vanes.
  - 7. Dedicated exhaust and ventilation components and makeup air systems.
- E. Mechanical Cleaning Methodology:
  - 1. Clean metal duct systems using mechanical cleaning methods that extract contaminants from within duct systems and remove contaminants from building.
  - 2. Use vacuum-collection devices that are operated continuously during cleaning. Connect vacuum device to downstream end of duct sections so areas being cleaned are under negative pressure.
  - 3. Use mechanical agitation to dislodge debris adhered to interior duct surfaces without damaging integrity of metal ducts, duct liner, or duct accessories.
  - 4. Clean fibrous-glass duct liner with HEPA vacuuming equipment; do not permit duct liner to get wet. Replace fibrous-glass duct liner that is damaged, deteriorated, or delaminated or that has friable material, mold, or fungus growth.
  - 5. Clean coils and coil drain pans according to NADCA 1992. Keep drain pan operational. Rinse coils with clean water to remove latent residues and cleaning materials; comb and straighten fins.
  - 6. Provide drainage and cleanup for wash-down procedures.
  - 7. Antimicrobial Agents and Coatings: Apply EPA-registered antimicrobial agents if fungus is present. Apply antimicrobial agents according to manufacturer's written instructions after removal of surface deposits and debris.

**3.10 START UP**

- A. Air Balance: Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC."

**3.11 DUCT SCHEDULE**

- A. Fabricate ducts with galvanized sheet steel except as otherwise indicated.

B. Ductwork

Table 1: Recommended Ductwork Seal Levels by Duct Type (Current ASHRAE Handbook – Fundamentals)

Duct Location	Supply (less than or equal to 2 in-wg)	Supply (greater than to 2 in-wg)	Exhaust	Return
Outdoors	A	A	A	A
Unconditioned Spaces	B	A	B	B
Conditioned Spaces (concealed ductwork)	C	B	B	C
Conditioned Spaces (exposed ductwork)	A	A	B	B

Table 2: Duct Leakage Classification (Current ASHRAE Handbook – Fundamentals)

Duct Type	Sealed	Unsealed
Metal (flexible excluded) – Round and flat oval	3	30
Metal – Rectangular (less than or equal to 2 in-wg)	12	48
Metal – Rectangular (greater than 2 in-wg)	6	48
Flexible (metal, aluminum)	8	30

C. Intermediate Reinforcement:

1. Galvanized-Steel Ducts: Galvanized steel.
2. Stainless-Steel Ducts:
  - a. Exposed to Airstream: Match duct material.
  - b. Not Exposed to Airstream: Match duct material.
3. Aluminum Ducts: Aluminum.

D. Elbow Configuration:

1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-2, "Rectangular Elbows."
  - a. Radius Type RE 1 with minimum 1.5 radius-to-diameter ratio.



- b. Radius Type RE 3 with minimum 1.0 radius-to-diameter ratio and two vanes.
  - c. Mitered Type RE 2 with vanes complying with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-3, "Vanes and Vane Runners," and Figure 4-4, "Vane Support in Elbows."
2. Round Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-4, "Round Duct Elbows."
- a. Minimum Radius-to-Diameter Ratio and Elbow Segments: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Table 3-1, "Mitered Elbows." Elbows with less than 90-degree change of direction have proportionately fewer segments.
    - 1) Radius-to Diameter Ratio: 1.5.
  - b. Round Elbows, 12 Inches and Smaller in Diameter: Stamped or pleated.
  - c. Round Elbows, 14 Inches and Larger in Diameter: Standing seam.
- H. Branch Configuration:
- 1. Rectangular Duct: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 4-6, "Branch Connection."
    - a. Rectangular Main to Rectangular Branch: 45-degree entry.
    - b. Rectangular Main to Round Branch: Spin in.
  - 2. Round and Flat Oval: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible," Figure 3-5, "90 Degree Tees and Laterals," and Figure 3-6, "Conical Tees." Saddle taps are permitted in existing duct.
    - a. Velocity (less than 2 in-wg) 1000 fpm or Lower: 90-degree tap.
    - b. Velocity 1000 to 1500 fpm: Conical tap.
    - c. Velocity 1500 fpm or Higher: 45-degree lateral.

**END OF SECTION**

**SECTION 23 33 00**  
**AIR DUCT ACCESSORIES****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. Backdraft and pressure relief dampers.
  2. Barometric relief dampers.
  3. Manual volume dampers.
  4. Control dampers.
  5. Fire Dampers.
  6. Smoke Dampers.
  7. Combination fire and smoke dampers.
  8. Flange connectors.
  9. Turning Vanes.
  10. Duct-mounted access doors.
  11. Flexible connectors.
  12. Flexible ducts.
  13. Duct accessory hardware.
- B. Related Requirements:
1. Section 283111 "Digital, Addressable Fire-Alarm System" for duct-mounted fire and smoke detectors.
  2. Section 283112 "Zoned (DC-Loop) Fire-Alarm System" for duct-mounted fire and smoke detectors.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product.
1. For duct silencers, include pressure drop and dynamic insertion loss data. Include breakout noise calculations for high transmission loss casings.
- B. Shop Drawings: For duct accessories. Include plans, elevations, sections, details and attachments to other work.
1. Detail duct accessories fabrication and installation in ducts and other construction. Include dimensions, weights, loads, and required clearances; and method of field assembly into duct systems and other construction. Include the following:
    - a. Special fittings.
    - b. Manual volume damper installations.
    - c. Fire-damper, smoke-damper, combination fire- and smoke-damper installations, including sleeves; and duct-mounted access doors and remote damper operators.
    - d. Wiring Diagrams: For power, signal, and control wiring.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted access panels and access doors required for access to duct accessories are shown and coordinated with each other, using input from Installers of the items involved.
- B. Source quality-control reports.

**1.05 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For air duct accessories to include in operation and maintenance manuals.

**PART 2 - PRODUCTS****2.01 ASSEMBLY DESCRIPTION**

- A. Comply with NFPA 90A, "Installation of Air Conditioning and Ventilating Systems," and with NFPA 90B, "Installation of Warm Air Heating and Air Conditioning Systems."
- B. Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for acceptable materials, material thicknesses, and duct construction methods unless otherwise indicated. Sheet metal materials shall be free of pitting, seam marks, roller marks, stains, discolorations, and other imperfections.

**2.02 MATERIALS**

- A. Galvanized Sheet Steel: Comply with ASTM A 653/A 653M.
  - 1. Galvanized Coating Designation: G60.
  - 2. Exposed-Surface Finish: Mill phosphatized.
- B. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts; compatible materials for aluminum and stainless-steel ducts.
- C. Tie Rods: Galvanized steel, 1/4-inch minimum diameter for lengths 36 inches or less; 3/8-inch minimum diameter for lengths longer than 36 inches.

**2.03 BACKDRAFT AND PRESSURE RELIEF DAMPERS**

- A. Description: Gravity balanced.
- B. Maximum Air Velocity: 2000 fpm.
- C. Maximum System Pressure: 2-inch wg.
- D. Frame: Hat-shaped, 0.05-inch- thick, galvanized sheet steel with welded corners or mechanically attached and mounting flange.
- E. Blades: Multiple single-piece blades, center pivoted, maximum 6-inch width, 0.025-inch-thick, roll-formed aluminum with sealed edges.
- F. Blade Action: Parallel.
- G. Blade Seals: Vinyl foam.
- H. Blade Axles:
  - 1. Material: Galvanized steel.
  - 2. Diameter: 0.20 inch.
- I. Tie Bars and Brackets: Aluminum or Galvanized steel
- J. Return Spring: Adjustable tension.
- K. Bearings: Steel ball or synthetic pivot bushings.
- L. Accessories:
  - 1. Adjustment device to permit setting for varying differential static pressure.
  - 2. Counterweights and spring-assist kits for vertical airflow installations.
  - 3. Electric actuators.
  - 4. Chain pulls.
  - 5. Screen Mounting: Front mounted in sleeve.
    - a. Sleeve Thickness: 20 gage minimum.
    - b. Sleeve Length: 6 inches minimum.
  - 6. Screen Mounting: Rear mounted.

7. Screen Material: Aluminum.
8. Screen Type: Insect.
9. 90-degree stops.

**2.04 BAROMETRIC RELIEF DAMPERS**

- A. Suitable for horizontal or vertical mounting.
- B. Maximum Air Velocity: 1250 fpm.
- C. Maximum System Pressure: 2-inch wg.
- D. Frame: Hat-shaped, [0.05-inch- thick, galvanized sheet steel, with welded corners or mechanically attached and mounting flange.
- E. Blades:
  1. Multiple, 0.025-inch- thick, roll-formed aluminum.
  2. Maximum Width: 6 inches.
  3. Action: Parallel.
  4. Balance: Gravity.
- F. Blade Seals: Vinyl
- G. Blade Axels: Galvanized steel.
- H. Tie Bars and Brackets:
  1. Material: Galvanized steel.
  2. Rattle free with 90-degree stop.
- I. Return Spring: Adjustable tension.
- J. Bearings: Synthetic.
- K. Accessories:
  1. Flange on intake.
  2. Adjustment device to permit setting for varying differential static pressures.

**2.05 MANUAL VOLUME DAMPERS**

- A. Standard, Aluminum, Manual Volume Dampers:
  1. Standard leakage rating, with linkage outside airstream.
  3. Suitable for horizontal or vertical applications.
  4. Frames:
    - a. Hat-shaped, 0.094-inch- thick, galvanized sheet steel.
    - b. Mitered and welded corners.
    - c. Flanges for attaching to walls and flangeless frames for installing in ducts.
  5. Blades:
    - a. Multiple or single blade.
    - b. Parallel- or opposed-blade design.
    - c. Stiffen damper blades for stability.
    - d. Galvanized-steel, 0.064 inch thick.
  6. Blade Axles: Galvanized steel.
  7. Bearings:
    - a. Oil-impregnated bronze.
    - b. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
  8. Tie Bars and Brackets: Galvanized steel.

**2.06 CONTROL DAMPERS**

- A. Low-leakage rating, with linkage outside airstream, and bearing AMCA's Certified Ratings Seal for both air performance and air leakage.
- B. Frames:
  - 1. Hat shaped.
  - 2. 0.094-inch- thick, galvanized sheet steel.
  - 3. Mitered and welded corners.
- D. Blades:
  - 1. Multiple blade with maximum blade width of 6 inches.
  - 2. Parallel and/or Opposed-blade design.
  - 3. Galvanized-steel.
  - 4. 0.064 inch thick single skin or 0.0747-inch- thick dual skin.
  - 5. Blade Edging: Closed-cell neoprene.
  - 6. Blade Edging: Inflatable seal blade edging, or replaceable rubber seals.
- E. Blade Axles: 1/2-inch- diameter; galvanized steel; blade-linkage hardware of zinc-plated steel and brass; ends sealed against blade bearings.
  - 1. Operating Temperature Range: From minus 40 to plus 200 deg F.
- F. Bearings:
  - 1. Oil-impregnated bronze.
  - 2. Dampers in ducts with pressure classes of 3-inch wg or less shall have axles full length of damper blades and bearings at both ends of operating shaft.
  - 3. Thrust bearings at each end of every blade.

**2.07 FIRE DAMPERS**

- A. Type: Dynamic; rated and labeled according to UL 555 by an NRTL.
- B. Closing rating in ducts up to 4-inch wg static pressure class and minimum 2000-fpm velocity.
- C. Fire Rating: 1-1/2 and 3 hours.
- D. Frame: Curtain type with blades outside airstream; fabricated with roll-formed, 0.034-inch- thick galvanized steel; with mitered and interlocking corners.
- E. Mounting Sleeve: Factory- or field-installed, galvanized sheet steel.
  - 1. Minimum Thickness: 0.138 inch thick, as indicated, and of length to suit application.
  - 2. Exception: Omit sleeve where damper-frame width permits direct attachment of perimeter mounting angles on each side of wall or floor; thickness of damper frame must comply with sleeve requirements.
- F. Mounting Orientation: Vertical or horizontal as indicated.
- G. Blades: Roll-formed, interlocking, 0.024-inch- thick, galvanized sheet steel. In place of interlocking blades, use full-length, 0.034-inch- thick, galvanized-steel blade connectors.
- H. Horizontal Dampers: Include blade lock and stainless-steel closure spring.
- I. Heat-Responsive Device: Replaceable, 165 deg F rated, fusible links.
- J. Heat-Responsive Device: Replaceable link and switch package, factory installed, 165 deg F rated.

**2.08 SMOKE DAMPERS**

- A. General Requirements: Label according to UL 555S by an NRTL.
- B. Smoke Detector: Integral, factory wired for single-point connection.
- C. Frame: Hat-shaped, 0.094-inch- thick, galvanized sheet steel, with welded interlocking, gusseted or mechanically attached corners.
- D. Blades: Roll-formed, horizontal, interlocking or overlapping, 16 gauge, galvanized sheet steel.
- E. Leakage: Class I
- F. Rated pressure and velocity to exceed design airflow conditions.
- G. Mounting Sleeve: Factory-installed, 20 gauge, galvanized sheet steel; length to suit wall or floor application with factory-furnished silicone caulking.
- H. Damper Motors: Modulating or two-position action.
  - 1. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
  - 2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Section 230900 "Instrumentation and Control for HVAC."
  - 3. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
  - 4. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf and breakaway torque rating of 150 in. x lbf.
  - 5. Outdoor Motors and Motors in Outdoor-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F.
  - 6. Nonspring-Return Motors: For dampers larger than 25 sq. ft., size motor for running torque rating of 150 in. x lbf and breakaway torque rating of 300 in. x lbf.
  - 7. Electrical Connection: 115 V, single phase, 60 Hz.
- J. Accessories:
  - 1. Auxiliary switches for signaling position indication.
  - 2. Test and reset switches, damper mounted.

**2.09 COMBINATION FIRE AND SMOKE DAMPERS**

- A. Type: Dynamic; rated and labeled according to UL 555 and UL 555S by an NRTL.
- B. Closing rating in ducts up to 4-inch wg static pressure class and minimum 2000-fpm velocity.
- C. Fire Rating: 1-1/2 and 3 hours.
- D. Frame: Hat-shaped, 16 gauge, galvanized sheet steel, with welded, interlocking, gusseted or mechanically attached corners.
- E. Heat-Responsive Device: Replaceable, 165 deg F rated, fusible links.
- F. Smoke Detector: Integral, factory wired for single-point connection.

- G. Blades: Roll-formed, horizontal, interlocking or overlapping, 16 gauge, galvanized sheet steel.
- H. Leakage: Class I.
- I. Rated pressure and velocity to exceed design airflow conditions.
- J. Mounting Sleeve: Factory-installed, 20 gauge, galvanized sheet steel; length to suit wall or floor application with factory-furnished silicone caulking.
- K. Master control panel for use in dynamic smoke-management systems.
- L. Damper Motors: Modulating or two-position action.
- M. Comply with NEMA designation, temperature rating, service factor, enclosure type, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
  - 1. Motor Sizes: Minimum size as indicated. If not indicated, large enough so driven load will not require motor to operate in service factor range above 1.0.
  - 2. Controllers, Electrical Devices, and Wiring: Comply with requirements for electrical devices and connections specified in Section 230900 "Instrumentation and Control for HVAC."
  - 3. Permanent-Split-Capacitor or Shaded-Pole Motors: With oil-immersed and sealed gear trains.
  - 4. Spring-Return Motors: Equip with an integral spiral-spring mechanism where indicated. Enclose entire spring mechanism in a removable housing designed for service or adjustments. Size for running torque rating of 150 in. x lbf and breakaway torque rating of 150 in. x lbf.
  - 5. Outdoor Motors and Motors in Outdoor-Air Intakes: Equip with O-ring gaskets designed to make motors weatherproof. Equip motors with internal heaters to permit normal operation at minus 40 deg F.
  - 6. Nonspring-Return Motors: For dampers larger than 25 sq. ft., size motor for running torque rating of 150 in. x lbf and breakaway torque rating of 300 in. x lbf.
  - 7. Electrical Connection: 115 V, single phase, 60 Hz.
- N. Accessories:
  - 1. Auxiliary switches for signaling position indication.
  - 2. Test and reset switches, damper mounted.

## 2.10 FLANGE CONNECTORS

- A. Description: Add-on or roll-formed, factory-fabricated, slide-on transverse flange connectors, gaskets, and components.
- B. Material: Galvanized steel.
- C. Gage and Shape: Match connecting ductwork.

## 2.11 TURNING VANES

- A. Manufactured Turning Vanes for Metal Ducts: Curved blades of galvanized sheet steel; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.
  - 1. Acoustic Turning Vanes: Fabricate airfoil-shaped aluminum extrusions with perforated faces and fibrous-glass fill.
- B. Manufactured Turning Vanes for Nonmetal Ducts: Fabricate curved blades of resin-bonded fiberglass with acrylic polymer coating; support with bars perpendicular to blades set; set into vane runners suitable for duct mounting.

- C. General Requirements: Comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 4-3, "Vaness and Vane Runners," and 4-4, "Vane Support in Elbows."
- D. Vane Construction: **Single** wall.
- E. Vane Construction: Single wall for ducts up to 48 inches wide and double wall for larger dimensions.

## 2.12 DUCT-MOUNTED ACCESS DOORS

- A. Duct-Mounted Access Doors: Fabricate access panels according to SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"; Figures 7-2, "Duct Access Doors and Panels," and 7-3, "Access Doors - Round Duct."
  - 1. Door:
    - a. Double wall, rectangular.
    - b. Galvanized sheet metal with insulation fill and thickness as indicated for duct pressure class.
    - c. Vision panel.
    - d. Hinges and Latches: 1-by-1-inch butt or piano hinge and cam latches.
    - e. Fabricate doors airtight and suitable for duct pressure class.
  - 2. Frame: Galvanized sheet steel, with bend-over tabs and foam gaskets.
  - 3. Number of Hinges and Locks:
    - a. Access Doors Less Than 12 Inches Square: No hinges and two sash locks.
    - b. Access Doors up to 18 Inches Square: Continuous and two sash locks.
    - c. Access Doors up to 24 by 48 Inches: Continuous and two compression latches with outside and inside handles.
    - d. Access Doors Larger Than 24 by 48 Inches: Continuous and two compression latches with outside and inside handles.

## 2.13 FLEXIBLE CONNECTORS

- A. Materials: Flame-retardant or noncombustible fabrics.
- B. Coatings and Adhesives: Comply with UL 181, Class 1.
- C. Metal-Edged Connectors: Factory fabricated with a fabric strip 3-1/2 inches wide attached to two strips of 2-3/4-inch- wide, 0.028-inch- thick, galvanized sheet steel or 0.032-inch- thick aluminum sheets. Provide metal compatible with connected ducts.
- D. Indoor System, Flexible Connector Fabric: Glass fabric double coated with neoprene.
  - 1. Minimum Weight: 26 oz./sq. yd..
  - 2. Tensile Strength: 480 lbf/inch in the warp and 360 lbf/inch in the filling.
  - 3. Service Temperature: Minus 40 to plus 200 deg F.
- E. Outdoor System, Flexible Connector Fabric: Glass fabric double coated with weatherproof, synthetic rubber resistant to UV rays and ozone.
  - 1. Minimum Weight: 24 oz./sq. yd.
  - 2. Tensile Strength: 530 lbf/inch in the warp and 440 lbf/inch in the filling.
  - 3. Service Temperature: Minus 50 to plus 250 deg F.
- F. High-Corrosive-Environment System, Flexible Connectors: Glass fabric with chemical-resistant coating.
  - 1. Minimum Weight: 14 oz./sq. yd.
  - 2. Tensile Strength: 450 lbf/inch in the warp and 340 lbf/inch in the filling.
  - 3. Service Temperature: Minus 67 to plus 500 deg F.
- G. Thrust Limits: Combination coil spring and elastomeric insert with spring and insert in



compression, and with a load stop. Include rod and angle-iron brackets for attaching to fan discharge and duct.

1. Frame: Steel, fabricated for connection to threaded rods and to allow for a maximum of 30 degrees of angular rod misalignment without binding or reducing isolation efficiency.
2. Outdoor Spring Diameter: Not less than 80 percent of the compressed height of the spring at rated load.
3. Minimum Additional Travel: 50 percent of the required deflection at rated load.
4. Lateral Stiffness: More than 80 percent of rated vertical stiffness.
5. Overload Capacity: Support 200 percent of rated load, fully compressed, without deformation or failure.
6. Elastomeric Element: Molded, oil-resistant rubber or neoprene.
7. Coil Spring: Factory set and field adjustable for a maximum of 1/4-inch movement at start and stop.

## 2.14 FLEXIBLE DUCTS

- A. Insulated, Flexible Duct: UL 181, Class 1, 2-ply vinyl film supported by helically wound, spring-steel wire; fibrous-glass insulation; aluminized vapor-barrier film.
  1. Pressure Rating: 10-inch wg positive and 1.0-inch wg negative.
  2. Maximum Air Velocity: 4000 fpm.
  3. Temperature Range: Minus 10 to plus 160 deg F.
  4. Insulation R-value: Comply with ASHRAE/IESNA 90.1.
- B. Flexible Duct Connectors:
  1. Clamps: Stainless-steel band with cadmium-plated hex screw to tighten band with a worm-gear action or Nylon strap in sizes 3 through 18 inches, to suit duct size.
  2. Non-Clamp Connectors: Adhesive plus sheet metal screws.

## 2.15 DUCT ACCESSORY HARDWARE

- A. Instrument Test Holes: Cast iron or cast aluminum to suit duct material, including screw cap and gasket. Size to allow insertion of pitot tube and other testing instruments and of length to suit duct-insulation thickness.
- B. Adhesives: High strength, quick setting, neoprene based, waterproof, and resistant to gasoline and grease.

## PART 3 EXECUTION

### 3.01 INSTALLATION

- A. Install duct accessories according to applicable details in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" for metal ducts and in NAIMA AH116, "Fibrous Glass Duct Construction Standards," for fibrous-glass ducts.
- B. Install duct accessories of materials suited to duct materials; use galvanized-steel accessories in galvanized-steel and fibrous-glass ducts, stainless-steel accessories in stainless-steel ducts, and aluminum accessories in aluminum ducts.
- C. Install backdraft dampers at inlet of exhaust fans or exhaust ducts as close as possible to exhaust fan unless otherwise indicated.
- D. Install volume dampers at points on supply, return, and exhaust systems where branches extend from larger ducts. Where dampers are installed in ducts having duct liner, install dampers with hat channels of same depth as liner, and terminate liner with nosing at hat channel.
  1. Install steel volume dampers in steel ducts.
  2. Install aluminum volume dampers in aluminum ducts.
- E. Set dampers to fully open position before testing, adjusting, and balancing.

- F. Install test holes at fan inlets and outlets and elsewhere as indicated.
- G. Install fire and smoke dampers according to UL listing.
- H. Install duct access doors on sides of ducts to allow for inspecting, adjusting, and maintaining accessories and equipment at the following locations:
  - 1. On both sides of duct coils.
  - 2. Upstream and downstream from duct filters.
  - 3. At outdoor-air intakes and mixed-air plenums.
  - 4. At drain pans and seals.
  - 5. Downstream from manual volume dampers, control dampers, backdraft dampers, and equipment.
  - 6. At each change in direction and at maximum 50-foot spacing.
  - 7. Control devices requiring inspection.
  - 8. Elsewhere as indicated.
- I. Install access doors with swing against duct static pressure.
- J. Access Door Sizes:
  - 1. One-Hand or Inspection Access: 8 by 5 inches.
  - 2. Two-Hand Access: 12 by 6 inches.
  - 3. Head and Hand Access: 18 by 10 inches.
  - 4. Head and Shoulders Access: 21 by 14 inches.
  - 5. Body Access: 25 by 14 inches.
  - 6. Body plus Ladder Access: 25 by 17 inches.
- K. Label access doors according to Section 230553 "Identification for HVAC Piping and Equipment" to indicate the purpose of access door.
- L. Install flexible connectors to connect ducts to equipment.
- M. For fans developing static pressures of 5-inch wg and more, cover flexible connectors with loaded vinyl sheet held in place with metal straps.
- N. Connect terminal units to supply ducts directly or with maximum 12-inch lengths of flexible duct. Do not use flexible ducts to change directions.
- O. Connect diffusers to ducts directly or with maximum 60-inch lengths of flexible duct clamped or strapped in place.
- P. Connect flexible ducts to metal ducts with adhesive plus sheet metal screws.
- Q. Install duct test holes where required for testing and balancing purposes.
- R. Install thrust limits at centerline of thrust, symmetrical on both sides of equipment. Attach thrust limits at centerline of thrust and adjust to a maximum of 1/4-inch movement during start and stop of fans.

### 3.02 FIELD QUALITY CONTROL

- A. Tests and Inspections:
  - 1. Operate dampers to verify full range of movement.
  - 2. Inspect locations of access doors and verify that purpose of access door can be performed.
  - 3. Operate fire, smoke, and combination fire and smoke dampers to verify full range of movement and verify that proper heat-response device is installed.
  - 4. Inspect turning vanes for proper and secure installation.
  - 5. Operate remote damper operators to verify full range of movement of operator

and damper.

**END OF SECTION**

**SECTION 23 34 13  
HVAC FANS****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. Ceiling-mounted ventilators.

**1.03 ACTION SUBMITTALS**

- B. Product Data: For each type of product.
  - 1. Include rated capacities, furnished specialties, and accessories for each fan.
  - 2. Certified fan performance curves with system operating conditions indicated.
  - 3. Certified fan sound-power ratings.
  - 4. Motor ratings and electrical characteristics, plus motor and electrical accessories.
  - 5. Material thickness and finishes, including color charts.
  - 6. Dampers, including housings, linkages, and operators.
  - 7. Fan speed controllers.
- C. Shop Drawings:
  - 1. Include plans, elevations, sections, 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. Include diagrams for power, signal, and control wiring.
  - 4. Design Calculations: Calculate requirements for selecting vibration isolators and seismic restraints and for designing vibration isolation bases.
  - 5. Vibration Isolation Base Details: Detail fabrication, including anchorages and attachments to structure and to supported equipment. Include auxiliary motor slides and rails, and base weights.
- D. Delegated-Design Submittal: For unit hangers and supports indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Retain "Coordination Drawings" Paragraph below for situations where limited space necessitates maximum utilization for efficient installation of different components or if coordination is required for installation of products and materials by separate installers. Coordinate paragraph with other Sections specifying products listed below. Preparation of coordination drawings requires the participation of each trade involved in installations within the limited space.

- B. Coordination Drawings: Show fan room layout and relationships between components and adjacent structural and mechanical elements. Show support locations, type of support, and weight on each support. Indicate and certify field measurements. Reflected ceiling plans and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
  - 1. Roof framing and support members relative to duct penetrations.
  - 2. Ceiling suspension assembly members.
  - 3. Size and location of initial access modules for acoustical tile.
  - 4. Ceiling-mounted items including light fixtures, diffusers, grilles, speakers, sprinklers, access panels and special moldings.
- C. Field quality-control reports.

#### **1.05 CLOSEOUT SUBMITTALS**

- A. Operation and Maintenance Data: For axial fans to include in emergency, operation, and maintenance manuals.

#### **1.06 QUALITY ASSURANCE**

- 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. AMCA Compliance: Fans shall have AMCA-Certified performance ratings and shall bear the AMCA-Certified Ratings Seal.
- C. UL Standards: Power ventilators shall comply with UL 705. Power ventilators for use for restaurant kitchen exhaust shall also comply with UL 762.

#### **1.07 COORDINATION**

- A. Coordinate size and location of structural-steel support members.
- B. Coordinate sizes and locations of concrete bases with actual equipment provided.
- C. Coordinate sizes and locations of roof curbs, equipment supports, and roof penetrations with actual equipment provided.

### **PART 2 - PRODUCTS**

#### **2.01 PERFORMANCE REQUIREMENTS**

- A. AMCA Compliance:
  - 1. Comply with AMCA performance requirements and bear the AMCA-Certified Ratings Seal.
  - 2. Operating Limits: Classify according to AMCA 99.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

**2.02 IN-LINE CENTRIFUGAL FANS**

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
  - 1. Acme Engineering & Manufacturing Corporation.
  - 2. Greenheck Fan Corporation.
  - 3. Loren Cook Company.
  - 4. PennBarry.
- B. Housing: Split, spun aluminum with aluminum straightening vanes, inlet and outlet flanges, and support bracket adaptable to floor, side wall, or ceiling mounting.
- C. Direct-Drive Units: Motor mounted in airstream, factory wired to disconnect switch located on outside of fan housing; with wheel, inlet cone, and motor on swing-out service door.
- D. Fan Wheels: Aluminum, airfoil blades welded to aluminum hub.
- E. Accessories:
  - 1. Variable-Speed Controller: Solid-state control to reduce speed from 100 to less than 50 percent.
  - 2. Volume-Control Damper: Manually operated with quadrant lock, located in fan outlet.
  - 3. Companion Flanges: For inlet and outlet duct connections.
  - 4. Fan Guards: 1/2- by 1-inch mesh of galvanized steel in removable frame. Provide guard for inlet or outlet for units not connected to ductwork.
  - 5. Motor and Drive Cover (Belt Guard): Epoxy-coated steel.

**2.03 MOTORS**

- A. Comply with NEMA designation, temperature rating, service factor, and efficiency requirements for motors specified in Section 230513 "Common Motor Requirements for HVAC Equipment."
- B. Enclosure Type: Totally enclosed, fan cooled.

**2.04 SOURCE QUALITY CONTROL**

- C. Sound-Power Level Ratings: Comply with AMCA 301, "Methods for Calculating Fan Sound Ratings from Laboratory Test Data." Factory test fans according to AMCA 300, "Reverberant Room Method for Sound Testing of Fans." Label fans with the AMCA-Certified Ratings Seal.
- D. Fan Performance Ratings: Establish flow rate, pressure, power, air density, speed of rotation, and efficiency by factory tests and ratings according to AMCA 210/ASHRAE 51, "Laboratory Methods of Testing Fans for Certified Aerodynamic Performance Rating."

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Install fans level and plumb.
- B. Disassemble and reassemble units, as required for moving to the final location, according to manufacturer's written instructions.
- C. Lift and support units with manufacturer's designated lifting or supporting points.
- D. Equipment Mounting:
  - 1. Comply with requirements for vibration isolation and seismic control devices specified in Section 230548 "Vibration and Seismic Controls for HVAC."
- E. Ceiling Units: Suspend units from structure; use steel wire or metal straps.
- F. Install units with clearances for service and maintenance.
- G. Label fans according to requirements specified in Section 230553 "Identification for HVAC Piping and Equipment."

**3.2 CONNECTIONS**

- A. Drawings indicate general arrangement of ducts and duct accessories. Make final duct connections with flexible connectors. Flexible connectors are specified in Section 233300 "Air Duct Accessories."
- B. Ground equipment according to Section 260526 "Grounding and Bonding for Electrical Systems."
- C. Connect wiring according to Section 260519 "Low-Voltage Electrical Power Conductors and Cables."
- D. Install ducts adjacent to fans to allow service and maintenance.
- E. Install piping from scroll drain connection, with trap with seal equal to 1.5 times specified static pressure, to nearest floor drain with pipe sizes matching the drain connection.

**3.03 FIELD QUALITY CONTROL**

- A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.
- B. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.
- C. Perform the following tests and inspections:
  - 1. Verify that shipping, blocking, and bracing are removed.
  - 2. Verify that unit is secure on mountings and supporting devices and that connections to ducts and electrical components are complete. Verify that proper thermal-overload protection is installed in motors, starters, and disconnect switches.

3. Verify that cleaning and adjusting are complete.
  4. Disconnect fan drive from motor, verify proper motor rotation direction, and verify fan wheel free rotation and smooth bearing operation. Reconnect fan drive system, align and adjust belts, and install belt guards.
  5. Adjust belt tension.
  6. Adjust damper linkages for proper damper operation.
  7. Verify lubrication for bearings and other moving parts.
  8. Verify that manual and automatic volume control and fire and smoke dampers in connected ductwork systems are in fully open position.
  9. Disable automatic temperature-control operators, energize motor and confirm proper motor rotation and unit operation, adjust fan to indicated rpm, and measure and record motor voltage and amperage.
  10. Shut unit down and reconnect automatic temperature-control operators.
  11. Remove and replace malfunctioning units and retest as specified above.
- D. Test and adjust controls and safeties. Controls and equipment will be considered defective if they do not pass tests and inspections.
- E. Prepare test and inspection reports.

#### **3.04 ADJUSTING**

- F. Adjust damper linkages for proper damper operation.
- G. Adjust belt tension.
- H. Lubricate bearings.
- I. Replace fan and motor pulleys as required to achieve design airflow.
- J. Comply with requirements in Section 230593 "Testing, Adjusting, and Balancing for HVAC" for testing, adjusting, and balancing procedures.

#### **3.05 DEMONSTRATION**

- K. Train Owner's maintenance personnel to adjust, operate, and maintain fans.

**END OF SECTION**



**SECTION 23 37 13**  
**DIFFUSERS, REGISTERS, AND GRILLES****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. Rectangular sidewall grilles
  2. Rectangular and square ceiling diffusers.
  3. Perforated diffusers.
  4. Louver face diffusers.
  5. Louvers.
- B. Related Sections:
1. Section 089116 "Operable Wall Louvers" and Section 089119 "Fixed Louvers" for fixed and adjustable louvers and wall vents, whether or not they are connected to ducts.
  2. Section 233300 "Air Duct Accessories" for fire and smoke dampers and volume-control dampers not integral to diffusers, registers, and grilles.

**1.03 ACTION SUBMITTALS**

- A. Product Data: For each type of product indicated, include the following:
1. Data Sheet: Indicate materials of construction, finish, and mounting details; and performance data including throw and drop, static-pressure drop, and noise ratings.
  2. Diffuser, Register, and Grille Schedule: Indicate drawing designation, room location, quantity, model number, size, and accessories furnished.

**1.04 INFORMATIONAL SUBMITTALS**

- A. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from Installers of the items involved:
1. Ceiling suspension assembly members.
  2. Method of attaching hangers to building structure.
  3. Size and location of initial access modules for acoustical tile.
  4. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
  5. Duct access panels.
- B. Source quality-control reports.

**PART 2 - PRODUCTS**

- 2.01** Basis-of-Design Product: Subject to compliance with requirements, provide product indicated on drawings or equal.

- 2.02** Refer to drawings.

**PART 3 - EXECUTION****3.01 EXAMINATION**

- A. Examine areas where diffusers, registers, and grilles are to be installed for compliance with requirements for installation tolerances and other conditions affecting performance of equipment.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.02 INSTALLATION**

- A. Install diffusers, registers, and grilles level and plumb.
- B. Ceiling-Mounted Outlets and Inlets: Drawings indicate general arrangement of ducts, fittings, and accessories. Air outlet and inlet locations have been indicated to achieve design requirements for air volume, noise criteria, airflow pattern, throw, and pressure drop. Make final locations where indicated, as much as practical. For units installed in lay-in ceiling panels, locate units in the center of panel. Where architectural features or other items conflict with installation, notify Architect for a determination of final location.
- C. Install diffusers, registers, and grilles with airtight connections to ducts and to allow service and maintenance of dampers, air extractors, and fire dampers.
- D. Install louvers per manufacturer recommendations.

**3.03 ADJUSTING**

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

**END OF SECTION**

**SECTION 260500  
COMMON WORK RESULTS FOR ELECTRICAL****PART 1 - GENERAL****1.01 IMPOSED REGULATIONS**

- A. Applicable provisions of the State and Local Codes and of the following codes and standards in addition to those listed elsewhere in the specifications are hereby imposed on a general basis for electrical work: codes and standards listed on the electrical drawings.

**1.02 SCOPE OF WORK**

- A. Provide all labor, materials, equipment and supervision to construct complete and operable electrical systems as indicated on the drawings and specified herein. All materials and equipment used shall be new, undamaged and free from any defects.

**1.03 RELATED DOCUMENTS AND OTHER INFORMATION**

- A. The general provisions of the Contract, including General and Supplementary Conditions and General Requirements, apply to the portions of work specified in each and every Section of this Division, individually and collectively.

**1.04 EXISTING SERVICES AND FACILITIES**

- A. Damage to Existing Services: Existing services and facilities damaged by the Contractor through negligence or through use of faulty materials or workmanship shall be promptly repaired, replaced, or otherwise restored to previous conditions by the Contractor without additional cost to the Owner.
- B. Interruption of Services: Interruptions of services necessary for connection to or modification of existing systems or facilities shall occur only at prearranged times approved by the Owner. Interruptions shall only occur after the provision of all temporary work and the availability of adequate labor and materials will assure that the duration of the interruption will not exceed the time agreed upon.
- C. Removed Materials: Existing materials made unnecessary by the new installation shall be stored on site. They shall remain the property of the Owner and shall be stored at a location and in a manner as directed by the Owner. If classified by the Owner's authorized representative as unsuitable for further use, the material shall become the property of the Contractor and shall be removed from the site at no additional cost to the owner.

**1.05 PRODUCT WARRANTIES**

- A. Provide manufacturer's standard printed commitment in reference to a specific product and normal application, stating that certain acts of restitution will be performed for the Purchaser or Owner by the manufacturer, when and if the product fails within certain operational conditions and time limits. Where the warranty requirements of a specific specification section exceed the manufacturer's standard warranty, the more stringent requirements will apply and modified manufacturer's warranty shall be provided. In no case shall the manufacturer's warranty be less than one (1) year.

**1.06 PRODUCT SUBSTITUTIONS**

- A. General: Materials specified by manufacturer's name shall be used unless prior approval of an alternate is given by addenda. Requests for substitutions must be received in the office of

the Architect at least 10 days prior to opening of bids.

### **1.07 ELECTRICAL DRAWINGS**

- A. Electrical contract drawings are diagrammatic and indicate the general arrangement of electrical equipment. Do not scale electrical plans. Obtain all dimensions from the Architect's dimensioned drawings and field measurements. The Contractor shall review Architectural plans for door swings and built-in equipment; conditions indicated on those plans shall govern for this work.
- B. Coordinate installation of electrical equipment with the structural and mechanical equipment and access thereto. Coordinate exterior electrical work with civil and landscaping work.
- C. Discrepancies shown on different drawings, between drawings and specifications or between documents and field conditions shall be installed to provide the better quality or greater quantity of work; or, comply with the more stringent requirement; either or both in accordance with the A/E's interpretation.

### **1.08 SYSTEMS REQUIRING ROUGH-IN**

- A. Rough-in shall consist of all outlet boxes/raceway systems/supports and sleeves required for the installation of cables/devices by other Divisions and by the Owner. It shall be the responsibility of this Contractor to determine the requirements by reviewing the contract documents and meeting with the Superintendent of the trade involved and Owner's representative to review submittal data, shop drawings, etc.
- B. Sealing of all sleeves, to meet the fire rating of the assembly, whether active or not, is work of this Division.

### **1.09 SUBMITTALS**

- A. Refer to section 260510

## **PART 2 - PRODUCTS**

### **2.01 FIRESTOPPING**

- A. A firestop system shall be used to seal penetrations of electrical conduits and cables through fire-rated partitions per the NEC. The firestop system shall be qualified by formal performance testing in accordance with ASTM E-814, or UL 1479.

## **PART 3 - EXECUTION**

### **3.01 PRODUCT INSTALLATION, GENERAL**

- A. Except where more stringent requirements are indicated, comply with the product manufacturer's installation instructions and recommendations, including handling, anchorage, assembly, connections, cleaning and testing, charging, lubrication, startup, test operation and shut-down of operating equipment. Consult with manufacturer's technical experts, for specific instructions on unique product conditions and unforeseen problems.
- B. Protection and Identification: Deliver products to project properly identified with names, models numbers, types, grades, compliance labels and similar information needed for distinct identifications; adequately packaged or protected to prevent deterioration during shipment,

storage and handling. Store in a dry, well ventilated, indoor space, except where prepared and protected by the manufacturer specifically for exterior storage.

- C. Permits and Tests: Provide labor, material and equipment to perform all tests required by the governing agencies and submit a record of all tests to the Owner or his representative. Notify the Architect five days in advance of any testing.
- D. Install temporary protective covers over equipment enclosures, outlet boxes and similar items after interiors, conductors, devices, etc. are installed, to prevent the entry of construction debris and to protect the installation during finish work performed by others. Do not install device plates, equipment covers or trims until finish work is complete.
- E. Clean all equipment, inside and out, upon completion of the work. Scratched or marred surfaces shall be touched-up with touch-up paint furnished by the equipment manufacturer.
- F. Replace all equipment and materials that become damaged.
- G. No more than three phase conductors, each of opposite phases for a three phase WYE system, shall be combined in a single raceway unless written approval is granted by the engineer or noted otherwise on the construction documents. (For 120 volt and 277 volt receptacle and lighting circuits are no more than 3 circuits unless written approval is granted by the engineer or noted otherwise on the construction documents.)

### **3.02 LOW VOLTAGE CABLING SEPARATION FROM EMI SOURCES**

- A. Comply with BICSI TDMM and TIA/EIA-569-A recommendations for separating unshielded copper voice and data communication cable from potential EMI sources, including electrical power lines and equipment.
- B. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:
  - 1. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches
  - 2. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches
  - 3. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches
- C. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:
  - 1. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches
  - 2. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches
  - 3. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches
- D. Separation between communications cables in grounded metallic raceways and power lines and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:
  - 1. Electrical Equipment Rating Less Than 2 kVA: No requirement.
  - 2. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches
  - 3. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches
- E. Separation between Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches
- F. Separation between Cables and light fixtures: A minimum of 5 inches

### **3.03 EQUIPMENT PROTECTION**

- A. Equipment and materials shall be protected during shipment and storage against physical damage, vermin, dirt, corrosive substances, fumes, moisture, cold and rain.
- B. Store equipment indoors in clean dry space with uniform temperature to prevent condensation. Equipment shall include but not be limited to switchgear, switchboards, panelboards, transformers, motor control centers, motor controllers, uninterruptible power systems, enclosures, controllers, circuit protective devices, cables, wire, light fixtures, electronic equipment, and accessories.
- C. During installation, equipment shall be protected against entry of foreign matter; and be vacuum-cleaned both inside and outside before testing and operating. Compressed air shall not be used to clean equipment. Remove loose packing and flammable materials from inside equipment.
- D. Damaged equipment shall be, as determined by the Engineer, placed in first class operating condition or be returned to the source of supply for repair or replacement.
- E. Painted surfaces shall be protected with factory installed removable heavy kraft paper, sheet vinyl or equal.

Damaged paint on equipment and materials shall be refinished with the same quality of paint and workmanship as used by the manufacturer so repaired areas are not obvious.

**3.04 ELECTRICAL WORK**

Electrical work shall be accomplished with all affected circuits or equipment de-energized.  
END OF SECTION 260500

**SECTION 260501  
ELECTRICAL DEMOLITION****PART 1 - GENERAL****1.01 Not Used****PART 2 - PRODUCTS****2.02 Not Used****PART 3 - EXECUTION****3.01 EXAMINATION**

- A. Field verify measurements and circuiting arrangements are as shown on Drawings.
- B. Verify that abandoned wiring and equipment serve only abandoned facilities.
- C. Demolition drawings are based on casual field observation.
- D. Report discrepancies to Engineer before disturbing existing installation.
- E. Beginning of demolition means installer accepts existing conditions.

**3.02 PREPARATION**

- A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
- B. Provide temporary wiring and connections to maintain existing systems in service during construction.
- C. When work must be performed on energized equipment or circuits, use personnel experienced in such operations, submit verification of compliance with the contractor's safety procedures to the Architect, and notify the Owner in writing a minimum of 24 hours prior to work.
- D. Existing Fire Alarm System: Maintain existing system in service until new system is installed and tested. Disable system only to make switchovers and connections. Minimize outage duration. Notify owner and AHJ before partially or completely disabling system.
- E. The existing television, telephone, computer data, intrusion detection and intercom system shall remain operable during construction. Plan and execute the work accordingly. Provide temporary wiring and facilities as may be required.

**3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK**

- A. Maintain electrical service to areas outside of the construction area.
- B. Remove, relocate, and extend existing installations to accommodate new construction.
- C. Remove abandoned wiring to source of supply.

- D. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
- E. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
- F. Disconnect and remove abandoned panelboards and distribution equipment.
- G. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
- H. Disconnect and remove abandoned luminaries. Remove brackets, stems, hangers, and other accessories.
- I. Repair adjacent construction and finishes damaged during demolition and extension work.
- J. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.
- K. Extend existing installations using materials and methods compatible with existing electrical installations, or as specified.
- L. All demolished ballasts and lamps shall be recycled.
- M. Remove all abandoned conductors and cables within the construction area.
- N. Support all existing communication cables within the construction area.
- O. Provide fire stopping for all existing communication conduit fire rated wall penetrations within the construction area.

### **3.04 CONSTRUCTION PHASING**

- A. Plan and execute the work in accordance with the construction phasing indicated on the Architectural plans. Test and certify all systems, by phase of construction, so that "partial occupancy" can be obtained.

### **3.05 REUSE OF EXISTING MATERIALS**

- A. Where new devices are to replace existing, it shall be permissible to reuse existing outlet boxes and branch circuit conduits. It shall be the responsibility of the Contractor to ensure that existing outlet boxes and conduits that are reused comply with requirements for new.
- B. The reuse of conduits (not remaining in place), conductors, and devices is not permitted.

### **3.06 CUTTING AND PATCHING**

- A. Structural Limitations: Do not cut structural framing, walls, floors, decks, and other members intended to withstand stress, except with the Engineer's written authorization. Authorization will be granted only when there is no other reasonable method for completing the electrical work, and where the proposed cutting clearly does not materially weaken the structure.



- B. Cutting Concrete: Where authorized, cut openings through concrete (for conduit penetrations and similar services) by core drilling or sawing. Do not cut by hammer-driven chisel or drill. Prior to cutting of existing concrete walls, floors, or ceilings x-ray existing concrete to locate existing hidden utilities.
- C. Other Work: Do not endanger or damage other work through the procedures and process of cutting to accommodate electrical work. Review the proposed cutting with the Installer of the work to be cut, and comply with his recommendations to minimize damage. Where necessary, engage the original Installer or other specialists to execute the cutting in the recommended manner.
- D. Patching: Where patching is required to restore other work, because of cutting or other damage inflicted during the installation of electrical work, execute the patching in the manner recommended by the original Installer. Restore the other work in every respect, including the elimination of visual defects in exposed finished, as judged by the Engineer. Engage the original Installer to complete patching of various categories of work including: concrete and masonry finishing, waterproofing and roofing, exposed wall finishes, etc.

### **3.07 CLEANING AND REPAIR**

- A. Clean and repair existing materials and equipment that remain or that are to be reused.
- B. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions.

### **3.08 LABELING**

- A. Provide typed circuit directory showing revised circuiting arrangement.
- B. Provide and install a new engraved nameplate for all electrical panels that have been modified during construction. Refer to the panelboard specification section for labeling requirements.

END OF SECTION 260501

**SECTION 260510  
ELECTRICAL SUBMITTALS****PART 1 - GENERAL****1.01 RELATED REQUIREMENTS**

- A. Comply with the applicable requirements of the Division 1 specifications (013300) and the requirements of this Division of the specifications.

**1.02 SUBMITTALS**

- B. Submit for review by the Engineer Architect a schedule with engineering data of materials and equipment to be incorporated in the work. Submittals shall be supported by descriptive materials, i.e., catalog sheets, product data sheets, diagrams, performance curves and charts published by the manufacturer, warranties, etc., to show conformance to Specifications and Plan requirements; model numbers alone shall not be acceptable. Data submitted for review shall contain all information to indicate compliance with Contract Documents. Complete electrical characteristics shall be provided for all equipment. Submittals for lighting fixtures shall include Photometric Data. The Engineer reserves the right to require samples of any equipment to be submitted for review.
- C. The purpose of shop drawing review is to demonstrate to the Architect that the Contractor understands the design concept. The Architect's review of such drawings, schedules, or cuts shall not relieve the Contractor from responsibility for deviations from the drawings or specifications unless he has, in writing, called the Architect's attention to such deviation at the time of submission, and received written permission from the Architect for such deviations.
- D. Where cut sheets include an entire product family, mark all specific items to be utilized for this project on equipment cut sheets. Generic cut sheets with no indication of which items on the cut sheet shall be used will be rejected.
- E. Response to Submittals: Shop drawings shall be returned by the Electrical Engineer with the following classifications:
1. "No Exceptions Taken": No corrections, no marks. Contractor shall submit copies for distribution
  2. "Make Corrections Noted": A few minor corrections. Items may be ordered as marked up without further resubmission. Submit copies for distribution.
  3. "Amend and Resubmit": Minor corrections. Item may be ordered at the Contractor's risk. Contractor shall resubmit drawings with corrections noted.
  4. "Rejected - Resubmit": Major corrections or not in accordance with the contract documents. No items shall be ordered. Contractor shall correct and resubmit drawings.
- F. Prior Approvals and Shop Drawings must be hand delivered, received by mail, or email.
- G. Equipment and materials requiring submittals:
1. Section 260500 – Common Work Results for Electrical
    - a. Firestopping Materials
  2. Section 260511 – Electrical Work Closeout

- a. Record Drawings
  - b. Record Manuals
  - c. Close out submittals
  - d. Training verification
3. Section 260519 – Low-Voltage Electrical Conductors and Cables
    - a. Product Data
  4. Section 260526 – Grounding and Bonding for Electrical Systems
    - a. Grounding Connections
    - b. Ground Wire
    - c. Bonding Jumper Braid
    - d. Ground buss bars
  5. Section 260529 – Hangers and Supports for Electrical Systems
    - a. Product Data
  6. Section 260533 – Raceway and Boxes for Electrical Systems
    - a. Product Data
  7. Section 260543 – Underground Ducts and Raceways for Electrical Systems
    - a. Raceway
    - b. Warning Tape
  8. Section 260548 – Vibration and Seismic Controls for Electrical Systems
    - a. Submit seismic force level (Fp) calculations from applicable building code.
    - b. Submit pre-approved restraint selections and installation details
    - c. Restraint selection and installation details shall be sealed by a professionally licensed engineer experienced in seismic restraint design.
    - d. Submit manufacturer's product data on strut channels including, but not limited to, types, materials, finishes, gauge thickness, and hole patterns. For each different strut cross-section, submit cross sectional properties including Section Modulus (Sx) and Moment of Inertia (Ix).
    - e. Electrical equipment seismic certification (These certificates can be submitted with the product data in the equipment specification)
    - f. Field reports
  9. Section 260553 – Identification for Electrical Systems
    - a. Product data for all labeling products
  10. Section 262726 – Wiring Devices
    - a. Product data
  11. Section 262816 – Enclosed Switches
    - a. Product data
  12. Section 265100 – Interior Lighting
    - a. Lighting Fixtures
  13. Section 265600 – Exterior Lighting
    - a. Lighting Fixtures
    - b. Poles and Accessories

14. Section 283100 – Fire Detection and Alarm
  - a. Surge Protection
  - b. HVAC Control Wiring Diagrams
  - c. Battery calculations.
  - d. Voltage drop calculations
  - e. Installer's qualifications.
  - f. Conduit fill calculations.
  - g. Manufacturer's detailed data sheet for each control unit, initiating device, and notification appliance.
  - h. Device layout drawings with proposed conduit routing. Drawings must be prepared using AutoCAD Release 2017 or newer.
  - i. System riser diagram.
  - j. List of all devices on each signaling line circuit, with spare capacity indicated.
  - k. Clear and concise description of operation, with input/output matrix similar to that shown in NFPA 72
  - l. Warranty
  - m. Include voice/alarm signaling-service equipment rack or console layout, grounding schematic, amplifier power calculation, and single-line connection diagram.
  - n. Verify that each duct detector is listed for complete range of air velocity, temperature, and humidity possible when air-handling system is operating.
  - o. Submission to Authority Having Jurisdiction: In addition to routine submission of the above material, make an identical submission to the authority having jurisdiction. Include copies of shop drawings as required to depict component locations to facilitate review. Upon receipt of comments from the Authority, make resubmissions if required to make clarifications or revisions to obtain approval.
  - p. Inspection and Test Reports:
    - 1) Submit inspection and test plan prior to closeout demonstration
    - 2) Submit documentation of satisfactory inspections and tests.
    - 3) Submit NFPA 72 "Inspection and Test Form," filled out.

## **PART 2 - PRODUCTS**

### **2.01 Not Used.**

## **PART 3 - EXECUTION**

### **3.01 MANUFACTURER'S DATA**

- A. Include the manufacturer's comprehensive product data sheet and installation instructions. Where operating ranges are shown, mark data to show portion of range required for project application. Where pre-printed data sheet covers more than one distinct product-size, type, material, trim, accessory group or other variations, delete or mark-out portions of the pre-printed data which are not applicable.

### **3.02 EQUIPMENT LIST**

- A. Where more than one type of a product is being used (i.e. starters, disconnects, breakers, etc.) provide a list with each submittal correlating the type and size of product to the load served.

### **3.03 TEST REPORTS**

- A. Submit test reports which have been signed and dated by the firm performing the tests, and prepare in the manner specified in the standard or regulation governing the tests procedure as indicated.

END OF SECTION 260510

**SECTION 260511  
ELECTRICAL WORK CLOSEOUT****PART 1 - GENERAL****1.01 SUBMITTALS**

- A. Refer to section 260510.

**1.02 RELATED SECTIONS**

- A. Refer to section 017839 for additional requirements.

**PART 2 - PRODUCTS****2.01 RECORD DRAWINGS**

- A. Except where otherwise indicated, electrical drawings prepared by Engineer are diagrammatic in nature and may not show locations accurately for various components of electrical system. Shop drawings, including coordination drawings, prepared by the Contractor show portions of work more accurately to scale and location, and in greater detail. It is recognized that actual layout of installed work may vary substantially from both Contractor drawings and shop drawings.
- B. The electrical superintendent shall maintain a white set of contract documents and shop drawings in clean, undamaged condition, for mark-up of actual installations which vary substantially from the work as shown. PDF or digital mark-ups is acceptable alternates Mark-up whatever drawings are most capable of showing installed conditions accurately. However, where shop drawings are marked, record a reference note on appropriate contract drawings. Mark with erasable pencil, and use multiple colors to aid in the distinction between work of separate electrical systems. These documents shall be used for no other purpose. In general, record every substantive installation of electrical work which previously is either not shown or shown inaccurately, but in any case record the following:
  - 1. Post all addenda prior to beginning work.
  - 2. Underground feeder conduits, both interior and exterior, drawn to scale and fully dimensioned.
  - 3. Work concealed behind or within other work, in a non-accessible arrangement.
  - 4. Mains and branches of wiring systems, with panelboards and control devices located and numbered, with concealed splices located, and with devices requiring maintenance located.
  - 5. Scope of each change order (C.O.), noting C.O. number.
- C. Upon each visit by the Architect/Engineer, the Contractor shall demonstrate that the record documents are being kept current, as specified hereinbefore.

**2.02 RECORD MANUALS**

- D. Record manuals shall include the following:
  - 1. Manufacturer's operation and maintenance manuals for:
    - a. Light Fixtures
    - b. Fire Alarm System
  - 2. Shop drawings, revised to reflect all review comments, supplemented with the

- installation instructions shipped with equipment.
  - 3. One copy of all panelboard directories.
  - 4. All field test Reports
  - 5. Electrical Contractor's Warranty
  - 6. Fire alarm set of floor plans showing actual installed locations of components, conduit, and zones.
  - 7. Fire Alarm "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.
- E. Submit record manuals in quantities and in the format prescribed in the Division 1 specifications.
- F. Submit copies of all Maintenance contracts including:
- 1. Fire Alarm Systems.

### **2.03 CLOSEOUT SUBMITTALS**

- G. Software and Firmware Operational Documentation:
- 1. Software operating and upgrade manuals.
  - 2. Program Software Backup: On USB drive, complete with data files.
  - 3. Device address list.
  - 4. Printout of software application and graphic screens.

## **PART 3 - EXECUTION**

### **3.01 SITE VISITS**

- A. At all construction observations by the Architect/Engineer, the Contractor shall demonstrate to the Architect/ Engineer that all work is complete in accordance with the contract documents and that all systems have been tested and are fully operational. The Contractor shall furnish the personnel, tools and equipment required to inspect and test all systems.

### **3.02 TRAINING**

- B. Train Owner's personnel on the operation and maintenance of the following systems:
- 1. Fire Alarm System - 1 hours
  - 2. Lighting Control Systems – 1 hours
- C. Training shall not be conducted until system has been tested by the Contractor and is 100% operational. Refer to the individual specification sections for additional requirements.

END OF SECTION 260511

**SECTION 260512  
ELECTRICAL COORDINATION****PART 1 - GENERAL****1.01 SUBMITTALS**

- A. Refer to section 260510.

**PART 2 - PRODUCTS****2.03 EQUIPMENT REQUIRING ELECTRICAL SERVICE**

- A. Provide electrical connections for all electrically driven equipment. Final connections are electrical work, except as otherwise noted. Obtain a copy of the shop drawings of equipment. Review shop drawings to verify electrical characteristics and to determine rough-in requirements, final connection requirements, location of disconnect switch, etc. Notify the General Contractor if the information received is ambiguous or incomplete. Keep a copy of these shop drawings at the project site throughout the course of construction.
- B. Equipment to be connected includes, but is not limited to the following:
1. HVAC Equipment
  2. Fire Alarm System
  3. Site Lighting
- C. The design of circuits for electrically driven equipment is based on the product of one manufacturer and may not be representative of all acceptable manufacturers. If equipment furnished has differing characteristics, make necessary adjustments to circuit components at no additional cost to the Owner, subject to the approval of the Engineer.
- D. Provide motor starters and disconnects for all mechanical equipment unless provided by the mechanical contractor.

**PART 3 - EXECUTION****3.01 COORDINATION OF MECHANICAL INSTALLATION:**

- A. Attachment Number 1 shall be filled out and returned with shop drawing submittals. The intent of Attachment Number 1 is to ensure that the electrical requirements for equipment have been reviewed and coordinated by the Contractor. No electrical equipment shall be ordered, nor shall rough-in begin, before this coordination has taken place. This document shall be returned appropriately marked whether or not any changes are deemed to be necessary by the contractor.



ATTACHMENT NO. 1

SHOP DRAWING COORDINATION AFFIDAVIT

I, the undersigned, certify that I have reviewed the equipment shop drawings for electrically driven equipment and that the accompanying electrical shop drawings reflect the requirements of the actual equipment to be furnished for use on this project. The following deviations from design drawings were required to serve the furnished equipment:

ITEM	CKT.DESIG.		BKR.SIZE		CONDUIT/WIRE		DISC.SIZE		STARTER	
	New	Old	New	Old	New	Old	New	Old	New	Old

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NOTE: If no deviations are required please indicate by circling the appropriate answer above your signature.

PROJECT: \_\_\_\_\_ DEVIATIONS: Yes / No

COMPANY: \_\_\_\_\_

TITLE: \_\_\_\_\_ SIGNATURE: \_\_\_\_\_

TELEPHONE: \_\_\_\_\_ DATE: \_\_\_\_\_

IT IS THE RESPONSIBILITY OF THE DIVISION 26 CONTRACTOR TO OBTAIN SHOP DRAWING INFORMATION FROM OTHER TRADES. FAILURE TO PERFORM THE WORK REQUIRED BY THIS AFFIDAVIT, PRIOR TO ORDERING MATERIALS OR ROUGHING-IN, MAY RESULT IN IMPROPER CONNECTIONS BEING PROVIDED. THE EXPENSE OF CORRECTIVE MEASURES, IF REQUIRED, SHALL BE BORNE BY THE CONTRACTOR.

NOTE:  
PANELBOARD SHOP DRAWINGS WILL NOT BE REVIEWED UNTIL THE ELECTRICAL CONTRACTOR COMPLETES AND SUBMITS THIS AFFIDAVIT TO THE ELECTRICAL ENGINEER.

END OF SECTION 260512

**SECTION 260519**  
**LOW-VOLTAGE ELECTRICAL CONDUCTORS AND CABLES****PART 1 - GENERAL****1.01 SUMMARY**

- A. This section includes the requirements for the following:
  - 1. Wire and cable for 600 volts and less.
  - 2. Wiring connectors and connections.

**1.02 SUBMITTALS**

- A. Refer to section 260510.

**1.03 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Furnish products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.04 REFERENCE STANDARDS**

- A. NECA 1 - Standard for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; current edition.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association, current edition.

**PART 2 - PRODUCTS****2.01 WIRING REQUIREMENTS**

- A. Concealed Dry Interior Locations: Use only THHN-2, THWN-2 or XHHW-2 wire in raceway.
- B. Exposed Dry Interior Locations: Use only THHN-2, THWN-2, or XHHW-2 in raceway.
- C. Above Accessible Ceilings: Use only THHN-2, THWN-2, or XHHW-2 in raceway.
- D. Wet or Damp Interior Locations: Use only THWN-2 or XHHW-2 in raceway.
- E. Exterior locations (above or below grade) THWN-2, XHHW-2 or USE in raceway.
- F. Use conductors not smaller than 12 AWG for power and lighting circuits.
- G. Use conductors not smaller than 14 AWG for control circuits.
- H. Metal Clad (MC) cable can be used for 20 Amp branch circuits, when installed in concealed indoor locations. and not used for home runs.

**2.02 BUILDING WIRE**

- A. Conductor: Copper.
- B. Insulation Voltage Rating: 600 volts.
- C. Temperature Rating: 90°C.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Pull all conductors into raceway at same time.
- B. Use suitable wire pulling lubricant for building wire 4 AWG and larger. Do not exceed manufacturers recommended maximum pulling tensions and sidewall pressure values. Do not use pulling lubricant on isolated power panel systems.
- C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips that will not damage cables or raceway.
- D. Neatly train and lace wiring inside boxes, equipment, and panelboards.
- E. Clean conductor surfaces before installing lugs and connectors.
- F. Make splices, taps, and terminations to carry full ampacity of conductors with no perceptible temperature rise.
- G. Use split bolt connectors or compression fittings for splices and taps on conductors 6 AWG and larger. Tape uninsulated conductors and connector with electrical tape to 150 percent of insulation rating of conductor.
- H. Use solderless pressure connectors with insulating covers for copper conductor splices and taps, 8 AWG and smaller.
- I. Use insulated spring wire connectors with plastic caps for copper conductor splices and taps, 10 AWG and smaller.
- J. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values or UL 486A and UL 486B.
- K. Identify and color code wire and cable under provisions of Section 26 05 53. Identify each conductor with its circuit number or other designation indicated.
- L. For each electrical connection/termination, provide a complete assembly of materials, including but not necessarily limited to, pressure connectors, terminals (lugs), electrical insulating tape, heat-shrinkable insulating tubing, cable ties, solderless wire nuts, and other materials necessary to complete splices and terminations. Torque all connections according to installation instructions.
- M. Motor connections shall be made with compression connectors forming a bolted in-line or

stub-type connection.

- N. Splicing of feeder conductors shall not be acceptable, unless specifically indicated on the drawing. Where splicing of feeder conductors is indicated, splices shall be made using compression type butt splice.
- O. All splices made underground or in the pipe basements shall be rated suitable for water immersion.
- P. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.
- Q. All MC cable shall be installed perpendicular or parallel to building structure and supports at intervals of 5 feet or less.
- R. Cable ties shall not be used to support MC cables.

### **3.02 LABELING**

- A. Color Coding
  - 1. Color shall be green for grounding conductors and green with yellow stripe for isolated grounding conductors.
  - 2. The color of the circuit conductors shall be as follows:

120/208 volt, 3-phase	Phase A - Black
	Phase B - Red
	Phase C - Blue
	Neutral - White

END OF SECTION 260519

**SECTION 260526**  
**GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.01 SUMMARY**

- A. Grounding and bonding components.

**1.02 SUBMITTALS**

- A. Refer to section 260510.

**1.03 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.

**1.04 REFERENCES**

- A. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; current edition.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association; current edition.
- C. IEEE Standard 142 "Green Book" – Recommended Practices for Grounding of industrial and Commercial Power Systems; current edition.

**PART 1 - PRODUCTS****2.02 CONDUCTORS**

- A. Bonding Jumper Braid: Copper braided tape, sized for application.
- B. Electrical Grounding conductors: Unless otherwise indicated, provide bare or green insulated stranded copper electrical grounding conductors sized according to NEC or as shown or specified. Provide green insulated for conductors sized No. 10 AWG and smaller.

**2.03 GROUND CONNECTIONS**

- A. Below Grade: Exothermic-welded type connectors.
- B. Above Grade:
  - 1. Bonding Jumpers: compression type connectors, using zinc-plated fasteners and external tooth lock washers.
  - 2. Ground Busbars: Two-hole compression type lugs using tin-plated copper or copper alloy bolts and nuts.
  - 3. Rack and Cabinet Ground Bars: one-hole compression-type lugs using zinc-plated or copper alloy fasteners.
- C. Install exothermic connectors and terminals as recommended by the connector and terminal manufacturer for intended applications.
- D. Bolted clamp will not be accepted between grounding rods and ground conductors.

**2.04 EQUIPMENT RACK AND CABINET GROUND BARS**

- A. Provide solid copper ground bars designed for mounting on the framework of open or cabinet-enclosed equipment racks with minimum dimensions of 3/8 inch x 3/4 inch unless noted otherwise.
- B. Busbar Connectors: Cast silicon bronze, solderless, mechanical connector; with a long barrel and two holes spaced on 5/8- or 1-inch (15.8- or 25.4-mm) centers for a two-bolt connection to the busbar.
- C. Telecommunications Enclosures and Equipment Racks: Bond metallic components of enclosures to the telecommunications bonding and grounding system. Install top-mounted rack grounding busbar unless the enclosure and rack are manufactured with the busbar. Bond the equipment grounding busbar to the TGB No. 2 AWG bonding conductors.
- D. Shielded Cable: Bond the shield of shielded cable to the TGB in communications rooms and spaces. Comply with TIA/EIA-568-B.1 and TIA/EIA-568-B.2 when grounding screened, balanced, twisted-pair cables.
- E. Rack- and Cabinet-Mounted Equipment: Bond powered equipment chassis to the cabinet or rack grounding bar. Power connection shall comply with NFPA 70; the equipment grounding conductor in the power cord of cord- and plug-connected equipment shall be considered as a supplement to bonding requirements in this Section.

**2.05 GROUND TERMINAL BLOCKS**

- A. At any equipment mounting location (e.g. backboards and hinged cover enclosures) where rack-type ground bars cannot be mounted, provide screw lug-type terminal blocks.

**PART 2 - EXECUTION****3.01 EXAMINATION**

- A. Verify existing conditions prior to beginning work.
- B. Verify that final backfill and compaction has been completed before driving rod electrodes.

**3.02 ELECTRICAL AND COMMUNICATION ROOM GROUNDING**

- A. Building Earth Ground Busbars: Provide ground busbar hardware at each electrical and communication room and connect to pigtail extensions of the building grounding ring.

**3.07 SECONDARY EQUIPMENT AND CIRCUITS**

- A. Panelboards, Disconnects; Connect metallic conduits, which terminate without mechanical connection to the housing, by grounding bushings and grounding conductor to the equipment ground bus.
- B. Feeders and Branch Circuits: Install equipment grounding conductors with all feeders and power and lighting branch circuits, sized in accordance with Article 250 of NFPA 70.
- C. Boxes, Cabinets, Enclosures, and Panelboards:
  - 1. Bond the equipment grounding conductor to each pullbox, junction box, outlet box, device box, cabinets, and other enclosures through which the conductor passes (except for special grounding systems for intensive care units and other critical units shown).

2. Provide lugs in each box and enclosure for equipment grounding conductor termination.
  3. Provide ground bars in panelboards, bolted to the housing, with sufficient lugs to terminate the equipment grounding conductors.
- D. Motors and Starters: Provide lugs in motor terminal box and starter housing or motor control center compartment to terminate equipment grounding conductors.
- E. Receptacles shall not be grounded through their mounting screws. Ground with a jumper from the receptacle green ground terminal to the device box ground screw and the branch circuit equipment grounding conductor.
- F. Fixed electrical appliances and equipment shall be provided with a ground lug for termination of the equipment grounding conductor.
- G. Metallic Conduit: Metallic conduits which terminate without mechanical connection to an electrical equipment housing by means of locknut and bushings or adapters, shall be provided with grounding bushings. Connect bushings with a bare grounding conductor to the equipment ground bus.

END OF SECTION 260526

**SECTION 260529**  
**HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.01 SUMMARY**

- A. This section includes the requirements for the following:
  - 1. Conduit and equipment supports.
  - 2. Anchors and fasteners.

**1.02 SUBMITTALS**

- A. Refer to section 260510.

**1.03 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.04 REFERENCE STANDARDS**

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; current edition.

**PART 2 - PRODUCTS****2.01 MATERIALS**

- A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.
- B. Supports: Fabricated of structural steel or formed steel members; galvanized, *or PVC*.
- C. Anchors and Fasteners:
  - 1. Do not use powder-actuated anchors.
  - 2. Concrete Structural Elements: Use precast inserts, expansion anchors, or preset inserts.
  - 3. Steel Structural Elements: Use beam clamps, steel spring clips, steel ramset fasteners, or welded fasteners.
  - 4. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
  - 5. Hollow Masonry, Plaster, and Gypsum Board Partitions: Use toggle bolts or hollow wall fasteners.
  - 6. Solid Masonry Walls: Use expansion anchors or preset inserts.
  - 7. Sheet Metal: Use sheet metal screws.
  - 8. Wood Elements: Use wood screws.



**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Install hangers and supports as required to adequately and securely support electrical system components, in a neat and workmanlike manner, as specified in NECA 1.
  - 1. Do not fasten supports to pipes, ducts, mechanical equipment, or conduit.
- B. Cutting or Holes:
  - 1. Locate holes in advance where they are proposed in the structural sections such as ribs or beams. Obtain the approval of the Architect prior to drilling through structural sections.
  - 2. Cut holes through concrete and masonry in new and existing structures with a diamond core drill or concrete saw. Pneumatic hammer, impact electric, hand or manual hammer type drills are not allowed, except where permitted by the Architect as required by limited working space.
- C. Rigidly weld support members or use hexagon-head bolts to present neat appearance with adequate strength and rigidity. Use spring lock washers under all nuts.
- D. Install surface-mounted cabinets and panelboards with minimum of four anchors.
- E. In wet and damp locations use steel channel supports to stand cabinets, disconnects and panelboards 1 inch (25 mm) off wall.
- F. Use sheet metal channel to bridge studs above and below cabinets and panelboards recessed in hollow partitions.
- G. Use stamped steel bridges to fasten flush mounting outlet box between studs.
- H. Use adjustable steel channel fasteners for hung ceiling outlet box.
- I. Do not fasten boxes to ceiling support wires.
- J. Support boxes independently of conduit, except cast box that is connected to two rigid metal conduits both supported within 12 inches of box.
- K. Support conduit using coated steel or malleable iron straps, lay-in adjustable hangers, clevis hangers, and split hangers.
- L. Group related conduits; support using conduit rack. Construct rack using steel channel; provide space on each for 25 percent additional conduits
- M. Do not support conduit with wire, wire ties, or perforated pipe straps. Remove wire used for temporary supports.
- N. Do not attach conduit to ceiling support wires.

END OF SECTION 260529

**SECTION 260533**  
**RACEWAY AND BOXES FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.01 SUBMITTALS**

- A. Refer to section 260510

**1.02 QUALITY ASSURANCE**

- A. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

**1.03 REFERENCE STANDARDS**

- A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC); current edition
- B. ANSI C80.3 - American National Standard for Steel Electrical Metallic Tubing (EMT); current edition
- C. ANSI C80.5 - American National Standard for Electrical Rigid Aluminum Conduit (ERAC); current edition
- D. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; current edition
- E. NECA 101 - Standard for Installing Steel Conduit (Rigid, IMC, EMT); National Electrical Contractors Association; current edition
- F. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable; National Electrical Manufacturers Association; current edition

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Accept conduit on site. Inspect for damage
- B. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.

**PART 2 - PRODUCTS****2.01 CONDUIT REQUIREMENTS**

- A. Conduit Size: Comply with NFPA 70.
  - 1. Minimum Size: 3/4 inch
- B. Wet and Damp Locations:
  - 1. Exterior above ground and in pipe basements: RMC, IMC, or LFMC (LFMC shall be only used with restrictions, see conduit installation)

2. Exterior below ground: RNC schedule 40
  3. Interior: RMC, IMC, or LFMC (LFMC shall be only used with restrictions, see conduit installation)
  4. Interior below grade: RNC schedule 40
  5. Where RNC Schedule 40 is installed below grade or under floor slabs, the elbows required to turn the raceway up through the slab shall be RMC.
- C. Dry Locations:
1. Concealed: Use EMT or FMC (FMC shall be only used with restrictions, see conduit installation)
  2. Exposed: Use EMT or FMC (FMC shall be only used with restrictions, see conduit installation)
  3. Interior below grade: RNC schedule 40
- D. Area subject to physical damage: RMC, IMC, or LFMC (LFMC shall be only used with restrictions, see conduit installation)
1. "Areas subject to physical damage" shall be defined as the most stringent of the following:
    - a. Exposed conduit below eight feet above finished floor.
    - b. As interpreted by the authority having jurisdiction (AHJ).

## 2.02 METAL CONDUIT

- A. Rigid Steel Galvanized Conduit (RMC): ANSI C80.1.
- B. Intermediate Metal Conduit (IMC): ANSI C80.6.
- C. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.
1. Fittings shall meet the requirements of UL 514B and ANSI/ NEMA FB1.
  2. Standard threaded couplings, locknuts, bushings, and elbows: Only steel or malleable iron materials are acceptable. Integral retractable type IMC couplings are also acceptable.
  3. Die-cast or pressure-cast zinc-alloy fittings or fittings made of "pot metal" are prohibited.
  4. Locknuts: Bonding type with sharp edges for digging into the metal wall of an enclosure.
  5. Bushings: Metallic insulating type, consisting of an insulating insert molded or locked into the metallic body of the fitting. Bushings made entirely of metal or nonmetallic material are not permitted.
  6. Sealing fittings: Threaded cast iron type. Use continuous drain type sealing fittings to prevent passage of water vapor. In concealed work, install fittings in flush steel boxes with blank cover plates having the same finishes as that of other electrical plates in the room.

## 2.03 FLEXIBLE METAL CONDUIT

- A. FLEXIBLE METAL CONDUIT (FMC) Description: Interlocked steel construction. Flexible metal conduit shall conform to UL 1.
- B. Fittings: NEMA FB 1.
1. Conform to UL 514B. Only steel or malleable iron materials are acceptable.

2. Die-cast or pressure-cast zinc-alloy fittings or fittings made of "pot metal" are prohibited.
3. Clamp type, with insulated throat.

#### **2.04 LIQUIDTIGHT FLEXIBLE METAL CONDUIT**

- A. LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC) Description: Interlocked steel construction with PVC jacket. Liquid-tight flexible metal conduit: Shall Conform to UL 360.
- B. Fittings: UL 514B and ANSI/ NEMA FB1.
  1. Only steel or malleable iron materials are acceptable.
  2. Die-cast or pressure-cast zinc-alloy fittings or fittings made of "pot metal" are prohibited.
  3. Fittings must incorporate a threaded grounding cone, a steel or plastic compression ring, and a gland for tightening. Connectors shall have insulated throats.
  4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness, 0.040 inch, with overlapping sleeves protecting threaded joints.

#### **2.05 ELECTRICAL METALLIC TUBING**

- A. ELECTRICAL METALLIC TUBING (EMT) Description: ANSI C80.3
- B. Fittings and Conduit Bodies: NEMA FB 1; steel compression type.
  1. Fittings shall meet the requirements of UL 514B and ANSI/ NEMA FB1.
  2. Only steel or malleable iron materials are acceptable.
  3. Die-cast or pressure-cast zinc-alloy fittings or fittings made of "pot metal" are prohibited.
  4. Couplings and connectors: Concrete tight and rain tight, with connectors having insulated throats. Use gland and ring compression type couplings and connectors for conduit sizes 50mm (2 inches) and smaller. Use set screw type couplings with four set screws each for conduit. Use set screws of case-hardened steel with hex head and cup point to firmly seat in wall of conduit for positive grounding.
  5. Indent type connectors or couplings are prohibited.

#### **2.06 NONMETALLIC CONDUIT**

- A. RIGID NONMETALLIC CONDUIT (RNC): Direct burial plastic conduit: Shall conform to UL 651 and UL 651A, heavy wall PVC or high density polyethylene (PE).
- B. RNC: NEMA TC 2, schedule 40 PVC
- C. Fittings shall meet the requirements of UL 514C and NEMA TC3
- D. Fittings for RNC: NEMA TC 3; match to conduit or tubing type and material.

#### **2.07 EXPANSION AND DEFLECTION COUPLINGS**

- A. Conform to UL 467 and UL 514B.
- B. Accommodate, 0.75 inch deflection, expansion, or contraction in any direction, and allow 30 degree angular deflections.

- C. Include internal flexible metal braid sized to guarantee conduit ground continuity and fault currents in accordance with UL 467, and the NEC code tables for ground conductors.
- D. Jacket: Flexible, corrosion resistant, watertight, moisture and heat resistant molded rubber material with stainless steel jacket clamps.

## **2.08 CORROSION PROTECTION**

- A. Corrosion protection for conduits passing through concrete slabs shall be by one of the following means: field-wrapped with 3M Scotchrap No. 50, 2-inch wide (minimum), with a 50 percent overlay, or shall have a factory-applied polyvinyl chloride, plastic resin, or epoxy coating.

## **3 EXECUTION**

### **3.07 EXAMINATION**

- A. Verify routing and termination locations of conduit prior to rough-in.
- B. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to provide a complete wiring system.

### **3.08 CONDUIT INSTALLATION**

- A. All fire alarm cable shall be installed in metallic conduit. Coordinate with fire alarm system manufacturer for cable routing and quantities.
- B. Install conduit securely, in a neat and workmanlike manner, as specified in NECA 101.
- C. Waterproofing: At floor, exterior wall, and roof conduit penetrations, completely seal clearances around the conduit and make watertight.
- D. Arrange supports to prevent misalignment during wiring installation.
- E. Arrange conduit to maintain headroom and present neat appearance.
- F. Route exposed conduit parallel and perpendicular to walls.
- G. Route conduit installed above accessible ceilings parallel and perpendicular to walls.
- H. Route conduit in and under slab from point-to-point.
- I. Maintain adequate clearance between conduit and piping.
- J. Maintain 12 inch (300 mm) clearance between conduit and surfaces with temperatures exceeding 104 degrees F (40 degrees C).
- K. Cut conduit square using saw or pipecutter; de-burr cut ends.
- L. Bring conduit to shoulder of fittings; fasten securely.

- M. For power conduits install no more than equivalent of three 90 degree bends between boxes. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one shot bender to fabricate bends in metal conduit larger than 2 inch (50 mm) size.
- N. For communication conduits install no more than the equivalent of two 90 degree bends between pull points. Use conduit bodies to make sharp changes in direction, as around beams. Use hydraulic one shot bender to fabricate bends in metal conduit larger than 2 inch (50 mm) size.
- O. Avoid moisture traps; provide junction box with drain fitting at low points in conduit system.
- P. Provide suitable fittings to accommodate expansion and deflection where conduit crosses seismic, control, and expansion joints.
- Q. Seal the inside of all conduits where conduit passes below floor or outside of the building.
- R. Provide suitable pull string in each empty conduit except sleeves and nipples.
- S. Use suitable caps to protect installed conduit against entrance of dirt and moisture.
- T. Do not install FMC or LFMC in lengths over 6'.
- U. Use LFMC or FMC only to connect to equipment subject to vibration or to suspended light fixtures.
- V. Wherever possible, install horizontal raceway runs above water and drain piping. Give the right-of-way in confined spaces to piping that must slope for drainage and to larger HVAC ductwork and similar services that are less conformable than electrical services.
- W. Complete the installation of electrical raceways before starting installation of cables within raceways.
- X. Raceways shall not be installed exposed in finished spaces. Install concealed in walls, ceilings, below slab-on-grade or embedded in slabs above grade.

### 3.09 BOX INSTALLATION

- A. Boxes for Concealed Conduits:
  - 1. Flush mounted.
  - 2. Provide raised covers for boxes to suit the wall or ceiling, construction and finish.
- B. In addition to boxes shown, install additional boxes where needed to prevent damage to cables and wires during pulling in operations.
- C. Remove only knockouts as required and plug unused openings. Use threaded plugs for cast metal boxes and snap-in metal covers for sheet metal boxes.
- D. Outlet boxes in the same wall mounted back-to-back are prohibited. A minimum 24 inch, center-to-center lateral spacing shall be maintained between boxes.

- E. Minimum size of outlet boxes for ground fault interrupter (GFI) receptacles is 4 inches square by 2-1/8 inches deep, with device covers for the wall material and thickness involved.
- F. Clean all debris out of floor boxes.

**3.10 IDENTIFICATION**

- A. Stencil or install phenolic nameplates on covers of the boxes identified on riser diagrams; for example "SIG-FA JB No. 1"
- B. On all concealed junction box covers, identify the circuits with black marker. For exposed junction boxes use printed labels.

END OF SECTION 260533

**SECTION 260543  
UNDERGROUND DUCTS AND RACEWAYS FOR ELECTRICAL SYSTEMS**

**PART 1 - GENERAL**

**1.01 SUBMITTALS:**

- A. Refer to section 260510.

**PART 2 - PRODUCTS**

**2.01 DUCTBANKS**

- A. Any grouping of conduits underground shall be considered a duct bank.
- B. Ducts shall be 4" diameter minimum, type EB40 for encased burial.
- C. Raceways shall be provided in accordance with specification 260533 Raceway and Boxes for Electrical Systems.
- D. Fittings for raceways shall be designed specifically for use with the type of raceway installed. All couplings or other connections shall be made tight and sealed to exclude water and concrete.
- E. Top, intermediate and bottom spacers of plastic, or other approved non-organic material, shall be provided to maintain a separation between raceways of not less than that shown on drawings. Spacers shall be of the type specifically intended for encased installations.

**2.03 WARNING TAPE**

- A. Provide a plastic warning tape in the backfill above all underground cables, conduits and duct banks. The tape shall be 3 inches wide, shall be bright, fade-resistant, red in color for power, yellow/orange in color for low voltage, and shall include an imprinted legend, "WARNING - BURIED HIGH VOLTAGE LINE", "WARNING - BURIED FIBER OPTIC LINE" or "WARNING - BURIED TELEPHONE LINE", as applicable., repeated continuously throughout the entire length. Tape shall be buried 12 inches below top of trench.

**PART 3 - EXECUTION**

**3.01 GENERAL**

- A. Layout of duct banks is the responsibility of the Contractor. Coordinate layout with existing site conditions, the elevation of manhole openings and work by other trades. Duct lines shall be sloped to drain towards manholes and pull boxes, with a pitch of not less than 3 inches in 100 feet. For lines run between adjacent manholes or pull boxes, high point may occur in the middle of run.
- B. Excavation, Trenching and Backfilling: Provide as required to install duct banks in the manner indicated on the drawings and in accordance with the applicable sections of Division 31 through 33 of the specifications.
- C. Provide barricades with warning lights, around all trenches. Barricades shall be orange mesh type supported by rods driven into the earth. Barricades shall remain in place at all times, not just at night. Maintain the integrity and appearance of the barricades until the trenches have been backfilled and compacted.



- D. Clearance from Other Utilities: Do not install lines installed under this contract in the same trenches with other utilities. Maintain horizontal and vertical separation as required by ANSI C2.

### **3.02 INSTALLATION**

- A. During construction, partially completed duct lines shall be protected from the entrance of debris such as mud, sand and dirt, by means of suitable conduit plugs. As each section of a duct line is completed from manhole to manhole, a testing mandrel not less than 12 inches long with a diameter 1/4-inch less than the size of the conduit, shall be drawn through each conduit, after which a brush having the diameter of the conduit, and having stiff bristles, shall be drawn through until the conduit is clear of all particles of earth, sand, and/or gravel; conduit plugs shall then be immediately installed.
- B. Install spacers every 5' along the duct run and at the midpoint and points of tangency of all bends. Anchor spacers to trench to ensure that the duct banks are held securely in place during concrete pours.
- C. Ducts shall be encased in concrete as shown on the drawings. Care shall be taken that no voids are left between ducts.
- D. Ducts crossing roadways and parking lots shall be reinforced as indicated on the drawings. Cutting and patching shall conform to the details shown on the Civil drawings. Engage the services of the paving and grading contractor to perform all cutting and patching.
- E. Install warning tape 12" below grade along the entire length of, and centered on duct banks.
- F. Bends: Except at conduit risers, changes in direction of runs exceeding a total of 10 degrees, either vertical or horizontal, shall be accomplished by long sweep bends having a minimum radius of curvature of 25 feet. Sweep bends may be made up of one or more curved or straight sections or combinations thereof. Manufactured bends shall have a minimum radius of 48".

### **3.04 RECONDITIONING OF SURFACES**

- A. Ground covering and vegetation disturbed during installation, shall be restored to original elevation and condition.
- B. Sod or topsoil shall be preserved carefully and replaced after the backfilling is completed. Sod that is damaged shall be replaced by sod of quality equal to that removed. When the surface is disturbed in a newly seeded area, the restored surface shall be re-seeded with the same quantity and formula of seed as that use in the original seeding.

### **3.05 CABLE PULLING**

- A. Pull cables down grade with the feed-in point at the handhole or buildings of the highest elevation. Use flexible cable feeds to convey cables through the handhole opening and into the conduit. Cable slack shall be accumulated at each handhole where space permits. Minimum allowable bending radii shall be maintained.
- B. Lubricants: For assisting in the pulling of cables shall be those specifically recommended by the cable manufacturer. The lubricant shall not be deleterious to the cable sheath, jacket, or outer coverings.

- C. Cable Pulling Tensions: Shall not exceed the maximum pulling tension recommended by the cable manufacturer.
- D. Grounding Conductor: Secondary cable runs, 600 volts and less, in non-metallic conduit shall, although not indicated, include an insulated copper equipment grounding conductor sized as required by the rating of the overcurrent device supplying the phase conductors.

END OF SECTION 260543

**SECTION 260548**  
**VIBRATION AND SEISMIC CONTROLS FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.01 SUBMITTALS**

- A. Refer to section 260510.

**1.02 QUALITY ASSURANCE**

- A. Submittals must be signed and sealed shop drawings from a professional engineer licensed in the state that the project is located in. Shop drawings to include project specific details, sketches, product data cut sheets.
- B. The contractor shall provide pre-engineered seismic restraint systems to meet total design lateral force requirements for support and restraint of piping, conduit, cable trays and other similar systems and equipment where required by the applicable building code.
- C. System Supports/Restraints Manufacturers shall be firms regularly engaged in the manufacture of products of the types specified in this section, whose products have been in satisfactory use in similar service for not less than 5 years.

**PART 2 - PRODUCT****2.01 SEISMIC BRACING**

- A. General:
  - 1. Seismic restraint designer shall coordinate all attachments with the structural engineer of record.
  - 2. Design analysis shall include calculated dead loads, static seismic loads, and capacity of materials utilized for the connection of the equipment or system to the structure.
  - 3. Analysis shall detail anchoring methods, bolt diameter, and embedment depth.
  - 4. All seismic restraint devices shall be designed to accept without failure the forces calculated per the details and notes on the construction documents
- B. Friction from gravity loads shall not be considered resistance to seismic forces.

**2.02 MANUFACTURER SEISMIC QUALIFICATION CERTIFICATION**

- A. All components indicated to be provided with an  $I_p=1.5$  seismic importance factor on the electrical drawings - shall be provided with an IBC compliant seismic component certificate.
- B. Indicate on the certificate or include with the certificate whether withstand certification is based on actual test of assembled components or by calculation from a Professional Engineer licensed in the jurisdiction of the project.
  - 1. The certificate shall indicate that the equipment will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event." The certificate shall also provide the following:
    - a. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
    - b. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. All seismic restraint systems shall be installed in strict accordance with the manufacturer's seismic restraint guidelines manual and all certified submittal data
- B. Installation of seismic restraints shall not cause any change in position of equipment or piping, resulting in stresses or misalignment.
- C. No rigid connections between equipment and the building structure shall be made that degrade the noise and vibration-isolation system specified.
- D. Do not install any equipment, piping, duct, or conduit that makes rigid connections with the building.
- E. Prior to installation, bring to the architect's/engineer's attention any discrepancies between the specifications and the field conditions, or changes required due to specific equipment selection.
- F. Bracing may occur from flanges of structural beams, upper truss cords of bar joists, cast in place inserts, or wedge-type concrete anchors. Consult structural engineer of record.
- G. Overstressing of the building structure shall not occur from overhead support of equipment. Bracing attached to structural members may present additional stresses. The contractor shall submit loads to the structural engineer of record for approval in this event.
- H. Brace support rods when necessary to accept compressive loads. Welding of compressive braces to the vertical support rods is not acceptable.
- I. Provide reinforced clevis bolts where required.
- J. Seismic restraints shall be mechanically attached to the system. Looping restraints around the system is not acceptable.
- K. Do not brace a system to two independent structures such as a ceiling and wall.
- L. Provide appropriately sized openings in walls, floors, and ceilings for anticipated seismic movement.
- M. Provide seismic controls as required for all existing electrical items exposed during renovations.

**3.02 FIELD QUALITY CONTROL**

- A. Inspect all seismic supports after installation and submit a report from a professional engineer licensed in the state that the project is located in.

END OF SECTION 260548

**SECTION 260553**  
**IDENTIFICATION FOR ELECTRICAL SYSTEMS****PART 1 - GENERAL****1.01 SUBMITTALS**

- A. Refer to section 260510.

**PART 2 - PRODUCTS****2.01 NAMEPLATES AND LABELS**

- A. Nameplates: Engraved three-layer laminated plastic, black letters on white background unless noted otherwise.
- B. Locations:
  - 1. Each electrical distribution and control equipment enclosure.
- C. Letter Size:
  - 1. Use 1/4 inch (6 mm) letters for identifying grouped equipment and loads.
- D. Labels: Embossed adhesive tape, with 3/16 inch (5 mm) white letters on black background. Use only for identification of individual wall switches, receptacles, and control device stations. Labels shall identify the panel and circuit number (Ex: PANEL: CIRCUIT).
- E. Plenum-Rated Cable Ties: Self extinguishing, UV stabilized, one piece, self locking.
  - 1. Minimum Width: 3/16 inch (5 mm).
  - 2. Tensile Strength at 73 deg F (23 deg C), According to ASTM D 638: 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: burgundy.

**PART 3 - EXECUTION****3.01 PREPARATION**

- A. Degrease and clean surfaces to receive nameplates and labels.

**3.02 INSTALLATION**

- A. Install nameplates and labels parallel to equipment lines.
- B. Secure nameplates to equipment front using corrosion resistant screws.
- C. Secure nameplates to inside surface of door on panelboard that is recessed in finished locations.
- D. Provide name plates on all disconnects, panelboards, switchboards, switchgear, transformers,

and motor starters.

- E. Provide labels on all receptacles, light switches, and wall mounted occupancy sensors.

END OF SECTION 260553

**SECTION 262726  
WIRING DEVICES****PART 1 - GENERAL****1.01 SUMMARY**

- A. This section includes the requirements for the following:
  - 1. Receptacles.
  - 2. Device plates.
  - 3. Wall switches.
  - 4. Wall dimmers.
  - 5. Occupancy Sensors
  - 6. Motion Sensors

**1.02 SUBMITTALS**

- A. Refer to section 260510.

**1.03 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Products: Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.04 OCCUPANCY SENSOR DRAWING**

- A. Drawing Format: Drawings shall be prepared at a scale of no less than 1/16"=1'-0". Drawing shall be titled to define Project Name, Drawing subject and date prepared. Drawings are to be prepared in AutoCAD 2017 or compatible software.

**1.05 REFERENCE STANDARDS**

- A. NECA 1 - Standard Practices for Good Workmanship in Electrical Contracting; National Electrical Contractors Association; current edition.
- B. NEMA WD 1 - General Color Requirements for Wiring Devices; National Electrical Manufacturers Association; current edition).
- C. NEMA WD 6 - Wiring Device -- Dimensional Requirements; National Electrical Manufacturers Association; current edition.

**PART 2 - PRODUCTS****2.01 APPROVED MANUFACTURERS**

- A. Acceptable manufacturers, contingent upon compliance with the contract documents, are as listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing substitutions are submitted in accordance with

requirements listed in the front end specifications and approved by the A/E. Bidders shall carefully review the front end documents and submit all information required to allow the A/E the ability to make a fully informed decision.

1. Cooper Wiring Devices
2. GE Industrial
3. Leviton Manufacturing, Inc
4. Hubbell, Inc
5. Lutron Electronics Inc
6. Wattstopper Inc
7. Schneider Electric
8. Legrand – Pass & Seymour
9. C.W. Cole & Company
10. Acuity Brands Lighting, Inc

## 2.02 RECEPTACLES

- A. Receptacles: Fed spec listed complying with NEMA WD 6 and WD 1.
  1. Device Body: color by architect plastic
  2. Configuration: NEMA WD 6, type as specified and indicated.
  3. Type 5-20.
- B. Residential Receptacles: Tamper-resistant receptacle
  1. Device Body: color by architect.
  2. Type 5-20 or 5-15
- C. GFCI Receptacles: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements. Feed through GFCI devices shall not be used. GFCI devices shall contain self-testing feature with power lockout if self-test fails.
- D. Special Purpose Receptacles: Provide heavy-duty type as indicated on the drawings.
- E. Wet Location: A receptacle installed in a wet location shall be GFCI listed weather-resistant type.

## 2.03 WALL PLATES

- A. Cover Plates: Provide one piece wall plates for wiring devices, with ganging and cutouts as required. Provide blank wall plates for all un-used outlet boxes. Provide with metal screws for securing plates to devices, screw heads colored to match finish of plate. All plates shall be standard size, smooth stainless steel. Impact resistant Nylon
- B. Weatherproof Cover Plates: All devices installed outdoors and indoor devices specifically indicated, shall be provided with weatherproof covers. Covers shall be of the type that maintains weatherproof integrity when in-use and not in-use. Covers shall be listed and identified as "extra duty" type.

## 2.05 WALL SWITCHES

- A. Wall Switches: Heavy Duty, AC only general-use snap switch, complying with NEMA WD 6 and WD 1.
  1. Body and Handle: color by architect plastic with toggle handle, or red for emergency power devices.
  2. Locator Light: Lighted handle type switch; red color handle.



3. Ratings: Match branch circuit and load characteristics.
4. Switch shall be rated for the horse power of the motor served.

B. Switch Types: Single pole, double pole, 3-way, and 4-way.

## 2.06 WALL DIMMERS

- A. Electronic Wall Dimmers: Coordinate with electronic dimming ballast requirements.
1. Body and Handle: plastic with slide adjuster.
- B. Incandescent Wall Dimmers:
1. Body and Handle: plastic with slide adjuster.
  2. Rating: Dimmer ratings shall be at least 125% of circuit load. De-rate ganged installations as recommended by the Manufacturer.

## 2.07 OCCUPANCY SENSORS

- A. Wall switch sensors: Passive Infrared type.
1. Capable of detection of occupancy at desktop level up to 300 sqft, and gross motion up to 1000 sqft with 180 degree coverage capability.
  2. Rating: Sensor rating shall be at least 125% of the connected load.
  3. Sensor shall utilize Zero Crossing Circuitry.
  4. Sensor shall have no leakage current to load, and voltage drop protection.
  5. Sensor shall provide high immunity to false triggering from RFI and EMI.
  6. Sensor shall be capable of operating normally with electronic ballasts, PL lamp systems and rated motor loads.
  7. Sensor shall utilize automatically adjustable time delay and sensitivity settings.
  8. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
  9. A bypass manual override shall be provided on each sensor.
  10. An integral photo cell with adjustable light level shall be provided
  11. All sensors shall have UL rated, 94V-0 plastic enclosures.
- B. Ceiling Sensors: Dual Technology type.
1. Rating: Sensor rating shall be at least 125% of the connected load.
  2. Sensor shall be ceiling mounted in such a way as to minimize coverage in unwanted areas.
  3. Sensor shall consist of passive infrared and ultrasonic technologies for occupancy detection. Products that react to noise or ambient sound shall not be considered.
  4. Passive Infrared Sensor shall provide high immunity to false triggering from RFI and EMI.
  5. Ultrasonic Sensor shall adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout the controlled space.
  6. Sensor shall be capable of operating normally with electronic ballasts, PL lamp systems and rated motor loads.
  7. Sensor shall utilize automatically adjustable time delay and sensitivity settings.
  8. Coverage of sensors shall remain constant after sensitivity control has been set. No automatic reduction shall occur in coverage due to the cycling of air conditioner or heating fans.
  9. A bypass manual override shall be provided on each sensor.
  10. All sensors shall have UL rated, 94V-0 plastic enclosures.

- C. Circuit Control Hardware – Where required.
  - 1. Control Unit: Self-contained unit consisting internally of isolated load switching relay(s) and transformer to provide low-voltage power.
  - 2. Control Unit shall provide power to a minimum of two sensors.
  - 3. Relay Contacts shall have ratings as required for connected load.

## **2.08 MOTION SENSORS**

- A. Exterior Motion Sensors shall have the following features:
  - 1. Rated for covered exterior applications.
  - 2. A 1 minute built-in time delay.
  - 3. Sensor shall utilize a sensitivity adjustment for wind in trees.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verify that outlet boxes are installed at proper height.
- B. Verify that wall openings are neatly cut and will be completely covered by wall plates.
- C. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.

### **3.02 PREPARATION**

- A. Provide extension rings to bring outlet boxes flush with finished surface.
- B. Clean debris from outlet boxes.

### **3.03 INSTALLATION**

- A. Install securely, in a neat and workmanlike manner, as specified in NECA 1.
- B. Install devices plumb and level.
- C. Do NOT utilize back wiring on any wiring device.
- D. Install receptacles with grounding pole on top.
- E. Do not install receptacles within 6" of the edge of sinks.
- F. Connect wiring device ground terminal to outlet box with bonding jumper.
- G. All receptacles installed as listed below shall be GFCI type.
  - 1. Receptacles installed outdoors.
  - 2. Receptacles installed within six feet of sinks.
  - 3. Receptacles designated for electric drinking fountains.
  - 4. Receptacles designated for vending machines.
  - 5. Any other receptacles specifically indicated on the drawings.
- H. Install decorative plates in finished areas.
- I. Connect wiring devices by wrapping conductor around screw terminal.

- J. Install switches with OFF position down.
- K. Install wall dimmers to achieve full rating specified and indicated after derating for ganging as instructed by manufacturer.
- L. Do not share neutral conductor on load side of dimmers.

### **3.04 FIELD QUALITY CONTROL**

- A. Perform all field inspection, testing, and adjusting specified in NETA STD ATS.
- B. Inspect each wiring device for defects.
- C. Verify that each receptacle device is energized.
- D. Test each receptacle device for proper polarity.
- E. Test each GFCI receptacle device for proper operation.
- F. Operate each wall switch with circuit energized and verify proper operation.
- G. Test each occupancy sensor and verify settings are appropriate for associated space.

### **3.05 ADJUSTING**

- A. Adjust devices and wall plates to be flush and level.
- B. It shall be the contractor's responsibility to locate and aim occupancy sensors in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer's recommendations. Rooms shall have ninety (90) to one hundred (100) percent coverage to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the room(s). The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. The contractor shall provide additional sensors if required to properly and completely cover the respective room.
- C. Proper judgment must be exercised in executing the installation so as to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components. The contractor shall also provide, at the owner's facility, the training necessary to familiarize the owner's personnel with the operation, use, adjustment, and problem solving diagnosis of the occupancy sensing devices and systems.

### **3.06 CLEANING**

- A. It is anticipated that painting and other finish work may occur after device installation. Device plates shall not be installed until these activities are completed. Protect device and conductors by installing molded plastic cover.
- B. Clean exposed surfaces to remove splatters and restore finish.

END OF SECTION 262726

**SECTION 262816  
ENCLOSED SWITCHES**

**PART 1 - GENERAL**

**1.01 SUBMITTALS**

- A. Refer to section 260510.

**1.02 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Products: Furnish products listed and classified by Underwriters Laboratories Inc.; or testing firm acceptable to authority having jurisdiction as suitable for purpose specified and indicated.

**1.03 REFERENCES**

- A. NEMA FU 1 - Low Voltage Cartridge Fuses; National Electrical Manufacturers Association; current edition.
- B. NEMA KS 1 - Enclosed and Miscellaneous Distribution Equipment Switches (600 Volts Maximum); National Electrical Manufacturers Association; current edition.
- C. NETA STD ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems; International Electrical Testing Association; current edition.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. Acceptable manufacturers
  - 1. Eaton Electrical/Cutler-Hammer
  - 2. GE Industrial
  - 3. Square D
  - 4. Siemens

**2.02 NON-FUSIBLE SWITCH**

- A. Non-fusible Switch Assemblies: NEMA KS 1, Type HD enclosed load interrupter knife switch.
  - 1. Externally operable handle interlocked to prevent opening front cover with switch in ON position.
  - 2. Handle lockable in OFF position.

**2.04 ENCLOSURES**

- A. Enclosures: NEMA KS 1.
  - 1. Interior Dry Locations: Type 1.
  - 2. Locations subjected to hose down: gasketed, stainless steel, NEMA 4X Rated.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Install in accordance with Manufacturer's instructions.
- B. Apply adhesive tag on inside door of each fused switch indicating NEMA fuse class and size installed.
- C. All switches associated with equipment mounted above a lay-in ceiling shall also be located above the lay-in ceiling.
- D. Coordinate safety and disconnect switch installation with surrounding equipment to provide unobstructed access to the switch (4 foot clearance) and to insure that the switch is within sight of the controller or driven equipment.

**3.02 FIELD QUALITY CONTROL**

- A. Inspect and test in accordance with NETA STD ATS, except Section 4.
- B. Perform inspections and tests listed in NETA STD ATS, Section 7.5.
- C. Touch-up scratched or marred surfaces to match original finish.
- D. Clean all debris from enclosure interiors.
- E. Test all shunt trip and under voltage trip units.

**3.03 LABELING**

- A. Provide nameplates on all switch enclosures wherein new circuits are modified or installed. Indicate the following information:
  - 1. Equipment Switch Serves.
  - 2. Branch Circuit.
  - 3. Voltage, phase, wire, short circuit current rating
  - 4. Date installed

**3.04 CLEARANCE AND WORKSPACE**

- A. Maintain workspace and clearances as required by the NEC for the voltage encountered. No pipes or ducts shall pass above the outline of the switch enclosure. It shall be the responsibility of this Contractor to make sure that other trades do not encroach on this space.

END OF SECTION 262816

**SECTION 265100  
LIGHTING****PART 1 - GENERAL****1.01 SUMMARY**

- A. This section includes the requirements for the following:
  - 1. Interior luminaires and accessories.
  - 2. Emergency lighting units.
  - 3. Exit signs.
  - 4. Luminaire accessories.

**1.02 SUBMITTALS**

- A. Refer to section 260510.

**1.03 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70 and NFPA 101.
- B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
- C. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.04 REFERENCE STANDARDS**

- A. ANSI C78.379 - American National Standard for Electric Lamps -- Reflector Lamps -- Classification of Beam Patterns; current edition.
- B. ANSI C78.377 – American National Standard for Electric Lamps – Specifications for the Chromaticity of Solid State Lighting Products.
- C. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information; current edition.
- D. IESNA LM-79-08 – Approved Method: Electrical and Photometric Measurements of Solid-State Lighting Products.
- E. IESNA LM-80-08 – Approved Method: Measuring Lumen Maintenance of LED Light Sources.
- F. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems; National Electrical Contractors Association; current edition.
- G. NEMA WD 6 - Wiring Devices - Dimensional Requirements; National Electrical Manufacturers Association; current edition.
- H. NFPA 70 - National Electrical Code; National Fire Protection Association, current edition.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. Basis of design is as scheduled on drawings. Acceptable manufacturers, contingent upon compliance with the contract documents, are as follows: Columbia, Prescolite, ILP Lighting, Lithonia, Compass, Gotham, Juno, Williams, Eclipse, and Spectrum. Equal products by other manufacturers are acceptable providing substitutions are submitted in accordance with requirements listed elsewhere in the Bid Documents and approved by the A/E.
- B. Prior Approved Equal Manufacturer(s) are listed in lighting fixture schedule on drawings.
- C. LM-79 reports must be submitted with all proposed LED substitutions from Basis of Design, regardless of whether manufacturer is listed as an approved equal.

**2.02 LUMINAIRES**

- A. Furnish products as indicated in Schedule on plans.

**2.03 EMERGENCY LED DRIVERS**

- A. Regardless of catalogue number shown in fixture schedule, all fixtures indicated to be emergency type shall be provided with emergency type driver battery packs conforming to the following:
  - 1. Fixture Using Integral Emergency Driver/Battery Pack: Provide emergency driver installed within the fixture. The charging light and test switch shall be accessible/visible from below. Driver/Battery must be capable of operating fixture at 75% of fixture lumens for a minimum of 90 minutes. Drivers/batteries shall have full 5-year warranty.
  - 2. Fixture Using Remote Emergency Driver/Battery Pack: Provide Iota or Bodine emergency driver/battery pack installed remotely above accessible ceiling. Driver/Battery must be capable of operating fixture at 75% of fixture lumens for a minimum of 90 minutes. Drivers/batteries shall have full 5-year warranty.
- B. Integral emergency drivers/batteries shall be factory installed whenever possible.
- C. Drivers/batteries installed in fixtures located outdoors or unheated spaces shall be suitable for the ambient temperatures encountered or remotely located in a nearby accessible space.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting).
- B. Install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.
- C. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.
- D. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.
- E. Install recessed luminaires to permit removal from below.

- F. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.
- G. Install clips to secure recessed grid-supported luminaires in place.
- H. Install wall mounted luminaires, emergency lighting units, and exit signs at height as indicated on Drawings.
- I. Install accessories furnished with each luminaire.
- J. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- K. Bond products and metal accessories to branch circuit equipment grounding conductor.
- L. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.

**3.02 FIELD QUALITY CONTROL**

- A. Perform field inspection in accordance with Section 01 40 00.
- B. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

**3.03 ADJUSTING**

- A. Aim and adjust luminaires as indicated.
- B. Position exit sign directional arrows as indicated.

**3.04 CLEANING**

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosures.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

**3.05 CLOSEOUT ACTIVITIES**

- A. Demonstrate luminaire operation for minimum of two hours.

**3.06 PROTECTION**

- A. Replace/Repair luminaires that have failed at Substantial Completion.

END OF SECTION 265100



**SECTION 265600  
EXTERIOR LIGHTING****PART 1 - GENERAL****1.01 SUBMITTALS**

- A. Refer to Section 260510.

**1.02 QUALITY ASSURANCE**

- A. Conform to requirements of NFPA 70 and NFPA 101.
- B. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

**1.03 REFERENCE STANDARDS**

- A. ANSI C78.379 - American National Standard for Electric Lamps -- Reflector Lamps -- Classification of Beam Patterns; current edition.
- B. NFPA 70 - National Electrical Code; National Fire Protection Association, current edition.

**1.04 DELIVERY, STORAGE, AND HANDLING**

- A. Poles: Do not store poles on ground. Store poles so they are at least 305 mm (one foot) above ground level and growing vegetation. Do not remove factory-applied pole wrappings until just before installing pole.

**PART 2 - PRODUCTS****2.01 MANUFACTURERS**

- A. As scheduled or listed on the contract documents. Acceptable manufacturers, contingent upon compliance with the contract documents, are as follows: ILP Lighting, Lithonia, and Columbia. Equal products by other manufacturers are acceptable providing substitutions are submitted in accordance with requirements listed elsewhere in the Bid Documents and approved by the A/E.

**2.02 LUMINAIRES**

- A. Furnish products as indicated in Schedule on the contract documents.
- B. UL 1598 and NEMA C136.17. Luminaries shall be weatherproof, heavy duty, outdoor types designed for efficient light utilization, adequate dissipation of driver heat and safe cleaning.
- C. Lenses shall be frame-mounted heat-resistant, borosilicate glass, prismatic refractors. Attach the frame to the luminaire housing by hinges or chain. Use heat and aging resistant resilient gaskets to seal and cushion lenses and refractors in luminary doors.
- D. Materials shall be rustproof. Latches and fittings shall be non-ferrous metal.
- E. IESNA Cutoff Category: cutoff

**2.03 POLES**

- A. Furnish products as indicated in Schedule on the contract documents.
- B. The pole and arm assembly shall be designed for wind loading of 100 miles per hour, with an additional 30 percent gust factor, supporting luminaire(s) having the effective projected areas indicated. The effective projected area of the pole shall be applied at the height of the pole base as shown on the drawings.
- C. Poles shall be anchor-bolt type designed for use with underground supply conductors. Poles shall have oval-shaped handhole having a minimum clear opening of 2.5 by 5 inches. Handhole cover shall be secured by stainless steel captive screws.
- D. Provide a steel-grounding stud opposite hand hole openings
- E. Provide a base cover matching the pole in material and color to conceal the mounting hardware pole-base welds and anchor bolts
- F. Hardware: All necessary hardware shall be 300 series stainless steel.
- G. Aluminum: Provide aluminum poles manufactured of corrosion resistant AA AAH35.1 aluminum alloys conforming to AASHTO LTS-4 for Alloy 6063-T6 or Alloy 6005-T5 for wrought alloys, and Alloy 356-T4 (3,5) for ASTM B108-03 cast alloys. Poles shall be seamless extruded or spun seamless type. Provide a pole grounding connection designed to prevent electrolysis when used with copper ground wire. Base covers for aluminum poles shall be cast from 356-T6 aluminum alloy in accordance with ASTM B108-03
- H. Steel: Provide steel poles having minimum 11-gage steel with minimum yield/strength of 48,000 psi and //hot-dipped galvanized// //iron-oxide primed// factory finish. //Galvanized steel poles shall comply with ASTM A123 and A153.// Provide a pole grounding connection designed to prevent electrolysis when used with copper ground wire. Base covers for steel poles shall be structural quality hot-rolled carbon steel plate having a minimum yield of 36,000 psi.

**2.04 EXISTING FOUNDATIONS FOR POLES**

- A. Foundations shall support the effective projected area of the specified pole, arm(s), and luminaire(s) under wind conditions previously specified in this section.
- B. If existing anchor bolt assemblies are incompatible with new light pole. Provide anchor bolt assemblies and reinforcing of concrete foundations shall be as shown on the drawings and meet ACI 318. Anchor bolts shall be in a welded cage or properly positioned by the tie wire to stirrups.

**PART 3 - EXECUTION****3.01 INSTALLATION**

- A. Install lighting in accordance with the NEC, as shown on the drawings, and in accordance with manufacturer's recommendations.
- B. Poles:

1. Provide pole foundations with galvanized steel anchor bolts, threaded at the top end and bent 90 degrees at the bottom end. Provide galvanized nuts, washers, and ornamental covers for anchor bolts. Thoroughly compact backfill with compacting arranged to prevent pressure between conductor, jacket, or sheath and the end of conduit. Adjust poles as necessary to provide a permanent vertical position with the bracket arm in proper position for luminaire location.
  2. After the poles have been installed, shimmed and plumbed, grout the spaces between the pole bases and the concrete base with non-shrink concrete grout material. Provide a plastic or copper tube, of not less than 3/8-inch inside diameter, through the grout tight to the top of the concrete base for moisture weeping.
- C. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting).
- D. Install accessories furnished with each luminaire.
- E. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.
- F. Bond products and metal accessories to branch circuit equipment grounding conductor.
- G. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.

### **3.02 GROUNDING**

- A. Ground noncurrent-carrying parts of equipment including metal poles, luminaries, mounting arms, brackets, and metallic enclosures as specified in Section 26 05 26. Where copper grounding conductor is connected to a metal other than copper, provide specially treated or lined connectors suitable and listed for this purpose.

### **3.03 FIELD QUALITY CONTROL**

- A. Operate each luminaire after installation and connection. Inspect for proper connection and operation.

### **3.04 ADJUSTING**

- A. Aim and adjust luminaires as indicated.
- B. Position exit sign directional arrows as indicated.

### **3.05 CLEANING**

- A. Clean electrical parts to remove conductive and deleterious materials.
- B. Remove dirt and debris from enclosures.
- C. Clean photometric control surfaces as recommended by manufacturer.
- D. Clean finishes and touch up damage.

### **3.06 CLOSEOUT ACTIVITIES**

- A. Demonstrate luminaire operation for minimum of two hours.

**3.07 PROTECTION**

- A. Replace/Repair luminaires that have failed at Substantial Completion.

END OF SECTION 265600

**SECTION 283111**  
**DIGITAL, ADDRESSABLE FIRE-ALARM SYSTEM****PART 1 - GENERAL****1.01 SUMMARY**

- A. Section Includes:
1. Fire-alarm control unit.
  2. Manual fire-alarm boxes.
  3. System smoke detectors.
  4. Air-sampling smoke detectors.
  5. Non-system smoke detectors.
  6. Notification appliances.
  7. Device guards.
  8. Remote annunciator.
  9. Addressable interface device.
  10. Digital alarm communicator transmitter.
  11. Network communications.

**1.02 DEFINITIONS**

- A. EMT: Electrical Metallic Tubing.
- B. FACP: Fire Alarm Control Panel.
- C. HLI: High Level Interface.
- D. NICET: National Institute for Certification in Engineering Technologies.
- E. PC: Personal computer.
- F. VESDA: Very Early Smoke-Detection Apparatus.

**1.03 ACTION SUBMITTALS**

- A. Refer to Specification 260510 Electrical Submittals.

**1.04 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 III** technician.
- C. NFPA Certification: Obtain certification according to NFPA 72 by an NRTL (nationally recognized testing laboratory).

**1.05 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.

## **PART 2 - PRODUCTS**

### **2.01 SYSTEM DESCRIPTION**

- A. Source Limitations for Fire-Alarm System and Components: 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.
- F. Provide TVSS for any exterior mounted or remote from building annunciation or alarm devices.

### **2.02 SYSTEMS OPERATIONAL DESCRIPTION**

- A. Fire-alarm signal initiation shall be by one or more of the following devices:
  1. Manual stations.
  2. Smoke detectors.
  3. Duct smoke detectors.
  4. Air-sampling smoke-detection system (VESDA).
- 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 connected network control panels, off-premises network control panels and remote annunciators.
  3. Transmit an alarm signal to the remote alarm receiving station.
  4. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
  5. Record events in the system memory.
  6. Indicate device in alarm on the remote annunciator.
- C. 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, remote annunciator, printer interface, or Ethernet module.
  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.

- D. System Supervisory Signal Actions:
1. Initiate notification appliances.
  2. Identify specific device initiating the event at fire-alarm control unit, connected network control panels, off-premises network control panels, and remote annunciators.
  3. Record the event on system printer.
  4. After a time delay of 200 seconds, transmit a trouble or supervisory signal to the remote alarm receiving station.
  5. Display system status on graphic annunciator.

## 2.03 FIRE-ALARM CONTROL UNIT

- A. Acceptable manufacturers, contingent upon compliance with the contract documents, are as listed below. Bidders shall carefully review the requirements listed in the technical specifications and only submit products that are equal or better. Equal products by other manufacturers are acceptable providing substitutions are submitted in accordance with requirements listed in the front end specifications and approved by the A/E. Bidders shall carefully review the front end documents and submit all information required to allow the A/E the ability to make a fully informed decision.
1. GAMEWELL.
  2. Notifier.
  3. Siemens Industry, Inc.; Fire Safety Division.
  4. SimplexGrinnell LP.
  5. Edwards
  6. Honeywell Fire Lite
  7. Eaton/ Cooper
- B. General Requirements for Fire-Alarm Control Unit:
1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864.
    - a. System software and programs shall be held in nonvolatile flash, electrically erasable, programmable, read-only memory, retaining the information through failure of primary and secondary power supplies.
    - b. Include a real-time clock for time annotation of events on the event recorder and printer.
    - c. Provide communication between the FACP and remote circuit interface panels, annunciators, and displays.
    - d. The FACP shall be listed for connection to a central-station signaling system service.
    - e. Provide nonvolatile memory for system database, logic, and operating system and event history. The system shall require no manual input to initialize in the event of a complete power down condition. The FACP shall provide a minimum 500-event history log.
  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.

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 B.
- 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. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.
- G. 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.
- H. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

## 2.04 PREACTION SYSTEM

- A. Initiate Presignal Alarm: This function shall cause an audible and visual alarm and indication to be provided at the FACP. Activation of an initiation device connected as part of a preaction system shall be annunciated at the FACP only, without activation of the general evacuation alarm.

## 2.05 MANUAL FIRE-ALARM BOXES

- A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
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.
  3. Indoor Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.
  4. Weatherproof Protective Shield: Factory-fabricated, clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

## 2.06 SYSTEM SMOKE DETECTORS

- A. General Requirements for System Smoke Detectors:



1. Comply with UL 268; operating at 24-V dc, nominal.
  2. 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.
  3. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
  4. 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. 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 AIR-SAMPLING SMOKE DETECTOR**

- A. General Description:
1. Air-sampling smoke detector shall be laser based using a piping system and a fan to transport the particles of combustion to the detector.
  2. Provide two levels of alarm from each zone covered by the detector and two supervisory levels of alarm from each detector.
  3. The air being sampled shall pass through filters to remove dust particulates greater than 20 microns before entering the detection chamber.
  4. Detectors shall have the capability via RS 485 to connect up to 100 detectors in a network.
  5. Detectors shall communicate with the fire-alarm control unit via addressable, monitored dry contact closures, RS 485, and interface modules. Provide a minimum of six relays, individually programmable remotely for any function.
  6. Pipe airflow balancing calculations shall be performed using approved calculation software.
- B. Detector:

1. Detector, Filter, Aspirator, and Relays: Housed in a mounting box and arranged in such a way that air is drawn from the detection area and a sample passed through the dual-stage filter and detector by the aspirator.
2. Obscuration Sensitivity Range: 0.005 - 6 percent obs/ft.
3. Four independent, field-programmable, smoke-alarm thresholds per sensor pipe and a programmable scan time delay. The threshold set points shall be programmable.
  - a. The four alarm thresholds may be used as follows:
    - 1) Alarm Level 1 (Alert): Activate a visual and an audible supervisory alarm.
    - 2) Alarm Level 2 (Action): Activate shutdown of electrical/HVAC equipment and activate a visual and an audible supervisory alarm.
    - 3) Alarm Level 3 (Fire 1): Activate building alarm systems and initiate call to fire response unit.
    - 4) Alarm Level 4 (Fire 2): Activate suppression system or other countermeasures.
  - b. Final Detection System Settings: Approved by Owner
  - c. Initial Detection Alarm Settings:
    - 1) Alarm Level 1 (Alert): 0.08 percent obs/ft.
    - 2) Alarm Level 2 (Action): 1.0 percent obs/ft..
    - 3) Alarm Level 3 (Fire 1): 2.0 percent obs/ft.
    - 4) Alarm Level 4 (Fire 2): 4.0 percent obs/ft.
4. Power Supply:
  - a. Regulated 24-V dc, monitored by the fire-alarm control unit, with battery backup.
  - b. Battery backup shall provide 24 hours' standby, followed by 30 minutes at maximum connected load.
5. Detector shall also transmit the following faults:
  - a. Detector.
  - b. Airflow.
  - c. Filter.
  - d. System.
  - e. Zone.
  - f. Network.
  - g. Power.
6. Provide four in-line sample pipe inlets that shall contain a flow sensor for each pipe inlet. The detector shall be capable of identifying the pipe from which smoke was detected.
7. Aspirator: Air pump capable of allowing for multiple sampling pipe runs up to 650 feet (200 m) in total, (four pipe runs per detector) with a transport time of less than 120 seconds from the farthest sample port.
8. Air-Sampling Flow Rates Outside Manufacturer's Specified Range: Result in a trouble alarm.
9. Provide software-programmable relays rated at 2 A at 30-V dc for alarm and fault conditions.
10. Provide built-in event and smoke logging; store smoke levels, alarm conditions, operator actions, and faults with date and time of each event. Each detector (zone) shall be capable of storing up to 18,000 events.
11. Urgent and Minor Faults. Minor faults shall be designated as trouble alarms. Urgent faults, which indicate the unit may not be able to detect smoke, shall be designated as supervisory alarms.

C. Displays:

1. Include display module within each detector.
2. Each display shall provide the following features at a minimum:
  - a. A bar-graph display.
  - b. Four independent, high-intensity alarm indicators (Alert, Action, Fire 1, and Fire 2), corresponding to the four alarm thresholds of the indicated sector.

- c. Alarm threshold indicators for Alert, Action, and Fire 1.
  - d. LED indication that the first alarm sector is established.
  - e. Detector fault and airflow fault indicators.
  - f. LED indicators shall be provided for faults originating in the particular zone (Zone Fault), faults produced by the overall smoke-detection system, and faults resulting from network wiring errors (Network Fault).
  - g. Minor and urgent LED fault indicators.
- D. Sampling Tubes:
- 1. Smooth bore with a nominal 1-inch (25-mm) OD and a 7/8-inch (21-mm) ID. Sampling pipe with between 5/8- and 1-inch (15- and 25-mm) ID can be used in specifically approved locations when recommended by manufacturer.
  - 2. Pipe Material: CPVC and complying with UL 1887, "Safety Fire Test of Plastic Sprinkler Pipe for Visible Flame and Smoke Characteristics."
  - 3. Joints in the sampling pipe shall be airtight. Use solvent cement approved by the pipe manufacturer on all joints except at entry to the detector.
  - 4. Identify piping with labels reading: "Aspirating Smoke Detector Pipe - Do Not Paint or Disturb" along its entire length at regular intervals according to NFPA 72.
  - 5. Support pipes at not more than 60-inch (1520-mm) centers.
  - 6. Fit end of each trunk or branch pipe with an end cap and drilled with a hole appropriately sized to achieve the performance as specified and as calculated by the system design.
- E. Sampling Holes:
- 1. Sampling holes of 5/64 inch (2 mm), or other sized holes per manufacturer's written instructions, shall be separated by not more than the maximum distance allowable for conventional smoke detectors. Intervals may vary according to calculations.
  - 2. Follow manufacturer's written recommendations to determine the number and spacing of sampling points and the distance from sampling points to ceiling or roof structure and to forced ventilation systems.
  - 3. Each sampling point shall be identified by an applied decal.

## 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. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn, using the coded signal prescribed in UL 464 test protocol.
- 1. Basis of design color shall be white, coordinate with architect.
- C. 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. Rated Light Output:
    - a. 15/30/75/110 cd, selectable in the field.
  - 2. Mounting: Wall mounted unless otherwise indicated.
  - 3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.

4. Flashing shall be in a temporal pattern, synchronized with other units.
5. Strobe Leads: Factory connected to screw terminals.
6. Mounting Faceplate: Factory finished. Basis of design color shall be white, coordinate with architect.

D. Voice/Tone Notification Appliances:

1. Comply with UL 1480.
2. Speakers for Voice Notification: Locate speakers for voice notification to provide the intelligibility requirements of the "Notification Appliances" and "Emergency Communications Systems" chapters in NFPA 72.
3. High-Range Units: Rated 2 to 15 W.
4. Low-Range Units: Rated 1 to 2 W.
5. Mounting: **Flush**.
6. Matching Transformers: Tap range matched to acoustical environment of speaker location.
7. Basis of design color shall be white, coordinate with architect.

## 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
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. Self-Test: Conducted automatically every 24 hours with report transmitted to central station.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Examine areas and conditions for compliance with requirements for ventilation, temperature, humidity, and other conditions affecting performance of the Work.
  - 1. Verify that manufacturer's written instructions for environmental conditions have been permanently established in spaces where equipment and wiring are installed, before installation begins.
  
- B. Examine roughing-in for electrical connections to verify actual locations of connections before installation.
  
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### **3.02 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."
  - 1. Devices placed in service before all other trades have completed cleanup shall be replaced.
  
- B. Install wall-mounted equipment, with tops of cabinets not more than 78 inches (1980 mm) above the finished floor.
  - 1. Comply with requirements for seismic-restraint devices specified in Section 260548 "Vibration and Seismic Controls for Electrical Systems."

- C. 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.
  
- D. Smoke- or Heat-Detector Spacing:
  - 1. Comply with the "Smoke-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for smoke-detector spacing.
  - 2. Comply with the "Heat-Sensing Fire Detectors" section in the "Initiating Devices" chapter in NFPA 72, for heat-detector spacing.
  - 3. Smooth ceiling spacing shall not exceed 30 feet (9 m)
  - 4. Spacing of detectors for irregular areas, for irregular ceiling construction, and for high ceiling areas shall be determined according to Annex A in NFPA 72.
  - 5. HVAC: Locate detectors not closer than 60 inches (1520 mm) from air-supply diffuser or return-air opening.
  - 6. Lighting Fixtures: Locate detectors not closer than 12 inches (300 mm) from any part of a lighting fixture and not directly above pendant mounted or indirect lighting.
  
- E. Install a cover on each smoke detector that is not placed in service during construction. Cover shall remain in place except during system testing. Remove cover prior to system turnover.
  
- F. 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.
  - 1. Do not install smoke detector in duct smoke-detector housing during construction. Install detector only during system testing and prior to system turnover.
  
- G. Air-Sampling Smoke Detectors: If using multiple pipe runs, the runs shall be pneumatically balanced.
  
- H. Elevator Shafts: Coordinate temperature rating and location with sprinkler rating and location. Do not install smoke detectors in sprinklered elevator shafts.
  
- I. Single-Station Smoke Detectors: Where more than one smoke alarm is installed within a dwelling or suite, they shall be connected so that the operation of any smoke alarm causes the alarm in all smoke alarms to sound.
  
- J. 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.
  
- K. 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.
  
- L. 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.
  
- M. Device Location-Indicating Lights: Locate in public space near the device they monitor.

**3.03 PATHWAYS**

- A. Pathways shall be installed in red EMT.
- B. Exposed EMT in public areas shall be painted to match the background color of the ceiling area.

**3.04 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. Coordinate list below with "Systems Operational Description" Article.
  - 2. Smoke dampers in air ducts of designated HVAC duct systems.
  - 3. Magnetically held-open doors.
  - 4. Alarm-initiating connection to elevator recall system and components.
  - 5. Alarm-initiating connection to activate emergency shutoffs for gas and fuel supplies.
  - 6. Supervisory connections at valve supervisory switches.
  - 7. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.
  - 8. Supervisory connections at elevator shunt-trip breaker.
  - 9. Supervisory connections at defibrillator locations.
  - 10. Supervisory connections at fire-pump power failure including a dead-phase or phase-reversal condition.
  - 11. Supervisory connections at fire-pump engine control panel.

**3.04 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.

**3.05 CIRCUIT BREAKERS**

- A. Circuit breakers serving fire alarm devices shall be provided with a red fire alarm circuit breaker lockout kit that permanently identifies circuit as "FIRE ALARM".

**3.06 FIELD QUALITY CONTROL**

- A. 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 the "Completion Documents, Preparation" table in the "Documentation" section of the "Fundamentals" chapter in NFPA 72.
    - 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.
- B. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
- C. Fire-alarm system will be considered defective if it does not pass tests and inspections.
- D. Prepare test and inspection reports.
- E. Maintenance Test and Inspection: Perform tests and inspections listed for weekly, monthly, quarterly, and semiannual periods. Use forms developed for initial tests and inspections.
- F. 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 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include **12** months' full maintenance by skilled employees of manufacturer's designated service organization. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
1. Include visual inspections according to the "Visual Inspection Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
  2. Perform tests in the "Test Methods" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.
  3. Perform tests per the "Testing Frequencies" table in the "Testing" paragraph of the "Inspection, Testing and Maintenance" chapter in NFPA 72.

### 3.08 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** <Insert number> 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.

**3.09 DEMONSTRATION**

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain fire-alarm system.

END OF SECTION 283111

**SECTION 32 16 23**  
**CONCRETE SIDEWALKS**

**PART 1 - GENERAL****1.01 DESCRIPTION OF WORK**

- A. The work shall include construction of pedestrian Portland cement concrete walkways on a prepared subgrade as specified herein and to the dimensions, typical sections and notations as shown on the Drawings. Construction shall be to the lines and grades as shown on the Drawings.

**1.02 REFERENCE STANDARDS**

Unless otherwise indicated, all referenced standards shall be the latest edition available at the time of bidding. Any requirements of these specifications shall in no way invalidate the minimum requirements of the referenced standards.

SCDOT SS	South Carolina State Highway Department Standard Specifications (2007 Edition), Section 720, "Concrete Curb, Gutter, Curb and Gutter, Sidewalk, Driveway, and Median"
ASTM C 31/C 31M	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C 143/C 143M	Standard Test Method for Slump of Hydraulic-Cement Concrete
ASTM C 171	Standard Specification for Sheet Materials for Curing Concrete
ASTM C 172	Standard Practice for Sampling Freshly Mixed Concrete
ASTM C 309	Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete
ASTM C 31/C 31M	Standard Practice for Making and Curing Concrete Test Specimens in the Field
ASTM C 920	Standard Specification for Elastomeric Joint Sealants
ASTM D 1751	Standard Specification for Preformed Expansion Joint Filler for Concrete Paving and Structural Construction (Nonextruding and Resilient Bituminous Types)
ASTM D 1752	Standard Specification for Preformed Sponge Rubber Cork and Recycled PVC Expansion Joint Fillers for Concrete Paving and Structural Construction
ASTM D 5893	Cold Applied, Single Component, Chemically Curing Silicone Joint Sealant for Portland Cement Concrete Pavements

**1.03 WORKMANSHIP**

- A. The Contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances and finishes. Correct deficient concrete as directed by the Engineer.

**1.04 SUBMITTALS**

The following shall be submitted for approval prior to starting work:

- A. Product Data: Provide manufacturer's product data sheets for the following items. Data sheets should include material dimensions and/or standards confirming material will meet indicated or specified standards of quality or performance.
  - 1. Expansion joint materials
  - 2. Concrete curing materials
  - 3. Joint sealants
- B. Design Data
  - 1. Concrete Mix Design: Thirty days minimum prior to concrete placement, submit a mix design, with applicable tests, for each strength and type of concrete for approval. Submit a complete list of materials including type; brand; source and amount of cement, fly ash, slag, and admixtures; and applicable reference specifications. Submittal shall clearly indicate where each mix design will be used when more than one mix design is submitted. Submit a new mix design for each material source change.
- C. Test Reports
  - 1. Field Quality Control Tests for Concrete
    - a. Strength Test
    - b. Slump Test
    - c. Surface evaluation

Copies of all test reports within 24 hours of completion of the test

**1.05 WEATHER LIMITATIONS**

- A. Placing During Cold Weather: Concrete placement shall not take place when the air temperature reaches 40 degrees F and is falling or is already below that point. Placement may begin when the air temperature reaches 35 degrees F and is rising, or is already above 40 degrees F. Provisions shall be made to protect the concrete from freezing during the specified curing period. If concrete must be placed when the temperature of the air, aggregates, or water is below 35 degrees F, placement and protection shall be approved in writing. Approval will be contingent upon full conformance with the following provisions. The underlying material shall be prepared and protected so that it is entirely free of frost when the concrete is deposited. Mixing water and aggregates shall be heated as necessary to result in the temperature of the in-place concrete being between 50 degrees and 85 degrees F. Methods and equipment for heating shall be approved. The aggregates shall be free of ice, snow, and frozen lumps before entering the mixer. Covering and other means shall be provided for maintaining the concrete at a temperature of at least 50 degrees F for not less than 72 hours after placing, and at a temperature above freezing for the remainder of the curing period.
- B. Placing During Warm Weather: The temperature of the concrete as placed shall not exceed 85 degrees F except where an approved retarder is used. The mixing water and/or aggregates shall be cooled, if necessary, to maintain a satisfactory placing temperature. The placing temperature shall not exceed 95 degrees F at any time.

**PART 2 - PRODUCTS****2.01 FORMS**

- A. Forms shall be of wood or metal and of a depth equal to or greater than the typical section shown on Drawings. Provide flexible or curved forms where required or directed to prevent a "chord" effect between tangent points when placing forms in areas having specified radii as indicated on the Drawings.
- B. Forms shall be free from warp, and of sufficient strength when staked to hold the alignment specified during concrete placing and finishing operations.
- C. All forms shall be cleaned and oiled prior to placement of concrete.

**2.02 PORTLAND CEMENT CONCRETE**

- A. Concrete shall be Class 3000 (3,000 psi 28-day compressive strength), as defined by the South Carolina State Highway Department Standard Specifications, (2007 Edition), Section 701, "Portland Cement Concrete for Structures." All concrete shall be ready mixed as produced by a reputable manufacturer, acceptable to the Engineer.
  - 1. Air Content: Mixtures shall have air content by volume of concrete of 5 to 7 percent, based on measurements made immediately after discharge from the mixer.
  - 2. Slump: The concrete slump for static formed work shall be 4 inches plus or minus 1 inch where determined in accordance with ASTM C 143/C 143M.

**2.03 JOINTS AND JOINTING MATERIALS**

- A. Expansion Joint Filler: Preformed expansion joint filler shall conform to ASTM D 1751 or ASTM D 1752, 1/2-inch-thick extending for the full depth of the concrete section, unless indicated otherwise.
- B. Sealants:
  - 1. Building Perimeter Expansion Joint Sealant: Joint sealant material for sealing the top of the expansion joint located around the exterior perimeter of the building where exterior concrete walk pavement abuts the building shall be a one-component moisture-curing polyurethane elastomeric compound, ASTM C 920, Type S, Grade NS, Class 35, color-Gray. Acceptable manufacturer is Master Seal NP-1 or equal.
  - 2. Sidewalk Control Joint Sealant: Joint sealant material for sealing control joints in Portland cement concrete walkway pavements, **where indicated**, shall be a cold applied, single component, chemically curing silicone sealant, per ASTM D 5893. Does not apply to exterior perimeter expansion joints specified above.

**2.04 CONCRETE CURING MATERIALS**

- A. Impervious Sheet Materials: Impervious sheet materials shall conform to ASTM C 171, type optional, except that polyethylene film, if used, shall be white opaque.
- B. White Pigmented Membrane-Forming Curing Compound: White pigmented membrane-forming curing compound shall conform to ASTM C 309, Type 2, Class B, free of paraffin or petroleum.

**PART 3 - EXECUTION****3.01 GENERAL**

Construct forms to the exact sizes, shapes, lines, and dimensions shown, and as required to obtain accurate alignment, location, and grades.

**3.02 SUBGRADE PREPARATION**

The subgrade shall be constructed to the specified grade and cross section prior to concrete placement. Subgrade shall be placed and compacted in conformance with Section 31 20 00 EARTH MOVING.

- A. Sidewalk Subgrade: The subgrade shall be tested for grade and cross section with a template extending the full width of the sidewalk and supported between side forms.
- B. Maintenance of Subgrade: The subgrade shall be maintained in a smooth, compacted condition in conformity with the required section and established grade until the concrete is placed. The subgrade shall be in a moist condition when concrete is placed. The subgrade shall be prepared and protected to produce a subgrade free from frost when the concrete is deposited.

**3.03 FORMWORK**

- A. Forms shall be set to the indicated alignment, grade and dimensions. Forms shall be held rigidly in place by a minimum of 3 stakes per form placed at intervals not to exceed 4 feet. Corners, deep sections, and radius bends shall have additional stakes and braces, as required. Clamps, spreaders, and braces shall be used where required to ensure rigidity in the forms. Forms shall be removed without injuring the concrete. Bars or heavy tools shall not be used against the concrete in removing the forms. Any concrete found defective after form removal shall be promptly and satisfactorily repaired. Forms shall be cleaned and coated with form oil each time before concrete is placed.

**3.04 SIDEWALK CONCRETE PLACEMENT AND FINISHING**

- A. Formed Sidewalks: Concrete shall be placed in the forms in one layer. When consolidated and finished, the sidewalks shall be of the thickness indicated. After concrete has been placed in the forms, a strike-off guided by side forms shall be used to bring the surface to proper section to be compacted. The concrete shall be consolidated with an approved vibrator, and the surface shall be finished to grade with a strike off.
- B. Concrete Finishing: After straight edging, when most of the water sheen has disappeared, and just before the concrete hardens, the surface shall be finished with a wood float or darby to a smooth and uniformly fine granular or sandy texture free of waves, irregularities, or tool marks. A scored surface shall be produced by brooming with a fiber-bristle brush in a direction transverse to that of the traffic, after edging.
- C. Edge and Joint Finishing: All slab edges, including those at formed joints, shall be finished with an edger having a radius of 1/8-inch. Transverse joint shall be edged before brooming, and the brooming shall eliminate the flat surface left by the surface face of the edger. Corners and edges which have crumbled and areas which lack sufficient mortar for proper finishing shall be cleaned and filled solidly with a properly proportioned mortar mixture and then finished.
- D. Surface and Thickness Tolerances: Finished surfaces shall not vary more than 5/16-inch from the testing edge of a 10-foot straightedge. Permissible deficiency in section thickness will be up to 1/4 inch.

### 3.05 SIDEWALK JOINTS

Sidewalk joints shall be constructed to divide the surface into rectangular areas. Transverse contraction joints shall be spaced at a distance equal to the sidewalk width or 5 feet on centers, whichever is less, unless indicated otherwise on the drawings, and shall be continuous across the slab. Longitudinal contraction joints shall be constructed along the centerline of all sidewalks 10 feet or more in width. Expansion joints shall be formed about structures and features which project through or into the sidewalk pavement, using joint filler of the type, thickness, and width indicated.

- A. Sidewalk Contraction Joints: The contraction joints shall be formed in the fresh concrete by cutting a groove in the top portion of the slab to a depth of at least one-fourth of the sidewalk slab thickness, using a jointer to cut the groove, or by sawing a groove in the hardened concrete with a power-driven saw, unless otherwise approved. Sawed joints shall be constructed by sawing a groove in the concrete with a 1/8-inch blade to the depth indicated as soon as the concrete is hard enough to support the sawing operation, preferably within 3-6 hours, but not greater than 24 hours. The sawing shall be performed at the locations of the hand tooled joint groove to ensure the proper depth of  $\frac{1}{4}$  of the total thickness is achieved at each joint location.
- B. Sidewalk Expansion Joints: Expansion joints shall be formed with 1/2-inch joint filler strips. Joint filler shall be placed with top edge 1/4 inch below the surface and shall be held in place with steel pins or other devices to prevent warping of the filler during floating and finishing. Immediately after finishing operations are completed, joint edges shall be rounded with an edging tool having a radius of 1/8 inch, and concrete over the joint filler shall be removed. At the end of the curing period, expansion joints shall be cleaned and sealed with specified joint sealant.

### 3.06 INSTALLATION OF SEALANT

- A. Time of Application: Seal joints immediately following final cleaning of the joint walls and following the placement of the separating or backup material. Open joints, that cannot be sealed under the conditions specified, or when rain interrupts sealing operations shall be recleaned and allowed to dry prior to installing the sealant.
- B. Sealing Joints: Immediately preceding, but not more than 50 feet ahead of the joint sealing operations, perform a final cleaning with compressed air. Fill the joints from the bottom up to 1/4 inch plus or minus 1/16 inch below the pavement surface. Remove and discard excess or spilled sealant from the pavement by approved methods. Install the sealant in such a manner as to prevent the formation of voids and entrapped air. In no case shall gravity methods or pouring pots be used to install the sealant material. Traffic shall not be permitted over newly sealed pavement until authorized by the Architect. When a primer is recommended by the manufacturer, apply it evenly to the joint faces in accordance with the manufacturer's instructions. Check the joints frequently to ensure that the newly installed sealant is cured to a tack-free condition within the time specified.

### 3.07 CURING AND PROTECTION

- A. General Requirements: Concrete shall be protected against loss of moisture and rapid temperature changes for at least 7 days from the beginning of the curing operation. Unhardened concrete shall be protected from rain and flowing water. All equipment needed for adequate curing and protection of the concrete shall be on hand and ready for use before actual concrete placement begins. Protection shall be provided as necessary to prevent

cracking of the pavement due to temperature changes during the curing period.

1. Impervious Sheeting Method: The entire exposed surface shall be wetted with a fine spray of water and then covered with impervious sheeting material. Sheets shall be laid directly on the concrete surface with the light-colored side up and overlapped 12 inches when a continuous sheet is not used. The curing medium shall not be less than 18-inches wider than the concrete surface to be cured and shall be securely weighted down by heavy wood planks, or a bank of moist earth placed along edges and laps in the sheets. Damaged sheets shall be repaired or replaced, if damaged during the curing period. The curing medium shall remain on the concrete surface to be cured for not less than 7 days.
  2. Liquid Membrane Curing Method: A uniform coating of white-pigmented membrane-curing compound shall be applied to the entire exposed surface of the concrete as soon after finishing as the free water has disappeared from the finished surface. Formed surfaces shall be coated immediately after the forms are removed and in no case longer than 1 hour after the removal of forms. Concrete shall not be allowed to dry before the application of the membrane. If any drying has occurred, the surface of the concrete shall be moistened with a fine spray of water and the curing compound applied as soon as the free water disappears. Curing compound shall be applied in two coats by hand-operated pressure sprayers at a coverage of approximately 200 square feet per gallon for the total of both coats. The second coat shall be applied in a direction approximately at right angles to the direction of application of the first coat. The compound shall form a uniform, continuous, coherent film that will not check, crack, or peel and shall be free from pinholes or other imperfections. If pinholes, abrasion, or other discontinuities exist, an additional coat shall be applied to the affected areas within 30 minutes. Concrete surfaces that are subjected to heavy rainfall within 3 hours after the curing compound has been applied shall be resprayed by the method and at the coverage specified above. Areas where the curing compound is damaged by subsequent construction operations within the curing period shall be resprayed. Necessary precautions shall be taken to ensure that the concrete is properly cured at sawed joints. Concrete surfaces to which membrane-curing compounds have been applied shall be adequately protected during the curing period from pedestrian and vehicular traffic, except as required for joint-sawing operations and surface tests.
- B. Backfilling: After curing, debris shall be removed and the area adjoining the concrete shall be backfilled, graded, and compacted to conform to the surrounding area in accordance with lines and grades indicated.
- C. Protection: Completed concrete shall be protected from damage until accepted. The Contractor shall repair damaged concrete and clean concrete discolored during construction. Concrete that is damaged shall be removed and reconstructed for the entire length between regularly scheduled joints. Refinishing the damaged portion will not be acceptable. Removed damaged portions shall be disposed of as directed.

### **3.08 FIELD QUALITY CONTROL**

- A. General Requirements: The Contractor shall perform the inspection and tests described and meet the specified requirements for inspection details and frequency of testing. Based upon the results of these inspections and tests, the Contractor shall take the action and submit reports as required below, and any additional tests to ensure that the requirements of these specifications are met.
- B. Sampling: The Contractor's approved laboratory shall collect samples of fresh concrete in accordance with ASTM C 172 during each working day as required to perform tests specified herein. Make test specimens in accordance with ASTM C 31/C 31M.
- C. Concrete Testing:

1. **Strength Testing:** The Contractor shall provide molded concrete specimens for strength tests. Samples of concrete shall be taken for every 250 cubic yards of concrete placed, but not less than once a day. The samples for strength tests shall be taken in accordance with ASTM C 172. Cylinders for acceptance shall be molded in conformance with ASTM C 31/C 31M by an approved testing laboratory. Each strength test result shall be the average of 2 test cylinders from the same concrete sample tested at 28 days, unless otherwise specified or approved. Concrete will be considered satisfactory if the averages of all sets of three consecutive strength test results equal or exceed the specified strength, and no individual strength test result falls below the specified strength by more than 500 psi.
  2. **Slump Test:** Two slump tests shall be made on randomly selected batches of each class of concrete for every 250 cubic yards, or fraction thereof, of concrete placed during each shift. Additional tests shall be performed when excessive variation in the workability of the concrete is noted.
- C. **Thickness Evaluation:** The anticipated thickness of the concrete shall be determined prior to placement by passing a template through the form.
- D. **Surface Evaluation:** The finished surface of each category of the completed work shall be uniform in color and free of blemishes and form or tool marks.

### **3.09 SURFACE DEFICIENCIES AND CORRECTIONS**

- A. **Thickness Deficiency:** When measurements indicate that the completed concrete section is deficient in thickness by more than 1/4 inch the deficient section will be removed, between regularly scheduled joints, and replaced.
- B. **High Areas:** In areas not meeting surface smoothness and plan grade requirements, high areas shall be reduced either by rubbing the freshly finished concrete with carborundum brick and water when the concrete is less than 36 hours old or by grinding the hardened concrete with an approved surface grinding machine after the concrete is 36 hours old or more. The area corrected by grinding the surface of the hardened concrete shall not exceed 5 percent of the area of any integral slab, and the depth of grinding shall not exceed 1/4 inch. Pavement areas requiring grade or surface smoothness corrections in excess of the limits specified above shall be removed and replaced.
- C. **Appearance:** Exposed surfaces of the finished work will be inspected by the Engineer and any deficiencies in appearance will be identified. Areas which exhibit excessive cracking, discoloration, form marks, or tool marks or which are otherwise inconsistent with the overall appearances of the work shall be removed and replaced.

**END OF SECTION**





**Limited Asbestos and Lead-Based Paint Assessment Report**  
**72 Bells Highway (Former Rite-Aid Pharmacy)**  
**Walterboro, South Carolina**  
**S&ME Project No. 23130170**

Assessment Performed by:

A blue ink signature of Bill Seaborn.

4-07-2023

Bill Seaborn (SCDHEC Accreditation #BI-01317)

Date

Report Prepared by:

A blue ink signature of Terry W. Richburg.

4-07-2023

Terry W. Richburg (SCDHEC Accreditation #MP-00110)

Date

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**April 7, 2023**



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## Executive Summary

An asbestos and lead-based paint assessment was conducted on March 27, 2023 at the former Rite-Aid Pharmacy located at 72 Bells Highway in Walterboro, South Carolina. The assessment included the interior and exterior of the structure, excluding roofing materials. The purpose of the assessment was to identify the presence of asbestos containing materials (ACMs) and lead-based paint to support planned renovation activities. The assessment also complies with federal, state, and local asbestos requirements regarding identification of ACMs that may be disturbed due to renovation or demolition.

The structure is one-story and approximately 10,000 square feet in size, situated on concrete slab on-grade, with a flat roof. Interior finishes consist of vinyl floor coverings, drywall walls, and suspended ceilings with acoustical tiles. Exterior finishes consist of exterior insulating finish system (EIFS) and a flat built-up roof. The structure was vacant at the time of our assessment.

## Asbestos Containing Materials

The suspect ACMs sampled as part of the assessment consist of drywall and associated joint compound, acoustical ceiling tiles, mastic associated with rubber cove base, vinyl floor tiles and associated mastics, exterior insulating finish system (EIFS), and exterior spray-applied texture. Of the representative materials sampled and analyzed as part of this assessment, no ACMs were identified.

The Environmental Protection Agency (EPA), South Carolina Department of Health and Environmental Control (SCDHEC), and Occupational Safety and Health Administration (OSHA) defines a material as an ACM if an asbestos content >1% is detected in a representative sample.

If additional suspect ACMs not addressed in this report are discovered during the planned renovations activities, bulk samples must be collected by a SCDHEC licensed inspector and analyzed for asbestos content prior to disturbance or disposal of the suspect materials. This report should also be provided to the contractor(s) to assist with compliance with applicable State and Federal regulations.

## Lead-Based Paint

A lead-based paint assessment was performed in conjunction with the asbestos assessment at the subject structure. Representative painted components associated with the interior and exterior were analyzed using direct measurement X-Ray Fluorescence (XRF) technology using a Heuresis Pb200i (serial #1852). For the purpose of this assessment, paint coatings with lead concentrations meeting the SCDHEC disposal limit (0.7 mg/cm<sup>2</sup>) are considered lead-based paint.

Of the representative suspect painted components tested, none exhibited a lead concentration meeting the SCDHEC disposal limit of 0.7 mg/cm<sup>2</sup>. Low levels of lead were also detected and may be applicable to the standards of the OSHA 29 CFR 1926.62 (Lead in Construction), dependent upon the tasks impacting those surfaces.

Destructive actions to paint containing detectable levels of lead (e.g. component removal, demolition, sanding, grinding, burning, paint preparation, etc.) will require the contractor comply with the standards of the OSHA



## Limited Asbestos and Lead-Based Paint Assessment Report

72 Bells Highway (Former Rite-Aid Pharmacy)

Walterboro, South Carolina

S&ME Project No. 23130170

regulation 29 CFR 1926.62 (Lead in Construction), including but not limited to training, initial exposure monitoring, the use of personal protective equipment, and medical surveillance.

This summary is for convenience of the reader and should not be completely relied upon without reviewing the full contents of this report, including appended materials.



## 1.0 Background

S&ME, Inc. (S&ME) was contracted to perform an asbestos and lead-based paint assessment, limited to the interior and exterior (excluding roofing materials) at the former Rite-Aid Pharmacy located at 72 Bells Highway in Walterboro, South Carolina. The assessment was subsequently performed on March 27, 2023 by John McEathron and Bill Seaborn, both with S&ME. The purpose of the assessment was to identify the presence of asbestos containing materials (ACMs) and lead-based paint prior to planned renovation activities. The assessment also complies with federal, state, and local asbestos requirements regarding identification of asbestos containing building materials that may be disturbed due to renovation or demolition.

The asbestos assessment was conducted to assess, sample, and identify ACMs in accordance with regulatory requirements. The identification of ACMs will aid in the prevention of occupational exposures and/or environmental releases of airborne asbestos. Identification of ACMs also complies with Title 40 Code of the Federal Regulations, part 61, and State Regulation 61-86.1 (Standards of Performance for Asbestos Projects) enforced by the South Carolina Department of Health and Environmental Control (SCDHEC), along with Title 29 Code of Federal Regulations, part 1926 enforced by the Occupational Safety and Health Administration (OSHA). The following sections describe the assessment procedures used, results of the suspect ACMs sampled and analyzed, and conclusions and recommendations related to ACMs.

The purpose of the lead-based paint testing was to assess and identify lead-based paint coatings associated with the structure. The identification of these coatings and materials will aid in the compliance of occupational exposure (OSHA) and/or environmental releases of airborne lead dust in accordance with OSHA 29 CFR 1926.62 (Lead in Construction) and provide information to determine proper disposal of lead-based paint coated components and debris in accordance with the SCDHEC and the Environmental Protection Agency (EPA).

## 2.0 Site and Project Description

### 2.1 Purpose

The purpose of the assessment was to identify the presence ACMs and lead-based paint associated with the referenced structure prior to planned renovation activities. The assessment included the interior and exterior of the structure, but did not include roofing materials. An assessment strategy appropriate for this purpose was presented in our proposal and is described in this report. The report should be interpreted only with regard to the specific location and materials referenced.

### 2.2 Site Description

The structure is one-story and approximately 10,000 square feet in size, situated on concrete slab on-grade, with a flat roof. Interior finishes consist of vinyl floor coverings, drywall walls, and suspended ceilings with acoustical tiles. Exterior finishes consist of exterior insulating finish system (EIFS) and a flat built-up roof. The structure was vacant at the time of our assessment.



## 3.0 Assessment Procedures

### 3.1 Asbestos Containing Materials

The assessment was performed by observing and sampling suspect ACMs associated with the interior and exterior of the referenced structure, excluding roofing materials. The possibility exists that suspect materials were undetected in inaccessible areas such as flooring overlays, and wall and ceiling voids. If additional suspect ACMs not addressed in this report are discovered during destructive activities, bulk samples must be collected by a SCDHEC licensed inspector and analyzed for asbestos content prior to disturbance or disposal of the suspect materials.

Suspect ACMs were quantified and subject to a physical condition assessment. A sampling strategy was then developed to provide representative samples in accordance with the SCDHEC and EPA. Suspect ACMs observed were classified based on their condition (good, damaged, or significantly damaged) and potential for disturbance. Bulk samples of suspect ACMs were collected by a SCDHEC licensed inspector. The bulk samples were then extracted from suspect ACMs and recorded on a chain of custody record and submitted to our in-house Polarized Light Microscopy (PLM) laboratory. The samples were subsequently analyzed by PLM, and confirmation analysis was performed by Transmission Electron Microscopy (TEM) by *EMSL Analytical*, for non-friable organically bound materials reported negative by PLM. The laboratories are located in Charlotte, North Carolina and are accredited by the National Voluntary Laboratory Accreditation Program (NVLAP), which is administered by the National Institute of Standards and Technology.

#### *Polarized Light Microscopy (PLM)*

The suspect materials were analyzed by trained microscopists using PLM techniques coupled with dispersion staining in accordance with EPA Test Method Title 40 Code of Federal Regulations, Chapter I (1-1-87 edition), Part 763, Subpart F-APPENDIX A. This method identifies asbestos mineral fibers based on six optical characteristics: morphology, birefringence, refractive index, extinction angle, sign of elongation and dispersion staining colors. The laboratory analysis reports the specific type of asbestos identified (there are six asbestos minerals) and the percentage of asbestos present.

#### *Transmission Electron Microscopy (TEM)*

One representative sample from each suspect non-friable organically bound homogeneous material, which exhibited negative results via PLM analysis, was analyzed by trained microscopists via TEM, in accordance with ASTM E2356 per SCDHEC requirements.

Identified ACMs were categorized based on the Environmental Protection Agency's (EPA) NESHAP regulation categories. A friable ACM is classified as an ACM that can be crumbled to a powder by moderate hand pressure. A non-friable ACM is classified as either Category I or Category II non-friable ACM. Category I and Category II non-friable ACMs are distinguished from each other by their fiber release potential when damaged. Generally, Category I non-friable ACM, which by definition includes intact asbestos-containing roofing materials, gaskets, packing, and resilient floor coverings, is less likely to become friable and release fibers in a damaged state. Category II non-friable ACM include all other non-friable ACMs excluding Category I that have a high probability



of being rendered friable during removal activities or demolition. All friable ACM, Category I non-friable ACM that has become friable, Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading, or Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations are considered to be a Regulated Asbestos-Containing Material (RACM).

## 3.2 Lead

Lead testing was performed on representative suspect painted components associated with the interior and exterior of the subject structure. The components were tested using a Heuresis Pb200i (serial #1852) XRF Lead Analyzer. The suspect paint coatings were selected based on the color of the topcoat and the underlying paint layers and/or the substrate on which it was applied. The possibility exists that lead-based paint and glazed finishes are present in inaccessible areas. The SCDHEC defines a lead-based paint as any paint containing lead at concentrations equaling 0.7 mg/cm<sup>2</sup> or greater by XRF testing. For the purpose of the assessment, paint containing 0.7 mg/cm<sup>2</sup> or greater was considered lead-based paint due to the planned demolition and disposal.

The OSHA does not recognize a threshold level of lead for definition purposes, only the airborne concentration of lead a worker is exposed. The current OSHA regulations recognize an airborne action level of 30 micrograms per cubic meter (µg/m<sup>3</sup>) during an eight-hour day and a permissible exposure limit of 50 µg/m<sup>3</sup>.

## 4.0 Findings and Results

### 4.1 Asbestos Containing Materials

The suspect ACMs sampled as part of the assessment consist of drywall and associated joint compound, acoustical ceiling tiles, mastic associated with rubber cove base, vinyl floor tiles and associated mastics, exterior insulating finish system (EIFS), and exterior spray-applied texture.

Of the representative materials sampled and analyzed as part of the assessment, no ACMs were identified.

The EPA, SCDHEC, and OSHA defines a material as an ACM if an asbestos content >1% is detected in a representative sample.

A summary of asbestos results is provided in Appendix I, and exhibits the sample number, location, type of material tested, approximate quantity of the material sampled, condition of the material, and corresponding result for each sample. A diagram of bulk sample locations is provided in Appendix II, and the inspectors' SCDHEC licenses are provided in Appendix III. The laboratory analyses and chain-of-custody records are provided in Appendix IV.

### 4.2 Lead

Based on the assessment and testing performed of the representative suspect paint and materials, none exhibited a lead concentration meeting the SCDHEC disposal limit of 0.7 mg/cm<sup>2</sup>. Low levels of lead were present which



may be applicable to the standards of the OSHA 29 CFR 1926.62 (Lead in Construction) dependent upon the tasks impacting those surfaces.

The summary of XRF readings is provided in Appendix V and should be reviewed in full.

## **5.0 Conclusions and Recommendations**

The limited asbestos and lead-based paint assessment performed on March 27, 2023, at the former Rite-Aid Pharmacy located at 72 Bells Highway in Walterboro, South Carolina did not identify the presence of ACMs or lead-based paint. Low levels of lead, applicable to the standards of the OSHA, were identified.

This report should be provided to the contractor(s) to assist with compliance with applicable State and Federal regulations. This report should not be used as a bidding document, project design or specification for the abatement of hazardous materials.

### **5.1 Asbestos Recommendations**

If additional suspect ACMs not addressed in this report are discovered during the planned renovation activities, bulk samples must be collected by a SCDHEC licensed inspector and analyzed for asbestos content prior to disturbance or disposal of the suspect materials.

### **5.2 Lead- Based Paint Recommendations**

Destructive actions to paint containing detectable levels of lead (e.g. component removal, demolition, sanding, grinding, burning, paint preparation, etc.) will require the contractor comply with the standards of the OSHA regulation 29 CFR 1926.62 (Lead in Construction), including but not limited to training, initial exposure monitoring, the use of personal protective equipment, and medical surveillance.

Paint coatings may be present that contain low levels of lead that cannot be detected by X-ray fluorescence and may be applicable to OSHA regulations 29 CFR 1926.62. The quantities reported by XRF may be useful in determining the relative risk associated with various demolition tasks, for example disturbances to paints with low lead levels may be less likely to result in airborne lead exposures in excess of the OSHA Action Level.

## **6.0 Assumptions and Limitations**

This report is provided for the sole use of Colleton County. Use of this report by any other parties will be at such party's sole risk, and S&ME disclaims liability for any such use or reliance by third parties. The results presented in this report are indicative of conditions only during the time of the sampling period and of the specific areas referenced. Under no circumstances is this report to be used as a bidding document, or as a project design or specification.

S&ME performed the services in accordance with generally accepted practices of reputable environmental consultants undertaking similar studies at the same time and in the same geographical area. S&ME has endeavored to meet this standard of care. No other warranty, expressed or implied, is intended or made with





## Limited Asbestos and Lead-Based Paint Assessment Report

72 Bells Highway (Former Rite-Aid Pharmacy)

Walterboro, South Carolina

S&ME Project No. 23130170

respect to this report or S&ME's services. Users of this report should consider the scope and limitations related to these services when developing opinions as to risks associated with the site.

The findings of the asbestos assessment were based largely on visual observations within the amount of time available. The findings do not warrant that all ACMs have been identified; suspect ACMs may be present in areas not readily-accessible to observation. In addition, the actual locations and quantities of materials may vary from those herein. Apparent homogeneous sampling areas may vary in actual asbestos content due to previous renovations, maintenance or related operations. The possibility exists that suspect materials were undetected in inaccessible or concealed areas such as under flooring overlays, pipe chases and other voids. If additional suspect materials are discovered during the planned destructive activities, samples must be collected and analyzed by qualified entities.

The findings of the lead-based paint assessment were based largely on visual observations within the amount of time available, and the specific number of areas analyzed. The findings do not warrant that all painted surfaces or materials containing lead have been identified; different underlying painted surfaces which contain lead could exist under similar top layers. Also, apparent similarly painted surfaces may vary in actual lead content.

## **Appendices**

## **Appendix I – Summary of Asbestos Results**



**Table I: Summary of Asbestos Results**

HA	Material Description	Material Location	<sup>2</sup> Approx. Quantity	Cat. (F/I/II)	Type	Condition/ Potential for Disturbance	Sample Number	Sample Location	<sup>1</sup> Type and Percent Asbestos
DW	Drywall	Throughout	7,525 SF	F	Misc	NA	RA-DW-01	South Wall Center	ND
							RA-DW-02	Storage Room	ND
							RA-DW-03	North Wall Center	ND
JC	Joint Compound				Sur		RA-JC-01	South Wall Center	ND
							RA-JC-02	Storage Room	ND
							RA-JC-03	North Wall Center	ND
							RA-JC-04	Near NE Corner	ND
							RA-JC-05	N. Wall at 1/2 Wall	ND
							RA-JC-06	Outside Mens Restroom	ND
							RA-JC-07	N. Wall at 1/2 Wall	ND
CT	Ceiling Tile (2' x 4' Lay-In)	Misc	NA	RA-CT-01	Center Front	ND			
				RA-CT-02	SE. Corner	ND			
				RA-CT-03	Center Back	ND			
CB	Mastic (tan) associated with rubber cove base	Misc	NA	RA-CB-01	Outside Office 1	ND			
				RA-CB-02	Near Drive Through	ND			
				<sup>3</sup> RA-CB-03	Near Drive Through	ND			
FT1	Floor Tile (12" white w/ blue Mastic (tan))	Misc	G, PD	RA-FT1-01	S. Wall Near Office 1	ND ND			
				RA-FT1-02	Near Drive Thru	ND ND			
				<sup>3</sup> RA-FT1-03	N. Wall at 1/2 Wall	ND ND			



**Table I: Summary of Asbestos Results**

HA	Material Description	Material Location	<sup>2</sup> Approx. Quantity	Cat. (F/I/II)	Type	Condition/ Potential for Disturbance	Sample Number	Sample Location	<sup>1</sup> Type and Percent Asbestos
FT2	Floor Tile (12" blue) Mastic same as FT1	Throughout	535 SF	NF Cat I	Misc	G, PD	RA-FT2-01	S. Wall Near Office 1	ND
							RA-FT2-02	Near Drive Thru	ND
							<sup>3</sup> RA-FT2-03	N. Wall at Half-Wall	ND
EF	Exterior Insulation and Finish System	Exterior	5,225 SF	NF Cat I	Sur	NA	RA-EF-01	N. Wall at Entrance	ND
							RA-EF-02	N. Wall at Entrance	ND
							RA-EF-03	S. Wall at SW Corner	ND
							RA-EF-04	S. Wall at SW Corner	ND
							RA-EF-05	E Wall at Drive Thru	ND
							RA-EF-06	E Wall at Drive Thru	ND
							RA-EF-07	SE Corner	ND
TX	Spray-Applied Texture	Exterior Overhang Ceilings	550 SF	NF Cat I	Sur	NA	RA-TX-01	Drive Thru	ND
							RA-TX-02	Drive Thru	ND
							RA-TX-03	Drive Thru	ND

LF = linear feet

F= friable

NF = non-friable

Cat I = Category I

Cat II = Category II

Sur = Surfacing

TSI = Thermal System Insulation

G = good

D = damaged

SD = significantly damaged

Misc. = Miscellaneous

PD = potential for disturbance

PSD = potential for significant disturbance

ND = No Asbestos Detected

NA = Not Applicable

EA = each

**Bold** = > 1% asbestos

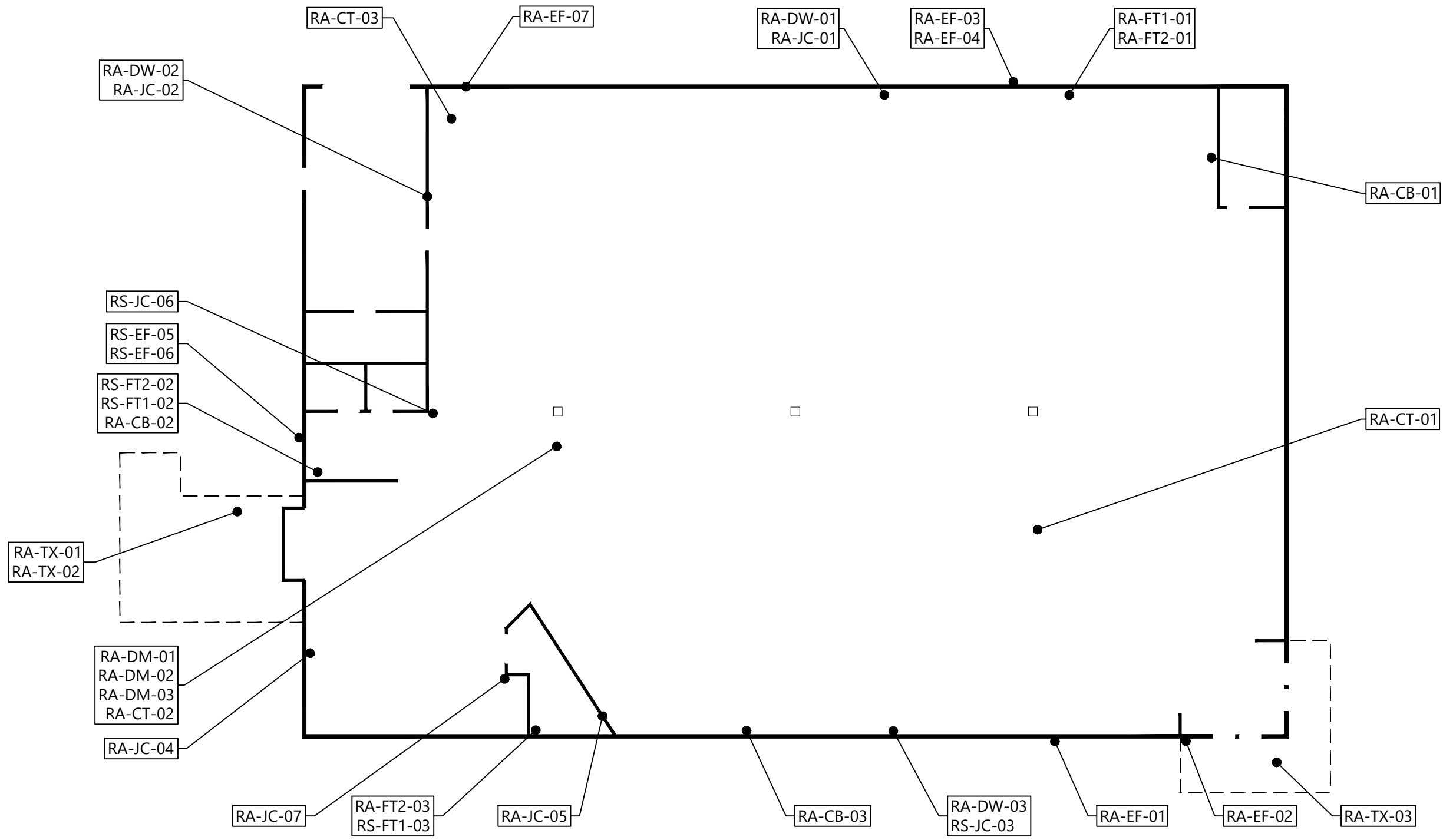
<sup>1</sup>EPA, SCDHEC and OSHA defines a material as asbestos containing if an asbestos content greater than one percent (> 1%) is detected in a representative sample

<sup>2</sup>Quantities are estimated, and should not be used for bidding purposes, as field conditions should be verified

<sup>3</sup>Samples analyzed by TEM to confirm negative results reported by PLM analysis

## **Appendix II – Diagram of Bulk Sample Locations**

Z:\Shared\SME\Ops\Charleston-1130\Projects\2023\23130170\_Colleton County\_72 Bells Hwy AB & LBP Services\_Walterboro\_Sc\ENV\CAD\23130170.dwg



NO ASBESTOS WAS DETECTED IN THE BULK SAMPLES COLLECTED AND ANALYZED. ROOFING MATERIALS WERE NOT INCLUDED IN THE SCOPE OF THIS LIMITED ASSESSMENT.

NO LEAD-BASED PAINT MEETING THE SCDHEC DISPOSAL LIMIT OF  $\geq 0.7$  mg/cm<sup>2</sup> WAS IDENTIFIED.

**LEGEND**  
 ● RA-XX-XX BULK SAMPLE LOCATION



**LIMITED ASBESTOS AND LEAD-BASED PAINT ASSESSMENT**

72 BELLS HIGHWAY  
 WALTERBORO, SOUTH CAROLINA

SCALE:  
 NTS  
 DATE:  
 4-7-2023  
 PROJECT NUMBER  
 23130170  
 FIGURE NO.

## **Appendix III – Inspectors’ SCDHEC Licenses**





**South Carolina  
Department of Health and Environmental Control**

**Asbestos License**

**Bill Seaborn**



*Air Sampler AS-00416  
Building Inspector BI-01317*



**South Carolina  
Department of Health and Environmental Control**

**Asbestos License**

**John McEathron**



*Air Sampler AS-000679  
Building Inspector BI-002111*

**Appendix IV – Laboratory Analysis Sheets and Chain of  
Custody Records**



9751 Southern Pine Boulevard  
 Charlotte, NC 28273  
 704-940-1830 Fax 704-565-4929  
 NVLAP Lab Code 102075-0

**POLARIZED LIGHT MICROSCOPY**  
 Performed by EPA 600/R-93/116 Method

# Asbestos Analysis Summary

**Client Name** Charleston Office 620 Wando Park Blvd.  
**Client Job** Colleton Co. 72 Bells Hwy Mt. Pleasant SC 29464

**Date Received** 3/28/2023  
**Date Analyzed** 3/30/2023

**Job Number** 23130170

<b>Lab ID:</b>	<b>Sample #:</b>	<b>Appearance</b>	<b>Comments</b>	<b>Asbestos %/Type</b>	<b>Non-Asbestos Fibrous %/Type</b>	<b>Non-Fibrous %/Type</b>
23-3116	RA-DW-01	BEIGE FIBROUS		ND	2 CELLULOSE	98 GYPSUM
23-3117	RA-DW-02	TAN/BEIGE FIBROUS		ND	5 CELLULOSE 2 GLASS	93 GYPSUM
23-3118	RA-DW-03	BEIGE FIBROUS		ND	2 GLASS 1 CELLULOSE	97 GYPSUM
23-3119	RA-JC-01	WHITE NONFIBROUS		ND		100 OTHER

Analyzed by: Jane Wasilewski  
*Additional Comments: Issued 3/30/23*

Jane Wasilewski  
 Laboratory Manager

For heterogeneous samples easily separated into subsamples, and for layered samples, each component is analyzed separately. ND = None Detected (Asbestos Not Present In Representative Sample). RCF= (Refractory Ceramic Fiber) The results relate only to the items tested. The sample may not be fully representative of the larger material in question. This report shall not be reproduced except in full with permission from SME, Inc. This report may not be used to claim product endorsement by NVLAP or any agency of the U.S. Government. Although Polarized Light Microscopy (PLM/Dispersion Staining) (Method EPA 600/R-93/116) is the specified method for analysis of bulk material samples for asbestos under the EPA Asbestos Hazard Emergency Response Act, there have been reports that this method may not identify asbestos when fiber sizes are extremely small or if they are bound in a resinous material. Such materials include floor tile, mastic and asphaltic roofing. Currently, reanalysis by Transmission Electron Microscopy (TEM) to verify results of <1% or "None Detected" for these materials is recommended.

Job Number 23130170

<i>Lab ID:</i>	<i>Sample #:</i>	<i>Appearance</i>	<i>Comments</i>	<i>Asbestos %/Type</i>	<i>Non-Asbestos Fibrous %/Type</i>	<i>Non-Fibrous %/Type</i>
23-3120	RA-JC-02	WHITE NONFIBROUS		ND		100 OTHER
23-3121	RA-JC-03	WHITE NONFIBROUS		ND		100 OTHER
23-3122	RA-JC-04	WHITE NONFIBROUS		ND		100 OTHER
23-3123	RA-JC-05	WHITE NONFIBROUS		ND		100 OTHER
23-3124	RA-JC-06	WHITE NONFIBROUS		ND		100 OTHER
23-3125	RA-JC-07	WHITE NONFIBROUS		ND		100 OTHER

Analyzed by: Jane Wasilewski  
*Additional Comments: Issued 3/30/23*

Jane Wasilewski  
Laboratory Manager

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<i>Lab ID:</i>	<i>Sample #:</i>	<i>Appearance</i>	<i>Comments</i>	<i>Asbestos %/Type</i>	<i>Non-Asbestos Fibrous %/Type</i>	<i>Non-Fibrous %/Type</i>
23-3126	RA-DM-01	GREY PLIABLE		ND	2 CELLULOSE	98 OTHER
23-3127	RA-DM-02	GREY PLIABLE		ND	2 CELLULOSE	98 OTHER
23-3129	RA-TX-01	GREY GRANULAR		ND		100 OTHER
23-3130	RA-TX-02	GREY GRANULAR		ND		100 OTHER
23-3131	RA-TX-03	GREY GRANULAR		ND		100 OTHER
23-3132	RA-EF-01	BEIGE/GREY FIBROUS		ND	5 GLASS	95 OTHER

Analyzed by: Jane Wasilewski  
*Additional Comments: Issued 3/30/23*

Jane Wasilewski  
Laboratory Manager

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<i>Lab ID:</i>	<i>Sample #:</i>	<i>Appearance</i>	<i>Comments</i>	<i>Asbestos %/Type</i>	<i>Non-Asbestos Fibrous %/Type</i>	<i>Non-Fibrous %/Type</i>
23-3133	RA-EF-02	GREY/BLUE FIBROUS		ND	5 GLASS	95 OTHER
23-3134	RA-EF-03	BEIGE/GREY FIBROUS		ND	10 GLASS	90 OTHER
23-3135	RA-EF-04	BEIGE/GREY FIBROUS		ND	5 GLASS	95 OTHER
23-3136	RA-EF-05	BEIGE/GREY FIBROUS		ND	5 GLASS	95 OTHER
23-3137	RA-EF-06	BEIGE/GREY FIBROUS		ND	5 GLASS	95 OTHER
23-3138	RA-EF-07	BEIGE/GREY FIBROUS		ND	5 GLASS	95 OTHER

Analyzed by: Jane Wasilewski  
*Additional Comments: Issued 3/30/23*

Jane Wasilewski  
Laboratory Manager

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<i>Lab ID:</i>	<i>Sample #:</i>	<i>Appearance</i>	<i>Comments</i>	<i>Asbestos %/Type</i>	<i>Non-Asbestos Fibrous %/Type</i>	<i>Non-Fibrous %/Type</i>
23-3139	RA-CT-01	GREY FIBROUS		ND	65 CELLULOSE 2 MINERAL WOOL	33 PERLITE
23-3140	RA-CT-02	GREY FIBROUS		ND	65 CELLULOSE	35 PERLITE
23-3141	RA-CT-03	GREY FIBROUS		ND	65 CELLULOSE	35 PERLITE
23-3142	RA-CB-01	YELLOW NONFIBROUS		ND		100 OTHER
23-3143	RA-CB-02	YELLOW NONFIBROUS		ND		100 OTHER
23-3145A	RA-FT1-01	BEIGE NONFIBROUS	TILE	ND		100 OTHER

Analyzed by: Jane Wasilewski  
*Additional Comments: Issued 3/30/23*

Jane Wasilewski  
 Laboratory Manager

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**Job Number** 23130170

<b>Lab ID:</b>	<b>Sample #:</b>	<b>Appearance</b>	<b>Comments</b>	<b>Asbestos %/Type</b>	<b>Non-Asbestos Fibrous %/Type</b>	<b>Non-Fibrous %/Type</b>
23-3145B	RA-FT1-01	YELLOW NONFIBROUS	MASTIC	ND		100 OTHER
23-3146A	RA-FT1-02	BEIGE NONFIBROUS	TILE	ND		100 OTHER
23-3146B	RA-FT1-02	YELLOW NONFIBROUS	MASTIC	ND		100 OTHER
23-3148	RA-FT2-01	AQUA NONFIBROUS		ND		100 OTHER
23-3149	RA-FT2-02	AQUA NONFIBROUS		ND		100 OTHER

Analyzed by: Jane Wasilewski  
*Additional Comments: Issued 3/30/23*

Jane Wasilewski  
Laboratory Manager

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# BULK SAMPLE CHAIN OF CUSTODY RECORD



<b>PROJECT NO.</b> 23130170		<b>PROJECT NAME</b> Colleton County			<b>RELINQUISHED BY:</b> <i>[Signature]</i>		<b>DATE</b> 03-27-23	<b>TIME</b> 1400	<b>RECEIVED BY:</b> <i>[Signature]</i> 10:05 A 3/28/23	
<b>FACILITY</b> 72 Bells Highway					<b>RELINQUISHED BY:</b>		<b>DATE</b>	<b>TIME</b>	<b>RECEIVED BY:</b>	
<b>SAMPLER(S)</b> B. Seaborn, J. McEathron			<b>DATE TAKEN</b> 3-27-23		<b>RELINQUISHED BY:</b>		<b>DATE</b>	<b>TIME</b>	<b>RECEIVED BY:</b>	
SAMPLE #	HOMOGENEOUS AREA	MATERIAL TYPE	LAB NUMBER	DATE ANALYZED	ANALYSTS INITIALS	ASBESTOS + I N/D	ARCHIVE NUMBER	DATE ARCH	ARCHIVERS INITIALS	SPECIAL INSTRUCTIONS
RA-DW-01	DW	Drywall	23- 3116							PLM
RA-DW-02	DW	Only	17							PLM
RA-DW-03	DW	"	18							PLM
RA-JC-01	JC	Joint Comp	19							PLM
RA-JC-02	JC	Only	20							PLM
RA-JC-03	JC	"	21							PLM
RA-JC-04	JC	"	22							PLM
RA-JC-05	JC	"	23							PLM
RA-JC-06	JC	"	24							PLM
RA-JC-07	JC	"	25							PLM
RA-DM-01	DM	Duct Mastic	26							PLM
RA-DM-02	DM	Only	27							PLM
RA-DM-03	DM	"	3128							TEM
			-							
			-							

ALL SAMPLES WILL BE DISPOSED OF NINETY DAYS AFTER ANALYSIS UNLESS OTHERWISE REQUESTED

**MATERIAL TYPES**

- A - <4" Pipe Fitting
  - B - 4-8" Pipe Fitting
  - C - 9-14" Pipe Fitting
  - D - >14" Pipe Fitting
  - E - <4" Pipe
  - F - 4-8" Pipe
  - G - 9-14" Pipe
  - H - >14" Pipe
  - I - Spray-On/Trowel
  - J - Floor Tile
  - K - Tanks/Boiler
  - L - A>H>U> Insul.
  - M - A.H.U. Exp. Jt.
  - N - Ceiling/Wall Tile
  - O - Fiberboard
  - P - Other
- (See notes-Front or back)

**ALL →  
SAMPLES**

PLM TAT - 5 Days Hours Same Day  
 TEM TAT - 3 Days Hours Same Day  
**Do not run TEM if both PLMs are positive**

**BULK SAMPLE  
CHAIN OF CUSTODY RECORD**



<b>PROJECT NO.</b> 23130170		<b>PROJECT NAME</b> Colleton County			<b>RELINQUISHED BY:</b> <i>[Signature]</i>		<b>DATE</b> 03-27-23	<b>TIME</b> 1400	<b>RECEIVED BY:</b> <i>[Signature]</i> 3/28/23			
<b>FACILITY</b> 72 Bells Highway					<b>RELINQUISHED BY:</b>		<b>DATE</b>	<b>TIME</b>	<b>RECEIVED BY:</b>			
<b>SAMPLER(S)</b> B. Seaborn, J. McEathron			<b>DATE TAKEN</b> 3-27-23		<b>RELINQUISHED BY:</b>		<b>DATE</b>	<b>TIME</b>	<b>RECEIVED BY:</b>			
SAMPLE #	HOMOGENEOUS AREA	MATERIAL TYPE	LAB NUMBER	DATE ANALYZED	ANALYSTS INITIALS	ASBESTOS			ARCHIVE NUMBER	DATE ARCH	ARCHIVERS INITIALS	SPECIAL INSTRUCTIONS
						+	I	N/D				
RA-TX-01	TX	Ceiling	23-3129									PLM
RA-TX-02	TX	Texture	30									PLM
RA-TX-03	TX	"	31									PLM
RA-EF-01	EF	Exterior	32									PLM
RA-EF-02	EF	Insulation and	33									PLM
RA-EF-03	EF	Finish System	34									PLM
RA-EF-04	EF	"	35									PLM
RA-EF-05	EF	"	36									PLM
RA-EF-06	EF	"	37									PLM
RA-EF-07	EF	"	38									PLM
RA-CT-01	CT	Ceiling Tile	39									PLM
RA-CT-02	CT	"	40									PLM
RA-CT-03	CT	"	3141									PLM
			—									
			—									

ALL SAMPLES WILL BE DISPOSED OF NINETY DAYS AFTER ANALYSIS UNLESS OTHERWISE REQUESTED

**MATERIAL TYPES**

- |                        |                     |                       |
|------------------------|---------------------|-----------------------|
| A - <4" Pipe Fitting   | G - 9-14" Pipe      | M - A.H.U. Exp. Jt.   |
| B - 4-8" Pipe Fitting  | H - >14" Pipe       | N - Ceiling/Wall Tile |
| C - 9-14" Pipe Fitting | I - Spray-On/Trowel | O - Fiberboard        |
| D - >14" Pipe Fitting  | J - Floor Tile      | P - Other             |
| E - <4" Pipe           | K - Tanks/Boiler    | (See notes-Front      |
| F - 4-8" Pipe          | L - A>H>U> Insul.   | or back)              |

PLM TAT - \_\_\_\_\_ Days Hours Same Day  
 TEM TAT - \_\_\_\_\_ Days Hours Same Day  
**Do not run TEM if both PLMs  
 are positive**

**BULK SAMPLE  
CHAIN OF CUSTODY RECORD**



<b>PROJECT NO.</b> 23130170		<b>PROJECT NAME</b> Colleton County			<b>RELINQUISHED BY:</b> <i>[Signature]</i>		<b>DATE</b> 03-27-23	<b>TIME</b> 1400	<b>RECEIVED BY:</b> <i>[Signature]</i> 3/28/23		
<b>FACILITY</b> 72 Bells Highway					<b>RELINQUISHED BY:</b>		<b>DATE</b>	<b>TIME</b>	<b>RECEIVED BY:</b>		
<b>SAMPLER(S)</b> B. Seaborn, J. McEathron			<b>DATE TAKEN</b> 3-27-23		<b>RELINQUISHED BY:</b>		<b>DATE</b>	<b>TIME</b>	<b>RECEIVED BY:</b>		
SAMPLE #	HOMOGENEOUS AREA	MATERIAL TYPE	LAB NUMBER	DATE ANALYZED	ANALYSTS INITIALS	ASBESTOS + I N/D		ARCHIVE NUMBER	DATE ARCH	ARCHIVERS INITIALS	SPECIAL INSTRUCTIONS
RA-CB-01	CB	Cove Base	23-3142								PLM
RA-CB-02	CB	Mastic	43								PLM
RA-CB-03	CB	Only	44								TEM
RA-FT1-01	FT1	Floor Tile	45								PLM
RA-FT1-02	FT1	and Mastic	46								PLM
RA-FT1-03	FT1	Only	47								TEM
RA-FT2-01	FT2	Floor Tile	48								PLM
RA-FT2-02	FT2	Only	49								PLM
RA-FT2-03	FT2	"	3150								TEM
ALL SAMPLES WILL BE DISPOSED OF NINETY DAYS AFTER ANALYSIS UNLESS OTHERWISE REQUESTED											

**MATERIAL TYPES**

- |                        |                     |                           |
|------------------------|---------------------|---------------------------|
| A - <4" Pipe Fitting   | G - 9-14" Pipe      | M - A.H.U. Exp. Jt.       |
| B - 4-8" Pipe Fitting  | H - >14" Pipe       | N - Ceiling/Wall Tile     |
| C - 9-14" Pipe Fitting | I - Spray-On/Trowel | O - Fiberboard            |
| D - >14" Pipe Fitting  | J - Floor Tile      | P - Other                 |
| E - <4" Pipe           | K - Tanks/Boiler    | (See notes Front or back) |
| F - 4-8" Pipe          | L - A>H>U> Insul.   |                           |

PLM TAT - \_\_\_\_\_ Days Hours Same Day  
 TEM TAT - \_\_\_\_\_ Days Hours Same Day  
**Do not run TEM if both PLMs are positive**



# EMSL Analytical, Inc.

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<b>EMSL Order:</b> 412303628
<b>Customer ID:</b> SMEI54
<b>Customer PO:</b> 23130170
<b>Project ID:</b>

<b>Attention:</b> Jane Wasilewski S&ME, Inc. 9771D Southern Pine Blvd. Charlotte, NC 28273	<b>Phone:</b> (704) 940-1830 <b>Fax:</b> (704) 565-4929 <b>Received Date:</b> 03/31/2023 12:10 PM <b>Analysis Date:</b> 04/05/2023 <b>Collected Date:</b>
<b>Project:</b> 23130170	

## Test Report: Asbestos Analysis of Non-Friable Organically Bound Materials by TEM via EPA/600/R-93/116 Section 2.5.5.1

Sample ID	Description	Appearance	% Matrix Material	% Non-Asbestos Fibers	Asbestos Types
RA-DM-03 412303628-0001	Mastic	Gray Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
RA-CB-03 412303628-0002	Mastic Only	Tan Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
RA-FT1-03 412303628-0003	Tile	White Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
RA-FT1-03 412303628-0004	Mastic	Yellow Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected
RA-FT2-03 412303628-0005	Tile Only	Blue Non-Fibrous Homogeneous	100.0 Other	None	No Asbestos Detected

Analyst(s)  


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 Sarah Breneman (5)

Lee Plumley, Laboratory Manager  
or other approved signatory

EMSL maintains liability limited to cost of analysis. Interpretation and use of test results are the responsibility of the client. This report relates only to the samples reported above, and may not be reproduced, except in full, without written approval by EMSL. EMSL bears no responsibility for sample collection activities or analytical method limitations. The report reflects the samples as received. Results are generated from the field sampling data (sampling volumes and areas, locations, etc.) provided by the client on the Chain of Custody. Samples are within quality control criteria and met method specifications unless otherwise noted. EMSL recommends that samples reported as none detected or <1% undergo additional analysis via PLM to avoid the possibility of false negatives.

Samples analyzed by EMSL Analytical, Inc. Pineville, NC

Report amended: 04/07/2023 15:15:10 Replaces initial report from: 04/05/2023 11:11:36 Reason Code: Data Entry-Change to Appearance



EMSL ANALYTICAL, INC.  
LABORATORY PRODUCTS TRAINING

# Asbestos Chain of Custody

EMSL Order Number: (Lab Use Only):

412303628

EMSL ANALYTICAL, INC.  
10801 SOUTHERN LOOP BLVD  
PINEVILLE, NC 28134  
PHONE: 704-525-2205  
FAX: 704-525-2382

Company : <b>S&amp;ME Inc.</b>		EMSL-Bill to: <input checked="" type="checkbox"/> Same <input type="checkbox"/> Different If Bill to is Different note instructions in Comments**	
Street: <b>9751 Southern Pine Blvd.</b>		Third Party Billing requires written authorization from third party	
City: <b>Charlotte</b>	State/Province: <b>NC</b>	Zip/Postal Code: <b>28273</b>	Country:
Report To (Name): <b>Jane Wasilewski</b>		Telephone #: <b>704-940-1830</b>	
Email Address: <b>jwasilewski@smeinc.com</b>		Fax #:	Purchase Order:
Project Name/Number:		Please Provide Results: <input type="checkbox"/> Fax <input checked="" type="checkbox"/> Email	
U.S. State Samples Taken:		CT Samples: <input type="checkbox"/> Commercial/Taxable <input type="checkbox"/> Residential/Tax Exempt	

**Turnaround Time (TAT) Options\* -> Please Check**

3 Hour  
  6 Hour  
  24 Hour  
  48 Hour  
  72 Hour  
  96 Hour  
  1 Week  
  2 Week

\*For TEM Air 3 hr through 6 hr, please call ahead to schedule. \*There is a premium charge for 3 Hour TEM AHERA or EPA Level II TAT. You will be asked to sign an authorization form for this service. Analysis completed in accordance with EMSL's Terms and Conditions located in the Analytical Price Guide.

<b>PCM - Air</b> <input type="checkbox"/> Check if samples are from NY <input type="checkbox"/> NIOSH 7400 <input type="checkbox"/> w/ OSHA 8hr. TWA <b>PLM - Bulk (reporting limit)</b> <input type="checkbox"/> PLM EPA 600/R-93/116 (<1%) <input type="checkbox"/> PLM EPA NOB (<1%) Point Count <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) Point Count w/Gravimetric <input type="checkbox"/> 400 (<0.25%) <input type="checkbox"/> 1000 (<0.1%) <input type="checkbox"/> NYS 198.1 (friable in NY) <input type="checkbox"/> NYS 198.6 NOB (non-friable-NY) <input type="checkbox"/> NIOSH 9002 (<1%)	<b>TEM - Air</b> <input type="checkbox"/> 4-4.5hr TAT (AHERA only) <input type="checkbox"/> AHERA 40 CFR, Part 763 <input type="checkbox"/> NIOSH 7402 <input type="checkbox"/> EPA Level II <input type="checkbox"/> ISO 10312 <b>TEM - Bulk</b> <input checked="" type="checkbox"/> TEM EPA NOB <input type="checkbox"/> NYS NOB 198.4 (non-friable-NY) <input type="checkbox"/> Chatfield SOP <input type="checkbox"/> TEM Mass Analysis-EPA 600 sec. 2.5 <b>TEM - Water: EPA 100.2</b> Fibers >10µm <input type="checkbox"/> Waste <input type="checkbox"/> Drinking All Fiber Sizes <input type="checkbox"/> Waste <input type="checkbox"/> Drinking	<b>TEM- Dust</b> <input type="checkbox"/> Microvac - ASTM D 5755 <input type="checkbox"/> Wipe - ASTM D6480 <input type="checkbox"/> Carpet Sonication (EPA 600/J-93/167) <b>Soil/Rock/Vermiculite</b> <input type="checkbox"/> PLM CARB 435 - A (0.25% sensitivity) <input type="checkbox"/> PLM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - B (0.1% sensitivity) <input type="checkbox"/> TEM CARB 435 - C (0.01% sensitivity) <input type="checkbox"/> TEM Qual. via Filtration Technique <input type="checkbox"/> TEM Qual. via Drop-Mount Technique <b>Other:</b> <input type="checkbox"/>
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Check For Positive Stop - Clearly Identify Homogenous Group      Filter Pore Size (Air Samples):  0.8µm  0.45µm

Samplers Name: \_\_\_\_\_ Samplers Signature: \_\_\_\_\_

Sample #	Sample Description	Volume/Area (Air) HA # (Bulk)	Date/Time Sampled
RA-DM-03	Mastic		
RA-CB-03	Mastic only		
RA-FT1-03	Tile		
↓	Mastic		
RA-FT2-03	Tile only		

Client Sample # (s): _____	Total # of Samples: <b>5</b>
Relinquished (Client):	Date: <b>3/31/23</b> Time: _____
Received (Lab):	Date: <b>3/31/23</b> Time: <b>1210pm W/m</b>
Comments/Special Instructions: ****EMAIL INVOICE TO: <a href="mailto:smeinc_invoice@concurolutions.com">smeinc_invoice@concurolutions.com</a> with this contact printed on the invoice: <b>Terry Ruckberg</b> <b>23730-170</b>	

## **Appendix V – Summary of XRF Lead Analyzer Readings**



XLN No.	Site	Floor	Side	Room	Structure	Component	Substrate	Color	Condition	Results	Action Level	Lead	Units
1									Calibration			1	mg/cm <sup>2</sup>
2									Calibration			1.1	mg/cm <sup>2</sup>
3									Calibration			1.1	mg/cm <sup>2</sup>
4	72 Bells Highway	1	A	Main Room	Wall		Drywall	White	Non-deteriorated	NEG	0.7	0.1	mg/cm <sup>2</sup>
5	72 Bells Highway	1	A	Main Room	Wall	Trim	Wood	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
6	72 Bells Highway	1	A	Main Room	Wall	Trim	Wood	Grey	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
7	72 Bells Highway	1	A	Main Room	Wall		Drywall	Green	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
8	72 Bells Highway	1	D	Main Room	Wall		Drywall	Green	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
9	72 Bells Highway	1	D	Main Room	Wall	Trim	Wood	Grey	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
10	72 Bells Highway	1	D	Main Room	Wall		Drywall	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
11	72 Bells Highway	1	D	Main Room	Wall		Drywall	Red	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
12	72 Bells Highway	1	C	Main Room	Wall		Drywall	Blue	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
13	72 Bells Highway	1	C	Main Room	Wall		Drywall	Green	Non-deteriorated	NEG	0.7	0.1	mg/cm <sup>2</sup>
14	72 Bells Highway	1	C	Main Room	Door		Metal	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
15	72 Bells Highway	1	C	Main Room	Door	Casing	Metal	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
16	72 Bells Highway	1	C	Main Room	Door	Casing	Metal	Tan	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
17	72 Bells Highway	1	C	Main Room	Door		Metal	Tan	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
18	72 Bells Highway	1	D	Main Room	Door		Metal	Grey	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
19	72 Bells Highway	1	D	Main Room	Door	Casing	Metal	Grey	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
20	72 Bells Highway	1	D	Women's RR	Sink		Porcelain	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
21	72 Bells Highway	1	D	Women's RR	Toilet		Porcelain	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
22	72 Bells Highway	1	D	Men's RR	Toilet		Porcelain	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
23	72 Bells Highway	1	D	Men's RR	Sink		Porcelain	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
24	72 Bells Highway	1	C	Main Room	Door		Metal	Grey	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
25	72 Bells Highway	1	C	Main Room	Door	Casing	Metal	Grey	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
26	72 Bells Highway	1	C	Office	Door	Casing	Metal	Beige	Non-deteriorated	NEG	0.7	0.1	mg/cm <sup>2</sup>
27	72 Bells Highway	1	C	Office	Door		Metal	Grey	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
28	72 Bells Highway	1	C	Office	Ceiling		Drywall	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
29	72 Bells Highway	1	B	Storage	Ladder		Metal	Yellow	Non-deteriorated	NEG	0.7	0.3	mg/cm <sup>2</sup>





XLN No.	Site	Floor	Side	Room	Structure	Component	Substrate	Color	Condition	Results	Action Level	Lead	Units
30	72 Bells Highway	1	C	Storage	Wall		Wood	White	Non-deteriorated	NEG	0.7	0.2	mg/cm <sup>2</sup>
31	72 Bells Highway	1	C	Storage	Wall		Wood	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
32	72 Bells Highway	1	C	Storage	Wall		Drywall	White	Non-deteriorated	NEG	0.7	0.1	mg/cm <sup>2</sup>
33	72 Bells Highway	1	C	Storage	Door		Metal	White	Non-deteriorated	NEG	0.7	0.2	mg/cm <sup>2</sup>
34	72 Bells Highway	1	C	Storage	Door	Casing	Metal	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
35	72 Bells Highway	1	C	Storage	Cabinet		Metal	Grey	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
36	72 Bells Highway	1	C	Storage	Cabinet		Metal	Grey	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
37	72 Bells Highway	1	D	Storage	Door		Metal	Tan	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
38	72 Bells Highway	1	D	Storage	Door	Casing	Metal	Brown	Non-deteriorated	NEG	0.7	0.1	mg/cm <sup>2</sup>
39	72 Bells Highway	1	D	Storage	Roof Truss		Metal	White	Non-deteriorated	NEG	0.7	0.2	mg/cm <sup>2</sup>
40	72 Bells Highway	1	D	Main Room	Door		Metal	Grey	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
41	72 Bells Highway	1	B	Main Room	Wall		Drywall	White	Non-deteriorated	NEG	0.7	0.1	mg/cm <sup>2</sup>
42	72 Bells Highway	1	B	Main Room	Wall		Drywall	Green	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
43	72 Bells Highway	1	B	Main Room	Wall	Trim	Wood	Grey	Non-deteriorated	NEG	0.7	0.1	mg/cm <sup>2</sup>
44	72 Bells Highway	1	B	Main Room	Wall	Trim	Wood	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
45	72 Bells Highway	1	B	Exterior	Wall		EIFS	Beige	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
46	72 Bells Highway	1	B	Exterior	Wall		EIFS	Brown	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
47	72 Bells Highway	1	D	Exterior	Wall		EIFS	Brown	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
48	72 Bells Highway	1	D	Exterior	Wall		EIFS	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
49	72 Bells Highway	1	C	Exterior	Wall		EIFS	White	Non-deteriorated	NEG	0.7	0	mg/cm <sup>2</sup>
50	72 Bells Highway	1	C	Exterior	Wall		EIFS	Brown	Non-deteriorated	NEG	0.7	0.1	mg/cm <sup>2</sup>
51									Calibration			1.2	mg/cm <sup>2</sup>
52									Calibration			1.1	mg/cm <sup>2</sup>
53									Calibration			1	mg/cm <sup>2</sup>

The SCDHEC requires special disposal for paint containing lead  $\geq 0.7$  mg/cm<sup>2</sup>

The OSHA does not recognize a concentration of lead for definition purposes, only the airborne concentration a worker is exposed.

**Bold** = Lead results meeting or exceeding SCDHEC disposal level of 0.7 mg/cm<sup>2</sup>