

INVITATION TO BID

SUBMIT BID TO: Grambling State University
Purchasing Department

purchasingbids@gram.edu

To maintain the integrity of the bid process, please **do not cc** any other University email address when submitting your bid.

Bid Number: 50018-260024

DATE: APRIL 17, 2026

TITLE: GRAMBLING HALL LECTURE HALL REFURBISHMENT

The required completion date for this project is
September 30, 2026

Purchasing Department Contacts: Erin
Walker (318-274-3280)

walkere@gram.edu

Architect on record is Rachel James,
Sutton Beebe Babin Architects, LLC,
(318-221-1623 - ext. 12)

rjames@sbbarchitects.com

BID SCHEDULE: MAY 19, 2026

DUE DATE/TIME (*email only*): MAY 19, 2026, BY 2:00 PM CST

BID OPENING (*Zoom*): MAY 19, 2026, AT 2:05 PM CST

MEETING ID: 831 0576 8801

PASSWORD: 540511

<https://us06web.zoom.us/j/83105768801?pwd=akbCB0bGKt4MTuZjBYKlT0aa5eXDHL1>

General Instructions to Bidders

1. Grambling State University reserves the right to award items separately, grouped or on an all or none basis and to reject any or all bids and waive any informalities.
2. Hard copies of sealed bids will no longer be accepted. All bids must be received electronically by the due date and time to be considered.
3. Sealed bids for furnishing the items and/or services specified are hereby solicited, and will be received by the issuing Grambling State University Campus/Department at the "Submit Bid To" address stated above, until the specified due date and time. Bidder is solely responsible for the timely delivery of bid. The Purchasing Office is not responsible for any delays. It is the responsibility of the Supplier to ensure the bid is received by GSU Purchasing by the indicated due date and time. Any delays that may occur in transmission of the bid is the responsibility of the supplier. A bid will be considered late if it is not received at the "Submit Bid TO" email address by the indicated due date and time.
4. The maximum email attachment size accepted is 125 MB. It is the supplier's responsibility to ensure bid submission is sized such that it is successfully transmitted and received by GSU. If the bid response is too large to be emailed as one document, the bid must be sent as separate documents. Each submittal should be labeled. (Example – Bid Submittal 1 out of 3 for IFB-50018-26XXXX - Title; Bid Submittal 2 out of 3 for IFB-50018-26XXXX - Title, etc.). If any submittal is received late, GSU will not consider the late submittal(s). Only the submittal(s) received by the due date and time will be considered. Late bids will not be accepted per
5. Bid submissions must be signed by a person authorized to bind the vendor. In accordance with Louisiana R.S. 39:1594, the person signing the bid must be:
 - (1) any corporate officer listed on the most current annual report on file with the secretary of state, or the signature on the bid is that of any member of a partnership or partnership in commended listed in the most current partnership records on file with the secretary of state; or
 - (2) an authorized representative of the corporation, partnership, or other legal entity and the Bidder submits or provides upon request a corporate resolution, certification as to the corporate principal, or other documents indicating authority which are acceptable to the public entity, including registration on an electronic Internet database maintained by the public entity; or
 - (3) entity has filed in the appropriate records of the secretary of state in which the public entity is located, an affidavit, resolution, or other acknowledged or authentic document indicating the names of all parties authorized to submit bids for public contracts.
6. When bid is submitted by email, **the subject line must show the Solicitation/File No.** and submission must be received by bid deadline.

7. Read the entire solicitation, including all terms, conditions and specifications within this packet.
8. All bid information and prices must be typed or written in ink. Any corrections, erasures or other forms of alteration to unit prices are to be initialed by the Bidder.
9. Bid prices shall include all delivery charges paid by the vendor, F.O.B. Grambling State University Destination, unless otherwise provided in the solicitation. Any invoiced delivery charges not quoted and itemized on the Grambling State University purchase order are subject to rejection and non-payment.
10. Payment terms: Net 30 after receipt of properly executed invoice or delivery and acceptance, whichever is later.
11. By signing this solicitation, the Bidder certifies compliance with all general instructions to Bidders, terms, conditions and specifications; and further certifies that this bid is made without collusion or fraud. MANDATORY bid requirements are detailed immediately following the Standard Terms & Conditions section.
12. Quantities listed in these specifications are approximate and are not guaranteed by the University. The University reserves the right to **increase or reduce** quantity as needed if in the best interest of the University.
13. **Bid Bonds: Are required on ALL bids and/or Public Works Project over \$25,000**, a bid bond must be submitted for each separate bid response. The bid bond shall be in an amount equal to 5% of the bid price submitted and alternates, if any. The bid security shall be in a form of a bid bond or certified check, or cashier's check.

*****FOR THIS BID SOLICITATION: To provide the most comprehensive coverage for this renovation project, bidders are required to submit a bid bond during the bidding phase and transition to a performance bond once the contractor is selected. This approach ensures both the integrity of the bidding process and the successful completion of the project.**
14. The Contractor is required to record the Contract with the Clerk of Court in Lincoln Parish and must provide the Purchasing Department with proof of filing. Additionally, **a Performance Bond will be required at the time of the award of the contract.**

(PLEASE NOTE THAT A BID BOND MUST BE SIGNED BY THE AGENT OR ATTORNEY-IN-FACT OF THE SURETY.)

(*) The surety or insurance company furnishing the bid bond shall be currently on the U.S. Department of the Treasury Financial Management Service list of approved bonding companies or by an insurance company that is either domiciled in Louisiana or owned by Louisiana residents and is licensed to write surety bonds.

STANDARD TERMS & CONDITIONS INVITATION TO BID

These standard terms and conditions shall apply to all Grambling State University solicitations, unless otherwise specifically amended and provided for in the special terms and conditions, specifications, or other solicitation documents. In the event of conflict between the General Instructions to Bidders or Standard Terms & Conditions and the Special Terms & Conditions, the Special Terms & Conditions shall govern.

Bids submitted are subject to provisions of the laws of the State of Louisiana, including but not limited to: the Louisiana Procurement Code (R.S. 39:1551-1736); Purchasing Rules and Regulations (Title 34 of the Louisiana Administrative Code); Executive Orders; and the terms, conditions, and specifications stated in this solicitation.

1. **Bid Delivery and Receipt:** To be considered, Bidders may submit bids electronically to purchasingbids@gram.edu When bid is submitted by email, the subject line must show the Solicitation/File No. and must be received by bid deadline.

Bidders are advised that the U.S. Postal Service does not make deliveries to the Purchasing Office. Bids will no longer be accepted by mail or in person. Bidder is solely responsible for the timely delivery of its bid, and failure to meet the bid due date and time shall result in rejection of the bid.

2. **Bid Forms:** Bids are to be submitted on and in accordance with the Grambling State University solicitation forms provided, and must be signed by an authorized agent of the vendor. Bids submitted on other forms or in other price formats may be considered informal and may be rejected in part or in its entirety. Bids submitted in pencil and/or bids containing no original signature indicating the Bidder's intent to be bound will not be accepted.
3. **Interpretation of Solicitation/Bidder Inquiries:** If Bidder is in doubt as to the meaning of any part or requirement of this solicitation, Bidder may submit a written request for interpretation to the Grambling State University Purchasing at the email address on page 1 of this solicitation. Written inquiries must be received in the Grambling State University Purchasing Department no later than five (5) calendar days prior to the opening of bids, and shall be clearly cross-referenced to the relevant solicitation/specification in question.

No decisions or actions shall be executed by any Bidder as a result of oral discussions with any Grambling State University employee or consultant. Any interpretation of the documents will be made by formal addendum only, issued by the Grambling State University Purchasing Department. It is the responsibility of the bidder, prior to submitting their bid, to periodically visit the State of Louisiana Purchasing Department LaPAC website, or contact the Grambling State University Purchasing Department, to identify if any addendums were issued. Grambling State University shall not be responsible for any other interpretations or assumptions made by Bidder.

4. **Bid Opening:** In-person bid openings have been suspended for the foreseeable future. Bidders may attend the public bid opening of sealed bids and proposals conducted on Zoom. No information or opinions concerning the ultimate contract award will be given at bid opening or during the evaluation process. Written bid tabulations will not be furnished. Bids may be examined within 72 hours after bid opening. Information pertaining to completed files may be secured by submitting a written request to the Grambling State University Purchasing at the email address shown in header.
5. **Special Accommodations:** Any "qualified individual with a disability" as defined by the Americans with Disabilities Act, who has submitted a bid and desires to attend the public bid opening, must notify the Grambling State University Purchasing Department in writing not later than seven days prior to the bid opening date of their need for special accommodations. If the request cannot be reasonably provided, the individual will be informed prior to the bid opening.
6. **Standards of Quality:** Any product or service bid shall conform to all applicable federal, state and local laws and regulations, and the specifications contained in the solicitation. Any manufacturer's name, trade name, brand name, or catalog number used in the specification is for the purpose of describing the standard of quality, performance, and characteristics desired; and is not intended to limit or restrict competition. Bidder must specify the brand and model number of the product offered in his bid. Bids not specifying brand and model number shall be considered as offering the exact product specified in the solicitation.
7. **New Products/Warranty/Patents:** All products bid for purchase must be new, never previously used, of the manufacturer's current model and/or packaging, and of best quality as measured by acceptable trade standards. No remanufactured, demonstrator, used or irregular products will be considered for purchase unless otherwise specified.

The manufacturer's standard published warranty and provisions shall apply, unless more stringent warranties are otherwise required by Grambling State University and specified in the solicitation. In such cases, the Bidder and/or manufacturer shall honor the specified warranty requirements, and bid prices shall include any premium costs of such coverage.

Bidder guarantees that the products proposed and furnished will not infringe upon any valid patent or trademark; and shall, at its own expense, defend any and all actions or suits charging such infringement, and shall save Grambling State University harmless. Descriptive Information: Bidders proposing an equivalent brand or model should submit descriptive information (such as

literature, technical data, illustrations, etc.) sufficient for Grambling State University to evaluate quality, suitability, and compliance with the specifications with the bid submission. Failure to submit descriptive information may cause bid to be rejected. Any changes made by Bidder to a manufacturer's published specifications shall be verifiable by the manufacturer. If items bid do not fully comply with specifications, Bidder should state in what respect items deviate. Bidder's failure to note exceptions in its bid will not relieve the Bidder from supplying the actual products requested.

8. Bids/Prices/F.O.B. Point

- The bid price for each item is to be quoted on a "net" basis and F.O.B. Grambling State University Destination, i.e. title passing upon receipt and inclusive of all delivery charges, any item discounts, etc.
- Bids other than F.O.B. Grambling State University Destination may be rejected.
- Bids indicating estimated freight charges may be rejected.
- Bids requiring deposits, payment in advance, or C.O.D. terms may be rejected.
- Bidders who do not quote "net" item prices and who separately quote an overall "lump sum" freight cost or discount for all items shall be considered as submitting an "all-or-none" bid for evaluation and award purposes; and risk rejection if award is made on an item basis.
- Prices shall be firm for acceptance for a minimum of 30 days, unless otherwise specified. Bids conditioned with shorter acceptance periods may be rejected.
- Prices are to be quoted in the unit/packaging specified (e.g. each, 12/box, etc), or may be rejected.
- In the event of extension errors, the unit price bid shall prevail.

9. Taxes: Vendor is responsible for including all applicable taxes in the bid price. Grambling State University is exempt from all Louisiana state and local sales and use taxes. By accepting an award, resident and non-resident firms acknowledge their responsibility for the payment of all taxes duly assessed by the State of Louisiana and its political subdivisions for which they are liable, including but not limited to: franchise taxes, privilege taxes, sales taxes, use taxes, ad valorem taxes, etc.

10. Terms and Conditions: This solicitation contains all terms and conditions with respect to the purchase of the goods and/or services specified herein. Submittal of any contrary terms and conditions may cause your bid to be rejected. By signing and submitting a bid, vendor agrees that contrary terms and conditions which may be included in its bid are nullified; and agrees that this contract shall be construed in accordance with this solicitation and governed by the laws of the State of Louisiana.

11. Vendor Forms/ Grambling State University Signature Authority: The terms and conditions of the Grambling State University solicitation, purchase order and contract shall solely govern the purchase agreement, and shall not be amended by any vendor contract, form, etc.

The University's has assigned delegated authorities to execute/sign any vendor contracts, forms, etc., on behalf of Grambling State University as a result of any award of the solicitation. Departments are expressly prohibited from signing any vendor forms.

Any such vendor contracts/forms bearing unauthorized signatures shall be null and void, shall have no legal force, and shall not be recognized by Grambling State University in any dispute arising therefrom. Vendors who present any such forms to department users for signature without regard to this strict Grambling State University policy may face contract cancellation, suspension, and/or debarment.

12. Awards: The intent to award this bid on an all-or-none basis to the lowest responsible and responsive Bidder will be stated on the bid form. For bids with several items, Grambling State University reserves the right: (1) to award items separately, grouped, or on an all-or-none basis, as deemed in its best interest; (2) to reject any or all bids and/or items; and (3) to waive any informalities.

All solicitation specifications, terms and conditions shall be made part of any subsequent award as if fully reproduced and included therein, unless specifically amended in the formal contract.

13. Acceptance of Bid: Only the issuance of an official Grambling State University purchase order, contract, Notification of Award letter, or a Notification of Intent to Award letter shall constitute the University's acceptance of a bid. Grambling State University shall not be responsible in any way to a vendor for goods delivered or services rendered without an official purchase order and/or contract.

14. Applicable Law: All contracts shall be construed in accordance with and governed by the laws of the State of Louisiana.

15. Awarded Products/Unauthorized Substitutions: Only those awarded brands and numbers stated in the Grambling State University contract are approved for delivery, acceptance, and payment purposes. Any substitutions must be reviewed and approved by the Grambling State University Purchasing Department prior to awarding the contract. Unauthorized product substitutions are subject to rejection at time of delivery, post-return at vendor's expense, and non-payment. Testing/Rejected Goods: Vendor warrants that the products furnished will be in full conformity with the specification, drawing or sample, and agrees that this warranty shall survive delivery, acceptance, and use. Any defect in any product may cause its rejection.

Grambling State University reserves the right to test products for conformance to specifications both prior to and after any award. Vendor shall bear the cost of testing if product is found to be non-compliant. All rejected goods will be held at vendor's risk and expense, and subject to vendor's prompt disposition. Unless otherwise arranged, rejected goods will be returned to the vendor freight collect.

- 16. Delivery:** Vendor is responsible for making timely delivery in accordance with its quoted delivery terms. Vendor shall promptly notify the Grambling State University Purchasing Department of any unforeseen delays beyond its control. In such cases, Grambling State University reserves the right to cancel the order and to make alternative arrangements to meet its needs. All deliveries must go to: **Property and Receiving, 407 Central Ave., Grambling, La 71245.**
- 17. Default of Vendor:** Failure to deliver within the time specified in the bid/award will constitute a default and may be cause for contract cancellation. Where the University has determined the vendor to be in default, Grambling State University reserves the right to purchase any or all goods or services covered by the contract on the open market and to surcharge the vendor with costs in excess of the contract price. Until such assessed surcharges have been paid, no subsequent bids from the defaulting vendor will be considered for award.
- 18. Vendor Invoices:** Invoices shall reference the Grambling State University purchase order number, vendor's packing list/delivery ticket number, shipping/delivery date, etc. Invoices are to be itemized and billed in accordance with the order, show the amount of any prompt payment discount, and submitted on the vendor's own invoice form. Invoices submitted by the vendor's supplier are not acceptable.
- 19. Delinquent Payment Penalties:** Delinquent payment penalties are mandated and governed by Louisiana R.S. 39:1695. Vendor penalties to the contrary shall be null and void, shall have no legal force, and shall not be recognized by Grambling State University in any dispute arising therefrom.
- 20. Assignment of Contract/Contract Proceeds:** Vendor shall not assign, sublet or transfer its contractual responsibilities, or payment proceeds thereof, to another party without the prior written consent and approval of the Grambling State University Purchasing Department. Unauthorized assignments of contract or assignments of contract proceeds shall be null and void, shall have no legal force, and shall not be recognized by Grambling State University in any dispute arising therefrom.
- 21. Contract Cancellation/Termination:** Grambling State University has the right to cancel any contract for cause, in accordance with purchasing rules and regulations, including but not limited to: (1) failure to deliver within the time specified in the contract; (2) failure of the product or service to meet specifications, conform to sample quality or to be delivered in good condition; (3) misrepresentation by the vendor; (4) fraud, collusion, conspiracy or other unlawful means of obtaining any contract with the University; (5) conflict of contract provisions with constitutional or statutory provisions of state or federal law; (6) any other breach of contract.

Grambling State University has the right to cancel any contract for convenience at any time by giving thirty (30) days written notice to the vendor. In such cases, the vendor shall be entitled to payment for compliant deliverables in progress.
- 22. Prohibited Contractual Arrangements:** Per Louisiana R.S. 42:1113.A, no public servant, or member of such a public servant's immediate family, or legal entity in which he has a controlling interest shall bid on or enter into any contract, subcontract, or other transaction that is under the supervision or jurisdiction of the agency of such public servant. See statute for complete law, exclusions, and provisions.
- 23. Equal Employment Opportunity Compliance:** By submitting and signing this bid, vendor agrees to abide by the requirements of the following as applicable: Title VI and VII of the Civil Rights Act of 1964, as amended by the Equal Opportunity Act of 1972; federal Executive Order 11246; federal Rehabilitation Act of 1973, as amended; the Vietnam Era Veteran's Readjustment Assistance Act of 1974; Title IX of the Education Amendments of 1972; the Age Act of 1975; the Americans with Disabilities Act of 1990. Vendor agrees not to discriminate in its employment practices and will render services under any contract entered into as a result of this solicitation without regard to race, color, religion, sex, age, national origin, veteran status, political affiliation, handicap, disability, or other non-merit factor. Any act of discrimination committed by vendor, or failure to comply with these statutory obligations when applicable, shall be grounds for termination of any contract entered into as a result of this solicitation.
- 24. Mutual Indemnification:** Each party hereto agrees to indemnify, defend, and hold the other, the State of Louisiana, any governing board, each party's officers, directors, agents and employees harmless from and against any and all losses, liabilities, and claims, including reasonable attorney's fees arising out of or resulting from the willful act, fault, omission, or negligence of the indemnifying party or of its employees, contractors, or agents in performing its obligations under this agreement, provided however, that neither party hereto shall be liable to the other for any consequential damages arising out of its willful act, fault, omission, or negligence. Certification of No Suspension or Debarment: By signing and submitting this bid, Bidder certifies that its company, any subcontractors, or principals thereof, are not suspended or debarred under federal or state laws or

regulations. A list of parties who have been suspended or debarred by federal agencies is maintained by the General Services Administration and can be viewed on the internet at <https://sam.gov/content/home>

- 25. Substitution of Personnel:** If applicable, the University intends to include in any contract resulting from this IFB the following condition: Substitution of Personnel: If, during the term of the contract, the Contractor or subcontractor cannot provide the personnel as proposed and requests a substitution, that substitution shall meet or exceed the requirements stated herein. A detailed resume of qualifications and justification is to be submitted to the University for approval prior to any personnel substitution. It shall be acknowledged by the Contractor that every reasonable attempt shall be made to assign the personnel listed in the Contractor's bid.
- 26. Insurance Requirements:** Please note insurance requirements section included in these bid specifications. **If applicable** to the services procured in this solicitation, the successful Bidder will be required to furnish a certificate of insurance evidencing required coverages and naming the Grambling State University as an additional insured, and grant a waiver of subrogation on all liability policies.
- 27. Nonperformance:** Successful Bidder is required to perform in strict accordance with all contract specifications, terms, and conditions. Successful Bidder will be advised in writing of nonperformance issues and shall be required to promptly implement corrective actions to ensure contract compliance and to prevent recurrences. In the event the successful Bidder is issued three or more complaints of nonperformance, Grambling State University reserves the right at its sole discretion to cancel the contract with a ten (10) day written notice. Contract cancellations due to nonperformance may be cause to deem vendor non-responsible in future solicitations.

NOTE: The University has a fall break and a Spring Break. Each Break is approximately 4 Days Each.

- 28. No Smoking Campus:** The Successful Bidder shall be responsible for compliance with all University policies, security measures and vehicle regulations. Specifically, the University is a NO SMOKING campus and all prospective Bidders are cautioned that smoking will not be permitted inside or outside on ANY part of this facility at any time. Any employee who is found to be in violation of this policy will be subject to immediate dismissal.
- 29. Non-Exclusivity:** This agreement is non-exclusive and shall not in any way preclude Grambling State University from entering into similar agreements and/or arrangements with other Vendors or from acquiring similar, equal, or like goods and/or services from other entities or sources.
- 30. Contract Amendments:** Requests for contract changes must be made in writing by an authorized agent/signatory of the Vendor and submitted to the Grambling State University Purchasing Department for prior approval. Requests shall include detailed justification and supporting documentation for the proposed amendment.
- Contract revisions shall be effective only upon approval by Grambling State University Purchasing Department and issuance of a formal Grambling State University Contract Amendment. The Vendor shall honor purchase orders issued prior to the approval of any contract amendment as applicable.
- 31. Term of Contract:** The duration of this Contract commences from the date specified herein or date of award notification and continues until University accepts final delivery of all deliverables. Total initial contract period not to exceed **Twelve (12)** months, unless renewal terms are specified in the solicitation documents. All terms of the solicitation shall be firm for the duration of Contract.
- 32. Notification of Fund Appropriation:** The continuation of this contract is contingent upon the appropriation of funds to fulfill the requirements of the contract by the Legislature. If the Legislature fails to appropriate sufficient monies to provide for the continuation of the contract or if such appropriation is reduced by the veto of the Governor or by any means provided in the Appropriations Act to prevent the total appropriations for the year from exceeding revenues for that year or for any lawful purpose and the effect of such reduction is to provide insufficient monies for the continuation of the contract, the contract shall terminate on the date of the beginning of the first fiscal year for which funds are not appropriated.

All Bidders should be aware that our Legislative process is such that it is often impossible to give prior notice of the non-appropriation of funds. Number of Bid Response Copies: Each Bidder must submit one (1) signed original bid to the Office of Purchasing at the mailing address specified in this solicitation document. The original must CONTAIN ORIGINAL SIGNATURES of those company officials or agents duly authorized to sign on behalf of the organization. Bidders may be required to mail in the original documents upon award.

- 33. Prohibition of Discriminatory Boycotts of Israel:** In accordance with LA R.S. 39:1602:1, for any contract for \$100,000 or more and for any contractor with five or more employees, Contractor, or any Subcontractor, shall certify it is not engaging in a boycott of Israel, and shall, for the duration of this contract, refrain from a boycott of Israel.

The State reserves the right to terminate this contract if the Contractor, or any Subcontractor, engages in a boycott of Israel during the term of the contract.

- 34. Pre-Bid Meeting: Mandatory** **Scheduled for April 30, 2026, at 11:00am** in the Facilities Conference Rm, located on 1 Facilities Drive. Grambling, La 71245. **La. R.S. 38:2212.H; Bidders must attend (and stay at) any mandatory pre-bid meeting.**
- 35. Site Visit/Contract Information:** It is the responsibility of the prospective bidder to visit and examine the jobsite, take measurements to his/her own satisfaction and determine conditions under which work is to be done. Owner will not accept responsibility for conditions which careful examination of premises would have shown existed. To visit jobsite and for further information, prospective bidder is to contact the Grambling State University Purchasing Departments at the contacts listed on page 1. It is preferred to have a written record of the correspondence for each site visit request. Please do not contact us by phone to schedule a visit unless you do not receive a response to your email request after 48 hours.
- 36. Piggy Back Clause:** Grambling State University is asking all responding vendors to indicate their willingness to extend the terms of resulting contracts, inclusive of price, to other Louisiana state agencies and/or universities. While this clause in no way commits any state agency and/or university to purchase from the awarded vendor, nor does it guarantee any additional orders will result, it does allow state agencies and/or universities, at their discretion, to make use of the Grambling State University's competitive process (provided said process satisfies their own procurement guidelines) and purchase directly from the awarded contractor. All purchases made by other state agencies and/or universities shall be understood to be transactions between that state agency and/or university and the awarded vendor. Grambling State University shall not be responsible for any such purchases.
- 37. State of Louisiana Contractor's Licenses Requirements:** If a Louisiana Contractor's License Number is Required for the items, work, or services to be performed under this solicitation, then it shall be stated in the bid advertisement that will appear in the Baton Rouge Advocate, and it will be stated in the specifications provided with these bid documents.
- 38. Examination of Bid Documents:** Bidders shall carefully examine the bidding documents and the sites to obtain first-hand knowledge of the scope and the conditions of the work. The submittal of a bid means the Contractor has inspected all elevators and related equipment in the buildings specified and has found elevators to be in a proper working order and satisfactory condition. No additional compensation will be allowed by the owner for failure of such contractor or subcontractor to inform themselves as to the conditions affecting the work
- 39. Errors and Omissions in Bid:** The University will not be liable for any error in the bid. Bidder will not be allowed to alter bid documents after the deadline for bid submission, except under the following condition: The University reserves the right to make corrections or clarifications due to patent errors identified in bids by the University or the Bidder. The University, at its option, has the right to request clarification or additional information from the Bidder.
- 40. Waiver of Administration Informalities:** The University reserves the right, at its sole discretion, to waive administrative informalities contained in any bid.
- 41. Cost of Offer Preparation:** The University is not liable for any costs incurred by prospective Bidders or Contractors prior to issuance of or entering into a Contract. Costs associated with developing the bid, and any other expenses incurred by the Bidder in responding to the ITB are entirely the responsibility of the Bidder, and shall not be reimbursed in any manner by Grambling State University.
- 42. Notice of Intent to Award:** Upon review and approval of the evaluation committee and agency recommendation for award, the Grambling State University will issue a Notice of Intent to Award letter to the apparent successful Bidder. A contract shall be completed and signed by all parties concerned on or before the date indicated. If this date is not met through no fault of the University, the University may elect to cancel the Notice of Intent to Award letter and make the award to the next most advantageous Bidder.
- The Purchase Order and the Contractor's specifications will be combined to form the complete contract when the award is made. The Contractor shall be responsible for Contract filing fee with the Lincoln Parish Courthouse.
- Any person aggrieved by the proposed award has the right to submit a protest in writing, in accordance with R.S. 39:1671, to the University Purchasing Director, within fourteen (14) days of the award/intent to award.

NOTICE TO VENDORS
LOUISIANA'S HUDSON (SMALL ENTREPRENEURSHIP) AND VETERAN INITIATIVE

The Louisiana Initiative for Small Entrepreneurships (the Hudson Initiative) and the Veteran Initiative (Veteran Small Entrepreneurship) are race and gender neutral goal-oriented programs which encourage State agencies to contract with and encourage contractors who receive contracts from the State to use good faith efforts to utilize certified small entrepreneurships and certified veteran or service-connected disabled veteran owned small entrepreneurships as subcontractors in the performance of the contract. The primary intent of the programs is to provide additional opportunities for Louisiana-based small entrepreneurships that are certified by the Louisiana Department of Economic Development (LED) to participate in contracting and procurement with the State.

Small entrepreneurships that are not currently certified and are interested in participating in procurement and contracting opportunities with the State are encouraged to visit <https://www.opportunitylouisiana.gov/small-business/special-programs-for-small-business/hudson-initiative> or <https://www.opportunitylouisiana.gov/small-business/special-programs-for-small-business/veteran-initiative> for qualification requirements and on-line certification. After certification, businesses are encouraged to register in the [LaGov Supplier Portal](#).

END OF SECTION

DEFINITIONS

Agent - The University's representative in Purchasing Department who is referred to throughout these documents as singular in number.

Contractor - The person/company who contracts with Grambling State University to provide the items, services, or to perform the work as called for on these documents who is referred to as singular in number.

Owner –Grambling State University.

IMPORTANT NOTES:

1. **VENDOR BIDDING ANYTHING OTHER THAN EXACT GOODS/SERVICES SPECIFIED IN THESE SPECIFICATIONS SHOULD SUBMIT DESCRIPTIVE AND ILLUSTRATIVE LITERATURE WITH BID FOR CONSIDERATION OF AWARD. FAILURE TO DO SO MAY BE CAUSE FOR REJECTION OF BID.**
2. **ALL PRICES QUOTED ARE TO REMAIN FIRM UNTIL ALL DELIVERABLE GOODS OR SERVICES ARE RENDERED TO AND ACCEPTED BY GRAMBLING STATE UNIVERSITY.**
3. **IN THE EVENT OF EXTENSION ERRORS, THE UNIT PRICE ON THE BID FORM SHALL PREVAIL.**
4. **GRAMBLING STATE UNIVERSITY ADHERES TO NET 30 PAYMENT TERMS. ALL OTHER PAYMENT TERMS MUST BE DISCLOSED WITH BID. BE ADVISED THAT STRICTER PAYMENT TERMS MAY BE CAUSE FOR REJECTION OF BID.**
5. **QUANTITIES ARE APPROXIMATE AND ARE NOT GUARANTEED BY THE UNIVERSITY. THE UNIVERSITY RESERVES THE RIGHT TO INCREASE OR REDUCE QUANTITY AS NEEDED IF IN THE BEST INTEREST OF THE UNIVERSITY.**
6. **THE UNIVERSITY RESERVES THE RIGHT TO AWARD PROPOSAL ON AN INDIVIDUAL ITEM BASIS, A COMBINATION OF ITEMS BASIS, OR AS A TOTAL PACKAGE TO ONE VENDOR, WHICHEVER IS IN THE BEST INTEREST OF THE UNIVERSITY.**
7. **BID SUBMISSIONS MUST DISCLOSE ALL FEES INCLUDING SHIPPING, HANDLING, FREIGHT, FUEL SURCHARGES, ETC.. NO ADDITIONAL FEES WILL BE ACCEPTED AFTER AWARD.**
8. **FAILURE TO COMPLY WITH ANY MANDATORY REQUIREMENTS SHALL BE CAUSE FOR REJECTION OF BID.**
9. **TAX EXEMPTION: *Grambling State University is exempt from all Louisiana state and local sales and use taxes and will not pay taxes delineated on invoices for this or any other project. Grambling State University is a tax-exempt State Agency. However, that tax-exempt status does not transfer to its contractors, subcontractors, suppliers or vendors for their use in purchasing project-related materials.***

END OF SECTION

MANDATORY BID REQUIREMENTS

Failure to meet all of the listed mandatory requirements will result in rejection of bid without further consideration.

1. **CERTIFICATION STATEMENT:** The Bidder **must** sign and include the Certification Statement as set forth in solicitation document. The signature of Bidder's Authorized Representative **must be an ORIGINAL signature** - not a typed/electronic signature. Documents signed in the DocuSign™ program are the only exceptions to this policy.
2. **BID SHEET/FORM:** The Bidder must submit bid on the form herein provided. The proposal must be signed in ink, and blank space(s) should be filled in for every applicable blank in the UNIT PRICE and EXTENDED TOTAL column. Items left blank will not be awarded to that bidder. It is not necessary to bid on all items. However, if you are not bidding on a particular item, or find a blank that is not applicable to your submission, write "NO BID" or "N/A" in the provided space(s). The Bidder must state the UNIT price (written in ink or typewritten) for each item and shall show the total amount for each item based on the quantities listed.
3. **CONTRACTOR QUALIFICATIONS: REFERENCE LETTERS:** The University reserves the right to verify contractor's qualifications regarding the bid response received, and to request references for verification purposes.
4. **CERTIFICATE OF INSURANCE:** **If Insurance is required under this solicitation, it will be stated in the advertisement of the solicitation to appear in the Baton Rouge Advocate, and in the specification provided with these bid documents.** Bidder shall submit a certificate of insurance with bid submission or by provide the following information: Policy number, names and addresses of carriers and Agents, amounts of coverage, types of coverage, and effective dates on the bid form enclosed.
5. **ILLUSTRATIVE MATERIALS: (If Applicable)** Vendor bidding anything other than exact goods/services specified in these specifications should submit descriptive and illustrative literature with the bid for consideration of award. Failure to do so may be cause for rejection of bid.

CONTACT INFORMATION

ELECTRONIC BID SUBMISSIONS (ONLY) *Do not email questions about the bid to this email address.*

purchasingbids@gram.edu

Be sure to include the solicitation number in the subject line.

Do not send your submission to any other University email address.

QUESTIONS/CONCERNS ABOUT SPECIFICATIONS

walkere@gram.edu

Do not email bid submissions this address.

To contact Purchasing by phone: 318-274-3280

CAMPUS DELIVERIES

Please send samples or other associated documents when a hard copy is requested or deemed necessary. By

Mail – Grambling State University

Purchasing Department

PO Box 4269

Grambling LA 71245

By Courier Service: Grambling State University

Purchasing Department

PO Box 4269

Grambling, LA 71245

EXHIBIT E INDEMNIFICATION AGREEMENT

The _____{Contractor/Lessee} agrees to protect, defend, indemnify, save, and hold harmless, Grambling State University, the State of Louisiana, all State Departments, Agencies, Boards and Commissions, its officers, agents, servants, employees, and volunteers, from and against any and all claims, damages, expenses, and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur, or in any way grow out of, any act or omission of

_____{Contractor/Lessee}, its agents, servants, and employees, or any and all costs, expenses and/or attorney fees incurred by _____{Contractor/Lessee} as a result of any claims, demands, suits or causes of action, except those claims, demands, suits, or causes of action arising out of the negligence of the State of Louisiana, all State Departments, Agencies, Boards, Commissions, its officers, agents, servants, employees and volunteers.

_____{Contractor/Lessee} agrees to investigate, handle, respond to, provide defense for and defend any such claims, demands, suits, or causes of action at its sole expense and agrees to bear all other costs and expenses related thereto, even if the claims, demands, suits, or causes of action are groundless, false or fraudulent.

Accepted by _____

Company Name

Signature

Title

Date Accepted _____

Is Certificate of Insurance Attached? ____Yes ____No

Contract No. _____ for

Grambling State University State Agency

PURPOSE OF CONTRACT: _____

BID BOND
FOR
GRAMBLING STATE UNIVERSITY PROJECTS

Date:

KNOW ALL MEN BY THESE PRESENTS:

That _____ of _____, as Principal, and as Surety, are held and firmly bound unto GRAMBLING STATE UNIVERSITY (Obligee), in the full and just sum of five (5%) percent of the total amount of this proposal, including all alternates, lawful money of the United States, for payment of which sum, well and truly be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally firmly by these presents.

Surety represents that it is listed on the current U. S. Department of the Treasury Financial Management Service list of approved bonding companies as approved for an amount equal to or greater that the amount for which it obligates itself in this instrument or that it is a Louisiana domiciled insurance company with at least an A - rating in the latest printing of the A. M. Best's Key Rating Guide. If surety qualifies by virtue of its Best's listing, the Bond amount may not exceed ten percent of policyholders' surplus as shown in the latest A. M. Best's Key Rating Guide.

Surety further represents that it is licensed to do business in the State of Louisiana and that this Bond is signed by surety's agent or attorney-in-fact. This Bid Bond is accompanied by appropriate power of attorney.

THE CONDITION OF THIS OBLIGATION IS SUCH that, whereas said Principal is herewith submitting its proposal to the Obligee on a Contract for:

NOW, THEREFORE, if the said Contract be awarded to the Principal and the Principal shall, within such time as may be specified, enter into the Contract in writing and give a good and sufficient bond to secure the performance of the terms and conditions of the Contract with surety acceptable to the Obligee, then this obligation shall be void; otherwise this obligation shall become due and payable.

PRINCIPAL (BIDDER)

SURETY

BY: _____
AUTHORIZED OFFICER-OWNER-PARTNER

BY: _____
AGENT OR ATTORNEY-IN-FACT(SEAL)

INSURANCE-STATEMENT

This is to certify that we carry the Workmen's Compensation, Employer's Liability Insurance, General Liability Insurance, and Automobile Liability Insurance as outlined above with:

Liability Insurance Company: _____

Auto Liability Company Insurance: _____

Workers Compensation Insurance Company: _____

Grambling State University to be named as additional insured on Insurance Certificate provided for this contract for Liability Coverage and Auto Liability Coverage. Grambling State University shall be granted a waiver of subrogation for all Insurance Policies.

Business Name: _____

Business Address: _____ Phone No.: _____

Authorized Signature of Bidder: _____ Date: _____

Printed Name: _____ Title: _____

Email Address: _____

CERTIFICATION STATEMENT

The undersigned hereby acknowledges she/he has read and understands all requirements and specifications of the Invitation for Bid (IFB), including any attachments.

OFFICIAL CONTACT. The University requests that the Bidder designate one person to receive all documents and the method in which the documents are best delivered. Identify the Contact name and fill in the information below: (Print Clearly)

Date	_____ Official Contact Name:	
A.	E-mail Address	
B.	Telephone Number with area code:	(____)

Bidder certifies that the above information is true and grants permission to the University to contact the above-named person or otherwise verify the information provided. By its submission of this Proposal and authorized signature below, Bidder certifies that:

1. The information contained in its response to this IFB is accurate;
2. Bidder complies with each of the mandatory requirements listed in the IFB and will meet or exceed the requirements specified therein; Bidder agrees to provide all tasks, services, and deliverables listed in Scope of Services for the total cost stated on Bid Form
3. Bidder accepts the procedures, evaluation criteria, mandatory contract terms, and all other administrative requirements set forth in this IFB.
4. Bidder confirms that its bid will be considered valid until award is made.
5. In making this bid, each Bidder represents that: They have read and understand the bid documents and the bid is made in accordance herewith, and the bid is based upon the specifications described in the bid documents without exception.
6. Bidder certifies, by signing and submitting a proposal for \$25,000 or more, that their company, any subcontractors, or principals are not suspended or debarred by the General Services Administration (GSA) in accordance with the requirements in OMB Circular A-133. (A list of parties who have been suspended or debarred can be viewed via the internet at <https://sam.gov/content/home>.)
7. **FEDERAL CLAUSES, IF APPLICABLE:** Should Federal Funds be utilized in this procurement transaction, the following clauses apply:

ANTI-KICKBACK CLAUSE: The contractor hereby agrees to adhere to the mandate dictated by the Copeland "Anti-Kickback" Act which provides that each contractor or subgrantee shall be prohibited from inducing, by any means, any person employed in the completion of work, to give up any part of the compensation to which he is otherwise entitled.

CLEAN AIR ACT: The contractor hereby agrees to adhere to the provisions which require compliance with all applicable standards, orders or requirements issued under Section 306 of the Clean Air Act which prohibits the use under non-exempt Federal Contracts, Grants or Loans of Facilities included on the EPA list of Violating Facilities.

ENERGY POLICY AND CONSERVATION ACT: The contractor hereby recognizes the mandatory standards and policies relating to energy efficiency which are contained in the State Energy Conservation Plan issued in compliance with the Energy Policy and Conservation Act (P.L. 94-163).

CLEAN WATER ACT: The contractor hereby agrees to adhere to the provisions which require compliance with all applicable standards, orders or requirements issued under Section 508 of the Clean Water Act which prohibits the use under non-exempt Federal Contracts, Grants or Loans of Facilities included on the EPA list of Violating Facilities.

ANTI-LOBBYING AND DEBARMENT ACT: The contractor will be expected to comply with Federal Statutes required in the Anti Lobbying Act and the Debarment Act.

Professional Job Title:		
Official Company Name:		
Federal Identification Number:		
Street Address:		
City:	State:	Zip:

SIGNATURE of Bidder's Authorized Representative: _____

(Signature MUST be HAND SIGNED and should be in Blue ink)

Date: _____

LOUISIANA UNIFORM PUBLIC WORK BID FORM

TO: Grambling State University
403 Main Street
Grambling, La 71245

*(Owner to provide name and address
of owner)*

BID FOR: IFB 50018-260024 Grambling Hall Lecture Hall Refurbishment

*(Owner to provide name of project and other identifying
information)*

The undersigned bidder hereby declares and represents that she/he: a) has carefully examined and understands the Bidding Documents, b) has not received, relied on, or based his bid on any verbal instructions contrary to the Bidding Documents or any addenda, c) has personally inspected and is familiar with the project site, and hereby proposes to provide all labor, materials, tools, appliances and facilities as required to perform, in a workmanlike manner, all work and services for the construction and completion of the referenced project, all in strict accordance with the Bidding Documents prepared by: Purchasing Department and dated: April 17, 2026

(Owner to provide name of entity preparing bidding documents.)

Bidders must acknowledge all addenda. The Bidder acknowledges receipt of the following **ADDENDA**: (Enter the number the Designer has assigned to each of the addenda that the Bidder is acknowledging) _____.

TOTAL BASE BID: For all work required by the Bidding Documents (including any and all unit prices designated "Base Bid"

* but not alternates) the sum of:

_____ Dollars (\$ _____)

ALTERNATES: For any and all work required by the Bidding Documents for Alternates including any and all unit prices designated as alternates in the unit price description.

Alternate No. 1 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars (\$ _____)

Alternate No. 2 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars (\$ _____)

Alternate No. 3 *(Owner to provide description of alternate and state whether add or deduct)* for the lump sum of:

_____ Dollars (\$ _____)

NAME OF BIDDER: _____

ADDRESS OF BIDDER: _____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

NAME OF AUTHORIZED SIGNATORY OF BIDDER: _____

TITLE OF AUTHORIZED SIGNATORY OF BIDDER: _____

SIGNATURE OF AUTHORIZED SIGNATORY OF BIDDER **: _____

DATE: _____

THE FOLLOWING ITEMS ARE TO BE INCLUDED WITH THE SUBMISSION OF THIS LOUISIANA UNIFORM PUBLIC WORK BID FORM:

* The Unit Price Form shall be used if the contract includes unit prices. Otherwise it is not required and need not be included with the form. The number of unit prices that may be included is not limited and additional sheets may be included if needed.

**** A CORPORATE RESOLUTION OR WRITTEN EVIDENCE** of the authority of the person signing the bid for the public work as prescribed by LA R.S. 38:2212(B)(5).

BID SECURITY in the form of a bid bond, certified check or cashier's check as prescribed by LA R.S. 38:2218(A) attached to and

made a part of this bid.

LOUISIANA UNIFORM PUBLIC WORK BID FORM

UNIT PRICE FORM

TO: **Grambling State University**
403 Main Street
Grambling, La 71245

BID FOR: **IFB 50018-260024 Grambling Hall Lecture Hall Refurbishment**

(Owner to provide name and address of owner)

UNIT PRICES: This form shall be used for any and all work required by the Bidding Documents and described as unit prices. Amounts shall be stated in figures and only in figures.

DESCRIPTION:	☐ Base Bid or ☐ Alt.# ____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# ____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# ____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# ____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# ____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# ____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# ____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

DESCRIPTION:	☐ Base Bid or ☐ Alt.# ____			
REF. NO.	QUANTITY:	UNIT OF MEASURE:	UNIT PRICE	UNIT PRICE EXTENSION (<i>Quantity times Unit Price</i>)

Wording for "DESCRIPTION" is to be provided by the Owner.

All quantities are estimated. The contractor will be paid based upon actual quantities as verified by the Owner.

BID SUBMISSION CHECKLIST

___ Certification statement w/original signature

___ Bid prices provided on the bid sheet(s) provided

___ Certificate of Insurance

___ Illustrative literature for items offered as equivalent

BID SUBMISSION DEADLINE:

Bid submissions for this solicitation are **due on May 19, 2026 by 2:00PMCST** – must be received electronically at purchasingbids@gram.edu. There are no exceptions to this deadline.

BID OPENING:

The public bid opening will take place on 5/19/2026 at **2:05PMCST** on Zoom, which is available for viewing by registering at: <https://us06web.zoom.us/j/83105768801?pwd=akbCB0bGkt4MTuZjBYKIT0aa5eXDHL.1>

ZOOM MEETING ID: 831 0576 8801

PASSWORD: 540511

Opening of the bid submissions begins at five (5) minutes past the hour.

For further information about the bid or to view job/delivery site, prospective bidder is to email the Purchasing Staff Members Contact Information provided on page 1

BID SHEET (continued)

PAYMENT OF TAXES

Grambling State University is exempt from all Louisiana state and local sales and use taxes and will not pay taxes delineated on invoices for items, services, or work under this solicitation or any other project. Grambling State University is a tax-exempt State Agency. However, that tax-exempt status does not transfer to its contractors, subcontractors, suppliers or vendors for their use in purchasing materials to be procured under this solicitation.

FIRM NAME _____

LOUISIANA CONTRACTOR'S LICENSE NUMBER: _____

SIGNED BY (signature) _____

SIGNED BY (printed) _____

By submitting your bid, you are acknowledging that you understand and agree that your company is capable of supplying the products/services in the timeline you have provided for the price(s) submitted in your bid.

Grambling State University reserves the right to reject any or all bids submitted.

GRAMBLING STATE UNIVERSITY

STANDARDIZED IFB LANGUAGE

1. **CHANGES IN THE WORK:** A Change Order is a written order to the Contractor signed by the Owner, issued after execution of the Contract, authorizing a Change in the Work or an adjustment in the Contract Sum or the Contract Time. The Contract Sum and the Contract Time may be changed only by Change Order. A Change Order signed by the Contractor indicates his agreement therewith, including the adjustment in the Contract Sum or the Contract Time. Any Change Order not signed by the Owner will be considered null and void.

The Owner, without invalidating the Contract, may order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and the Contract Time being adjusted accordingly. All such changes in the Work shall be authorized by Change Order and shall be performed under the applicable conditions of the Contract Documents.

When the Change Order is negotiated it shall be fully documented and itemized as to cost, including material quantities, material costs, insurance, employee benefits, other related costs, profit and overhead, and will be processed in accordance with LA R.S. 38:2222.

2. **QUALIFICATION REQUIREMENTS FOR COMPANIES SUBMITTING A BID:** All contractors submitting a bid for this contract shall meet these requirements listed below. Please include documentation in your bid submission that addresses each requirement. Submit the Bid including Unit Prices, Equipment List Breakout, executed & sworn; obtain and maintain throughout the term of the Contract, all required licenses, permits, certificates, insurances, performance and payment bonds, and agency signoffs to perform the Contract; demonstrate that it is an organization doing business for a minimum of three years prior to the Bid Opening Date; Must be an authorized dealer for all the Equipment; provide Bid Security – either a 5% percent Bid Bond.
3. **PERFORMANCE BOND LABOR AND MATERIAL PAYMENT BOND:** Performance and Payment Bonds shall be required on projects with an expected cost greater than \$50,000. Performance and Payment Bonds, when required, shall be provided in an amount of 50% of the contract price. Performance and Payments Bonds shall be required by the successful bidder.

Any surety bond required shall be written by a surety or insurance company currently on the U. S. Department of the Treasury Financial Management Service list of approved bonding companies which is published annually in the Federal Register. For any Public Works projects, no surety or insurance company shall write a bond which is in excess of the amount indicated as approved by the U. S. Department of the Treasury Financial Management Service list. The surety bond written for a Public Works project shall be written by a surety or insurance company that is currently licensed to do business in the State of Louisiana. **PLEASE NOTE THAT A BID BOND MUST BE SIGNED BY THE AGENT OR ATTORNEY-IN-FACT OF THE SURETY.**

The bidder shall require the attorney in fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of his power of attorney indicating the monetary limit of such power.

Contractor shall be licensed and certified as required by the State of Louisiana Secretary of State, and all other applicable agencies. Documentation to be provided within five (5) days after receipt of request from the University.

Contractor awarded the bid shall provide a copy of their insurance certificate indicating proof of coverage as required in the insurance section of these bid within five (5) days from receipt of request.

4. **SUBSTITUTIONS:** Each bidder represents that his bid is based upon the materials and equipment described in the bidding documents.
5. **MANUFACTURER'S NUMBERS OR TRADE NAMES:** Where a manufacturer's product is named or specified, it is understood that "or equal" shall apply, whether stated or not. Such name and number is meant to establish the standard of quality desired and does not restrict bidders to the specific brand, make, manufacturer, or specification named; and are set forth and convey to prospective bidders the general style, type, character, and quality of product desired; and that equal products will be acceptable. Grambling State University shall be sole judge as to whether or not the material is equal to that specified.

6. **EXAMINATION OF BIDDING DOCUMENTS:** Each bidder shall examine the bidding documents carefully and, no later than seven days prior to the date for receipt of bids, shall make written request to the Owner for interpretation or correction of any ambiguity, inconsistency or error therein which he may discover. Any interpretation or correction will be issued as an Addendum by the Owner. Only a written interpretation or correction by Addendum shall be binding. No bidder shall rely upon any interpretation or correction given by any other method.
7. **INQUIRY PROCESS:** Contractors shall direct all inquiries, requests for information, requests for clarification, etc. in writing to the Grambling State University Purchasing Department. Inquiries may be emailed to Erin Walker at walkere@gram.edu. **The last day to receive inquiries shall be by the close of business May 14, 2026.**
8. **CONTRACT COORDINATORS FOR THE UNIVERSITY:** The University will assign a contract coordinator for this contract. The University may assign one or more University employees to supervise and or coordinate work activities to be performed under this contract. The Contractor awarded the bid shall be provided the name(s) of University employee supervisors.
9. **AWARDS:** Awards may not be made to any person, firm, or company in default of any contract. Said person, firm, or company shall be considered non-responsible bidders and may be reinstated and awards made to them only after they have given evidence of good faith and have satisfactorily completed their obligations.
10. **PUBLICIZING AWARDS:** Written notice of award shall be sent to the successful bidder. In procurement over \$50,000, each unsuccessful bidder shall be notified of the award provided that he/she submitted with his/her bid in and email requesting this information to purchasingbids@gram.edu. Notice of award will be made a part of the procurement file.
11. **RIGHT TO PROTEST:** Any person who is aggrieved in connection with the solicitation or award of a contract shall protest to the Director Purchasing. Protests with respect to a solicitation shall be submitted in writing at least (2) two days prior to the opening of bids on all matters except housing of state agencies, their personnel, operations, equipment, or activities pursuant to R.S. 39:1643 for which such protest shall be submitted at least (10) ten days prior to the opening of bids. Protests with respect to the award of a contract shall be submitted in writing within (14) fourteen days after contract award.
12. **AUTHORITY TO RESOLVE PROTESTS:** Prior to the commencement of an action in court concerning any controversy, the Director of Purchasing or his/her designee shall have the authority, to resolve the protest of any aggrieved person concerning the solicitation or award of a contract. This authority shall be exercised in accordance with regulations.
13. **REJECTION OF BIDS:** The Bidder acknowledges the right of the University to reject any or all bids and to waive any informality or irregularity in any bid received. In addition, the bidder recognizes the right of the University to reject a bid if the Bidder failed to furnish any required bid security, or to submit the data required by the bidding documents, or if the bid is in any way incomplete or irregular.
14. **NORMAL / ROUTINE SCHEDULE:** The Contractor shall provide complete services Monday thru Thursday every week, from 8:00 AM to 4:00 PM.
15. **CONTRACTOR'S LICENSE:** On any bid amounting \$50,000 or more, the Contractor shall certify that she/he is licensed under Act 377 of the 1976 Louisiana Regular Legislative Session and show the contractor license number and the bid number on the front portion of the envelope; except projects financed, partially or wholly, with Federal Funds, provided that any successful Bidder before signing Contract thereon, files application for a license and pays the fee as provided in this Act and complies with all terms and provisions of this Act and with the rules and regulations of the Licensing Board.

A subcontractor who wishes to bid or perform commercial work where the total cost of the project including labor and materials for the following must be licensed:

 - \$50,000 or more for major and specialty classifications
 - \$10,000 or more for electrical, mechanical, and plumbing
 - \$1 or more for hazardous
16. **CONTRACTOR'S AFFIDAVIT:** In accordance with the Louisiana R.S. 38:2190 -2220, if the Contract is awarded to the successful Bidder, the Bidder shall, at the time of the signing of the Contract, execute the Contractor's Affidavit included in the Contract Documents.
17. **INTEREST:** There shall be no payment of interest on money owed.

18. **SECURITY REQUIREMENTS:** The University may allow the contractor to store tools, equipment, materials, supplies, etc. on site at University facilities, however, the University in no way warrants the security of any of this property. The Contractor shall be responsible for security of their property. The University may allow the Contractor to store tools, equipment, supplies, and materials on site at University facilities in designated storage areas. The University reserves the right to change these designated areas as needed and additionally the University is not required to provide these storage areas. The Contractor shall be required to keep all designated areas in a neat / orderly manner. The Contractor shall be required to provide insurance coverage for all equipment stored on site at Grambling. The contractor assumes all risk with storing tools, equipment, and materials on site at University facilities. The University shall not be responsible for theft, damage, or other harm to any property of the contractor securing any property.
19. **DAMAGES TO FACILITIES:** Contractor shall be responsible for all damages to the existing site, facilities, furniture, and equipment that are caused by this project. The contractor shall carefully document existing site conditions and existing damages prior to commencing work. The contractor shall repair all damage to its original, undamaged condition prior to completing this project
20. **CONTRACTOR EMPLOYEE REQUIREMENTS:** Contractor shall provide a sufficient amount of adequately trained staff to perform all required services in a timely manner.
21. **Supervision and Professional Conduct-**

The Supervisor shall be responsible for communicating work schedules with the University's designated contract coordinator.

The Supervisor shall be present at all times when any contractor personnel are working at Grambling. The contractor shall designate employees who may fill in for the supervisor if the supervisor is absent for any reason. The University shall be notified by telephone and email as soon as possible if the normal supervisor will be absent. This notification shall be made no later than one hour after the normal work day schedule begins. The contractor shall provide complete contact information for the supervisors and the personnel designated as "back up" supervisors. The contractor shall provide the supervisors with a mobile cellular phone and shall provide the University with the phone number for the cellular phone so that the University can reach the supervisor at any time.

The University reserves the right to require the contractor to remove any contract employee who is not dressed appropriately or who is not taking care of their personal hygiene from any or all buildings employed under the contract when the University deems it to be in the University's best interest. Contractor's employees shall maintain a neat, clean, and professional appearance at all times. Contractor's employees shall wear clothing identifying the name of their company. The contractor shall be responsible for furnishing a replacement employee who also shall meet all previously stated requirements in the event of sickness or absence of the regular worker and notify the University contract coordinator of that replacement.

Contractor's employees will be able to use McCall Dining Hall for lunch. Pricing varies during the summer. The contractor, sub-contractors, material suppliers, and all workers associated with the project shall use University facilities such as restrooms, break rooms, vending machines, etc. The contractor shall supply a portable restroom for their employees to use.

Contractor's employees shall adhere to the university's tobacco-free policy. See GSU's tobacco use policy for detailed information at <https://www.gram.edu/student-life/judicial-affairs/docs/Tobacco-Free%20Policy-2013-1.pdf>

22. **SUPPLIES, MATERIALS, TOOLS, AND EQUIPMENT REQUIRED FOR THIS CONTRACT:** The Contractor must provide all supplies, materials, tools, equipment, etc. necessary to complete the requirements of this contract. In no case will the University be required to provide / supply any of these items. The tools and equipment provided shall be maintained in optimum condition at all times. Specifically, the tools and equipment provided shall include but not be limited to. Equipment and tools used for this contract shall be professional equipment / tools in good working condition. Contractor shall utilize equipment and tools that provide the least amount of interruption to normal building operations (very noisy equipment shall not be used, equipment that creates objectionable fumes shall not be used, etc.). The University reserves the right to deny the Contractor use of a certain tool or piece of equipment if the University deems that tool or piece of equipment to cause an unacceptable interruption. Contractor must have an adequate supply of appropriate equipment and tools to efficiently provide service to all facilities included in this contract. Furthermore, the Contractor must have backup equipment / tools that are immediately ready for use in the event that the normally used equipment / tool fails to operate, is lost / stolen, etc. A delay in service is not

acceptable due to equipment / tool failure or loss.

- 23. SUPPLIES / MATERIALS:** Contractor shall supply and provide all needed materials to complete the scope of services. The quality of these materials shall meet or exceed the quality of materials currently being used at these facilities. Contractors are encouraged to inspect each facility prior to submitting a bid to ensure that the quality of materials in their bid meets or exceeds the quality of materials / supplies currently used.

- 24. SAFETY / ENVIRONMENTAL / PUBLIC HEALTH COMPLIANCE REQUIREMENTS:** The Contractor shall emphasize that safety is the most important part of this contract. The goal of the contract is to provide safe and sanitary facilities for the University community. We want to ensure that the Contractor has a proactive approach to working safely and a written safety program that their employees are trained on. Additionally, we expect the Contractor to strictly comply with all applicable rules, guidelines, laws, requirements, etc. The University shall require the Contractor to take immediate action to remedy any deficiencies / areas of non-compliance.

Occupational Safety and Health Act (OSHA) Compliance - the Contractor shall meet or exceed all OSHA requirements, rules, laws, guidelines. Environmental Protection Agency (EPA) and Louisiana Department of Environmental Quality (LDEQ) Compliance the Contractor shall meet or exceed all EPA and / or LDEQ requirements, rules, laws, guidelines, etc.

Safety Program - the Contractor shall include a copy of their written safety program with their bid submission that covers all policies and procedures that pertain to compliance with safety / OSHA requirements.

Material Safety Data Sheets (MSDS) -the Contractor must keep a printed copy of a material safety data sheet for each chemical used to complete the requirements of this contract. The MSDS must be readily available and easily accessible to all employees.

- 25. PAYMENTS AND COMPLETION and SUBSTANTIAL COMPLETION:** The Owner will issue a NOTICE OF ACCEPTANCE for the Contractor to record with the Clerk of Court in Lincoln Parish.
- 26. FINAL COMPLETION AND FINAL PAYMENT:** The Contract is to provide that the contractor is not to be paid more than ninety percent (90%) of the amount of the contract upon completion of the work. The Contractor shall record the NOTICE OF ACCEPTANCE with the Lincoln Parish Clerk of Court and shall furnish a CLEAR LIEN CERTIFICATE from the Clerk of Court within forty-five days after recordation of NOTICE OF ACCEPTANCE. At that time, the remaining ten percent (10%) will be paid.
- 29. LIQUIDATED DAMAGES:** The Owner will suffer financial loss if the Project is not substantially complete on the date set forth in the CONTRACT DOCUMENTS. The Contractor (and/or Surety) shall be liable for and shall pay to the Owner Liquidated Damages for each calendar day of delay until the work is Substantially Complete.

The Completion Time stated in Consecutive Calendar Days and the Liquidated Damages stated in (\$250) two-hundred and fifty Dollars per Day are listed in the PROPOSAL FORM.

- 30. PRICING REQUIREMENTS:** Pricing for all items shall be a complete, turnkey price and shall include but is not limited to: labor, equipment, tools, materials, supplies, insurance, permitting, taxes, and shipping.
- 31. TAXES:** Applicable taxes are to be included in lump sum bid.
- 32. INVOICING / PAYMENT TERMS:** The contractor will be required to submit an itemized monthly invoice, to Accounts Payable email address acctpayable@gram.edu. Monthly payments will be made by the Agency within approximately thirty (30) days after receipt of a properly executed invoice, and approval by the Agency.

All invoices must list the following information: the contract purchase order number, dates of services performed, building name and elevator number if applicable, a brief explanation of repair including any parts replaced. Invoices submitted without the requested documentation will not be approved for payment until the required information is provided.

STANDARDIZED INSURANCE REQUIREMENTS FOR STATE AGENCY CONTRACTS

EXHIBIT A INSURANCE AND INDEMNIFICATION REQUIREMENTS FOR CONTRACTORS

The Contractor shall purchase and maintain for the duration of the contract insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the work hereunder by the Contractor, its agents, representatives, employees or subcontractors.

A. MINIMUM SCOPE AND LIMITS OF INSURANCE

1. **WORKER COMPENSATION:** Workers Compensation insurance shall be in compliance with the Workers Compensation law of the State of the Contractor's headquarters. Employers Liability is included with a minimum limit of \$500,000 per accident/per disease/per employee. If work is to be performed over water and involves maritime exposure, applicable LHWCA, Jones Act, or other maritime law coverage shall be included and the Employers Liability limit increased to a minimum of \$1,000,000. A.M. Best's insurance company rating requirement may be waived for workers compensation coverage only.
2. **COMMERICAL GENERAL LIABILITY:** Commercial General Liability insurance, including Personal and Advertising Injury Liability, shall have a minimum limit per occurrence of \$1,000,000 and a minimum general aggregate of \$2,000,000. The Insurance Services Office (ISO) Commercial General Liability occurrence coverage form CG 00 01 (current form approved for use in Louisiana), or equivalent, is to be used in the policy. Claims-made form is unacceptable.
3. **AUTOMOBILE LIABILITY:** Automobile Liability Insurance shall have a minimum combined single limit per occurrence of \$1,000,000. ISO form number CA 00 01 (current form approved for use in Louisiana), or equivalent, is to be used in the policy. This insurance shall include third-party bodily injury and property damage liability for owned, hired and non-owned automobiles.

B. **DEDUCTIBLES AND SELF-INSURED RETENTIONS:** Any deductibles or self-insured retentions must be declared to and accepted by the Agency. The Contractor shall be responsible for all deductibles and self-insured retentions.

C. **OTHER INSURANCE PROVISIONS:** The policies are to contain, or be endorsed to contain, the following provisions:

1. **General Liability and Automobile Liability Coverages**

- a. The Agency, its officers, agents, employees and volunteers shall be named as an additional insured as regards negligence by the contractor. ISO Form CG 20 10 (current form approved for use in Louisiana), or equivalent, is to be used when applicable. The coverage shall contain no special limitations on the scope of protection afforded to the Agency.
- b. The Contractor's insurance shall be primary as respects the Agency, its officers, agents, employees and volunteers. Any insurance or self-insurance maintained by the Agency shall be excess and non-contributory of the Contractor's insurance.
- c. Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the Agency, its officers, agents, employees and volunteers.
- d. The Contractor's insurance shall apply separately to each insured against whom claim is made or suit is brought, except with respect to the policy limits.
- e. All property losses caused by the actions of the Contractor shall be adjusted with and made payable to the Agency.
- f. Neither the acceptance of the completed work nor payment shall release the Contractor from the insurance requirements and indemnification agreement obligations.
- g. Additional insurance may be required on an individual basis for hazardous activities and specific service agreements. If such additional insurance is required for a specific contract, that requirement should be added to the list of required coverages found in the appropriate Exhibit.
- h. If the Contractor does not continue to comply with all of the insurance requirements at any time during the contract or at contract renewal, the Agency has the following options:
 - Payments to the Contractor may be withheld until the requirements have been met;

- The Agency may pay any renewal policy premiums and withhold such payments from any monies due the Contractor;
- The Agency may suspend, discontinue or terminate the contract.

2. **Workers Compensation and Employers Liability Coverage**

The insurer shall agree to waive all rights of subrogation against the Agency, its officers, agents, employees and volunteers for losses arising from work performed by the Contractor for the Agency.

3. **All Coverages**

- a. Coverage shall not be canceled, suspended, or voided by either party (the Contractor or the insurer) or reduced in coverage or in limits except after 30 days written notice has been given to the Agency. Ten-day written notice of cancellation is acceptable for non-payment of premium. Notifications shall comply with the standard cancellation provisions in the Contractor's policy.
- b. Neither the acceptance of the completed work nor the payment thereof shall release the Contractor from the obligations of the insurance requirements or indemnification agreement.
- c. The insurance companies issuing the policies shall have no recourse against the Agency for payment of premiums or for assessments under any form of the policies. Any failure of the Contractor to comply with reporting provisions of the policy shall not affect coverage provided to the Agency, its officers, agents, employees and volunteers.

- D. **ACCEPTABILITY OF INSURERS:** All required insurance shall be provided by a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located. Insurance shall be placed with insurers with a A.M. Best's rating of A:-VI or higher. This rating requirement may be waived for workers compensation coverage only.

If at any time an insurer issuing any such policy does not meet the minimum A.M. Best rating, the Contractor shall obtain a policy with an insurer that meets the A.M. Best rating and shall submit another Certificate of Insurance as required in the contract.

- E. **VERIFICATION OF COVERAGE:** Contractor shall furnish the Agency with Certificates of insurance reflecting proof of required coverage. The Certificates for each insurance policy are to be signed by a person authorized by that insurer to bind coverage on its behalf. The Certificates are to be received and approved by the Agency before work commences and upon any contract renewal thereafter.

In addition to the Certificates, Contractor shall submit the declarations page and the cancellation provision endorsement for each insurance policy. The Agency reserves the right to request complete certified copies of all required insurance policies at any time.

Upon failure of the Contractor to furnish, deliver and maintain such insurance as above provided, this contract, at the election of the Agency, may be suspended, discontinued or terminated. Failure of the Contractor to purchase and/or maintain any required insurance shall not relieve the Contractor from any liability or indemnification under the contract.

- F. **SUBCONTRACTORS:** Contractor shall include all subcontractors as insureds under its policies OR shall be responsible for verifying and maintaining the Certificates provided by each subcontractor. Subcontractors shall be subject to all of the requirements stated herein. The Agency reserves the right to request copies of subcontractor's Certificates at any time.

- G. **WORKERS COMPENSATION INDEMNITY:** In the event Contractor is not required to provide or elects not to provide workers compensation coverage, the parties hereby agree that Contractor, its owners, agents and employees will have no cause of action against, and will not assert a claim against, the State of Louisiana, its departments, agencies, agents and employees as an employer, whether pursuant to the Louisiana Workers Compensation Act or otherwise, under any circumstance. The parties also hereby agree that the State of Louisiana, its departments, agencies, agents and employees shall in no circumstance be, or considered as, the employer or statutory employer of Contractor, its owners, agents and employees. The parties further agree that Contractor is a wholly independent contractor and is exclusively responsible for its employees, owners, and agents. Contractor hereby agrees to protect, defend, indemnify and hold the State of Louisiana, its departments, agencies, agents and employees harmless from any such assertion or claim that may arise from the performance of this contract.

- H. **INDEMNIFICATION/HOLD HARMLESS AGREEMENT:** Contractor agrees to protect, defend, indemnify, save, and hold harmless, Grambling State University, the State of Louisiana, all State Departments, Agencies, Boards and Commissions, its officers, agents, servants, employees, and volunteers, from and against any and all claims, damages, expenses, and liability arising out of injury or death to any person or the damage, loss or destruction of any property which may occur, or in any way grow out of, any act or omission of Contractor, its agents, servants, and employees, or any and all costs, expenses and/or attorney fees incurred by Contractor as a result of any claims, demands, suits or causes of action, except those claims,

demands, suits, or causes of action arising out of the negligence of Grambling State University, the State of Louisiana, all State Departments, Agencies, Boards, Commissions, its officers, agents, servants, employees and volunteers.

Contractor agrees to investigate, handle, respond to, provide defense for and defend any such claims, demands, suits, or causes of action at its sole expense and agrees to bear all other costs and expenses related thereto, even if the claims, demands, suits, or causes of action are groundless, false or fraudulent.

PROJECT MANUAL

Grambling State University Grambling Hall Lecture Hall Refurbishment Grambling, Louisiana

Date: March 10, 2026

SBB Project Number 2602.00



Sutton Beebe Babin Architects, LLC

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Grambling Hall Lecture Hall Refurbishment Grambling State University Grambling, Louisiana

March 10, 2026

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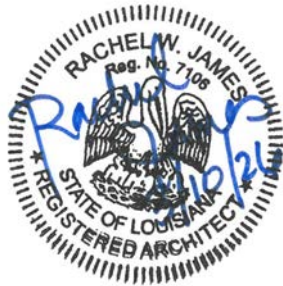
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DOCUMENT 000107 - SEALS PAGE

1.1 DESIGN PROFESSIONALS OF RECORD

A. Architect:

1. Sutton Beebe Babin Architects, LLC.
2. Rachel James.
3. LA 7106.
4. Responsible for Divisions 01-49 Sections except where indicated as prepared by other design professionals of record.



B. Plumbing Engineer:

1. Aillet, Fenner, Jolly, & McClelland, Inc.
2. John Wilson.
3. LA Professional Engineer License No. 19008.
4. Responsible for Division 22.



C. HVAC Engineer:

1. Aillet, Fenner, Jolly, & McClelland, Inc.
2. John Wilson.
3. LA Professional Engineer License No. 19008.
4. Responsible for Divisions 23.



D. Electrical Engineer:

1. Aillet, Fenner, Jolly, & McClelland, Inc.
2. Daniel Brown.
3. LA Professional Engineer License No. 41687.
4. Responsible for Divisions 26.



END OF DOCUMENT 000107

DOCUMENT 000115 - LIST OF DRAWING SHEETS

PART 1 - GENERAL

1.1 LIST OF DRAWINGS

- A. Drawings: Drawings that will be enumerated in the Owner/Contractor Agreement as part of the Contract Documents are listed on the Table of Contents page of the separately bound drawing set, dated March 10, 2026, as modified by subsequent Addenda and Modifications.
 - 1. The words "Resource Drawing" or "For information" after the titles of drawings indicate that those drawings are not intended to be incorporated in the Contract Documents.

END OF DOCUMENT 000115

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Project information.
2. Work covered by Contract Documents.
3. Owner's product purchase contracts.
4. Contractor's use of site and premises.
5. Coordination with occupants.
6. Work restrictions.
7. Specification and Drawing conventions.
8. Miscellaneous provisions.

B. Related Requirements:

1. Section 015000 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.
2. Section 017300 "Execution" for coordination of Owner-installed products.

1.2 PROJECT INFORMATION

A. Project Identification: Grambling Hall Lecture Hall Refurbishment.

1. Project Location: Grambling State University, Grambling, Louisiana.

B. Owner: State of Louisiana.

1. Owner's Representative: Damien Chatman, 318.274.3136, chatmand@gram.edu.

C. Architect: Sutton Beebe Babin Architects, LLC.

1. Architect's Representative: Rachel James, 318.221.1623, rjames@sbbarchitects.com.

D. Architect's Consultants: Architect has retained the following design professionals, who have prepared designated portions of the Contract Documents:

1. Mechanical and Electrical Engineer: Aillet, Fenner, Jolly, & McClelland, Inc.
 - a. Representative: Daniel Brown, 318.425.7452, dbrown@afjmc.com.

E. Web-Based Project Software: Contractor's option to provide project software will be used for purposes of managing communication and documents during the construction stage.

1. See Section 013100 "Project Management and Coordination" for requirements for using web-based Project software.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

A. The Work of Project is defined by the Contract Documents and includes, but is not limited to, the following:

1. Refurbishment of the existing Lecture Hall to include new architectural finishes, new auditorium seating, new lighting, and other Work indicated in the Contract Documents.

B. Type of Contract:

1. Project will be constructed under a single prime contract.

1.4 CONTRACTOR'S USE OF SITE AND PREMISES

- A. Restricted Use of Site: Contractor shall have limited use of Project site for construction operations as indicated on Drawings by the Contract limits and as indicated by requirements of this Section.
- B. Limits on Use of Site: Limit use of Project site to areas within the Contract limits indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
1. Limits on Use of Site: Confine construction operations to areas designated by Owner for Contractor's use.
 2. Driveways, Walkways and Entrances: Keep driveways, loading areas, and entrances serving premises clear and available to Owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or for storage of materials.
 - a. Schedule deliveries to minimize use of driveways and entrances by construction operations.
 - b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.
- C. Condition of Existing Building: Maintain portions of existing building affected by construction operations in a weathertight condition throughout construction period. Repair damage caused by construction operations.
- D. Condition of Existing Grounds: Maintain portions of existing grounds, landscaping, and hardscaping affected by construction operations throughout construction period. Repair damage caused by construction operations.

1.5 COORDINATION WITH OCCUPANTS

- A. Partial Owner Occupancy: Owner will occupy the premises during entire construction period, with the exception of areas under construction. Cooperate with Owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations. Maintain existing exits unless otherwise indicated.
1. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities. Do not close or obstruct walkways, corridors, or other occupied or used facilities without written permission from Owner and authorities having jurisdiction.
 2. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.

1.6 WORK RESTRICTIONS

- A. Comply with restrictions on construction operations.
1. Comply with limitations on use of public streets, work on public streets, rights of way, and other requirements of authorities having jurisdiction.
- B. On-Site Work Hours: Limit work to between 7:00 a.m. to 4:40 p.m., Monday through Friday, unless otherwise indicated. Work hours may be modified to meet Project requirements if approved by Owner and authorities having jurisdiction.
1. Weekend Hours: Same as week day hours.
- C. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging for temporary utility services according to requirements indicated:
1. Notify Owner not less than two days in advance of proposed utility interruptions.
 2. Obtain Owner's written permission before proceeding with utility interruptions.
- D. Noise, Vibration, Dust, and Odors: Coordinate operations that may result in high levels of noise and vibration, dust, odors, or other disruption to Owner occupancy with Owner.

1. Notify Owner not less than two days in advance of proposed disruptive operations.
 2. Obtain Owner's written permission before proceeding with disruptive operations.
- E. Nonsmoking Building: Smoking is not permitted within the building or within **25 feet** of entrances, operable windows, or outdoor-air intakes.
- F. Smoking and Controlled Substance Restrictions: Use of tobacco products, alcoholic beverages, and other controlled substances within the existing building is not permitted.
- G. Employee Identification: Provide identification tags for Contractor personnel working on Project site. Require personnel to use identification tags at all times.
- H. Employee Screening: Comply with Owner's requirements for drug and background screening of Contractor personnel working on Project site.
1. Maintain list of approved screened personnel with Owner's representative.

1.7 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Imperative mood and streamlined language are generally used in the Specifications. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 2. Text Color: Text used in the Specifications, including units of measure, manufacturer and product names, and other text may appear in multiple colors or underlined as part of a hyperlink; no emphasis is implied by text with these characteristics.
 3. Hypertext: Text used in the Specifications may contain hyperlinks. Hyperlinks may allow for access to linked information that is not residing in the Specifications. Unless otherwise indicated, linked information is not part of the Contract Documents.
 4. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
- B. Division 00 Contracting Requirements: General provisions of the Contract, including General and Supplementary Conditions, apply to all Sections of the Specifications.
- C. Division 01 General Requirements: Requirements of Sections in Division 01 apply to the Work of all Sections in the Specifications.
- D. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations scheduled on Drawings and published as part of the U.S. National CAD Standard.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 011000

SECTION 012500 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work of This Section Includes: Administrative and procedural requirements for substitutions.
- B. Related Requirements:
 - 1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.2 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
 - 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit documentation identifying product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use form acceptable to Architect.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
 - b. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - c. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - d. Samples, where applicable or requested.
 - e. Certificates and qualification data, where applicable or requested.
 - f. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
 - h. Research reports evidencing compliance with building code in effect for Project, from ICC-ES.
 - i. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

- 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within

seven days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.

- a. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
- b. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.4 QUALITY ASSURANCE

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

1.5 PROCEDURES

- A. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

1.6 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 15 days prior to time required for preparation and review of related submittals.

- 1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

- a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
- b. Substitution request is fully documented and properly submitted.
- c. Requested substitution will not adversely affect Contractor's construction schedule.
- d. Requested substitution has received necessary approvals from authorities having jurisdiction.
- e. Requested substitution is compatible with other portions of the Work.
- f. Requested substitution has been coordinated with other portions of the Work.
- g. Requested substitution provides specified warranty.
- h. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

- B. Substitutions for Convenience:

- 1. Architect will consider requests for substitution if received within 30 days after the Notice of Award. Requests received after that time may be considered or rejected at discretion of Architect.

- a. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:
 - 1) Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 - 2) Requested substitution does not require extensive revisions to the Contract Documents.
 - 3) Requested substitution is consistent with the Contract Documents and will produce indicated results.
 - 4) Substitution request is fully documented and properly submitted.
 - 5) Requested substitution will not adversely affect Contractor's construction schedule.
 - 6) Requested substitution has received necessary approvals from authorities having jurisdiction.
 - 7) Requested substitution is compatible with other portions of the Work.
 - 8) Requested substitution has been coordinated with other portions of the Work.
 - 9) Requested substitution provides specified warranty.

- 10) If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

SECTION 012600 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Requirements:
 - 1. Section 012500 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
 - 2. Section 013100 "Project Management and Coordination" for requirements for forms for contract modifications provided as part of web-based Project management software.

1.2 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. Work Change Proposal Requests issued by Architect are not instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Quotation Form: Use forms acceptable to Architect.
- B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.
 - 5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - 6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.
 - 7. Proposal Request Form: Use form acceptable to Architect.

1.3 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Work Change Proposal Request, Architect will issue a Change Order for signatures of Owner and Contractor on AIA Document G701.

1.4 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive: Architect may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.
 - 1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.
 - 1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Requirements:
 - 1. Section 012600 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 2. Section 013200 "Construction Progress Documentation" for administrative requirements governing the preparation and submittal of the Contractor's construction schedule.

1.2 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.3 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.
 - 1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
 - 2. Submit the schedule of values to Architect at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the schedule of values:
 - a. Project name and location.
 - b. Owner's name.
 - c. Owner's Project number.
 - d. Name of Architect.
 - e. Architect's Project number.
 - f. Contractor's name and address.
 - g. Date of submittal.
 - 2. Arrange schedule of values consistent with format of AIA Document G703.
 - 3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
 - 4. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site.
 - 5. Purchase Contracts: Provide a separate line item in the schedule of values for each Purchase contract. Show line-item value of Purchase contract. Indicate Owner payments or deposits, if any, and balance to be paid by Contractor.
 - 6. Overhead Costs, Proportional Distribution: Include total cost and proportionate share of general overhead and profit for each line item.
 - 7. Temporary Facilities: Show cost of temporary facilities and other major cost items that are not direct cost of actual

- work-in-place as separate line items.
8. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.4 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments, as certified by Architect and paid for by Owner.
- B. Payment Application Times: The date for each progress payment is indicated in the Owner/Contractor Agreement. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.
- C. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.
- D. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
 2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.
 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration.
- E. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed. Differentiate between items stored on-site and items stored off-site.
 1. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials.
 2. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
 3. Provide summary documentation for stored materials indicating the following:
 - a. Value of materials previously stored and remaining stored as of date of previous Applications for Payment.
 - b. Value of previously stored materials put in place after date of previous Application for Payment and on or before date of current Application for Payment.
 - c. Value of materials stored since date of previous Application for Payment and remaining stored as of date of current Application for Payment.
- F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt. One copy shall include waivers of lien and similar attachments if required.
- G. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
 1. List of subcontractors.
 2. Schedule of values.
 3. Contractor's construction schedule (preliminary if not final).
 4. Products list (preliminary if not final).
 5. Submittal schedule (preliminary if not final).
 6. List of Contractor's staff assignments.
 7. List of Contractor's principal consultants.
 8. Copies of building permits.
 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 10. Initial progress report.
 11. Report of preconstruction conference.
 12. Performance and payment bonds.
 13. Data needed to acquire Owner's insurance.

- H. Application for Payment at Substantial Completion: After Architect issues the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - a. Complete administrative actions, submittals, and Work preceding this application, as described in Section 017700 "Closeout Procedures."
 2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- I. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Certification of completion of final punch list items.
 3. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 4. Updated final statement, accounting for final changes to the Contract Sum.
 5. AIA Document G706.
 6. AIA Document G706A.
 7. AIA Document G707.
 8. Evidence that claims have been settled.
 9. Final liquidated damages settlement statement.
 10. Proof that taxes, fees, and similar obligations are paid.
 11. Waivers and releases.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

SECTION 013100 - PROJECT MANAGEMENT AND COORDINATION

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work of this Section includes administrative provisions for coordinating construction operations on Project, including, but not limited to, the following:
 - 1. General coordination procedures.
 - 2. Coordination drawings.
 - 3. RFIs.
 - 4. Digital project management procedures.
 - 5. Web-based Project management software package.
 - 6. Project meetings.
- B. Related Requirements:
 - 1. Section 013200 "Construction Progress Documentation" for preparing and submitting Contractor's construction schedule.
 - 2. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 3. Section 017700 "Closeout Procedures" for coordinating closeout of the Contract.

1.2 DEFINITIONS

- A. RFI: Request for Information. Request from Owner, Architect, or Contractor seeking information required by or clarifications of the Contract Documents.

1.3 INFORMATIONAL SUBMITTALS

- A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:
 - 1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
 - 2. Number and title of related Specification Section(s) covered by subcontract.
 - 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses, cellular telephone numbers, and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.

1.4 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
 - 1. Schedule construction operations in sequence required to obtain the best results, where installation of one part of the Work depends on installation of other components, before or after its own installation.
 - 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 - 3. Make adequate provisions to accommodate items scheduled for later installation.

- B. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Preparation of Contractor's construction schedule.
2. Preparation of the schedule of values.
3. Installation and removal of temporary facilities and controls.
4. Delivery and processing of submittals.
5. Progress meetings.
6. Preinstallation conferences.
7. Project closeout activities.
8. Startup and adjustment of systems.

1.5 REQUEST FOR INFORMATION (RFI)

- A. General: Immediately on discovery of the need for additional information, clarification, or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in the form specified.

1. Architect will return without response those RFIs submitted to Architect by other entities controlled by Contractor.
2. Coordinate and submit RFIs in a prompt manner to avoid delays in Contractor's work or work of subcontractors.

- B. Content of the RFI: Include a detailed, legible description of item needing information or interpretation and the following:

1. Project name.
2. Owner name.
3. Owner's Project number.
4. Name of Architect.
5. Architect's Project number.
6. Date.
7. Name of Contractor.
8. RFI number, numbered sequentially.
9. RFI subject.
10. Specification Section number and title and related paragraphs, as appropriate.
11. Drawing number and detail references, as appropriate.
12. Field dimensions and conditions, as appropriate.
13. Contractor's suggested resolution. If Contractor's suggested resolution impacts the Contract Time or the Contract Sum, Contractor shall state impact in the RFI.
14. Contractor's signature.
15. Attachments: Include sketches, descriptions, measurements, photos, Product Data, Shop Drawings, coordination drawings, and other information necessary to fully describe items needing interpretation.
 - a. Include dimensions, thicknesses, structural grid references, and details of affected materials, assemblies, and attachments on attached sketches.

- C. RFI Forms: AIA Document G716.

1. Attachments shall be electronic files in PDF format.

- D. Action: Architect will review each RFI, determine action required, and respond. Allow seven days for Architect's response for each RFI. RFIs received by Architect after 1:00 p.m. will be considered as received the following working day.

1. The following Contractor-generated RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for approval of Contractor's means and methods.
 - d. Requests for coordination information already indicated in the Contract Documents.
 - e. Requests for adjustments in the Contract Time or the Contract Sum.
 - f. Requests for interpretation of Architect's actions on submittals.
 - g. Incomplete RFIs or inaccurately prepared RFIs.

2. Architect's action may include a request for additional information, in which case Architect's time for response will date from time of receipt by Architect of additional information.
3. Architect's action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures."
 - a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Architect in writing within 5 days of receipt of the RFI response.

- E. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by the RFI number. Submit log weekly. Include the following:
 1. Project name.
 2. Name and address of Contractor.
 3. Name and address of Architect.
 4. RFI number, including RFIs that were returned without action or withdrawn.
 5. RFI description.
 6. Date the RFI was submitted.
 7. Date Architect's response was received.
 8. Identification of related Minor Change in the Work, Construction Change Directive, and Proposal Request, as appropriate.
- F. On receipt of Architect's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Architect within three days if Contractor disagrees with response.

1.6 DIGITAL PROJECT MANAGEMENT PROCEDURES

- A. Architect's Data Files Not Available: Architect will not provide Architect's CAD drawing digital data files for Contractor's use during construction.
- B. Web-Based Project Management Software Package: It is Contractor's option to provide, administer, and use web-based Project management software package for purposes of hosting and managing Project communication and documentation until Final Completion.
 1. Web-based Project management software includes, at a minimum, the following features:
 - a. Compilation of Project data, including Contractor, subcontractors, Architect, Architect's consultants, Owner, and other entities involved in Project. Include names of individuals and contact information.
 - b. Access control for each entity for each workflow process, to determine entity's digital rights to create, modify, view, and print documents.
 - c. Document workflow planning, allowing customization of workflow between project entities.
 - d. Creation, logging, tracking, and notification for Project communications required in other Specification Sections, including, but not limited to, RFIs, submittals, Minor Changes in the Work, Construction Change Directives, and Change Orders.
 - e. Track status of each Project communication in real time, and log time and date when responses are provided.
 - f. Procedures for handling PDFs or similar file formats, allowing markups by each entity. Provide security features to lock markups against changes once submitted.
 - g. Processing and tracking of payment applications.
 - h. Processing and tracking of contract modifications.
 - i. Creating and distributing meeting minutes.
 - j. Document management for Drawings, Specifications, and coordination drawings, including revision control.
 - k. Management of construction progress photographs.
 - l. Mobile device compatibility, including smartphones and tablets.
 2. Provide up to seven Project management software user licenses for use of Owner, Architect, and Architect's consultants. Provide eight hours of software training at Architect's office for web-based Project software users.
 3. At completion of Project, provide digital archive in format that is readable by common desktop software applications in format acceptable to Architect. Provide data in locked format to prevent further changes.
- C. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:
 1. Assemble complete submittal package into a single indexed file, incorporating submittal requirements of a single

- Specification Section and transmittal form with links enabling navigation to each item.
- 2. Name file with submittal number or other unique identifier, including revision identifier.
- 3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.7 PROJECT MEETINGS

- A. General: Architect will schedule and conduct meetings and conferences at Project site unless otherwise indicated.
 - 1. Attendees: Inform participants and others involved, and individuals whose presence is required, of date and time of each meeting. Notify Owner and Architect of scheduled meeting dates and times a minimum of seven days prior to meeting.
 - 2. Minutes: Entity responsible for conducting meeting will record significant discussions and agreements achieved. Distribute the meeting minutes to everyone concerned, including Owner and Architect, within three days of the meeting.
- B. Preconstruction Conference: Architect will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Architect, but no later than 15 days after execution of the Agreement.
 - 1. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Discuss items of significance that could affect progress, including the following:
 - a. Responsibilities and personnel assignments.
 - b. Tentative construction schedule.
 - c. Phasing.
 - d. Critical work sequencing and long lead items.
 - e. Designation of key personnel and their duties.
 - f. Lines of communications.
 - g. Use of web-based Project software.
 - h. Procedures for processing field decisions and Change Orders.
 - i. Procedures for RFIs.
 - j. Procedures for testing and inspecting.
 - k. Procedures for processing Applications for Payment.
 - l. Distribution of the Contract Documents.
 - m. Submittal procedures.
 - n. Preparation of Record Documents.
 - o. Use of the premises and existing building.
 - p. Work restrictions.
 - q. Working hours.
 - r. Owner's occupancy requirements.
 - s. Responsibility for temporary facilities and controls.
 - t. Procedures for moisture and mold control.
 - u. Procedures for disruptions and shutdowns.
 - v. Construction waste management and recycling.
 - w. Parking availability.
 - x. Office, work, and storage areas.
 - y. Equipment deliveries and priorities.
 - z. First aid.
 - aa. Security.
 - bb. Progress cleaning.
 - 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.
- C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other Sections and when required for coordination with other construction.
 - 1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
 - 2. Agenda: Review progress of other construction activities and preparations for the particular activity under

consideration, including requirements for the following:

- a. Contract Documents.
 - b. Options.
 - c. Related RFIs.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility requirements.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written instructions.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
 4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Architect will conduct progress meetings at biweekly intervals.

1. Coordinate dates of meetings with preparation of payment requests.
2. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - b. Review present and future needs of each entity present, including the following:
 - 1) Interface requirements.
 - 2) Sequence of operations.
 - 3) Status of submittals.
 - 4) Deliveries.
 - 5) Off-site fabrication.
 - 6) Access.
 - 7) Site use.
 - 8) Temporary facilities and controls.

- 9) Progress cleaning.
- 10) Quality and work standards.
- 11) Status of correction of deficient items.
- 12) Field observations.
- 13) Status of RFIs.
- 14) Status of Proposal Requests.
- 15) Pending changes.
- 16) Status of Change Orders.
- 17) Pending claims and disputes.
- 18) Documentation of information for payment requests.

4. Minutes: Entity responsible for conducting the meeting will record and distribute the meeting minutes to each party present and to parties requiring information.

- a. Schedule Updating: Revise Contractor's construction schedule after each progress meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

E. Coordination Meetings: Architect will conduct project coordination meetings at biweekly intervals opposite of a progress meeting. Project coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.

1. Attendees: In addition to representatives of Owner and Architect, each contractor, subcontractor, supplier, and other entity concerned with current progress or involved in planning, coordination, or performance of future activities shall be represented at these meetings. All participants at the meetings shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Review and correct or approve minutes of the previous coordination meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.

- a. Combined Contractor's Construction Schedule: Review progress since the last coordination meeting. Determine whether each contract is on time, ahead of schedule, or behind schedule, in relation to combined Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
- b. Schedule Updating: Revise combined Contractor's construction schedule after each coordination meeting, where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
- c. Review present and future needs of each contractor present, including the following:

- 1) Interface requirements.
- 2) Sequence of operations.
- 3) Status of submittals.
- 4) Deliveries.
- 5) Off-site fabrication.
- 6) Access.
- 7) Site use.
- 8) Temporary facilities and controls.
- 9) Work hours.
- 10) Hazards and risks.
- 11) Progress cleaning.
- 12) Quality and work standards.
- 13) Status of RFIs.
- 14) Proposal Requests.
- 15) Change Orders.
- 16) Pending changes.

3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

F. Project Closeout Conference: Schedule and conduct a project closeout conference, at a time convenient to Owner and Architect, but no later than 60 days prior to the scheduled date of Substantial Completion.

1. Conduct the conference to review requirements and responsibilities related to Project closeout.

2. Attendees: Authorized representatives of Owner, Architect, and their consultants; Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the meeting. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
 - a. Preparation of Record Documents.
 - b. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - c. Procedures for completing and archiving web-based Project software site data files.
 - d. Submittal of written warranties.
 - e. Requirements for preparing operations and maintenance data.
 - f. Requirements for delivery of material samples, attic stock, and spare parts.
 - g. Requirements for demonstration and training.
 - h. Preparation of Contractor's punch list.
 - i. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - j. Submittal procedures.
 - k. Responsibility for removing temporary facilities and controls.
4. Minutes: Entity conducting meeting will record and distribute meeting minutes.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

SECTION 013200 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Construction schedule updating reports.
 - 3. Daily construction reports.
 - 4. Material location reports.
 - 5. Site condition reports.
 - 6. Unusual event reports.

1.2 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
 - 2. Predecessor Activity: An activity that precedes another activity in the network.
 - 3. Successor Activity: An activity that follows another activity in the network.
- B. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- C. Event: The starting or ending point of an activity.
- D. Float: The measure of leeway in starting and completing an activity.
 - 1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 - 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
 - 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- E. Resource Loading: The allocation of labor and equipment necessary for completing an activity as scheduled.

1.3 INFORMATIONAL SUBMITTALS

- A. Format for Submittals: Submit required submittals in the following format:
 - 1. PDF file.
- B. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.
- C. Construction Schedule Updating Reports: Submit with Applications for Payment.
- D. Daily Construction Reports: Submit at weekly intervals.
- E. Material Location Reports: Submit at weekly intervals.

- F. Site Condition Reports: Submit at time of discovery of differing conditions.
- G. Unusual Event Reports: Submit at time of unusual event.

1.4 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Computer Scheduling Software: Prepare schedules using current version of a program that is capable of managing construction schedules.
- B. Time Frame: Extend schedule from date established for the Notice of Award to date of Substantial Completion.
 - 1. Contract completion date to not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each area as a separate numbered activity for each main element of the Work. Comply with the following:
 - 1. Activity Duration: Define activities so no activity is longer than 20 days, unless specifically allowed by Architect.
 - 2. Temporary Facilities: Indicate start and completion dates for the following as applicable:
 - a. Securing of approvals and permits required for performance of the Work.
 - b. Temporary facilities.
 - c. Owner interfaces and furnishing of items.
 - d. Regulatory agency approvals.
 - e. Punch list.
 - 3. Procurement Activities: Include procurement process activities for the following long lead-time items and major items, requiring a cycle of more than 45 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - a. Auditorium seating.
 - 4. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
 - 5. Startup and Testing Time: Include no fewer than 15 days for startup and testing.
 - 6. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
 - 7. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and Final Completion.
- D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
 - 1. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 - 2. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 011000 "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
 - 3. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with existing construction.
 - b. Limitations of continued occupancies.
 - c. Uninterruptible services.
 - d. Use-of-premises restrictions.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered Requests for Information.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and the Contract Time.

- F. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
 - 1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 - 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 - 3. As the Work progresses, indicate Final Completion percentage for each activity.
- G. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.
- H. Distribution: Distribute copies of approved schedule to Architect, Owner, and other parties identified by Contractor with a need-to-know schedule responsibility.

1.5 GANTT-CHART SCHEDULE REQUIREMENTS

- A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within 20 days of date established for the Notice of Award.
 - 1. Base schedule on the startup construction schedule and additional information received since the start of Project.
- B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
 - 1. For construction activities that require three months or longer to complete, indicate an estimated completion percentage in 10 percent increments within time bar.

1.6 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. List of subcontractors at Project site.
 - 2. List of separate contractors at Project site.
 - 3. Approximate count of personnel at Project site.
 - 4. Equipment at Project site.
 - 5. Material deliveries.
 - 6. Accidents.
 - 7. Meetings and significant decisions.
 - 8. Unusual events.
 - 9. Stoppages, delays, shortages, and losses.
 - 10. Emergency procedures.
 - 11. Orders and requests of authorities having jurisdiction.
 - 12. Change Orders received and implemented.
 - 13. Construction Change Directives received and implemented.
 - 14. Services connected and disconnected.
 - 15. Equipment or system tests and startups.
 - 16. Partial completions and occupancies.
 - 17. Substantial Completions authorized.
- B. Material Location Reports: At weekly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List to be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
 - 1. Material stored prior to previous report and remaining in storage.
 - 2. Material stored prior to previous report and since removed from storage and installed.

3. Material stored following previous report and remaining in storage.

- C. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.
- D. Unusual Event Reports: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, responses by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.
 - 1. Submit unusual event reports directly to Owner within one day(s) of an occurrence. Distribute copies of report to parties affected by the occurrence.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013300 - SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Submittal schedule requirements.
2. Administrative and procedural requirements for submittals.

B. Related Requirements:

1. Section 013100 "Project Management and Coordination" for submitting coordination drawings and subcontract list and for requirements for web-based Project software.
2. Section 013200 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's construction schedule.
3. Section 013233 "Photographic Documentation" for submitting preconstruction photographs, periodic construction photographs, and Final Completion construction photographs.
4. Section 017700 "Closeout Procedures" for submitting closeout submittals and maintenance material submittals.
5. Section 017823 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
6. Section 017839 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Architect's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."
- B. Informational Submittals: Written and graphic information and physical samples that do not require Architect's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as "informational submittals."

1.3 SUBMITTAL SCHEDULE

- A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Architect and additional time for handling and reviewing submittals required by those corrections.
1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
 2. Final Submittal Schedule: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule as required to reflect changes in current status and timing for submittals.
 3. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal Category: Action; informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Architect's final release or approval.

1.4 SUBMITTAL FORMATS

- A. Submittal Information: Include the following information in each submittal:
1. Project name.
 2. Date.
 3. Name of Architect.
 4. Name of Contractor.
 5. Name of firm or entity that prepared submittal.
 6. Names of subcontractor, manufacturer, and supplier.
 7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier and alphanumeric suffix for resubmittals.
 8. Category and type of submittal.
 9. Submittal purpose and description.
 10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
 11. Drawing number and detail references, as appropriate.
 12. Indication of full or partial submittal.
 13. Location(s) where product is to be installed, as appropriate.
 14. Other necessary identification.
 15. Remarks.
 16. Signature of transmitter.
- B. Options: Identify options requiring selection by Architect.
- C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Architect on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.
- D. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.
- E. Submittals Utilizing Web-Based Project Software: It is Contractor's option to prepare submittals as PDF files or other format indicated by Project management software.

1.5 SUBMITTAL PROCEDURES

- A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
1. Email: Prepare submittals as PDF package and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.
 - a. Architect will return annotated file. Annotate and retain one copy of file as a digital Project Record Document file.
 2. Web-Based Project Management Software: It is Contractor's option to prepare submittals in PDF form, and upload to web-based Project management software website. Enter required data in web-based software site to fully identify submittal.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of submittals for related parts of the Work specified in different Sections, so processing will not be delayed because of need to review submittals concurrently for coordination.

- a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

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

- 1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
- 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
- 3. Resubmittal Review: Allow 15 days for review of each resubmittal.
- 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow 21 days for initial review of each submittal.
- 5. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 15 days for review of each submittal. Submittal will be returned to Architect before being returned to Contractor.

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

- 1. Note date and content of previous submittal.
- 2. Note date and content of revision in label or title block, and clearly indicate extent of revision.
- 3. Resubmit submittals until they are marked with approval notation from Architect's action stamp.

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

F. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals that are marked with approval notation from Architect's action stamp.

1.6 SUBMITTAL REQUIREMENTS

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

- 1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
- 2. Mark each copy of each submittal to show which products and options are applicable.
- 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's product specifications.
 - c. Standard color charts.
 - d. Statement of compliance with specified referenced standards.
 - e. Testing by recognized testing agency.
 - f. Application of testing agency labels and seals.
 - g. Notation of coordination requirements.
 - h. Availability and delivery time information.
- 4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams that show factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
- 5. Submit Product Data before Shop Drawings, and before or concurrently with Samples.

B. Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data unless submittal based on Architect's digital data drawing files is otherwise permitted.

1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Schedules.
 - c. Compliance with specified standards.
 - d. Notation of coordination requirements.
 - e. Notation of dimensions established by field measurement.
 - f. Relationship and attachment to adjoining construction clearly indicated.
 - g. Seal and signature of professional engineer if specified.

C. Samples: Submit Samples for review of type, color, pattern, and texture for a check of these characteristics with other materials.

1. Transmit Samples that contain multiple, related components, such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:
 - a. Project name and submittal number.
 - b. Generic description of Sample.
 - c. Product name and name of manufacturer.
 - d. Sample source.
 - e. Number and title of applicable Specification Section.
 - f. Specification paragraph number and generic name of each item.
3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics and identification information for record.
4. Web-Based Project Management Software: It is Contractor's option to prepare submittals in PDF form, and upload to web-based Project software website. Enter required data in web-based software site to fully identify submittal.
5. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
6. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units, showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.
7. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples: Submit three sets of Samples. Architect will retain two Sample sets; remainder will be returned.
 - 1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

D. Product Schedule: As required in individual Specification Sections, prepare a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:

1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
2. Manufacturer and product name, and model number if applicable.
3. Number and name of room or space.
4. Location within room or space.

- E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.
- F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.
- G. Certificates:
 - 1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
 - 2. Installer Certificates: Submit written statements on manufacturer's letterhead, certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
 - 3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead, certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
 - 4. Material Certificates: Submit written statements on manufacturer's letterhead, certifying that material complies with requirements in the Contract Documents.
 - 5. Product Certificates: Submit written statements on manufacturer's letterhead, certifying that product complies with requirements in the Contract Documents.
- H. Test and Research Reports:
 - 1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
 - 2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
 - 3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
 - 4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
 - 5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
 - 6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - a. Name of evaluation organization.
 - b. Date of evaluation.
 - c. Time period when report is in effect.
 - d. Product and manufacturers' names.
 - e. Description of product.
 - f. Test procedures and results.
 - g. Limitations of use.

1.7 CONTRACTOR'S REVIEW

- A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.
 - 1. Architect will not review submittals received from Contractor that do not have Contractor's review and approval.

1.8 ARCHITECT'S REVIEW

- A. Action Submittals: Architect will review each submittal, indicate corrections or revisions required, and return.
 - 1. PDF Submittals: Architect will indicate, via markup on each submittal, the appropriate action.
 - 2. Submittals by Web-Based Project Management Software: Architect will indicate, on Project management software website, the appropriate action.
- B. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Architect.
- D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- E. Architect will return without review submittals received from sources other than Contractor.
- F. Submittals not required by the Contract Documents will be returned by Architect without action.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

SECTION 014000 - QUALITY REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 DEFINITIONS

- A. Experienced: When used with an entity or individual, "experienced," unless otherwise further described, means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- B. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.
 - 1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).
- C. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) in accordance with 29 CFR 1910.7, by a testing agency accredited in accordance with NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- D. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- E. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work, to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.
- F. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work, to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Architect.

1.3 CONFLICTING REQUIREMENTS

- A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Architect regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Architect for clarification before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified is the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Architect for a decision before proceeding.

1.4 INFORMATIONAL SUBMITTALS

- A. Reports: Prepare and submit certified written reports and documents as specified.
- B. Permits, Licenses, and Certificates: For Owner's record, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents established for compliance with standards and regulations bearing on performance of the Work.

1.5 REPORTS AND DOCUMENTS

- A. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement of whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- B. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, telephone number, and email address of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement of whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.

1.6 QUALITY ASSURANCE

- A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.
- C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.
- D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that is similar in material, design, and extent to those indicated for this Project.
- F. Specialists: Certain Specification Sections require that specific construction activities be performed by entities who are recognized experts in those operations. Specialists will satisfy qualification requirements indicated and engage in the activities indicated.
1. Requirements of authorities having jurisdiction supersede requirements for specialists.
- G. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.
- H. Factory-Authorized Service Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect, demonstrate, repair, and perform service on installations of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

1.7 QUALITY CONTROL

- A. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."
- B. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014000

SECTION 015000 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

- A. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.
- B. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use without metering and without payment of use charges. Provide connections and extensions of services as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

- A. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.
- C. Dust- and HVAC-Control Plan: Submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Include the following:
 - 1. Locations of dust-control partitions at each phase of work.
 - 2. HVAC system isolation schematic drawing.
 - 3. Location of proposed air-filtration system discharge.
 - 4. Waste-handling procedures.
 - 5. Other dust-control measures.
- D. Noise and Vibration Control Plan: Identify construction activities that may impact the occupancy and use of existing spaces within the building or adjacent existing buildings, whether occupied by others, or occupied by Owner. Include the following:
 - 1. Methods used to meet the goals and requirements of Owner.
 - 2. Concrete cutting method(s) to be used.
 - 3. Location of construction devices on the site.
 - 4. Show compliance with the use and maintenance of quieted construction devices for the duration of the Project.
 - 5. Indicate activities that may disturb building occupants and that are planned to be performed during non-standard working hours as coordinated with Owner.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Polyethylene Sheet: Reinforced, fire-resistive sheet, **10-mil** minimum thickness, with flame-spread rating of 15 or less in accordance with ASTM E84 and passing NFPA 701 Test Method 2.
- B. Dust-Control Adhesive-Surface Walk-Off Mats: Provide mats, minimum **36 by 60 inches**.

2.2 TEMPORARY FACILITIES

- A. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
 - 3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction.
- C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Section 011000 "Summary."
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.
- C. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.

3.3 SUPPORT FACILITIES INSTALLATION

- A. Comply with the following:
 - 1. Utilize designated area within existing building for temporary field offices.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Parking: Use designated areas of Owner's existing parking areas for construction personnel.
- D. Storage and Staging: Use designated areas of Project site for storage and staging needs.
- E. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.
 - 1. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.
 - a. Provide temporary, directional signs for construction personnel and visitors.
 - 2. Maintain and touch up signs, so they are legible at all times.
- F. Waste Disposal Facilities:
 - 1. Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with progress cleaning requirements in Section 017300 "Execution."

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- C. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- D. Temporary Egress: Provide temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction. Provide signage directing occupants to temporary egress.
- E. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
 - 1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
 - 2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition in accordance with requirements of authorities having jurisdiction.

END OF SECTION 015000

SECTION 016000 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. The Work of This Section Includes: Administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.
- B. Related Requirements:
 - 1. Section 011000 "Summary" for Contractor requirements related to Owner-furnished products.
 - 2. Section 012500 "Substitution Procedures" for requests for substitutions.
 - 3. Section 017700 "Closeout Procedures" for submitting warranties.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products unless otherwise indicated.
 - 3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - 1. Evaluating Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of basis-of-design product also establish salient characteristics of products for purposes of evaluating comparable products.
- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:
 - 1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
 - 2. Data indicating compliance with the requirements specified in "Comparable Products" Article.
- E. Basis-of-Design Product Specification Submittal: An action submittal complying with requirements in Section 013300 "Submittal Procedures."

- F. Substitution: Refer to Section 012500 "Substitution Procedures" for definition and limitations on substitutions.

1.3 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
- B. Identification of Products: Except for required labels and operating data, do not attach or imprint manufacturer or product names or trademarks on exposed surfaces of products or equipment that will be exposed to view in occupied spaces or on the exterior.
1. Labels: Locate required product labels and stamps on a concealed surface, or, where required for observation following installation, on a visually accessible surface that is inconspicuous.
 2. Equipment Nameplates: Provide a permanent nameplate on each item of service- or power-operated equipment. Locate on a visually accessible but inconspicuous surface. Include information essential for operation, including the following:
 - a. Name of product and manufacturer.
 - b. Model and serial number.
 - c. Capacity.
 - d. Speed.
 - e. Ratings.
 3. See individual identification Sections in Divisions 21, 22, 23, and 26 for additional equipment identification requirements.

1.4 COORDINATION

- A. Modify or adjust affected work as necessary to integrate work of approved comparable products and approved substitutions.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products, using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 4. Inspect products on delivery to determine compliance with the Contract Documents and that products are undamaged and properly protected.
- C. Storage:
1. Provide a secure location and enclosure at Project site for storage of materials and equipment.
 2. Store products to allow for inspection and measurement of quantity or counting of units.
 3. Store materials in a manner that will not endanger Project structure.
 4. Store products that are subject to damage by the elements under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation and with adequate protection from wind.
 5. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 7. Protect stored products from damage and liquids from freezing.

1.6 PRODUCT WARRANTIES

- A. Warranties specified in other Sections are to be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of Owner or endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of Owner or endorsed by manufacturer to Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
 - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 017700 "Closeout Procedures."

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
 - 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 - 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 - 3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
 - 4. Where products are accompanied by the term "as selected," Architect will make selection.
 - 5. Descriptive, performance, and reference standard requirements in Specifications establish salient characteristics of products.
 - 6. Or Equal: For products specified by name and accompanied by the term "or equal," "or approved equal," or "or approved," comply with requirements in "Comparable Products" Article to obtain approval for use of an unnamed product.
 - a. Submit additional documentation required by Architect in order to establish equivalency of proposed products. Unless otherwise indicated, evaluation of "or equal" product status is by Architect, whose determination is final.
- B. Product Selection Procedures:
 - 1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."
 - 2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."
 - 3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide

one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

- a. Limited list of products may be indicated by the phrase "Subject to compliance with requirements, provide one of the following."
4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.
 - a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.
5. Limited List of Manufacturers: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - a. Limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, provide products by one of the following."
6. Non-Limited List of Manufacturers: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed or a product by an unnamed manufacturer that complies with requirements.
 - a. Non-limited list of manufacturers is indicated by the phrase "Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following."
 - b. Provision of products of an unnamed manufacturer is not considered a substitution, if the product complies with requirements.
7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration of Comparable Products: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with the following requirements:
 1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
 2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
 3. Evidence that proposed product provides specified warranty.
 4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.
- B. Architect's Action on Comparable Products Submittal: If necessary, Architect will request additional information or documentation for evaluation within seven days of receipt of a request for a comparable product. Architect will notify Contractor of approval or rejection of proposed comparable product within 15 days of receipt of request, or seven days of receipt of additional information or documentation, whichever is later.
 1. Architect's Approval of Submittal: Marked with approval notation from Architect's action stamp. See Section 013300 "Submittal Procedures."

2. Use product specified if Architect does not issue a decision on use of a comparable product request within time allocated.

- C. Submittal Requirements, Single-Step Process: When acceptable to Architect, incorporate specified submittal requirements of individual Specification Section in combined submittal for comparable products. Approval by Architect of Contractor's request for use of comparable product and of individual submittal requirements will also satisfy other submittal requirements.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

SECTION 017300 - EXECUTION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes general administrative and procedural requirements governing execution of the Work, including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering.
 - 3. Installation.
 - 4. Cutting and patching.
 - 5. Coordination of Owner's portion of the Work.
 - 6. Progress cleaning.
 - 7. Starting and adjusting.
 - 8. Protection of installed construction.
 - 9. Correction of the Work.
- B. Related Requirements:
 - 1. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.

1.2 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 - 1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Architect of locations and details of cutting and await directions from Architect before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
 - 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety. Operational elements include the following:
 - a. Primary operational systems and equipment.
 - b. Fire separation assemblies.
 - c. Air or smoke barriers.
 - d. Plumbing piping systems.
 - e. Mechanical systems piping and ducts.
 - f. Control systems.
 - g. Communication systems.
 - h. Fire-detection and -alarm systems.
 - i. Conveying systems.
 - j. Electrical wiring systems.
 - k. Operating systems of special construction.
 - 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results

in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:

- a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Sprayed fire-resistive material.
 - d. Equipment supports.
 - e. Piping, ductwork, vessels, and equipment.
 - f. Noise- and vibration-control elements and systems.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Architect's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Comply with requirements specified in other Sections.
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Architect for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.
- C. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- B. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
 2. List of detrimental conditions, including substrates.
 3. List of unacceptable installation tolerances.
 4. Recommended corrections.

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

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to [local utility][Owner] that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect in accordance with requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

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

3.4 INSTALLATION

- A. Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb, and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
 - 4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- C. Install products at the time and under conditions that will ensure satisfactory results as judged by Architect. Maintain conditions required for product performance until Substantial Completion.
- D. Conduct construction operations, so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy of type expected for Project.
- E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.
- F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.
- G. Templates: Obtain and distribute to the parties involved templates for Work specified to be factory prepared and field installed. Check Shop Drawings of other portions of the Work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.
 - 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.

2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

- I. Joints: Make joints of uniform width. Where joint locations in exposed Work are not indicated, arrange joints for the best visual effect, as judged by Architect. Fit exposed connections together to form hairline joints.

3.5 CUTTING AND PATCHING

- A. General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.
- B. Temporary Support: Provide temporary support of Work to be cut.
- C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Adjacent Occupied Areas: Where interference with use of adjoining areas or interruption of free passage to adjoining areas is unavoidable, coordinate cutting and patching in accordance with requirements in Section 011000 "Summary."
- E. Existing Utility Services and Mechanical/Electrical Systems: Where existing services/systems are required to be removed, relocated, or abandoned, bypass such services/systems before cutting to minimize interruption to occupied areas.
- F. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 3. Concrete: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
 4. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 5. Proceed with patching after construction operations requiring cutting are complete.
- G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
 - b. Restore damaged pipe covering to its original condition.
 3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.

H. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.

3.6 COORDINATION OF OWNER'S PORTION OF THE WORK

A. Site Access: Provide access to Project site for Owner's construction personnel.

1. Provide temporary facilities required for Owner-furnished, Contractor-installed products.
2. Refer to Section 011000 "Summary" for other requirements for Owner-furnished, Contractor-installed products.

B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction personnel.

1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
2. Preinstallation Conferences: Include Owner's construction personnel at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction personnel if portions of the Work depend on Owner's construction.

3.7 PROGRESS CLEANING

A. Clean Project site and work areas daily, including common areas. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold waste materials more than seven days during normal weather or three days if the temperature is expected to rise above **80 deg F**.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, in accordance with regulations.

a. Use containers intended for holding waste materials of type to be stored.

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

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

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

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

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

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

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in Section 015000 "Temporary Facilities and Controls."

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

I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the

construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

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

3.8 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust equipment for proper operation. Adjust operating components for proper operation without binding.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.
- C. Comply with manufacturer's written instructions for temperature and relative humidity.

3.10 CORRECTION OF THE WORK

- A. Repair or remove and replace damaged, defective, or nonconforming Work. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.
- C. Restore permanent facilities used during construction to their specified condition.
- D. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.
- E. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Contract closeout, including, but not limited to, the following:
 - 1. Substantial Completion procedures.
 - 2. Final Completion procedures.
 - 3. List of incomplete items.
 - 4. Submittal of Project warranties.
 - 5. Final cleaning.
- B. Related Requirements:
 - 1. Section 012900 "Payment Procedures" for requirements for Applications for Payment for Substantial Completion and Final Completion.
 - 2. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
 - 3. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
 - 4. Section 017900 "Demonstration and Training" for requirements to train Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.2 DEFINITIONS

- A. List of Incomplete Items: Contractor-prepared list of items to be completed or corrected, prepared for the Architect's use prior to Architect's inspection, to determine if the Work is substantially complete.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of cleaning agent.
- B. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.
- C. Certified List of Incomplete Items: Final submittal at Final Completion.

1.4 CLOSEOUT SUBMITTALS

- A. Certificates of Release: From authorities having jurisdiction.
- B. Certificate of Insurance: For continuing coverage.
- C. Field Report: For pest-control inspection.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items required by other Sections.

1.6 SUBSTANTIAL COMPLETION PROCEDURES

- A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch

list"), indicating the value of each item on the list and reasons why the Work is incomplete.

- B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
 3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number.
 - a. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Owner's signature for receipt of submittals.
 5. Submit testing, adjusting, and balancing records.
 6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
- C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.
1. Advise Owner of pending insurance changeover requirements.
 2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 3. Complete startup and testing of systems and equipment.
 4. Perform preventive maintenance on equipment used prior to Substantial Completion.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
 6. Advise Owner of changeover in utility services.
 7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
 8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 9. Complete final cleaning requirements.
 10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.
1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.
 2. Results of completed inspection will form the basis of requirements for Final Completion.

1.7 FINAL COMPLETION PROCEDURES

- A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:
1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
 2. Certified List of Incomplete Items: Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. Certified copy of the list will state that each item has been completed or otherwise resolved for acceptance.
 3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report.

5. Submit Final Completion photographic documentation.

B. Inspection: Submit a written request for final inspection to determine acceptance a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.

1. Request reinspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.8 LIST OF INCOMPLETE ITEMS

A. Organization of List: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.

1. Organize list of spaces in sequential order, listed by room or space number.
2. Organize items applying to each space by major element, including categories for ceilings, individual walls, floors, equipment, and building systems.
3. Include the following information at the top of each page:

- a. Project name.
- b. Date.
- c. Name of Architect.
- d. Name of Contractor.
- e. Page number.

4. Submit list of incomplete items in the following format:

- a. PDF Electronic File: Architect will return annotated file.

1.9 SUBMITTAL OF PROJECT WARRANTIES

A. Time of Submittal: Submit written warranties on request of Architect for designated portions of the Work where warranties are indicated to commence on dates other than date of Substantial Completion, or when delay in submittal of warranties might limit Owner's rights under warranty.

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

C. Warranty Electronic File: Provide warranties and bonds in PDF format. Assemble complete warranty and bond submittal package into a single electronic PDF file with bookmarks enabling navigation to each item. Provide bookmarked table of contents at beginning of document.

1. Submit by email to Architect.

D. Warranties in Paper Form:

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive **8-1/2-by-11-inch** paper.
2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address, and telephone number of Installer.
3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.

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

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:
 - a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - h. Clean flooring, removing debris, dirt, and staining; clean in accordance with manufacturer's instructions.
 - i. Vacuum and mop concrete.
 - j. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean in accordance with manufacturer's instructions if visible soil or stains remain.
 - k. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
 - l. Remove labels that are not permanent.
 - m. Wipe surfaces of mechanical and electrical equipment and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - n. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - o. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - p. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
 - q. Clean strainers.
 - r. Leave Project clean and ready for occupancy.
- C. Construction Waste Disposal: Comply with waste-disposal requirements in Section 015000 "Temporary Facilities and Controls."

3.2 CORRECTION OF THE WORK

- A. Complete repair and restoration operations required by "Correction of the Work" Article in Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory manuals.
 - 2. Systems and equipment operation manuals.
 - 3. Systems and equipment maintenance manuals.
 - 4. Product maintenance manuals.
- B. Related Requirements:
 - 1. Section 013300 "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.

1.2 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.3 CLOSEOUT SUBMITTALS

- A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect will comment on whether content of operation and maintenance submittals is acceptable.
 - 2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
- B. Format: Submit operation and maintenance manuals in the following format:
 - 1. Submit on digital media acceptable to Architect. Enable reviewer comments on draft submittals.
 - 2. Submit three paper copies. Architect will return two copies.
- C. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect will return copy with comments.
 - 1. Correct or revise each manual to comply with Architect's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
- D. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.4 FORMAT OF OPERATION AND MAINTENANCE MANUALS

- A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 - 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 - 2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to

correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

B. Manuals, Paper Copy: Submit manuals in the form of hard-copy, bound and labeled volumes.

1. Binders: Heavy-duty, three-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold **8-1/2-by-11-inch** paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents, and indicate Specification Section number on bottom of spine. Indicate volume number for multiple-volume sets.
2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section of the manual. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software storage media for computerized electronic equipment. Enclose title pages and directories in clear plastic sleeves.
4. Supplementary Text: Prepared on **8-1/2-by-11-inch** white bond paper.
5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.5 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS

A. Organization of Manuals: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual to contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name and contact information for Contractor.
6. Name and contact information for Architect.
7. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
8. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single

binder.

- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation in accordance with ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

- A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - 1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 - 2. Performance and design criteria if Contractor has delegated design responsibility.
 - 3. Operating standards.
 - 4. Operating procedures.
 - 5. Operating logs.
 - 6. Wiring diagrams.
 - 7. Control diagrams.
 - 8. Piped system diagrams.
 - 9. Precautions against improper use.
 - 10. License requirements including inspection and renewal dates.
- C. Descriptions: Include the following:
 - 1. Product name and model number. Use designations for products indicated on Contract Documents.
 - 2. Manufacturer's name.
 - 3. Equipment identification with serial number of each component.
 - 4. Equipment function.
 - 5. Operating characteristics.
 - 6. Limiting conditions.
 - 7. Performance curves.
 - 8. Engineering data and tests.
 - 9. Complete nomenclature and number of replacement parts.
- D. Operating Procedures: Include the following, as applicable:
 - 1. Startup procedures.
 - 2. Equipment or system break-in procedures.
 - 3. Routine and normal operating instructions.
 - 4. Regulation and control procedures.
 - 5. Instructions on stopping.
 - 6. Normal shutdown instructions.
 - 7. Seasonal and weekend operating instructions.
 - 8. Required sequences for electric or electronic systems.
 - 9. Special operating instructions and procedures.
- E. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- F. Piped Systems: Diagram piping as installed, and identify color coding where required for identification.

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.
1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds as described below.
- C. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:
1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- E. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance.
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training video recording, if available.
- F. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- G. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

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

1. Do not use original project record documents as part of maintenance manuals.

1.8 PRODUCT MAINTENANCE MANUALS

- A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- C. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- D. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- E. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.
 5. Repair instructions.
- F. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
1. Include procedures to follow and required notifications for warranty claims.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Record Drawings.
 - 2. Miscellaneous record submittals.
- B. Related Requirements:
 - 1. Section 017700 "Closeout Procedures" for general closeout procedures.
 - 2. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set(s) of marked-up record prints.

1.3 RECORD DRAWINGS

- A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.
 - 1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.
 - a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - b. Accurately record information in an acceptable drawing technique.
 - c. Record data as soon as possible after obtaining it.
 - d. Record and check the markup before enclosing concealed installations.
 - e. Cross-reference record prints to corresponding photographic documentation.
 - 2. Content: Types of items requiring marking include, but are not limited to, the following:
 - a. Dimensional changes to Drawings.
 - b. Revisions to details shown on Drawings.
 - c. Depths of foundations.
 - d. Locations and depths of underground utilities.
 - e. Revisions to routing of piping and conduits.
 - f. Revisions to electrical circuitry.
 - g. Actual equipment locations.
 - h. Duct size and routing.
 - i. Locations of concealed internal utilities.
 - j. Changes made by Change Order or Construction Change Directive.
 - k. Changes made following Architect's written orders.
 - l. Details not on the original Contract Drawings.
 - m. Field records for variable and concealed conditions.
 - n. Record information on the Work that is shown only schematically.
 - 3. Mark the Contract Drawings and Shop Drawings completely and accurately. Use personnel proficient at recording

- graphic information in production of marked-up record prints.
- 4. Mark record prints with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
- 5. Mark important additional information that was either shown schematically or omitted from original Drawings.
- 6. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable.

1.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.
- B. Format: Submit miscellaneous record submittals as PDF electronic file.
 - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.5 MAINTENANCE OF RECORD DOCUMENTS

- A. Maintenance of Record Documents: Store Record Documents in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.

1.2 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.3 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Systems and equipment operation manuals.
 - c. Systems and equipment maintenance manuals.
 - d. Product maintenance manuals.
 - e. Project Record Documents.
 - f. Identification systems.
 - g. Warranties and bonds.
 - h. Maintenance service agreements and similar continuing commitments.
 - 3. Operations: Include the following, as applicable:
 - a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.

- d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
4. Adjustments: Include the following:
- a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
5. Troubleshooting: Include the following:
- a. Diagnostic instructions.
 - b. Test and inspection procedures.
6. Maintenance: Include the following:
- a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning.
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
7. Repairs: Include the following:
- a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

1.4 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

1.5 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

- 1. Schedule training with Owner with at least seven days' advance notice.

- C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the

actual equipment in-place. Conduct training using final operation and maintenance data submittals.

- D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral performance-based test.
- E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

PART 2 - PRODUCTS (Not Used)
PART 3 - EXECUTION (Not Used)

END OF SECTION 017900

SECTION 024119 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

A. The Work of this Section Includes:

1. Demolition and removal of selected portions of exterior or interior of building or structure and site elements.
2. Removal and salvage of existing items for delivery to Owner and removal of existing items for reinstallation.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 017300 "Execution" for cutting and patching procedures.

1.2 DEFINITIONS

- A. Remove: Detach items from existing construction and legally dispose of off-site unless indicated to be removed and salvaged or removed and reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner as indicated.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage; prepare for reuse; and reinstall where indicated.
- D. Existing to Remain: Existing items of construction that are not to be removed.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

1.4 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
1. Inspect and discuss condition of construction to be selectively demolished.
 2. Review and finalize selective demolition schedule and verify availability of demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 3. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 4. Review areas where existing construction is to remain and requires protection.
 5. Review and finalize protection requirements.
 6. Review procedures for noise control and dust control.
 7. Review storage, protection, and accounting for items to be removed for salvage or reinstallation.

1.5 CLOSEOUT SUBMITTALS

- A. Inventory: Submit a list of items that have been removed and salvaged.

1.6 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
 - 1. Before selective demolition, Owner will remove the following items:
 - a. A/V equipment to include projectors, cameras, Wi-Fi equipment, speakers, etc.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials:
 - 1. It is not expected that hazardous materials will be encountered in the Work.
 - a. Hazardous materials will be removed by Owner before start of the Work.
 - b. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. On-site sale of removed items or materials is not permitted.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ANSI/ASSP A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or video.
 - 1. Inventory and record the condition of items to be removed for salvage or reinstallation. Photograph or video conditions that might be misconstrued as damage caused by removal.
 - 2. Photograph or video existing conditions of adjoining construction including finish surfaces, that might be misconstrued as damage caused by selective demolition operations or removal of items for salvage or reinstallation.

3.2 PREPARATION

- A. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

B. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
3. Cover and protect furniture, furnishings, and equipment that have not been removed.
4. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

C. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.3 UTILITY SERVICES AND BUILDING SYSTEMS

A. Existing Services/Systems to Remain: Maintain utilities and building systems and equipment to remain and protect against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utilities and building systems serving areas to be selectively demolished.

1. If disconnection of utilities and building systems will affect adjacent occupied parts of the building, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to those parts of the building.
2. Demolish and remove existing building systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment and components.
3. Abandon existing building systems, equipment, and components indicated on Drawings to be abandoned in place.
 - a. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material and leave in place.
 - b. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.
4. Remove and reinstall/salvage existing building systems, equipment, and components indicated on drawings to be removed and reinstalled or removed and salvaged:
 - a. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment and components; when appropriate, reinstall, reconnect, and make equipment operational.
 - b. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and components and deliver to Owner.

3.4 SALVAGE/REINSTALL

A. Removed and Salvaged Items:

1. Clean salvaged items.
2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.

3. Store items in a secure area until delivery to Owner.
4. Transport items to Owner's storage area designated by Owner.
5. Protect items from damage during transport and storage.

B. Removed and Reinstalled Items:

1. Clean and repair items to functional condition adequate for intended reuse.
2. Pack or crate items after cleaning and repairing. Identify contents of containers.
3. Protect items from damage during transport and storage.
4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.

3.5 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.
5. Maintain fire watch during and for at least 3 hours after flame-cutting operations.
6. Maintain adequate ventilation when using cutting torches.
7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.

B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Do not close or obstruct streets, walks, walkways, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction. Provide alternate routes around closed or obstructed trafficways if required by authorities having jurisdiction.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Resilient Floor Coverings: Remove floor coverings and adhesive in accordance with recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings."

3.7 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. Burning: Do not burn demolished materials.

3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION 024119

SECTION 060660 - TRANSLUCENT RESIN PANEL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes the Resin Fabrication as shown on the drawings:

1.3 SUBMITTALS

- A. General: Submit the following in accordance with conditions of contract and Division 1 specification section 01 33 00 "Submittal Procedures."
- B. Product Data: Indicate product description, fabrication information, and compliance with specified performance requirements.
- C. Submit material test results or certifications indicating each type and class of panel system complies with the project performance requirements

1. Test results required are:

- a. Tensile Strength (ASTM D 638)
- b. Tensile Modulus (ASTM D 638)
- c. Flexural Strength (ASTM D 790)
- d. Flexural Modulus (ASTM D 790)
- e. Rate of Burning (ASTM D 635)
- f. Density of Smoke (ASTM D 2843)
- g. Impact Strength (ASTM D 256)
- h. Abrasion Resistance (ASTM D 1044)
- i. Max Continuous Service Temperature
- j. Coefficient of Thermal Expansion (ASTM D 696)
- k. Thermal Conductivity (ASTM C 177)

D. Samples for Initial Selection:

- 1. Submit minimum 3.5 inch by 3.5 inch samples.
- 2. Indicate full color, texture, and pattern variation.
- 3. Approved samples will be retained as standards for work.

E. Samples for Verification:

- 1. Submit minimum 8 inch by 8 inch sample for each type, texture, pattern and color of Resin.

- F. Maintenance Data: Submit manufacturer's care and maintenance data, including care, repair and cleaning instructions. Include in Project closeout documents.

1.4 QUALITY ASSURANCE

A. Manufacturer's Qualifications

- 1. Manufacturer must demonstrate leadership in the field of resin encapsulation with patents or similar proof of ownership of intellectual property or expertise.
- 2. Materials and systems shall be manufactured by a company continuously and regularly employed in the manufacture of specified materials for a period of at least 7 consecutive years.

B. Material Properties

- 1. Minimum light transmission of 92% through clear resin portion of panel.
- 2. Minimum tensile modulus of 490,000 psi.
- 3. Resin will not yellow or degrade with exposure to sunlight.

C. Performance Criteria

1.	Tensile Strength (ASTM D 638)	Minimum 11,000 psi
2.	Tensile Modulus (ASTM D 638)	Minimum 490,000 psi
3.	Flexural Strength (ASTM D 790)	Minimum 17,000 psi
4.	Flexural Modulus (ASTM D 790)	Minimum 490,000 psi
5.	Rate of Burning (ASTM D 635):	CC2
6.	Density of Smoke (ASTM D 2843)	Maximum 5%
7.	Impact Strength (ASTM D 256)	Minimum .28 ft-lb/in notch
8.	Abrasion Resistance (ASTM D 1044)	Maximum 25% @ 200 cycles
9.	Max Continuous Service Temperature	170°F
10.	Coef of Thermal Expansion (ASTM D 696)	Maximum 3.0x10e-5 in/(in-°F)
11.	Thermal Conductivity (ASTM C 177)	Maximum 0.90 BTU-in/(hr-ft²-°F)

D. Allowable Tolerances:

1. Flatness: 1/16" maximum deviation over 12"
2. Thickness: ±10%
3. Height/Width: ±1/2"

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver no components to project site until areas are ready for installation.
- B. Handle materials to prevent damage to finished surfaces and edges.
- C. Keep protective masking in place while fabricating.
- D. Provide protective coverings to prevent damage or staining following installation for duration of project.
- E. Store components on edge, fully supported at 10 off vertical, indoors where atmospheric conditions are controlled to avoid temperature extremes and exposure to ultraviolet light and moisture.
- F. Follow Manufactures recommendations for storage and handling.
- G. Before installing Resin Fabrications, permit them to reach room temperature.

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install Resin Fabrications until spaces are enclosed and weatherproof, and ambient temperatures and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 WARRANTY

- A. Provide manufacturers 1 year warranty against defects in materials. Warranty shall provide material to repair, or replace, defective materials.
- B. The warranty shall not deprive the owner of other rights or remedies the Owner may have under other provisions of the Contract Documents, and is in addition to and runs concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturer:
 1. Lumicor, Inc.; Lumiclear Scatter is basis of design product.
 2. 3form, LLC.

2.2 MATERIALS

- A. Material:
 - 1. Acrylic resin.
 - 2. Sheet Size: Standard 4' x 8'.
 - 3. Thickness: Minimum 1/4".
 - 4. Finishes: Matte.
- B. Description:
Minimum 1/4" thickness per Manufacturer's recommendation, cut to size, edge sealed per Manufacturer's Fabrication Guide, and installed per the drawings.

2.3 FABRICATION

- A. General: Fabricate Resin Fabrications to designs, sizes and thicknesses indicated and to comply with indicated standards. Sizes, profiles and other characteristics are indicated on the drawings.
- B. Comply with manufacturer's written recommendations for fabrication.
- C. Machining: Acceptable means of machining are listed below. Ensure that material is not chipped or warped by machining operations.
 - 1. Sawing: Select equipment and blades suitable for type of cut required.
 - 2. Drilling: Drills specifically designed for use with Resin products.
 - 3. Milling: Climb cut where possible.
 - 4. Routing
- D. Forming: Form products to shapes indicated using the appropriate method listed below. Comply with manufacturer's written instructions.
 - 1. Cold Bending
 - 2. Hot Bending
 - 3. Thermoforming
 - 4. Drape Forming
 - 5. Matched Mold Forming
 - 6. Mechanical Forming
- E. Laminating: Laminate to substrates indicated using adhesives and techniques recommended by manufacturer.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide products of material, size, and shape required for application indicated, and with a proven record of compatibility with surfaces contacted in installation.
- B. Cleaner: Mild soap and water or common acrylic cleaners such as Novus or Gel-Gloss.
- C. Fasteners: Use screws designed specifically for Resins. Provide threaded metal or nylon inserts for applications requiring frequent disassembly such as light fixtures.
- D. Bonding Cements: Solvent or adhesives, suitable for use with product and application.
- E. Drilled Panel Wall Anchors: As provided by the manufacturer. Provide extensions to accommodate thicknesses scheduled or illustrated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where installation of Resin Fabrications will occur, with Installer present, for compliance with manufacturer's requirements. Verify that substrates and conditions are satisfactory for installation and comply with requirements specified.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written instructions for the installation of Resin Fabrications.

- B. Shop fabricates items to the greatest degree possible.
 - C. Utilize fasteners, adhesives and bonding agents recommended by manufacturer for type of installation indicated. Material that is chipped, warped, hazed or discolored as a result of installation or fabrication methods will be rejected.
 - D. Install components plumb, level and rigid, scribed to adjacent finishes, in accordance with approved shop drawings and product data.
 - E. Form field joints using manufacturer's recommended procedures. Locate seams in panels so that they are not directly in line with seams in substrates.
- 3.3 CLEANING AND PROTECTION
- A. Protect surfaces from damage until date of substantial completion. Repair work or replace damaged work, which cannot be repaired to Architect's satisfaction.

End of Section 060660

SECTION 061000 - ROUGH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Wood products.
2. Fire-retardant-treated lumber.
3. Miscellaneous lumber.
4. Plywood backing panels.

1.2 DEFINITIONS

- A. Boards or Strips: Lumber of less than **2 inches nominal** size in least dimension.
- B. Dimension Lumber: Lumber of **2 inches nominal** size or greater but less than **5 inches nominal** size in least dimension.
- C. Lumber grading agencies, and abbreviations used to reference them, include the following:
1. SPIB: The Southern Pine Inspection Bureau.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product. Indicate component materials and dimensions and include construction and application details.
1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 2. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency in accordance with ASTM D5664.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack wood products flat with spacers beneath and between each bundle to provide air circulation. Protect wood products from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS

- A. Lumber: Comply with DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Grade lumber by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
1. Factory mark each piece of lumber with grade stamp of grading agency.
 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry wood products.
 3. Dress lumber, S4S, unless otherwise indicated.

- B. Maximum Moisture Content:
 - 1. Boards: 19 percent.
 - 2. Dimension Lumber: 19 percent unless otherwise indicated.

2.2 FIRE-RETARDANT-TREATED LUMBER

- A. General: Where fire-retardant-treated materials are indicated, materials are to comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested in accordance with ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than **10.5 ft.** beyond the centerline of the burners at any time during the test.
 - 1. Treatment is not to promote corrosion of metal fasteners.
 - 2. Interior Type A: Treated materials are to have a moisture content of 28 percent or less when tested in accordance with ASTM D3201/D3201M at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry lumber after treatment to maximum moisture content of 19 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency and other information required by authorities having jurisdiction.
- E. Application: Treat all rough carpentry unless otherwise indicated.

2.3 MISCELLANEOUS LUMBER

- A. Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
- B. Wood Blocking: For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

2.4 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1.
 - 1. Grade: Exterior, C-C Plugged, fire-retardant treated.
 - 2. Thickness: As indicated on the drawings or, if not indicated, not less than **3/4-inch** nominal thickness.

2.5 FASTENERS

- A. General: Fasteners are to be of size and type indicated and comply with requirements specified in this article for material and manufacture. Provide nails or screws, in sufficient length, to penetrate not less than **1-1/2 inches** into wood substrate.
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC58, ICC-ES AC193, or ICC-ES AC308 as appropriate for the substrate.

PART 3 - EXECUTION

3.1 INSTALLATION OF ROUGH CARPENTRY, GENERAL

- A. Plywood Backing Panels: Install backing panels by fastening to studs; coordinate locations with utilities requiring backing panels. Install fire-retardant-treated plywood backing panels with classification marking of testing agency exposed to view.
- B. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
- C. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- D. Securely attach rough carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.10.1, "Fastening Schedule," in ICC's "International Building Code" (IBC).
 - 2. ICC-ES evaluation report for fastener.

3.2 INSTALLATION OF WOOD BLOCKING

- A. Install wood blocking where indicated on Drawings and where required for screeding or attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

END OF SECTION 061000

SECTION 061600 - SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Subflooring.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product. Indicate component materials and dimensions and include construction and application details.

1. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
2. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency in accordance with ASTM D5516.

1.3 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Fire-retardant-treated plywood.
2. Power-driven fasteners.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 FIRE-RETARDANT-TREATED PLYWOOD

A. General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

B. Fire-Retardant-Treated Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested in accordance with ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 ft. beyond the centerline of the burners at any time during the test.

1. Treatment must not promote corrosion of metal fasteners.
2. Exterior Type: Treated materials are to comply with requirements specified above for fire-retardant-treated plywood by pressure process after being subjected to accelerated weathering in accordance with ASTM D2898. Use for exterior locations and where indicated on Drawings.

C. Kiln-dry material after treatment to a maximum moisture content of 15 percent. Do not use material that is warped or does not comply with requirements for untreated material.

D. Identify fire-retardant-treated plywood with appropriate classification marking of qualified testing agency.

E. Application: Treat plywood indicated on Drawings.

2.2 SUBFLOORING

A. Plywood Subflooring:

1. Classification: DOC PS 1, Exposure 1, Structural I single-floor panels or sheathing.
2. Span Rating: Not less than 16.
3. Nominal Thickness: Not less than 23/32 inch.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacturer.
- B. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- C. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C954, except with wafer heads and reamer wings, length as recommended in writing by screw manufacturer for material being fastened.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 1. Table 2304.10.1, "Fastening Schedule," in the ICC's "International Building Code."
 2. ICC-ES evaluation report for fastener.
- D. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 INSTALLATION OF WOOD STRUCTURAL PANELS

- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
- B. Fastening Methods: Fasten panels as indicated below:
 1. Subflooring:
 - a. Screw to cold-formed metal framing.
 - b. Space panels 1/8 inch apart at edges and ends.

END OF SECTION 061600

SECTION 062023 - INTERIOR FINISH CARPENTRY

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior trim.
2. Paneling.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for blocking and other carpentry work not exposed to view.

1.2 DEFINITIONS

- A. MDO: Plywood with a medium-density overlay on the face.

1.3 ACTION SUBMITTALS

A. Product Data:

1. Interior trim.
2. Paneling.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation.

1. Protect materials from weather by covering with waterproof sheeting, securely anchored.
2. Provide for air circulation around stacks and under coverings.

- B. Deliver interior finish carpentry materials only when environmental conditions comply with requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions comply with requirements specified for installation areas.

1.5 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet-work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

- B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, comply with applicable rules of any rules-writing agency certified by the American Lumber Standard Committee's (ALSC) Board of Review. Grade lumber by an agency certified by the ALSC's Board of Review to inspect and grade lumber under the rules indicated.
 - 1. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by grading agency.
- B. Hardboard: ANSI A135.4.

2.2 INTERIOR TRIM

- A. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):
 - 1. Species and Grade: Red oak
 - 2. Maximum Moisture Content: 10 percent.
 - 3. Gluing for Width: Use for lumber trim wider than 6 inches.
 - 4. Veneered Material: Not allowed.
 - 5. Face Surface: Surfaced (smooth).
 - 6. Matching: Selected for compatible grain and color.

2.3 PANELING

- A. Hardwood Veneer Plywood Paneling: Manufacturer's stock hardwood plywood panels complying with HPVA HP-1.
 - 1. Face Veneer Species and Cut: Plain-sliced red oak.
 - 2. Veneer Matching: Selected for similar color and grain.
 - 3. Backing Veneer Species: Any hardwood compatible with face species.
 - 4. Construction: Veneer core.
 - 5. Thickness: As indicated on the drawings .
 - 6. Panel Size:
 - a. 48 by 96 inches (1219 by 2438 mm).

2.4 MISCELLANEOUS MATERIALS

- A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.
- B. Glue: Aliphatic-resin, polyurethane, or resorcinol wood glue recommended by manufacturer for general carpentry use.
- C. Multipurpose Construction Adhesive: Formulation, complying with ASTM D3498, that is recommended for indicated use by adhesive manufacturer.

2.5 FABRICATION

- A. Back out or kerf backs of the following members, except those with ends exposed in finished work:
 - 1. Interior standing and running trim, except shoe and crown molds.
 - 2. Wood-board paneling.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of projections and substances detrimental to application.
- B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours.

3.3 INSTALLATION, GENERAL

- A. Do not use materials that are unsound; warped; improperly treated or finished; inadequately seasoned; too small to fabricate with proper jointing arrangements; or with defective surfaces, sizes, or patterns.
- B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials.
 - 1. Use concealed shims where necessary for alignment.
 - 2. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
 - 3. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
 - 4. Install to tolerance of **1/8 inch in 96 inches** for level and plumb. Install adjoining interior finish carpentry with **1/32-inch** maximum offset for flush installation and **1/16-inch** maximum offset for reveal installation.
 - 5. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 INSTALLATION OF INTERIOR TRIM

- A. Install trim with minimum number of joints as is practical, using full-length pieces from maximum lengths of lumber available.
 - 1. Do not use pieces less than **24 inches** long, except where necessary.
 - 2. Stagger joints in adjacent and related standing and running trim.
 - 3. Miter at returns, miter at outside corners, and cope at inside corners to produce tight-fitting joints with full-surface contact throughout length of joint.
 - 4. Use scarf joints for end-to-end joints.
 - 5. Plane backs of casings to provide uniform thickness across joints where necessary for alignment.
 - 6. Install trim after gypsum-board joint finishing operations are completed.
 - 7. Install without splitting; drill pilot holes before fastening where necessary to prevent splitting.
 - 8. Fasten to prevent movement or warping.
 - 9. Countersink fastener heads on exposed carpentry work and fill holes.

3.5 INSTALLATION OF PANELING

- A. Plywood Paneling: Select and arrange panels on each wall to minimize noticeable variations in grain character and color between adjacent panels.
 - 1. Leave **1/4-inch (6-mm)** gap to be covered with trim at top, bottom, and openings.
 - 2. Install with uniform tight joints between panels.
 - 3. Attach panels to supports with manufacturer's recommended panel adhesive and fasteners.

4. Space fasteners and adhesive as recommended by panel manufacturer.
5. Conceal fasteners to greatest practical extent.

3.6 ADJUSTING

- A. Replace interior finish carpentry that is damaged or does not comply with requirements.
 1. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing.
- B. Adjust joinery for uniform appearance.

3.7 CLEANING

- A. Clean interior finish carpentry on exposed and semiexposed surfaces.
- B. Restore damaged or soiled areas and touch up factory-applied finishes if any.

3.8 PROTECTION

- A. Protect installed products from damage from weather and other causes during construction.
- B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.
 1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

SECTION 081416 - FLUSH WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Solid-core five-ply flush wood veneer-faced doors and transom panels for transparent finish.
2. Light frames.

B. Related Requirements:

1. Section 087111 "Door Hardware (Descriptive Specification)" for door hardware for flush wood doors.
2. Section 099301 "Staining and Transparent Finishing (MPI Standards)" for field finishing doors.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of specified product. Include information indicating compliance with performance requirements indicated.

B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in product data; and the following:

1. Door schedule indicating door location, type, size, fire protection rating, and swing.
2. Door elevations, dimension and locations of hardware, lite and louver cutouts, and glazing thicknesses.
3. Dimensions and locations of blocking for hardware attachment.
4. Dimensions and locations of mortises and holes for hardware.
5. Clearances and undercuts.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Comply with requirements of referenced standard and manufacturer's written instructions.

B. Package doors individually in cardboard cartons, and wrap bundles of doors in plastic sheeting.

C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.4 FIELD CONDITIONS

A. Environmental Limitations:

1. Do not deliver or install doors until building is enclosed and weathertight, wet work is complete, and HVAC system is operating and maintaining temperature between **60 and 90 deg F** and relative humidity between 25 and 55 percent during remainder of construction period.

1.5 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

- a. Delamination of veneer.

- b. Warping (bow, cup, or twist) more than **1/4 inch** in a **42-by-84-inch** section.
 - c. Telegraphing of core construction in face veneers exceeding **0.01 inch in a 3-inch** span.
2. Warranty also includes installation and finishing that may be required due to repair or replacement of defective doors.
 3. Warranty Period for Solid-Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door and Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction, for fire-protection ratings and temperature-rise limits indicated on Drawings, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
 1. Temperature-Rise Limit: Where indicated on Drawings, provide doors that have a maximum transmitted temperature end point of not more than **450 deg F** above ambient after 30 minutes of standard fire-test exposure.
- B. Smoke- and Draft-Control Door and Frame Assemblies: Listed and labeled for smoke and draft control based on testing in accordance with UL 1784 by a qualified testing agency acceptable to authorities having jurisdiction.

2.2 FLUSH WOOD DOORS AND FRAMES, GENERAL

- A. Quality Standard: In addition to requirements specified, comply with ANSI/WDMA I.S. 1A.

2.3 SOLID-CORE FIVE-PLY FLUSH WOOD VENEER-FACED DOORS AND TRANSOM PANELS FOR TRANSPARENT FINISH

- A. Interior Doors, Solid-Core Five-Ply Veneer-Faced:
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following :
 - a. Forte Opening Solutions
 - b. Lambton Doors
 - c. Oshkosh Door Company
 - d. VT Industries, Inc.
 2. Performance Grade: ANSI/WDMA I.S. 1A Heavy Duty.
 3. ANSI/WDMA I.S. 1A Quality Grade: Premium.
 4. Faces: Single-ply wood veneer not less than **1/50 inch** thick.
 - a. Species: Select ash.
 - b. Cut: Plain sliced (flat sliced).
 - c. Match between Veneer Leaves: Book match.
 - d. Assembly of Veneer Leaves on Door Faces: Running match.
 - e. Pair and Set Match: Provide for doors hung in same opening.
 5. Exposed Vertical and Top Edges: Same species as faces - Architectural Woodwork Standards edge Type A.
 - a. Fire-Rated Single Doors: Provide edge construction with intumescent seals concealed by outer stile. Comply with specified requirements for exposed vertical edges.
 - b. Fire-Rated Pairs of Doors:
 - 1) Provide fire-retardant stiles that are listed and labeled for applications indicated without formed-steel edges and astragals. Provide stiles with concealed intumescent seals. Comply with specified requirements for exposed edges.
 - c. Mineral-Core Doors: At hinge stiles, provide laminated-edge construction with improved screw-holding capability and split resistance. Comply with specified requirements for exposed edges.

- 1) Screw-Holding Capability: **475 lbf** in accordance with WDMA T.M. 10.
6. Core for Non-Fire-Rated Doors:
 - a. Particleboard: ANSI A208.1, Grade LD-1.
 - 1) Blocking: Provide wood blocking in particleboard-core doors as follows:
 - a) **5-inch** top-rail blocking, in doors indicated to have closers.
 - b) **5-inch** bottom-rail blocking, in exterior doors and doors indicated to have kick, mop, or armor plates.
 - c) **5-inch** midrail blocking, in doors indicated to have exit devices.
7. Core for Fire-Rated Doors: As required to achieve fire-protection rating indicated on Drawings.
 - a. Blocking for Mineral-Core Doors: Provide composite blocking with improved screw-holding capability approved for use in doors of fire-protection ratings indicated on Drawings as follows:
 - 1) **5-inch** top-rail blocking.
 - 2) **5-inch** bottom-rail blocking, in doors indicated to have protection plates.
 - 3) **5-inch** midrail blocking, in doors indicated to have armor plates.
 - 4) **4-1/2-by-10-inch** lock blocks, in doors without exit devices.
 - 5) **5-inch** midrail blocking, in doors indicated to have exit devices.
8. Construction: Five plies, hot-pressed bonded (vertical and horizontal edging is bonded to core), with entire unit abrasive planed before veneering.

2.4 LIGHT FRAMES

- A. Metal Frames for Light Openings: Manufacturer's standard frame formed of **0.048-inch-** thick, cold-rolled steel sheet; factory primed for paint finish; and approved for use in doors of fire-protection rating indicated on Drawings.

2.5 FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated.
 1. Comply with clearance requirements of referenced quality standard for fitting unless otherwise indicated.
 2. Comply with NFPA 80 requirements for fire-rated doors.
- B. Factory machine doors for hardware that is not surface applied.
 1. Locate hardware to comply with DHI-TDH-007.
 2. Comply with final hardware schedules, door frame Shop Drawings, ANSI/BHMA-156.115-W, and hardware templates.
 3. Coordinate with hardware mortises in metal frames, to verify dimensions and alignment before factory machining.
 4. Metal Astragals: Factory machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- C. Openings: Factory cut and trim openings through doors.
 1. Light Openings: Trim openings with moldings of material and profile indicated.
 2. Glazing: Provide fire protection-rated glazing to comply with fire-resistance rating and temperature rise limits.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.

1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
2. Reject doors with defects.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF FLUSH WOOD DOORS AND TRANSOM PANELS

A. Hardware: For installation, see Section 087111 "Door Hardware (Descriptive Specification)."

B. Install doors to comply with manufacturer's written instructions and referenced quality standard, and as indicated.

C. Install frames level, plumb, true, and straight.

1. Shim as required with concealed shims. Install level and plumb to a tolerance of **1/8 inch in 96 inches**.
2. Anchor frames to anchors or blocking built in or directly attached to substrates.
 - a. Secure with countersunk, concealed fasteners and blind nailing.
 - b. Use fine finishing nails or finishing screws for exposed fastening, countersunk and filled flush with woodwork.
 - 1) For factory-finished items, use filler matching finish of items being installed.
3. Fire-Rated Door and Frame Assemblies: Install in accordance with NFPA 80.
4. Smoke- and Draft-Control Door and Frame Assemblies: Install in accordance with NFPA 105.

D. Job-Fitted Doors:

1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
 - a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
2. Machine doors for hardware.
3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
4. Clearances:
 - a. Provide **1/8 inch** at heads, jambs, and between pairs of doors.
 - b. Provide **1/8 inch** from bottom of door to top of decorative floor finish or covering unless otherwise indicated on Drawings.
 - c. Where threshold is shown or scheduled, provide **1/4 inch** from bottom of door to top of threshold unless otherwise indicated.
 - d. Comply with NFPA 80 for fire-rated doors.
5. Bevel non-fire-rated doors **1/8 inch in 2 inches** at lock and hinge edges.
6. Bevel fire-rated doors **1/8 inch in 2 inches** at lock edge; trim stiles and rails only to extent permitted by labeling agency.

3.3 ADJUSTING

A. Operation: Rehang or replace doors that do not swing or operate freely.

END OF SECTION 081416

SECTION 087111 - DOOR HARDWARE (DESCRIPTIVE SPECIFICATION)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Hinges.
2. Mortise locks.
3. Lock cylinders.
4. Operating trim.
5. Surface closers.
6. Door gasketing.
7. Thresholds.
8. Metal protective trim units.

B. Related Requirements:

1. Section 081416 "Flush Wood Doors" for astragals and integral intumescent seals provided as part of labeled fire-rated assemblies.

1.2 COORDINATION

- A. Existing Openings: Where hardware components are scheduled for application to existing construction or where modifications to existing door hardware are required, field-verify existing conditions and coordinate installation of door hardware to suit opening conditions and to provide proper door operation.

1.3 PREINSTALLATION MEETINGS

A. Keying Conference: Conduct conference at Project site.

1. Conference participants must include Owner's designated representatives.
2. Incorporate conference decisions into keying schedule after reviewing door hardware keying system, including, but not limited to, the following:
 - a. Flow of traffic and degree of security required.
 - b. Preliminary key system schematic diagram.
 - c. Address for delivery of keys.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Door Hardware Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant. Coordinate door hardware schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Submittal Sequence: Submit door hardware schedule concurrent with submissions of product data, Samples, and Shop Drawings. Coordinate submission of door hardware schedule with scheduling requirements of other work to facilitate the fabrication of other work that is critical in Project construction schedule.
2. Format: Use same scheduling sequence and format and use same door numbers as in door hardware schedule in the Contract Documents.
3. Content: Include the following information:

- a. Identification number, location, hand, fire rating, size, and material of each door and frame.
- b. Locations of each door hardware set, cross-referenced to Drawings on floor plans and to door and frame schedule.
- c. Complete designations, including name and manufacturer, type, style, function, size, quantity, function, and finish of each door hardware product.
- d. Fastenings and other installation information.
- e. Explanation of abbreviations, symbols, and designations contained in door hardware schedule.
- f. Mounting locations for door hardware.
- g. List of related door devices specified in other Sections for each door and frame.

- C. Keying Schedule: Prepared by or under the supervision of Installer's Architectural Hardware Consultant, detailing Owner's final keying instructions for locks. Include schematic keying diagram and index each key set to unique door designations that are coordinated with the Contract Documents.

1.5 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

- A. Maintenance Data: For each type of door hardware to include in maintenance manuals.
- B. Schedules: Final door hardware and keying schedule.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lockup for door hardware delivered to Project site.
- B. Tag each item or package separately with identification coordinated with the final door hardware schedule, and include installation instructions, templates, and necessary fasteners with each item or package.

1.8 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of door hardware that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Structural failures, including excessive deflection, cracking, or breakage.
 - b. Faulty operation of doors and door hardware.
 - c. Deterioration of metals, metal finishes, and other materials beyond normal weathering and use.
 - 2. Warranty Period: Three years from date of Substantial Completion unless otherwise indicated below:
 - a. Exit Devices: Two years from date of Substantial Completion.
 - b. Manual Closers: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each type of door hardware from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Door Assemblies: Where fire-rated doors are indicated, provide door hardware complying with NFPA 80 that is listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure in accordance with NFPA 252 or UL 10C.
- B. Smoke- and Draft-Control Door Assemblies: Where smoke- and draft-control door assemblies are required, provide door hardware that complies with requirements of assemblies tested in accordance with UL 1784 and installed in compliance with NFPA 105.
 - 1. Air-Leakage Rate: Maximum air leakage of **0.3 cfm per sq. ft.** at the tested pressure differential of **0.3 inch wg** of water.
- C. Means of Egress Doors: Latches do not require more than **15 lbf** to release the latch. Locks do not require use of a key, tool, or special knowledge for operation.
- D. Accessibility Requirements: For door hardware on doors in an accessible route, comply with the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.
 - 1. Provide operating devices that do not require tight grasping, pinching, or twisting of the wrist and that operate with a force of not more than **5 lbf**.
 - 2. Comply with the following maximum opening-force requirements:
 - a. Interior, Non-Fire-Rated Hinged Doors: **5 lbf** applied perpendicular to door.
 - b. Sliding or Folding Doors: **5 lbf** applied parallel to door at latch.
 - c. Fire Doors: Minimum opening force allowable by authorities having jurisdiction.
 - 3. Bevel raised thresholds with a slope of not more than 1:2. Provide thresholds not more than **1/2 inch** high.
 - 4. Adjust door closer sweep periods so that, from an open position of 90 degrees, the door will take at least 5 seconds to move to a position of 12 degrees from the latch.
 - 5. Adjust spring hinges so that, from an open position of 70 degrees, the door will take at least 1.5 seconds to move to the closed position.

2.3 HINGES

- A. Hinges: ANSI/BHMA A156.1.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allegion plc
 - b. Hager Companies
 - c. McKinney Products Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
 - d. PBB, Inc
 - e. STANLEY; dormakaba USA, Inc.
- B. Antifriction-Bearing Hinges:
 - 1. Mounting: Full mortise (butts).
 - 2. Bearing Material: Manufacturer's standard antifriction bearing.
 - 3. Grade 1 (heavy weight).
 - 4. Base and Pin Metal:
 - a. Exterior Hinges: Brass with stainless steel pin body and brass protruding heads.
 - b. Interior Hinges: Brass with stainless steel pin body and brass protruding heads.
 - c. Hinges for Fire-Rated Assemblies: Steel with steel pin.
 - 5. Pins: Nonremovable.
 - 6. Tips: Flat button.
 - 7. Corners: Square.

2.4 MECHANICAL LOCKS AND LATCHES

- A. Lock Functions: As indicated in door hardware schedule.
- B. Lock Throw: Comply with testing requirements for length of bolts required for labeled fire doors, and as follows:
 - 1. Bored Locks: Minimum **1/2-inch** latchbolt throw.
 - 2. Mortise Locks: Minimum **3/4-inch** latchbolt throw.
- C. Lock Backset: **2-3/4 inches** unless otherwise indicated.
- D. Lock Trim:
 - 1. Levers: Cast.
 - a. Construction: Solid.
 - 2. Escutcheons (Roses): Forged.
 - 3. Dummy Trim: Match lever lock trim and escutcheons.
- E. Strikes: Provide manufacturer's standard strike for each lock bolt or latchbolt complying with requirements indicated for applicable lock or latch and with strike box and curved lip extended to protect frame; finished to match lock or latch.
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
- F. Mortise Locks: ANSI/BHMA A156.13, Operational Grade 1; stamped steel case with steel or brass parts; Series 1000.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allegion plc
 - b. Corbin Russwin, Inc.; an ASSA ABLOY Group company
 - c. Hager Companies
 - d. SARGENT Manufacturing Company; ASSA ABLOY
 - e. STANLEY; dormakaba USA, Inc.
 - f. Yale Security Inc; ASSA ABLOY

2.5 EXIT DEVICES AND AUXILIARY ITEMS

- A. Panic Exit Devices: Listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for panic protection, based on testing in accordance with UL 305.
- B. Fire Exit Devices: Devices complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire and panic protection, based on testing in accordance with UL 305 and NFPA 252.
- C. Mortise Exit Devices: Grade 1.
 - 1. Type 10, narrow stile.
 - 2. Actuating Bar: Narrow-stile push pad.
 - 3. Material: Brass.
- D. Exit Device Outside Trim: Lever with cylinder; material and finish to match locksets unless otherwise indicated.
 - 1. Match design for lock trim unless otherwise indicated.
- E. Through-Bolt Fasteners: For exit devices and trim on all doors.

2.6 LOCK CYLINDERS

- A. Lock Cylinders: Tumbler type, constructed from brass or bronze, stainless steel, or nickel silver.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BEST Access Solutions, Inc.; dormakaba USA Inc.; MJ1 keyway, type A2 is University's standard.
- B. Standard Lock Cylinders: ANSI/BHMA A156.5, Grade 1 permanent cores; face finished to match lockset.
 - 1. Core Type: Interchangeable.
 - 2. Number of Pins: Seven.
 - 3. Lock Type: Mortise type.

2.7 KEYING

- A. Keying System: Factory registered, complying with guidelines in ANSI/BHMA A156.28, appendix. Provide one extra key blank for each lock. Incorporate decisions made in keying conference.
 - 1. Existing System:
 - a. Master key or grand master key locks to Owner's existing system.
- B. Keys: Nickel silver or Brass.
 - 1. Stamping: Permanently inscribe each key with a visual key control number and include the following notation:
 - a. Notation: "DO NOT DUPLICATE."

2.8 OPERATING TRIM

- A. Operating Trim: ANSI/BHMA A156.6; brass unless otherwise indicated.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allegion plc
 - b. Hager Companies
 - c. Hiawatha, Inc; a division of the Activar Construction Products Group
 - d. INOX; Unison Hardware, Inc
 - e. Rockwood Manufacturing Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
 - f. Trimco
- B. Offset Push-Pull Door Pulls: Pull fixed to **0.050-inch**- thick plate, **4 inches wide by 16 inches high** with square corners and beveled edges.
 - 1. Pull Diameter: **1-inch** constant diameter.
 - 2. Pull Offset: **2 inches**.
 - 3. Minimum Pull Clearance: **2-1/4 inches** from face of door.
 - 4. Overall Pull Length: **9 inches**.

2.9 SURFACE CLOSERS

- A. Surface Closers: ANSI/BHMA A156.4; rack-and-pinion hydraulic type with adjustable sweep and latch speeds controlled by key-operated valves and forged-steel main arm. Comply with manufacturer's written instructions for size of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Provide factory-sized closers, adjustable to meet field conditions and requirements for opening force.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Allegion plc; LCN 4111 is basis of design product.
- b. Corbin Russwin, Inc.; an ASSA ABLOY Group company
- c. dormakaba USA Inc.
- d. Hager Companies
- e. INOX; Unison Hardware, Inc
- f. Norton Door Controls; ASSA ABLOY
- g. Rixson Specialty Door Controls; ASSA ABLOY
- h. SARGENT Manufacturing Company; ASSA ABLOY
- i. STANLEY; dormakaba USA, Inc.

B. Surface Closer with Cover: Grade 1; modern type with mechanism enclosed in cover.

1. Mounting: Parallel arm.
2. Type: CUSH arm.
3. Backcheck: Adjustable, effective between 60 and 85 degrees of door opening.
4. Cover Material: Plated steel.
5. Closing Power Adjustment: At least 35 percent more than minimum tested value.

2.10 DOOR GASKETING

A. Door Gasketing: ANSI/BHMA A156.22; with resilient or flexible seal strips that are easily replaceable and readily available from stocks maintained by manufacturer.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Hager Companies
- b. National Guard Products, Inc
- c. Pemko Manufacturing Company Inc.; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
- d. Reese Enterprises, Inc
- e. Sealeze
- f. Zero International; Allegion plc

B. Maximum Air Leakage: When tested in accordance with ASTM E283/E283M with tested pressure differential of **0.3 inch wg**, as follows:

1. Smoke-Rated Gasketing: **0.3 cfm/sq. ft.** of door opening.
2. Gasketing on Single Doors: **0.3 cfm/sq. ft.** of door opening.
3. Gasketing on Double Doors: **0.50 cfm per ft.** of door opening.

C. Adhesive-Backed Perimeter Gasketing: Sponge neoprene gasket material applied to frame rabbet with self-adhesive.

D. Door Sweeps: Vinyl gasket material held in place by flat housing or flange; surface mounted to face of door with screws.

1. Housing or Flange Material: Bronze.

2.11 THRESHOLDS

A. Thresholds: ANSI/BHMA A156.21; fabricated to full width of opening indicated.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- a. Hager Companies
- b. National Guard Products, Inc
- c. Pemko Manufacturing Company Inc.; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
- d. Rixson Specialty Door Controls; ASSA ABLOY
- e. Zero International; Allegion plc

B. Saddle Thresholds:

1. Type: Fluted top.
2. Base Metal: Stainless steel.

2.12 METAL PROTECTIVE TRIM UNITS

A. Metal Protective Trim Units: ANSI/BHMA A156.6; fabricated from **0.050-inch-** thickbrass; with manufacturer's standard machine or self-tapping screw fasteners.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Allegion plc
 - b. Hager Companies
 - c. Rockwood Manufacturing Company; ASSA ABLOY Accessories and Door Controls Group, Inc.; ASSA ABLOY
 - d. Trimco

B. Kick Plates: **10 inches** high by door width with allowance for frame stops.

2.13 FABRICATION

A. Manufacturer's Nameplate: Do not provide products that have manufacturer's name or trade name displayed in a visible location except in conjunction with required fire-rating labels and as otherwise approved by Architect.

B. Base Metals: Produce door hardware units of base metal indicated, fabricated by forming method indicated, using manufacturer's standard metal alloy, composition, temper, and hardness. Furnish metals of a quality equal to or greater than that of specified door hardware units and ANSI/BHMA A156.18.

C. Fasteners: Provide door hardware manufactured to comply with published templates prepared for machine, wood, and sheet metal screws. Provide screws that comply with commercially recognized industry standards for application intended; however, aluminum fasteners are not permitted. Provide Phillips flat-head screws with finished heads to match surface of door hardware unless otherwise indicated.

1. Concealed Fasteners: For door hardware units that are exposed when door is closed, except for units already specified with concealed fasteners. Do not use through bolts for installation where bolt head or nut on opposite face is exposed unless it is the only means of securely attaching the door hardware. Where through bolts are used on hollow door and frame construction, provide sleeves for each through bolt.
2. Fire-Rated Applications:
 - a. Wood or Machine Screws: For the following:
 - 1) Hinges mortised to doors or frames.
 - 2) Strike plates to frames.
 - 3) Closers to doors and frames.
 - b. Steel Through Bolts: For the following unless door blocking is provided:
 - 1) Surface hinges to doors.
 - 2) Closers to doors and frames.
 - 3) Surface-mounted exit devices.
3. Spacers or Sex Bolts: For through bolting of hollow-metal doors.
4. Gasketing Fasteners: Provide noncorrosive fasteners for exterior applications and elsewhere as indicated.

2.14 FINISHES

A. Provide finishes complying with ANSI/BHMA A156.18 as indicated in door hardware schedule. Door hardware to match existing 606 Satin brass US4.

- B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine 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 of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Steel Doors and Frames: For surface-applied door hardware, drill and tap doors and frames in accordance with ANSI/SDI A250.6.
- B. Wood Doors: Comply with door and hardware manufacturers' written instructions.

3.3 INSTALLATION OF DOOR HARDWARE

- A. Mounting Heights: 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. Wood Doors: DHI's "Recommended Locations for Architectural Hardware for Wood Flush Doors."
- B. Install each door hardware item to comply with manufacturer's written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work. Do not install surface-mounted items until finishes have been completed on substrates involved.
 - 1. Set units level, plumb, and true to line and location. Adjust and reinforce attachment substrates as necessary for proper installation and operation.
 - 2. Drill and countersink units that are not factory prepared for anchorage fasteners. Space fasteners and anchors in accordance with industry standards.
- C. Hinges: Install types and in quantities indicated in door hardware schedule, but not fewer than the number recommended by manufacturer for application indicated or one hinge for every **30 inches** of door height, whichever is more stringent, unless other equivalent means of support for door, such as spring hinges or pivots, are provided.
- D. Lock Cylinders: Install construction cores to secure building and areas during construction period.
 - 1. Furnish permanent cores to Owner for installation.
- E. Thresholds: Set thresholds for exterior doors and other doors indicated in full bed of sealant complying with requirements specified in Section 079200 "Joint Sealants."
- F. Perimeter Gasketing: Apply to head and jamb, forming seal between door and frame.
 - 1. Do not notch perimeter gasketing to install other surface-applied hardware.

3.4 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.

3.5 CLEANING AND PROTECTION

- A. Clean adjacent surfaces soiled by door hardware installation.
- B. Clean operating items as necessary to restore proper function and finish.
- C. Provide final protection and maintain conditions that ensure that door hardware is without damage or deterioration at time of Substantial Completion.

3.6 DOOR HARDWARE SCHEDULE

- A. Hardware Set 1: Each Restroom door and Auditorium entrance door to have the following:
 - (3) Hinges
 - (1) Closer
 - (1) Push Pull
 - (1) Kick Plate
- B. Hardware Set 2: Each Control Room and Electrical Room door to have the following:
 - (3) Hinges
 - (1) Strike
 - (1) Storage Room Lever Lockset
 - (1) Cylinder
- C. Hardware Set 3: 90 Minute Rated Double entrance door from Vestibule door to have the following:
 - (6) Hinges
 - (1) Strike
 - (1) Exit Device with Lever
 - (1) Cylinder
 - (1) Closer
- D. Hardware Set 4: Exterior exit door from Auditorium door to have the following:
 - (3) Hinges
 - (1) Strike
 - (1) Exit Device, less dogging, with Lever
 - (1) Cylinder
 - (1) Closer
 - (1) Kick Plate
 - (1) Threshold
 - (1) Door Sweep
 - Perimeter Gasketing

END OF SECTION 087111

SECTION 092216 - NON-STRUCTURAL METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Nonstructural steel framing.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.

1.3 QUALITY ASSURANCE

- A. Code-Compliance Certification of Studs and Track: Provide documentation that framing members are certified in accordance with product-certification program of the Steel Framing Industry Association, the Steel Stud Manufacturers Association, or the Supreme Steel Framing System Association.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Protect materials from corrosion, deformation, and other damage during delivery, storage, and handling in accordance with AISI S202.

PART 2 - PRODUCTS

2.1 NONSTRUCTURAL STEEL FRAMING

- A. Framing Members, General: Comply with requirements in AISI S220 for conditions indicated on Drawings.

1. Protective Coating: ASTM A653/A653M, **G40** hot-dip galvanized or coating with demonstrated equivalent corrosion resistance. Galvannealed products are unacceptable.
 - a. Equivalent Corrosion-Resistant Coating: Evaluation report acceptable to authorities having jurisdiction demonstrates corrosion resistance equivalent to specified protective coating.

- B. Studs and Track: Conventional members, roll-formed into standard shapes without surface deformations to stiffen framing members.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CEMCO; California Expanded Metal Products Co.
 - b. ClarkDietrich
 - c. MarinoWARE
 - d. SCAFCO Steel Stud Company; Stone Group of Companies
 - e. TELLING Industries
2. Minimum Base-Steel Thickness: As indicated on Drawings or if not indicated use **0.0296 inch**.
3. Minimum Yield Strength: **33 ksi**.

4. Depth: As indicated on Drawings.

2.2 AUXILIARY MATERIALS

- A. General: Provide auxiliary materials that comply with referenced installation standards.
 1. Fasteners for Steel Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.
- B. Power-Actuated Anchors: Fastener systems with an evaluation report, acceptable to authorities having jurisdiction, based on ICC-ES AC70.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas, substrates, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION OF NONSTRUCTURAL STEEL FRAMING, GENERAL

- A. Installation Standard: ASTM C754.
 1. Gypsum Board Assemblies: Also comply with requirements in ASTM C840 that apply to framing installation.
- B. Install framing and accessories plumb, square, and true to line, with connections securely fastened.
- C. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.
- D. Do not bridge building control and expansion joints with framing members. Frame both sides of joints independently.

3.3 INSTALLATION OF NONSTRUCTURAL STEEL FRAMING

- A. Install framing system components at spacings indicated on Drawings, but not greater than spacings required by referenced installation standards for assembly types.
 1. Single-Layer Application: **16 inches** o.c. unless otherwise indicated on Drawings.
- B. Install studs so flanges within framing system point in same direction.
- C. Installation Tolerances for Nonstructural Steel Framing:
 1. Framing Members: Install each framing member so fastening surfaces vary not more than **1/8 inch** from the plane formed by faces of adjacent framing.

END OF SECTION 092216

SECTION 092900 - GYPSUM BOARD

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior gypsum board.
2. Tile backing panels.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 DELIVERY, STORAGE, AND HANDLING

- ##### A.
- Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.4 FIELD CONDITIONS

- ##### A.
- Environmental Limitations: Comply with ASTM C840 requirements or manufacturer's written instructions, whichever are more stringent.
- ##### B.
- Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.
- ##### C.
- Do not install panels that are wet, moisture damaged, or mold damaged.
1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 INTERIOR GYPSUM BOARD

A. Gypsum Board, Type X: ASTM C1396/C1396M.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum
 - b. CertainTeed; SAINT-GOBAIN
 - c. Georgia-Pacific Gypsum LLC
 - d. USG Corporation
2. Thickness: 5/8 inch.

2.2 TILE BACKING PANELS

- A. Glass-Mat, Water-Resistant Backing Board: ASTM C1178/C1178M, with manufacturer's standard edges.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Gypsum
 - b. CertainTeed; SAINT-GOBAIN
 - c. Georgia-Pacific Gypsum LLC
 - d. USG Corporation
 - 2. Core: 5/8 inch (15.9 mm), Type X.
 - 3. Mold Resistance: ASTM D3273, score of 10 as rated in accordance with ASTM D3274.
- A. Joint Treatment Materials for Tile Backing Panels: Comply with ASTM C475/C475M requirements.
 - 1. Mold-Resistant Joint Compound: Use mold-resistant formulations with mold-resistant panel products.
 - 2. Joint Tape: As recommended in writing by panel manufacturer.
 - 3. Joint Compound for Tile Backing Panels:
 - a. Glass-Mat, Water-Resistant Gypsum Panel: As recommended in writing by panel manufacturer.

2.3 AUXILIARY MATERIALS

- A. Provide auxiliary materials that comply with referenced installation standards and manufacturer's written instructions.
- B. Steel Drill Screws: ASTM C1002 unless otherwise specified or indicated on Drawings.
 - 1. Use screws complying with ASTM C954 for fastening panels to steel members from 0.033 to 0.112 inch thick.
- C. Sound-Attenuation Blankets: ASTM C665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers as follows:
 - 1. Non-Fire-Resistance-Rated Assemblies: Glass or slag or rock wool.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and substrates including welded hollow-metal frames and support framing, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
- B. Examine panels before installation. Reject panels that are wet, moisture damaged, or mold damaged.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION AND FINISHING OF GYPSUM BOARD, GENERAL

- A. Comply with ASTM C840 requirements.
- B. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch of open space between panels. Do not force into place.
- C. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

- D. Form expansion (control) joints with space between edges of adjoining gypsum panels.
- E. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.
 - 1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than **8 sq. ft.** in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow **1/4- to 3/8-inch-** wide joints to install sealant.
- F. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- G. Install sound-attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 INSTALLATION OF INTERIOR GYPSUM BOARD

- A. Single-Layer Application:
 - 1. On partitions/walls, apply gypsum panels vertically (parallel to framing) unless otherwise specified or indicated on Drawings or required by fire-resistance-rated assembly, and minimize end joints.
 - 2. Fastening Methods: Apply gypsum panels to supports with steel drill screws.
- B. Joint Treatment Materials for Interior Gypsum Board: Treat joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare panel surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.
 - 1. Prefill open joints, rounded or beveled edges, and damaged surface areas.
 - 2. Apply joint tape over panel joints, except for trim products specifically indicated as not intended to receive tape.
- C. Finish interior gypsum board panels to comply with levels indicated below and in accordance with ASTM C840:
 - 1. Level 1: Ceiling plenum areas, concealed areas, and where indicated on Drawings.
 - 2. Level 2: Panels that are substrate for tile.
 - 3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

3.4 PROTECTION

- A. Protect adjacent surfaces from joint compound and promptly remove from floors and other non-gypsum board surfaces. Repair surfaces stained, marred, or otherwise damaged during gypsum board installation and finishing.
- B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.
- C. Remove and replace panels that have gotten wet, moisture damaged, or mold damaged.
 - 1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
 - 2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

SECTION 093013 - CERAMIC TILING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Porcelain tiles.
2. Glazed wall tiles.
3. Setting materials.
4. Grout materials.
5. Metal edge trim.

B. Related Requirements:

1. Section 092900 "Gypsum Board" for tile backing panels.

1.2 DEFINITIONS

- A. General: Definitions in ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.
- B. Face Size: Actual tile size, excluding spacer lugs.
- C. Large Format Tile: Tile with at least one edge **15 inches** or longer.
- D. Module Size: Actual tile size plus joint width indicated.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of specified product.
- B. Samples for Initial Selection: For tile, grout, and accessories involving color selection or shade variation.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size specified.
 2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated for Project.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.
- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

- D. Store liquid materials in unopened containers and protected from freezing.

1.6 FIELD CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Tile: Obtain tile of each type from single source or producer.
 - 1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

2.2 CERAMIC TILE SYSTEM, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard Grade requirements.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCNA installation methods specified in tile installation schedules, and other requirements specified.
- C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

2.3 PORCELAIN TILES

- A. Porcelain Tile:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:
 - a. American Olean; a brand of Dal-Tile Corporation
 - b. Crossville, Inc.; Retroactive 2.0 is basis of design product.
 - c. Daltile; a brand of Dal-Tile Corporation
 - d. Marazzi USA; a brand of Dal-Tile Corporation
 - 2. Type: Unglazed.
 - 3. Certification: Tile certified by the Porcelain Tile Certification Agency.
 - 4. Face Size: **12 by 24 inches**.
 - 5. Face Size Variation: Rectified.
 - 6. Thickness: **5/16 inch**.
 - 7. Product Use Classification: Interior, Dry (ID).
 - 8. Physical Properties: Chemical resistant when tested with indicated chemicals in accordance with ASTM C650.
 - 9. Tile Color, Glaze, and Pattern: As selected by Architect from manufacturer's full range.
 - 10. Grout Color: As selected by Architect from manufacturer's full range.

2.4 GLAZED WALL TILES

- A. Glazed Wall Tile:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. American Olean; a brand of Dal-Tile Corporation
 - b. Crossville, Inc.
 - c. Daltile; a brand of Dal-Tile Corporation; Color Wheel Linear is basis of design product.
 - d. Marazzi USA; a brand of Dal-Tile Corporation
2. Module Face Size: 4 by 12 inches.
3. Face Size Variation: Rectified.
4. Thickness: 5/16 inch.
5. Tile Color and Pattern: As selected by Architect from manufacturer's full range of standard (non-accent).
6. Grout Color: As selected by Architect from manufacturer's full range.
7. Mounting: Loose tiles.

2.5 SETTING MATERIALS

A. Improved Modified Dry-Set Mortar (Thinset): ANSI A118.15.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas
 - b. Laticrete International, Inc.
 - c. MAPEI Corporation
2. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to other requirements in ANSI A118.15.

2.6 GROUT MATERIALS

A. High-Performance Tile Grout: ANSI A118.7.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ARDEX Americas
 - b. Laticrete International, Inc.
 - c. MAPEI Corporation
2. Polymer Type: Dry, redispersible form, prepackaged with other dry ingredients or liquid-latex form for addition to prepackaged dry-grout mix.

2.7 MISCELLANEOUS MATERIALS

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting and adhesive materials for installations indicated.
- B. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.
- C. Grout Sealer: Grout manufacturer's standard product for sealing grout joints that does not change color or appearance of grout.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with

requirements for installation tolerances and other conditions affecting performance of the Work.

1. Verify that substrates for setting tile are firm; dry; clean; free of coatings that are incompatible with tile-setting materials, including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thinset mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.
 - a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
 - b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.
3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Remove coatings, including curing compounds or other coatings, that are incompatible with tile-setting materials.
- B. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thinset mortar with trowelable leveling and patching compound specifically recommended in writing by tile-setting material manufacturer.
- C. Where indicated, prepare substrates to receive waterproof membrane by applying a reinforced mortar bed that complies with ANSI A108.1 and is sloped **1/4 inch per foot** toward drains.
- D. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.
- E. Substrate Flatness:
 1. For tile shorter than **15 inches**, confirm that structure or substrate is limited to variation of **1/4 inch in 10 ft.** from the required plane, and no more than **1/16 inch in 12 inches** when measured from tile surface high points.
 2. For large format tile, tile with at least one edge **15 inches** or longer, confirm that structure or substrate is limited to **1/8 inch in 10 ft.** from the required plane, and no more than **1/16 inch in 24 inches** when measured from tile surface high points.

3.3 INSTALLATION OF CERAMIC TILE SYSTEM, GENERAL

- A. Setting and Grout Materials: Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
 1. Add materials, water, and additives in accurate proportions.
 2. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.
- B. Install tile in accordance with TCNA's "Handbook for Ceramic, Glass, and Stone Tile Installation" for TCNA installation methods specified in tile installation schedules. Comply with parts of ANSI A108 series that are referenced in TCNA installation methods and specified in tile installation schedules, and apply to types of setting and grouting materials used.
 1. For the following installations, follow procedures in ANSI A108 series of tile installation standards for providing 95 percent mortar coverage:
 - a. Tile floors in wet areas.
 - b. Tile floors consisting of tiles **8 by 8 inches** or larger.
 - c. Tile floors consisting of rib-backed tiles.

2. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.
 3. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
 4. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.
 - a. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
 - b. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.
- C. Metal Flooring Transitions: Install where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with or below top of tile and no threshold is indicated.

3.4 ADJUSTING

- A. Remove and replace tile that is damaged or that does not match adjoining tile. Provide new matching units, installed as specified and in a manner to eliminate evidence of replacement.

3.5 CLEANING

- A. On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
1. Remove grout residue from tile as soon as possible.
 2. Clean grout smears and haze from tile in accordance with tile and grout manufacturer's written instructions. Use only cleaners recommended in writing by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

3.6 PROTECTION

- A. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended in writing by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.
- B. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.
- C. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.7 INTERIOR CERAMIC TILE INSTALLATION SCHEDULE

- A. Interior Floor Installations, Concrete Subfloor:
1. TCNA F115: Thinset mortar.
 - a. Thinset Mortar: Improved modified dry-set mortar.
 - b. Grout: High-performance tile grout.
 - c. Joint Width: **3/16 inch (4.76 mm)**.
- B. Interior Wall Installations, Wood or Metal Studs or Furring:
1. TCNA W245: Thinset mortar on glass-mat, water-resistant gypsum backer board.
 - a. Ceramic Tile Type: Glazed ceramic tile.
 - b. Mortar: Improved modified dry-set mortar.

- c. Grout: High-performance tile grout.
 - 1) Type: Unsanded.
- d. Joint Width: **3/16 inch.**

END OF SECTION 093013

095126 WOOD SLAT WALL SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and general conditions of Contract, including General and Supplementary Conditions and Divisions-1 Specification sections apply to work of this section.

1.2 SUMMARY

a) Section Includes:

1. Solid Wood (Poplar) Slat Wall Panels with Centered Notched and Flat Backers
2. Wire hangers, fasteners, main runners, cross tees, wall angle moldings and accessories.

b) Related Sections:

1. Division 26 (16) Sections - Electrical Work

1.3 REFERENCES

a) American Society for Testing and Materials (ASTM):

1. ASTM E 84 Standard Test Method for Surface Burning Characteristics of Building Materials.
2. ASTM C 423 Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
3. ASTM E 1264 Classification for Acoustical Ceiling Products.
4. Hardwood Plywood & Veneer Association (HPVA)
5. International Building Code
6. NFPA 70 National Electrical Code

1.4 SUBMITTALS

- a) Shop Drawings: Layout and details of walls. Show locations of items that are to be coordinated with or supported by the walls.
- b) Installation Instructions: Submit manufacturer's installation instructions as referenced in Part three, Installation.
- c) Product Data: Submit manufacturer's technical data for each type of wall unit and framing structure required.
- d) Samples: 4-1/4"x 7"x 3/4 – Solid Wood Poplar Finishes - Semi-gloss tinted topcoat – Clear Finish
- e) Certifications: Manufacturer's certifications that products comply with specified requirements, including laboratory reports showing compliance with specified tests and standards.

1.5 QUALITY ASSURANCE

- a) Single-Source Responsibility: Provide wall panel units and grid components by a single manufacturer.
- b) Fire Performance Characteristics: Identify wall components with appropriate markings of applicable testing and inspecting organization.
 1. Surface Burning Characteristics: As follows, tested per ASTM E-84 and complying with ASTM E 1264 for Class C products.
 2. HPVA (Hardwood Plywood and Veneer Association) certification and audit program per ASTM E-84 tunnel test.
- c) Woodworking Standards: Manufacturer must comply with specified provisions of Architectural Woodworking Institute quality standards.
- d) Coordination of Work: Coordinate wall work with installers of related work including, but not limited to building insulation, gypsum board, light fixtures, mechanical systems, electrical systems, and sprinklers.

1.6 DELIVERY, STORAGE, AND HANDLING

- a) Store wall components in a dry interior location in their cartons prior to installation to avoid damage. Store cartons in a flat, horizontal position. The protectors between the panels should not be removed until installation.
- b) Do not store in unconditioned spaces with humidity greater than 55 percent or lower than 25 percent relative humidity and temperatures lower than 50 degrees F or greater than 86 degrees F. Panels must not be exposed to extreme temperatures, for example, close to a heating source or near a window with direct sunlight.
- c) Handle wall units carefully to avoid chipped edges or damage to units in any way.

1.7 PROJECT CONDITIONS

- a) Wood wall materials should be permitted to reach room temperature and have a stabilized moisture content for a minimum of 72 hours before installation. (Remove plastic wrap to allow panels to climatize).
- b) The wood panels should not be installed in spaces where the temperature or humidity conditions vary from the temperatures and conditions that will be normal in the occupied space.
- c) As interior finish products, the solid wood panels are designed for installation in temperature conditions between 50 degrees F and 86 degrees F, in spaces where the building is enclosed, and HVAC systems are functioning and will be in continuous operation. Relative humidity should not fall below 25 percent or exceed 55 percent.

1.8 WARRANTY

- a) Solid Slat Wood Panel: Submit a written warranty executed by the manufacturer, agreeing to repair or replace panels that fail within the warranty period. Failures include, but are not limited to:
 - 1. Solid Slat Wood Panels (Poplar): Defects in materials or factory workmanship.
- b) Warranty Period:
 - 1. One (1) year from date of installation.
- c) The Warranty shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and will be in addition to and run concurrent with other warranties made by the Contractor under the requirements of the Contract Documents.

1.9 MAINTENANCE

- a) Extra Materials: Deliver extra materials to Owner. Furnish extra materials described below that match products installed. Packaged with protective covering for storage and identified with appropriate labels.
 - 1. Wall Units: Furnish quality of full-size units equal to 2.0 percent of amount installed.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- a) Basis of Design Product: WoodWorks Grille Forté Solid Poplar Walls Panels:
 - 1. Armstrong World Industries, Inc.
 - 2. Other Manufacturers:
 - i. CertainTeed.

2.2 WOOD WALL UNITS

- a) Wall Panels Type AP-1:
 - 1. Surface Texture: Smooth
 - 2. Composition: Solid Wood (Poplar)
 - 3. Finish(s): Solid Wood (Poplar):
 - Rich Mahogany (GRY)
 - 4. Panel Width: 12-inch
Panel Length Size(s): With 1" reveal panel to panel @ length
 - 96-inch (Nominal): 95-inch (Actual)
 - 5. Panel Length Size(s): 96-inch (Nominal): 95-inch (Actual) With 1" reveal panel to panel @ length

Slat Width 3/4-inch:

Height – Number of Slats (Spacing): 2-1/4" –5 Slats (1-13/20")

6. Acoustical Performance Infill Options:

- 1) BioAcoustic Infill Panes– NRC 0.75, CAC N/A

7. Flame Spread: Class C

b) Accessories:

1. Flat Backer Kit
2. Gallon Size Stain Can for Solid Wood Panels

2.3 SUSPENSION SYSTEMS

a) Refer to Manufacturer's Wall Installation Instructions.

b) Accessories/Edge Moldings and Perimeter Trim:

- a. Backer Clip 3/8 x 11/16 x 7/8" Backer

PART 3 - EXECUTION

3.1 EXAMINATION

- a) Do not proceed with installation until all wet work such as concrete, terrazzo, plastering and painting has been completed and thoroughly dried out.
- b) Proper designs for both supply air and return air, maintenance of the HVAC filters and building interior space are essential to minimize soiling. Before starting the HVAC system, make sure supply air is properly filtered and the building interior is free of construction dust.

3.2 PREPARATION

- a) Measure each wall area and establish layout of acoustical units to balance border widths at opposite edges of each wall. Avoid use of less than half width units at borders and comply with wall elevations. Coordinate panel layout with mechanical and electrical fixtures.
- b) Wood slat wall materials should be permitted to reach room temperature and have a stabilized moisture content for a minimum of 72 hours before installation. (Remove plastic wrap to allow panels to climatize).

3.3 INSTALLATION

- a) Interior wood slat wall products, the solid wood panels are designed for installation in temperature conditions between 50 degrees F and 86 degrees F, in spaces where the building is enclosed, and HVAC systems are functioning and will be in continuous operation. Relative humidity should not fall below 25 percent or exceed 55 percent.

3.4 ADJUSTING AND CLEANING

- a) Replace damaged and broken panels.
- b) Clean exposed surfaces of walls panels, including trim, edge moldings, and suspension members. Comply with manufacturer's instructions for cleaning and touch up of minor finish damage.

END OF SECTION 095126

SECTION 096513 - RESILIENT BASE AND ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Thermoset rubber base.
 - 2. Vinyl molding accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of specified product.
 - 1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
 - 2. Include manufacturer's written installation instructions for each type of substrate.
- B. Samples for Initial Selection: For each type of exposed product.

1.3 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Furnish not less than **10 linear ft.** for every **500 linear ft.** or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than **50 deg F** or more than **90 deg F**.

1.5 FIELD CONDITIONS

- A. Installation Temperature Requirements: Maintain ambient temperatures within range recommended by manufacturer, but not less than **70 deg F** or more than **95 deg F**, in spaces to receive resilient products during the following periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- B. Post-Installation Temperature Requirements: After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than **55 deg F** or more than **95 deg F**.
- C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: As determined by testing identical products in accordance with ASTM E648 or ASTM E662 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 RESILIENT BASE

- A. Thermoset Rubber Base:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Mannington Mills, Inc
 - b. Roppe Corporation; Roppe Holding Company
 - c. Tarkett USA
 - 2. Classification: ASTM F1861, Type TS (rubber, vulcanized thermoset), Group I (solid, homogeneous).
 - 3. Style: Style B, Cove.
 - 4. Thickness: 0.125 inch.
 - 5. Height: 4 inches.
 - 6. Lengths: Coils in manufacturer's standard length.
 - 7. Outside Corners: Preformed.
 - 8. Inside Corners: Job formed or preformed.
 - 9. Colors: As selected by Architect from Manufacturer's full range of colors.

2.3 RESILIENT MOLDING ACCESSORIES

- A. Vinyl Molding Accessories :
 - 1. Accessory Description: Stair-tread nosing, reducer strip for carpet and resilient floor coverings, and resilient floor covering to carpet transition strips.
- B. Locations: Provide resilient molding accessories in areas where there is a transition from one flooring type to another and at stair tread nosings.
 - 1. Colors and Patterns: As selected by Architect from Manufacturer's full range of colors.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by resilient-product manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended in writing by resilient-product manufacturer for resilient products and substrate conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1. Installation of resilient products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Prepare substrates in accordance with manufacturer's written instructions to ensure adhesion of resilient products.

B. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

C. Do not install resilient products until materials are the same temperature as space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient products and installation materials into spaces where they will be installed.

D. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient products.

3.3 INSTALLATION OF RESILIENT BASE

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practical without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. Preformed Corners: Install preformed corners before installing straight pieces.

G. Job-Formed Corners:

1. Inside Corners: Use straight pieces of maximum lengths possible and form with returns not less than 3 inches in length.

- a. Cope corners to minimize open joints.

3.4 INSTALLATION OF RESILIENT MOLDING ACCESSORIES

A. Comply with manufacturer's written instructions for installing resilient molding accessories.

B. Butt resilient molding accessories to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of floor covering that would otherwise be exposed.

3.5 CLEANING

A. Comply with manufacturer's written instructions for cleaning resilient products.

B. Perform the following operations immediately after completing resilient-product installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum horizontal surfaces thoroughly.
3. Damp-mop horizontal surfaces to remove marks and soil.

3.6 PROTECTION

- A. Comply with manufacturer's written instructions for protecting resilient products.
- B. After post-installation cleaning, immediately protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- C. Cover resilient products subject to wear and foot traffic until Substantial Completion.

END OF SECTION 096513

SECTION 096519 - RESILIENT TILE AND PLANK FLOORING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Commercial luxury vinyl floor tiles.
2. Commercial luxury vinyl floor planks.

1.2 DEFINITIONS

- A. LVP: Luxury vinyl planks. A marketing term that is applied to modular resilient floor plank products.
- B. LVT: Luxury vinyl tiles. A marketing term that is applied to modular resilient floor tile products.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of specified product.

1. Include manufacturers' written data on physical characteristics, durability, and fade resistance.
2. Include manufacturers' written installation instructions for each type of substrate.

B. Samples for Initial Selection: For each type of resilient flooring product required.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of resilient flooring product type to include the following:

1. Methods for maintaining resilient flooring, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to resilient flooring.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Resilient Tile and Plank Flooring: Furnish no fewer than 1 box for each 50 boxes or fraction thereof, of each type, color, pattern, and size of resilient flooring product installed.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are competent in techniques required by manufacturer for resilient flooring installation and seaming method indicated.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturers' labels indicating brand name and directions for storing.

- B. Store resilient flooring and accessory materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than **50 deg F** or more than **90 deg F**. Store resilient flooring on flat surfaces.

1.8 FIELD CONDITIONS

- A. Environmental Limitations: Do not deliver or install resilient flooring until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- B. Do not install resilient flooring over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended in writing by resilient flooring manufacturer.
- C. Adhesively Applied Products:
 - 1. Maintain temperatures during installation within range recommended in writing by manufacturer, but not less than **70 deg F** or more than **95 deg F**, in spaces to receive flooring 48 hours before installation, during installation, and 48 hours after installation unless longer period is recommended in writing by manufacturer.
 - 2. After postinstallation period, maintain temperatures within range recommended in writing by manufacturer, but not less than **55 deg F** or more than **95 deg F**.
 - 3. Close spaces to traffic during flooring installation.
 - 4. Close spaces to traffic for 48 hours after flooring installation unless manufacturer recommends longer period in writing.

1.9 WARRANTY

- A. Special Warranty for Resilient Flooring Products: Manufacturer agrees to repair or replace components of flooring installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of flooring due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Warranty Period: 15 years minimum from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products in accordance with ASTM E648 or ASTM E662 by a qualified testing agency.
 - 1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

2.2 RESILIENT TILE AND PLANK FLOORING

- A. Commercial Luxury Vinyl Floor Tiles: Solid, resilient tile flooring product composed of binder, fillers, and pigments compounded with suitable stabilizers and processing aids; marketed as luxury vinyl tiles (LVT).
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Armstrong Flooring, Inc.
 - b. Flexco Corporation
 - c. Mannington Mills, Inc
 - d. Mohawk Group
 - e. Roppe Corporation; Roppe Holding Company
 - f. Shaw Industries Group, Inc.; Berkshire Hathaway Company; Strand 0516V is basis of design product.
 - g. Tarkett USA

2. Classification: ASTM F1700, ClassIII, Printed Film Vinyl Tile.
 - a. Type: B, Embossed Surface.
3. Overall Thickness: **0.100 inch** nominal including manufacturer's standard clear wear layer and UV-cured polyurethane topcoat.
4. Nominal Size: **12 by 24 inches ,18 by 18 inches, 24 by 24 inches, or 18 by 36 inches.**
5. Colors and Patterns: As selected by Architect from Manufacturer's full range of colors and patterns.

2.3 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds: Latex-modified, portland-cement-based or blended hydraulic-cement-based formulation provided or approved by flooring manufacturer for applications indicated.
- B. Adhesives: Water-resistant type recommended in writing by floor tile and adhesive manufacturers for substrate and conditions indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, moisture content, and other conditions affecting performance of the Work.
 1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
 1. Installation of resilient flooring products indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Prepare substrates in accordance with manufacturer's written installation instructions to ensure adhesion of flooring.
- B. Concrete Substrates: Prepare in accordance with ASTM F710.
 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by resilient flooring manufacturer. Do not use solvents.
 3. Alkalinity Testing: Perform pH testing in accordance with ASTM F710. Proceed with installation only if pH readings are not less than 7.0 and not greater than 8.5.
 4. Moisture Testing: Perform tests so that each test area does not exceed **200 sq. ft.** and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft.** in 24 hours.
 - b. Relative Humidity Test: Using in-situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
- C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.
- D. Move flooring and installation materials into spaces where they will be installed at least 48 hours in advance of installation unless manufacturer recommends a longer period in writing.

1. Do not install flooring until it is the same temperature as space where it is to be installed.

E. Sweep and vacuum clean substrates to be covered by flooring immediately before installation. After cleaning, examine substrates for moisture, alkaline salts, carbonation, and dust. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 INSTALLATION OF RESILIENT TILE AND PLANK FLOORING

A. Comply with manufacturer's written installation instructions.

B. Discard broken, cracked, chipped, or deformed tiles.

C. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles in pattern indicated.

D. Tile Matching: Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered.

1. Lay tiles in pattern of colors and sizes indicated.

E. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

F. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

H. Adhered Floor Tile: Adhere floor tiles to substrates using a full spread of adhesive applied to substrate to comply with adhesive and flooring manufacturers' written installation instructions, including those for trowel notching, adhesive mixing, and adhesive open and working times, to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING

A. Comply with manufacturer's written instructions for cleaning flooring.

B. Perform the following operations immediately after completing flooring installation:

1. Remove adhesive and other blemishes from surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

3.5 PROTECTION

A. Comply with manufacturer's written instructions for protecting flooring.

B. After post-installation cleaning, immediately protect flooring from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

C. Cover resilient flooring until Substantial Completion.

END OF SECTION 096519

SECTION 096813 - TILE CARPETING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Carpet tiles.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of specified product.

1. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include manufacturer's written installation recommendations for each type of substrate.

B. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of carpet tile.

1. Include Samples of exposed edge, transition, and other accessory stripping involving color or finish selection.

C. Samples for Verification: Actual Sample of finished products for each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: **12-inch-** long Samples.

1.3 INFORMATIONAL SUBMITTALS

A. Sample Warranties: For carpet tile.

1.4 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same production run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but no fewer than 10 full-size units.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Comply with CRI 104.

1.7 FIELD CONDITIONS

- A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.
- B. Environmental Limitations: Do not deliver or install carpet tiles until spaces are enclosed and weathertight, wet-work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at levels planned for building occupants during the remainder of the construction period.
- C. Do not install carpet tiles over concrete slabs until slabs have cured and are sufficiently dry to bond with adhesive and concrete slabs have pH range recommended in writing by carpet tile manufacturer.

1.8 WARRANTY

- A. Special Warranty for Carpet Tiles: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.
 - 1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
 - 2. Failures include, but are not limited to, the following:
 - a. More than 10 percent loss of face fiber, edge raveling, snags, and runs.
 - b. Loss of tuft-bind strength.
 - c. Excess static discharge.
 - d. Delamination.
 - e. Dimensional instability.
 - 3. Warranty Period: Lifetime Commercial warranty or 25 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILES

- A. Carpet Tile:
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. J&J Flooring Group LLC
 - b. Mannington Commercial; a business unit of Mannington Mills, Inc.
 - c. Mohawk Group
 - d. Shaw Industries Group, Inc.; Berkshire Hathaway Company; Breathe Tile is basis of design product.
 - e. Tarkett USA
 - 2. Color: As selected by Architect from manufacturer's full range. Colors are to coordinate with school colors and is to include gold along with other background colors including gray, black, or beige.
 - 3. Pattern: As selected by Architect from manufacturer's full range. Pattern is to be an abstract pattern.
 - 4. Fiber Content: 100 percent nylon.
 - 5. Pile Characteristic: Multi-level pattern loop pile.
 - 6. Density: 7579 oz./cu. yd..
 - 7. Pile Thickness: 0.76 inches for finished carpet tile.
 - 8. Stitches: 7.5 stitches per inch.
 - 9. Gauge: 1/12ends per inch.
 - 10. Primary Backing/Backcoating: Manufacturer's standard composite materials.
 - 11. Size: 24 by 24 inches.
 - 12. Applied Treatments:
 - a. Soil-Resistance Treatment: Manufacturer's standard treatment.
 - b. Antimicrobial Treatment: Manufacturer's standard treatment that protects carpet tiles as follows:

- 1) Antimicrobial Activity: Not less than 2 mm halo of inhibition for gram-positive bacteria, not less than 1 mm halo of inhibition for gram-negative bacteria, and no fungal growth, in accordance with AATCC 174.

13. Performance Characteristics:

- a. Texture Appearance Retention Rating (TARR): Heavy traffic, 3.0 minimum in accordance with ASTM D7330.
- b. Dry Breaking Strength: Not less than **100 lbf** in accordance with ASTM D2646.
- c. Dimensional Tolerance: Within **1/32 inch** of specified size dimensions, as determined by physical measurement.
- d. Colorfastness to Crocking: Not less than 4, wet and dry, in accordance with AATCC 165.
- e. Colorfastness to Light: Not less than 4 after 40 AFU (AATCC fading units) in accordance with AATCC 16.3 Option 3.
- f. Electrostatic Propensity: Less than 3.5 kV in accordance with AATCC 134.

2.2 ACCESSORIES

- A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended in writing by carpet tile manufacturer.
- B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive types to suit products and subfloor conditions indicated, that comply with flammability requirements for installed carpet tile, and that are recommended in writing by carpet tile manufacturer for releasable installation.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance.
- B. Examine carpet tile for type, color, pattern, and potential defects.
- C. Concrete Slabs: Verify that finishes comply with requirements specified in Section 033000 "Cast-in-Place Concrete" and that surfaces are free of cracks, ridges, depressions, scale, and foreign deposits.
 1. Moisture Testing: Perform tests so that each test area does not exceed **200 sq. ft.**, and perform no fewer than three tests in each installation area and with test areas evenly spaced in installation areas.
 - a. Anhydrous Calcium Chloride Test: ASTM F1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of **3 lb of water/1000 sq. ft.** in 24 hours.
 - b. Relative Humidity Test: Using in situ probes, ASTM F2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level measurement.
 - c. Perform additional moisture tests recommended in writing by adhesive and carpet tile manufacturers. Proceed with installation only after substrates pass testing.
- D. Wood Subfloors: Verify the following:
 1. Underlayment over subfloor complies with requirements specified in Section 061600 "Sheathing."
 2. Underlayment surface is free of irregularities and substances that may interfere with adhesive bond or show through surface.
- E. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. General: Comply with CRI 104 and with carpet tile manufacturer's written installation instructions for preparing substrates.

- B. Trowelable Leving and Patching Compounds: Use trowelable leveling and patching compounds in accordance with manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions **1/8 inch** wide or wider, and protrusions more than **1/32 inch** unless more stringent requirements are required by manufacturer's written instructions.
- C. Concrete Substrates: Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by adhesive and carpet tile manufacturers.
- D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION OF CARPET TILES

- A. General: Comply with CRI 104, Section 10, "Carpet Tile," and with carpet tile manufacturer's written installation instructions.
- B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.
- C. Maintain dye-lot integrity. Do not mix dye lots in same area.
- D. Maintain pile-direction patterns recommended in writing by carpet tile manufacturer.
- E. Cut and fit carpet tile to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended in writing by carpet tile manufacturer.
- F. Extend carpet tile into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- G. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on carpet tile as marked on subfloor. Use nonpermanent, nonstaining marking device.
- H. Install pattern parallel to walls and borders.

3.4 CLEANING

- A. Perform cleaning operations immediately after installing carpet tile as follows:
 - 1. Remove excess adhesive and other surface blemishes using cleaner recommended in writing by carpet tile manufacturer.
 - 2. Remove yarns that protrude from carpet tile surface.
 - 3. Vacuum carpet tile using commercial machine with face-beater element.

3.5 PROTECTION

- A. Protect installed carpet tile to comply with CRI 104, Section 13.7.
- B. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

SECTION 099124 - INTERIOR PAINTING (MPI STANDARDS)

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Surface preparation of substrates and application of the following:
 - 1. Interior paint systems.
- B. Related Requirements:
 - 1. Section 099301 "Staining and Transparent Finishing (MPI Standards)" for surface preparation and the application of wood stains and transparent finishes on interior wood substrates.

1.2 DEFINITIONS

- A. MPI Gloss Level G1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, in accordance with ASTM D523.
- B. MPI Gloss Level G2: Not more than 10 units at 60 degrees and between 10 to 35 units at 85 degrees, in accordance with ASTM D523.
- C. MPI Gloss Level G3: Between 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, in accordance with ASTM D523.
- D. MPI Gloss Level G4: Between 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, in accordance with ASTM D523.
- E. MPI Gloss Level G5: Between 35 to 70 units at 60 degrees, in accordance with ASTM D523.
- F. MPI Gloss Level G6: Between 70 to 85 units at 60 degrees, in accordance with ASTM D523.
- G. MPI Gloss Level G7: More than 85 units at 60 degrees, in accordance with ASTM D523.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
 - 2. Include preparation requirements and application instructions.
 - 3. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product.
- C. Product List: Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

- A. Furnish extra materials that match paint products applied and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint Products: 5 percent, but not less than **1 gal.** of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than **45 deg F.**
 1. Maintain containers in clean condition, free of foreign materials and residue.
 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between **50 and 95 deg F.**
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than **5 deg F** above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain each paint product from single source from single manufacturer.

2.2 INTERIOR PAINTS, GENERAL

- A. Interior Paint Systems: Subject to compliance with requirements, provide one of the products listed in the applicable interior painting schedule articles for the paint category indicated.
 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Benjamin Moore & Co.
 - b. PPG Architectural Coatings.
 - c. Sherwin-Williams Company (The)
- B. MPI Standards: Provide products complying with MPI standards indicated in applicable interior painting schedule articles and listed in the "MPI Approved Products List."
- C. Material Compatibility:
 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 2. For each coat in a paint system, products must be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- D. Colors: As selected by Architect from manufacturer's full range.
 1. Walls will be painted with deep tones.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content

and other conditions affecting performance of the Work.

- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Gypsum Board: 12 percent. Verify that finishing compound is dry and sanded smooth.
- C. Verify suitability of substrates, including surface conditions and compatibility, with finishes and primers. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: Remove loose rust, loose mill scale, loose shop primer, and other loose foreign matter. Clean using methods recommended in writing by paint manufacturer.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized Metal Substrates: Remove grease and oil residue from galvanized metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.
- G. Aluminum Substrates: Remove loose surface oxidation.

3.3 APPLICATION OF INTERIOR PAINT PRODUCTS

- A. Apply paints in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 - 1. Use applicators and techniques suited for paint and substrate indicated.
 - 2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
 - 3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
 - 4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
 - 5. Primers specified in applicable interior painting schedule articles may be omitted on items that are factory primed or factory finished if compatible with intermediate and topcoat coatings and acceptable to intermediate and topcoat paint manufacturers.
- B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

- C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

- A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.
 - 1. Touch up and restore painted surfaces damaged by testing.
 - 2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, apply additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.
 - 3. Cost of retesting is Contractor's responsibility.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 - 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 - 3. Allow empty paint cans to dry before disposal.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE, METAL SUBSTRATES

- A. Steel and Iron Substrates:
 - 1. Water-Based Light Industrial Coating System: MPI INT 5.1B.
 - a. Prime Coat: Primer, rust inhibitive, water based, MPI #107.
 - b. Intermediate Coat: Light industrial coating, interior, water based, matching topcoat.
 - c. Topcoat: Light industrial coating, interior, water based, semigloss (MPI Gloss Level G5), MPI #153.

3.7 INTERIOR PAINTING SCHEDULE, GYPSUM-BASED SUBSTRATES

- A. Gypsum Board and Plaster Substrates:
 - 1. High-Performance Architectural Latex System: MPI INT 9.2B.
 - a. Prime Coat: Primer sealer, latex, interior, MPI #50.
 - b. Intermediate Coat: Latex, interior, high-performance architectural, matching topcoat.
 - c. Topcoat: Latex, interior, high-performance architectural, (MPI Gloss Level G3), MPI #139.

END OF SECTION 099124

SECTION 099301 - STAINING AND TRANSPARENT FINISHING (MPI STANDARDS)

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Staining and transparent finishing of exterior and interior wood surfaces.

1.2 DEFINITIONS

- A. MPI Gloss Level 1: Not more than five units at 60 degrees and 10 units at 85 degrees, in accordance with ASTM D523.
- B. MPI Gloss Level 2: Not more than 10 units at 60 degrees and 10 to 35 units at 85 degrees, in accordance with ASTM D523.
- C. MPI Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, in accordance with ASTM D523.
- D. MPI Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, in accordance with ASTM D523.
- E. MPI Gloss Level 5: 35 to 70 units at 60 degrees, in accordance with ASTM D523.
- F. MPI Gloss Level 6: 70 to 85 units at 60 degrees, in accordance with ASTM D523.
- G. MPI Gloss Level 7: More than 85 units at 60 degrees, in accordance with ASTM D523.

1.3 ACTION SUBMITTALS

A. Product Data:

1. For each type of product.
2. Include preparation requirements and application instructions.
3. Include printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
4. Indicate VOC content.

B. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of product.

C. Samples for Verification: Sample for each type of finish system and in each color and gloss of finish required on representative samples of actual wood substrates.

1. Size: 8 inches (200 mm) square.
2. Apply coats on Samples in steps to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: Cross-reference to finish system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include color designations.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Extra Stock Material: Furnish extra materials, from the same product run, to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Stains and Transparent Finishes: 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.6 FIELD CONDITIONS

- A. Apply finishes only when temperature of surfaces to be finished and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).
- B. Do not apply finishes when relative humidity exceeds 85 percent, at temperatures of less than 5 deg F (3 deg C) above the dew point, or to damp or wet surfaces.
- C. Do not apply exterior finishes in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Benjamin Moore & Co.
 - 2. PPG Paints; PPG Industries, Inc.
 - 3. Sherwin-Williams Company (The).

2.2 SOURCE LIMITATIONS

- A. Source Limitations: Obtain each coating product from single source from single manufacturer.

2.3 MATERIALS, GENERAL

- A. MPI Standards: Products shall comply with MPI standards indicated and shall be listed in its "MPI Approved Products List."
- B. Material Compatibility:
 - 1. Materials for use within each coating system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
- C. Stain Colors: As selected by Architect from manufacturer's full range of standard colors.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Interior Wood Substrates: 15 percent, when measured with an electronic moisture meter.
- C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- D. Proceed with finish application only after unsatisfactory conditions have been corrected.

1. Beginning finish application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and finishing.
 1. After completing finishing operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean and prepare surfaces to be finished in accordance with manufacturer's written instructions for each substrate condition and as specified.
 1. Remove dust, dirt, oil, and grease by washing with a detergent solution; rinse thoroughly with clean water and allow to dry. Remove grade stamps and pencil marks by sanding lightly. Remove loose wood fibers by brushing.
 2. Remove mildew by scrubbing with a commercial wash formulated for mildew removal and as recommended by stain manufacturer.
- D. Interior Wood Substrates:
 1. Scrape and clean knots, and apply coat of knot sealer before applying primer.
 2. Apply wood filler paste to open-grain woods, as defined in "MPI Architectural Painting Specification Manual," to produce smooth, glasslike finish.
 3. Sand surfaces exposed to view and dust off.
 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dry.

3.3 APPLICATION

- A. Apply finishes in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual."
 1. Use applicators and techniques suited for finish and substrate indicated.
 2. Finish surfaces behind movable equipment and furniture same as similar exposed surfaces.
 3. Do not apply finishes over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
- B. Apply finishes to produce surface films without cloudiness, holidays, lap marks, brush marks, runs, ropiness, or other surface imperfections.

3.4 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
- B. After completing finish application, clean spattered surfaces. Remove spattered materials by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from finish application. Correct damage by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced finished wood surfaces.

3.5 INTERIOR WOOD -FINISH-SYSTEM SCHEDULE

- A. Semi-Transparent Wood Substrates, Doors:

1. Polyurethane Varnish over Stain System MPI INT 6.3E:
 - a. Stain Coat: Stain, semi-transparent, alkyd, for interior wood, MPI #90.
 - b. First Intermediate Coat: Polyurethane varnish matching topcoat.
 - c. Second Intermediate Coat: Polyurethane varnish matching topcoat.
 - d. Topcoat: Varnish, interior, polyurethane, oil modified, satin (MPI Gloss Level 4), MPI #57.

END OF SECTION 099301

SECTION 102113.17 - PHENOLIC-CORE TOILET COMPARTMENTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Phenolic-core toilet compartments.

1.2 COORDINATION

- A. Coordinate requirements for overhead supports, blocking, reinforcing, and other supports concealed within wall and ceiling to ensure that toilet compartments can be supported and installed as indicated.

1.3 ACTION SUBMITTALS

A. Product Data.

1. Phenolic-core toilet compartments.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for toilet compartments.

B. Shop Drawings:

1. Include plans, elevations, sections, details, and attachment details.
2. Show locations of cutouts for compartment-mounted toilet accessories.
3. Show locations of centerlines of toilet fixtures.
4. Show locations of floor drains.

- C. Samples for Initial Selection: Manufacturer's standard color sheets, showing full range of available colors for each type of toilet compartment.

1. Include Samples of hardware and accessories involving material and color selection.

- D. Delegated Design Submittals: For grab bars mounted on toilet compartment panels, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1. Include structural design calculations indicating compliance with specified structural-performance requirements.

1.4 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: For toilet compartments.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Extra Stock Materials: Furnish extra materials to Owner that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Door Hinges: One hinge(s) with associated fasteners.
2. Latch and Keeper: One latch(es) and keeper(s) with associated fasteners.
3. Door Bumper: One door bumper(s) with associated fasteners.

4. Door Pull: One door pull(s) with associated fasteners.
5. Fasteners: 10 fasteners of each size and type.

1.6 FIELD CONDITIONS

- A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements, and coordinate before fabrication.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain phenolic-core toilet compartments from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Flame-Spread Index: 75 or less.
 2. Smoke-Developed Index: 450 or less.
- B. Structural Performance: Where grab bars are mounted on toilet compartments, design panels to comply with the following requirements:
 1. Panels are able to withstand a concentrated load on grab bar of at least **250 lbf** applied at any direction and at any point, without deformation of panel.
- C. Regulatory Requirements: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1 for toilet compartments designated as accessible.

2.3 PHENOLIC-CORE TOILET COMPARTMENTS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 1. ASI Accurate Partitions
 2. ASI Global Partitions
 3. Bobrick Washroom Equipment, Inc
 4. Bradley Corporation
 5. Knickerbocker Partition Corporation
- B. Toilet-Enclosure Style: Overhead braced, privacy type.
- C. Entrance-Screen Style: Overhead braced.
- D. Door, Panel, and Pilaster Construction: Solid phenolic-core material with melamine facing on both sides fused to substrate during manufacture (not separately laminated), and with eased and polished edges. Provide minimum **3/4-inch**- thick doors and pilasters and minimum **1/2-inch**- thick panels. Provide with no-sightline system consisting of door and pilaster lapped edges on strike side of door and door and pilaster lapped edges on hinge side of door (unless continuous hinge is used).
- E. Entrance-Screen Construction: Matching panel construction.
- F. Pilaster Shoes: Formed from stainless steel sheet, not less than **0.031-inch** nominal thickness and **3 inches** high, finished to match hardware.

- G. Pilaster Sleeves (Caps): Formed from stainless steel sheet, not less than **0.031-inch** nominal thickness and **3 inches** high, finished to match hardware.
- H. Brackets (Fittings):
 - 1. Full-Height (Continuous) Type: Manufacturer's standard design, stainless steel.
- I. Phenolic Compartment Finish: One color in each room.
 - 1. Through-Color Phenolic: Manufacturer's standard solid through-color.
 - a. Color: As selected by Architect from manufacturer's full range.

2.4 HARDWARE AND ACCESSORIES

- A. Door Hardware and Accessories: Manufacturer's operating hardware and accessories. Mount with through bolts.
 - 1. Hinges: Manufacturer's stainless steel continuous, cam type that swings to a closed or partially open position, allowing emergency access by lifting door.
 - 2. Latch and Keeper: Manufacturer's standard stainless steel, surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at toilet enclosures designated as accessible.
 - 3. Coat Hook: Manufacturer's standard stainless steel combination hook and rubber-tipped bumper, sized to prevent inswinging door from hitting compartment-mounted accessories.
 - 4. Door Bumper: Manufacturer's standard stainless steel, rubber-tipped bumper at outswinging doors.
 - 5. Door Pull: Manufacturer's standard stainless steel pull at outswinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at toilet enclosures designated as accessible.
- B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.
- C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized-steel, or other rust-resistant, protective-coated steel compatible with related materials.

2.5 MATERIALS

- A. Aluminum Castings: ASTM B26/B26M.
- B. Aluminum Extrusions: **ASTM B221**.
- C. Stainless Steel Sheet: ASTM A240/A240M or ASTM A666, Type 304, stretcher-leveled standard of flatness.
- D. Stainless Steel Castings: ASTM A743/A743M.

2.6 FABRICATION

- A. Fabricate toilet compartment components to sizes indicated. Coordinate requirements and provide cutouts for through-partition toilet accessories where required for attachment of toilet accessories.
- B. Overhead-Braced Units: Manufacturer's standard corrosion-resistant supports, leveling mechanism, and anchors at pilasters and walls to suit floor and wall conditions. Provide shoes at pilasters to conceal supports and leveling mechanism.
- C. Door Size and Swings: Unless otherwise indicated, provide **24-inch-** wide, inswinging doors for standard toilet enclosures and **36-inch-** wide, outswinging doors with a minimum **32-inch-** wide, clear opening for toilet enclosures designated as accessible.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with Installer present, for compliance with requirements for fastening, support, alignment, operating clearances, and other conditions affecting performance of the Work.
 - 1. Confirm location and adequacy of blocking and supports required for installation.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.
 - 1. Maximum Clearances:
 - a. Pilasters and Panels or Screens: **1/2 inch.**
 - b. Panels or Screens and Walls: **1 inch.**
 - 2. Full-Height (Continuous) Brackets: Secure panels or screens to walls and to pilasters with full-height brackets.
 - a. Locate bracket fasteners so holes for wall anchors occur in masonry or tile joints.
 - b. Align brackets at pilasters with brackets at walls.
- B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than **1-3/4 inches** into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

3.3 ADJUSTING

- A. Hardware Adjustment: Adjust and lubricate hardware in accordance with hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors to return doors to fully closed position.

END OF SECTION 102113.17

SECTION 102800 - TOILET, BATH, AND LAUNDRY ACCESSORIES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Public-use washroom accessories.

1.2 COORDINATION

- A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.
- B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.3 ACTION SUBMITTALS

A. Product Data Submittals: For each product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
2. Include anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated.
2. Identify accessories using designations indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For manufacturer's special warranties.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For accessories to include in maintenance manuals.

1.6 WARRANTY

A. Manufacturer's Special Warranty for Mirrors: Manufacturer agrees to repair or replace mirrors that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, visible silver spoilage defects.
2. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Structural Performance: Design accessories and fasteners to comply with the following requirements:

1. Grab Bars: Installed units are able to resist 250 lbf (1112 N) concentrated load applied in any direction and at any point.

2.2 PUBLIC-USE WASHROOM ACCESSORIES

A. Source Limitations: Obtain each type of public-use washroom accessory from single source from single manufacturer.

B. Toilet Tissue (Jumbo-Roll) Dispenser:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
2. Description: One-roll unit.
3. Mounting: Surface mounted.
4. Capacity: 9- or 10-inch- (228- or 254-mm-) diameter rolls.
5. Material and Finish: Stainless Steel with matte black powder coating.
6. Lockset: Tumbler type.
7. Refill Indicator: Pierced slots at front.

C. Automatic Paper Towel (Roll) Dispenser:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
2. Description: Automatic motion-sensing mechanism with user-adjustable delay and paper towel length;.
3. Mounting: Surface mounted.
4. Minimum Capacity: 8-inch- (203-mm-) wide, 800-foot- (244-m-) long roll.
2. Material and Finish: Stainless Steel with matte black powder coating or ABS plastic, black.
3. Lockset: Tumbler type.

C. Soap Dispenser:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
2. Description: Designed for manual operation and dispensing soap in liquid or lotion form.
3. Mounting: Vertically oriented, surface mounted.
4. Capacity: 1L.
5. Materials: Stainless Steel with matte black powder coating.
6. Lockset: Tumbler type.
7. Refill Indicator: Window type.

D. Grab Bar:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
2. Mounting: Flanges with concealed fasteners.
3. Material: Stainless steel, 0.05 inch (1.3 mm) thick.
 - a. Finish: Smooth, ASTM A480/A480M with matte black powder coating on ends and slip-resistant texture in grip area.
4. OD: 1-1/2 inches (38 mm).

5. Configuration and Length: 36" and 42" as indicated on Drawings.

G. Mirror Unit:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
2. Frame: Stainless steel angle with matte black powder coating.
 - a. Corners: Manufacturer's standard.
3. Size: As indicated on Drawings.
4. Hangers: Manufacturer's standard rigid, tamper and theft resistant.

H. High-Speed Air Hand Dryer:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. ASI-American Specialties, Inc.
 - b. Bobrick Washroom Equipment, Inc.
 - c. Bradley Corporation.
2. Description: High-speed, warm-air hand dryer for rapid hand drying.
3. Mounting: Surface mounted.
 - a. Protrusion Limit: Installed unit protrudes maximum 4 inches (102 mm) from wall surface.
4. Operation: Infrared-sensor activated with timed power cutoff switch.
 - a. Average Dry Time: 15 seconds.
 - b. Automatic Shutoff: At 60 seconds.
5. Maximum Sound Level: 75 dB.
6. Cover Material and Finish: Steel, with matte black finish.
7. Electrical Requirements: 115 V, 13 A, 1500 W.

1.2 MATERIALS

- A. Stainless Steel: ASTM A240/A240M or ASTM A666, Type 304, 0.031-inch- (0.8-mm-) minimum nominal thickness unless otherwise indicated.
- B. Steel Sheet: ASTM A1008/A1008M, Designation CS (cold rolled, commercial steel), 0.036-inch- (0.9-mm-) minimum nominal thickness.
- C. Galvanized-Steel Sheet: ASTM A653/A653M, with G60 (Z180) hot-dip zinc coating.
- D. Galvanized-Steel Mounting Devices: ASTM A153/A153M, hot-dip galvanized after fabrication.
- E. Fasteners: Screws, bolts, and other devices of same material as accessory unit, unless otherwise recommended by manufacturer or specified in this Section, and tamper and theft resistant where exposed, and of stainless or galvanized steel where concealed.
- F. Chrome Plating: ASTM B456, Service Condition Number SC 2 (moderate service).
- G. Mirrors: ASTM C1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

1.3 FABRICATION

- A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.
- B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 2 - EXECUTION

2.1 INSTALLATION

- A. Install accessories in accordance with manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.
 - 1. Remove temporary labels and protective coatings.
- B. Grab Bars: Install to comply with specified structural-performance requirements.

2.2 ADJUSTING AND CLEANING

- A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.
- B. Clean and polish exposed surfaces in accordance with manufacturer's written instructions.

END OF SECTION 102800

SECTION 104413 - FIRE PROTECTION CABINETS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-protection cabinets for the following:
 - a. Portable fire extinguisher.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Show door hardware, cabinet type, trim style, and panel style. Include roughing-in dimensions and details showing recessed-, semirecessed-, or surface-mounting method and relationships of box and trim to surrounding construction.

B. Product Schedule: For fire-protection cabinets. Indicate whether recessed, semirecessed, or surface mounted. Coordinate final fire-protection cabinet schedule with fire-extinguisher schedule to ensure proper fit and function. Use same designations indicated on Drawings.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance Data: For fire-protection cabinets to include in maintenance manuals.

1.4 COORDINATION

- A. Coordinate size of fire-protection cabinets to ensure that type and capacity of fire extinguishers indicated are accommodated.
- B. Coordinate sizes and locations of fire-protection cabinets with wall depths.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain fire-protection cabinets, accessories, and fire extinguishers from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Fire-Rated Fire-Protection Cabinets: Listed and labeled to comply with requirements in ASTM E814 for fire-resistance rating of walls where they are installed.

2.3 FIRE-PROTECTION CABINET

- 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. Babcock-Davis
2. Guardian Fire Equipment, Inc
3. JL Industries; Activar Construction Products Group, Inc.
4. Larsen's Manufacturing Company
5. MOON American, Inc.
6. Nystrom, Inc.
7. Potter Roemer LLC; a Division of Morris Group International

B. Fire-Protection Cabinet Type: Suitable for fire extinguisher.

C. Cabinet Construction: Nonrated.

D. Cabinet Material: Cold-rolled steel sheet.

E. Semirecessed Cabinet: One-piece combination trim and perimeter door frame overlapping surrounding wall surface, with exposed trim face and wall return at outer edge (backbend).

1. Square-Edge Trim: ~~1-1/4-~~ to 1-1/2-inch backbend depth.

F. Cabinet Trim Material: Steel sheet.

G. Door Material: Brass sheet.

H. Door Style: Vertical duo panel with frame.

I. Door Glazing: Acrylic sheet.

1. Acrylic Sheet Color:
 - a. Clear transparent acrylic sheet.

J. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

1. Provide manufacturer's standard.
2. Provide manufacturer's standard hinge, permitting door to open 180 degrees.

K. Accessories:

1. Identification: Lettering complying with authorities having jurisdiction for letter style, size, spacing, and location. Locate as indicated.
 - a. Identify fire extinguisher in fire-protection cabinet with the words " FIRE EXTINGUISHER."
 - 1) Location: Applied to cabinet door.
 - 2) Application Process: Pressure-sensitive vinyl letters.
 - 3) Lettering Color: Red.
 - 4) Orientation: Vertical.

L. Materials:

1. Cold-Rolled Steel: ASTM A1008/A1008M, Commercial Steel (CS), Type B.
 - a. Finish: Baked enamel, TGIC polyester powder coat, HAA polyester powder coat, epoxy powder coat, or polyester/epoxy hybrid powder coat, complying with AAMA 2603.
 - b. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - c. Color: As selected by Architect from manufacturer's full range.
2. Copper Alloy, Brass: ASTM B36/B36M alloy as standard with manufacturer.
 - a. Finish: Satin.

2. Transparent Acrylic Sheet: ASTM D4802, Category A-1 (cell-cast sheet), 6 mm thick, with Finish 1 (smooth or polished).

2.4 FABRICATION

- A. Fire-Protection Cabinets: Provide manufacturer's standard box (tub) with trim, frame, door, and hardware to suit cabinet type, trim style, and door style indicated.
 1. Weld joints and grind smooth.
 2. Miter corners and grind smooth.
 3. Provide factory-drilled mounting holes.
 4. Prepare doors and frames to receive locks.
- B. Cabinet Doors: Fabricate doors according to manufacturer's standards, from materials indicated and coordinated with cabinet types and trim styles.
 1. Fabricate door frames with tubular stiles and rails and hollow-metal design, minimum **1/2 inch** thick.
 2. Miter and weld perimeter door frames and grind smooth.
- C. Cabinet Trim: Fabricate cabinet trim in one piece with corners mitered, welded, and ground smooth.

2.5 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's AMP 500, "Metal Finishes Manual for Architectural and Metal Products," for recommendations for applying and designating finishes.
- B. Protect mechanical finishes on exposed surfaces of fire-protection cabinets from damage by applying a strippable, temporary protective covering before shipping.
- C. Finish fire-protection cabinets after assembly.
- D. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine walls and partitions for suitable framing depth and blocking where semirecessed cabinets will be installed.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare recesses for semirecessed fire-protection cabinets as required by type and size of cabinet and trim style.

3.3 INSTALLATION OF FIRE-PROTECTION CABINETS

- A. General: Install fire-protection cabinets in locations and at mounting heights indicated or, if not indicated, at height indicated below:
 1. Fire-Protection Cabinet Mounting Height: **42 inches** above finished floor to top of fire extinguisher.
- B. Fire-Protection Cabinets: Fasten cabinets to structure, square and plumb.

1. Fasten mounting brackets to inside surface of fire-protection cabinets, square and plumb.

C. Identification:

1. Apply vinyl lettering at locations indicated.

3.4 ADJUSTING AND CLEANING

- A. Remove temporary protective coverings and strippable films, if any, as fire-protection cabinets are installed unless otherwise indicated in manufacturer's written installation instructions.
- B. Adjust fire-protection cabinet doors to operate easily without binding. Verify that integral locking devices operate properly.
- C. On completion of fire-protection cabinet installation, clean interior and exterior surfaces as recommended by manufacturer.
- D. Touch up marred finishes, or replace fire-protection cabinets that cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by fire-protection cabinet and mounting bracket manufacturers.
- E. Replace fire-protection cabinets that have been damaged or have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 104413

SECTION 123623.13 - PLASTIC-LAMINATE-CLAD COUNTERTOPS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Plastic-laminate-clad countertops.
 - 2. Accessories.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Shop Drawings:
 - 1. Plans, sections, details, edge and backsplash profiles, and attachments to other work.
 - 2. Locations and details of joints.
 - 3. Locations and sizes of cutouts and holes for items installed in countertop.
- C. Samples for Initial Selection: Plastic laminates in each type, color, pattern, and surface finish required in manufacturer's standard size.

1.3 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.
- B. Installer Qualifications: Fabricator of products.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver countertops only after casework and supports on which they will be installed have been completed in installation areas.
- B. Store countertops in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.
- C. Keep surfaces of countertops covered with protective covering during handling and installation.

1.5 FIELD CONDITIONS

- A. Environmental Limitations with Humidity Control: Do not deliver or install countertops until building is enclosed, wet-work is complete, and HVAC system is operating and maintaining temperature between **60 and 90 deg F** and relative humidity between 25 and 55 percent during the remainder of the construction period.
- B. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-CLAD COUNTERTOPS

- A. Quality Standard: Unless otherwise indicated, comply with ANSI/AWI 1236 for grades of plastic-laminate-clad countertops indicated for construction, finishes, installation, and other requirements.
 - 1. The Contract Documents contain requirements that are more stringent than that of the referenced quality standard. Comply with requirements of the Contract Documents in addition to those of referenced quality standard.
- B. Grade: Custom.
- C. High-Pressure Decorative Laminate: ISO 4586-3, Grade HGS.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Formica Corporation
 - b. Nevamar Company, LLC
 - c. Pionite; a Panolam Industries International, Inc. brand
 - d. Wilsonart LLC
- D. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:
 - 1. As selected by Architect from manufacturer's full range in the following categories:
 - a. Solid colors, matte finish.
 - b. Wood grains, matte finish with grain running parallel to length of countertop.
 - c. Patterns, matte finish.
- E. Edge Treatment: Same as laminate cladding on horizontal surfaces.
- F. Core Material at Sinks: veneer-core plywood made with Type II adhesive.
- G. Core Thickness: **3/4 inch**.
 - 1. Build up countertop thickness to thickness as indicated on the drawings at front, back, and ends with additional layers of core material laminated to top.
- H. Paper Backing: Provide paper backing on underside of countertop substrate.

2.2 WOOD MATERIALS

- A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.

2.3 MISCELLANEOUS MATERIALS

- A. Adhesive for Bonding Plastic Laminate: Type I, waterproof type as selected by fabricator to comply with requirements.
 - 1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces.
- B. Installation Adhesive: Manufacturer's standard product that is recommended for application indicated.

2.4 FABRICATION

- A. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of **1 inch** over base

cabinets. Ease edges to radius indicated for the following:

1. Solid-Wood (Lumber) Members: **1/16 inch** unless otherwise indicated.
- B. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.
- C. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates to receive countertops and conditions under which countertops will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of countertops.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.
- B. Examine shop-fabricated work for completion and complete work as required, including removal of packing.

3.3 INSTALLATION OF PLASTIC-LAMINATE-CLAD COUNTERTOPS

- A. Grade: Install countertops to comply with same grade as item to be installed.
- B. Assemble countertops and complete fabrication at Project site to extent that it was not completed in the shop.
 1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately, and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.
- C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where indicated on Shop Drawings.
 1. Secure field joints in countertops with concealed clamping devices located within **6 inches** of front and back edges and at intervals not exceeding **24 inches**. Tighten in accordance with manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.
- D. Countertop Installation:
 1. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.
 2. Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 3. Anchor wall cleating necessary for proper setting for countertops not supported by casework.
 4. Install countertops level and true in line. Use concealed shims as required to maintain not more than **1/8-inch-in-96-inch** variation from a straight, level plane.
 5. Secure backsplashes to walls with adhesive.
 6. Seal joints between countertop and backsplash, if any, and joints where countertop and backsplash abut walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.4 ADJUSTING AND CLEANING

- A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects. Where impossible to repair, replace countertops. Adjust joinery for uniform appearance.
- B. Clean countertops on exposed and semiexposed surfaces.
- C. Protection: Provide kraft paper or other suitable covering over countertop surfaces, taped to underside of countertop at a minimum of **48 inches** o.c. Remove protection at Substantial Completion.

END OF SECTION 123623.13

SECTION 144200 - WHEELCHAIR LIFTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Vertical platform lifts.

1.2 DEFINITIONS

- A. Definitions in ASME A18.1 apply to Work of this Section.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components, and finishes for lifts.
2. Include rated capacities, operating characteristics, electrical characteristics, safety features, controls, finishes, and accessories.

B. Shop Drawings: For each lift.

1. Include plans, elevations, sections, attachment details, and required clearances.
2. Indicate dimensions, weights, loads, and points of load to building structure.
3. Include details of equipment assemblies, method of field assembly, components, and location and size of each field connection.
4. Include diagrams for power, signal, and control wiring.

C. Samples for Initial Selection: For surfaces and components with factory-applied color finishes.

1. Include Samples of integrally colored materials and accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer and Installer.

B. Sample Warranty: For special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For each type of lift to include in operation and maintenance manuals.

1. In addition to items specified in Section 017823 "Operation and Maintenance Data," include the following:

- a. Parts list with sources indicated.
- b. Recommended parts inventory list.

B. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted use of lifts.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An authorized representative who is trained and approved by manufacturer.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of lifts that fail in materials or workmanship within specified warranty period.
 - 1. Warranty Period: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Accessibility Standard: Comply with applicable provisions in the USDOJ's "2010 ADA Standards for Accessible Design" and ICC A117.1.
- B. Regulatory Requirements: Comply with ASME A18.1, "Safety Standard for Platform Lifts and Stairway Chairlifts."

2.2 VERTICAL PLATFORM LIFT

- A. Vertical Platform Lifts: Preengineered lift system.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Ascension, Division of AGM Container Controls, Inc.
 - b. Garaventa Lift; Genesis Opal is basis of design product.
 - c. Savaria
- B. Number of Stops: Two.
- C. Platform Size: 42 by 60 inches.
- D. Door Operation and Clear Opening Width: Low-energy, power-operated doors that remain open for 20 seconds minimum; end door with minimum 32-inch and side door with minimum 42-inch clear opening width.
- E. Rated Speed: 17 fpm.
- F. Power Supply: Hydraulic.
 - 1. Electrical Characteristics: Coordinate with Manufacturer and Electrical Drawings.
- G. Emergency Operation: Provide manual operation to raise or lower unit to a landing in case of malfunction or power loss.
- H. Self-Supporting Unit: Support vertical loads of unit only at base, with lateral support only at landing levels.
- I. Platform:
 - 1. Steel sheet or galvanized-steel sheet with matte or primed finish suitable to accept flooring.
- J. Platform Low-Profile Carriage: Fabricate platform floor assembly to a total thickness not exceeding 1-1/2 inches.
- K. Platform Enclosure and Door:
 - 1. Rectangular steel-tube frame with flush steel-sheet panels.

- L. Ramp: Retractable ramp matching platform to provide transition from lower floor to lift platform. Ramp lowers to floor automatically when lifts reach lower landing and door opens. Ramp rises automatically when lift control is activated for lift to leave lower landing.
1. Ramp Size: End ramps a minimum of **32 inches** and side ramps a minimum of **42 inches** wide; length as required for slope.
 2. Ramp Slope: Maximum 1:12.
 3. Ramp Finish: Finish ramps to match lift platform.

2.3 MATERIALS

- A. Steel Plates, Shapes, and Bars: ASTM A36/A36M.
- B. Steel Tubing: ASTM A500/A500M.
- C. Steel Pipe: ASTM A53/A53M; standard weight (Schedule 40) unless otherwise indicated or required by loads.
- D. Steel Sheet: ASTM A1008/A1008M, cold-rolled commercial steel (CS) or ASTM A1011/A1011M hot-rolled, commercial steel (CS); as required for each use.
- E. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing structural members, guide rails, machines, and other lift components where installation of devices is specified in another Section.
- F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C1107/C1107M. Provide grout specifically recommended by manufacturer for interior and exterior applications.

2.4 FASTENERS

- A. Post-Installed Anchors: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01, ICC-ES AC19,3 ICC-ES AC58, or ICC-ES AC308 as appropriate for the substrate.
1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B633 or ASTM F1941 (ASTM F1941M), Class Fe/Zn 5, unless otherwise indicated.
- B. Power-Actuated Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.

2.5 GENERAL FINISH REQUIREMENTS

- A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.6 FINISHES

- A. Steel Factory Finish:
1. Baked-Enamel or Powder-Coat Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat with a minimum dry film thickness of **1 mil** for topcoat.
 2. Color and Gloss: As selected by Architect from manufacturer's full range.
- B. Stainless-Steel Finishes:
1. Floor Plate Finish: Mill.

2. Grab Rail Finish: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, critical dimensions, and other conditions affecting performance of the Work.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Comply with ASME A18.1 and manufacturer's written instructions for installation of lifts unless otherwise indicated.
- B. Secure lifts to building construction as follows unless otherwise indicated:
 1. For concrete anchorage, use post-installed anchors.
 2. For steel-framed partitions, use hanger or lag bolts set into wood backing between studs. Coordinate with stud installation to locate backing members.
 3. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.
 4. For steel-framed partitions, use toggle bolts installed through flanges of steel framing or through concealed steel reinforcements.
- C. Wiring Method: Conceal conductors and cables within housings of units or building construction. Do not install conduit exposed to view in finished spaces. Bundle, lace, and route conductors to terminal points with no excess and without exceeding manufacturer's limitations on bending radii.
- D. Coordinate runway doors with platform travel and positioning, for accurate alignment and minimum clearance between platforms, runway doors, sills, and door frames.
- E. Position sills accurately and fill space under sills solidly with nonshrink, nonmetallic grout.
- F. Coordinate platform doors with platform travel and positioning.
- G. Adjust stops for accurate stopping and leveling at each landing, within required tolerances.
 1. Leveling Tolerance: **1/4 inch** up or down, regardless of load and direction of travel.
- H. Adjust retractable ramps to meet maximum allowable slope and change-in-elevation requirements, and to lie fully against landing surfaces.
- I. Lubricate operating parts of lift, including drive mechanism, guide rails, hinges, safety devices, and hardware.
- J. Test safety devices and verify smoothness of required protective enclosures and other surfaces.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of lift installation and before permitting use of lifts, perform acceptance tests as required and recommended by ASME A18.1 and authorities having jurisdiction.
- B. Operating Test: In addition to acceptance testing, load lifts to rated capacity and operate continuously for 30 minutes between lowest and highest landings served. Readjust stops, signal equipment, and other devices for accurate stopping and operation of system.

- C. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times tests are to be performed on lifts.

3.4 MAINTENANCE SERVICE

- A. Initial Maintenance Service: Beginning at Substantial Completion, maintenance service shall include three months' full maintenance by skilled employees of lift Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper lift operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain lifts. Include a review of emergency systems and emergency procedures to be followed at time of operational failure and other building emergencies.
- B. Check operation of lifts with Owner's personnel present and before date of Substantial Completion. Determine that operating systems and devices are functioning properly.
- C. Check operation of lifts with Owner's personnel present not more than one month before end of warranty period. Determine that operating systems and devices are functioning properly.

END OF SECTION 144200

SECTION 220100 -BASIC MECHANICAL MATERIALS AND METHODS FOR PLUMBING AND HVAC

PART - 1 GENERAL

1.01 RELATED DOCUMENTS

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

1.02 SUMMARY

- A. This Section includes the following:
 - 1. Piping materials and installation instructions common to most piping systems
 - 2. Dielectric fittings
 - 3. Flexible connectors
 - 4. Sleeves
 - 5. Escutcheons
 - 6. Grout
 - 7. Mechanical demolition
 - 8. Equipment installation requirements common to equipment sections
 - 9. Painting and finishing
 - 10. Concrete bases
 - 11. Supports and anchorages
 - 12. Access panels

1.03 DEFINITIONS

- A. Finished Spaces: Spaces other than mechanical and electrical equipment rooms, furred spaces, pipe and duct shafts, unheated spaces immediately below roof, spaces above ceilings, unexcavated spaces, crawlspaces, and tunnels.
- B. Exposed, Interior Installations: Exposed to view indoors. Examples include finished occupied spaces and mechanical equipment rooms.
- C. Exposed, Exterior Installations: Exposed to view outdoors or subject to outdoor ambient temperatures and weather conditions. Examples include rooftop locations.
- D. Concealed, Interior Installations: Concealed from view and protected from physical contact by building occupants. Examples include above ceilings and in duct shafts.
- E. Concealed, Exterior Installations: Concealed from view and protected from weather conditions and physical contact by building occupants but subject to outdoor ambient temperatures. Examples include installations within unheated shelters.
- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- H. "Provide": Except as otherwise defined in greater detail, the term "provide" means furnish and install, complete in every respect and ready for the intended use, as applicable in each instance.
- I. "Inspect": The term "inspect" or "inspection: when used to describe observation of the Contractor's Work by the Engineer shall mean an endeavor to guard the Owner against defects and deficiencies in the Work and to determine, in general, if the Work is being performed in a manner such that, when completed, it will be in accordance with the Contract Documents.
- J. Wiring: the term "wiring" shall include providing raceway, conductors, and cable in accordance with the requirements of Division 26.
- K. The following are industry abbreviations for plastic materials:
 - 1. ABS: Acrylonitrile-butadiene-styrene plastic.
 - 2. PVC: Polyvinyl chloride plastic.
- L. The following are industry abbreviations for rubber materials:

1. EPDM: Ethylene-propylene-diene terpolymer rubber.
2. NBR: Acrylonitrile-butadiene rubber.

1.04 SUBMITTALS

- A. Product Data: For the following:
 1. Dielectric fittings.
 2. Escutcheons.
- B. Shop Drawings: Detail fabrication and installation for metal supports and anchorage for mechanical materials and equipment.

1.05 QUALITY ASSURANCE

- A. Steel Support Welding: Qualify processes and operators according to AWS D1.1, "Structural Welding Code--Steel."
- B. Equipment Selection: Equipment of higher electrical characteristics, capacities, and ratings may be furnished provided such proposed equipment is approved in writing and connecting mechanical and electrical services, circuit breakers, conduit, motors, bases, and equipment spaces are appropriately modified. The Contractor will be responsible for any added costs for such modifications. If minimum energy ratings or efficiencies of equipment are specified, equipment must meet design and commissioning requirements.
- C. Drawings: The Mechanical Drawings show the general arrangement of piping, equipment, and appurtenances, and shall be followed as closely as actual building construction and the work of other trades will permit. The Mechanical work shall conform to the requirements shown on all the Drawings. Because of the small scale of the Mechanical Drawings, it is not possible to indicate all offsets, fittings, and accessories which may be required. The Contractor shall investigate the structural and finish conditions and other building components affecting the work and shall arrange his work accordingly, providing such offsets, fittings, and accessories as may be required to meet such conditions. No extras will be approved for required additional offsets and fittings. Any offsets or additional fittings required to coordinate mechanical systems with existing conditions and other trades, or that are necessary for the complete installation of the system, including modifications to shop or off-site fabricated piping and/or ductwork, all shall be provided by the Contractor at no additional cost to the Owner.
- D. Codes and Standards: comply with the following codes. Comply with the latest edition except where indicated otherwise or a specific edition is required by the authority having jurisdiction:
 1. International Building Code
 2. International Mechanical Code
 3. International Plumbing Code with Louisiana Amendments
 4. Louisiana State Energy Code
 5. NFPA 70, 72, 90A, 90B, 96, and 101
 6. All applicable local codes

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver pipes and tubes with factory-applied end caps. Maintain end caps through shipping, storage, and handling to prevent pipe end damage and prevent entrance of dirt, debris, and moisture.
- B. Protect stored pipes and tubes from moisture and dirt. Elevate above grade. Do not exceed structural capacity of floor, if stored inside.
- C. Protect flanges, fittings, and piping specialties from moisture and dirt.

1.07 COORDINATION

- A. Coordinate mechanical equipment installation with other building components and existing conditions.
- B. Arrange for pipe spaces, chases, slots, and openings in building structure during progress of construction to allow for mechanical installations.

- C. Coordinate installation of required supporting devices and set sleeves in poured-in-place concrete and other structural components, as they are constructed.
- D. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the Work. Coordinate installation of large equipment requiring positioning before closing in building.
- E. Coordinate connection of mechanical systems with exterior underground utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Costs for all utility connections shall be the Contractor's responsibility, including any connections made by the utility company.
- F. Coordinate requirements for access panels and doors if mechanical items requiring access are concealed behind finished surfaces.
- G. Coordinate installation of identifying devices after completing covering and painting, if devices are applied to surfaces. Install identifying devices before installing acoustical ceilings and other concealment.

PART - 2 PRODUCTS

2.01 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by firms regularly engaged in the manufacture of products required, whose products have been in satisfactory use in similar service.

2.02 PIPE, TUBE, AND FITTINGS

- A. Refer to individual Division 23 Piping Sections and "Pipe and Fitting Material Schedule" on the Drawings for pipe, tube, and fitting materials and joining methods.
- B. Pipe Threads: ASME B1.20.1 for factory-threaded pipe and pipe fittings.

2.03 JOINING MATERIALS

- A. Refer to individual Division 23 Piping Sections and "Pipe and Fitting Material Schedule" on the Drawings for special joining materials not listed below.
- B. Pipe-Flange Gasket Materials: Suitable for chemical and thermal conditions of piping system contents.
 - 1. ASME B16.21, nonmetallic, flat, asbestos-free, 1/8-inch (3.2-mm) maximum thickness unless thickness or specific material is indicated.
 - a. Full-Face Type: For flat-face, Class 125, cast-iron and cast-bronze flanges.
 - b. Narrow-Face Type: For raised-face, Class 250, cast-iron and steel flanges.
 - 2. AWWA C110, rubber, flat face, 1/8 inch (3.2 mm) thick, unless otherwise indicated; and full-face or ring type, unless otherwise indicated.
- C. Flange Bolts and Nuts: ASME B18.2.1, carbon steel, unless otherwise indicated.
- D. Plastic, Pipe-Flange Gasket, Bolts, and Nuts: Type and material recommended by piping system manufacturer, unless otherwise indicated.
- E. Solder Filler Metals: ASTM B 32, lead-free alloys. Include water-flushable flux according to ASTM B 813.
- F. Brazing Filler Metals: AWS A5.8, BAg1, silver alloy.
- G. Welding Filler Metals: Comply with AWS D10.12 for welding materials appropriate for wall thickness and chemical analysis of steel pipe being welded.
- H. Solvent Cements for Joining Plastic Piping:
 - 1. ABS Piping: ASTM D 2235.
 - 2. PVC Piping: ASTM D 2564. Include primer according to ASTM F 656.
 - 3. PVC to ABS Piping Transition: ASTM D 3138.
- I. Fiberglass Pipe Adhesive: As furnished or recommended by pipe manufacturer.

2.04 DIELECTRIC FITTINGS

- A. Description: Combination fitting of copper alloy and ferrous materials with threaded, flanged, solder-joint, plain, or weld-neck end connections that match piping system materials and isolate joined dissimilar metals to prevent galvanic action and stop corrosion.
- B. Insulating Material: Suitable for system fluid, pressure, and temperature.
- C. Dielectric Nipples: Electroplated steel nipple with inert and noncorrosive, thermoplastic lining; plain, threaded, or grooved ends; and 300-psig (2070-kPa) minimum working pressure at 225 degrees F (107 degrees C).

2.05 SLEEVES

- A. Galvanized-Steel Sheet: 0.0239-inch (0.6-mm) minimum thickness; round tube closed with welded longitudinal joint.
- B. Steel Pipe: ASTM A 53, Type E, Grade B, Schedule 40, galvanized, plain ends.

2.06 ESCUTCHEONS

- A. Description: Manufactured wall and ceiling escutcheons and floor plates, with an ID to closely fit around pipe, tube, and insulation of insulated piping and an OD that completely covers opening.
- B. One-Piece, Deep-Pattern Type: Deep-drawn, box-shaped brass with polished chrome-plated finish.
- C. One-Piece, Cast-Brass Type: With set screw.
 - 1. Finish: Polished chrome-plated.
- D. Split-Plate, Stamped-Steel Type: With concealed hinge, spring clips, and chrome-plated finish.
- E. Split-Casting, Floor-Plate Type: Cast brass with concealed hinge and set screw.

2.07 GROUT

- A. Description: ASTM C 1107, Grade B, nonshrink and nonmetallic, dry hydraulic-cement grout.
 - 1. Characteristics: Post-hardening, volume-adjusting, nonstaining, noncorrosive, nongaseous, and recommended for interior and exterior applications.
 - 2. Design Mix: 5000-psi (34.5-MPa), 28-day compressive strength.
 - 3. Packaging: Premixed and factory packaged.

2.08 ACCESS PANELS

- A. Access Panels (Toilet and Bath Rooms): Flush stainless steel, 180 degrees door with concealed hinges, key-actuated lock, frame and flexible anchor straps.
- B. Access Panels: (Elsewhere): Flush metal hinged access panel and frame (type as required for surface encountered), prime coat finish, and key actuated cylinder lock.
- C. Access Panels: Minimum size 12 inch x 12 inch. Locate over device to be serviced.

PART - 3 EXECUTION

3.01 MECHANICAL DEMOLITION

- A. Refer to Division 1 Sections, "Cutting and Patching" and "Selective Demolition" for general demolition requirements and procedures.
- B. Disconnect, demolish, and remove mechanical systems, equipment, and components indicated to be removed.
 - 1. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - 2. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.

- C. If pipe, insulation, or equipment to remain is damaged in appearance or is unserviceable, remove damaged or unserviceable portions and replace with new products of equal capacity and quality.

3.02 PIPING SYSTEMS - COMMON REQUIREMENTS

- A. Install piping according to the following requirements and Division 22 Sections specifying piping systems.
- B. Install components with pressure rating equal to or greater than system operating pressure.
- C. Install piping at right angles or parallel to building walls. Diagonal runs are prohibited, unless otherwise indicated.
- D. Install piping tight to slabs, beams, joists, columns, walls, and other building elements. Allow sufficient space above removable ceiling panels to allow for ceiling panel removal.
- E. Locate groups of pipes parallel to each other, spaced to permit valve servicing.
- F. Install couplings according to manufacturer's written instructions.
- G. 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.
- H. Install piping in concealed locations, unless otherwise indicated and except in equipment rooms and service areas.
- I. Install all buried water piping, regardless of content, a minimum of 12 inches below and 12 inches laterally from any buried electrical line. Whether in conduit or direct buried cable, this requirement shall apply regardless of voltage of the electrical line.
- J. Install piping above accessible ceilings to allow sufficient space for ceiling panel removal.
- K. Install piping to permit valve servicing.
- L. Install piping at indicated slopes.
- M. Install piping free of sags and bends.
- N. Install fittings for changes in direction and branch connections.
- O. Pulled-tee, extruded-tee, thread-o-let, weld-o-let, and mitered elbow connections are not acceptable, unless specifically indicated otherwise. Provide manufactured tee and elbow fittings.
- P. Install tees with removable threaded cleanout plugs at each change in direction in all condensate drain piping.
- Q. Select system components with pressure rating equal to or greater than system operating pressure.
- R. Install escutcheons for penetrations of walls, ceilings, and floors according to the following:
 - 1. New Piping:
 - a. Piping with Fitting or Sleeve Protruding from Wall: One-piece, deep-pattern type.
 - b. Chrome-Plated Piping: Cast-brass type with chrome-plated finish, split-casing for existing piping, and one-piece for new piping.
 - c. Insulated and Bare Piping: Split-plate, stamped-steel type with concealed hinge and spring clips.
 - d. Bare Piping at Floor Penetrations in Equipment Rooms: Split-casting, floor-plate type.
- S. Sleeves are not required for core-drilled holes.
- T. Permanent sleeves are not required for holes formed by removable PE sleeves.
- U. Install sleeves for pipes passing through concrete and masonry walls, gypsum-board partitions, and concrete floor and roof slabs.
 - 1. Cut sleeves to length for mounting flush with both surfaces.
 - a. Exception: Extend sleeves installed in floors of mechanical equipment areas or other wet areas 2 inches (50 mm) above finished floor level.
 - 2. Install sleeves in new walls and slabs as new walls and slabs are constructed.
 - 3. Install sleeves that are large enough to provide 1/4-inch (6.4-mm) annular clear space between sleeve and pipe or pipe insulation. Use the following sleeve materials:
 - a. Steel Pipe Sleeves: For pipes smaller than NPS 6 (DN 150).
 - b. Steel Sheet Sleeves: For pipes NPS 6 (DN 150) and larger, penetrating interior walls.
 - c. Stack Sleeve Fittings: For pipes penetrating floors with membrane waterproofing. Secure flashing between clamping flanges. Install section of cast-iron soil pipe to extend sleeve to 2 inches (50 mm) above finished floor level. Refer to Division 7 Section, "Sheet Metal Flashing and Trim" for flashing.
 - 1) Seal space outside of sleeve fittings with grout.
 - 4. Seal annular space between sleeve and pipe or pipe insulation, using joint sealants appropriate for size, depth, and location of joint. Refer to Division 7 Section "Joint Sealants" for materials and installation.
- V. Fire-Barrier Penetrations: Maintain indicated fire rating of walls, partitions, ceilings, and floors at pipe penetrations. Seal pipe penetrations with firestop materials. Refer to Division 7 Section, "Through-Penetration Firestop Systems" for materials.

- W. Verify final equipment locations for roughing-in.

3.03 PIPING JOINT CONSTRUCTION

- A. Join pipe and fittings according to the following requirements, Division 22 Sections, and Schedules on the Drawings, specifying piping systems.
- B. Ream ends of pipes and tubes and remove burrs. Bevel plain ends of steel pipe.
- C. Remove scale, slag, dirt, and debris from inside and outside of pipe and fittings before assembly.
- D. Soldered Joints: Apply ASTM B 813, water-flushable flux, unless otherwise indicated, to tube end. Construct joints according to ASTM B 828 or CDA's "Copper Tube Handbook," using lead-free solder alloy complying with ASTM B 32.
- E. Brazed Joints: Construct joints according to AWS's "Brazing Handbook," "Pipe and Tube" Chapter, using copper-phosphorus brazing filler metal complying with AWS A5.8.
- F. Threaded Joints: Thread pipe with tapered pipe threads according to ASME B1.20.1. Cut threads full and clean using sharp dies. Ream threaded pipe ends to remove burrs and restore full ID. Join pipe fittings and valves as follows:
 - 1. Apply appropriate tape or thread compound to external pipe threads unless dry seal threading is specified.
 - 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.
- G. Welded Joints: Construct joints according to AWS D10.12, using qualified processes and welding operators according to Part 1 "Quality Assurance" Article.
- H. Flanged Joints: Select appropriate gasket material, size, type, and thickness for service application. Install gasket concentrically positioned. Use suitable lubricants on bolt threads.
- I. Plastic Piping Solvent-Cement Joints: Clean and dry joining surfaces. Join pipe and fittings according to the following:
 - 1. Comply with ASTM F 402 for safe-handling practice of cleaners, primers, and solvent cements.
 - 2. ABS Piping: Join according to ASTM D 2235 and ASTM D 2661 Appendixes.
 - 3. PVC Pressure Piping: Join schedule number ASTM D 1785, PVC pipe and PVC socket fittings according to ASTM D 2672. Join other-than-schedule-number PVC pipe and socket fittings according to ASTM D 2855.
 - 4. PVC Nonpressure Piping: Join according to ASTM D 2855.
 - 5. PVC to ABS Nonpressure Transition Fittings: Join according to ASTM D 3138 Appendix.
- J. Plastic Pressure Piping Gasketed Joints: Join according to ASTM D 3139.
- K. Plastic Non-Pressure Piping Gasketed Joints: Join according to ASTM D 3212.

3.04 PIPING CONNECTIONS

- A. Make connections according to the following, unless otherwise indicated:
 - 1. Install unions, in piping NPS 2 (DN 50) and smaller, adjacent to each valve and at final connection to each piece of equipment.
 - 2. Install flanges, in piping NPS 2-1/2 (DN 65) and larger, adjacent to flanged valves and at final connection to each piece of equipment.
 - 3. Dry Piping Systems: Install dielectric unions and flanges to connect piping materials of dissimilar metals.
 - 4. Wet Piping Systems: Install dielectric coupling and nipple fittings to connect piping materials of dissimilar metals.

3.05 EQUIPMENT INSTALLATION - COMMON REQUIREMENTS

- A. Manufacturer's Installation and Operating Instructions: All equipment and material shall be installed and operated in strict accord with manufacturer's "Installation and Operating Instructions." The manufacturer's installation instructions shall become part of this Specification, and shall take precedence over and/or supplement any Specification herein and as shown and/or described on plans. All individual items of equipment and components thereof shall be 100 percent accessible for repair, removal, or replacement without functional impairment or dismantling of any adjoining major surfaces or assemblies.
- B. Install equipment to allow maximum possible headroom unless specific mounting heights are not indicated.
- C. Install equipment level and plumb, parallel and perpendicular to other building systems and components in exposed interior spaces, unless otherwise indicated.

- D. Install mechanical equipment to facilitate service, maintenance, and repair or replacement of components. Connect equipment for ease of disconnecting, with minimum interference to other installations. Extend grease fittings to accessible locations.
- E. Install equipment to allow right of way for piping installed at required slope.
- F. Cut and drill floors, roofs, walls, partitions, ceilings, and other surfaces as required to permit installation of mechanical piping, ducts, and equipment. Perform cutting by skilled mechanics of trades involved.
- G. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Install new fireproofing where existing firestopping has been disturbed. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.
- H. Electrical Work: Wherever equipment requiring electrical power connection is specified, all wiring shall be furnished and installed under Division 26 of the Specifications. Starting switches, protective devices, and other means for the operation and control of equipment shall be furnished under the various Division 2 Sections, and installed and electrically connected complete under Division 26 unless otherwise specifically noted, except that control devices that are installed in or on ducts, piping, or mechanical equipment shall be mounted under Divisions 22. If equipment is furnished requiring power wiring different from that indicated on the Electrical Drawings, the Contractor furnishing the equipment shall be responsible for any required revisions and pay any additional costs connected therewith. Wiring revisions shall be submitted to the Architect for approval prior to installation.
 - 1. Contractors furnishing items to be wired shall provide adequate wiring diagrams.
 - 2. Temperature control wiring shall be furnished and installed in raceway under Division 23 according to the requirements of Division 26, specifically Section, "Conductors and Cables," and Section, "Raceways and Boxes."

3.06 PAINTING

- A. Touching Up: 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.
 - 1. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).
- B. Touching Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9 Section, "Painting."
- C. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

3.07 ERECTION OF METAL SUPPORTS AND ANCHORAGES

- A. Refer to Division 5 Section, "Metal Fabrications" for structural steel.
- B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor mechanical materials and equipment.
- C. Field Welding: Comply with AWS D1.1.

3.08 ERECTION OF WOOD SUPPORTS AND ANCHORAGES

- A. Cut, fit, and place wood grounds, nailers, blocking, and anchorages to support, and anchor mechanical materials and equipment.
- B. Select fastener sizes that will not penetrate members if opposite side will be exposed to view or will receive finish materials. Tighten connections between members. Install fasteners without splitting wood members.
- C. Attach to substrates as required to support applied loads.

3.09 MISCELLANEOUS

- A. Access Panels: Provide access panels as indicated. In addition, provide access panels for each concealed item requiring service or adjustment that would otherwise be inaccessible whether shown or not. Access panel locations shown on

drawings are approximate. Exact location shall be verified with the Architect prior to installation. Deliver access panels to trade responsible for finish surfaces in which access panels are to be installed.

END OF SECTION 220100

SECTION 220500 - HANGERS AND SUPPORTS FOR PLUMBING AND HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes hangers and supports for mechanical system piping and equipment.

1.3 DEFINITIONS

- A. MSS: Manufacturers Standardization Society for the Valve and Fittings Industry.
- B. Terminology: As defined in MSS SP-90, "Guidelines on Terminology for Pipe Hangers and Supports."

1.4 SUBMITTALS

- A. Product Data: For each type of pipe hanger, channel support system component, and thermal-hanger shield insert indicated.
- B. Welding Certificates: Copies of certificates for welding procedures and operators.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify processes and operators according to ASME Boiler and Pressure Vessel Code: Section IX, "Welding and Brazing Qualifications."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Firms regularly engaged in manufacture of supports and hangers, of types and sizes required, whose products have been in satisfactory use in similar service.

2.2 MANUFACTURED UNITS

- A. Pipe Hangers, Supports, and Components: MSS SP-58, factory-fabricated components. Refer to "Hanger and Support Applications" Article in Part 3 for where to use specific hanger and support types.
 - 1. Nonmetallic Coatings: On hangers for electrolytic protection where hangers are in direct contact with copper tubing.

2.3 MISCELLANEOUS MATERIALS

- A. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.
- B. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.

PART 3 - EXECUTION

3.1 HANGER AND SUPPORT APPLICATIONS

- A. Specific hanger requirements are specified in Sections specifying equipment and systems.
- B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Specification Sections.
- C. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
- D. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of noninsulated or insulated stationary pipes, NPS 1/2 to NPS 30 (DN15 to DN750).
- E. Vertical-Piping Clamps: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
 - 1. Extension Pipe or Riser Clamps (MSS Type 8): For support of pipe risers, NPS 3/4 to NPS 20 (DN20 to DN500).
 - 2. Carbon- or Alloy-Steel Riser Clamps (MSS Type 42): For support of pipe risers, NPS 3/4 to NPS 20 (DN20 to DN500), if longer ends are required for riser clamps.
- F. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
 - 1. Steel Turnbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
 - 2. Steel Clevises (MSS Type 14): For 120 to 450 degrees F (49 to 232 degrees C) piping installations.
 - 3. Malleable-Iron Sockets (MSS Type 16): For attaching hanger rods to various types of building attachments.
- G. Building Attachments: Except as otherwise indicated, provide factory-fabricated building attachments complying with ANSI/MSS SP-58, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods.
- H. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:
- I. Protection Shields (MSS Type 40): Of length recommended by manufacturer to prevent crushing insulation.
- J. Thermal-Hanger Shield Inserts:
 - 1. Description: 100 psig (690 kPa) minimum, compressive-strength insulation insert encased in sheet metal shield.
 - 2. Insulation-Insert Material for Cold Piping: ASTM C 552, Type II cellular glass with vapor barrier.
 - 3. Insulation-Insert Material for Hot Piping: ASTM C 552, Type II cellular glass.
 - 4. For Hangers and Clamped Systems: Insert and shield shall cover entire circumference of pipe.
 - 5. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

3.2 HANGER AND SUPPORT INSTALLATION

- A. Pipe Hanger and Support Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure. All hangers for equipment and piping are to be supported from building structure even if structural enhancements to roof support is required.
- B. Install building attachments within concrete slabs or attach to structural steel. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional attachments at concentrated loads, including valves, flanges, guides, strainers, and expansion joints, and at changes in direction of piping.
- C. Install mechanical-anchor fasteners in concrete after concrete is placed and completely cured. Install fasteners according to manufacturer's written instructions.
- D. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

- E. 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.
- F. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.
- G. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping," is not exceeded.
- H. Do not use wire or perforated metal to support piping, and do not support piping from other piping.
- I. Support vertical piping at each floor and roof.
- J. Insulated Piping: Comply with the following:
 - 1. All hangers and supports shall be external of insulation.
 - 2. Install MSS SP-58, Type 40 protective shields on all insulated piping. Shields shall span arc of 180 degrees.
 - 3. Shield Dimensions for Pipe: Not less than the following:
 - a. NPS 1/4 to NPS 3-1/2 (DN8 to DN90): 12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.
 - b. NPS 4 (DN100): 12 inches (305 mm) long and 0.06 inch (1.52 mm) thick.
 - c. NPS 5 and NPS 6 (DN125 and DN150): 18 inches (457 mm) long and 0.06 inch (1.52 mm) thick.
 - d. NPS 8 to NPS 14 (DN200 to DN350): 24 inches (610 mm) long and 0.075 inch (1.91 mm) thick.

3.3 EQUIPMENT SUPPORTS

- A. Fabricate structural-steel stands to suspend equipment from structure above or to support equipment above floor.

3.4 METAL FABRICATION

- A. Cut, drill, and fit miscellaneous metal fabrications for heavy-duty steel trapezes and equipment supports.
- B. Field Welding: Comply with AWS D1.1 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 contours of welded surfaces match adjacent contours.
- C. Any vertical structural members required to form overhead attachments for hangers or equipment supports shall be located adjacent to walls and any horizontal members be adjacent to the roof structure.

3.5 ADJUSTING

- A. Hanger Adjustment: Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

3.6 PAINTING

- A. Touching Up: Cleaning and touchup painting of field welds, bolted connections, and abraded areas of shop paint on miscellaneous metal are specified in Division 9 Sections.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint.

END OF SECTION 220500

SECTION 220553 - MECHANICAL IDENTIFICATION FOR PLUMBING AND HVAC EQUIPMENT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes mechanical identification materials and devices.

1.3 SUBMITTALS

- A. Product Data: For identification materials and devices.
- B. Samples: Of color, lettering style, and graphic representation required for each identification material and device.

1.4 QUALITY ASSURANCE

- A. Comply with ASME A13.1, "Scheme for the Identification of Piping Systems" for lettering size, length of color field, colors, and viewing angles of identification devices.

1.5 SEQUENCING AND SCHEDULING

- A. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.

PART 2 - PRODUCTS

2.1 IDENTIFYING DEVICES AND LABELS

- A. General: Products specified are for applications referenced in other Division 22 Sections. If more than single type is specified for listed applications, selection is Installer's option.
- B. Equipment Nameplates: Metal permanently fastened to equipment with data engraved or stamped.
 - 1. Data: Manufacturer, product name, model number, serial number, capacity, operating and power characteristics, labels of tested compliances, and essential data.
 - 2. Location: Accessible and visible.
- C. Snap-On Plastic Pipe Markers: Manufacturer's standard preprinted, semirigid, snap-on type. Include color-coding according to ASME A13.1, unless otherwise indicated.
- D. Pipes with OD, Including Insulation, Less Than 6 Inches (150 mm): Full-band pipe markers, extending 360 degrees around pipe at each location.
- E. Pipes with OD, Including Insulation, 6 Inches (150 mm) and Larger: Either full-band or strip-type pipe markers, at least 3 times letter height and of length required for label.

- F. Lettering: Manufacturer's standard preprinted captions as selected by Engineer.
1. Arrows: Either integrally with piping system service lettering, to accommodate both directions, or as separate unit, on each pipe marker to indicate direction of flow.
- G. Plastic Tape: Manufacturer's standard color-coded, pressure-sensitive, self-adhesive, vinyl tape, at least 3 mils (0.08 mm) thick.
1. Width: 1-1/2 inches (40 mm) on pipes with OD, including insulation, less than 6 inches (150 mm); 2-1/2 inches (65 mm) for larger pipes.
 2. Color: Comply with ASME A13.1, unless otherwise indicated.
- H. Engraved Plastic-Laminate Signs: ASTM D 709, Type I, cellulose, paper-base, phenolic-resin-laminate engraving stock; Grade ES-2, black surface, black phenolic core, with white melamine subcore, unless otherwise indicated. Fabricate in sizes required for message. Provide holes for mechanical fastening.
1. Engraving: Engraver's standard letter style, of sizes and with terms to match equipment identification.
 2. Thickness: 1/16 inch (2 mm), for units up to 20 sq. in. (130 sq. cm) or 8 inches (200 mm) in length, and 1/8 inch (3 mm) for larger units.
 3. Fasteners: Self-tapping, stainless-steel screws or contact-type, permanent adhesive.
- I. Plastic Equipment Markers: Manufacturer's standard laminated plastic, in the following color codes:
1. Green: Cooling equipment and components.
 2. Yellow: Heating equipment and components.
 3. Brown: Energy reclamation equipment and components.
 4. Blue: Equipment and components that do not meet criteria above.
 5. Hazardous Equipment: Use colors and designs recommended by ASME A13.1.
 6. Terminology: Match schedules as closely as possible. Include the following:
 - a. Name and plan number.
 - b. Equipment service.
 - c. Design capacity.
 - d. Other design parameters such as pressure drop, entering and leaving conditions, and speed.
 7. Size: 2-1/2 by 4 inches (65 by 100 mm) for control devices and valves; 4-1/2 by 6 inches (115 by 150 mm) for equipment.
- J. Lettering and Graphics: Coordinate names, abbreviations, and other designations used in mechanical identification with corresponding designations indicated. Use numbers, letters, and terms indicated for proper identification, operation, and maintenance of mechanical systems and equipment.
1. Multiple Systems: Identify individual system number and service if multiple systems of same name are indicated.

PART 3 - EXECUTION

3.1 LABELING AND IDENTIFYING PIPING SYSTEMS

- A. Install pipe markers on each system. Include arrows showing normal direction of flow.
- B. Marker Type: Plastic markers, with application systems.
- C. Fasten markers on pipes and insulated pipes smaller than 6 inches (150 mm) OD by one of following methods:
1. Snap-on application of pre-tensioned, semi-rigid plastic pipe marker.
- D. Fasten markers on pipes and insulated pipes 6 inches (150 mm) in diameter and larger by one of following methods:

1. Laminated or bonded application of pipe marker to pipe or insulation.
 2. Taped to pipe or insulation with color-coded plastic adhesive tape, not less than 1-1/2 inches (40 mm) wide, lapped a minimum of 3 inches (75 mm) at both ends of pipe marker, and covering full circumference of pipe.
 3. Strapped to pipe or insulation with manufacturer's standard stainless-steel bands.
- E. Locate pipe markers and color bands where piping is exposed; machine rooms; accessible maintenance spaces such as shafts, tunnels, and plenums; and exterior nonconcealed locations according to the following:
1. Near each valve and control device.
 2. Near each branch connection, excluding short takeoffs. Mark each pipe at branch, where flow pattern is not obvious.
 3. Near penetrations through walls, floors, ceilings, or nonaccessible 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 a maximum of 50-foot (15-meters) intervals along each run. Reduce intervals to 25 feet (7.5 meters) in areas of congested piping and equipment.

3.2 EQUIPMENT SIGNS AND MARKERS

- A. Install engraved plastic-laminate signs or equipment markers on or near each major item of mechanical equipment. Include signs for the following general categories of equipment:
1. Fans

3.3 ADJUSTING AND CLEANING

- A. Relocate mechanical identification materials and devices that have become visually blocked by work of this or other Divisions.
- B. Clean faces of identification devices and glass frames of valve charts.

END OF SECTION 220553

SECTION 220719 - PIPE INSULATION FOR PLUMBING AND HVAC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes preformed, rigid and flexible pipe insulation; insulating cements; field-applied jackets; accessories and attachments; and sealing compounds.
- B. Related Sections include the following:
 - 1. Division 23 Section, "Duct Insulation" for insulation for ducts and plenums.
 - 2. Division 22 Section, "Hangers and Supports" for pipe insulation shields and protection saddles.

1.3 SUBMITTALS

- A. Product Data: Identify thermal conductivity, thickness, and jackets, for each type of product indicated.
- B. Installer Certificates: Signed by the Contractor certifying that installers comply with requirements.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Skilled mechanics who have successfully completed an apprenticeship program or another craft training program certified by the U.S. Department of Labor, Bureau of Apprenticeship and Training.
- B. Fire-Test-Response Characteristics: As determined by testing materials identical to those specified in this Section according to ASTM E 84, by a testing and inspecting agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and sealer and cement material containers with appropriate markings of applicable testing and inspecting agency.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Packaging: Ship insulation materials in containers marked by manufacturer with appropriate ASTM specification designation, type and grade, and maximum use temperature.

1.6 COORDINATION

- A. Coordinate size and location of supports, hangers, and insulation shields specified in Division 22 Section, "Hangers and Supports for Plumbing and HVAC."
- B. Coordinate clearance requirements with piping Installer for insulation application.
- C. Coordinate installation and testing of steam or electric heat tracing.

1.7 SCHEDULING

- A. Schedule insulation application after testing piping systems. Insulation application may begin on segments of piping that have satisfactory test results.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, manufacturers regularly engaged in the manufacture of piping insulation products of the types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

2.2 INSULATION MATERIALS

- A. Mineral-Fiber Insulation: Glass fibers bonded with a thermosetting resin complying with the following:
 - 1. Preformed Pipe Insulation: Comply with ASTM C 547, Type 1, with factory-applied, all-purpose, vapor-retarder jacket.
 - 2. Blanket Insulation: Comply with ASTM C 553, Type II, without facing.
 - 3. Fire-Resistant Adhesive: Comply with MIL-A-3316C in the following classes and grades.
 - a. Class 1, Grade A for bonding glass cloth and tape to unfaced glass-fiber insulation, for sealing edges of glass-fiber insulation, and for bonding lagging cloth to unfaced glass-fiber insulation.
 - b. Class 2, Grade A for bonding glass-fiber insulation to metal surfaces.
 - 4. Vapor-Retarder Mastics: Fire- and water-resistant, vapor-retarder mastic for indoor applications. Comply with MIL-C-19565C, Type II.
 - 5. Mineral-Fiber Insulating Cements: Comply with ASTM C 195.
 - 6. Mineral-Fiber, Hydraulic-Setting Insulating and Finishing Cement: Comply with ASTM C 449/C 449M.
- B. Flexible Elastomeric Thermal Insulation: Closed-cell, sponge- or expanded-rubber materials. Comply with ASTM C 534, Type I for tubular materials and Type II for sheet materials.
 - 1. Adhesive: As recommended by insulation material manufacturer.
 - 2. Ultraviolet-Protective Coating: As recommended by insulation manufacturer.

2.3 FIELD-APPLIED JACKETS

- A. PVC Jacket: High-impact, ultraviolet-resistant PVC; 20 mils (0.5 mm) thick; pre-curved ready for shop or field cutting and installing.
 - 1. Adhesive: As recommended by insulation material manufacturer.
 - 2. PVC Jacket Color: White or gray.
- B. Standard PVC Fitting Covers: Factory-fabricated fitting covers manufactured from 20-mil- (0.5 mm-) thick, high-impact, ultraviolet-resistant PVC.
 - 1. Shapes: 45 and 90 degree, short- and long-radius elbows, tees, valves, flanges, reducers, end caps, soil-pipe hubs, traps, mechanical joints, and P-trap and supply covers for lavatories for the disabled.
 - 2. Adhesive: As recommended by insulation material manufacturer.

2.4 ACCESSORIES AND ATTACHMENTS

- A. Glass Cloth and Tape: Comply with MIL-C-20079H, Type I for cloth and Type II for tape. Woven glass-fiber fabrics, plain weave, pre-sized a minimum of 8 oz./sq. yd. (270 g/sq. m).

1. Tape Width: 4 inches (100 mm).
- B. Bands: 3/4 inch (19 mm) wide, in one of the following materials compatible with jacket:
 1. Stainless Steel: ASTM A 666, Type 304; 0.020 inch (0.5 mm) thick.
- C. Wire: 0.080 inch (2.0 mm), nickel-copper alloy; 0.062 inch (1.6 mm), soft-annealed, stainless steel; or 0.062 inch (1.6 mm), soft-annealed, galvanized steel.

2.5 VAPOR RETARDERS

- A. Mastics: Materials recommended by insulation material manufacturer that are compatible with insulation materials, jackets, and substrates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions for compliance with requirements for installation and other conditions affecting performance of insulation application.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Preparation: Clean and dry pipe and fitting surfaces. Remove materials that will adversely affect insulation application.

3.3 GENERAL APPLICATION REQUIREMENTS

- A. Apply insulation materials, accessories, and finishes according to the manufacturer's written instructions; with smooth, straight, and even surfaces; free of voids throughout the length of piping, including fittings, valves, and specialties.
- B. Refer to schedules at the end of this Section for materials, forms, jackets, and thicknesses required for each piping system.
- C. Use accessories compatible with insulation materials and suitable for the service. Use accessories that do not corrode, soften, or otherwise attack insulation or jacket in either wet or dry state.
- D. Apply insulation with longitudinal seams at top and bottom of horizontal pipe runs.
- E. Do not weld brackets, clips, or other attachment devices to piping, fittings, and specialties.
- F. Seal joints and seams with vapor-retarder mastic.
- G. Keep insulation materials dry during application and finishing.
- H. Apply insulation with tight longitudinal seams and end joints. Bond seams and joints with adhesive recommended by the insulation material manufacturer.
- I. Apply insulation with the least number of joints practical.
- J. Apply insulation over fittings, valves, and specialties, with continuous thermal and vapor-retarder integrity, unless otherwise indicated. Refer to special instructions for applying insulation over fittings, valves, and specialties.

- K. Hangers and Anchors: Where vapor retarder is indicated, seal penetrations in insulation at hangers, supports, anchors, and other projections with vapor-retarder mastic.
1. Apply insulation continuously through hangers and around anchor attachments.
 2. Install insert materials and apply insulation to tightly join the insert. Seal insulation to insulation inserts with adhesive or sealing compound recommended by the insulation material manufacturer.
 3. Cover inserts with jacket material matching adjacent pipe insulation. Install shields over jacket, arranged to protect the jacket from tear or puncture by the hanger, support, and shield.
- L. Insulation Terminations: For insulation application where vapor retarders are indicated, taper insulation ends. Seal tapered ends with a compound recommended by the insulation material manufacturer to maintain vapor retarder.
- M. Apply adhesives and mastics at the manufacturer's recommended coverage rate.
- N. Apply insulation with integral jackets as follows:
1. Pull jacket tight and smooth.
 2. Circumferential Joints: Cover with 3 inch- (75 mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip and spaced 4 inches (100 mm) o.c.
 3. Longitudinal Seams: Overlap jacket seams at least 1-1/2 inches (40 mm). Apply 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 4 inches (100 mm) o.c.
 - a. Exception: Do not staple longitudinal laps on insulation having a vapor retarder.
 4. Vapor-Retarder Mastics: Where vapor retarders are indicated, apply mastic on seams and joints and at ends adjacent to flanges, unions, valves, and fittings.
 5. At penetrations in jackets for thermometers and pressure gages, fill and seal voids with vapor-retarder mastic.
- O. Interior Wall and Partition Penetrations: Apply insulation continuously through walls and floors.
- P. Fire-Rated Wall and Partition Penetrations: Apply insulation continuously through penetrations of fire-rated walls and partitions.

3.4 MINERAL-FIBER INSULATION APPLICATION

- A. Apply insulation to straight pipes and tubes as follows:
1. Secure each layer of preformed pipe insulation to pipe with wire, tape, or bands without deforming insulation materials.
 2. Where vapor retarders are indicated, seal longitudinal seams and end joints with vapor-retarder mastic. Apply vapor retarder to ends of insulation at intervals of 15 to 20 feet (4.5 to 6 m) to form a vapor retarder between pipe insulation segments.
 3. For insulation with factory-applied jackets with vapor retarders, do not staple longitudinal tabs but secure tabs with additional adhesive as recommended by the insulation material manufacturer and seal with vapor-retarder mastic.
- B. Apply insulation to flanges as follows:
1. Apply preformed pipe insulation to outer diameter of pipe flange.
 2. Make width of insulation segment the same as overall width of the flange and bolts, plus twice the thickness of the 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. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.
- C. Apply insulation to fittings and elbows as follows:
1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.

2. When premolded insulation elbows and fittings are not available, apply mitered sections of pipe insulation, to a thickness equal to adjoining pipe insulation. Secure insulation materials with wire, tape, or bands.
3. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

D. Apply insulation to valves and specialties as follows:

1. Apply premolded insulation sections of the same material as straight segments of pipe insulation when available. Secure according to manufacturer's written instructions.
2. When premolded insulation sections are not available, apply glass-fiber blanket insulation to valve body to thickness equal to adjoining pipe insulation. Arrange insulation to permit access to packing and to allow valve operation without disturbing insulation. For check valves, arrange insulation for access to stainer basket without disturbing insulation.
3. Apply insulation to flanges as specified for flange insulation application.
4. Apply canvas jacket material with manufacturer's recommended adhesive, overlapping seams at least 1 inch (25 mm), and seal joints with vapor-retarder mastic.

3.5 FLEXIBLE ELASTOMERIC THERMAL INSULATION APPLICATION

A. Apply insulation to straight pipes and tubes as follows:

1. Follow manufacturer's written instructions for applying insulation.
2. Seal longitudinal seams and end joints with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

B. Apply insulation to fittings and elbows as follows:

1. Apply mitered sections of pipe insulation.
2. Secure insulation materials and seal seams with manufacturer's recommended adhesive. Cement to avoid openings in insulation that will allow passage of air to the pipe surface.

3.6 FIELD-APPLIED JACKET APPLICATION

- A. Apply PVC jacket over all piping, fittings, valves, flanges, etc. located in equipment rooms and mechanical rooms, up to an elevation of 6'-0" above the finished floor of the space. Apply with 1 inch (25 mm) overlap at longitudinal seams and end joints. Seal with manufacturers' recommended adhesive.

3.7 PIPING SYSTEM APPLICATIONS

- A. Insulation materials and thicknesses are specified in schedules at the end of this Section.

B. Items Not Insulated: Unless otherwise indicated, do not apply insulation to the following systems, materials, and equipment:

1. Flexible connectors.
2. Vibration-control devices.

3.8 FIELD QUALITY CONTROL

- A. Insulation applications will be considered defective if sample inspection reveals noncompliance with requirements. Remove defective Work and replace with new materials according to these Specifications.
- B. Reinstall insulation and covers on fittings and valves if required to be uncovered for inspection according to these Specifications.

3.9 INSULATION APPLICATION SCHEDULE, GENERAL

- A. Refer to insulation application schedules for required insulation materials, vapor retarders, and field-applied jackets.

- B. Application schedules identify piping system and indicate pipe size ranges and material, thickness, and jacket requirements.

3.10 INTERIOR INSULATION APPLICATION SCHEDULE

- A. This application schedule is for interior insulation inside both the main building and the equipment building on the roof.

- B. Service: Domestic cold water.

1. Operating Temperature: 35 to 60 deg F (2 to 15 deg C).
2. Insulation Material: Mineral fiber.
3. Insulation Thickness: Apply the following insulation thicknesses:
 - a. Copper Pipe, 1 Inch and Smaller: 1/2 inch.
 - b. Copper Pipe, 1-1/4 Inches and Larger: 1 inch.
4. Field-Applied Jacket: PVC for exposed piping in Equipment Rooms.
5. Vapor Retarder Required: Yes.
6. Finish: None.

- C. Service: Domestic hot water and hot water return.

1. Operating Temperature: 60 to 140 deg F (15 to 60 deg C).
2. Insulation Material: Mineral fiber.
3. Insulation Thickness: Apply the following thicknesses:
 - a. Runouts up to 2 Inches and less than 12 Foot length: 1/2 inch.
 - b. 2 Inches size and less: 1 inch.
 - c. 2-1/2 Inches size and larger: 1-1/2 inches.
4. Field-Applied Jacket: PVC for exposed piping in Mechanical Rooms.
5. Vapor Retarder Required: No.
6. Finish: None.

- D. Heating-water supply and return.

1. Operating Temperature: 60 to 140 degrees F (15 to 60 degrees C).
2. Insulation Material: Mineral fiber.
3. Insulation Thickness: Apply the following insulation thicknesses:
 - a. Steel Pipe; 2 Inches and Smaller: 1 inch.
 - b. Steel Pipe; 3 Inches and Larger: 1-1/2 inch.
4. Field-Applied Jacket: PVC for exposed piping.
5. Vapor Retarder Required: Yes.
6. Finish: None.

- E. Service: Exposed sanitary drains and domestic water supplies and stops for fixtures for the disable.

1. Insulate and jacket with factory insulation and white PVC jacket kit conforming to ADA and equivalent to Truebro "Handi Lav-Guard", McGuire Manufacturing Co. "ProWrap", or approved equivalent.

END OF SECTION 220719

SECTION 221116 - DOMESTIC WATER PIPING SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Extent of domestic water piping systems work is indicated on the Drawings and schedules and by requirements of this Section.
- B. Applications for domestic water piping systems include the following:
 - 1. Domestic cold-water piping.
 - 2. Domestic hot-water piping.
- C. Refer to appropriate Division 22 and 23 Sections for insulation required in connection with domestic water piping; not work of this Section.
- D. Trenching and backfill required in conjunction with exterior water piping is specified in applicable Division 2 Sections and is included as work of this Section.

1.3 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of domestic water piping systems products, of types, materials, and sizes required, whose products have been in satisfactory use in similar service.
- B. Plumbing Code Compliance: Comply with applicable portions of governing Plumbing Code pertaining to plumbing materials, construction, and installation of products.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's data for domestic water piping systems, materials, and products.

PART 2 - PRODUCTS

2.1 DOMESTIC WATER PIPING MATERIALS AND PRODUCTS

- A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated and scheduled. Where not indicated or scheduled, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in domestic water piping systems. Where more than one type of material or product is indicated, selection is Installer's option.

2.2 BASIC IDENTIFICATION

- A. General: Provide identification complying with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC," in accordance with the following listing:

1. Water Service: Underground-type plastic line markers.

2.3 BASIC PIPE, TUBE, AND FITTINGS

- A. General: Provide pipe, tube, and fittings complying with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC," in accordance with the schedule on the Drawings.

2.4 BASIC HANGERS AND SUPPORTS

- A. General: Provide hangers and supports complying with Division 22 Section, "Hangers and Supports for Plumbing and HVAC."

2.5 BASIC VALVES

- A. Ball Valves – 2 Inches (DN50) and Smaller: MSS SP-110, Class 150, 600 psi (4140 kPa) CWP, ASTM B 584 bronze body and bonnet, 2-piece construction; chrome-plated brass ball, standard port for 1/2 inch (DN15) valves and smaller and conventional port for 3/4 inch (DN20) valves and larger; blowout proof; bronze or brass stem; teflon seats and seals; threaded end connections.
 1. Operator: Vinyl-covered steel lever handle.
 2. Manufacturers: Subject to compliance with requirements, provide products by one of the following or approved equivalent:
 - a. Milwaukee, BA100.
 - b. Appollo, #70-100.
 - c. Hammond, #8501.
 - d. Nibco, #585.

2.6 TRAP SEAL PRIMER VALVES

- A. Supply-Type Trap Seal Primer Valves: ASSE 1018, water-supply-fed type, with the following characteristics. Provide where a trap primer is required by code or is shown on the Drawings.
 1. Manufacturers:
 - a. Precision Plumbing Products, Inc.
 2. 125-psig (860-kPa) minimum working pressure.
 3. Bronze body with atmospheric-vented drain chamber.
 4. Inlet and Outlet Connections: NPS 1/2 (DN 15) threaded, union, or solder joint.
 5. Gravity Drain Outlet Connection: NPS 1/2 (DN 15) threaded or solder joint.
 6. Finish: Chrome plated, or rough bronze for units used with pipe or tube that is not chrome finished.

2.7 WATER HAMMER ARRESTERS

- A. General: ASSE 1010 or PDI-WH 201, piston type with pressurized metal-tube cushioning chamber. Sizes indicated are based on ASSE 1010, Sizes AA and A through F or PDI-WH 201, Sizes A through F.
 1. Manufacturers:
 - a. Josam Co.
 - b. Precision Plumbing Products, Inc.
 - c. Sioux Chief Manufacturing Co., Inc.
 - d. Zurn Industries, Inc.; Wilkins Div.

PART 3 - EXECUTION

3.1 EXCAVATION

- A. Excavating, trenching, and backfilling are specified in Division 2 Section, "Earthwork."

3.2 INSTALLATION OF DOMESTIC WATER PIPING

- A. General: Install water distribution piping in accordance with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC Systems."

3.3 INSTALLATION OF PIPING SPECIALTIES

- A. Water Hammer Arresters: Install in upright position, in locations and of sizes in accordance with PDI Standard WH-201, and elsewhere as indicated.
- B. Trap Seal Primer Valves: Install trap seal primer valves with outlet pitched down toward drain tap a minimum of 1 percent and connect to floor drain, trap or inlet fitting. Adjust valve for proper flow.
- C. Install wood blocking reinforcement for wall mounting and recessed type plumbing specialties.
- D. Install individual ball type shutoff valve in water supply to trap seal primer valve and install minimum 12 inches x 12 inches access panel over valve and trap primer.

3.4 INSTALLATION OF HANGERS AND SUPPORTS

- A. Install hangers and supports in accordance with Division 22 Section, "Hangers and Supports."

3.5 EQUIPMENT CONNECTIONS

- A. Piping Runouts to Fixtures: Provide hot and cold water piping runouts to fixtures of sizes indicated, but in no case smaller than required by governing Plumbing Code.

3.6 FIELD QUALITY CONTROL

- A. Test water and hot water piping throughout hydrostatically at 150 p.s.i.g. (four hours).
- B. Repair or replace domestic water piping as required to eliminate leaks and retest as specified to demonstrate compliance.
- C. Sterilization: Sterilize all water lines in strict accordance with State Board of Health requirements. After flushing out, obtain approval of water sample analysis from State Board of Health and submit to Architect.

END OF SECTION 221116

SECTION 221316 - SOIL, WASTE, AND VENT PIPING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Extent of soil, waste, and vent piping system work is indicated on Drawings and Schedules, and by requirements of this Section.
- B. Trenching and backfilling required in conjunction with underground drain piping is specified in applicable Division 2 Sections and is included as work of this Section.

1.3 QUALITY ASSURANCE

- A. Manufacturers: Firms regularly engaged in manufacture of piping products of types, materials, and sizes required, whose products have been in satisfactory use in similar service.
- B. Plumbing Code Compliance: Comply with applicable portions of governing Plumbing Code pertaining to plumbing materials, construction, and installation of products.
- C. ANSI Compliance: Comply with applicable American National Standards pertaining to products and installation of soil, waste, and vent piping systems.
- D. PDI Compliance: Comply with applicable Plumbing and Drainage Institute Standards pertaining to products and installation of soil, waste, and vent piping systems.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's data for soil, waste, and vent piping systems materials and products.

PART 2 - PRODUCTS

2.1 SOIL, WASTE AND VENT PIPING MATERIALS AND PRODUCTS

- A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in soil, waste, and vent piping systems. Where more than one type of materials or product is indicated, selection is Installer's option.

2.2 BASIC PIPE, TUBE AND FITTINGS

- A. General: Provide pipe, tube, and fittings complying with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC," in accordance with the Schedule on the Drawings.

2.3 BASIC HANGERS AND SUPPORTS

- A. General: Provide hangers and supports complying with Division 22 Section, "Hangers and Supports for Plumbing and HVAC."

2.4 DRAINAGE PIPING PRODUCTS

- A. General: Provide factory-fabricated drainage piping products of size and type indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements and governing regulations.
- B. Cleanout Plugs: Cast-bronze or brass, threaded, countersunk head.
- C. Floor Cleanouts: Cast-iron body and frame; cleanout plug; adjustable round top as follows:
 - 1. Nickel-Bronze Top: Manufacturers standard cast unit of the pattern indicated:
 - a. Pattern: Exposed rim type, with recess to receive 1/8 inch thick resilient floor finish where applicable.
 - b. Pattern: Exposed rim type, with recess to receive 1 inch thick terrazzo floor finish where applicable.
 - c. Pattern: Exposed flush type, standard non-slip scored or abrasive finish.
 - d. Carpet Marker: Include approximately 1-1/4 inches diameter carpet marker for cleanouts that occur in carpeted areas.
- D. Wall Cleanouts: Cast-iron body adaptable to pipe with cast-bronze or brass cleanout plug; stainless steel cover including screws.
- E. Flashing: As approved by metal roof manufacturer.

PART 3 - EXECUTION

3.1 INSTALLATION OF SOIL, WASTE AND VENT ABOVE GROUND PIPING

- A. General: Install soil, waste, and vent piping in accordance with Division 22 Section, "Basic Mechanical Materials and Methods for Plumbing and HVAC," and with governing Plumbing Code.
- B. Flashing: Flash all vent penetrations through roofs as approved by roof manufacturer. Offset vents where necessary to provide 2 feet – 0 inches minimum clearance from other flashing such as outside walls, curbs, etc. All flashing shall be as approved by roofing manufacturer.

3.2 INSTALLATION OF BUILDING DRAIN PIPING

- A. General: Install underground building drains as indicated and in accordance with governing Plumbing Code. Lay underground building drains beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install required gaskets in accordance with manufacturer's recommendations for use of lubricants, cements, and other special installation requirements. Clean interior of piping of dirt and other superfluous material as work progresses. Maintain swab or drag-in-line and pull past each joint as it is completed. Place plugs in ends of uncompleted piping at end of day or whenever work stops.
- B. Install soil, waste and vent piping pitched to drain at minimum slope of 1/4 inch per foot (2 percent) for piping 3 inches and smaller, and 1/8 inch per foot (1 percent) for piping 4 inches and larger.

3.3 INSTALLATION OF HANGERS AND SUPPORTS

- A. Install hangers and supports in accordance with Division 22 Section, "Hangers and Supports for Plumbing and HVAC."

3.4 INSTALLATION OF DRAINAGE PIPING PRODUCTS.

- A. Inside cleanouts shall be brought up flush with floors and provided with cleanout covers or in wall with wall cleanout cover.

3.5 EQUIPMENT CONNECTIONS

- A. Piping Runouts to Fixtures: Provide soil and waste piping runouts to equipment, plumbing fixtures, and drains with approved trap of sizes indicated; but in no case smaller than required by governing Plumbing Code. Comply with equipment manufacturer's instructions where not indicated otherwise.

3.6 PIPING TESTS

- A. Test soil, waste, and vent piping system in accordance with requirements of governing Plumbing Code, but not less than 10 foot head water test.

END OF SECTION 221316

SECTION 224213 - PLUMBING FIXTURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Extent of plumbing fixtures and trim work is indicated by Drawings and Schedules, and by requirements of this Section.
- B. Types of plumbing fixtures required for the project are indicated by the Drawings and Schedules.
- C. Refer to Division 22 Sections for domestic water piping systems used in conjunction with plumbing fixtures; not work of this Section.
- D. Refer to Division 22 Sections for soil and waste piping systems used in conjunction with plumbing fixtures; not work of this Section.

1.3 QUALITY ASSURANCE

- A. Manufacturers: Provide products by one of the manufacturers listed in the Schedule on the Drawings or approved equivalent.
- B. Plumbing Fixture Standards: Comply with applicable portions of governing Plumbing Code pertaining to materials and installation of plumbing fixtures.
- C. Regulatory Requirements: Comply with requirements of CABO A117.1, "Accessible and Usable Buildings and Facilities;" Public Law 90-480, "Architectural Barriers Act;" and Public Law 101-336, "Americans with Disabilities Act;" regarding plumbing fixtures for physically handicapped people.
- D. PDI Compliance: Comply with standards established by Plumbing and Drainage Institute pertaining to plumbing fixture supports.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications for plumbing fixtures and trim, including catalog cut of each fixture type and trim item furnished, roughing-in dimensioned drawings, templates for cutting substrates, fixture carriers, and installation instructions.
- B. Maintenance Data: Submit maintenance data and parts lists for each fixture type and trim item, including instructions for care of finishes. Include this data in maintenance manual.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver plumbing fixtures individually wrapped in factory-fabricated containers.
- B. Handle plumbing fixtures carefully to prevent breakage, chipping, and scoring the fixture finish. Do not install damaged plumbing fixtures; replace and return damaged units to equipment manufacturer.

PART 2 - PRODUCTS

2.1 PLUMBING FIXTURES

- A. General: Provide factory-fabricated fixtures of type, style, and material indicated. For each type fixture, 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 is indicated, selection is Installer's option; but, all fixtures of same type must be furnished by single manufacturer. Where type is not otherwise indicated, provide fixtures complying with governing regulations.

2.2 MATERIALS

- A. General: Provide materials which have been selected for their surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, foundry sand holes, stains, discoloration, or other surface imperfections on finished units are not acceptable.
- B. Where fittings, trim and accessories are exposed or semi-exposed, provide bright chrome-plated or polished stainless steel units. Provide copper or brass where not exposed.
- C. Stainless Steel Sheets: Type 302/304, hardest workable temper.
 - 1. Finishes: No. 4, bright, directional polish on exposed surfaces.
- D. Vitreous China: High quality, free from fire cracks, spots, blisters, pinholes, and specks; glaze exposed surfaces.

2.3 PLUMBING FITTINGS, TRIM AND ACCESSORIES

- A. P-Traps: Include removable P-traps where drains are indicated for direct connection to drainage system.
- B. Escutcheons: Where fixture supplies and drains penetrate walls in exposed locations and within cabinets, provide chrome plated cast-brass escutcheons with set screw.
- C. Aerators: Provide aerators of types approved by Health Departments having jurisdiction.
- D. Comply with additional fixture requirements contained in fixture schedule on drawings.
- E. Floor Drains: Provide drains equivalent to that scheduled on drawings. Provide minimum top size of 5 inches for 2 inches size, 6 inches for 3 inches size, and 10 inches for 4 inches size. Include clamping ring for drains in waterproofed membrane floors. Provide drains with water passage size not smaller than outlet size.
- F. Trap Primer Valves: Refer to Division 22 Section, "Domestic Water Piping."

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

- A. Examine roughing-in work of domestic water and waste piping systems to verify actual locations of piping connections prior to installing fixtures. Also examine floors and substrates, and conditions under which fixture work is to be accomplished. Correct any incorrect locations of piping and other unsatisfactory conditions for installation of plumbing fixtures. Do not proceed with work until unsatisfactory conditions have been corrected.
- B. Install plumbing fixtures of types indicated where shown and at indicated heights; in accordance with fixture manufacturer's written instructions, roughing-in drawings, and with recognized industry practices. Ensure that plumbing fixtures comply with

requirements and serve intended purposes. Comply with applicable requirements of the governing Plumbing Code pertaining to installation of plumbing fixtures.

- C. Fasten plumbing fixtures securely to indicated supports or building structure; and ensure that fixtures are level and plumb. Secure plumbing supplies behind or within all construction so as to be rigid and not subject to pull or push movement. Secure with bolts full size of hanger drilling, through-wall where practicable, with back plates.
- D. Provide deep seal P-trap at each floor drain. In waterproofed, membrane floors, secure waterproofing with clamping ring.

3.2 CLEAN AND PROTECT

- A. Clean plumbing fixtures of dirt and debris upon completion of installation.
- B. Protect installed fixtures from damage during the remainder of the construction period.

3.3 FIELD QUALITY CONTROL

- A. Upon completion of installation of plumbing fixtures and after units are water pressurized, test fixtures to demonstrate capability and compliance with requirements. Test floor drains for free flow. When possible, correct malfunctioning units at site, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.
- B. Inspect each installed unit for damage to finish. If feasible, restore and match finish to original at site; otherwise, remove fixture and replace with new unit. Feasibility and match to be judged by Architect. Remove cracked or dented units and replace with new units.

END OF SECTION 224213

SECTION 230593 - TESTING, ADJUSTING, AND BALANCING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. All Division 23 Specification Sections, Drawings, and general provisions of the Contract apply to work of this Section, as do other documents referred to in this Section.

1.2 SCOPE OF WORK

- A. The Contractor shall obtain the services of an independent Test and Balance (TAB) Company which specializes in the testing and balancing of heating, ventilating and air conditioning (HVAC) systems to test, adjust and balance all HVAC systems in the building(s).
- B. The work included in this Section consists of furnishing labor, instruments, and tools required in testing, adjusting and balancing the HVAC systems as described in these Specifications or shown on accompanying Drawings. Services shall include checking equipment performance, taking the specified measurements, and recording and reporting the results. The testing, adjusting, and balancing agency shall act as a reporting agency; that is, list and report each piece of equipment as to identification number, manufacturer, model number, serial number, proper location, specified performance, and report actual performance of all equipment as found during testing. The report is intended to be used during the life of the building as a ready reference indicating original conditions, equipment components, etc.
- C. Representatives of the Test and Balance Company shall visit the job site during installation of the HVAC equipment, piping, and ductwork as required.
- D. Upon completion of the HVAC system installation, the Test and Balance Company shall perform all required testing and balancing with the full cooperation of the Contractor and his Sub-Contractors. The Contractor shall make changes and/or adjustments to the HVAC system components that are required by the Test and Balance Company to accomplish proper balancing. The TAB agency shall not supply or install any materials or balancing devices such as pulleys, drives, belts, etc. All of this work is by the Contractor and shall be performed at no additional cost to the Owner.
- E. The test and balance report complete with a summary page listing all deficiencies shall be submitted to the Architect for review by his Mechanical Engineer. If the Mechanical Engineer agrees with the report, he shall sign it and return it to the Architect. The test and balance report must be complete and must be accepted by the Mechanical Engineer prior to acceptance of the project. Any outstanding test and balance items shall be placed on the punch list and a monetary value shall be assigned to them.
- F. After all deficiencies have been corrected, the Mechanical Engineer shall sign the testing and balancing report, and the Test and Balance Company shall supply 4 copies of the final and complete report to the Architect for inclusion in the Operation and Maintenance Manuals.
- G. The items requiring testing, adjusting, and balancing include (but are not restricted to) the following:
 - 1. Air Systems:
 - a. Duct systems
 - b. Diffusers, Registers, Grilles and Dampers

1.3 DEFINITIONS, REFERENCES, STANDARDS

- A. All work shall be in accordance with the latest edition of the Associated Air Balance Council (AABC) National Standards or the latest standards of the National Environmental Balancing Bureau (NEBB). If these contract

documents set forth more stringent requirements than the AABC National Standards or the NEBB Standards, these Contract Documents shall prevail.

1.4 QUALIFICATIONS

- A. Agency Qualifications: The TAB Agency shall be a current member of the AABC or the NEBB.

1.5 SUBMITTALS

- A. Procedures and Agenda: The TAB agency shall submit the TAB Procedures and agenda proposed to be used.
- B. Sample Forms: The TAB agency shall submit sample forms, which shall include the minimum data required by the AABC National Standards or the NEBB Standards.
- C. Job Site Inspection Report: Inspect the installation of all HVAC systems prior to TAB work. Provide inspection report to the Architect and Contractor.

1.6 TAB PREPARATION AND COORDINATION

- A. Shop drawings, submittal data, up-to-date revisions, change orders, fan curves, pump curves and other data required for planning, preparation, and execution of the TAB work shall be provided when available and no later than 30 days after the Designer has returned the final approved submittal data to the Contractor.
- B. System installation and equipment startup shall be complete prior to the TAB agency's being notified to begin.
- C. The building control system (BMCS) contractor shall provide and install the control system, including all temperature, pressure and humidity sensors. These shall be calibrated for accurate control. If applicable, the BMCS contractor shall install all necessary computers and computer programs, and make these operational. Assistance shall be provided as required for reprogramming, coordination, and problem resolution.
- D. All test points, balancing devices, identification tags, etc., shall be accessible and clear of insulation and other obstructions that would impede TAB procedures.
- E. Qualified installation or startup personnel shall be readily available for the operation and adjustment of the systems. Assistance shall be provided as required for coordination and problem resolution.

1.7 REPORTS

- A. TAB Report: The TAB agency shall submit the preliminary TAB report for review by the Architect. On plans provided, all outlets, devices, HVAC equipment, etc., shall be identified (including manufacturer, model number, serial number, motor manufacturer, HP, drive type, fan and motor sheaves and belt number), along with a numbering system corresponding to report unit identification. The TAB agency shall submit an AABC "National Project Performance Guaranty" (or similar NEBB Guaranty) assuring that the project systems were tested, adjusted and balanced in accordance with the project specifications and AABC National Standards (or similar NEBB Standards). The Designer shall review the TAB report and note any items which do not appear to be within the allowable tolerances. The contractor shall make corrections to the installation of these items and the TAB contractor shall retest the corrected items and resubmit the complete TAB report. The designer shall indicate his approval of the Final Tab Report and return to the contractor.
 - 1. The Contractor shall Submit the Final TAB Report to the Architect and include in each copy of the Operation and Maintenance Manuals.

PART 2 - INSTRUMENTATION

2.1 GENERAL

- A. All instruments used for measurements shall be accurate and calibrated. Calibration and maintenance of all instruments shall be in accordance with the requirements of AABC National Standards (or similar NEBB Standards).

PART 3 - EXECUTION

3.1 GENERAL

- A. The specified systems shall be reviewed and inspected for conformance to Design Documents. Testing, adjusting and balancing on each identified system shall be performed. The accuracy of measurements shall be in accordance with AABC National Standards (or similar NEBB Standards). Adjustment tolerances shall be + or - 10 percent unless otherwise stated.
- B. Equipment settings, including manual damper quadrant positions, valve indicators, fan speed control levers, and similar controls and devices shall be marked to show final settings.
- C. All information necessary to complete a proper TAB project and report shall be per AABC or NEBB standards unless otherwise noted. The descriptions of work required, as listed in this section, are a guide to the minimum information needed.
- D. TAB contractor shall cut insulation, ductwork and piping for installation of test probes to the minimum extent necessary to allow adequate performance of procedures. Upon completion, patch insulation, ductwork, and housings using materials identical to those removed. Seal insulation to reestablish integrity of the vapor barrier.
- E. TAB work shall include additional inspection and adjustment of components during the season following the initial balance to include re-balance of any items influenced by seasonal changes or as directed by the Owner.

3.2 AIR SYSTEMS

- A. The TAB agency shall verify that all ductwork, splitters, extractors, dampers, grilles, registers, and diffusers have been installed per design, are functional, and set full open. Any leakage in the ductwork shall be repaired prior to the test. The TAB agency shall perform the following TAB procedures in accordance with the AABC National Standards or NEBB Standards:
 - 1. For zone, branch and main ducts:
 - a. Adjust ducts to within design CFM requirements. As applicable, at least one zone balancing damper shall be completely open. Multi-diffuser branch ducts shall have at least one outlet or inlet volume damper completely open.
 - 2. For diffusers, registers and grilles:
 - a. Tolerances: Test, adjust, and balance each diffuser, grille, and register to within 10 percent of design requirements. Minimize drafts. Include required CFM, initial test CFM and final CFM.
 - b. Identification: Identify the type, location, and size of each grille, diffuser, and register. This information shall be recorded on air outlet data sheets.

3.3 ADDITIONAL TAB SERVICES

- A. Job Site Inspections: During construction, the TAB agency shall inspect the installation of pipe systems, sheet metal work, temperature controls, and other component parts of the HVAC systems as required.

- B. Verification of HVAC Controls: The TAB agency shall be assisted by the building control systems Contractor in verifying the operation and calibration of all HVAC and temperature control systems. The following tests shall be conducted:
1. Verify that all control components are installed in accordance with project requirements and are functional, including all electrical interlocks, damper sequences, air and water resets, fire and freeze stats, and other safety devices.
 2. Verify that all controlling instruments are calibrated and set for design operating conditions.
- C. Temperature Testing: To verify system control and operation, a series of three temperature tests shall be taken at approximately two hour intervals in each separately controlled zone. The resulting temperatures shall not vary more than two degrees Fahrenheit from the thermostat or control set point during the tests. Outside temperature and humidity shall also be recorded during the testing periods.
- D. TAB Report Verification: At the time of final inspection, the TAB agency may be required to recheck, in the presence of the owner's representative, specific and random selections of data, air quantities, and air motion recorded in the certified report. Points and areas for recheck shall be selected by the owner's representative. Measurements and test procedures shall be the same as approved for the initial work for the certified report. Selections for recheck, specific plus random, will not exceed 10 percent of the total number tabulated in the report.

END OF SECTION 230593

SECTION 230713 - DUCT INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes insulating the following duct services:
 - 1. Indoor, concealed supply air.
- B. Related Sections:
 - 1. Section "Pipe Insulation for Plumbing and HVAC."

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product indicated.
- 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.

1.3 INFORMATIONAL SUBMITTALS

- A. Field quality-control reports.

1.4 QUALITY ASSURANCE

- A. Surface-Burning Characteristics: For insulation and related materials, as determined by testing identical products according to ASTM E 84, by a testing agency acceptable to authorities having jurisdiction. Factory label insulation and jacket materials and adhesive, mastic, tapes, and cement material containers, with appropriate markings of applicable testing agency.
 - 1. Insulation Installed Indoors: Flame-spread index of 25 or less, and smoke-developed index of 50 or less.
 - 2. Insulation Installed Outdoors: Flame-spread index of 75 or less, and smoke-developed index of 150 or less.

PART 2 - PRODUCTS

2.1 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. 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 I, Type III with factory-applied FSK jacket. Factory-applied jacket requirements are specified in "Factory-Applied Jackets" Article.
1. Products: Subject to compliance with requirements, provide one of 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.
- G. 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, provide one of 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.

2.2 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. 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."
- C. 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; 85-50.
 - 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."

2.3 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 (0.009 metric perm) at 43-mil (1.09-mm) dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
 - 4. Solids Content: ASTM D 1644, 58 percent by volume and 70 percent by weight.
 - 5. Color: White.
- C. Breather Mastic: Water based; suitable for indoor and outdoor use on above 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; 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 (1.2 metric perms) at 0.0625-inch (1.6-mm) dry film thickness.
 - 3. Service Temperature Range: Minus 20 to plus 180 deg F (Minus 29 to plus 82 deg C).
 - 4. Solids Content: 60 percent by volume and 66 percent by weight.
 - 5. Color: White.

2.4 SEALANTS

- A. FSK and Metal Jacket Flashing Sealants:
 - 1. Products: Subject to compliance with requirements, provide 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, use sealants that 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."

2.5 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. FSK Jacket: Aluminum-foil, fiberglass-reinforced scrim with kraft-paper backing; complying with ASTM C 1136, Type II.

2.6 FIELD-APPLIED FABRIC-REINFORCING MESH

- A. Woven Polyester Fabric: Approximately 1 oz./sq. yd. (34 g/sq. m) with a thread count of 10 strands by 10 strands/sq. in. (4 strands by 4 strands/sq. mm), in a Leno weave, for ducts.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Foster Brand, Specialty Construction Brands, Inc., a business of H. B. Fuller Company; Mast-A-Fab.
 - b. Vimasco Corporation; Elastafab 894.

2.7 FIELD-APPLIED JACKETS

- A. Field-applied jackets shall comply with ASTM C 921, Type I, unless otherwise indicated.
- B. FSK Jacket: Aluminum-foil-face, fiberglass-reinforced scrim with kraft-paper backing.
- C. Self-Adhesive Outdoor Jacket: 60-mil- (1.5-mm-) thick, laminated vapor barrier and waterproofing membrane for installation over insulation located aboveground outdoors; consisting of a rubberized bituminous resin on a crosslaminated polyethylene film covered with white aluminum-foil facing.
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Polyguard Products, Inc.; Alumaguard 60.

2.8 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, provide one of 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 (75 mm).
 - 3. Thickness: 6.5 mils (0.16 mm).
 - 4. Adhesion: 90 ounces force/inch (1.0 N/mm) in width.
 - 5. Elongation: 2 percent.
 - 6. Tensile Strength: 40 lbf/inch (7.2 N/mm) in width.
 - 7. FSK Tape Disks and Squares: Precut disks or squares of FSK tape.
- B. 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 (50 mm).
3. Thickness: 3.7 mils (0.093 mm).
4. Adhesion: 100 ounces force/inch (1.1 N/mm) in width.
5. Elongation: 5 percent.
6. Tensile Strength: 34 lbf/inch (6.2 N/mm) in width.

2.9 SECUREMENTS

A. Insulation Pins and Hangers:

1. 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, provide one of 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 (0.76 mm) thick by 2 inches (50 mm) square.
 - c. Spindle: Stainless steel, fully annealed, 0.106-inch- (2.6-mm-) 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.
2. 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, provide one of the following:
 - 1) GEMCO; Nylon Hangers.
 - 2) Midwest Fasteners, Inc.; Nylon Insulation Hangers.
 - b. Baseplate: Perforated, nylon sheet, 0.030 inch (0.76 mm) thick by 1-1/2 inches (38 mm) in diameter.
 - c. Spindle: Nylon, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated, up to 2-1/2 inches (63 mm).
 - d. Adhesive: Recommended by hanger manufacturer. Product with demonstrated capability to bond insulation hanger securely to substrates indicated without damaging insulation, hangers, and substrates.
3. 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, provide one of 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 (0.76 mm) thick by 2 inches (50 mm) square.
 - c. Spindle: Stainless steel, fully annealed, 0.106-inch- (2.6-mm-) diameter shank, length to suit depth of insulation indicated.
 - d. Adhesive-backed base with a peel-off protective cover.
4. Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick, stainless-steel sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.
 - a. Products: Subject to compliance with requirements, provide one of 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.

5. Nonmetal Insulation-Retaining Washers: Self-locking washers formed from 0.016-inch- (0.41-mm-) thick nylon sheet, with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches (38 mm) in diameter.

a. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

- 1) GEMCO.
- 2) Midwest Fasteners, Inc.

B. Staples: Outward-clinching insulation staples, nominal 3/4-inch- (19-mm-) wide, stainless steel or Monel.

C. Wire: 0.062-inch (1.6-mm) 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.

2.10 CORNER ANGLES

A. Aluminum Corner Angles: 0.040 inch (1.0 mm) thick, minimum 1 by 1 inch (25 by 25 mm), aluminum according to ASTM B 209 (ASTM B 209M), Alloy 3003, 3005, 3105, or 5005; Temper H-14.

PART 3 - EXECUTION

3.1 PREPARATION

A. Surface Preparation: Clean and dry surfaces to receive insulation. Remove materials that will adversely affect insulation application.

3.2 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- (75-mm-) wide strips, of same material as insulation jacket. Secure strips with adhesive and outward clinching staples along both edges of strip, spaced 4 inches (100 mm) o.c.
 - 3. Overlap jacket longitudinal seams at least 1-1/2 inches (38 mm). Clean and dry surface to receive self-sealing lap. Staple laps with outward clinching staples along edge at 2 inches (50 mm) 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 (100 mm) beyond damaged areas. Adhere, staple, and seal patches similar to butt joints.

3.3 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 (50 mm) 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 (50 mm).
 - 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: 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 (50 mm).
1. Comply with requirements in Division 7 Section "Through-Penetration Firestop Systems" for firestopping and fire-resistive joint sealers.

3.4 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 (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
 - b. On duct sides with dimensions larger than 18 inches (450 mm), place pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) 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 overcompress 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 (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) 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 (10 deg C) at 18-foot (5.5-m) 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 (75 mm).
5. Overlap unfaced blankets a minimum of 2 inches (50 mm) on longitudinal seams and end joints. At end joints, secure with steel bands spaced a maximum of 18 inches (450 mm) 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- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) 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 (450 mm) and smaller, place pins along longitudinal centerline of duct. Space 3 inches (75 mm) maximum from insulation end joints, and 16 inches (400 mm) o.c.
 - b. On duct sides with dimensions larger than 18 inches (450 mm), space pins 16 inches (400 mm) o.c. each way, and 3 inches (75 mm) 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 overcompress 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 (50 mm) from one edge and one end of insulation segment. Secure laps to adjacent insulation section with 1/2-inch (13-mm) outward-clinching staples, 1 inch (25 mm) 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 (10 deg C) at 18-foot (5.5-m) 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 (75 mm).
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- (150-mm-) wide strips of same material used to insulate duct. Secure on alternating sides of stiffener, hanger, and flange with pins spaced 6 inches (150 mm) o.c.

3.5 FIELD-APPLIED JACKET INSTALLATION

- A. Where FSK jackets are indicated, install as follows:
- 1. Draw jacket material smooth and tight.
 - 2. Install lap or joint strips with same material as jacket.
 - 3. Secure jacket to insulation with manufacturer's recommended adhesive.
 - 4. Install jacket with 1-1/2-inch (38-mm) laps at longitudinal seams and 3-inch- (75-mm-) wide joint strips at end joints.
 - 5. Seal openings, punctures, and breaks in vapor-retarder jackets and exposed insulation with vapor-barrier mastic.

3.6 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 Division 7 Section "Through-Penetration Firestop Systems."

3.7 FINISHES

- A. Color: Final color as selected by Architect. Vary first and second coats to allow visual inspection of the completed Work.
- B. Do not field paint aluminum or stainless-steel jackets.

3.8 FIELD QUALITY CONTROL

- A. Perform tests and inspections.
- B. 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.

- C. All insulation applications will be considered defective Work if sample inspection reveals noncompliance with requirements.

3.9 INDOOR DUCT AND PLENUM INSULATION SCHEDULE

- A. Concealed, Supply-Air Duct and Plenum Insulation: Mineral-fiber blanket 2 inches (50 mm) thick and 1.5-lb/cu. ft. (24-kg/cu. m) nominal density.

END OF SECTION 230713

SECTION 233113 - METAL DUCTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes metal ducts for supply, return, outside, and exhaust air-distribution systems in pressure classes from minus 7 to plus 10 inch wg (minus 1750 to plus 2500 Pa). Metal ducts include the following:
 - 1. Rectangular ducts and fittings.
 - 2. Single-wall round spiral-seam ducts and formed fittings.
- B. Related Sections include Division 23 Section 23 30 00, "Ductwork Accessories," for dampers, sound-control devices, duct-mounting access doors and panels, turning vanes, and flexible ducts.

1.3 SYSTEM DESCRIPTION

- A. Duct system design, as indicated, has been used to select size and type of air moving and distribution equipment and other air system components. Changes to layout or configuration of duct system must be specifically approved in writing by Architect. Accompany requests for layout modifications with calculations showing that proposed layout will provide original design results without increasing system total pressure.
- B. Ducts shall be single-wall except where indicated to be double-wall on the Drawings.

1.4 SUBMITTALS

- A. Shop Drawings: CAD-generated and drawn to 1/4 inch equals 1 foot (1:50) scale. Show fabrication and installation details for metal ducts.
 - 1. Duct layout indicating sizes and pressure classes.
 - 2. Elevations of top and bottom of ducts.
 - 3. Fittings.
 - 4. Reinforcement and spacing.
 - 5. Seam and joint construction.
 - 6. Penetrations through fire-rated and other partitions.
 - 7. Equipment installation based on equipment being used on Project.
 - 8. Duct accessories, including access doors and panels.
 - 9. Hangers and supports, including methods for duct and building attachment.
- B. Field quality-control test reports.

1.5 QUALITY ASSURANCE

- A. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel," for hangers and supports and AWS D9.1, "Sheet Metal Welding Code," for duct joint and seam welding.

B. Codes and Standards:

1. SMACNA Standards: "HVAC Duct Construction Standards, Metal and Flexible."
2. NFPA 90A, "Installation of Air Conditioning and Ventilating Systems."
3. International Mechanical Code.
4. SMACNA Standards: "IAQ Guidelines for Occupied Buildings Under Construction"

PART 2 - PRODUCTS

2.1 SHEET METAL MATERIALS

- A. 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: Lock-forming quality; complying with ASTM A 653/A 653M and having G60 (Z180) coating designation; ducts shall have mill-phosphatized finish for surfaces exposed to view.
- C. Carbon-Steel Sheets: ASTM A 366/A 366M, cold-rolled sheets; commercial quality; with oiled, matte finish for exposed ducts.
- D. Stainless Steel: ASTM A 480/A 480M, Type 304, and having a No. 2D finish for concealed ducts and No. 4 finish for exposed ducts.
- E. Reinforcement Shapes and Plates: Galvanized-steel reinforcement where installed on galvanized sheet metal ducts.
- F. Tie Rods: Galvanized steel, 1/4-inch (6-mm) minimum diameter for lengths 36 inches (900 mm) or less; 3/8-inch (10-mm) minimum diameter for lengths longer than 36 inches (900 mm).

2.2 SEALANT MATERIALS

- A. Joint and Seam Sealants, General: The term "sealant" is not limited to materials of adhesive or mastic nature but includes tapes and combinations of open-weave fabric strips and mastics.
- B. Joint and Seam Tape: 2 inches (50 mm) wide; glass-fiber-reinforced fabric.
- C. Flanged Joint Mastic: One-part, acid-curing, silicone, elastomeric joint sealant complying with ASTM C 920, Type S, Grade NS, Class 25, Use O.
- D. Flange Gaskets: Butyl rubber or EPDM polymer with polyisobutylene plasticizer.

2.3 HANGERS AND SUPPORTS

- A. Building Attachments: Concrete inserts, powder-actuated fasteners, or structural-steel fasteners appropriate for construction materials to which hangers are being attached.
 1. Use powder-actuated concrete fasteners for standard-weight aggregate concretes or for slabs more than 4 inches (100 mm) thick.
 2. Exception: Do not use powder-actuated concrete fasteners for lightweight-aggregate concretes or for slabs less than 4 inches (100 mm) thick.
- B. Hanger Materials: Galvanized sheet steel or threaded steel rod.
 1. Hangers Installed in Corrosive Atmospheres: Electrogalvanized, all-thread rods or galvanized rods with threads painted with zinc-chromate primer after installation.

2. Strap and Rod Sizes: Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for steel sheet width and thickness and for steel rod diameters.
 3. Galvanized-steel straps attached to aluminum ducts shall have contact surfaces painted with zinc-chromate primer.
- C. Duct Attachments: Sheet metal screws, blind rivets, or self-tapping metal screws; compatible with duct materials.
- D. Trapeze and Riser Supports: Steel shapes complying with ASTM A 36/A 36M.
1. Supports for Galvanized-Steel Ducts: Galvanized-steel shapes and plates.
 2. Supports for Stainless-Steel Ducts: Stainless-steel support materials.

2.4 RECTANGULAR DUCT FABRICATION

- A. Fabricate ducts, elbows, transitions, offsets, branch connections, and other construction according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" and complying with requirements for metal thickness, reinforcing types and intervals, tie-rod applications, and joint types and intervals.
1. Lengths: Fabricate rectangular ducts in lengths appropriate to reinforcement and rigidity class required for pressure class.
 2. Deflection: Duct systems shall not exceed deflection limits according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."
- B. Transverse Joints: Prefabricated slide-on joints and components constructed using manufacturer's guidelines for material thickness, reinforcement size and spacing, and joint reinforcement.
- C. Formed-On Flanges: Construct according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," Figure 1-4, using corner, bolt, cleat, and gasket details.
1. Duct Size: Maximum 30 inches (750 mm) wide and up to 2 inch wg (500 Pa) pressure class.
 2. Longitudinal Seams: Pittsburgh lock sealed with noncuring polymer sealant.
- D. Cross Breaking or Cross Beading: Cross break or cross bead duct sides 19 inches (480 mm) and larger and 0.0359 inch (0.9 mm) thick or less, with more than 10 sq. feet (0.93 sq. meter) of nonbraced panel area unless ducts are lined.

2.5 ROUND DUCT AND FITTING FABRICATION

- A. Round, Spiral Lock-Seam Ducts: Fabricate supply ducts of galvanized steel according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."
1. Manufacturers:
 - a. Dixie Sheet Metal Works – Falls Church, VA
 - b. DuctDirect – Houston, TX
 - c. Eastern Sheet Metal
 - d. Graco
 - e. Hamlin Sheet Metal
 - f. McGill AirFlow Corporation
 - g. Mason Road Sheet Metal
 - h. SEMCO Incorporated
 - i. Spiral Pipe of Texas
 - j. Spiral Systems Incorporated
- B. Duct Joints:
1. Ducts up to 20 Inches (500 mm) in Diameter: Interior, center-beaded slip coupling, sealed before and after fastening, attached with sheet metal screws.

2. Ducts 21 to 72 Inches (535 to 1830 mm) in Diameter: Three-piece, gasketed, flanged joint consisting of two internal flanges with sealant and one external closure band with gasket.
3. Round Ducts: Prefabricated connection system consisting of double-lipped, EPDM rubber gasket. Manufacture ducts according to connection system manufacturer's tolerances.
 - a. Manufacturers:
 - 1) Ductmate Industries, Inc.
 - 2) Lindab Inc.
- C. 90-Degree Tees and Laterals and Conical Tees: Fabricate to comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," with metal thicknesses specified for longitudinal-seam straight ducts.
- D. Diverging-Flow Fittings: Fabricate with reduced entrance to branch taps and with no excess material projecting from fitting onto branch tap entrance.
- E. Fabricate elbows using die-formed or mitered construction. Bend radius of die-formed shall be 1-1/2 times duct diameter. Unless elbow construction type is indicated, fabricate elbows as follows:
 1. Mitered-Elbow Radius and Number of Pieces: Continuously welded construction complying with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible."
 2. Round Mitered Elbows: Continuously welded construction with the following metal thickness for pressure classes from minus 2 to plus 2 inch wg (minus 500 to plus 500 Pa):
 - a. Ducts 3 to 36 Inches (75 to 915 mm) in Diameter: 0.034 inch (0.85 mm).
 3. Round Mitered Elbows: Welded construction with the following metal thickness for pressure classes from 2 to 10 inch wg (500 to 2500 Pa):
 - a. Ducts 3 to 26 Inches (75 to 660 mm) in Diameter: 0.034 inch (0.85 mm).
 - b. Ducts 27 to 50 Inches (685 to 1270 mm) in Diameter: 0.040 inch (1.0 mm).
 4. Round Elbows 8 Inches (200 mm) and Less in Diameter: Fabricate die-formed elbows for 45 and 90 degree elbows and pleated elbows for 30, 45, 60, and 90 degrees only. Fabricate nonstandard bend-angle configurations or nonstandard diameter elbows with gored construction.
 5. Round Elbows Larger than 9 Inches in Diameter: Fabricate mitered elbows for 30, 45, 60, and 90 degrees.
 6. Die-Formed Elbows for Sizes through 8 Inches (200 mm) in Diameter and All Pressures 0.040 inch (1.0 mm) thick with 2-piece welded construction.

PART 3 - EXECUTION

3.1 DUCT APPLICATIONS

- A. Static-Pressure Classes: Unless otherwise indicated, construct ducts according to the following:
 1. Supply Ducts: Low pressure, 2 inch wg (500 Pa).
 2. Supply Ducts: Medium/high pressure 5 inch wg (1250 Pa).
 3. Return Ducts (Negative Pressure): 1 inch wg (250 Pa).
 4. Exhaust Ducts (Negative Pressure): 2 inch wg (500 Pa).

3.2 DUCT INSTALLATION

- A. Construct and install ducts according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible," unless otherwise indicated.

- B. Install round and flat-oval ducts in lengths not less than 12 feet (3.7 meters) unless interrupted by fittings.
- C. Install ducts with fewest possible joints.
- D. Install fabricated fittings for changes in directions, size, and shape and for connections.
- E. Install couplings tight to duct wall surface with a minimum of projections into duct. Secure couplings with sheet metal screws. Install screws at intervals of 12 inches (300 mm), with a minimum of 3 screws in each coupling.
- F. Install ducts, unless otherwise indicated, vertically and horizontally and parallel and perpendicular to building lines; avoid diagonal runs.
- G. Install ducts close to walls, overhead construction, columns, and other structural and permanent enclosure elements of building.
- H. Exposed supply air/return air duct shall be sealed from dust and debris during storage and after installation.
- I. Install ducts with a clearance of 1 inch (25 mm), plus allowance for insulation thickness.
- J. Conceal ducts from view in finished spaces. Do not encase horizontal runs in solid partitions unless specifically indicated.
- K. Coordinate layout with suspended ceiling, fire- and smoke-control dampers, lighting layouts, and similar finished work.
- L. Seal all joints and seams. Apply sealant to male end connectors before insertion, and afterward to cover entire joint and sheet metal screws.
- M. Electrical Equipment Spaces: Route ducts to avoid passing through transformer vaults and electrical equipment spaces and enclosures.
- N. Non-Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls and are exposed to view, conceal spaces between construction openings and ducts or duct insulation with sheet metal flanges of same metal thickness as ducts. Overlap openings on 4 sides by at least 1-1/2 inches (38 mm).
- O. Fire-Rated Partition Penetrations: Where ducts pass through interior partitions and exterior walls, install appropriately rated fire dampers, sleeves, and firestopping sealant. Fire and smoke dampers are specified in Division 23 Section 23 30 00, "Ductwork Accessories."
- P. Protect duct interiors from the elements and foreign materials until building is enclosed. Follow SMACNA's "Duct Cleanliness for New Construction."

3.3 SEAM AND JOINT SEALING

- A. Seal duct seams and joints according to SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for duct pressure class indicated.
 - 1. For pressure classes lower than 2 inch wg (500 Pa), seal transverse joints.
- B. Seal and test ducts before external insulation is applied.
- C. Test ducts in accordance with SMACNA. Make necessary repairs to sustain test pressure with not more than 5 percent leakage.

3.4 HANGING AND SUPPORTING

- A. Support horizontal ducts within 24 inches (600 mm) of each elbow and within 48 inches (1200 mm) of each branch intersection.
- B. Support vertical ducts at maximum intervals of 16 feet (5 meters) and at each floor.
- C. Install upper attachments to structures with an allowable load not exceeding one-fourth of failure (proof-test) load.

3.5 CONNECTIONS

- A. Make connections to equipment with flexible connectors according to Division 23 Section 23 30 00, "Ductwork Accessories."
- B. Comply with SMACNA's "HVAC Duct Construction Standards--Metal and Flexible" for branch, outlet and inlet, and terminal unit connections.

3.6 CLEANING NEW SYSTEMS

- A. Mark position of dampers and air-directional mechanical devices before cleaning, and perform cleaning before air balancing.
- B. Use service openings, as required, for physical and mechanical entry and for inspection.
 - 1. Create other openings to comply with duct standards.
 - 2. Disconnect flexible ducts as needed for cleaning and inspection.
 - 3. Remove and reinstall ceiling sections to gain access during the cleaning process.
- C. Vent vacuuming system to the outside. Include filtration to contain debris removed from HVAC systems, and locate exhaust down wind and away from air intakes and other points of entry into building.
- D. Clean the following metal duct systems 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, and actuators except in ceiling plenums and mechanical equipment rooms.
 - 6. Supply-air ducts, dampers, actuators, and turning vanes.
- 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. 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.
- F. Cleanliness Verification:
 - 1. Visually inspect metal ducts for contaminants.
 - 2. Where contaminants are discovered, re-clean and re-inspect ducts.

END OF SECTION 233113

SECTION 233300 - DUCTWORK ACCESSORIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 DESCRIPTION OF WORK

- A. Extent of ductwork accessories work is indicated on Drawings and in Schedules and by requirements of this Section.
- B. Types of ductwork accessories required for project include the following:
 - 1. Low pressure manual dampers.
 - 2. Turning vanes.
 - 3. Duct hardware.
 - 4. Duct access doors.
 - 5. Flexible connections.
- C. Refer to other Division 23 sections for testing, adjusting, and balancing of ductwork accessories; not work of this Section.

1.3 QUALITY ASSURANCE

- A. Codes and Standards:
 - 1. SMACNA Compliance: Comply with applicable portions of SMACNA "HVAC Duct Construction Standards, Metal and Flexible."
 - 2. UL Compliance: Construct, test, and label fire dampers in accordance with UL Standard 555 "Fire Dampers and Ceiling Dampers."
 - 3. NFPA Compliance: Comply with applicable provisions of NFPA 90A "Air Conditioning and Ventilating Systems" pertaining to installation of ductwork accessories.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data for each type of ductwork accessory, including dimensions, capacities, and materials of construction and installation instructions.
- B. Maintenance Data: Submit manufacturer's maintenance data including parts lists for each type of duct accessory. Include this data and product data in maintenance manual; in accordance with requirements of Division 1 Sections and Division 23 Section, "Basic Mechanical Materials and Methods."

PART 2 - PRODUCTS

2.1 DAMPERS

- A. Low Pressure Manual Dampers: Provide manual volume dampers constructed of galvanized steel.

1. Square and Rectangular Dampers: Dampers shall have minimum 20 gauge frames and minimum 20 gauge roll formed blades. Multi-blade dampers shall have interlocking corrugated edges. Damper linkage shall be concealed in the damper frame. Dampers for ducts smaller than 36 inches by 12 inches may be single blade dampers, all other dampers shall have multiple blades. Provide opposed blade type unless indicated otherwise.
2. Round Dampers: Dampers shall be minimum 20 gauge frame and 20 gauge blade. Blade shall be secured to 3/8 inch square or 1/2 inch diameter galvanized or plated axle/shaft that extends beyond frame through bearings and locking hand quadrant.
3. Dampers shall include permanently lubricated oilite bronze bearings pressed securely into damper frame.
4. Dampers shall include factory furnished locking quadrants with 2 inch elevated dial and "OPEN" and "CLOSED" indicators.

- B. Manufacturer: Subject to compliance with requirements, provide balancing dampers of one of the following or approved equivalent:

		Single	Opposed	Parallel	Round
		Blade	Blade	Blade	Blade
1.	Ruskin	MD35	MD35	MD35	MDRS25
2.	Greeneck	MDB-15	MDB-15	MDB-15	MBDR-50
3.	Pottoroff	CD10	MD42	MD41	CD10R

2.2 TURNING VANES

- A. Fabricated Turning Vanes: Provide fabricated turning vanes and vane runners, constructed in accordance with SMACNA "HVAC Duct Construction Standards."

2.3 DUCT HARDWARE

- A. General: Provide duct hardware, manufactured by one manufacturer for all items on project, for the following:
1. Test Holes: Provide in ductwork at fan inlet and outlet and elsewhere as indicated, duct test holes, consisting of slot and cover, for instrument tests.

2.4 DUCT ACCESS DOORS

- A. General: Provide where indicated, duct access doors of size indicated.
- B. Construction: Construct of same or greater gage as ductwork served; provide insulated doors for insulated ductwork with minimum 1 inch insulation $k\text{-value} = 0.26$ at 75 degrees F mean temperature sandwiched between sheetmetal panels. Provide flush frames for uninsulated ductwork; extended frames for externally insulated duct. Provide one side hinged, other side with one handle-type latch for doors 12 inches high and smaller, 2 handle-type latches for larger doors. Screwdriver operated latches are not acceptable.

2.5 FLEXIBLE CONNECTIONS

- A. Provide flexible duct connections wherever ductwork connects to HVAC equipment, fans or other vibration isolated equipment. Construct flexible connections of neoprene-coated flameproof fabric crimped into duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibrations of connected equipment.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine areas and conditions under which ductwork accessories will be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

3.2 INSTALLATION OF DUCTWORK ACCESSORIES

- A. Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.
- B. Where ducts take off mains, and where ducts divide, install splitter dampers or volume dampers, each with adjustable locking quadrant control. Provide volume damper unless splitter damper is indicated. Provide adjustable pivoting splitter with locking quadrant control for all splitter dampers. Provide a volume damper after each splitter damper, located in the branch with the lowest resistance.
- C. Concealed dampers that are not accessible shall be controlled by a concealed regulator type as indicated. Where type is not indicated, provide type as recommended by manufacturer for application. Include flush chrome plated access panel for each.
- D. Install turning vanes in all square or rectangular 90 degree elbows in supply, return, and exhaust air systems, and elsewhere as indicated.
- E. Install access doors to open against system air pressure, with latches operable from either side, except outside only where duct is too small for person to enter.
- F. Coordinate with other work, including ductwork, as necessary to interface installation of ductwork accessories properly with other work.

3.3 FIELD QUALITY CONTROL

- A. Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories, as required to obtain proper operation and leakproof performance.

3.4 ADJUSTING AND CLEANING

- A. Adjusting: Adjust ductwork accessories for proper settings, install fusible links in fire dampers, and adjust for proper action.
- B. Final positioning of manual dampers is specified in Division 23 Section, "Testing, Adjusting, and Balancing."
- C. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

END OF SECTION 233300

SECTION 233713 - DIFFUSERS, REGISTERS, AND GRILLES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

- A. This Section includes ceiling- and wall-mounted diffusers, registers, and grilles.

1.3 SUBMITTALS

- A. Product Data: For each 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 model number and accessories furnished.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following requirements apply to product selection:
 - 1. Products: Subject to compliance with requirements, provide one of the products scheduled on the drawings.

2.2 SOURCE QUALITY CONTROL

- A. Verification of Performance: Rate diffusers, registers, and grilles according to ASHRAE 70, "Method of Testing for Rating the Performance of Air Outlets and Inlets."

PART 3 - EXECUTION

3.1 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.

3.2 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 practicable. 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.

3.3 ADJUSTING

- A. After installation, adjust diffusers, registers, and grilles to air patterns indicated, or as directed, before starting air balancing.

END OF SECTION 233713

SECTION 260000 - GENERAL PROVISIONS

PART 1 - GENERAL

1.1 SCOPE

- A. The electrical portion of this project includes all labor, materials, equipment, etc., required to provide the complete electrical work to fulfill the intent of the Contract Documents.

1.2 RELATED DOCUMENTS

- A. All applicable provisions of Division 0 and 1 govern work under this division. Refer to these articles in the specifications for additional information.
- B. All work shall be in compliance with the currently enforced edition of the applicable state, national, and local ordinance and building codes, and the National Electric Code. No additional compensation shall be granted for work which must be changed as a result of the work not originally complying with the codes and standards. etc.
- C. Refer to each section for additional applicable codes and reference standards.

1.3 FEES, PERMITS AND TAXES

- A. This Contractor is responsible for all inspection fees and permits required by local authorities having jurisdiction. The Contractor is also responsible for all taxes levied for labor and materials associated with the electrical portion of the work. After completion of the work, a certificate of final inspection shall be provided showing approval from the local Electrical Inspector.
- B. This contractor is responsible for any fees, charges or installation costs charged by the local utility for the new electrical service provided.

1.4 SUBMITTALS

- A. Submittals shall be provided for all items indicated. Product data shall be from published manufacturer's data. Data shall include enough information so that the Engineer can verify compliance with codes, standards, and the contract documents. Submittal shall not contain data that is not relevant to the equipment being submitted. The data shall be highlighted by arrows, underlining, etc. broad, general data, is not acceptable. Data shall be presented at one time, in a neatly bound and organized manner.
- B. The contractor shall provide and maintain at the site a set of prints which accurately represent the actual installation of all work under this Division. Any changes in sizes, locations, dimensions, etc. shall be shown. Changes in circuitry shall be clearly and completely indicated as the work progresses.
- C. At the completion of the Project, a set of marked-up drawings, including DIMENSIONED, location of all underground conduit shall be provided to the owner.

1.5 OPERATING AND MAINTENANCE MANUALS AND INSTRUCTIONS

- A. Operating and Maintenance Data includes printed information, such as manufacturer's installation instructions, manufacturer's service manuals, manufacturer's lubrication charts, standard wiring diagrams, and a parts list including the price of each item.
- B. Mark each copy to show applicable choices and options. Where printed Operating and Maintenance Data includes information on several products that are not required, mark copies to indicate the applicable information.
- C. Do not submit Operating and Maintenance Data until compliance with requirements of the Contract Documents has been confirmed.
- D. Submittals: Submit 3 copies of each required submittal. The Engineer will return the copies marked with action taken and corrections or modifications required. Unless resubmittal is requested, the submittal may serve as the final submittal.

1.6 PRIOR APPROVAL

- A. The contractor shall submit a list of proposed substitutions to the Engineer. All proposed substitutions shall be in writing to the Engineer, at least, seven (7) calendar days prior to bid opening. The submittal will list the proposed substitutions from published manufacturer's data, which cover the applicable features of the submitted equipment. Any approvals shall be issued in writing.

1.7 GUARANTEE

- A. The contractor shall fully guarantee the installation against defects in materials and workmanship which may occur under normal usage for a period of one year after owner's acceptance. Defects shall be promptly remedied at no cost to the owner. This guarantee is in addition to, and not a limit to, any other guarantees or warranties.

1.8 DEFINITIONS. The following words and phases are defined:

- A. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.
- B. "Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect/Engineer, requested by the Architect/Engineer, and similar phrases.
- C. "Approved": The term "approved," when used in conjunction with the Architect's/Engineer's action on the Contractor's submittals, applications, and requests, is limited to the Architect's/Engineer's duties and responsibilities as stated in the Conditions of the Contract.
- D. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conventions, and agreements within the construction industry that control performance of the Work.
- E. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- F. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- G. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.
- H. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.
- I. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as part of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.
- J. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

1.9 INSPECTION OF THE SITE

- A. The drawings are prepared from the most accurate information available. However, the contractor shall, prior to placing any bids, visit the site to verify existing conditions, proposed conduit routings, etc.
- B. All proposals shall take these existing conditions and any speculated revisions needed into account. The contractor shall be fully responsible for his bid regardless of any additional site information which may be uncovered after a contract is signed.

1.10 CONSTRUCTION SAFETY

- A. The plans and specifications do not include items necessary for the contractor to insure the safety of his personnel on the project construction site. Construction site safety for the project is the responsibility of the contractor. Reference other sections of these specifications for any additional information.

1.11 DAMAGE

- A. The contractor shall be held accountable to repair, at no additional cost, any damage to existing wiring, piping, or other materials and equipment intended to remain.

1.12 DRAWINGS AND SPECIFICATIONS

- A. Should be considered as complimentary to each other. What is required by one shall be binding as if required by both. If conflicts between plans and specifications are found, the Engineer shall be contacted to secure clarification, prior to bidding. The contractor shall verify all dimensions and existing conditions.

1.13 MANUFACTURER'S DRAWINGS AND DATA

- A. Submit Shop Drawings for approval, for all items indicated below.
 - 1. Panelboards
 - 2. AV System
 - 3. Lighting
- B. Provide O&M Manuals i.a.w, Paragraph 1.5, for all items indicated below.
 - 1. AV System

PART 2 - EXECUTION

2.1 WORKMANSHIP

- A. All work shall be done in a professional and complete manner by experienced craftsmen. Unsatisfactory workmanship shall be duly noted and corrected at the contractors expense.
- B. Only new materials shall be used, unless otherwise indicated on plan or prior approved.

2.2 MANUFACTURER'S INSTALLATION INSTRUCTIONS

- A. All equipment shall be installed in accordance with manufacturer's installation instructions.

2.3 PROTECTION OF EQUIPMENT

- A. The contractor shall provide protection of stored material and installed equipment against dirt, rust, moisture, and abuse from other trades. Where tarps or other cover is used, provide air circulation to prevent condensate build up. No materials or equipment shall be stored directly on the ground.

2.4 CONFLICTS, INTERFERENCES AND COORDINATION BETWEEN TRADES

- A. Coordinate work so as to conform with the progress of the work of others. The drawings are only intended to indicate the extent, general location and arrangement, of conduit systems and equipment. Any questions regarding the information given on the plans shall be directed to the Engineer for clarification. The contractor shall refer to other sections of the specifications and other drawings such as structural, mechanical, etc., in order to eliminate conflicts when laying out his work. The contractor shall be responsible for the proper coordination of the electrical work with the installations under other Divisions for clearances, etc. Any changes required to avoid interferences shall be submitted to the Architect for approval and shall be made, as approved, without additional cost.
- B. Code requirements shall have precedence over plans or specifications in the event of a conflict. If a discrepancy or conflict exists between specifications and drawings, drawings shall take precedence over specifications except as pertaining to quality. Manufacturer's installation instructions shall govern the installation of all equipment.

- C. Control wiring, schematics, or logic shown on plan is only intended to show the general intent. Such plans are not to be considered shop drawings. The contractor is responsible for determining and coordinating the detailed requirements, including but not limited to wiring, to interface systems and provide a fully functional system which follows the intent.
- D. The contractor shall coordinate with equipment suppliers for any requirements specific to the equipment provided which may not be shown on the plans or given in the specifications. The contractor shall include the provision and installation of such requirements in his bid. The contractor shall coordinate with equipment suppliers, prior to bid, to determine what ancillary equipment is or is not provided with the equipment, such as lugs, terminal blocks, etc.
- E. Equipment requiring set grades or elevations and piping has precedence over conduit, boxes, etc. as to location.
- F. The contractor shall coordinate with other equipment providers to insure correct operation of the equipment, such as, phase rotation, interlocking, accessibility, etc.
- G. Low voltage temperature control systems for HVAC systems including controls, relays, time clocks, wiring and devices will be furnished and wired under Division 23. 120Vac wiring required in support of HVAC and other mechanical/plumbing systems shall be furnished and wired under Division 26.
- H. The contractor shall examine the Architectural plans for the location of suitable openings and aisles for the passage of equipment to be installed under this Division. The contractor shall be responsible for having suitable openings and aisles left open until his equipment has been properly installed.
- I. Except as otherwise noted, it shall be understood that the indication and/or description of any item, in the drawings or specifications, or both, carries with it the instruction to furnish and install the item, regardless of whether or not this instruction is explicitly stated as part of the indication or description.
- J. It shall be understood that the plans are not intended to indicate exact raceway routings. Determination as to the routing shall be made in consideration of structural conditions and interferences with other trades or by terminal locations on apparatus.
- K. The right is reserved to make reasonable changes in locations of equipment indicated in Drawings prior to installation without an increase in the contract cost.
- L. The drawings and specifications do not undertake to indicate every item required to produce a complete and properly operating installation. Material, equipment or labor not indicated, but which can be reasonably inferred to be necessary for a complete installation shall be provided.

2.5 CUTTING AND PATCHING

- A. Every effort shall be made to build-in the work as the job progresses. As required, cutting and patching for the installation of sleeves, conduits, equipment, etc., shall be coordinated with the General Contractor. Do not cut any structural element without written permission from the Structural Engineer.

2.6 EQUIPMENT CONNECTIONS

- A. The contractor shall make final connection of all required services to all equipment items furnished, including that provided by others or by the owner. Equipment shall be left in a ready to operate state.

2.7 FLASHING AND WATERPROOFING

- A. Any building penetrations to outside shall be flashed, as required, to prevent leaks.

END OF SECTION 260000

SECTION 260500 - BASIC ELECTRICAL MATERIALS AND METHODS

PART 1 - GENERAL

1.1 SCOPE

- A. Work of this section includes specification of the following:

Wire and connectors.
Wiring and control devices.
Electrical identification.
Firestopping
Demolition
Cutting and patching for electrical construction.
Touchup painting.

1.2 QUALITY ASSURANCE

- A. Provide electrical components, devices, and accessories specified in this section that are UL listed and labeled as defined in NFPA 70, Article 100.
- B. The materials and methods used for all electrical components, devices, and accessories specified in this section shall comply with NFPA 70.

1.3 COORDINATION

- A. Coordinate chases, slots, inserts, sleeves, and openings with general construction work and arrange in building structure during progress of construction to facilitate the electrical installations that follow.
1. Set inserts and sleeves in poured-in-place concrete, masonry work, and other structural components as they are constructed.
- B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment requiring positioning before closing in the building.
- C. Coordinate electrical service connections to components furnished by utility companies.
1. Coordinate installation and connection of exterior underground utilities and services, including provision for electricity-metering components.
 2. Comply with requirements of authorities having jurisdiction and of utility company providing electrical power and other services.
- D. Where electrical identification devices are applied to field-finished surfaces, coordinate installation of identification devices with completion of finished surface.
- E. Where electrical identification markings and devices will be concealed by acoustical ceilings and similar finishes, coordinate installation of these items before ceiling installation.
- F. Verify characteristics, sizes, and ratings, of motors actually supplied prior to providing starter, overload protection and branch circuit wiring.

PART 2 - PRODUCTS

2.1 CONDUCTORS

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Wire/Cable
 - a. Anaconda
 - b. American Wire and Cable

- c. Southwire
- d. Okonite Company

2. Wire/Cable Connectors

Split-Bolt Connectors

- a. Appleton
- b. Crouse-Hinds
- c. Teledyne

Solderless Pressure Connectors

- a. Burndy
- b. Thomas and Betts
- c. AMP

Spring Wire Connectors

- a. Burndy
- b. Thomas and Betts
- c. Teledyne

Compression Connectors

- a. Burndy
- b. Crouse-Hinds
- c. Teledyne

- B. All wire sizes specified shall be i.a.w. American Wire Gauge (AWG) designations.
- C. Conductors, No. 10 awg and smaller shall be solid or stranded copper. Larger than 10 awg shall be stranded copper. Copper clad conductors are not permitted.
- D. Conductors shall be copper with not less than 95% conductivity.
- E. Insulation for power conductors shall be type THW or THHN, rated 600 volts, rated 75 deg. C minimum. Conductor insulation for feeders size 1/0 and larger may be type RHW moisture and heat resistant rubber. Conductor insulation shall have the manufacturers name, type insulation and conductor size imprinted on the jacket at regular intervals. Branch circuit conductors sizes #6 awg and smaller may be type TW. For conductors wired in fluorescent light fixture cable runs use type RHH or THHN insulation rated 90 deg. C.
- F. Conductor phasing shall be as follows. From left to right, the first bus in each panel shall be Phase 'A', middle bus 'B', and right bus 'C'.
- G. Insulation shall be color coded as required by NFPA 70, 210-5. Color coding shall be consistent throughout the project. Use white conductors only for circuit neutrals. When unable to provide a white conductor, the neutral shall be identified at switches, panelboards, junction boxes, etc. with white tape or paint. Equipment grounds shall be green. Isolated equipment grounds shall be green with yellow stripe.
- H. All materials used for wire connections and splices shall be of the size, ampacity, material type, and class suitable for the service.
- I. Provide wire and cable terminations made with UL-listed one-piece, compression deforming type, solderless high conductivity copper or copper alloy terminal lugs as follows:
 - 1. Terminal lugs shall have hole sizes and spacing i.a.w. NEMA standards.
 - 2. Terminal lugs on wire sizes 3/0 and smaller shall be single hole, single compression type. Wire and cable No. 6 awg and smaller may be terminated on mechanical type connections or terminal strips integral with the equipment or wiring device. The mechanical connector and terminal strip shall be UL-listed copper, either tubular type with a pressure plate or screw type with a wire clamp. The screw shall not directly compress the conductors.
 - 3. Terminal lugs for use on wire sizes 4/0 and larger shall be two-hole, long barrel, double compression type.
- J. In general, there shall be no splices from the power source to the load without written approval from the Engineer. If written approval is given, provide splices and taps which are made with solderless copper compression deforming connectors and which bear the UL label. All splices and taps shall be made in accordance with the manufacturer's written instructions.
 - 1. A solid barrel crimped connector shall be used for splices and taps on wire sizes No. 8 AWG and smaller.
 - 2. A solid barrel compression connector or bolting solid barrel terminal lugs shall be used for splices and taps on wire sizes No. 6 AWG and larger.

- K. Connection to motors, solenoids and other devices with integral leads sized No. 4 AWG and smaller (including all current transformers) shall be made with ring-type pressure connectors. Provide connectors bolted together and taped with oil-resistant electrical tape. Soldered or insulation piercing type connectors shall not be used. No connection shall be inside a conduit fitting.

2.2 ELECTRICAL IDENTIFICATION

- A. Wire markers shall be a vinyl or vinyl-cloth, self-adhesive, wraparound type with preprinted numbers and letters.
- B. Engraved-Plastic labels, signs, and instruction plates shall be a melamine plastic laminate punched or drilled for mechanical fasteners 1/16-inch minimum thickness for signs up to 20 sq. in. and 1/8-inch minimum thickness for larger sizes. Engraved legend in black letters on white background.
- C. Nameplates and signs fasteners shall be self-tapping, stainless-steel screws or No. 10/32 stainless-steel machine screws with nuts and flat and lock washers.

2.3 TOUCHUP PAINT

- A. Equipment touch-up paint shall be selected to match the installed equipment finish. For galvanized surfaces, a zinc-rich paint recommended by the equipment manufacturer shall be used.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

- A. Materials and components shall be installed level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.
- B. Install equipment to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.
- C. Where wire and cable routing is not shown, and destination only is indicated, determine exact routing and lengths required. Wire and cable routing indicated on the Drawings is approximate unless dimensioned. Route wire and cable as required to meet Project Conditions.
- D. Branch circuit wiring is generally sized not to exceed a two-percent voltage drop, but in no case shall exceed a three-percent voltage drop.

3.2 WIRING INSTALLATION

- A. Install wiring in a conduit raceway with conductors of the types and sizes as shown on the drawings and specified in these specifications. Where no type or size is given install conductors as required by code.
- B. From panels extend a complete system of wiring to all fixtures, motors, devices, and other equipment. Employ multi-wire circuits as indicated. Connect circuits to panelboards to give an evenly balanced load. Secure approval for any departure from the circuit arrangement as shown.
- C. Numerals shown on the drawing "home-runs" indicate the circuit arrangement. Cross marks on branch circuit runs indicate the number of conductors required. Where no cross marks are shown, two conductors are indicated.
- D. All home runs shall be 12 (twelve) awg or larger as indicated. Provide 10 (ten) awg where home runs exceed 60 feet in length. No wire smaller than #12 is permitted serving lighting or outlets.
- E. Do not pull conductors until the entire conduit system is complete and the building is "in the dry". Use only UL approved lubricants to facilitate conductor pulling.
- F. Furnish all switches, connections, branch circuits, wiring, etc. to HVAC equipment, as needed, to provide a complete power wiring system. Install and connect 120 Vac control devices which are to be included in power wiring.

- G. Furnish raceway, backboxes, wiring, connections, etc. for all equipment and systems furnished under this or other section(s) of these specifications, or by Owner, for a complete installation i.a.w. suppliers and manufacturers instructions. All equipment shall be connected ready for operation, i.a.w. detailed wiring diagrams furnished by the equipment manufacturer and in cooperation with the respective subcontractor or Owner. Provide receptacles to match equipment furnished plugs.
- H. Install wiring at outlets with a minimum of 8" of slack conductor.
- I. Install pre-finished cord sets where connection with an attachment plug is indicated or specified, or use attachment plug with suitable strain relief clamps.
- J. Solderless pressure connectors with insulating covers shall be used for copper conductor splices and taps, No. 8 awg and smaller.
- K. Insulation on approved splices and taps for wire sizes No. 8 AWG and smaller shall consist of:
 - 1. Half-lapped layers of all weather pvc tape installed to a thickness equivalent to the conductor insulation. Or
 - 2. An insulation system consisting of a heat shrink or cold shrink system properly sized for the application.
- L. Insulation on approved splices and taps for wire sizes No. 6 AWG and larger shall consist of:
 - 1. A minimum of three half-lapped layers of yellow, varnished cambric tape and three half-lapped layers of all weather pvc tape. An electrically insulating putty may be used over irregular shapes prior to application of the tape.
 - 2. An insulation system consisting of a heat shrink or cold shrink system properly sized for the application.

3.3 IDENTIFICATION MATERIALS AND DEVICES

- A. Install at locations for most convenient viewing without interference with operation and maintenance of equipment.
- B. Coordinate names, abbreviations, colors, and other designations used for electrical identification with corresponding designations indicated in the Contract Documents or required by codes and standards. Use consistent designations throughout Project.
- C. Clean surfaces before applying self-adhesive identification products.
- D. Tag and label circuits designated to be extended in the future. Identify source and circuit numbers in each cabinet, pull and junction box, and outlet box. Color-coding may be used for voltage and phase identification.
- E. Install engraved plastic-laminated instruction signs with approved legend where instructions are needed for system or equipment operation. Install metal-backed butyrate signs for outdoor items.
- F. Panel schedules for existing branch circuit panel boards shall be updated for all circuit changes.
- G. Label raceway branch circuit junction boxes as to the panel(s) and circuit number(s) from which the circuit(s) originates. Use machine printed, pressure sensitive, abrasion resistant label tape on the faceplate and wiremarkers or tags within the box.
- H. Provide engraved nameplates to identify all electrical distribution and control equipment and loads served. Letter height shall be 1/8 inch for individual switches and loads served, 1/4 inch for distribution and control equipment identification.
- I. Panelboards, switchboards and motor control centers shall have 1/4 inch letter engraved nameplates to identify with the equipment designation, 1/8 inch lettering to identify the voltage rating and source.
- J. Provide an engraved nameplate with 1/8 lettering to identify the conductor color coding scheme at each panelboard and switchboard. Mount on the interior of the door if so equipped, otherwise on the back of the trim.

3.4 FIRESTOPPING

- A. Penetrations of fire rated floor and wall assemblies shall be sealed with firestop material appropriate to achieve the designated fire resistance rating of the assembly. Firestopping materials and installation requirements are specified in Division 7.

3.5 DEMOLITION

- A. Remove all existing lighting lamps and fixtures exercising caution to prevent damage. All such lamps and fixtures shall be made available to the owner. Any () items the owner does not want shall be properly disposed of by the contractor.

- B. Remove all existing duplex receptacles. In receptacle locations not subject to reuse, repair wall and prepare for new finish.
- C. All lighting and duplex receptacle branch circuit wiring will be pulled back to the originating panelboard and removed.
- D. In wall raceway may be capped and abandoned in place. All existing raceway which is run above the ceiling shall be removed and disposed of by the contractor. In wall raceway may be reused where appropriate for the location of a new receptacle outlet.
- E. Remove existing telephone and cable outlets. Also remove existing door hold devices. Pull telephone wiring back to existing terminal board and remove. Pull dictation cable back to nearest junction box which is exterior to the room and disconnect. Pull door hold device cabling back to the nearest junction box and remove. Remove existing nurse call and intercom devices. Pull wiring back to nearest junction box external to the room and remove. Repair wall and make ready for new finish.
- F. All demolished materials shall be removed from the project site and disposed of properly.

3.6 CUTTING AND PATCHING

- A. Cut, channel, chase, and drill floors, walls, partitions, ceilings, and other surfaces required to permit electrical installations. Perform cutting by skilled mechanics of trades involved.
- B. Repair and refinish disturbed finish materials and other surfaces to match adjacent undisturbed surfaces. Repair and refinish materials and other surfaces by skilled mechanics of trades involved.

3.7 REFINISHING AND TOUCHUP PAINTING

- A. The following procedure should be used for refinishing and/or touch-up needed:
 - 1. Clean damaged and disturbed areas and apply primer, intermediate, and finish coats to suit the degree of damage at each location.
 - 2. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
 - 3. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 4. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260500

SECTION 260526 - GROUNDING & BONDING

PART 1 - GENERAL

1.1 SCOPE

- A. This Section includes grounding of electrical systems and equipment and basic requirements for grounding for protection of life, equipment, circuits, and systems. Grounding requirements specified in this Section may be supplemented in other Sections of these Specifications.

1.2 RELATED DOCUMENTS

- A. Referenced standards include:
 - NFPA 70 - National Electric Code
 - OSHA 1910 - Standards for General Industry
 - ANSI/IEEE 81 - Guide for Measuring Earth Resistivity, Ground Impedance, and Earth Surface Potentials of a Ground System

1.3 QUALITY ASSURANCE

- A. Provide electrical components, devices, and accessories specified in this section that are UL listed and labeled as defined in NFPA 70, Article 100.
- B. Grounding system to be tested i.a.w. ANSI/IEEE Std 81 using the "two-point" method.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Mechanical Connectors
 - a. O.Z. Gedney
 - b. Burndy
 - c. Thomas & Betts, Electrical
 - 2. Exothermic Connections
 - a. Caldweld
 - b. Thermoweld

2.2 GROUNDING AND BONDING PRODUCTS

- A. Where types, sizes, ratings, and quantities indicated are in excess of National Electrical Code (NEC) requirements, the more stringent requirements and the greater size, rating, and quantity indications govern.

2.3 WIRE AND CABLE GROUNDING CONDUCTORS

- A. Wire and cable grounding conductors shall conform to NEC Table 8, except as otherwise indicated.
- B. All equipment grounding conductors shall be insulated with green color insulation.
- C. Grounding-electrode conductors shall be stranded copper cable.

2.4 MISCELLANEOUS CONDUCTORS

- A. Where required, braided bonding jumpers shall be a copper tape, braided No. 30 AWG bare copper wire, terminated with copper ferrules. Bonding straps shall be soft copper, 0.05 inch thick and 2 (two) inches wide.

2.5 CONNECTOR PRODUCTS

- A. Pressure type connectors shall be of a high-conductivity-plated design.
- B. Bolted Clamps shall be heavy-duty type.
- C. Exothermic-welded connections shall be as provided in kit form and selected per manufacturer's written instructions for specific types, sizes, and combinations of conductors and connected items.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Equipment grounding conductors shall be installed to comply with NEC Article 250. Where types, sizes, and quantities of equipment grounding conductors, are more than required by NEC use the more stringent requirements.
 - 1. Install insulated equipment grounding conductor with circuit conductors for the items below in addition to those required by Code:
 - a. Feeders and branch circuits.
 - b. Lighting circuits.
 - c. Receptacle circuits.
 - d. Flexible raceway runs.
 - e. Armored and metal-clad cable runs.
 - f. Single phase motor or appliance branch circuits.
 - g. Three phase motor or appliance branch circuits.
 - 2. Install a separate equipment grounding conductor to each electric water heater, heat-tracing assembly, and antifrost heating cable. Bond conductor to heater units, piping, connected equipment, and components.
 - 3. Ground metal pole supporting outdoor lighting fixture to a grounding electrode in addition to separate equipment grounding conductor run with supply branch circuit.
- B. Exothermic welded connections shall be used for all underground connections or connections to structural steel
- C. Equipment grounding conductor connections will be made with bolted pressure clamps.
- D. Install an insulated equipment grounding conductor connected to the receptacle grounding terminal for all isolated grounding receptacle circuits. Isolate grounding conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- E. As noted on the plans, for designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate equipment grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service, unless otherwise indicated.
- F. Provide grounding and installation for telephone equipment i.a.w., NFPA 70, Section 800.

3.2 INSTALLATION

- A. Ground electrical systems and equipment according to NEC requirements, except where Drawings or Specifications exceed NEC requirements.
 - 1. Drive ground rods until tops are 2 inches below finished floor or final grade, unless otherwise indicated. Verify that final backfill and compaction has been completed prior to driving ground rods.
 - 2. Interconnect ground rods with grounding electrode conductors. Use exothermic welds, except at test wells and as

otherwise indicated. Make connections without exposing steel or damaging copper coating.

- B. Grounding conductors shall be routed along the shortest and straightest paths possible, except as otherwise indicated. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
- C. For underground grounding conductors, use bare copper wire buried at least 24 inches below grade.
- D. Provide insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes by grounding clamp connectors. Where a dielectric main water fitting is installed, connect grounding conductor to street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end. Use braided-type bonding jumpers to electrically bypass water meters.

3.3 CONNECTIONS

- A. Make connections so possibility of galvanic action or electrolysis is minimized. Select connectors, connection hardware, conductors, and connection methods so metals in direct contact will be galvanically compatible.
 - 1. Use electroplated or hot-tin-coated materials to assure high conductivity and to make contact points closer in order of galvanic series.
 - 2. Make connections with clean, bare metal at points of contact.
- B. Use exothermic-welded connections for connections to structural steel and for underground connections. Comply with manufacturer's written instructions. Welds that are puffed up or that show convex surfaces indicating improper cleaning are not acceptable.
- C. Equipment grounding-wire terminations for No. 8 awg and larger, use pressure-type grounding lugs. No. 10 awg and smaller grounding conductors may be terminated with winged pressure-type connectors.
 - 1. Use hydraulic compression tools to provide correct circumferential pressure for compression connectors. Use tools and dies recommended by connector manufacturer. Provide embossing die code or other standard method to make a visible indication that a connector has been adequately compressed on grounding conductor.
- D. Where metallic raceways terminate at metal housings without mechanical and electrical connection to housing, terminate each conduit with a grounding bushing. Connect grounding bushings with a bare grounding conductor to grounding bus or terminal in housing. Bond electrically noncontinuous conduits at both entrances and exits with grounding bushings and bare grounding conductors, except as otherwise indicated.
- E. All test and measurement data shall be provided to the Engineer for review.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Hangers and supports for electrical equipment and systems.
 - 2. Construction requirements for concrete bases.

1.3 DEFINITIONS

- A. EMT: Electrical metallic tubing.
- B. IMC: Intermediate metal conduit.
- C. RMC: Rigid metal conduit.

1.4 PERFORMANCE REQUIREMENTS

- A. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.
- B. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

1.5 SUBMITTALS

- A. Product Data: For the following:
 - 1. Steel slotted support systems.

1.6 QUALITY ASSURANCE

- A. Comply with NFPA 70.

1.7 COORDINATION

- A. Coordinate size and location of concrete bases. Cast anchor-bolt inserts into bases.
- B. Coordinate installation of roof curbs, equipment supports, and roof penetrations.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

- A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - a. Allied Tube & Conduit.
 - b. Cooper B-Line, Inc.; a division of Cooper Industries.
 - c. Thomas & Betts Corporation.
 - d. Unistrut; Tyco International, Ltd.
 - 2. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
 - 3. Channel Dimensions: Selected for applicable load criteria.
- B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.
- C. Conduit and Cable Support Devices: Steel and malleable-iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
- D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or 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.
- E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.
- F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
 - 1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Hilti Inc.
 - 2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.
 - 2. Mechanical-Expansion Anchors: Insert-wedge-type, stainless steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.
 - a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1) Cooper B-Line, Inc.; a division of Cooper Industries.
 - 2) Hilti Inc.
 - 3) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
 - 3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.
 - 4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
 - 5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
 - 6. Toggle Bolts: All-steel springhead type.
 - 7. Hanger Rods: Threaded steel.

PART 3 - EXECUTION

3.1 APPLICATION

- A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.
- B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.
- C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
- D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

- A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.
- B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.
- C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
- D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
 - 1. To Wood: Fasten with lag screws or through bolts.
 - 2. To New Concrete: Bolt to concrete inserts.
 - 3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
 - 4. To Existing Concrete: Expansion anchor fasteners.
 - 5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
 - 6. To Steel: Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69
 - 7. To Light Steel: Sheet metal screws.
 - 8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate
- E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 CONCRETE BASES

- A. Construct concrete bases of dimensions indicated but not less than 4 inches (100 mm) larger in both directions than supported unit, and so anchors will be a minimum of 10 bolt diameters from edge of the base.
- B. Use 3000-psi (20.7-MPa), 28-day compressive-strength concrete. Concrete materials, reinforcement, and placement requirements are specified in Division 03 Section "Cast-in-Place Concrete"
- C. Anchor equipment to concrete base.

1. Place and secure anchorage devices. Use supported equipment manufacturer's setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
2. Install anchor bolts to elevations required for proper attachment to supported equipment.
3. Install anchor bolts according to anchor-bolt manufacturer's written instructions.

3.4 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.
 1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils.
- B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SCOPE

- A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

1. Raceways include the following:
 - a. EMT - Electrical Metallic Tubing
 - b. FMC - Flexible Metal Conduit
 - c. LFMC - Liquid Tight Flexible Metal Conduit
 - d. PVC - PVC coated, Rigid Steel Conduit
 - e. RNC - Rigid Non-metallic Conduit
 - f. RSG - Rigid Steel Galvanized Conduit
2. Boxes, enclosures, and cabinets include the following:
 - a. Device boxes.
 - b. Floor boxes.
 - c. Outlet boxes.
 - d. Pull and junction boxes.
 - e. Cabinets and hinged-cover enclosures.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary conditions and Division 1 Specification Sections, apply to this section.
- B. Referenced standards include:

NFPA 70 - National Electric Code
ANSI C80.1 - American National Standard, Rigid Steel Galvanized Conduit
ANSI C80.3 - American National Standard, Electrical Metallic Tubing
OSHA 1910 - Standards for General Industry
NEMA FB1 - National Electrical Manufacturers Assoc., fittings
NEMA TC 3 - PVC fittings

1.3 COORDINATION

- A. Coordinate layout and installation of raceways and boxes with other construction elements to ensure adequate headroom, working clearance, and access.
- B. Field verify measurements.
- C. Verify routing and termination locations of conduit prior to rough-in.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Metal Conduit and Tubing:
 - a. Allied Tube and Conduit
 - b. Triangle
 - c. Wheatland
 - d. Anaconda (flexible conduit)
 2. Nonmetallic Conduit and Tubing:

- a. Carlon
 - b. Robroy
 - c. Anaconda
- 3. Conduit Bodies and Fittings:
 - a. Crouse-Hinds
 - b. Appleton
 - c. O-Z/Gedney
- 4. Fire Rated Fittings:
 - a. Crouse-Hinds
 - b. O-Z/Gedney
 - c. Appleton
- 5. Expansion/Deflection Fittings:
 - a. Crouse-Hinds
 - b. O-Z/Gedney
 - c. Appleton
- 6. Cable Trough/Wireway
 - a. B-Line
 - b. Wiremold
 - c. Hoffman
 - d. Hammond
- 7. Boxes, Enclosures, and Cabinets:
 - a. Crouse-Hinds
 - b. Hoffman
 - c. B-Line
 - d. Robroy

2.2 METAL CONDUIT AND TUBING

A. EMT and Fittings

- 1. All electrical metallic tubing shall comply with the latest revision of ANSI C80.3.
- 2. Electrical metallic tubing (EMT) shall be galvanized steel and shall be used for all indoor concealed or exposed work, unless otherwise noted. Connectors and couplings shall be threadless compression type.

B. FMC

- 1. Flexible metal conduit shall be used for final connections to motors. Conduit shall be of an interlocked steel construction.

C. LFMC

- 1. Liquid tight flexible metal conduit shall be used in wet locations for final connections to motors and other equipment subject to vibration. Preference given to neoprene jacketed Seal-tite by Anaconda or equal.

D. PVC

- 1. PVC coated rigid steel conduit shall be used for all transitions from below grade to 18 (eighteen) inches above the finished grade or floor.

E. RSG

- 1. All rigid steel galvanized conduit shall comply with the latest revision of ANSI C80.1.
- 2. Rigid steel galvanized conduit shall be used for all exterior exposed work, unless otherwise noted. Rigid steel galvanized conduit shall be used in all NEC, classified, hazardous locations whether interior or exterior.

F. Fittings

1. All fittings shall comply with the requirements of NEMA FB 1, standard for conduit fittings, cast metal boxes, and conduit bodies. All fittings used shall be compatible with the conduit and tubing materials used.

2.3 NONMETALLIC CONDUIT

A. RNC

1. Unless otherwise noted, all rigid nonmetallic conduit shall be schedule 40 PVC complying with NEMA TC 3 standards.
2. RNC shall be used for underground cable runs, unless otherwise noted. Provide schedule 80 PVC where underneath roadways and drives subject to vehicle traffic.

B. Fittings

1. Unless otherwise noted, all fittings used with nonmetallic conduit shall be schedule 40 PVC complying with NEMA TC 3 standards. The fittings used shall be compatible with conduit size and type.

2.4 OUTLET AND DEVICE BOXES

A. Metal Boxes

1. Provide galvanized steel metal boxes sized to accommodate devices and conductors as per NEC Art. 370 at each outlet location indicated on the drawings or as required. Boxes shall be a minimum of 1.5" deep, of metal a minimum of 1/16" thick.
2. Boxes used with exposed conduit should be a four-inch square utility box.
3. The owner reserves the right to make adjustments to the location of outlet boxes prior to rough-in.
4. Sizes and configuration of boxes shall be as required for the intended service. The boxes shall conform to and be applied, i.a.w, NEC requirements. Supports, gaskets, extension rings, etc. shall be provided where required.
5. Gang type boxes shall be used where multiple wiring devices are located together.

B. Floor Boxes

1. Floor boxes shall be located as indicated on the drawings. Coordinate with architect/owner prior to final placement. A multi-function floor box, providing completely segregated power and data cabling and outlets, shall be used where power and communications outlets are shown in the same general location, even when the outlets are shown on different electrical plan sheets.
2. Nonmetallic boxes suitable for concrete encasement may be used.
3. Boxes equal to Wiremold 880MP, rectangular, series, with separate, brushed aluminum, flip lid, cover plates.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive raceways, boxes, enclosures, and cabinets for compliance with installation tolerances and other conditions affecting performance of raceway installation. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install raceways, boxes, enclosures, and cabinets as indicated, according to manufacturer's written instructions.
- B. Minimum Raceway Size: 1/2-inch trade size. Homeruns shall be 3/4" minimum.
- C. Conceal conduit and EMT, unless otherwise indicated, within finished walls, CMU walls, ceilings, and floors, except in equipment room. Do not run conduit in **cavity** of exterior wall with brick exteriors.

- D. Keep raceways at least 12 inches away from hot-water pipes. Install horizontal raceway runs above water piping.
- E. Install raceways level and square and at proper elevations. Provide adequate headroom.
- F. Complete raceway installation before starting conductor installation.
- G. All conduits, concealed or exposed, shall be supported and substantially fastened to structural members at intervals of not more than 8 (eight) feet. Attach supporting devices with screws, bolts, expansion sleeves or other workmanlike means appropriate to the surface. Boxes which are not embedded in masonry or concrete shall be fastened to the structure in the same manner as for conduits.
- H. Use temporary closures to prevent foreign matter from entering raceways.
- I. Protect stub-ups from damage where conduits rise through floor slabs. Arrange so curved portion of bends is not visible above the finished slab. Where conduits emerge from the ground or slab, provide a rigid steel adapter, elbow and conduit. Slope conduits to drain away from the building. All metal conduits installed underground shall be PVC coated. PVC coated rigid steel conduit shall be used within five feet from foundation walls.
- J. Make bends and offsets so ID is not reduced. Keep legs of bends in the same plane and straight legs of offsets parallel, unless otherwise indicated.
- K. Use raceway fittings compatible with raceways and suitable for use and location.
- L. Run concealed raceways, with a minimum of bends, in the shortest practical distance considering the type of building construction and obstructions, unless otherwise indicated.
- M. Raceways Embedded in Slabs: Install in middle third of slab thickness where practical, and leave at least 1-inch concrete cover.
 - 1. Secure raceways to reinforcing rods to prevent sagging or shifting during concrete placement.
 - 2. Space raceways laterally to prevent voids in concrete.
 - 3. Run conduit larger than 1-inch trade size parallel to or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
 - 4. Transition from nonmetallic tubing to rigid steel conduit before rising above floor.
- N. Install exposed raceways parallel to or at right angles to nearby surfaces or structural members, and follow the surface contours as much as practical.
 - 1. Run parallel or banked raceways together, on common supports where practical.
 - 2. Make bends in parallel or banked runs from same centerline. Use factory elbows only where elbows can be installed parallel; otherwise, provide field bends for parallel raceways.
- O. Join raceways with fittings designed and approved for the purpose and make joints tight.
 - 1. Make raceway terminations tight. Use bonding bushings or wedges at connections subject to vibration. Use bonding jumpers where joints cannot be made tight.
 - 2. Use insulating bushings to protect conductors.
- P. Terminations: Where raceways are terminated with locknuts and bushings, align raceways to enter squarely and install locknuts with dished part against the box. Where terminations are not secure with 1 locknut, use 2 locknuts: 1 inside and 1 outside the box. Provide bushings on ends where auxiliary system conduit raceway is stubbed out into furred space, adjacent to backboard, etc.
- Q. Where raceways are terminated with threaded hubs, screw raceways or fittings tightly into the hub so the end bears against the wire protection shoulder. Where chase nipples are used, align raceways so the coupling is square to the box and tighten the chase nipple so no threads are exposed.
- R. Install pull wires in empty raceways. Use No. 14 AWG zinc-coated steel or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of the pull wire.
- S. Telephone and Signal System Raceways, 2-Inch Trade Size and Smaller: In addition to the above requirements, install raceways in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements.

- T. Stub-up Connections: Extend conduits through concrete floor for connection to freestanding equipment. Install with an adjustable top or coupling threaded inside for plugs set flush with the finished floor. Extend conductors to equipment with rigid steel conduit; FMC may be used 6 inches above the floor. Install screwdriver-operated, threaded flush plugs flush with floor for future equipment connections.
- U. Flexible Connections: Use maximum of 6 feet of flexible conduit for recessed and semi-recessed lighting fixtures; for equipment subject to vibration, noise transmission, or movement; and for all motors. Use liquidtight flexible conduit in wet or damp locations. Install separate ground conductor across flexible connections.
- V. Set floor boxes level and trim after installation to fit flush to finished floor surface.
- W. Provide galvanized sheet metal pull boxes with screw type cover, as required, to avoid excessive runs or bends between outlets.
- X. Grade all raceway away from service entrance equipment to prevent water damage.
- Y. Provide expansion fittings in all conduits crossing an expansion joint. Fitting shall be OZ type "EX" for rigid metal conduit or schedule 40 pvc. Fitting shall be OZ type "TX" for EMT. Metallic conduit not containing a grounding conductor shall have OZ type "BJ" bonding jumpers installed across expansion joints. Provide expansion fittings for PVC conduit runs over 150 feet, or outdoors or in areas or runs subject to temperature variations over 75 degrees F, and as recommended by the manufacturer.
- Z. Grouped raceways shall be supported with galvanized steel channel assemblies equal to Kindorf B-909 and single bolt straps equal to Kindorf C-105. Raceway supports shall be spaced within 2 (two) feet of termination and/or connection and 8 (eight) feet on center for rigid steel, and EMT conduit. RNC shall be supported i.a.w. NFPA 70, 347-8. FNMC shall be supported within 12 (twelve) inches of termination/connection and 4.5 (four and one-half) feet on center.
- AA. The drawings indicate approximate locations only. Determine the exact location on site in consideration of all structural and architectural conditions.
- BB. Provide and install "low point drains" in all above grade, outdoor raceway. Provide and install breather drains in the bottom of outdoor control panels. As much as possible, route conduits into the bottom of control panels.
- CC. All phase conductors and, where used, the grounded conductor, and all equipment grounding conductors shall be grouped together in a single raceway. Where multiple phase conductors are run in parallel, separate conduits shall be run to contain one set of all phase conductors, neutral (if used) and the equipment grounding conductor.
- DD. Where underground conduits stub-up through concrete equipment pad "blocked out" windows, after curing blocks, fill the block-out window with gravel to 1" of the top and cap with mortar. Caulk all entrances and around the mortar.

3.3 PROTECTION

- A. Provide final protection and maintain conditions, in a manner that ensures coatings, finishes, and cabinets are without damage or deterioration at the time of Substantial Completion.
 - 1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
 - 2. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

3.4 CLEANING

- A. On completion of installation, including outlet fittings and devices, inspect exposed finish. Remove burrs, dirt, and construction debris and repair damaged finish, including chips, scratches, and abrasions.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Identification for raceways.
 - 2. Identification of power and control cables.
 - 3. Identification for conductors.
 - 4. Warning labels and signs.
 - 5. Equipment identification labels.
 - 6. Miscellaneous identification products.

1.3 QUALITY ASSURANCE

- A. Comply with NFPA 70.
- B. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.
- C. Comply with ANSI Z535.4 for safety signs and labels.
- D. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

1.4 COORDINATION

- A. Coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and the Operation and Maintenance Manual; and with those required by codes, standards, and 29 CFR 1910.145. Use consistent designations throughout Project.
- B. Coordinate installation of identifying devices with completion of covering and painting of surfaces where devices are to be applied.
- C. Coordinate installation of identifying devices with location of access panels and doors.
- D. Install identifying devices before installing acoustical ceilings and similar concealment.

PART 2 - PRODUCTS

2.1 POWER RACEWAY IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway size.
- B. Colors for Raceways Carrying Circuits at 600 V or Less:

1. Black letters on an orange field.
2. Legend: Indicate voltage and system or service type.

- C. Self-Adhesive Vinyl Labels for Raceways Carrying Circuits at 600 V or Less: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.2 POWER AND CONTROL CABLE IDENTIFICATION MATERIALS

- A. Comply with ANSI A13.1 for minimum size of letters for legend and for minimum length of color field for each raceway and cable size.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.

2.3 CONDUCTOR IDENTIFICATION MATERIALS

- A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils (0.08 mm) thick by 1 to 2 inches (25 to 50 mm) wide.
- B. Self-Adhesive Vinyl Labels: Preprinted, flexible label laminated with a clear, weather- and chemical-resistant coating and matching wraparound adhesive tape for securing ends of legend label.
- C. Marker Tapes: Vinyl or vinyl-cloth, self-adhesive wraparound type, with circuit identification legend machine printed by thermal transfer or equivalent process.

2.4 WARNING LABELS AND SIGNS

- A. Comply with NFPA 70 and 29 CFR 1910.145.
- B. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.
- C. Metal-Backed, Butyrate Warning Signs:
1. Weather-resistant, nonfading, preprinted, cellulose-acetate butyrate signs with 0.0396-inch (1-mm) galvanized-steel backing; and with colors, legend, and size required for application.
 2. 1/4-inch (6.4-mm) grommets in corners for mounting.
 3. Nominal size, 10 by 14 inches (250 by 360 mm).

2.5 EQUIPMENT IDENTIFICATION LABELS

- A. Engraved, Laminated Acrylic or Melamine Label: Punched or drilled for screw mounting. White letters on a dark-gray background. Minimum letter height shall be 3/8 inch (10 mm).

2.6 MISCELLANEOUS IDENTIFICATION PRODUCTS

- A. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Verify identity of each item before installing identification products.

- B. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.
- C. Apply identification devices to surfaces that require finish after completing finish work.
- D. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.
- E. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
- F. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.
 - 1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for ungrounded service feeder and branch-circuit conductors.
 - a. Color shall be factory applied.
 - b. Colors for 208/120-V Circuits:
 - 1) Phase A: Black.
 - 2) Phase B: Red.
 - 3) Phase C: Blue.
 - c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches (150 mm) from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.
- G. Install instructional sign including the color-code for grounded and ungrounded conductors using adhesive-film-type labels.
- H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power and Lighting: Self-adhesive warning labels Baked-enamel warning signs.
 - 1. Comply with 29 CFR 1910.145.
 - 2. Identify system voltage with black letters on an orange background.
 - 3. Apply to exterior of door, cover, or other access.
 - 4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:
 - a. Power transfer switches.
 - b. Controls with external control power connections.
- I. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.
 - 1. Labeling Instructions:
 - a. Indoor Equipment: Engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.
 - b. Elevated Components: Increase sizes of labels and letters to those appropriate for viewing from the floor.
 - c. Unless provided with self-adhesive means of attachment, fasten labels with appropriate mechanical fasteners that do not change the NEMA or NRTL rating of the enclosure.
 - 2. Equipment to Be Labeled:
 - a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be **engraved**, laminated acrylic or melamine label.
 - b. Enclosures and electrical cabinets.
 - c. Access doors and panels for concealed electrical items.

- d. Switchboards.
- e. Enclosed switches.
- f. Contactors.

END OF SECTION 26 05 53

SECTION 260923 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following lighting control devices:

1. Time switches.
2. Indoor occupancy sensors.

1.2 DEFINITIONS

- A. LED: Light-emitting diode.
- B. PIR: Passive infrared.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show installation details for occupancy and light-level sensors.
1. Interconnection diagrams showing field-installed wiring.
- C. Field quality-control test reports.
- D. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals.

1.4 QUALITY ASSURANCE

- A. Electrical Components, Devices, and Accessories: UL listed and labeled as defined in NFPA 70, Article 100, and marked for intended use.

1.5 COORDINATION

- A. Coordinate layout and installation of ceiling-mounted devices with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, smoke detectors, fire-suppression system, and partition assemblies.

PART 2 - PRODUCTS

2.1 TIME SWITCHES

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Grasslin Controls Corporation; a GE Industrial Systems Company.
 2. Intermatic, Inc.
 3. Leviton Mfg. Company Inc.
 4. Lithonia Lighting; Acuity Lighting Group, Inc.
 5. Paragon Electric Co.; Invensys Climate Controls.
 6. Square D; Schneider Electric.

7. TORK.

- B. Electronic Time Switches: Electronic, solid-state programmable units with alphanumeric display; complying with UL 917.
1. Contact Configuration: DPDT
 2. Contact Rating: 30-A inductive or resistive, 240-V ac or as otherwise noted on the plans.
 3. Program: 2 on-off set points on a 24-hour schedule, allowing different set points for each day of the week and an annual holiday schedule that overrides the weekly operation on holidays.
 4. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program.
 5. Astronomic Time: All channels.
 6. Battery Backup: For schedules and time clock.
- C. Electromechanical-Dial Time Switches: Type complying with UL 917.
1. Contact Configuration: DPDT
 2. Contact Rating: 30-A inductive or resistive, 240-V ac or as otherwise noted on the plans.
 3. Circuitry: Allow connection of a photoelectric relay as substitute for on-off function of a program.
 4. Astronomic time dial.
 5. Eight-Day Program: Uniquely programmable for each weekday and holidays.
 6. Skip-a-day mode.
 7. Wound-spring reserve carryover mechanism to keep time during power failures, minimum of 16 hours.

2.2 INDOOR OCCUPANCY SENSORS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
1. Hubbell Lighting.
 2. Leviton Mfg. Company Inc.
 3. Lithonia Lighting; Acuity Lighting Group, Inc.
 4. Novitas, Inc.
 5. Sensor Switch, Inc.
 6. TORK.
- B. General Description: Wall- or ceiling-mounting, solid-state units with a separate relay unit.
1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a time delay for turning lights off, adjustable over a minimum range of 1 to 15 minutes.
 2. Sensor Output: Contacts rated to operate the connected relay, complying with UL 773A. Sensor shall be powered from the relay unit.
 3. Relay Unit: Dry contacts rated for 20-A ballast load at 120- and 277-V ac, for 13-A tungsten at 120-V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24-V dc, 150-mA, Class 2 power source as defined by NFPA 70.
 4. Mounting:
 - a. Sensor: Suitable for mounting in any position on a standard outlet box.
 - b. Relay: Externally mounted through a 1/2-inch (13-mm) knockout in a standard electrical enclosure.
 - c. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.
 5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.
 6. Bypass Switch: Override the on function in case of sensor failure.
 7. Automatic Light-Level Sensor: Adjustable from 2 to 200 fc (21.5 to 2152 lx); keep lighting off when selected lighting level is present.
- C. Dual-Technology Type: Ceiling mounting; detect occupancy by using a combination of PIR and ultrasonic detection methods in area of coverage. Particular technology or combination of technologies that controls on-off functions shall be selectable in the field by operating controls on unit.
1. Sensitivity Adjustment: Separate for each sensing technology.
 2. Detector Sensitivity: Detect occurrences of 6-inch- (150-mm-) minimum movement of any portion of a human body that presents a target of not less than 36 sq. in. (232 sq. cm), and detect a person of average size and weight moving

- not less than 12 inches (305 mm) in either a horizontal or a vertical manner at an approximate speed of 12 inches/s (305 mm/s).
3. Detection Coverage (Standard Room): Detect occupancy anywhere within a circular area of 1000 sq. ft. (93 sq. m) when mounted on a 96-inch- (2440-mm-) high ceiling.

PART 3 - EXECUTION

3.1 SENSOR INSTALLATION

- A. Install and aim sensors in locations to achieve not less than 90 percent coverage of areas indicated. Do not exceed coverage limits specified in manufacturer's written instructions.

3.2 CONTACTOR INSTALLATION

- A. Mount electrically held lighting contactors with elastomeric isolator pads, to eliminate structure-borne vibration, unless contactors are installed in an enclosure with factory-installed vibration isolators.

3.3 WIRING INSTALLATION

- A. Wiring within Enclosures: Comply with NECA 1. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- B. Size conductors according to lighting control device manufacturer's written instructions, unless otherwise indicated.
- C. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.

3.4 IDENTIFICATION

- A. Identify components and power and control wiring.
1. Identify controlled circuits in lighting contactors.
 2. Identify circuits or luminaires controlled by photoelectric and occupancy sensors at each sensor.
- B. Label time switches and contactors with a unique designation.

3.5 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
1. After installing time switches and sensors, and after electrical circuitry has been energized, adjust and test for compliance with requirements.
 2. Operational Test: Verify operation of each lighting control device, and adjust time delays.
- B. Lighting control devices that fail tests and inspections are defective work.

3.6 ADJUSTING

- A. Occupancy Adjustments: When requested within 12 months of date of Substantial Completion, provide on-site assistance in adjusting sensors to suit occupied conditions. Provide up to two visits to Project during other-than-normal occupancy hours for this purpose.

END OF SECTION 260923

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SCOPE

- A. Work of this section includes specification of the following:
 - 1. Receptacles
 - 2. Switches
 - 3. Wall Plates

1.2 SUBMITTALS

- A. Submit product data on the switches, receptacles, and wall plates to be used.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Wiring Devices:
 - a. Arrow
 - b. Hubbell
 - c. Leviton

2.2 RECEPTACLES

- A. Receptacles shall be specification grade, duplex type, rated 20 amp, 120 volt service, unless otherwise noted. Receptacles shall be of the straight-blade design, NEMA configuration 5-20R. Receptacles of critical branch circuits shall be red.

Hubbell 5351, Arrow-Hart 5351, or Leviton 5351: 125 V single convenience receptacle

Hubbell 5352, Arrow-Hart 5352, or Leviton 5352: 125 V duplex convenience receptacle

- B. GFCI receptacles may be a feed-through, as needed to protect downstream receptacles on the same circuit. The duplex receptacle configuration shall be NEMA 5-20R. Weatherproof enclosures shall be provided as indicated on the drawings. Receptacle shall have an integral ground fault circuit interrupter.

Hubbell GF5362, Arrow-Hart GF5342, or Leviton 6899: 125 V GFCI duplex receptacle.

- C. All receptacles shall have plaster ears and grounding straps.
- D. Unless otherwise noted by Owner and/or Architect, all receptacles shall be white in color with white cover plate. Each like receptacle on the project shall be of the same manufacturer and catalog number.

2.3 SWITCHES

- A. All toggle switches will be specification grade, quiet type snap switches, rated for 20 amp, 120/277 volt service. At a minimum, side screw terminals shall be provided.

Hubbell HBL1221, Arrow-Hart 1991, Leviton 1221: Single pole toggle switch.

Hubbell HBL1222, Arrow-Hart 1992, Leviton 1222: Double pole toggle switch.

Hubbell HBL1223, Arrow-Hart 1993, Leviton 1223: Three-way toggle switch.

Hubbell HBL1224, Arrow-Hart 1994, Leviton 1224: Four-way toggle switch.

- B. Unless otherwise noted by Owner and/or Architect, all switches shall be white in color with white cover plate. Each like switch on the project shall be of the same manufacturer and catalog number.

- C. Fluorescent dimmer switches shall be compatible with dimmer ballast. Dimmer/Ballast combination shall be capable of consistent dimming down to no more than 5% of full brightness.

2.4 WALL PLATES

- A. Single, gang, and combination type wall plates will be used as needed with each corresponding wiring device.
- B. Each wall plate will be of a matching color to the wiring device attached. The plate will be secured with metal, matching color headed screws. Provide stainless steel plate unless otherwise noted by Owner and/or Architect.
- C. Where weatherproof devices are noted, provide IN-USE type with clear cover. Equal to Pass & Seymour WIUC10-CL (for single gang applications)

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install all wiring devices and assemblies plumb and secure.
- B. Install all wall plates when painting is complete.
- C. Install all wiring devices by connection to screw terminals only. Connection to pressure terminals is not acceptable.
- D. Use single plates of proper gang where more than one device occurs. Furnish blank plates on outlets for future use.
- E. Unless otherwise noted, install wall devices vertically so that all devices of any given height will exactly align. Plates must be plumb and true with all four edges in continuous contact with the wall surface. Do not install devices until plastering or other wall covering work is complete.
- F. Protect wiring devices during painting.
- G. Wiring devices and other equipment shall, unless otherwise noted, be mounted with respect to indicated surfaces as follows:
Note – verify all device mounting heights with Architect prior to rough-in. Architectural/ADA requirements take precedence over that given here in the event of any discrepancies.

Receptacles:	18" AFF or 6" above working surface
Switches:	48" AFF or as otherwise required for ADA compliance
Telephone outlets:	same as receptacles
Computer network outlets:	same as receptacles
Thermostats:	48" AFF or as otherwise required for ADA compliance

All dimensions to centerline of the device box.

- H. Wiring device grounding terminals shall be connected to the branch-circuit equipment grounding conductor.
- I. GFCI receptacles will be functionally tested according to the manufacturers instructions. Record of the test shall be provided to the owner.
- J. All emergency system receptacles shall be marked as to the panelboard and circuit number from which it originates.
- K. Install all switches with the "OFF" position down.
- L. Install receptacles with grounding pole on top.
- M. Coordinate exact location of all wiring devices with owner/architect prior to rough-in.

END OF SECTION 262726

SECTION 265119 - LED INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Interior solid-state luminaires that use LED technology.
 - 2. Lighting fixture supports.

1.2 DEFINITIONS

- A. CCT: Correlated color temperature.
- B. CRI: Color Rendering Index.
- C. Fixture: See "Luminaire."
- D. IP: International Protection or Ingress Protection Rating.
- E. LED: Light-emitting diode.
- F. Lumen: Measured output of lamp and luminaire, or both.
- G. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. Arrange in order of luminaire designation.
 - 2. Include data on features, accessories, and finishes.
 - 3. Include physical description and dimensions of luminaires.
 - 4. Include emergency lighting units, including batteries and chargers.
 - 5. Include life, output (lumens, CCT, and CRI), and energy efficiency data.
 - a. Testing Agency Certified Data: For indicated luminaires, photometric data certified by a qualified independent testing agency. Photometric data for remaining luminaires shall be certified by manufacturer.

1.4 QUALITY ASSURANCE

- A. Provide luminaires from a single manufacturer for each luminaire type.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Protect finishes of exposed surfaces by applying a strippable, temporary protective covering before shipping.

1.6 WARRANTY

- A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.

- B. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 LUMINAIRE REQUIREMENTS

- A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
- B. Recessed Fixtures: Comply with NEMA LE 4.
- C. CRI of minimum 80 CCT of 3500 K.
- D. Rated L70 life of 50,000 hours for the entire fixture assembly, including driver.
- E. Lamps dimmable from 100 percent to 1 percent of maximum light output.
- F. Internal driver.

2.2 MATERIALS

- A. Metal Parts:
 - 1. Free of burrs and sharp corners and edges.
 - 2. Sheet metal components shall be steel unless otherwise indicated.
 - 3. Form and support to prevent warping and sagging.
- B. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.
- C. Diffusers and Globes:
 - 1. Acrylic Diffusers: One hundred percent virgin acrylic plastic, with high resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.
 - 2. Glass: Annealed crystal glass unless otherwise indicated.
 - 3. Lens Thickness: At least 0.125 inch (3.175 mm) minimum unless otherwise indicated.
- D. Housings:
- E. Factory-Applied Labels: Comply with UL 1598. Include recommended lamps. Locate labels where they will be readily visible to service personnel, but not seen from normal viewing angles when lamps are in place.
 - 1. Label shall include the following lamp characteristics:
 - a. "USE ONLY" and include specific lamp type.
 - b. Lamp diameter, shape, size, wattage, and coating.
 - c. CCT and CRI for all luminaires.

2.3 METAL FINISHES

- A. Variations in finishes are unacceptable in the same piece. Variations in finishes of adjoining components are acceptable if they are within the range of approved Samples and if they can be and are assembled or installed to minimize contrast.

2.4 LUMINAIRE FIXTURE SUPPORT COMPONENTS

- A. Single-Stem Hangers: 1/2-inch (13-mm) steel tubing with swivel ball fittings and ceiling canopy. Finish same as luminaire.
- B. Wires: ASTM A 641/A 641 M, Class 3, soft temper, zinc-coated steel, 12 gage (2.68 mm)
- C. Rod Hangers: 3/16-inch (5-mm) minimum diameter, cadmium-plated, threaded steel rod.
- D. Hook Hangers: Integrated assembly matched to luminaire, line voltage, and equipment with threaded attachment, cord, and locking-type plug.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Examine roughing-in for luminaire to verify actual locations of luminaire and electrical connections before fixture installation. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Comply with NECA 1.
- B. Install luminaires level, plumb, and square with ceilings and walls unless otherwise indicated.
- C. Install lamps in each luminaire.
- D. Supports:
 - 1. Sized and rated for luminaire weight.
 - 2. Able to maintain luminaire position after cleaning and relamping.
 - 3. Provide support for luminaire without causing deflection of ceiling or wall.
 - 4. Luminaire mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and vertical force of 400 percent of luminaire weight.
- E. Flush-Mounted Luminaire Support:
 - 1. Secured to outlet box.
 - 2. Attached to ceiling structural members at four points equally spaced around circumference of luminaire.
 - 3. Trim ring flush with finished surface.
- F. Wall-Mounted Luminaire Support:
 - 1. [Attached to structural members in walls] [Attached to a minimum 20 gauge backing plate attached to wall structural members] [Attached using through bolts and backing plates on either side of wall] <Insert means of attachment>.
 - 2. Do not attach luminaires directly to gypsum board.
- G. Ceiling-Grid-Mounted Luminaires:
 - 1. Secure to any required outlet box.
 - 2. Secure luminaire to the luminaire opening using approved fasteners in a minimum of four locations, spaced near corners of luminaire.
 - 3. Use approved devices and support components to connect luminaire to ceiling grid and building structure in a minimum of four locations, spaced near corners of luminaire.

3.3 FIELD QUALITY CONTROL

- A. Perform the following tests and inspections:
 - 1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
 - 2. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery power and retransfer to normal.
- B. Luminaire will be considered defective if it does not pass operation tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION 265119

SECTION 271400 – AUDIO/VIDEO (AV) INFRASTRUCTURE AND EQUIPMENT

PART 1. GENERAL

1.1. GENERAL NOTES

- A. The Audiovisual System Designer herein shall be referred to as the Architect.
- B. Grambling State University herein shall be referred to as the User Agency.
- C. The State of Louisiana herein shall be referred to as the Owner.
- C. The Audiovisual Contractor herein shall be referred to as the AV Contractor.

1.2 SUMMARY

- A. This Section covers the general requirements for integration of audiovisual systems to be used for presentation, collaboration and media distribution at Grambling State University's Grambling Hall Auditorium. All audiovisual hardware and equipment furnished by the Contractor shall conform to the general requirements in this specification as well as the performance specifications for the intended particular application.

1.3 DEFINITIONS

- A. ADA: Americans with Disabilities Act, which became civil law in 1990, which prohibits discrimination against individuals with disabilities in all areas of public life, including jobs, schools, transportation, and all public and private places that are open to the general public.
- B. ANSI: American National Standards Institute
- C. AV: Audiovisual (typically referring to related equipment or specific application)
- D. AVIXA: Audiovisual and Integrated Experience Association™, formerly known as INFOCOMM, is an international trade association representing the audio-visual industry that is committed to development of world standards for best practices and formalized AV training.
- E. Backbone: A facility (e.g., pathway, cable, or conductors) between equipment rooms or floor distribution terminals, the entrance facilities, and the equipment rooms within or between buildings.
- F. BICSI: Building Industry Consulting Service International
- G. DSP: Digital Signal Processor
- H. EIA: Electronic Industries Alliance
- I. EMI: Electromagnetic Interference
- J. LAN: Local Area Network
- K. LED: Light-Emitting Diode
- L. NECA: National Electrical Contractors Association
- M. NRTL: Nationally Recognized Testing Laboratory, an independent agency with the experience and capability to conduct the testing as defined by OSHA in 29 CFR 1910.7
- N. OSHA: Occupational Safety & Health Administration
- O. TIA: Telecommunications Industry Association

1.4 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including instructions to Bidders, General and Supplementary Conditions and Division 1 Specification Sections, apply to the work performed within this Section.
- B. The publications listed below form a part of this specification to the extent referenced and are referred to in the text by the basic designation only.
- C. Where applicable, work performed shall comply with guidelines as established in the latest edition/revision, as of the date of the Contract Documents, for the following publications:
 - 1. 2010 ADA "Standards for Accessible Design"
 - 2. ANSI/TIA/EIA-568-B.1 "Commercial Building Telecommunications Cabling Standards, Part 1: General Requirements"

3. ANSI/TIA/EIA-568-B.2 "Commercial Building Telecommunications Cabling Standard Part 2: Balanced Twisted-Pair Cabling Components"
4. ANSI/TIA/EIA-568-B.3 "Optical Fiber Cabling Components Standard"
5. ANSI/TIA/EIA-569-A "Commercial Building Standard for Telecommunications Pathways and Spaces"
6. ANSI/TIA/EIA-606-A "Administration Standard for Commercial Telecommunications Infrastructure"
7. ANSI/TIA/EIA-526 "Standard Test Procedures for Fiber Optic Systems"
8. ANSI/NECA/BICSI-568-2006, "Standards for Installing Commercial Building Telecommunications Cabling"
9. ANSI/INFOCOMM-10:2013, "Audiovisual Systems Performance Verification"
10. AVIXA-F501.01.201X, "Energy Management for Audiovisual Systems" (Replaces ANSI/INFOCOMM-2:2012)
11. AVIXA-S601.01.2015, "Cable Labeling for Audiovisual Systems"
12. AVIXA-D401.01:201X, "Standard Guide for Audiovisual Systems Design and Coordination Processes" (Replaces 2M:2010) Association

1.5 RELATED WORK SPECIFIED ELSEWHERE

- A. Requirements and materials as applicable to the work of others related to audiovisual systems are listed here to define and establish quality-acceptance criteria necessary to support the installation or operation of audiovisual systems.
- B. High-voltage electrical line power, and all required conduits for both power supply and low-voltage, shall be furnished by the Electrical Contractor. Unless otherwise specified, all back-boxes are to be furnished and installed by the Electrical Contractor as indicated in the electrical drawings located elsewhere in this document. (See Section 260533)
- C. Coordination with the Electrical Contractor is required in order to assure correct conduit placement and routing, AV back-box locations and line power circuit locations as specified in Division 26 – Electrical.
- D. The AV Contractor shall not be responsible for providing the load-bearing mounting back-board upon which the LED wall display will be installed at the front of the auditorium. The AV Contractor shall provide any specifications from the given manufacturer, but the responsibility for providing and installing the mounting back-board work shall be performed by other contractor(s).

1.6 WORK SPECIFICATIONS FOR THIS SECTION

- A. This section addresses the initial phase of audiovisual systems integration as described for Grambling State University's Grambling Hall Auditorium. The objective is for the AV Contractor to provide the owners of this facility with the turnkey professional AV systems that fit their specific application needs. The awarded AV Contractor is expected to provide all AV equipment as specified, to include professional turn-key installation, QA performance-acceptance testing, end-user training, and ongoing systems support as established under the terms of an extended service/maintenance agreement.
- B. The written work specifications and AV drawings outlined in this package shall be collectively referred to herein as Contract Documents. It is possible some of the system features or requirements listed in one part may not be present in others. In the case of conflict between written specifications and drawings, the AV Contractor must seek written clarification from the Architect. In the event the AV Contractor fails to obtain such written clarification, the interpretation of the Architect shall prevail. Where conflict exists with other specifications concerning such work or materials this specification takes precedence, unless otherwise approved in writing by the Owner.
- C. This section includes all labor, materials, equipment, and services necessary to furnish and install aforementioned audiovisual systems in the Grambling Hall Auditorium at Grambling State University in Grambling, Louisiana. The overall system shall include but not be limited to the following:
 1. LED Array Video Wall - Large-Format, High Definition Display System
 2. High-Bandwidth Video Digital Switcher/Scaler
 3. Integrated Control System Processor and Touch Panel User Interface(s)
 4. Sound Reinforcement & Media Presentation Audio Subsystem

1.7 PROJECT CONDITIONS

- A. All dimensions and equipment locations shall be verified in the field prior to component fabrication or equipment installation by the AV Contractor, who shall make at least one (1) visit to the job site prior to preparation of shop drawings.
- B. All affected conduit placement, routing, and separation shall be coordinated with the Electrical Contractor to ensure compliance with established specifications and proper installation.

C. No claims for additional compensation shall be allowed due to the AV Contractor's negligence, misunderstanding of the work scope, or lack of preparation by not performing a thorough investigation of the job site.

1.8 CONTRACTOR RESPONSIBILITY

A. It shall be the sole responsibility of the AV Contractor to furnish and install equipment as a complete system in all respects and to furnish and install any additional equipment required to fulfill the intent of the Contract Documents, regardless of whether or not such items are herein specified or indicated without claim for additional payment or costs.

B. The work specified herein shall be accomplished by a single AV Contractor who assumes complete responsibility for the audiovisual systems described. The AV Contractor shall be required to have a minimum of ten (10) years professional experience with installation, configuration and programming of audiovisual systems having similar size, complexity and scope. Written proof of such experience shall be submitted to the Architect prior to selection, as one of the qualifying factors for bidding candidates.

C. The Audiovisual Contractor shall be responsible for coordinating with other trades as needed to ensure complete and suitable installation of any electrical isolation equipment needed to meet the intent of this specification.

D. No electrical equipment (except that which is approved by the Owner) shall be installed or located within Acoustically Sensitive Spaces or installed on walls common to Acoustically Sensitive Spaces. The AV Contractor shall report any and all discrepancies between this requirement and the Contract Documents to the Architect and Electrical Engineer prior to installation of such equipment.

1.9 DESIGN INTENT

A. The Audiovisual Contractor shall furnish and install Infrastructure and Major Equipment for system, including but not limited to wire, cable, equipment racks, wiring devices, and listed Major Equipment.

B. If requested, the AV Contractor shall furnish line item pricing for Infrastructure and Major Equipment List written in this specification.

1.10 FUNCTIONAL REQUIREMENTS

A. LED ARRAY VIDEO WALL – Device must meet or exceed following specifications:

1. 5.3 'Tall x 16.5 'Wide Screen Size, 864 x 2688 Pixels Total Resolution, 2.5mm Pitch
2. Video Wall frame depth is not to exceed 2.5 inches.
3. Video Wall to include framing and integrated mounting/hang points.
4. Video Wall manufacturer must provide a five (5) -year factory warranty for all components to include the Display Interface Unit (DIU) and shall extend to cover each individual pixel from the first date of shipment.
5. Video Wall shall have a minimum 100,000-hour life span to half-brightness as an inherent performance characteristic guaranteed by the manufacturer.
6. Video Wall Display System from the manufacturer shall not require total of more than 20,000 Watts maximum power to during use and operating at full-brightness.
7. Spare Parts Kit Included – includes a minimum of 5% running spares for LED Modules, Power Supplies, Receive Cards, and internal cabling for the entire warranty period. Spare parts shall be included at no additional charge as part of the warranty program. As spare parts are accessed, the faulty part(s) will be sent back to the manufacturer for repair or replacement.
8. Video Wall shall be front-serviceable for quick and easy maintenance.
9. Video Wall must be finished with non-reflective black surfaces, which produce better content enhancement.
10. Video Wall must have Off-Axis Viewing angles of at least 160 degrees, producing displays that have virtually no visual distortions in the image, regardless of how far off-axis a viewer gets to the video wall display. Virtually no distortion from above or below view as well.
11. Video wall must utilize LED tiles that magnetically attach to the manufacturer's bespoke sheet metal substrate (frame), without static registration in the X and Y axis to allow for take-up of inconsistencies in host wall and for ease of re-calibration post install, as may be required as a result of long-term settling or mechanical disruption.
12. Video Wall surface must be comprised of LED tiles with a footprint no greater than 0.5ft², in order to minimize the impact of disruption of the entire system in the event of an LED tile failure.
13. Video Wall must be wired internally in a manner that prevents isolated LED tile, power supply, or data card failure from affecting the overall usability of the video wall.

14. Video Wall must be wired to accept AC power local to the video wall, via recessed junction box, to allow for flush mount to host wall, and not powered over DC umbilical from an off-board power supply/array.
15. Video Wall Display Interface (DIU) must accept a 4K60 signal over a single video input (HDMI or DisplayPort).
16. Video Wall Display processor must support control of at least 26 million pixels at 10bits and HDR support.
17. Video Wall Display processor must support up to 16 video layers per screen, with multi-window support and irregular window size support
18. Video Wall Display processor must include at a minimum of two (2) HDMI 2.0 and two (2) DisplayPort 1.2 inputs.
19. Video Wall Display processor must support TCP/IP and RS232 support from the Integrated Control System.
 - a. Basis of Design Vendor: KWav
 - b. Basis of Design Vendor: Novastar H2

B. VIDEO DIGITAL SWITCHER/SCALER – Device must meet or exceed the following specifications:

1. Switcher/Scaler shall have four (4) HDCP-compatible HDMI (1.4 & 2.0) inputs, supporting signal inputs of DVI 1.0, HDMI 1.4 and 2.0, HDCP 1.4 and 2.3
2. Switcher/Scaler shall be capable of displaying up to 8 user-definable windows concurrently for graphics and/or video signals.
3. Switcher/Scaler shall support video resolutions up to 4K/60 with 4:4:4 color sampling
4. Switcher/Scaler to be capable of fully real-time processing with no dropped frames, which shall allow smooth video scaling and seamless switching
5. Switcher/Scaler shall provide broadcast-quality video imaging.
6. Switcher/Scaler shall have an embedded operating system and be rated for 24/7 operation.
 - a. Basis of Design Vendor: Extron

C. INTEGRATED CONTROL SYSTEM – All equipment must meet or exceed the following specifications:

A commercial-grade control system will be installed to allow single-point control of all video and audio distribution, volume controls for audio media and microphones from one (1) custom-programmed touch panel with a graphical user interface. The touch panel shall be located in the Control Booth.

A high-definition scaling auto-switcher and media/control extender shall be provided to auto-switch HDMI and VGA inputs at the transmitter and one additional HDMI input at the receiver to ensure a reliable, high-quality video image.

Control functions shall include Audio System Power, Video Signal Switching, and Microphone and Presentation Volume Controls.

1. One (2) 24-Port PoE 1 Gigabit managed AV Ethernet switch shall be installed to allow communications with Ethernet-based control interfaces in the AV System.
2. Industrial-grade control system processor with one (1) bidirectional RS-232 serial port with software handshaking, one (1) bidirectional RS-232/RS-422/RS-485 serial port with hardware and software handshaking, one (1) IR/Serial port for one-way control of external devices, four (4) digital I/O ports, two (2) control relays, one (1) Ethernet port, supports secure industry standard communications protocols including HTTP (insecure), HTTPS, SSH, SFTP, SMTP, NTP, Discovery Service, DHCP, DNS, ICMP, 802.1X, and IPv4, shall be provided and custom-programmed by the AV Contractor.
3. One (1) 7 inch touch-sensitive control panel with 1024x600 resolution and 24-bit color depth shall be provided in the Control Booth area and programmed by the AV Contractor with a custom GIU to allow single-point control of the system functions described herein.
6. The AV Contractor shall provide the uncompiled source code to the Owner at the time of system commissioning.
 - a. Basis of Design Vendor: Extron IPCP Pro 250 xi and TLP Pro 725M.

D. SOUND REINFORCEMENT AND MEDIA AUDIO SYSTEM – All related equipment must meet or exceed following listed specifications:

1. The AV Contractor shall provide two (2) Black 8" compact 2-way passive speakers, each rated at power capacity of 200 Watts, and two (2) Black compact 4" 2-way passive speakers, and install them mounted from the ceiling at the front of the stage of Grambling Hall's auditorium stage left and right. These front-of-house speakers at the front of the stage shall be

focused towards the audience. The speaker system shall be capable of a Maximum continuous SPL of 124db at 1 meter, with a frequency range from 60Hz to 20KHz (-10dB).

a. Approved Vendor: RCF

2. The AV Contractor shall provide one (1) Professional Class H Audio Power Amplifier rated at 2 x 1250 Watts @ 4 ohms to power the passive loudspeakers. This amplifier shall have a Total Harmonic Distortion rating of <0.01% at @ 1 kHz nominal power.

a. Approved Vendor: RCF

b. Approved Alternate Vendor: Crown

3. The AV Contractor shall provide two (2) wireless combo systems, which include two (2) wireless bodypack transmitters with two (2) cardioid lavalier condenser microphones for hand-free presentations and two (2) wireless handheld microphones paired to two (2) wireless receivers.

a. Approved Vendor: Shure

b. Approved Alternate Vendor: Sennheiser

4. The AV Contractor shall provide a (1) commercial-grade Audio Digital Signal Processor (DSP) with 12 mic/line-level inputs and 8 mic/line-level outputs. The audio processor shall be capable of performing 24-bit audio signal shaping, incorporate a 48KHz digital sampling rate, and perform audio signal routing during general presentations and meetings. The digital audio processors shall include RS-232 and Ethernet ports for connectivity with external control systems.

a. Approved Vendor: Extron

5. The AV Contractor shall provide one (1) rack-mountable, high-performance wireless microphone antenna combiner system with a slim-profile diversity architectural antenna, capable of supporting up to five (5) microphone systems.

a. Approved Vendor: RF Venue

1.11 SCOPE OF WORK

A. Furnish shop drawings and receive approvals from the Architect, prior to fabrication and installation.

B. Furnish all materials, labor, and any engineering services required to provide a complete and professionally installed system in working order as described herein. Labor furnished shall be performed by personnel specialized and experienced in audiovisual systems installation.

C. Furnish and install all wiring and cable called out in Contract Documents.

D. Coordinate all back-box locations with the Electrical Contractor and other appropriate general trades.

E. Furnish any additional items, not specifically mentioned herein, to meet system requirements as specified, without claim for additional payment. Such items may include, but are not limited to, hardware, transformers, line/distribution amplifiers, and other devices needed to achieve proper installation, systems interface, electrical isolation, or audio gain structure.

F. Perform initial adjustments and performance verification tests as needed. Submit verification test report to the Architect five (5) days prior to commissioning.

G. Perform formal Quality Assurance inspections and performance-acceptance testing of all system functions, and generate documented results of final adjustments performed, utilizing AV Contractor-furnished test equipment and project engineers.

H. Furnish and participate in User training.

I. Furnish system documentation, including copies of all relevant drawings and equipment manuals in compliance with the Contract Documents.

J. Furnish maintenance services for the specified period from the date of acceptance.

K. Guarantee all new equipment, software, hardware, components, and workmanship for the specified periods herein from the date of acceptance.

L. Provide ongoing systems support, according to the terms of a five (5) year Maintenance Agreement, for all installed AV systems installed which are included in these Contract Documents.

1.12 QUALITY REQUIREMENTS

A. Wire Labeling: All system wiring and cabling provided by the AV Contractor shall comply with labeling requirements as defined in AVIXA Standard F501.01.2015, "*Cable Labeling for Audiovisual Systems*" and be acceptable to authorities having local jurisdiction. As applicable, these components shall be marked for intended use and follow consistent nomenclature.

B. Packaging: All purchased project materials shall be suitably packaged by their respective manufacturers to prevent damage during shipment and/or handling. Any received materials that are damaged shall not be considered acceptable for use.

C. Building Code: Compliance must be maintained with the local authority having jurisdiction over the standards of Building Code, which shall take precedence over all other restrictions or codes, unless the requirements of other codes are more stringent than the local building code. In such cases, the more stringent requirements shall govern and supersede.

D. Installer Qualifications: The awarded AV Contractor shall have on-staff appropriate AVIXA-trained and manufacturer-certified technicians and engineers as designated herein that will be assigned to this project. If the AV Contractor's personnel are not formally AVIXA-trained, or not manufacturer-certified where specified, the AV Contractor shall submit with their bid all professional credentials and certificates of professional training for those personnel who will be assigned to the project for evaluation and determination by the Architect that the said credentials and certificates are comparable to AVIXA accreditation.

E. Staffing: During project execution, the project shall be staffed at all times by professional Technicians and Engineers who, in the role of lead crafts persons, shall be capable of providing leadership and technical direction to those AV personnel who remain on the project site. The AV Contractor must:

1. Be fully capable and experienced in the installation of the audiovisual systems specified, and have a minimum of ten (10) years 'experience with systems of similar size, complexity, and value.
2. Possesses AVIXA APEx program certification credentials.
3. Have on staff no less than one (1) certified Extron Control Professional with no less than ten (10) years combined professional experience at the specified levels.
4. Have on staff no less than one (1) audio DSP programmer who possesses current Extron ProDSP Specialist certification credentials for programming the Extron DSP or other approved audio DSP device.
5. Be factory-certified by the equipment manufacturing company(ies) in all aspects of programming, installation, and testing of their AV equipment, where recommended by those manufacturers. Specifically, this applies to those manufacturer(s) whose equipment may constitute a component of the audiovisual system(s) installed as part of the information transport systems. Said certification is to be such that the Contractor can offer documented proof from the manufacturer(s) and fully comply with all the requirements for providing the Owner with a System Warranty and Application Assurance.
6. Ensure compliance with the intended and established performance-acceptance criteria through use of formal in-house Quality Assurance and Field Operations Testing Program(s) and Procedures(s) in place, and formally execute all associated procedures for testing, corrective actions and archival documentation in accordance with classical Quality Assurance requirements. The document(s) that will be used by the AV Contractor for reporting test results shall be submitted with the bid package for approval by Architect.

F. System Designer & Project Manager Requirements:

1. The AV Contractor shall have on-staff a Project Manager to act as a single point of contact for all activities performed under this section. The Project Manager shall have a minimum of 3 years 'experience in commercial AV design and related project installation work.
2. The AV Contractor's Project Manager, or designee thereof, shall be required to attend periodic project meetings as required until project closeout/signoff.
3. Should the Project Manager assigned to this project change during the installation, the new Project Manager assigned must meet all qualifications stated in this section, and must also submit a resume for review by the Architect.
4. If, in the opinion of the Owner, the Project Manager does not possess adequate skills or qualifications to properly support the project, the Owner reserves right to require the Contractor to assign a different designer who, in the Owner's opinion, possesses the necessary skills and experience required for successful completion of this project.

G. Installer References

1. The AV Contractor shall supply references for three (3) projects of similar size, complexity and scope that were completed successfully over the previous three (3) years.

1.13 COORDINATION

A. Coordinate layout and installation of audiovisual components and cabling with other trades.

1. Meet jointly with mechanical, electrical, telecom, table manufacturer and millwork contractor to exchange information and agree on details of equipment arrangements and installation interfaces.

- 2. Record agreements reached in meetings and distribute to other participants.
- B. Where work covered by this Section connects to equipment furnished under other Sections, verify audiovisual work involved in the field and make proper connection to such equipment.
- C. Coordination of wall plates, floor boxes, connection points, rack locations, power, data, and conduit must be approved by the Architect or Owner prior to installation of any equipment.
- D. The AV Contractor shall not be responsible for performing any high voltage work on this project
- E. The AV Contractor must coordinate all high-voltage electrical work through the client-contracted electrical contractor (EC).
- F. The AV Contractor shall not be responsible for providing the load-bearing mounting board upon which the LED wall display will be installed at the front of the auditorium. This work shall be executed by others.

PART 2. PROJECT EXECUTION REQUIREMENTS

2.1 INSTALLATION STANDARDS

A. All work performed on this project will be installed in accordance with the current edition of the following:

- 1. Documents listed in Article 1.4 "References".

2.2 DELIVERY AND STORAGE

A. Receive, handle, and store audiovisual system items and materials at the project site. Materials and items shall be so placed that they are protected from damage, deterioration and theft.

2.3 INSTALLATION

- A. The drawings for work under Division 26 Sections related to audiovisual systems are diagrammatic and are intended to convey the scope of work and indicate the general arrangement of conduit, boxes, equipment, termination hardware, fixtures and other work included in the Contract.
- B. Location of items required by the drawings or specifications not definitely fixed by dimensions are approximate only and exact locations necessary to secure the best conditions and results shall be determined at the site and shall be subject to the approval of the Architect/Consultant/Client.
- C. Follow drawings in laying out work, check drawings of other trades to verify spaces in which work will be installed, and maintain maximum headroom and/or space conditions at all points.
 - 1. Where headroom or space conditions appear inadequate, the Architect shall be notified before proceeding with installation.
 - 2. Minor conduit and cable rerouting and changes shall be made at no additional cost to the Owner.
 - 3. Coordinate the mounting heights of audiovisual equipment to clear the opening heights of doors and the heights of equipment which needs to be removed and replaced.
 - 4. As necessary, adjust elevations of rack-mounted hardware and horizontal wire management panels so as to compensate for rack unit sizes of actual hardware used, as compared to hardware rack unit sizes depicted in Contract Drawings.
- D. Perform all work with skilled professionals of the particular trade involved in a neat and organized manner.
- E. Perform all work in cooperation and coordination with other trades and schedule.
- F. Furnish other trades advance information on locations and sizes of frames, boxes, sleeves and openings needed for the work, routes for conduit and cable pathways, and also furnish information and shop drawings necessary to permit trades affected to install their work properly and without delay.
- G. Where there is evidence that work of one trade will interfere with the work of other trades, all trades shall assist in working out space allocations to make satisfactory adjustments and shall be prepared to submit and revise coordinated shop drawings.
- H. With the approval of the Architect and without additional cost to the Owner, make minor modifications in the work as required by structural interferences, by interferences with work of other trades or for proper execution of the work.
- I. Work installed before coordinating with other trades so as to cause interference with the work of such other trades shall be changed to correct such condition without additional cost to the Owner and as directed by the Architect.
- K. AV Contractor shall cooperate with other trades and coordinate work so that conflicts with other work are eliminated.
- L. Equipment shall be installed with adequate space allowed for removal, repair or changes to equipment. Ready accessibility to removable parts of equipment and to wiring shall be provided without having to move other equipment already in place or

awaiting to be installed. The AV Contractor shall verify all measurements critical to equipment installation. Discrepancies shall be brought to the Architect's attention for direction.

M. Determine temporary openings in the buildings that will be required for the admission of apparatus furnished under this Division, and notify the Architect accordingly. In the event of failure to give sufficient time in notice to arrange for these openings during construction, the Contractor shall assume all costs of providing such openings thereafter.

N. Drawing locations of audiovisual outlets and raceway pathways are considered approximate. Exact locations shall be determined on site by the awarded AV Contractor.

O. The AV Contractor shall refer to the original contract documents for construction details, reflected ceiling plans, and large-scale drawings.

2.4 PATHWAY EXAMINATION

A. Examine pathway routes intended for cables.

1. Verify proposed routes of pathways. Check pathways and other elements for compliance with space allocations, clearances, installation tolerances, hazards to cable installation, and other conditions affecting installation. Verify that cabling can be installed complying with EMI clearance requirements.
2. Prepare wall penetrations and verify that penetrations of rated fire walls are made using products labeled for type of wall penetrated.
3. Identify plan to support cables and raceways in suspended ceilings. Verify weight of individual types and sizes of cables. Verify that load capacity of cable support structures is adequate for each pathway.
4. Proceed with the installation only after unsatisfactory conditions have been corrected.

B. Separation from EMI Sources: Comply with InfoComm-AVDRM, AVIXA-D401.01:201X, and TIA/EIA-569-A, which provide recommendations for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment. Comply with the following minimum separation distances from possible sources of EMI:

1. Separation between unshielded power lines or electrical equipment in proximity to open cables or cables in nonmetallic raceways is as follows:

- a. Electrical Equipment Rating Less Than 2 kVA: 5 inches.
- b. Electrical Equipment Rating between 2 and 5 kVA: 12 inches.
- c. Electrical Equipment Rating More Than 5 kVA: 24 inches.

2. Separation between unshielded power lines or electrical equipment in proximity to cables in grounded metallic raceways is as follows:

- a. Electrical Equipment Rating Less Than 2 kVA: 2-1/2 inches.
- b. Electrical Equipment Rating between 2 and 5 kVA: 6 inches.
- c. Electrical Equipment Rating More Than 5 kVA: 12 inches.

3. Separation between power lines and electrical equipment located in grounded metallic conduits or enclosures in proximity to cables in grounded metallic raceways is as follows:

- a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
- b. Electrical Equipment Rating between 2 and 5 kVA: 3 inches.
- c. Electrical Equipment Rating More Than 5 kVA: 6 inches.

4. Electrical Motors and Transformers, 5 kVA or HP and Larger: 48 inches.

5. Fluorescent Fixtures: 5 inches.

2.5 CONDUIT REQUIREMENTS

- A. One and one-half inch (1.5") conduit shall be used for all audiovisual cable pathways unless otherwise specified.
- B. No more than two (2) 90-degree bends in the conduit shall be allowed without a pull box.
- C. No more than one hundred feet (100') shall exist between pull boxes.
- D. A physical barrier between power and audio video cabling shall exist in all floor boxes.
- E. The power and audiovisual conduit pathways to all floor boxes shall not adjoin one another.

- F. The conduit utilized for all AV wiring shall be EMT or compliant with standards for shielding of electromagnetic interference from inductive fields from electric current.

2.6 FIRESTOPPING

A. Utilize an approved firestop assembly to seal all cable and raceway penetrations of fire-rated Floor and wall assemblies. Assembly must achieve the same smoke/fire-resistance rating as the floor or wall being penetrated.

2.7 CUTTING AND PATCHING

A. Cut, channel, chase and drill any floors, walls, partitions, ceilings and/or other surfaces required to permit audiovisual systems installation, including all pathway elements and supports necessary for same. Cutting operations shall be performed by skilled professionals of the trades involved. Any cutting operations required shall be performed in such a manner that the structural stability and/or functional integrity of the building construction and related support systems are not impaired in any way.

B. Conduits passing through roofs or other surfaces exposed to weather shall be properly flashed as specified in roofing and waterproofing sections.

C. The AV Contractor shall repair and re-finish any finishes and/or other surfaces damaged by the AV Contractor's personnel to match the adjacent undamaged surfaces. Install new fire-stopping where existing fire-stopping has been disturbed during the course of install. Repair and re-finish work shall be performed by skilled professionals of the trades involved.

2.8 CLEANING AND PROTECTION

A. On completion of installation, all affected furniture and equipment, including outlets, fittings, and devices, inspect exposed finishes shall be cleaned in preparation for turnover.

B. The AV Contractor shall remove any dirt, paint spots, and construction debris created by AV personnel during the project installation work.

C. All finishes shall be clean upon Substantial Completion. Unless otherwise indicated, clean shall mean free of dust, dirt, mud, debris, oil, grease, residues, and contamination.

D. Protect equipment and installations and maintain conditions to ensure that coatings, finishes, and cabinets are without damage or deterioration at time of Substantial Completion. Protect conduit and wire-way openings against the entrance of foreign matter by means of plugs or caps. Cover fixtures, materials, equipment and devices furnished or installed under this Section or otherwise protect against damage, both before and after installation. Hardware, materials, equipment, or devices damaged prior to final acceptance of the work shall be restored to their original condition or replaced.

E. During the course of audiovisual installation work, provide for on-going proper disposal of all debris, including but not limited to: equipment packaging and shipping materials, shipping pallets, empty cable reels/boxes, cable cuttings, etc.

PART 3. ADMINISTRATIVE PROCEDURES AND DOCUMENTATION REQUIREMENTS

3.1 RELATED DOCUMENTS

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

3.2 DESCRIPTION

A. Apparatus, appliance, material or work not shown on drawings, but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and ready for operation, even though not specified or shown on the drawings, shall be furnished and installed as necessary without additional expense to the Owner.

B. Should there be any discrepancies or question of intent, refer the matter to the Architect for a decision prior to ordering any equipment or materials and before starting any related work.

C. Furnish, erect, install, connect, clean, adjust, test and condition all manufactured articles, materials and equipment, and place in service in accordance with the manufacturer's directions and recommendations except as otherwise noted.

3.3 SUBMITTALS

- A. Operating Manuals: The AV Contractor must submit three (3) copies of operating manuals for all installed equipment as hard-bound document binders containing approved shop drawings, operating instructions, wiring diagrams, and parts lists.
- B. Shop Drawings: A complete set of as-built Shop Drawings shall be provided by the AV Contractor to the Owner at the time of project completion.
- C. Source Quality Control Test Reports: The AV Contractor shall perform appropriate quality inspections and testing procedures throughout the duration of the Project, document all available test information, and submit those data in formal QA reports to the Owner within five (5) days of completion of the project.

3.4 SHOP DRAWINGS

- A. The AV Contractor shall perform no portion of the work requiring submittal and review of shop drawings, product data or samples until the Architect has approved the respective submittal(s). Any materials, fixtures, apparatus or equipment installed without stamped or written approval must be removed by the AV Contractor and replaced with properly specified equipment under the direction of the Architect and without recourse from the AV Contractor for additional compensation.
- B. Where applicable, shop drawings shall incorporate a 1/8" equal 1'-0" scale on architectural floor plans, except for layouts of all congested areas such as conference rooms which shall be provided at 1/4" equal 1'-0" scale or larger. All drawings shall be of the same size and with the same border lines and title blocks as the Architect's Drawings, with the AV Contractor's name added.
- C. All drawing sets shall be prepared in AutoCAD, DWG format (Release 2010 or higher) or Microsoft Visio, with associated data in a systematic layered format. Shop drawings of any fixtures, apparatus or equipment that are not in accordance with the established specification requirements will be rejected for use in this installation and construction process.
- D. Cabling Administration Drawings: Using label/identification scheme outlined in Contract Drawings, develop Cabling Administration Drawings for system identification, testing, and management. Cabling Administration Drawings shall feature a unique, alphanumeric designation for each cable outlet, faceplate and backbone cable pathway. Coordinate with requirements of Section 271500 "Communication Horizontal Cabling." At completion, Cabling Administration Drawings shall reflect the as-built conditions of all related AV systems.
- E. Where applicable, dimensioned plans and elevation views of affected facility rooms shall be submitted, labeling each individual component with unique identifier(s).
- F. System Labeling Schedules: Electronic copy of labeling schedules, in software and format selected by AV Contractor.
- G. Layout Responsibility: Preparation of Shop Drawings is to be overseen by the AV Contractor's In-House Design Engineer and CTS Project Manager.
- H. The AV Contractor shall be responsible for the coordination of audiovisual work with the work of all other trades and shall, in preparing the drawings, check the work of other trades in order to avoid possible installation conflicts arising from it. It shall be understood that the work shown on the construction drawings has been so coordinated. In the event of conflicts or interference that cannot be resolved in the field, the AV Contractor shall request a written clarification from the Architect.
- I. The submitted "As-Built" drawings shall indicate the systems installations exactly as they were constructed onsite.
- J. All drawings shall be developed in accordance with an approved schedule, to be prepared by the Contractor, and arranged to coincide with actual construction in such a manner as to allow the latter to proceed without delay.
- K. If, in the opinion of the Architect, the drawings are considered acceptable in accuracy and detail after each has been finally revised and reviewed, the AV Contractor may submit same drawings as the "as-built" archival drawings.

3.5 QUALITY ASSURANCE

- A. Carefully examine the contract documents, visit the site, and thoroughly become familiar with the local conditions relating to the work. Failure to do so will not relieve the contractor of the obligations of the Contract.
- B. After all equipment, devices and raceways are installed and wires and cables are in place and connected to devices and equipment, test the system for defects. If a defective condition is present, make all necessary corrections and retest for compliance. Test systems for proper operation and demonstrate successful operation of the system to the Consultant.
- C. Adherence to Construction Codes and Standards:
 - 1. Materials and installation provided by the AV Contractor shall comply with codes, laws, and ordinances of all Federal, State, and local governing bodies having jurisdiction.

2. In case of differences between building codes, State and Federal laws, local ordinances, utility company regulations, and the original contract documents, the most stringent rules shall govern.
3. Should work be performed which does not comply with the requirements of the applicable building codes, State and Federal laws, local ordinances, industry standards, and utility company regulations, all related changes or modifications required to achieve compliance shall be performed by the AV Contractor at no additional cost to the Owner.
4. Secure and pay for all permits, governmental fees, taxes, and licenses necessary for the proper execution and completion of communications systems work.
5. Submit to governmental agencies and utility companies shop drawings, as required by these agencies, for their approval.
6. Notify the Architect of any materials or apparatus believed to be inadequate, unsuitable, in violation of laws, ordinances, rules, or regulations of authorities having jurisdiction.
7. Evaluate and test video subsystems using industry-standard test procedures and equipment for compliance with established performance-acceptance criteria:
 - a. All video cabling shall be shielded where noted in the above requirements. All video cabling shall be tested for continuity and short-circuits.
 - b. All playback devices shall be tested to ensure that all supported media display correctly over the displays.
 - c. All recording devices shall be tested to ensure that recording functions are correct.
 - d. All recorded video playback must be clean, with colors balanced, commensurate to the fidelity of the recording medium.
8. Evaluate and test all audio subsystems for compliance with established performance-acceptance criteria.
9. The AV Contractor shall ensure that switching audio sources does not cause popping, static, hum, or feedback.
10. The AV Contractor shall ensure that the sound is balanced between the speakers.
11. Sound volume shall be left at a neutral level at the time of systems turnover to the Owner. The Owner will be responsible for increasing/decreasing volume as needed.
12. The AV Contractor shall ensure that powering up devices shall not cause power bumps on the overhead speakers.

3.6 SYSTEM WARRANTY AND APPLICATION ASSURANCE

- A. General Warranty: The warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be concurrent with other warranties provided by the Contractor under other requirements of the Contract Documents.
- B. The AV Contractor shall guarantee at the time of the bid that all audiovisual equipment, that all cabling and components meet or exceed established specifications or performance-acceptance criteria.

3.7 MATERIALS AND EQUIPMENT

- A. Materials and equipment shall be new, UL or CSA-labeled and shall bear the manufacturer's name, model number and other identification markings.
- B. Materials and equipment shall be the standard product of a manufacturer regularly engaged in the production of the required type of material or equipment for at least five years (unless specifically exempted by the Architect) and shall be the manufacturer's latest design with published properties.
- C. Source Limitations: Equipment and materials of the same general type shall be of the same manufacture throughout the project to provide uniform appearance, compatibility, operation and maintenance.
- D. Equipment and materials provided by AV Contractor shall be without blemish or defect.
- E. Where two or more makes or kinds of materials or equipment are specified, indicate which of these choices will be used. This information shall be included with the list of manufacturers for equipment and materials to be submitted to the Architect/Consultant as specified under "Submittals".

3.8 EQUIPMENT FURNISHED BY OTHERS

A. Where equipment is to be owner-furnished or provided by others, and that equipment requires audiovisual equipment and/or connections, the AV Contractor shall determine and coordinate any ancillary equipment and/or materials necessary to install the provided equipment.

B. The contractor furnishing the equipment shall erect, align, level and prepare the equipment for audiovisual work. Work performed under Division 26 provides for any raceway rough-ins to include conduit systems, connections and electrical accessories not furnished, but considered necessary to provide a fully operational and complete audiovisual system(s).

3.9 INSTRUCTION AND DEMONSTRATIONS

A. AV Contractor shall be responsible for training the Owner's personnel in audiovisual management operations, including resetting components, reloading control system source code, projector maintenance and manual operation and managing changes to documentation.

B. AV Contractor shall train Owner's users and trainers in daily operations of the audiovisual control panel and other systems

C. AV Contractor shall provide training materials for users as necessary to reference within the room

D. The primary adjustments of the system(s) shall be accomplished by the AV Contractor to the complete satisfaction of the Owner and Architect at the time of completion for the installation.

PART 4. WORK REQUIREMENTS AND SPECIFICATIONS

4.1 PHASE I - SCOPE OF WORK

Grambling State University in Grambling, Louisiana has requested a state-of-the-art audio/visual system to be installed within the campus 'Nursing Auditorium for support of general presentations, panel discussions, host lectures, and production-oriented events. have an intuitive interface for seamless operability. NOTE: Any and all required electrical service, millwork, etc. required at the installation site shall be the responsibility of others. The AV Contractor shall be responsible for providing, installing, and configuring new equipment to meet the requirements of the specified audio-visual system laid out in this document. The AV Contractor is responsible for providing and installing a completely functional system for the Owner.

NOTE: No equipment shall be substituted without the consent of the Architect, with concurrence from the Owner.

A. Video Wall Display System

The AV Contractor shall provide and install a one (1) 16.54ft wide x 5.31ft tall, 1.8mm direct-view LED video wall, with a 3.1:1 aspect ratio, or equivalent substitute, to be placed on the center of the front auditorium wall on the stage at the appropriate height to ensure visibility for the entire audience.

B. Video Wall Processor and Video Equipment

The AV Contractor shall provide and install one (1) Video Wall Processor/Splicer for full control of all the pixels, with support for multi-window, multi-layer video. The Video Wall Processor shall be able to take in up to four (4) presentation video sources and arrange them together into one large video space to be shown on the LED video wall display.

The AV Contractor shall provide and install a four (4) input 4K/60 Seamless Scaling Switcher, which will manage inputs from a wall-mounted HDMI source, a wireless HDMI extension system, and any Owner-Furnished PC to be located in the equipment rack area.

C. Control System Equipment

The AV Contractor shall provide and install the following Control System Equipment, or equivalent substitute, to provide control of all video and audio functionality from one (1) custom touch panel interface. The touch panel shall be located in the Control Booth.

Control functions programmed shall include Audio System Power, Video Source Selection, Video Windowing Layout, and Microphone and Presentation Volume Controls.

- One (1) Control Processor to be installed in the head end rack
- One (1) 7" Touch Screen with Wall Mount
- One (1) 24-Port Gigabit PoE+ Compliant AV Managed Network Switch

The AV Contractor shall provide custom programming for the following control functionality listed below:

AUDIOVIDEO (AV) INFRASTRUCTURE AND EQUIPMENT
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Date: March 10, 2026

- User Log in page with password protection
- Video Wall Standby Mode
- Video Content Routing to Video Wall
- Audio Content Routing to Speaker System
- Volume Control to Speaker System

The AV Contractor shall provide custom configuration of the touch screen controller layout and functionality to be approved by the client.

D. Audio System Equipment

The AV Contractor shall provide two (2) approved Two-Way Compact 8" Passive Speakers at the front of the stage, stage right and stage left, focused towards the audience, and two (2) approved Two-Way Compact 4" Passive Speakers at the front of the stage, focused towards the audience to cover the extreme edges of the listening area for smooth, even coverage.

The AV Contractor shall provide one (1) 2 x 1250Watt Professional Power Amplifier to power the Compact speakers.

The AV Contractor shall provide two (2) Bodypack Transmitters and two (2) Shure cardioid lavalier microphone elements, or equivalent substitutes, for hands-free presentations.

The AV Contractor shall provide two (2) Handheld Transmitters with Shure SM58 dynamic microphone elements, or equivalent substitutes, for general presentations.

The AV Contractor shall provide two (2) Wireless microphone receivers for the wireless transmitters.

The AV Contractor shall provide a (1) commercial-grade Audio Digital Signal Processor (DSP) with 12 mic/line-level inputs and 8 mic/line-level outputs. The audio processor shall be capable of performing 24-bit audio signal shaping, incorporate a 48KHz digital sampling rate, and perform audio signal routing during general presentations and meetings. The digital audio processors shall include RS-232 and Ethernet ports for connectivity with external control systems.

E. Equipment Rack

The AV Contractor shall provide one (1) 12-Space Wall-Mounted Equipment Rack to be installed in the Control Booth.

The AV Contractor shall provide one (1) Power Conditioner, 11 outlets, 15A, which will distribute and control power to various system equipment.

NOTE: The AV Contractor shall provide and install the necessary rack hardware for a clean and professional rack layout, including blank plates to fill unused spaces and lace bars for proper wire management. An unprofessional layout shall not be accepted by the Architect or the Owner.

The AV Contractor shall provide any machinery or hardware needed to mount Audio-Visual equipment at heights over 35 feet.

The AV Contractor shall provide and install all low-voltage cabling needed to facilitate the Audio-Visual System.

I. Approved AV Equipment

A list of AV equipment for use with this integration project has been provided below. For components listed by performance all products shall be submitted for prior approval and if approved, will be listed in an addendum as acceptable for inclusion in the bid. Any items not prior approved, will not be accepted. Substitute products may be accepted if their specifications are equal to or greater than those listed with the products listed herein. Any equipment substitutions must be approved by the Architect prior to acceptance of bids for this project. The list of recommended, or preferred equipment, for integration with this AV system shall include, but not be limited to, the following items:

Manufacturer or Component	Model/Part#	Description	Qty	Notes
KWav	ATX	16.54" x 5.31' P1.8mm Pitch LED Wall	1	

Shure	SLXD124+/85M	Digital Wireless Combo System with SM58® Handheld and WL185m Lavalier Microphones	2	
Novastar	H2	Video Wall Processor / Splicer	1	
RCF	Compact M 08	Passive 8" 2-way Compact Speaker (Blk)	2	
RCF	Compact M04	Passive 4" 2-way Compact Speaker (Blk)	2	
RCF	IPS 2.5K	Class H Power Amplifier 2 X 1,250 W @ 4 Ohm	1	

J. Standard Service & Maintenance Agreement

The AV Contractor shall provide a standard service agreement that guarantees a minimum of 90 days of installation warranty coverage after systems commissioning for all AV systems installed. This coverage applies only to the installation portion of the project; the manufacturer's warranties will apply to all products installed by the AV contractor, with the terms outlined within each manufacturer's warranty terms.

K. Extended Service & Maintenance Agreement

The AV Contractor will provide, as an option, an extended warranty as outlined below:

The AV Contractor shall provide ongoing systems support for a period of five (5) years after systems commissioning, for all installed AV systems installed which are included in these Contract Documents according to the terms below:

- The AV Contractor shall provide four-hour telephone response for system-related problems upon receipt of notification.
- The AV Contractor shall guarantee priority status over other customers for the resolution of system-related problems during the period of coverage.
- The AV Contractor shall provide unlimited on-site labor support for diagnostics or repair of system-related problems.
- The AV Contractor shall provide next-day on-site labor services during normal business hours.
- The AV Contractor shall provide an on-call field service engineer as needed to diagnose system-related problems during normal business hours.
- The AV Contractor's technical staff shall perform software and firmware version upgrades, as they become necessary and are available from the manufacturer.
- For the Video Wall Display and Video Windows Processor components, all labor parts, repair and replacement items shall be completely covered by the AV Contractor for the duration of the extended service agreement.
- With the exception of the Video Wall Display and Video Windows Processor components, any equipment or parts not covered by the manufacturers' warranties that fail during this period shall be charged at-cost plus 15% by the AV Contractor.
- The AV Contractor shall provide on-site preventive maintenance inspections annually. The preventive maintenance items that will be performed for systems that were installed by the AV Contractor as required in these Contract Documents shall be:
 - a. Coverage of the equipment listed in the service agreement
 - b. Diagnostics and performance acceptance checks on all equipment
 - c. Testing of all input sources, video and data, alignment, resolution, and convergence checks of display systems
 - d. Evaluation and diagnostics checks of inter-systems communications
 - e. On-site communication with designated representative for problem resolution.

The AV Contractor shall schedule maintenance by notifying a designated contact and arranging for room availability through that individual.

L. Items Specifically Not Covered

The AV Contractor shall not be responsible for any problems or malfunctions that have an origin determined not to be the result of a manufacturing defect or failure. Operator error, operator abuse, general misuse or neglect of equipment is not covered under the terms of the Extended Service & Maintenance Agreement.

Consumables, such as CRT's, lamps and batteries, etc. are defined as consumables and shall only be covered under the terms of the manufacturer's warranty. These items are only covered in case of manufacturer defect. All service calls and repairs performed to the equipment under the above circumstances shall be billed at current labor rates and may include a rush or emergency service charge.

END OF SECTION 271400

Grambling Hall Lecture Hall

Refurbishment



Sutton Beebe Babin
Architects, LLC

Grambling State University

Construction Documents

Date:

03/10/2026

SBB Project Number:

2602.00

Symbol Legend:

Room name

101

Room Name & Number

Detail Number

1

A101

Elevation Indicator

Detail Number

1

A101

Sheet Number

Detail Number

1

A101

Building Section Indicator

North Arrow

North

Door Indicator

101

Wall Section Indicator

1

A101

Detail Number

1

A101

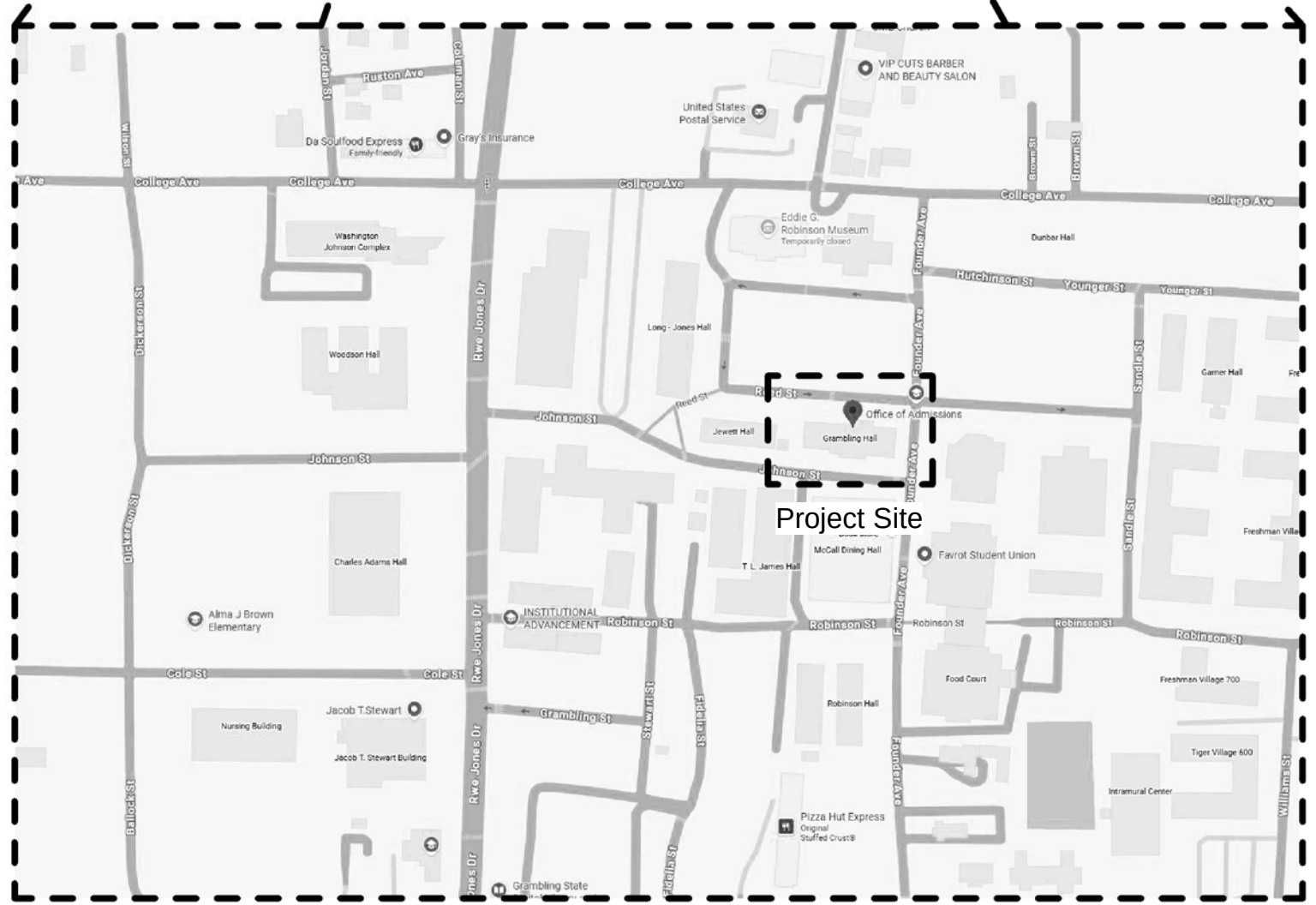
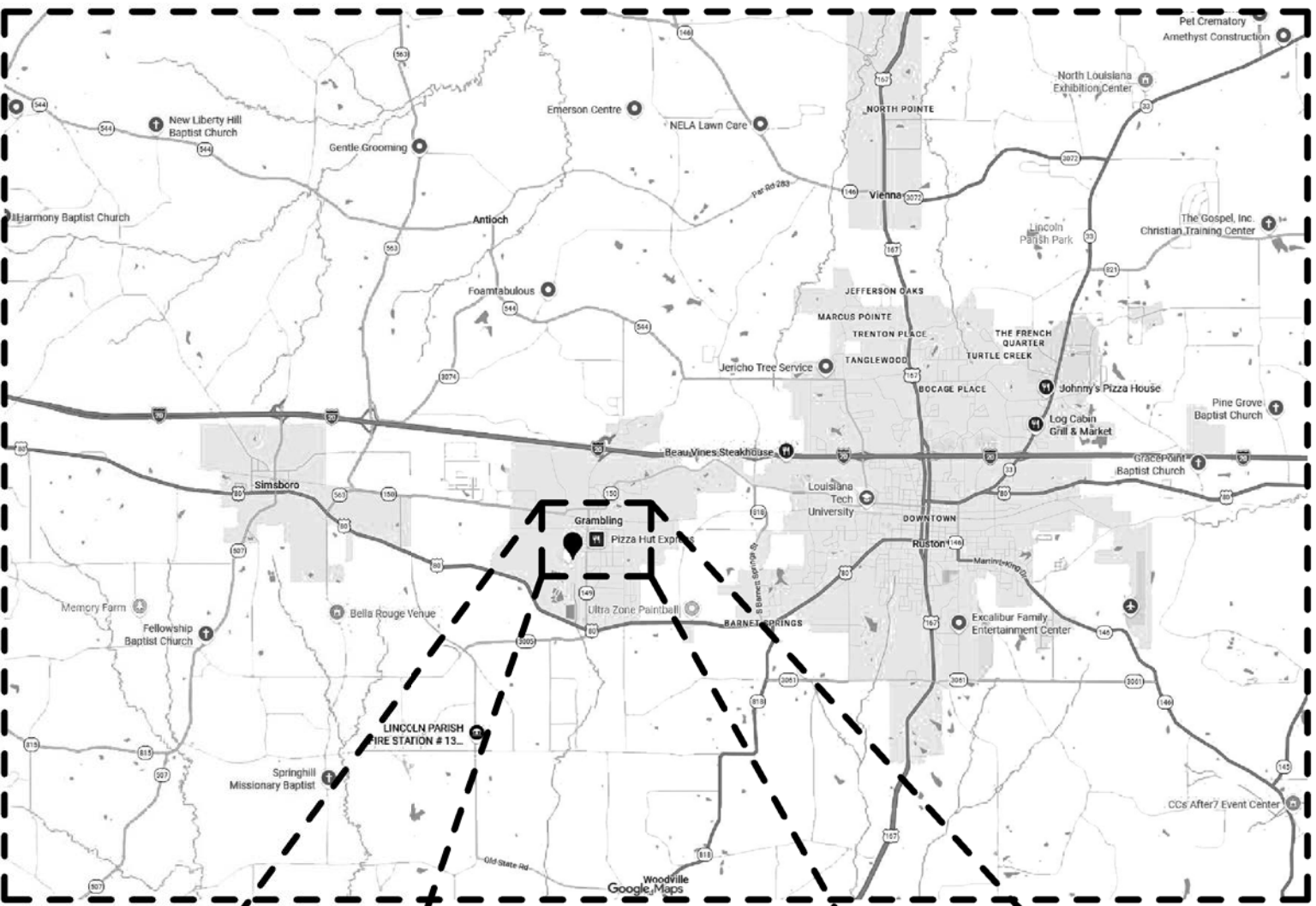
Enlarged Detail/View Indicator

1

A101



Vicinity Map



Architectural	
Sheet Number	Sheet Name
A0.00	Cover
A1.01	Demolition / Renovation Plans
A1.02	Seating & Floor Pattern Plans
A5.01	Interior Elevations
A5.02	Interior Elevations
A5.03	Interior Elevations
A5.04	Interior Details
A5.05	Interior Details
A6.01	Reflected Ceiling Plan

Mechanical	
Sheet Number	Sheet Name
M1.01	First Floor HVAC Demolition & Renovation Plan

Electrical	
Sheet Number	Sheet Name
ED1.01	Electrical Demo Plan
E1.01	Electrical General Notes
E2.01	Electrical Plans
E3.01	Electrical Details

Plumbing	
Sheet Number	Sheet Name
P1.01	First Floor Plumbing Demolition & Renovation Plans

Audio/Visual	
Sheet Number	Sheet Name
AV 601	Electrical Requirements
AV 602	Electrical Elevation Requirements
AV 603	AV Conduit Floor Plan
AV 604	AV Conduit Elevation

Grambling Hall Lecture Hall
Refurbishment
Grambling State University

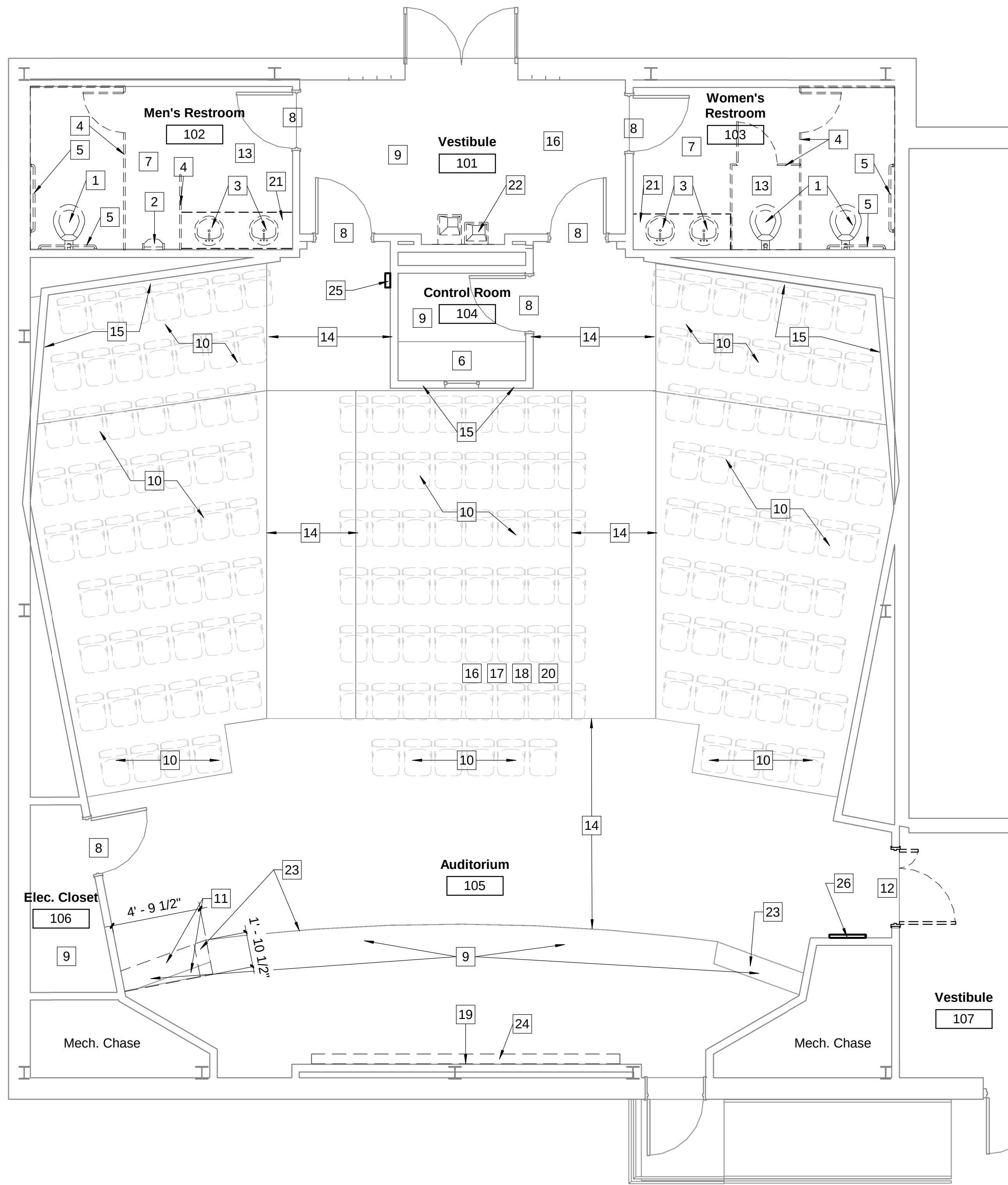
Project No.
2602.00

Issue

Date
03/10/2026

Sheet Title
Demolition /
Renovation
Plans

Sheet No.
A1.01



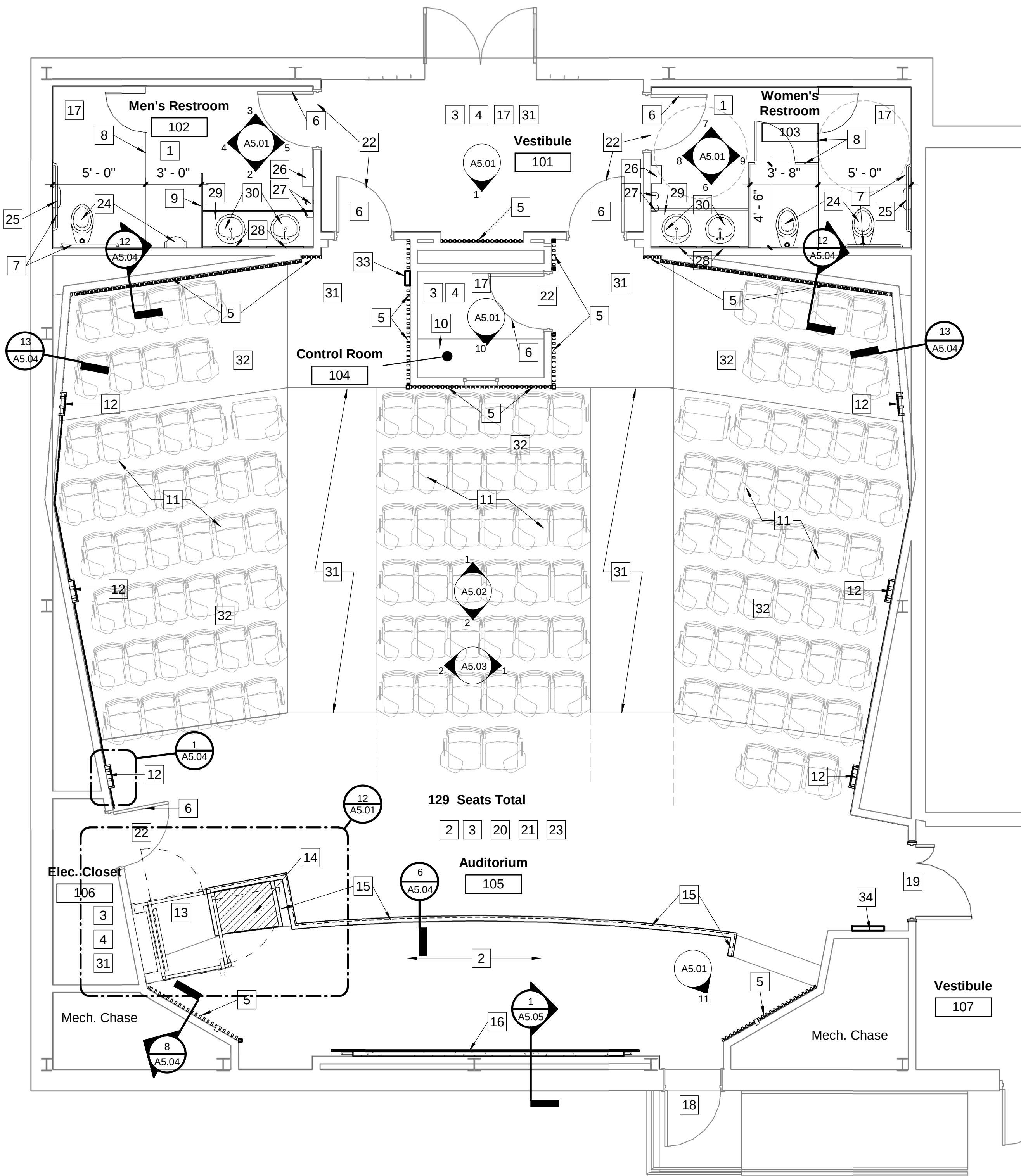
1 Demolition Floor Plan
1/4" = 1'-0" 0' 4'

Demolition Plan Notes:

All notes designated by are for specific locations. All others are general notes.

- 1 Remove existing toilet, prep for new toilet, RE: Mechanical.
- 2 Remove existing floor mounted urinal, prep for new urinal, RE: Mechanical.
- 3 Remove existing faucets & lavatory, prep for new lavatory and faucets, RE: Mechanical.
- 4 Remove existing toilet partition and prep for new.
- 5 Remove existing grab bar and prep for new.
- 6 Not used
- 7 Remove existing tile flooring and thin set mortar bed, prep for new.
- 8 Existing door and frame to remain, prep existing wood door for new stain, remove existing door hardware and prep for new hardware.
- 9 Remove existing VCT flooring, base, and transition strips, prep for new flooring.
- 10 Remove existing auditorium seats.
- 11 Remove steps and this portion of stage, and portion of wood framing.
- 12 Remove existing door and hardware, prep for new door and hardware, existing frame to remain.

- 13 Remove existing wall tile and tile on overhead furring, backer board, and prep for new tile this room.
- 14 Remove existing carpet and transaction strips, prep for new flooring.
- 15 Remove acoustical panel system and wood trim.
- 16 Remove existing vinyl wall covering each wall this room and prep for painting.
- 17 Remove existing ceiling texture for refinishing and repaint ceiling this room.
- 18 Remove existing wood base, wainscot, and ceiling perimeter trims this room.
- 19 Remove wall mounted markerboard and projector screen, salvage for Owner.
- 20 Remove existing chair rail this room, patch wall and prep for new paint.
- 21 Remove existing countertop.
- 22 Remove existing drinking fountain, RE: Mechanical.
- 23 Remove nosing at platform and stairs.
- 24 Remove existing projection screen recess, infill to match existing ceiling and paint.
- 25 Remove existing fire extinguisher cabinet. Salvage fire extinguisher for reuse.
- 26 Remove existing return air grilles, RE: Mechanical.



2 Renovation Floor Plan
1/4" = 1'-0" 0' 4'

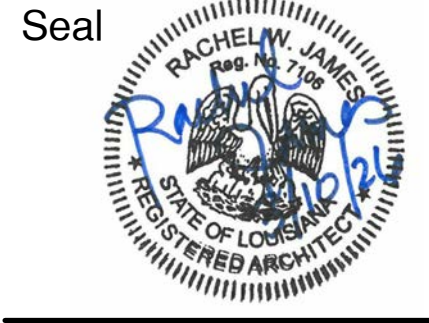
Renovation Notes:

All notes designated by are for specific locations. All others are general notes.

- 1 New porcelain floor tile.
- 2 New carpet tile flooring.
- 3 New paint this room.
- 4 New rubber base.
- 5 Wood slat wall over existing wall, RE: Specifications.
- 6 Strip, repair and re-stain existing door. Repaint existing door frame.
- 7 New grab bars.
- 8 New phenolic toilet partition.
- 9 New phenolic entrance screen.

- 10 Existing countertop to remain, re-laminate countertop.
- 11 New fixed auditorium seating, OFOI
- 12 Light column, wood frame, stained. Resin panel, back lighted by color changing LED. Color changing LED light on top, RE: Electrical.
- 13 New wheelchair lift.
- 14 New stage construction, hatched area. Align with existing stage height. Verify new construction area with wheelchair lift area. New wood edge, stained.
- 16 New video wall, RE: AV Plan.
- 17 Re-paint ceiling this room.
- 18 Re-paint existing door & frame to remain.
- 19 New wood door and hardware in existing frame, paint existing frame.

- 20 New 4 inch wood base this room.
- 21 Refer to floor pattern finish plan for floor type and location.
- 22 Provide new door hardware in existing door.
- 23 Refinish and re-paint ceiling this room
- 24 New toilet or urinal, RE: Plumbing.
- 25 New toilet paper dispenser.
- 26 New hand dryer.
- 27 New soap dispenser.
- 28 New ceramic wall tile and paint, RE: Elevations.
- 29 New countertop.
- 30 New lavatory and faucets, RE: Plumbing.
- 31 New LVT.
- 32 Epoxy painted floor.
- 33 New fire extinguisher cabinet.
- 34 Provide new return air grilles. RE: Mechanical. Powder coat to match wall paint.



Grambling Hall Lecture Hall
Refurbishment
Grambling State University

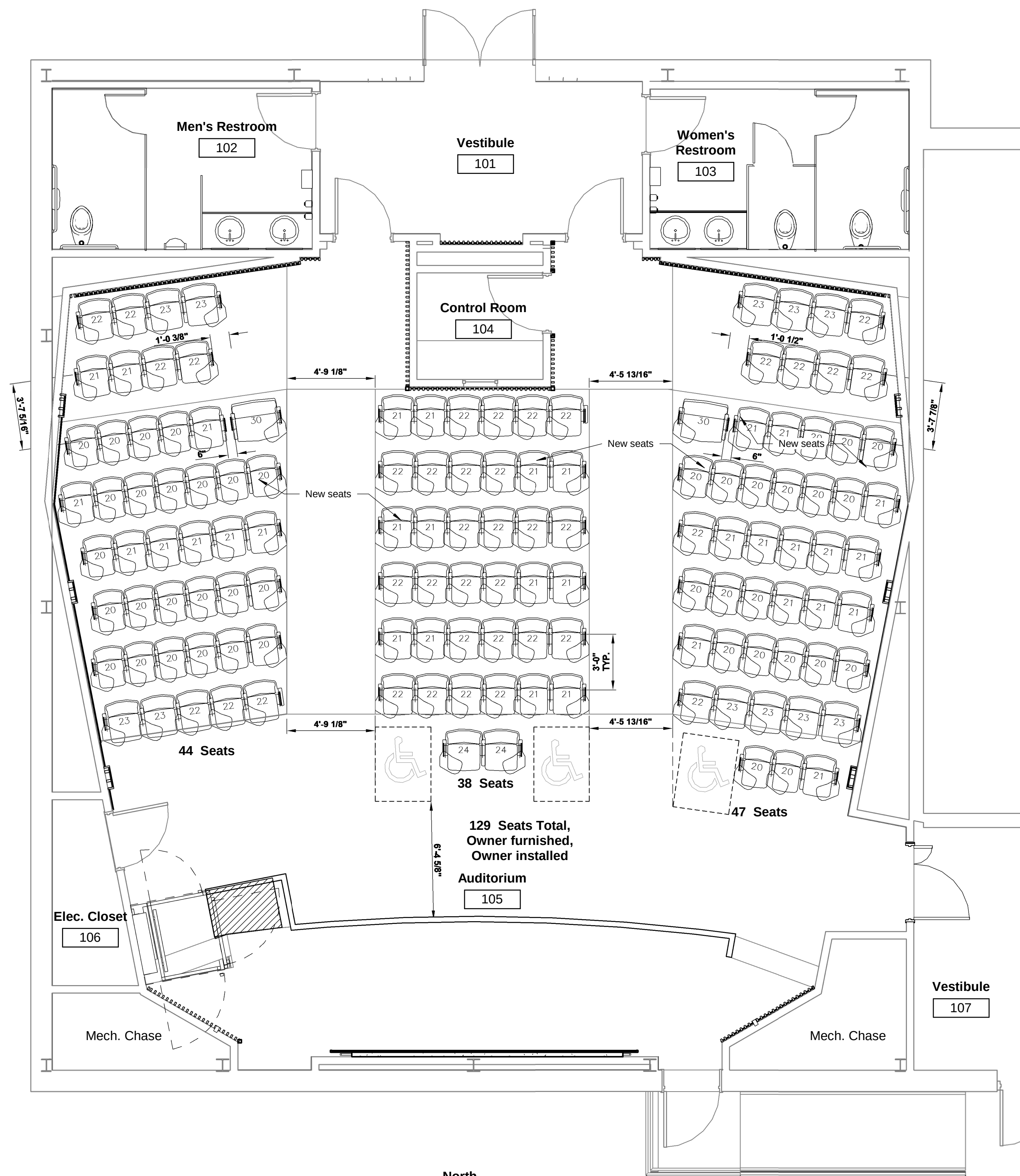
Project No.
2602.00

Issue

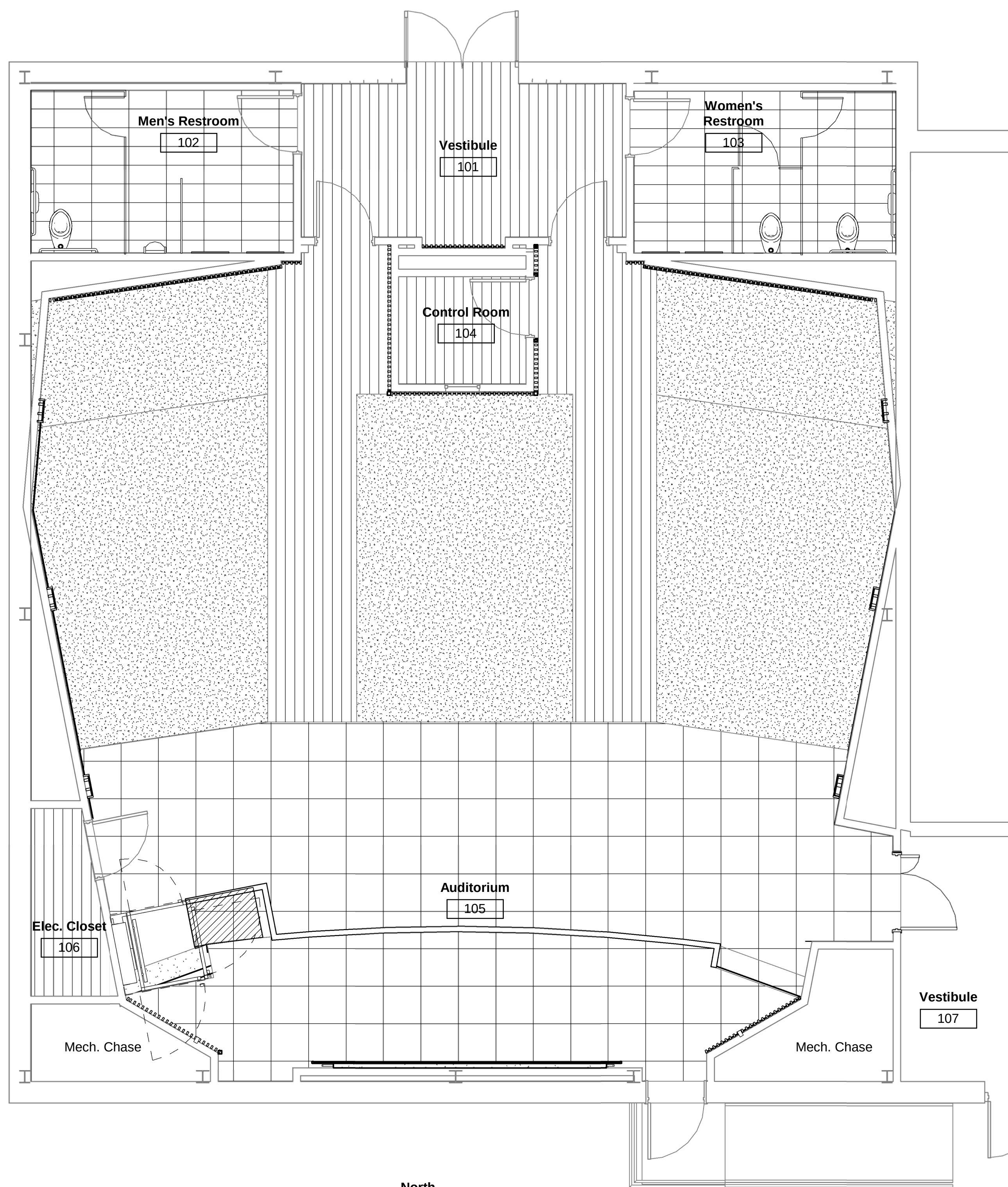
Date
03/10/2026

Sheet Title
Seating &
Floor Pattern
Plans

Sheet No.
A1.02



1 Seating Plan
1/4" = 1'-0"

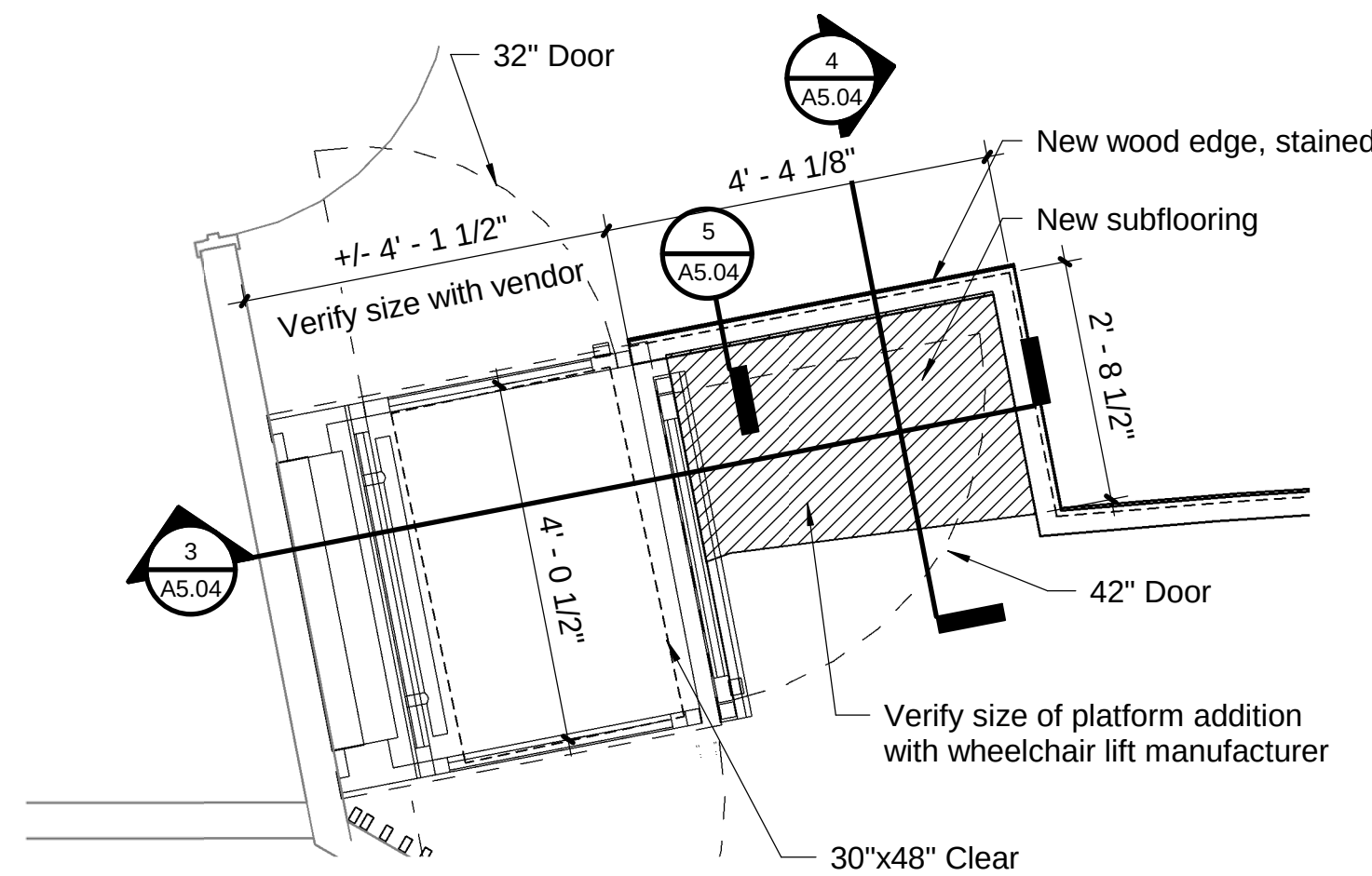
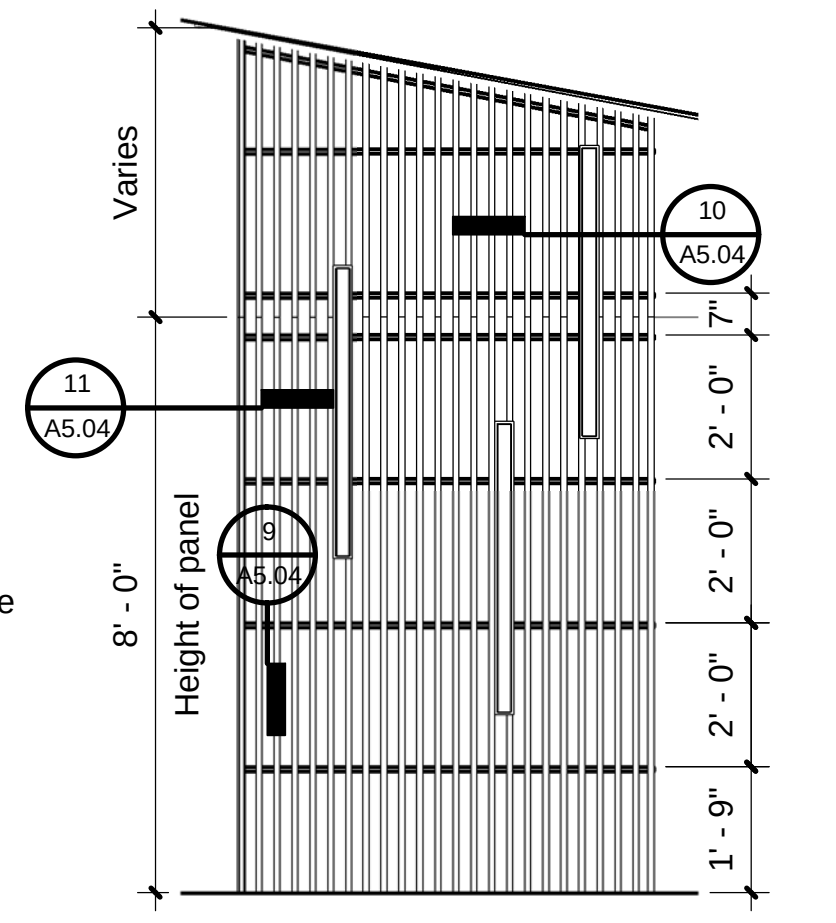
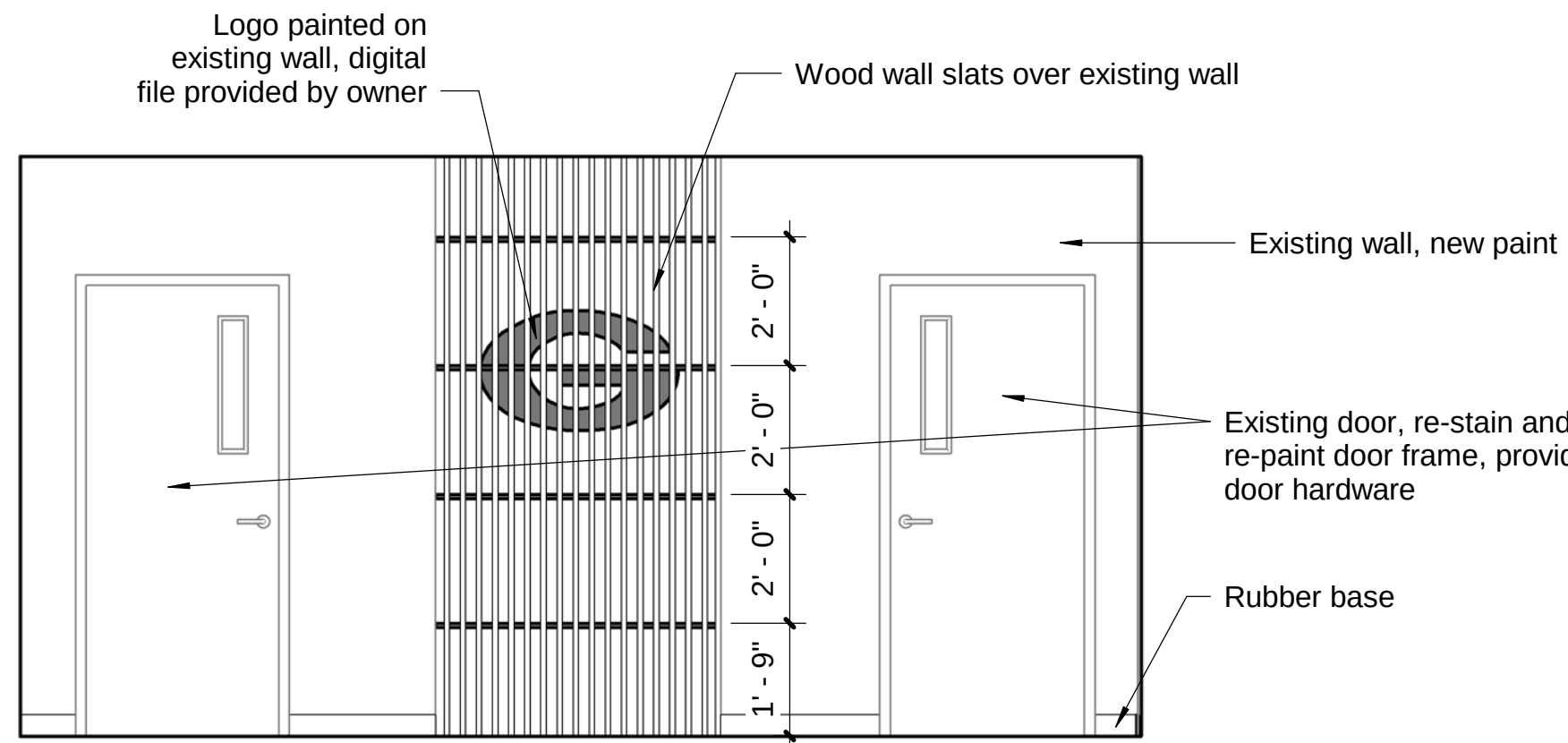


2 Floor Finish Plan
1/4" = 1'-0"

Floor Pattern Legend:

	Carpet Tiles		Epoxy Painted Concrete
	LVT-Luxury Vinyl Tile		Porcelain Tile

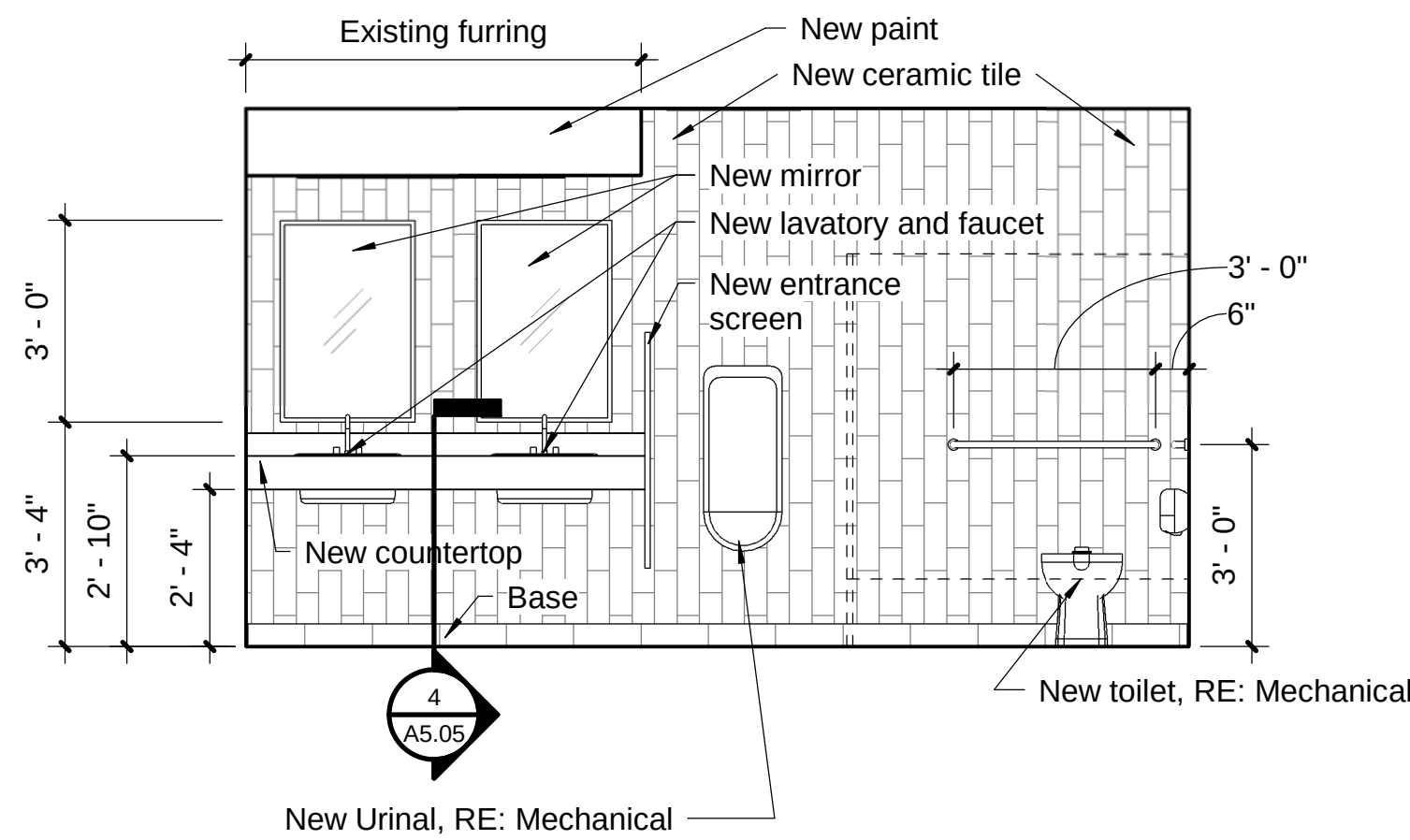
Finish Schedule							
Room Number	Room Name	Floor Finish	Base Finish	Wall Finish	Ceiling Finish	Ceiling Height	Comments
101	Vestibule	LVT	Rubber Base	Paint	Paint		
102	Men's Restroom	Porcelain tile	Porcelain Tile	Porcelain Tile/Paint	Paint		
103	Women's Restroom	Porcelain tile	Porcelain Tile	Porcelain Tile/Paint	Paint		
104	Control Room	LVT	Rubber Base	Paint	Paint		
105	Auditorium	Epoxy Painted Concrete/LVT	Rubber Base	Paint	Paint		
106	Elec. Closet	LVT	Rubber Base	Paint	Paint		
107	Vestibule	LVT	Rubber Base	Paint	Paint		



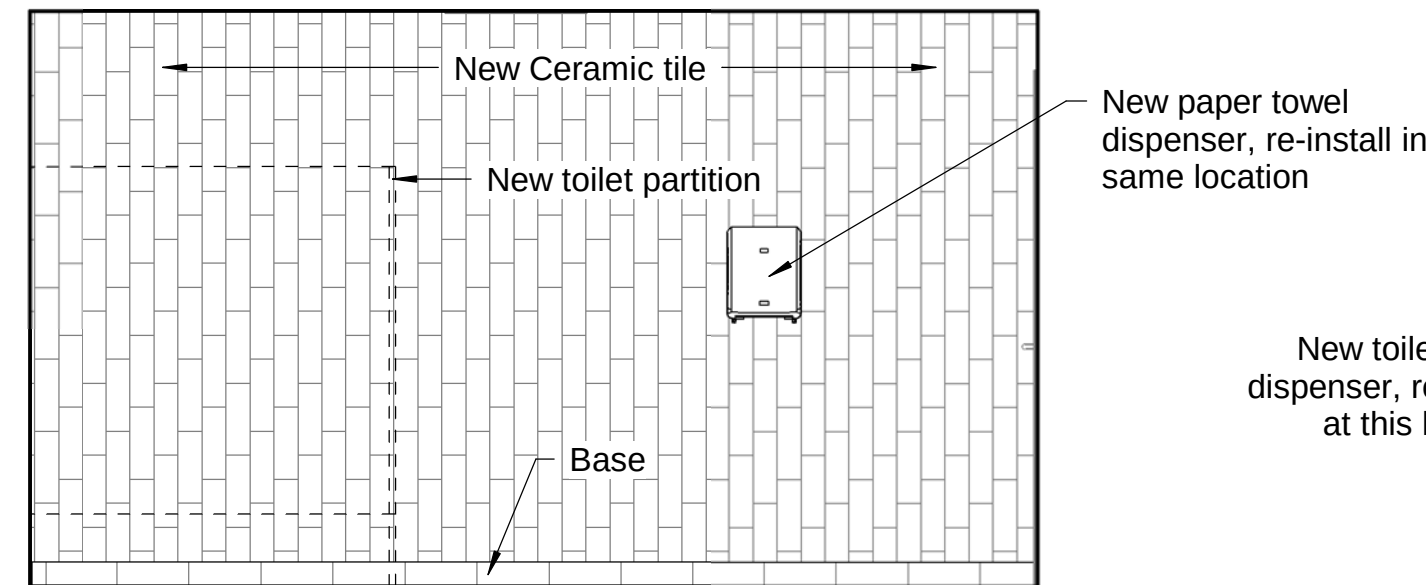
1 101-Vestibule South Elevation
3/8" = 1'-0"
0' 2'

11 Wood Slat Wall Elevation
3/8" = 1'-0"
0' 2'

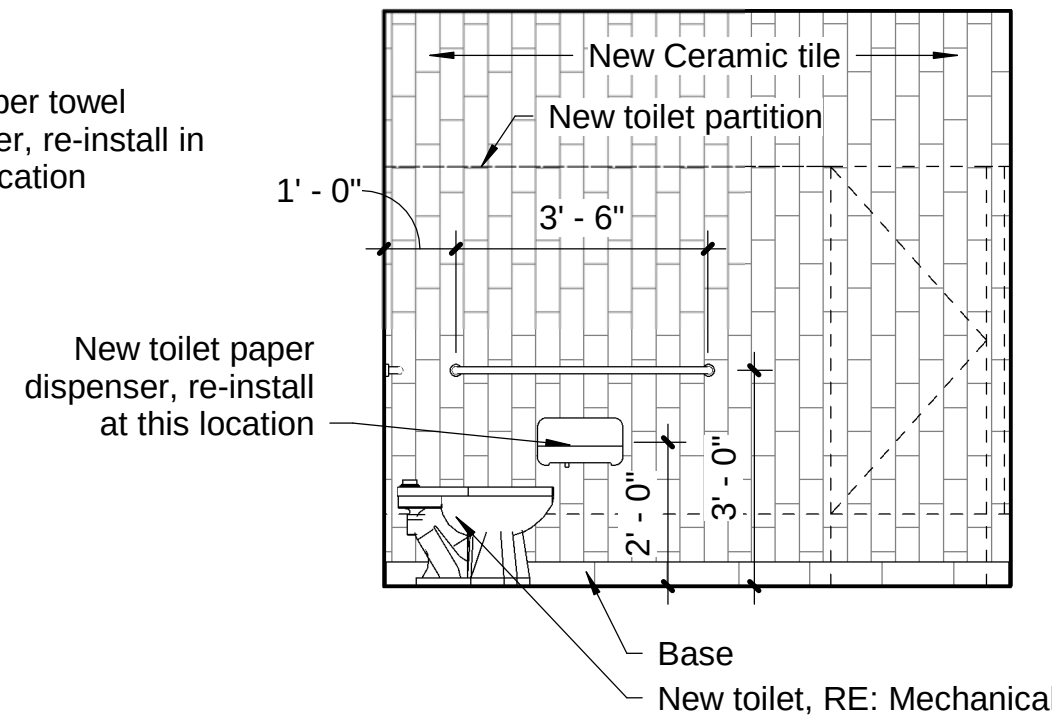
12 Enlarged Plan at Lift
1/2" = 1'-0"
0' 2'



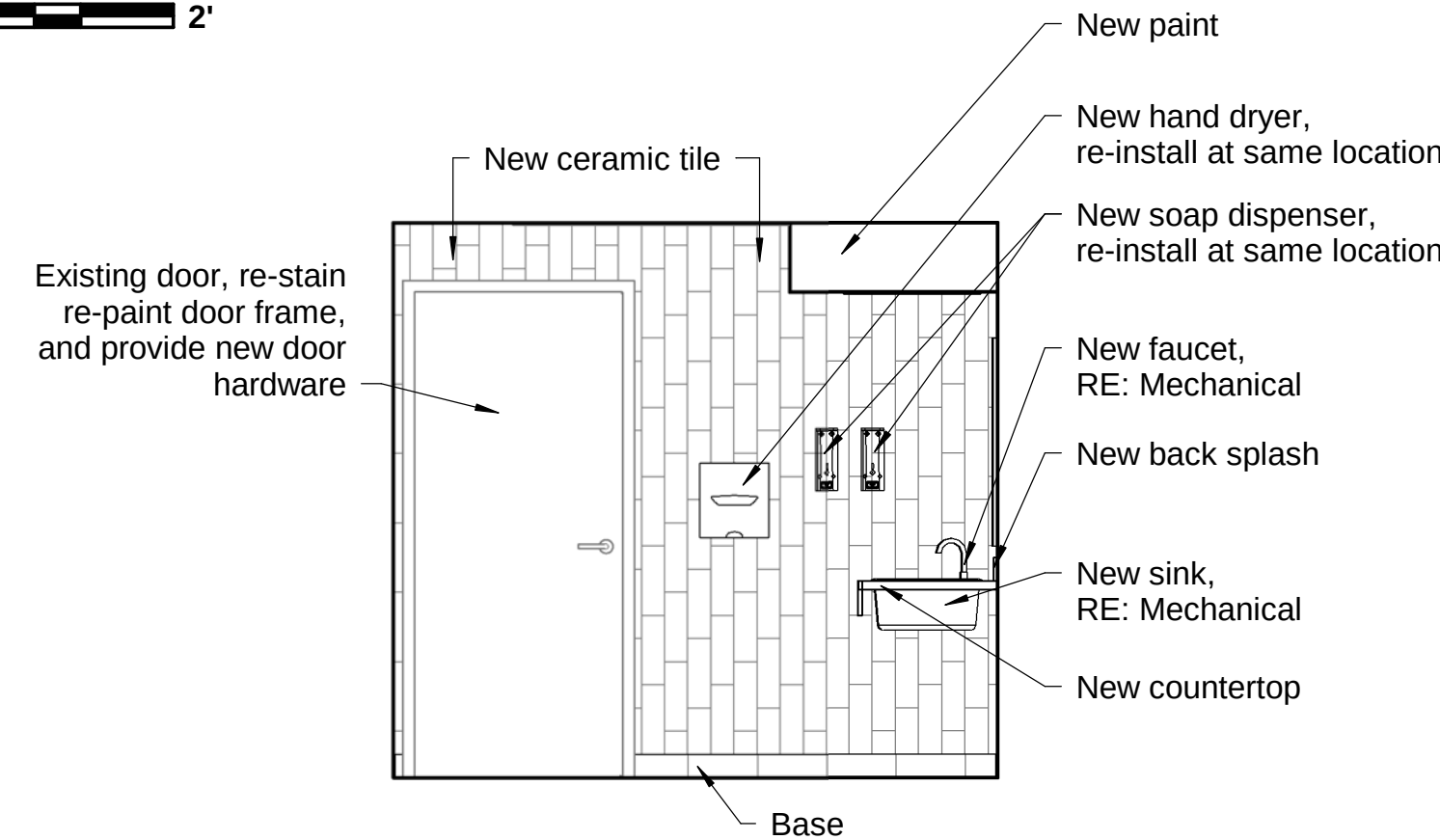
2 102-Men's South Elevation
3/8" = 1'-0"
0' 2'



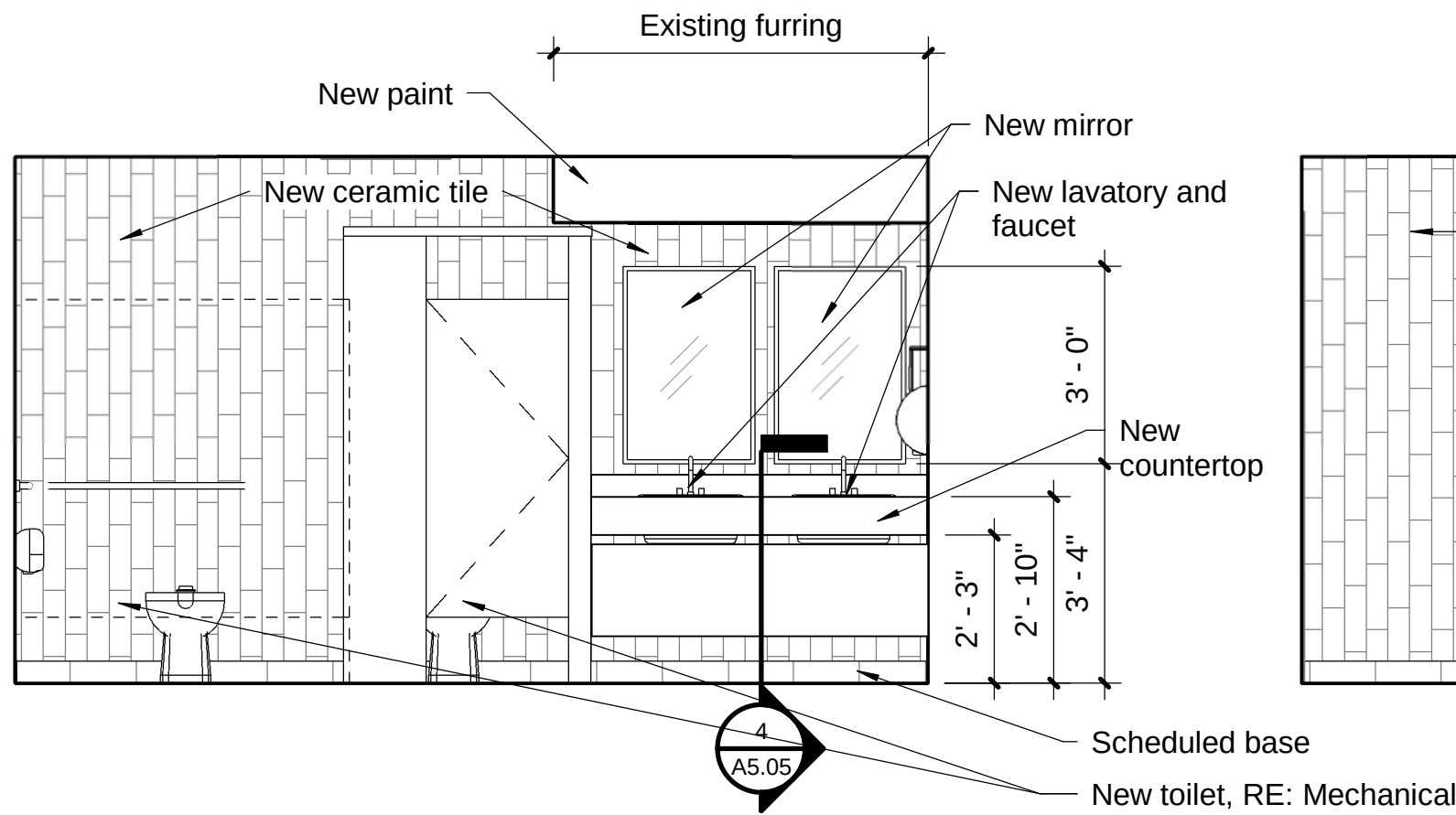
3 102-Men's North Elevation
3/8" = 1'-0"
0' 2'



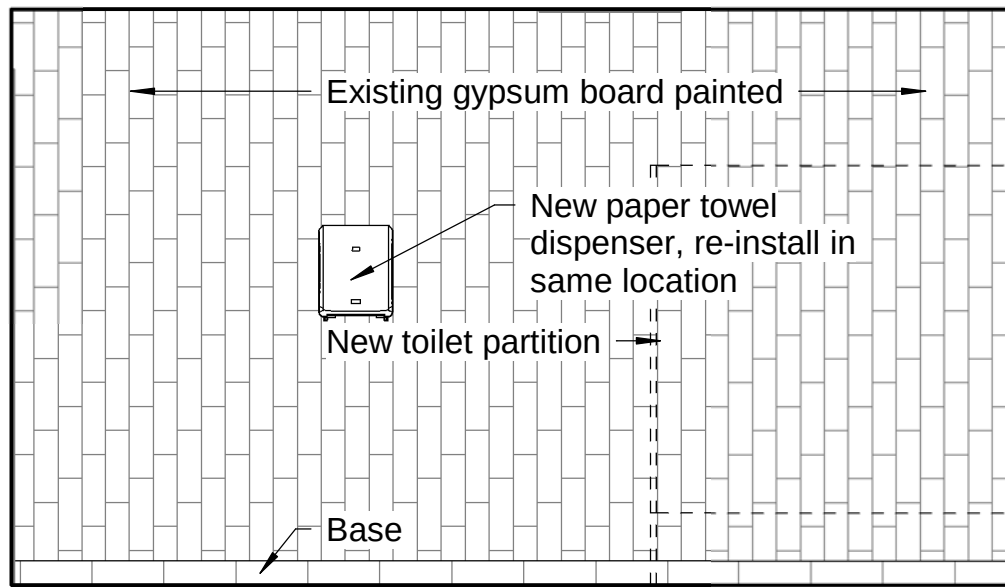
4 102-Men's West Elevation
3/8" = 1'-0"
0' 2'



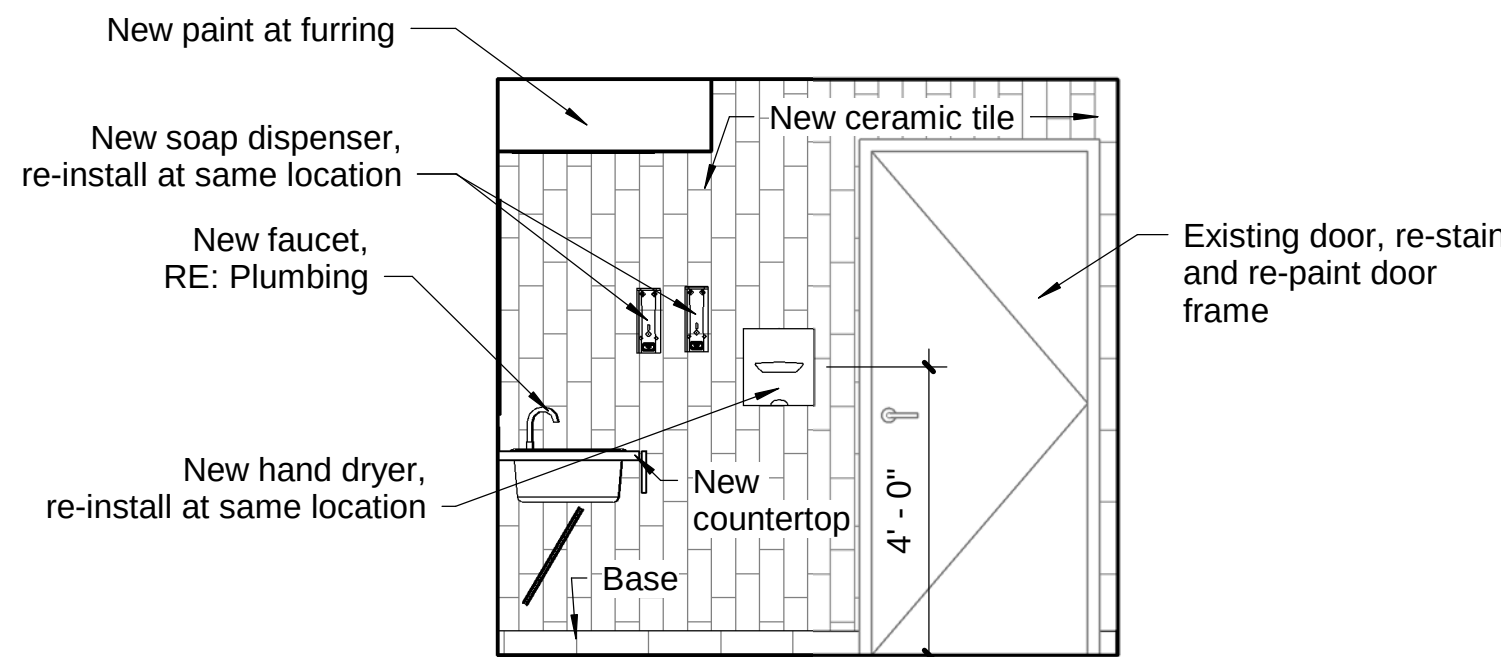
5 102-Men's East Elevation
3/8" = 1'-0"
0' 2'



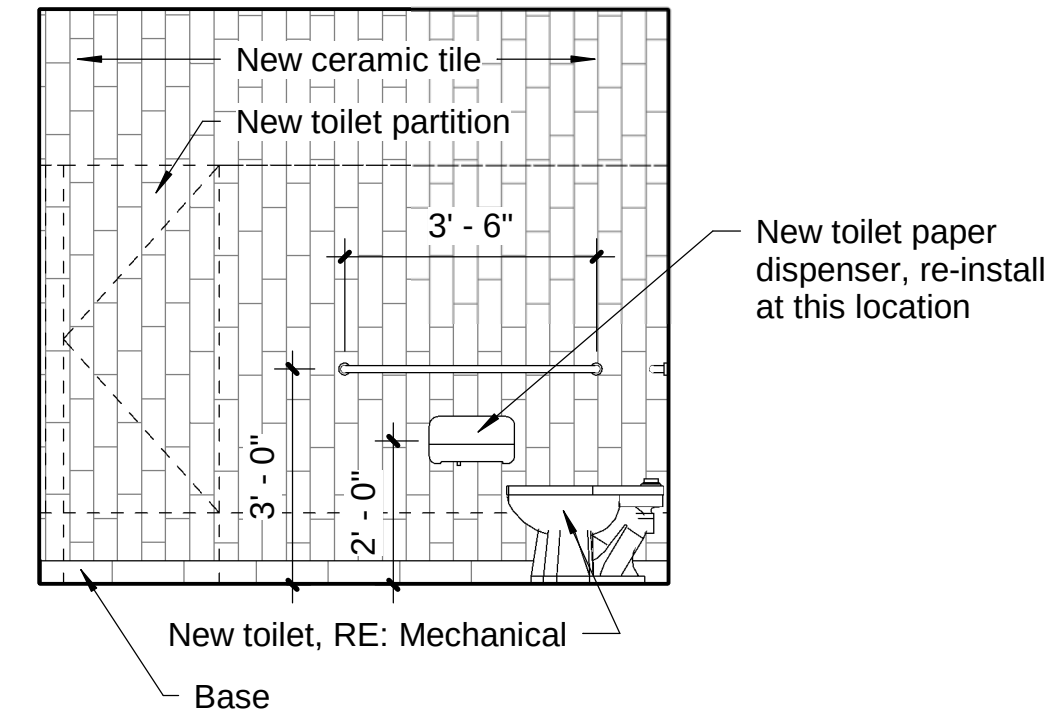
6 103-Women's South Elevation
3/8" = 1'-0"
0' 2'



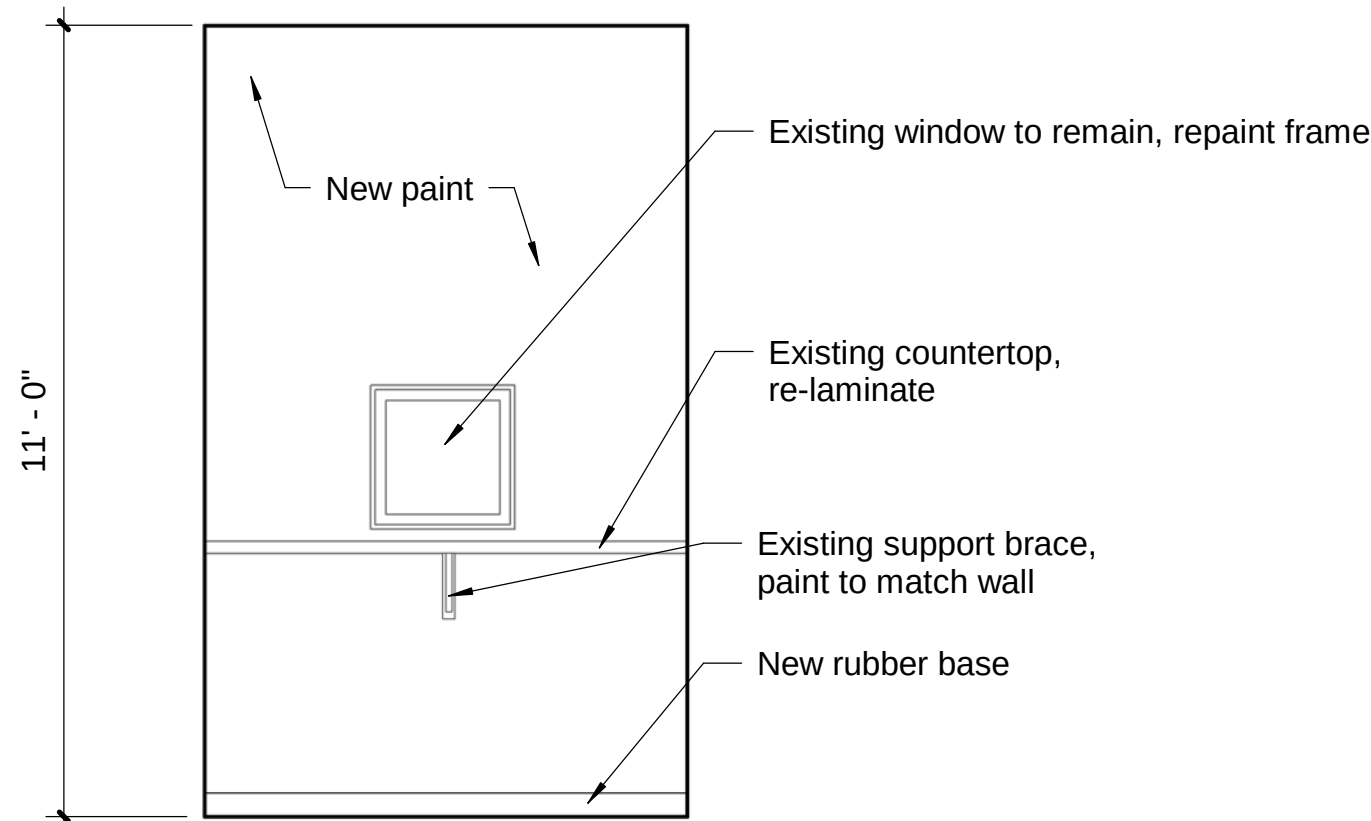
7 103-Women's North Elevation
3/8" = 1'-0"
0' 2'



8 103-Women's West Elevation
3/8" = 1'-0"
0' 2'



9 103-Women's East Elevation
3/8" = 1'-0"
0' 2'



10 104-Control Room Elevation
3/8" = 1'-0"
0' 2'



**Grambling Hall Lecture Hall
Refurbishment**
Grambling State University

Project No.
2602.00

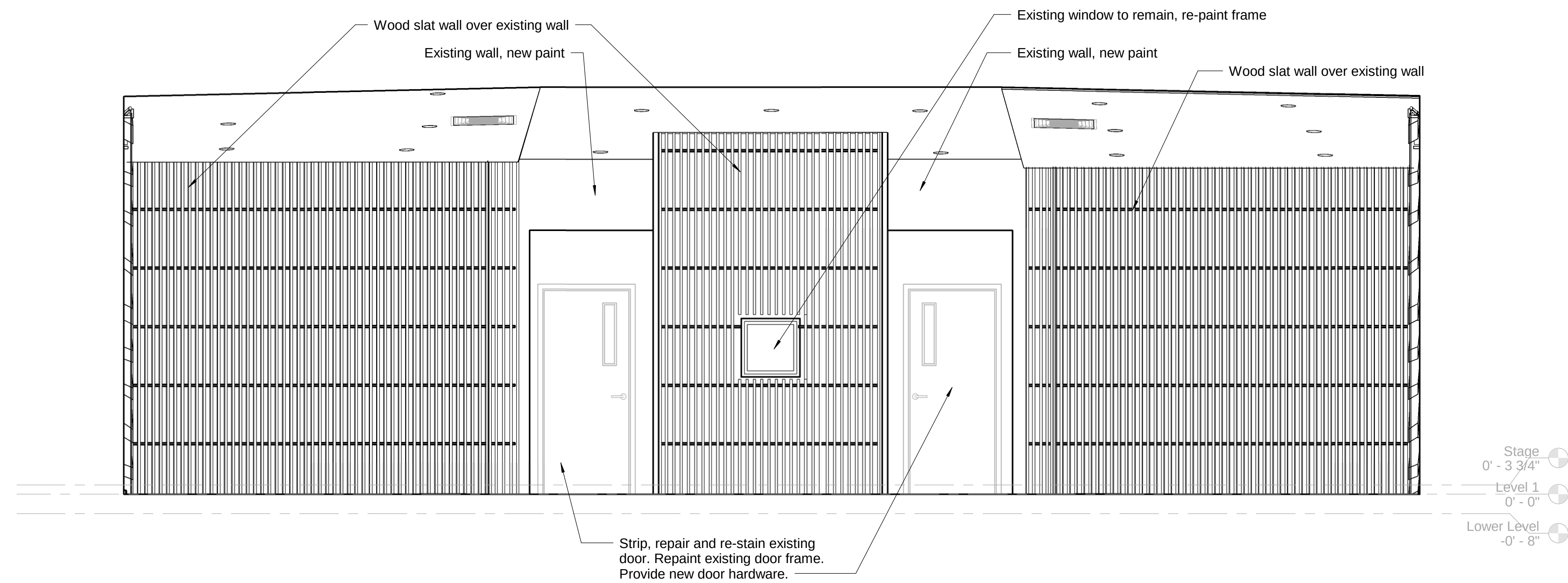
Issue

Date
03/10/2026

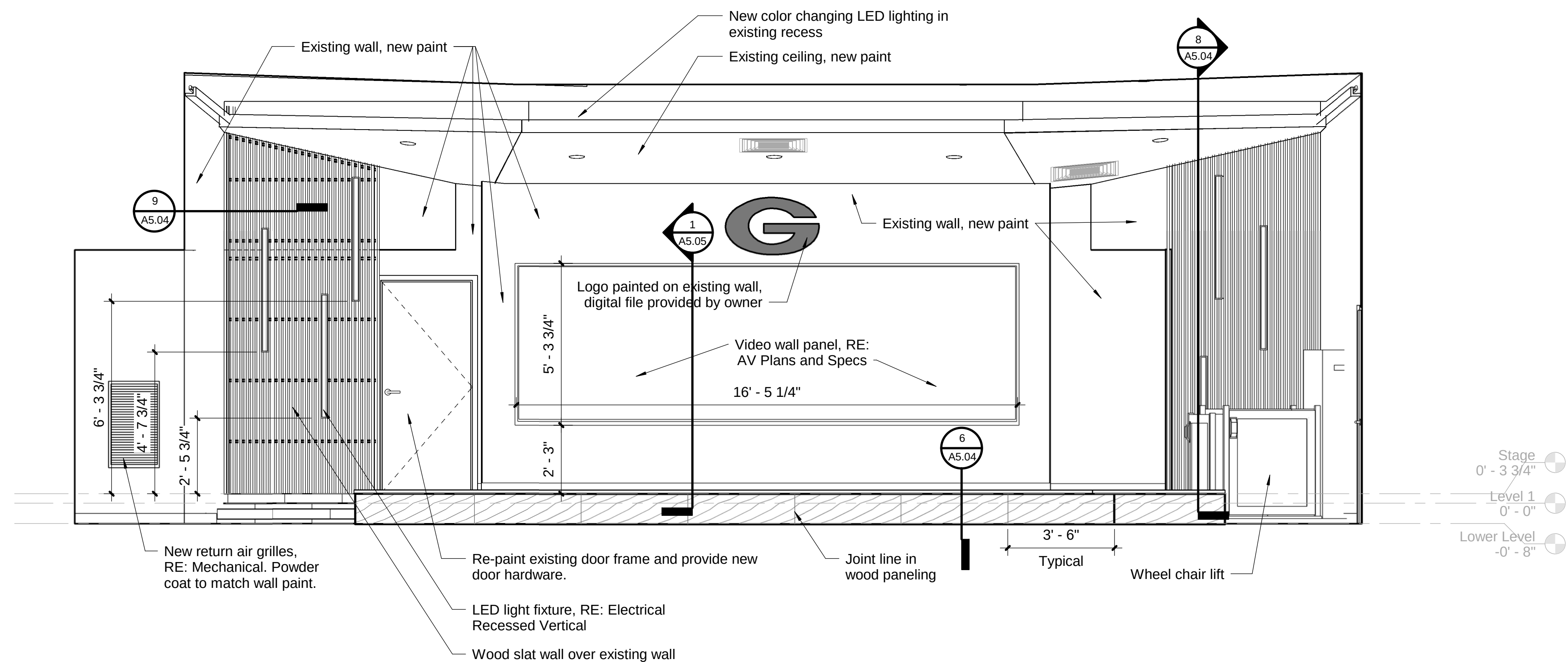
Sheet Title
**Interior
Elevations**

Sheet No.

A5.02



1 Auditorium North Elevation
3/8" = 1'-0" 0' 2'



2 Auditorium South Elevation
3/8" = 1'-0" 0' 4'



**Grambling Hall Lecture Hall
Refurbishment**
Grambling State University

Project No.

2602.00

Issue

Date

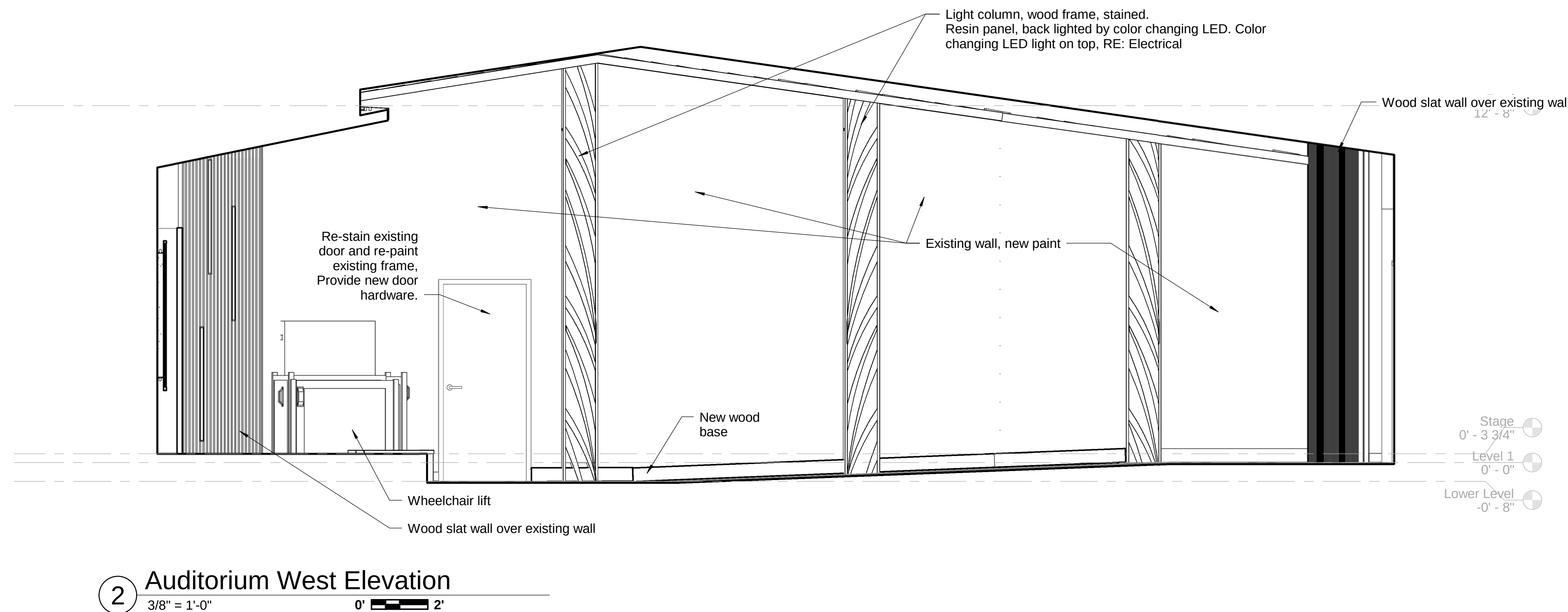
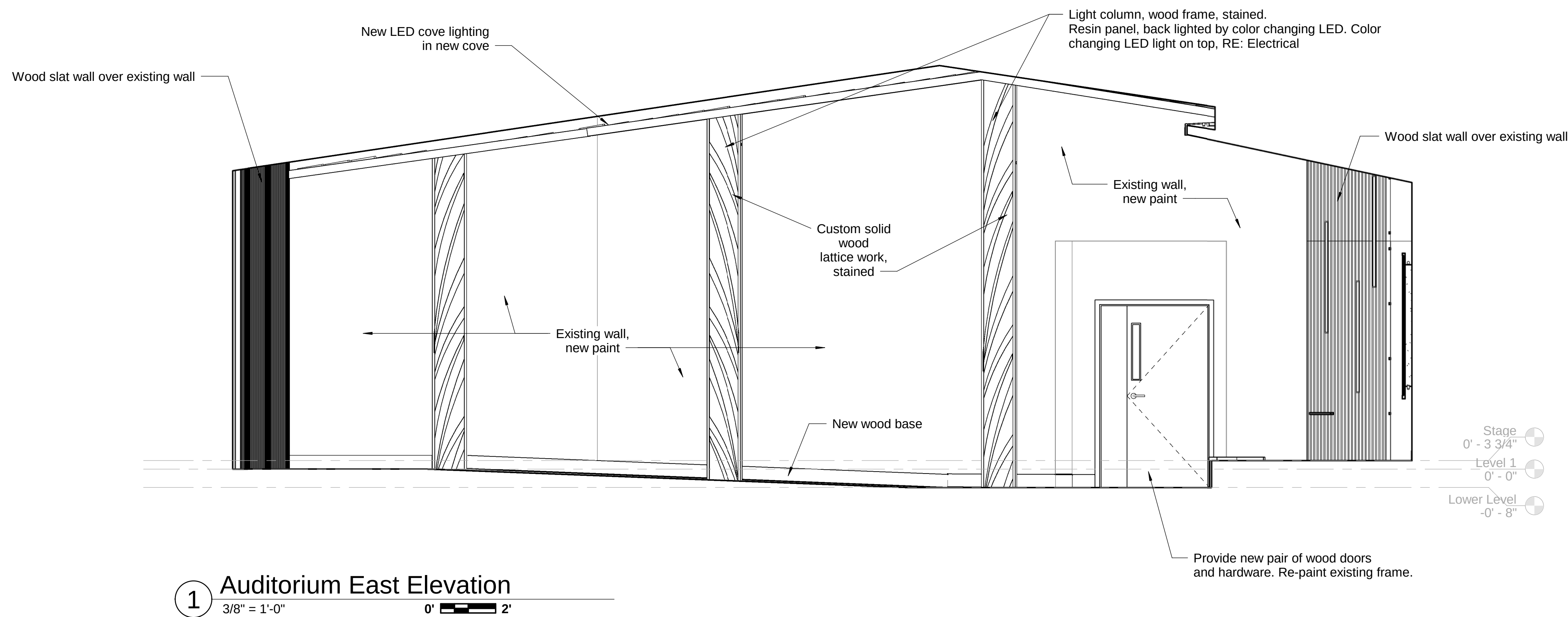
03/10/2026

Sheet Title

**Interior
Elevations**

Sheet No.

A5.03





**Grambling Hall Lecture Hall
Refurbishment
Grambling State University**

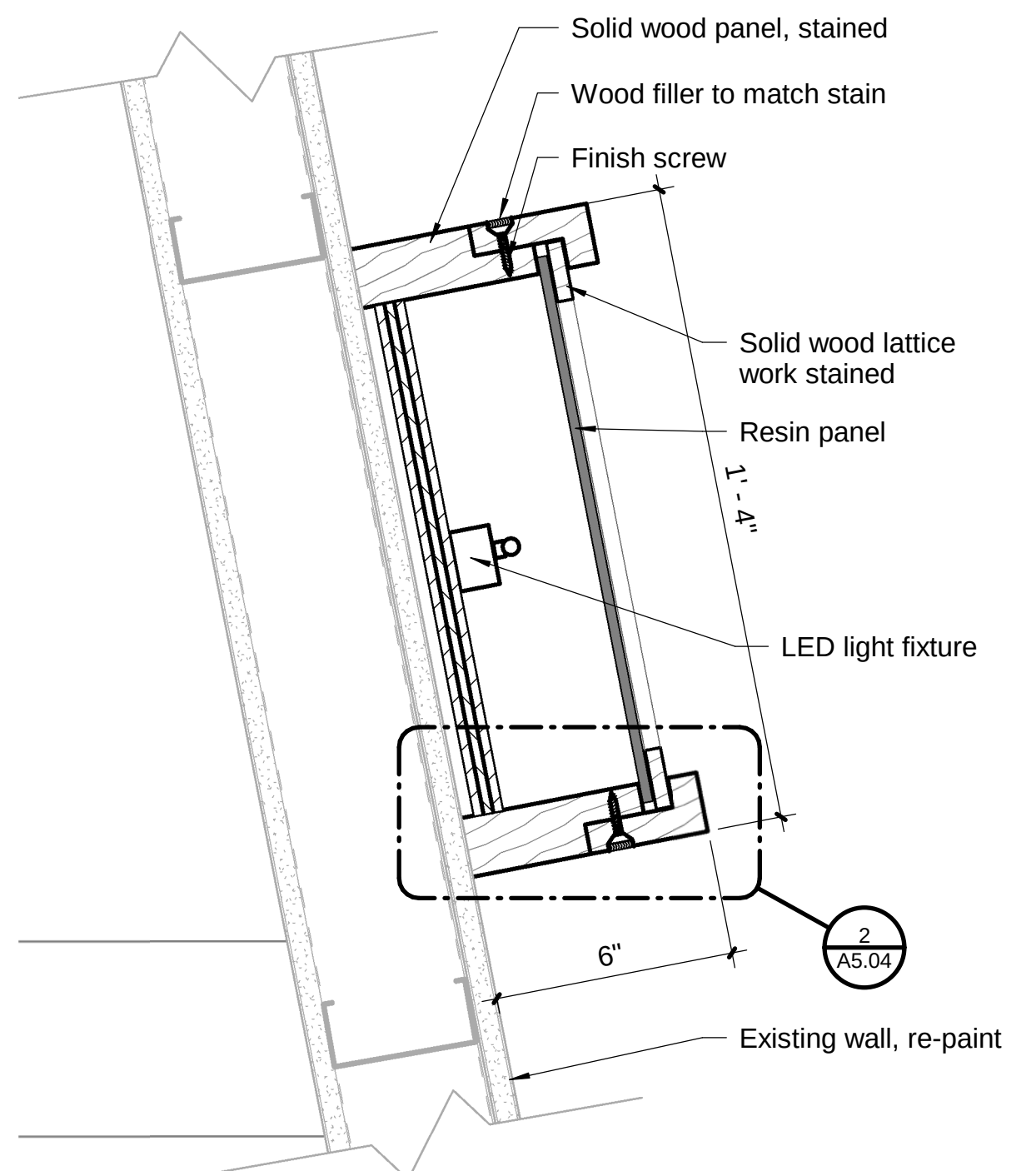
Project No.
2602.00

Issue

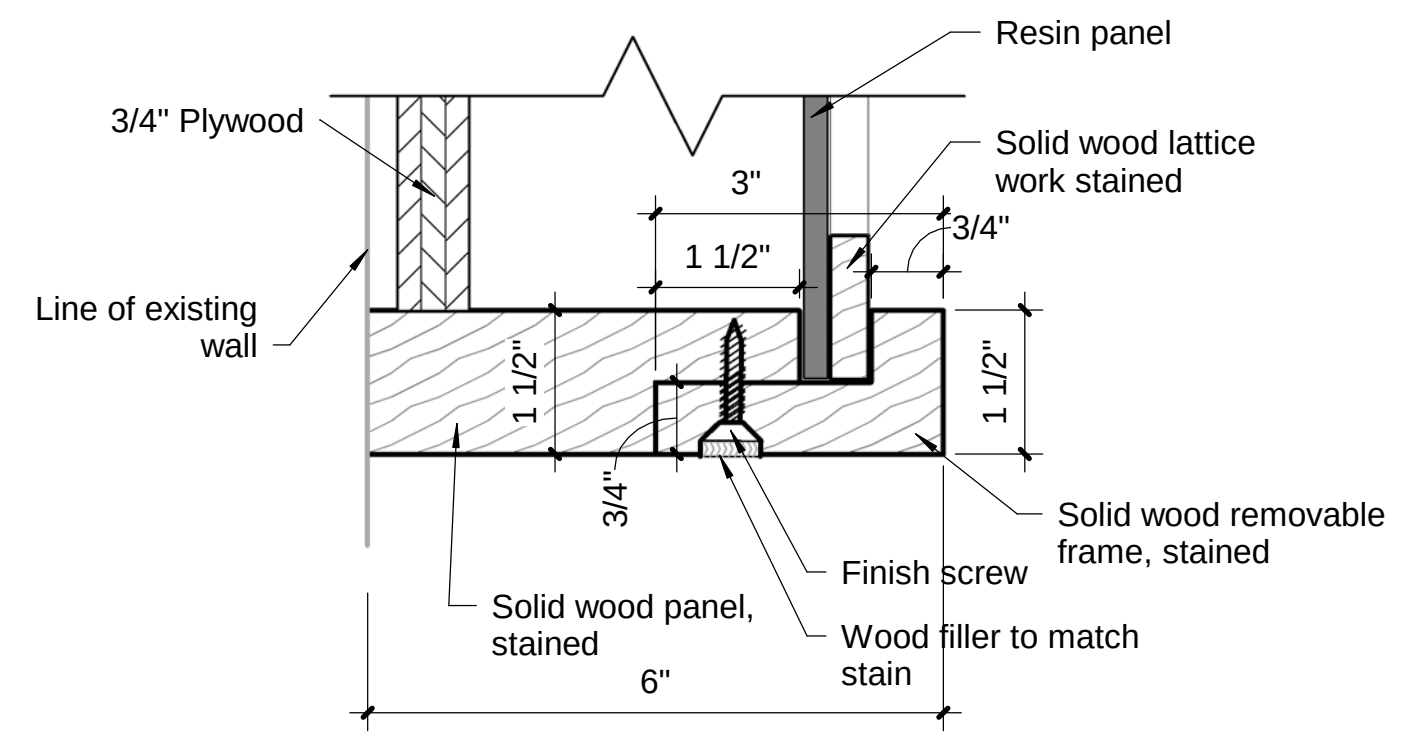
Date
03/10/2026

Sheet Title
**Interior
Details**

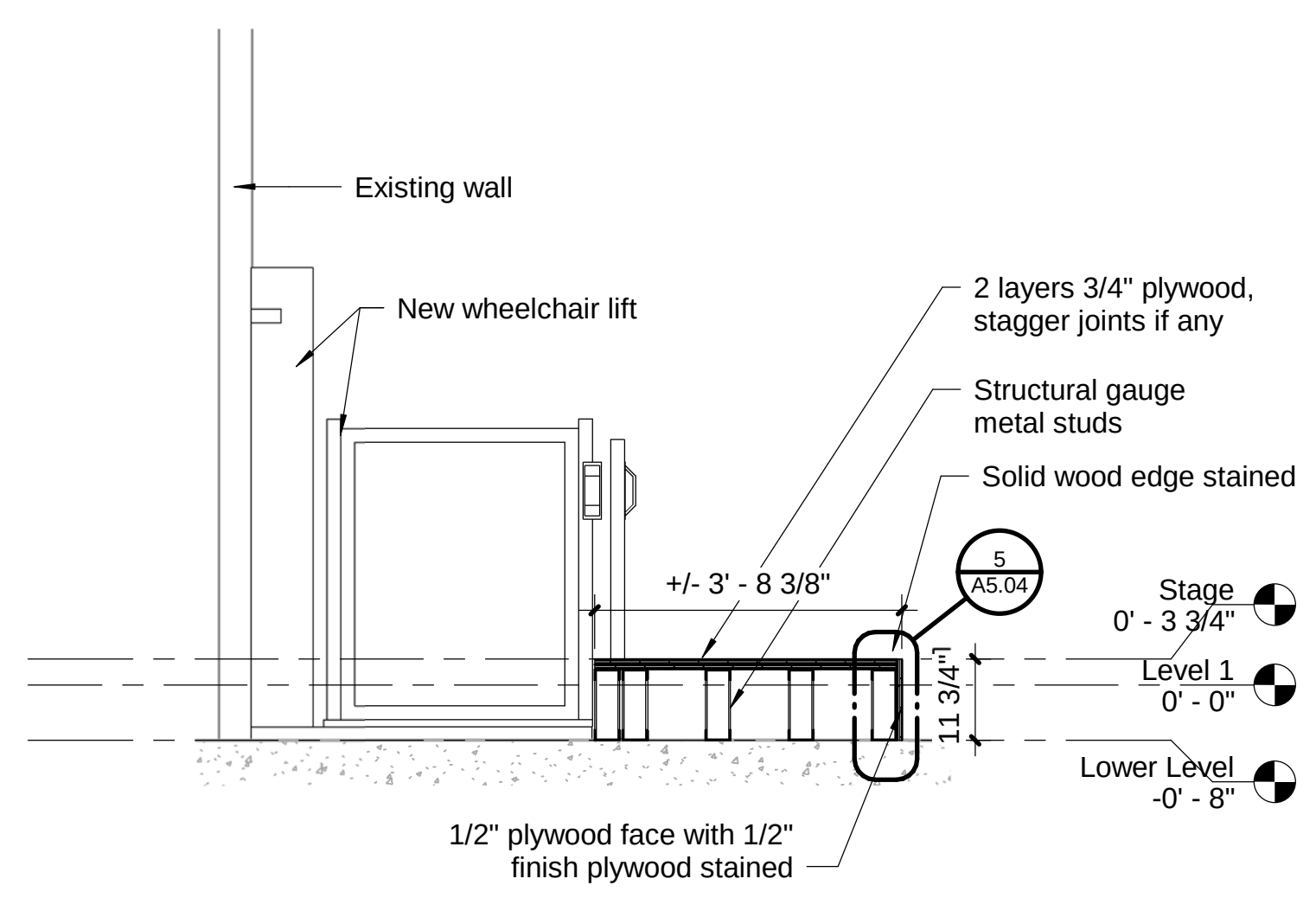
Sheet No.
A5.04



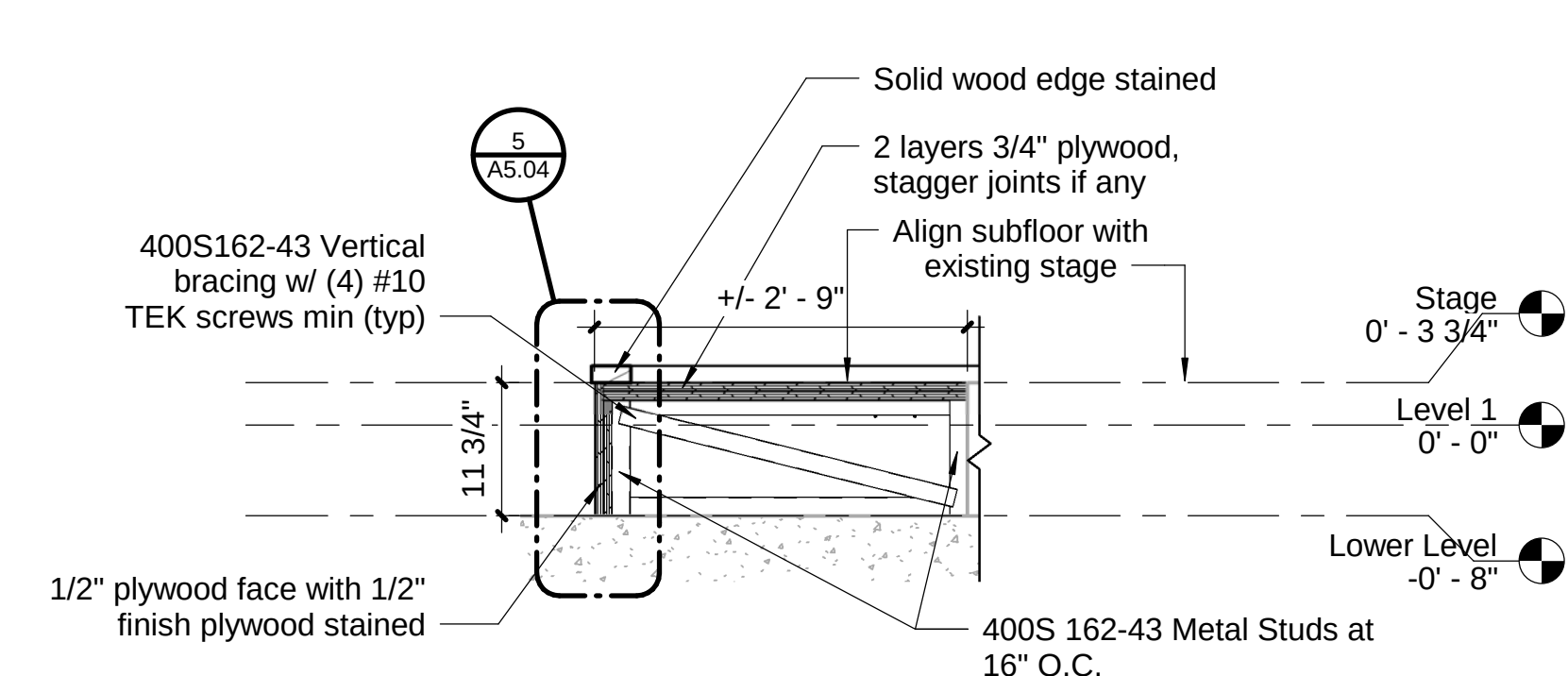
1 Enlarged Pilaster Detail
3" = 1'-0"



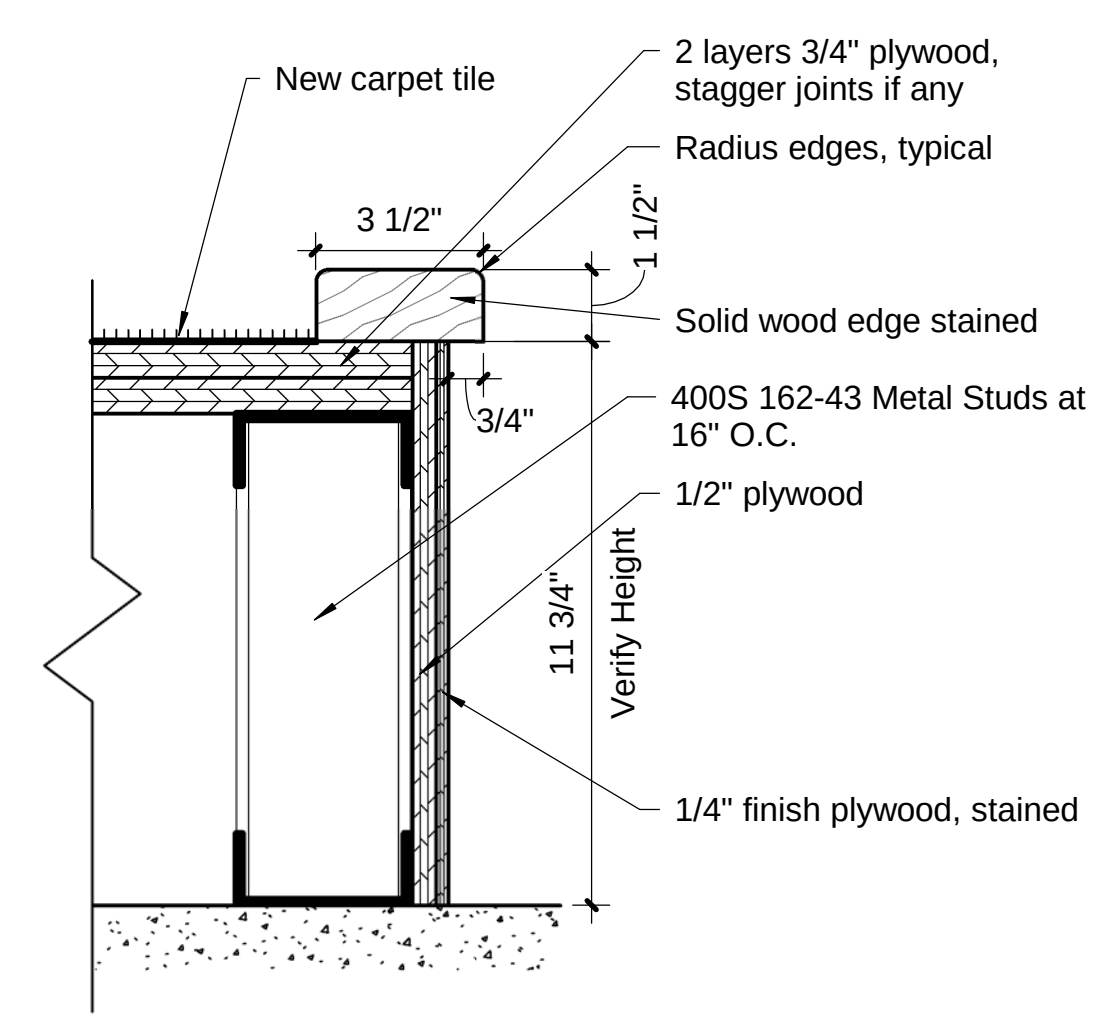
2 Edge Detail
6" = 1'-0"



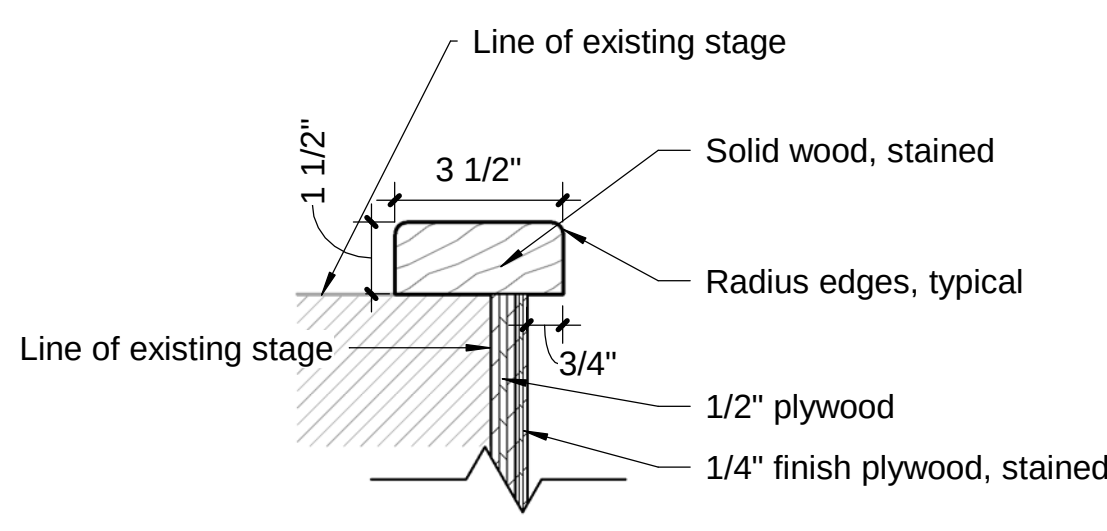
3 Section at Wheelchair Lift
1/2" = 1'-0"



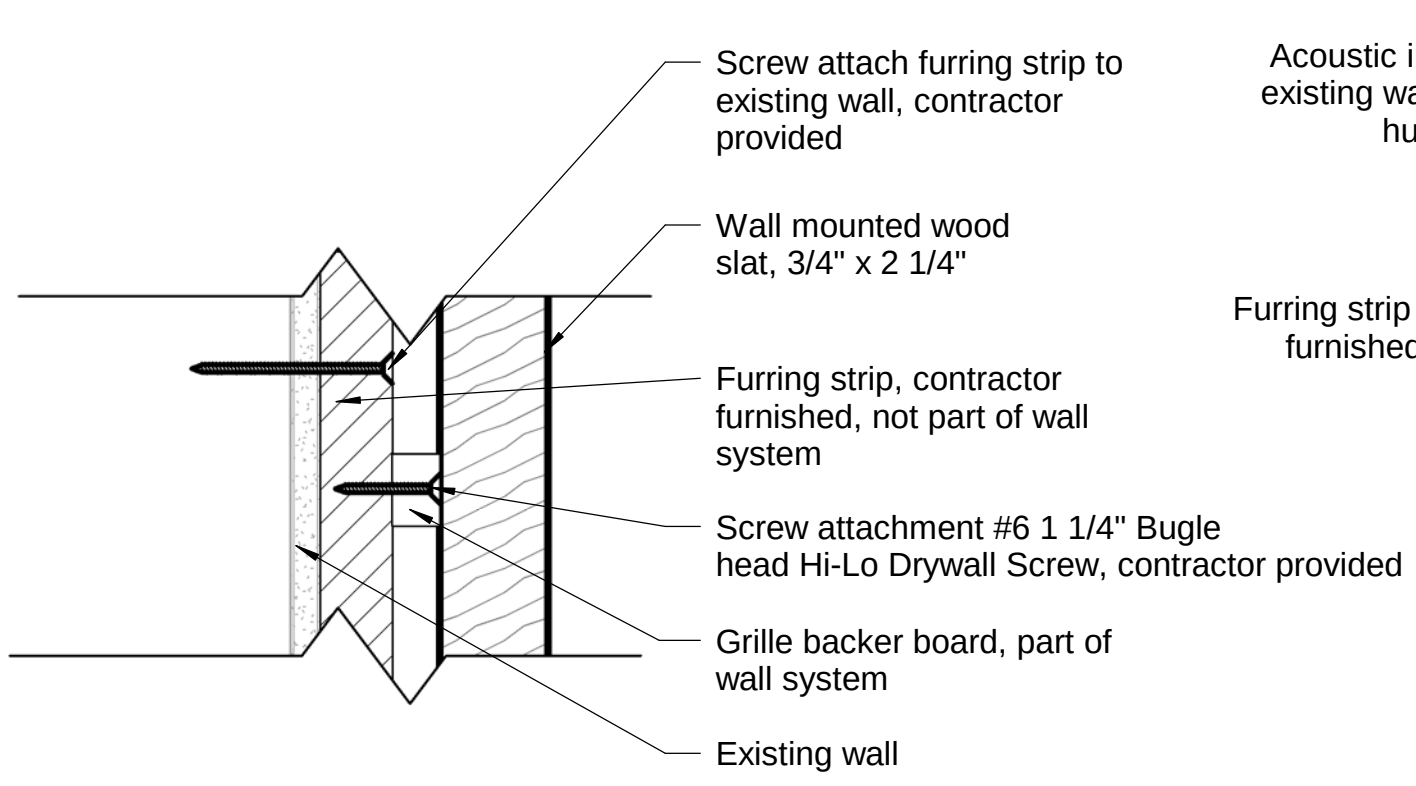
4 Section at Stage
3/4" = 1'-0"



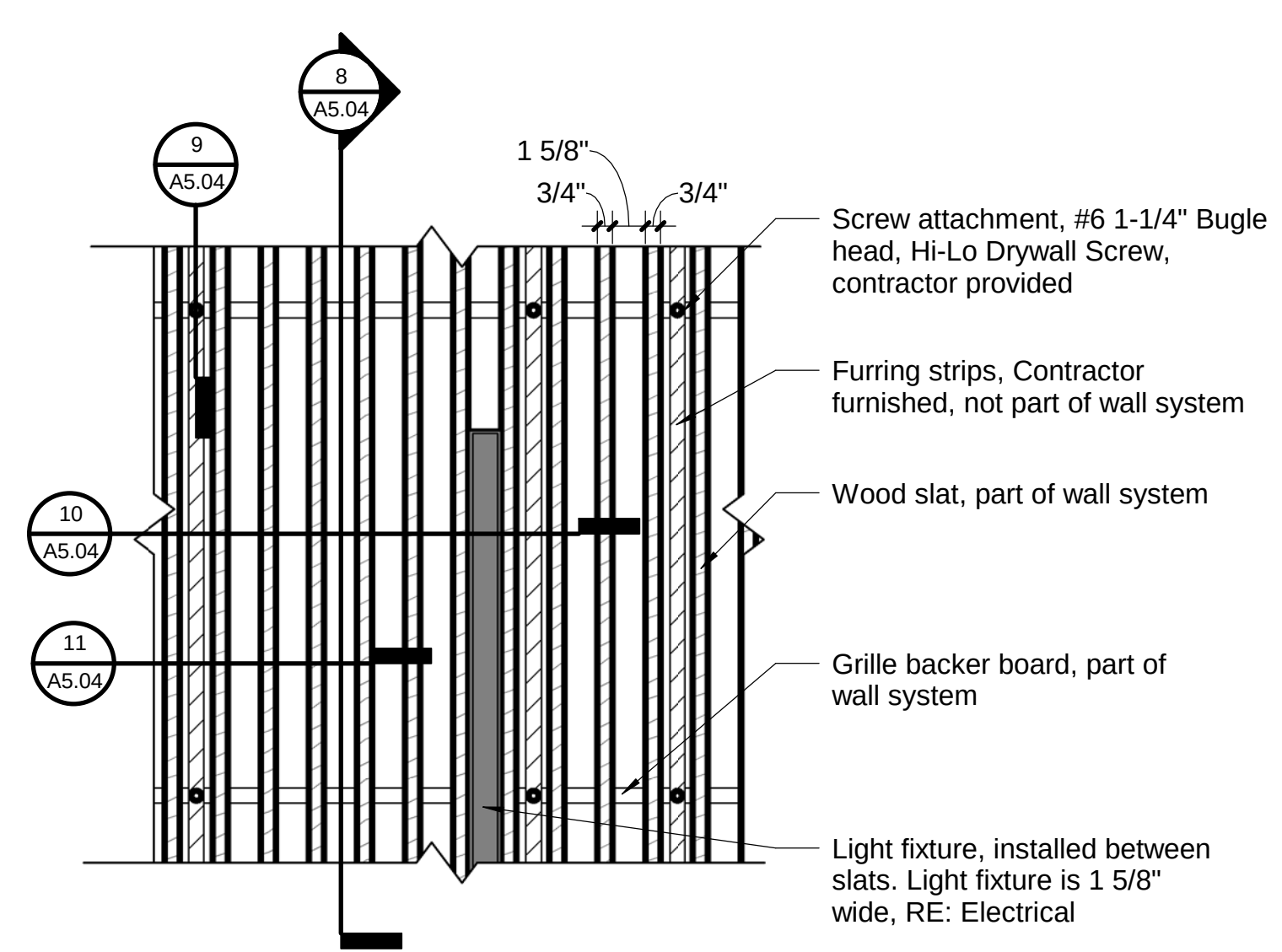
5 Stage Detail
3" = 1'-0"



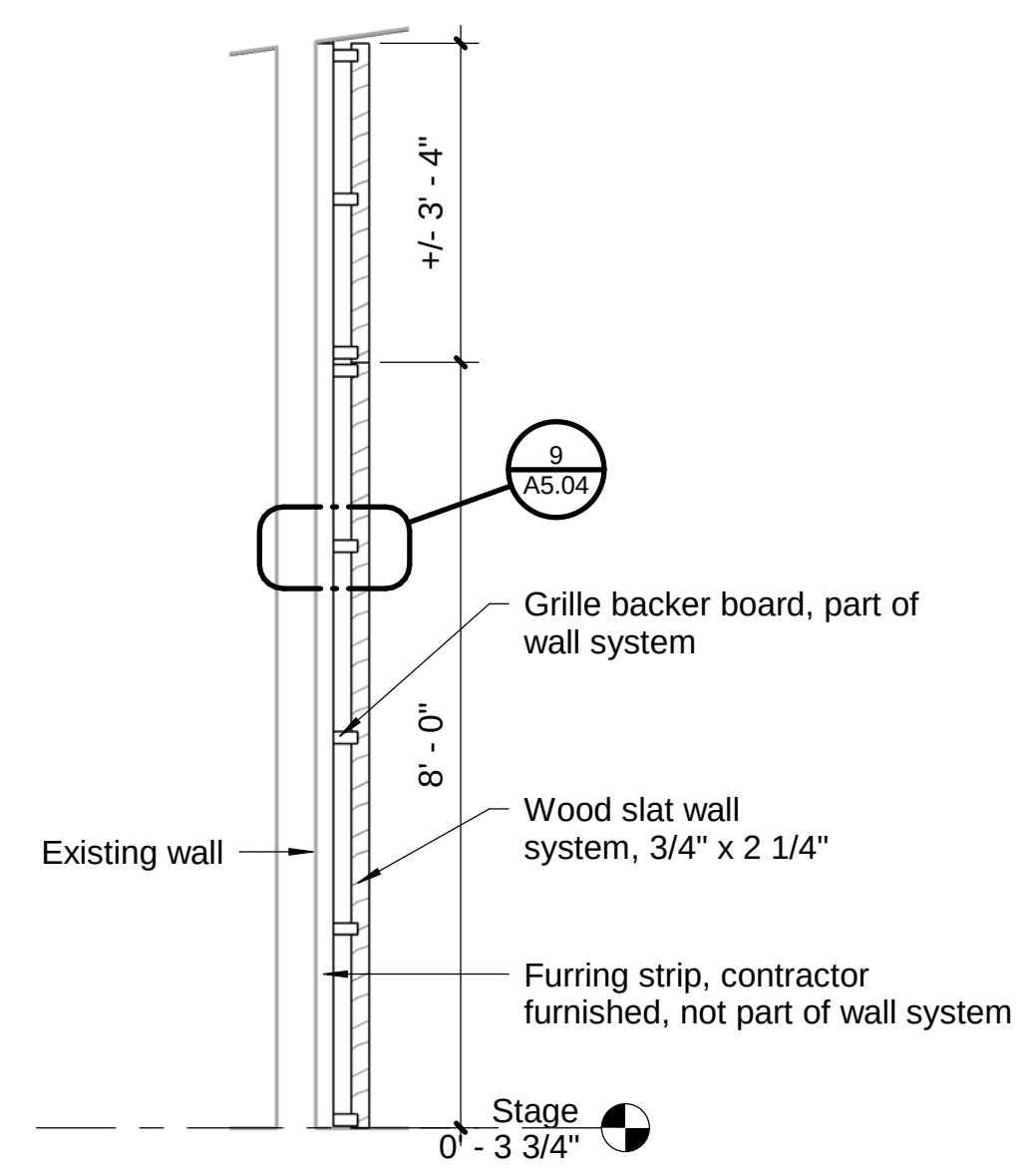
6 Wood Edge Detail at Existing Stage
3" = 1'-0"



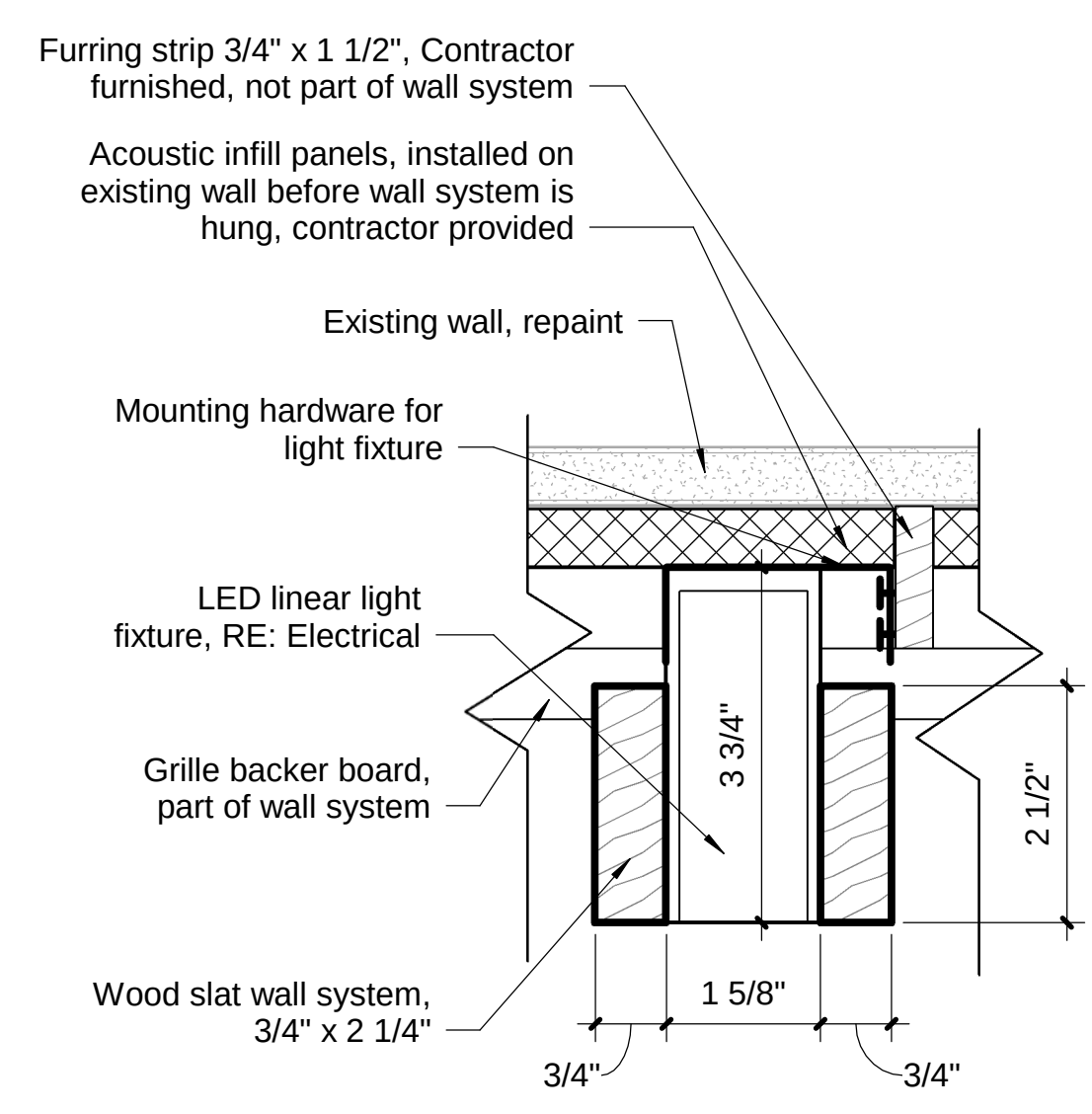
9 Wood Slat Detail
3" = 1'-0"



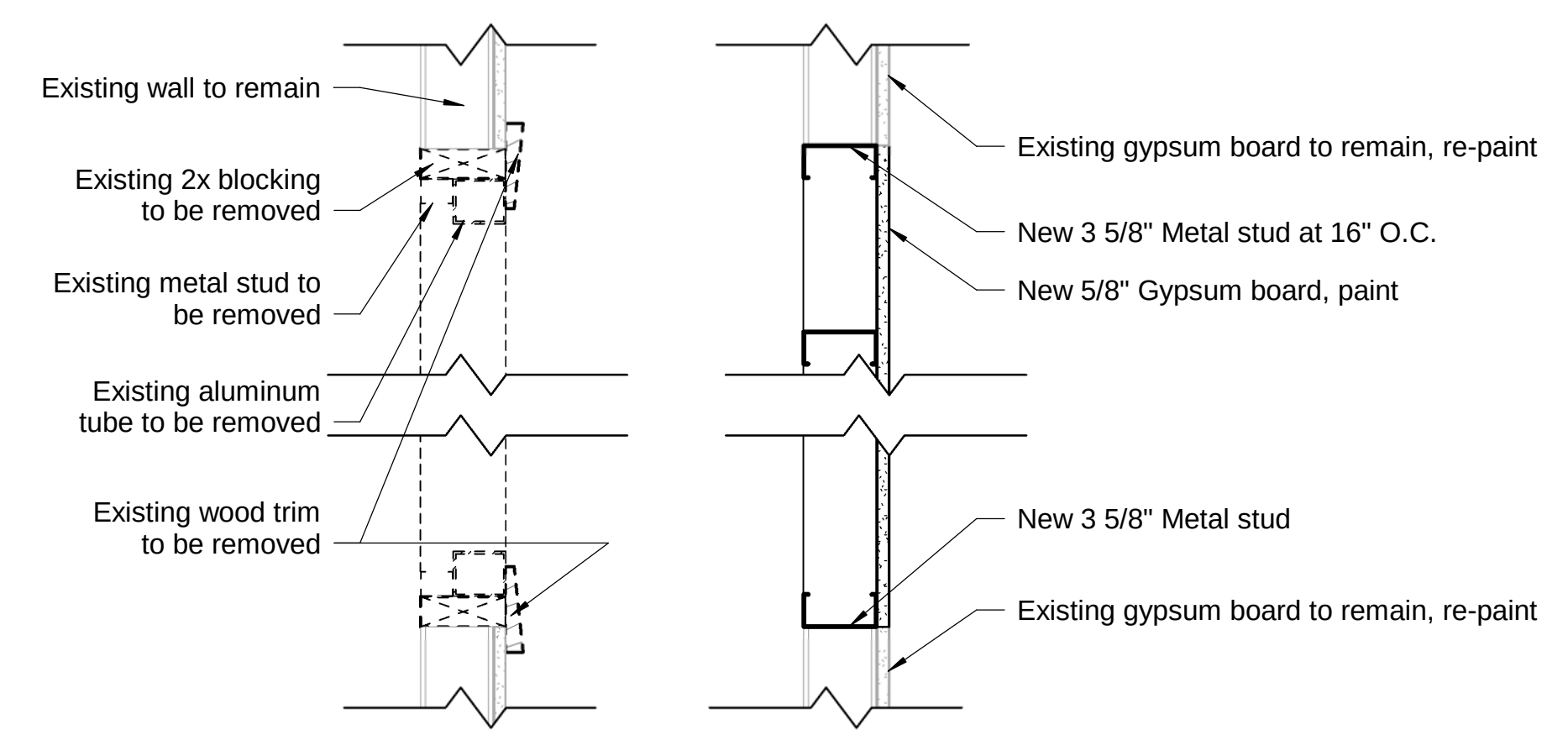
7 Slat Wall Partial Elevation
1 1/2" = 1'-0"



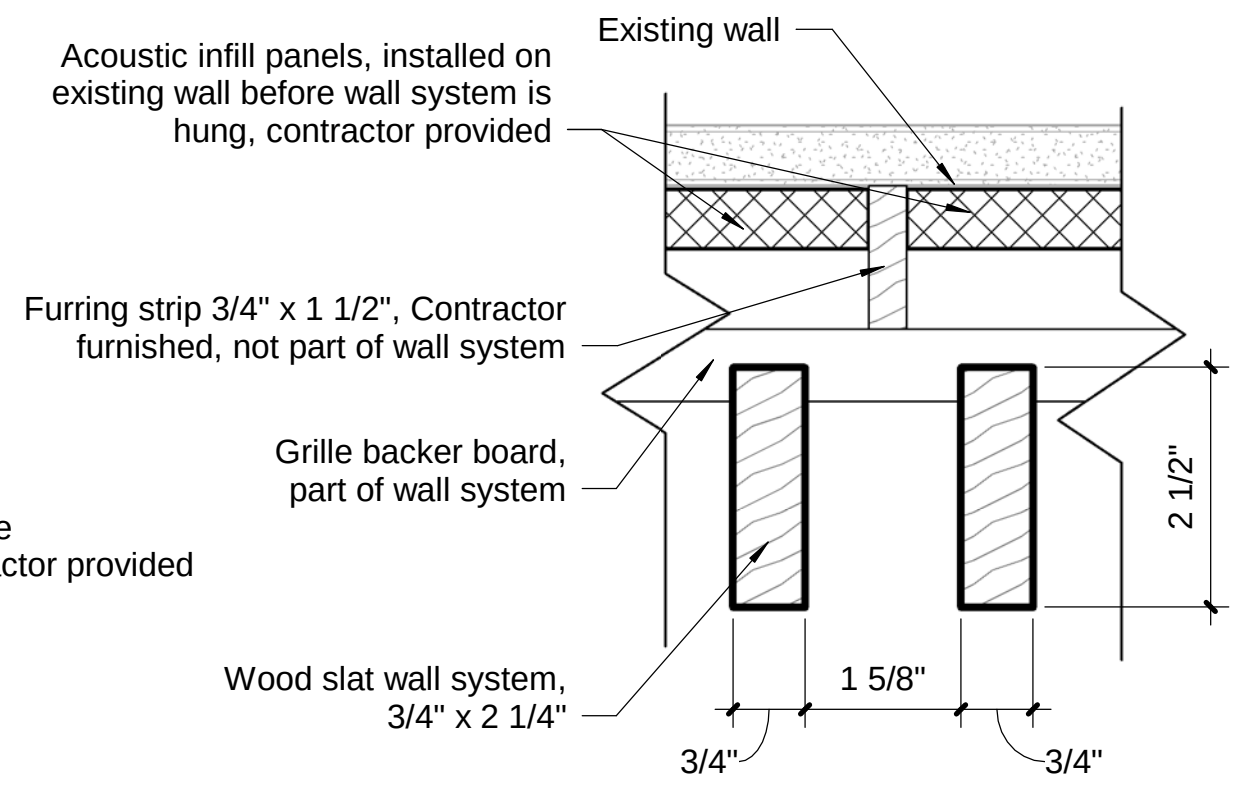
8 Wall Section at Stage
1/2" = 1'-0"



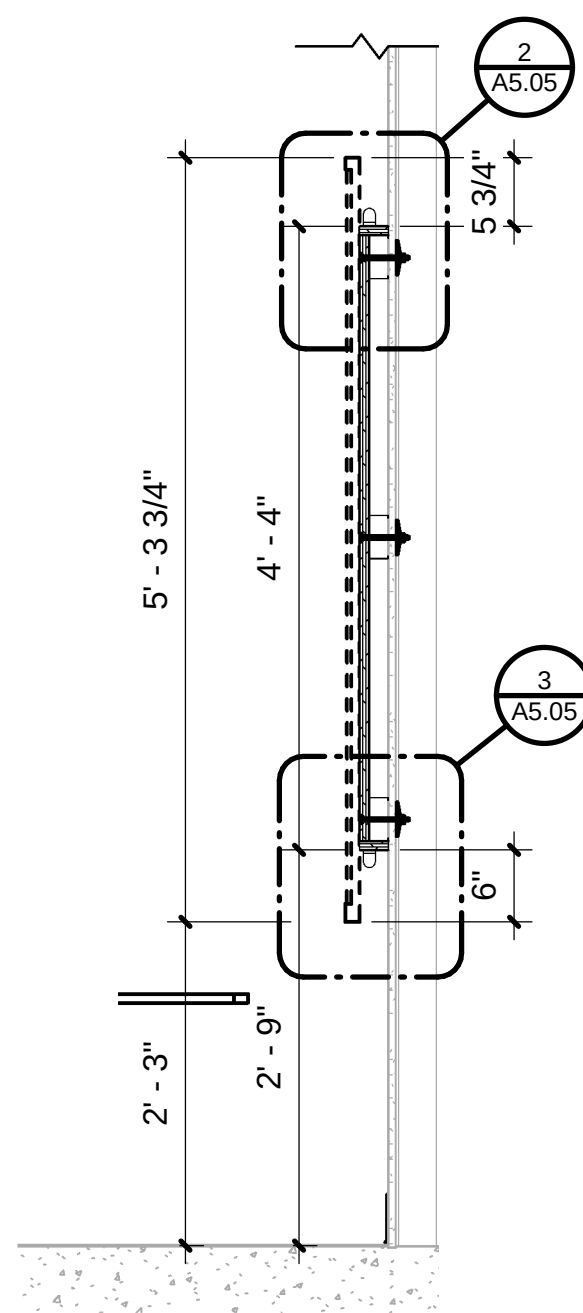
10 Section at Light Fixture
6" = 1'-0"



13 Panel Infill Detail
1 1/2" = 1'-0"

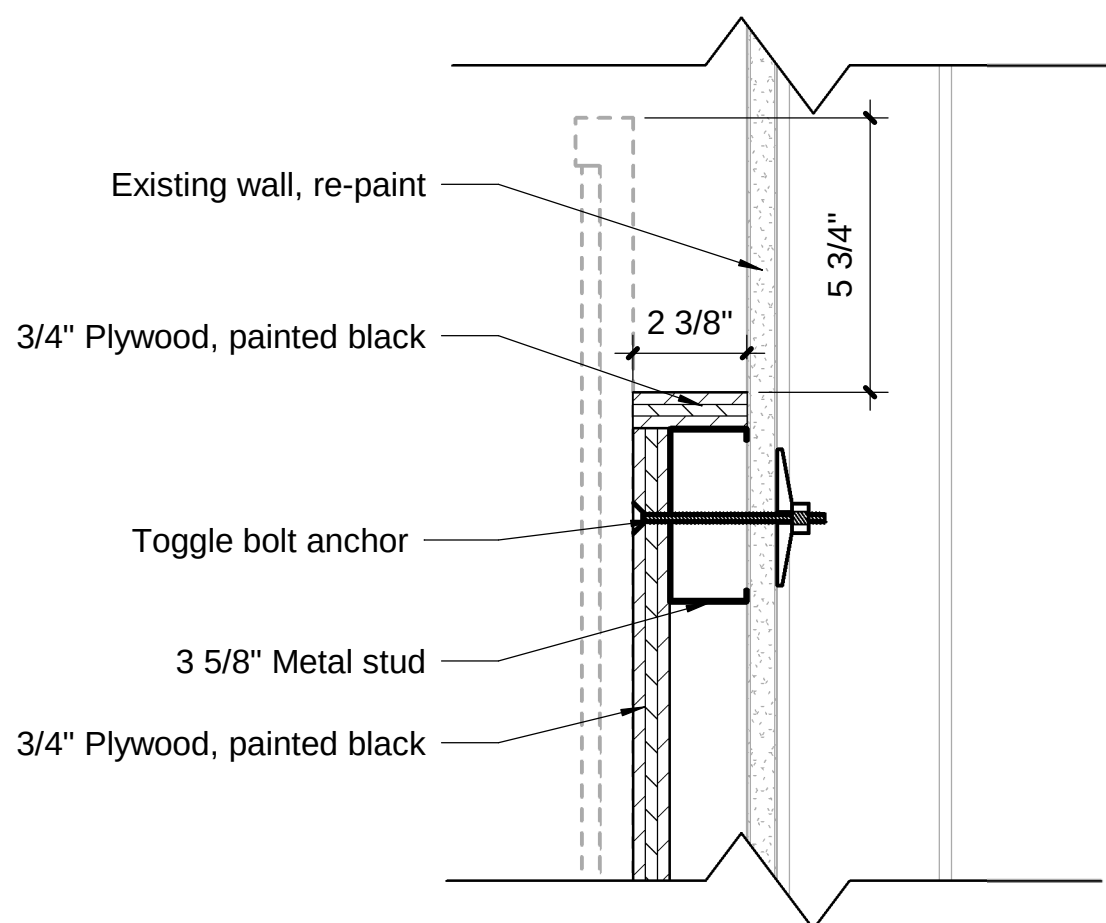


11 Section at Slat Joint
6" = 1'-0"



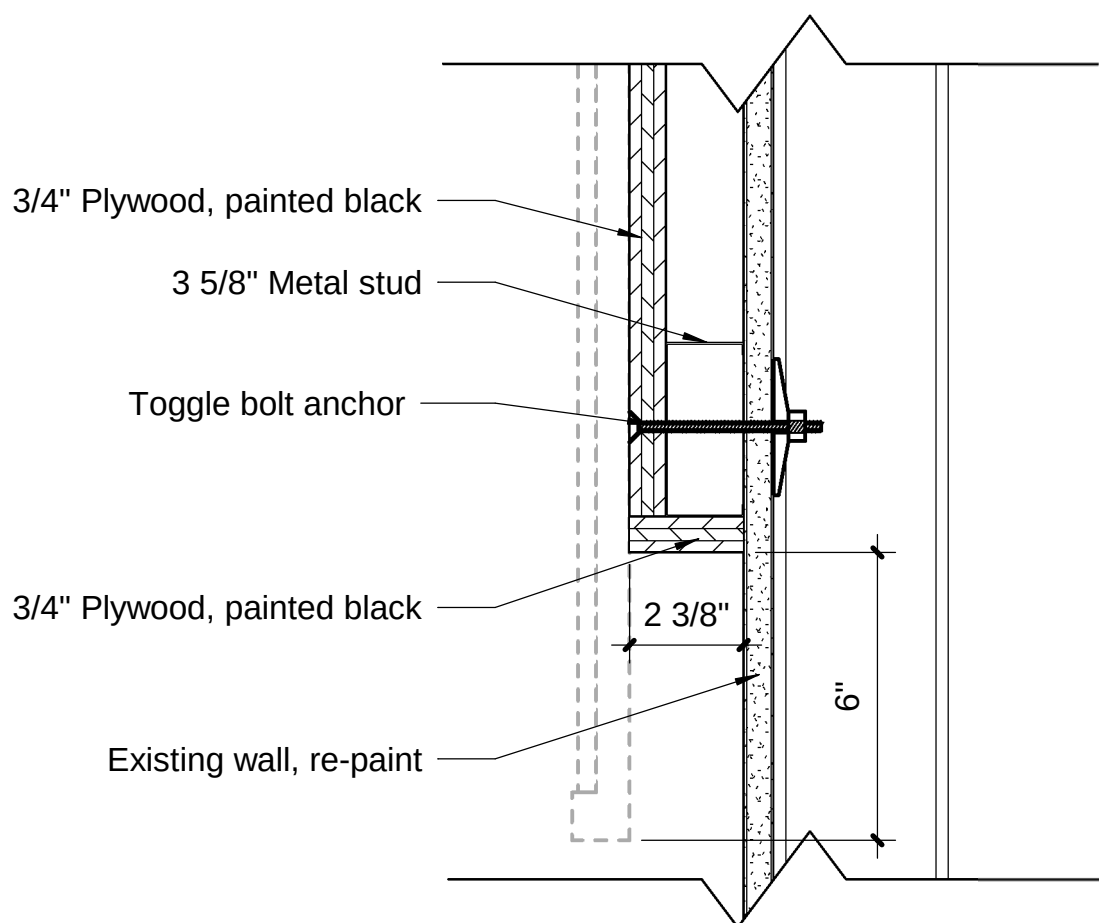
1Section at TV Panel

3/4" = 1'-0"0' 2'



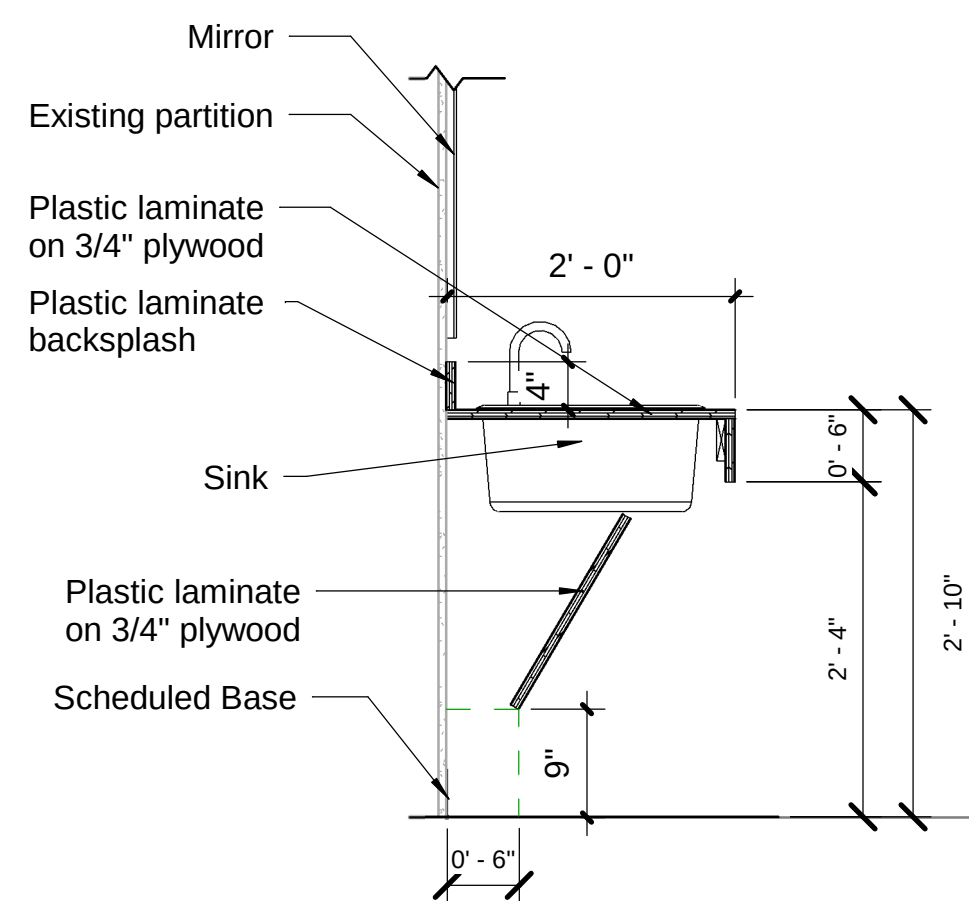
2TV Panel Head Detail

3" = 1'-0"0' 4"



3TV Panel Base Detail

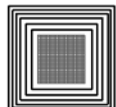
3" = 1'-0"0' 4"



4Section at Sink

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

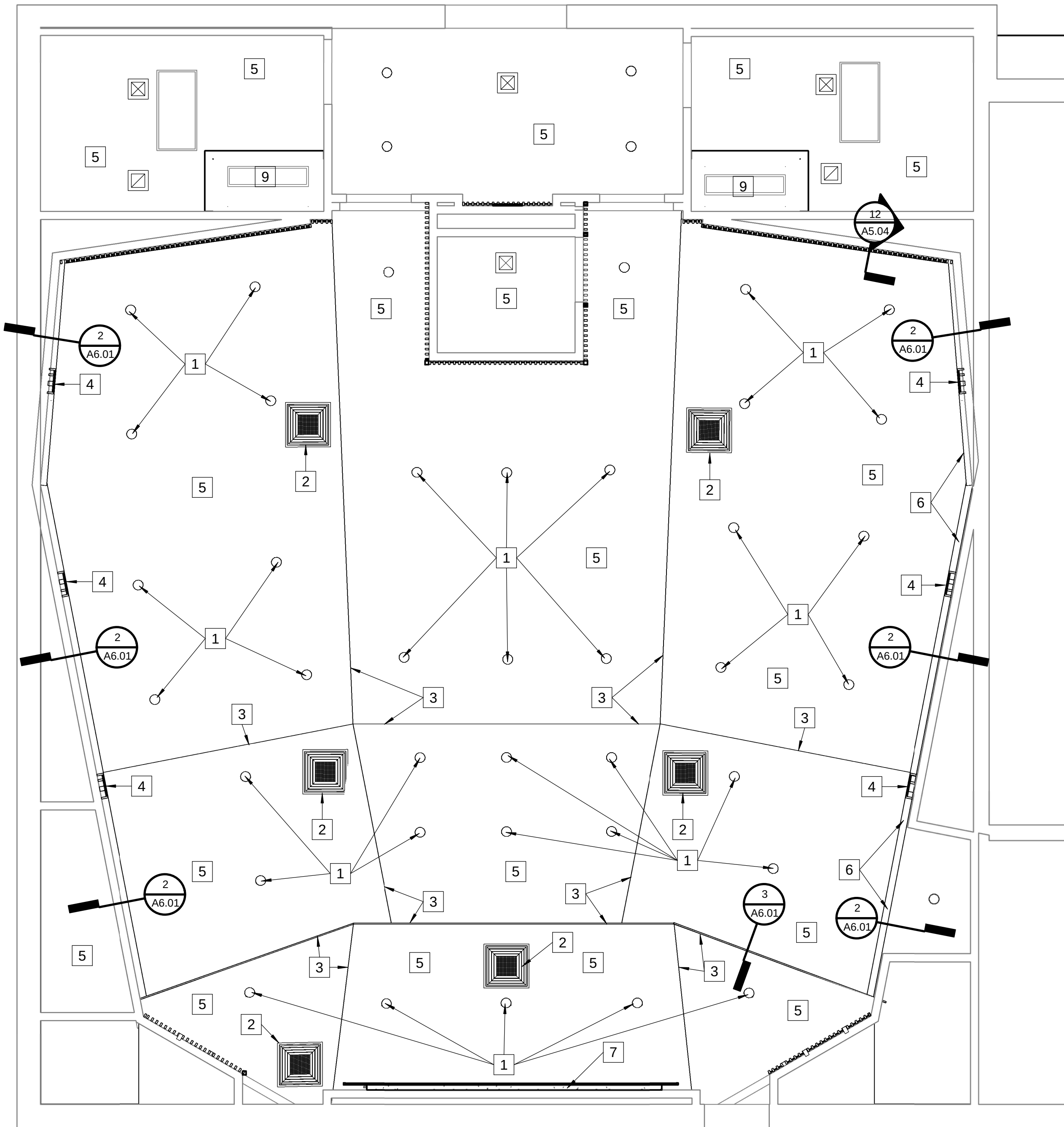
Ceiling Legend:

-  New Recessed LED Downlight
-  New air supply diffuser, RE: Mechanical
-  New air supply diffuser in same place as existing diffuser
-  New return diffuser, RE: Mechanical

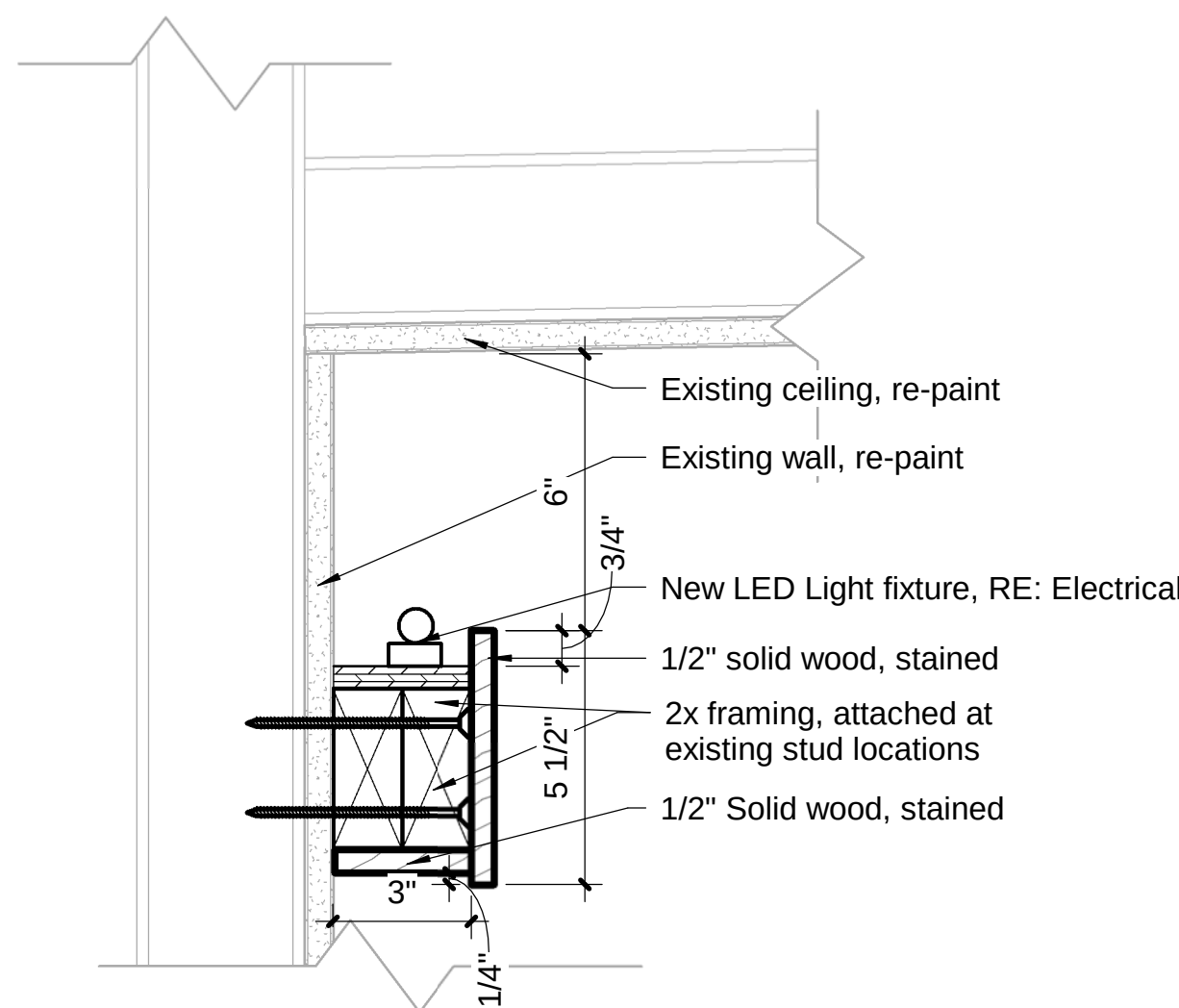
Ceiling Notes:

All notes designated by  are for specific locations.
All others are general notes.

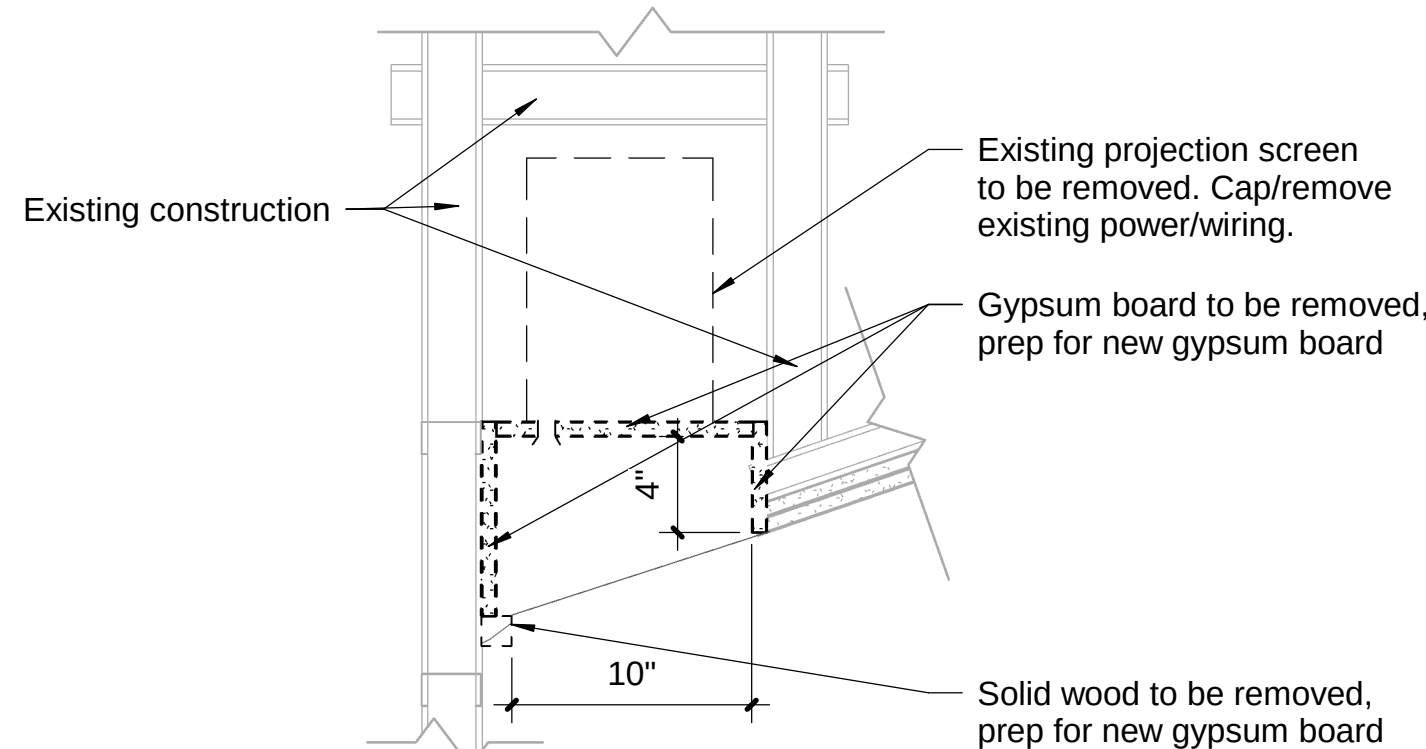
-  New recessed LED downlight in existing location, RE: Electrical
-  New air supply diffuser in existing location, RE: Mechanical
-  Line of existing ceiling angle change
-  New pilasters with color changing LED lighting, RE: Electrical
-  Existing ceiling, new paint
-  New lighting cove with color changing LED, RE: Electrical
-  New color changing LED lighting behind wall mounted monitor, RE: Electrical
-  New 2x4 LED light fixture, RE: Electrical



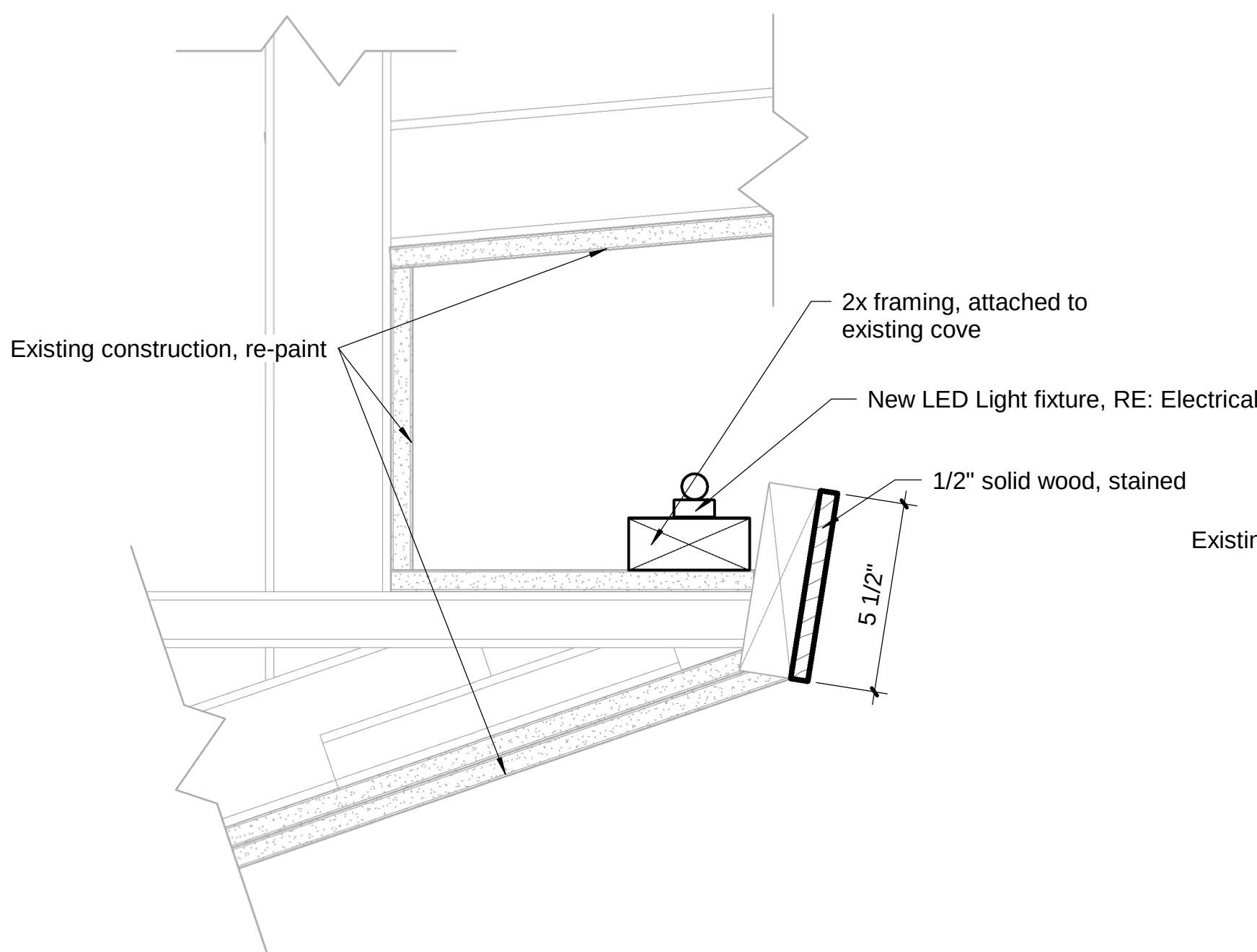
 **1** Reflected Ceiling Plan
1/4" = 1'-0"
0' 4'



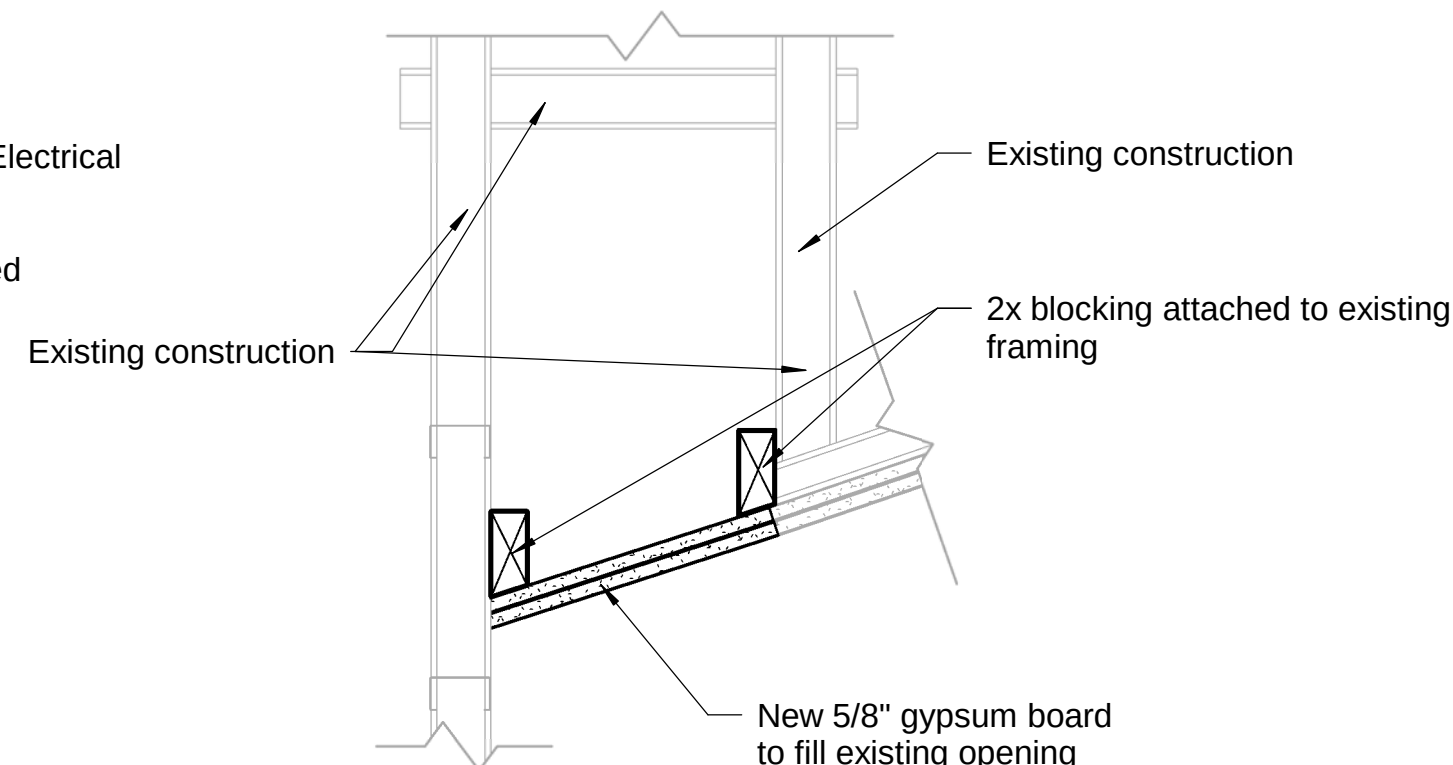
 **2** Light Cove Detail
3" = 1'-0"
0' 4"



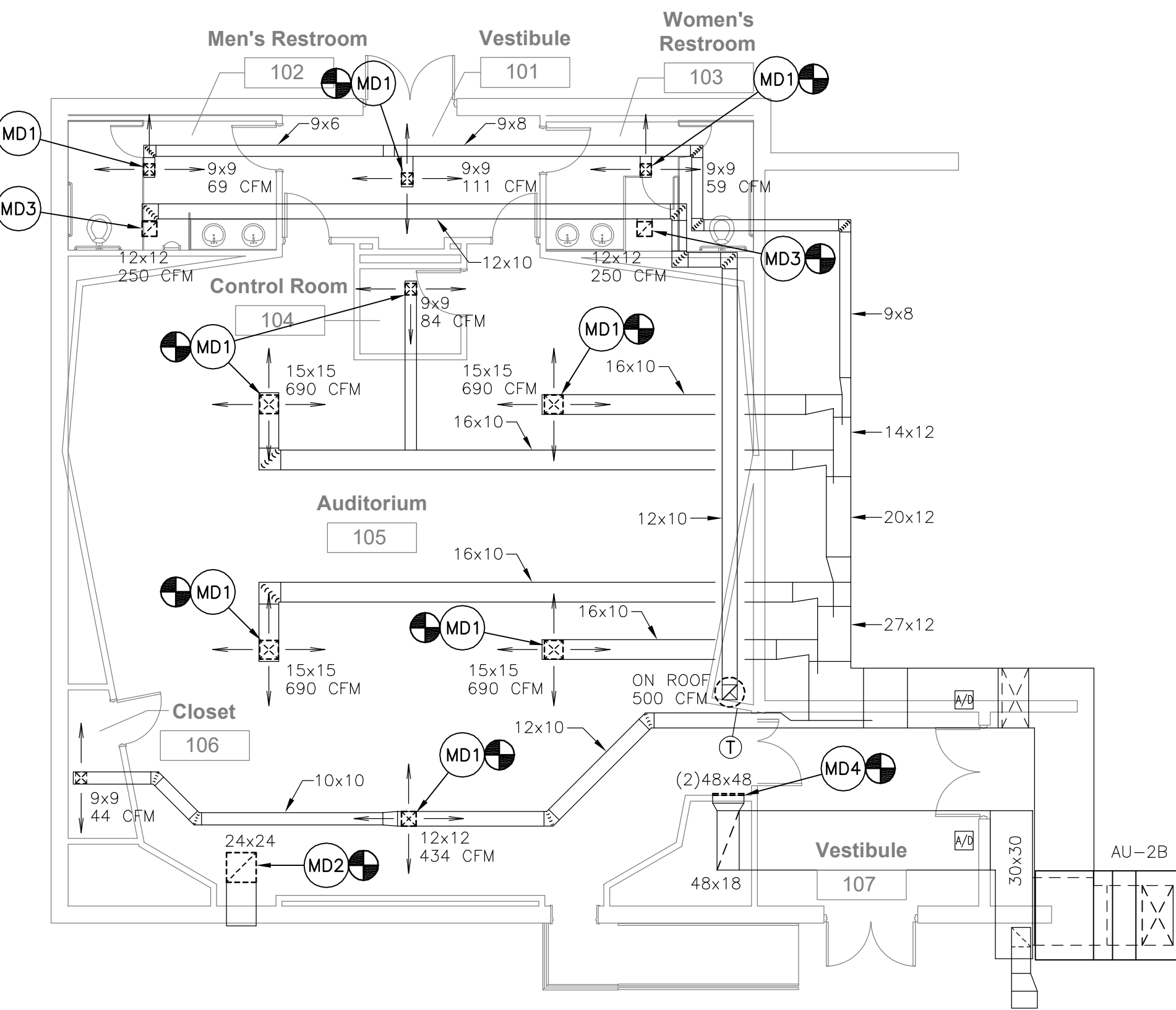
 **4** Existing Screen Recess Demo
1 1/2" = 1'-0"
0' 8"



 **3** Existing Light Cove Detail
3" = 1'-0"
0' 4"



 **5** Existing Screen Recess New Construction
1 1/2" = 1'-0"
0' 8"



1ST FLOOR HVAC DEMOLITION PLAN

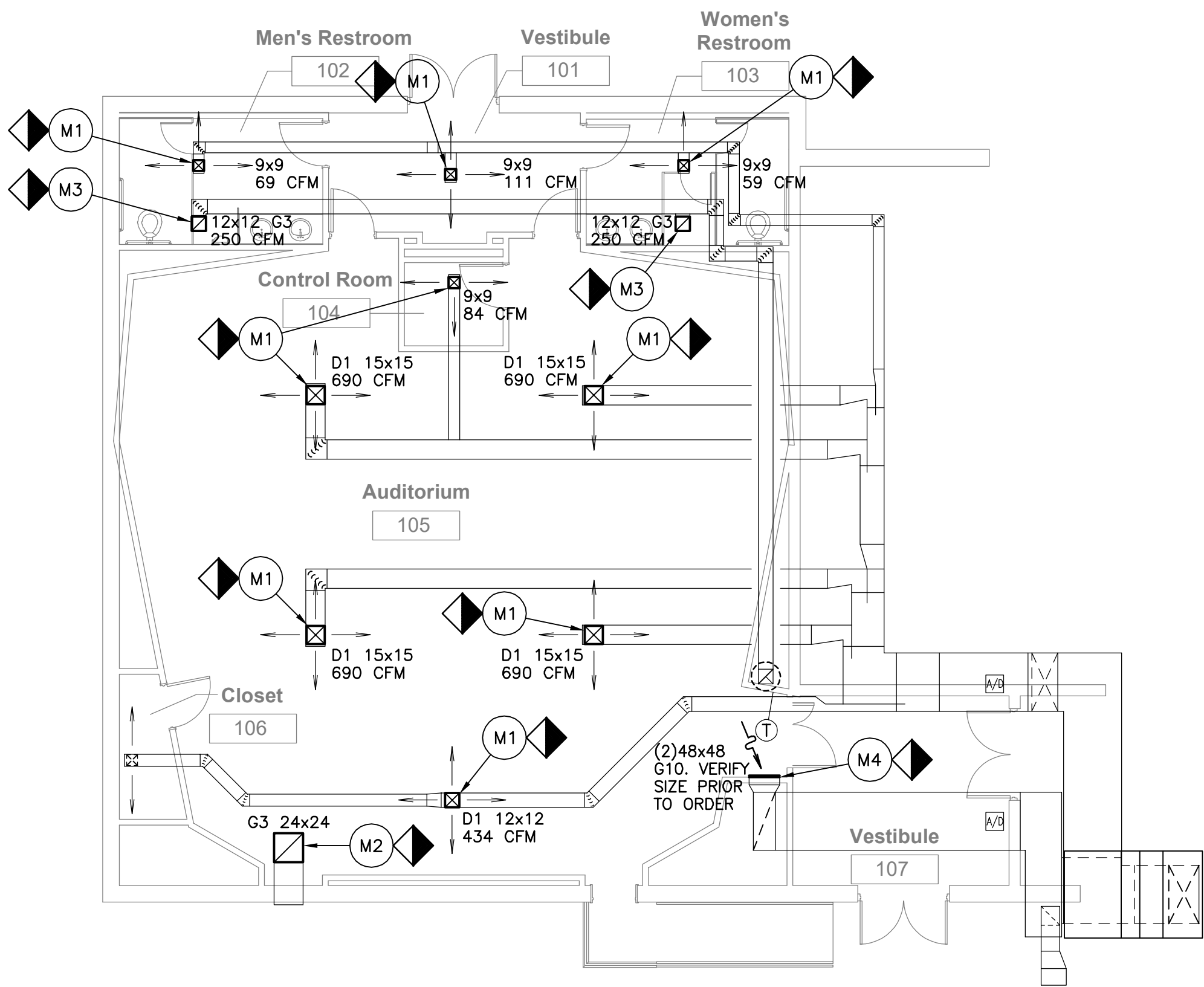
SCALE: 1/8" = 1'-0"

MECHANICAL DEMOLITION NOTES:

- MD1 REMOVE EXISTING SUPPLY AIR DIFFUSER.
- MD2 REMOVE EXISTING RETURN AIR GRILLE.
- MD3 REMOVE EXISTING EXHAUST GRILLE.
- MD4 REMOVE EXISTING WALL RA GRILLE.

MECHANICAL SYMBOLS	
SYMBOL	DESCRIPTION
	ROOM THERMOSTAT
SA,RA,OA	SUPPLY AIR, RETURN AIR, OUTSIDE AIR
D1,R1,G1	AIR DIFFUSER, AIR REGISTER, AIR GRILLE (SEE SCHEDULE)
	SQUARE ELBOW WITH TURNING VANES - SEE DETAIL A/M200
	FULL RADIUS ELBOW - SEE DETAIL C/M200
	SPLITTER DAMPER - SEE DETAIL D/M200
	SUPPLY AIR DIFFUSER
	RETURN OR EXHAUST AIR
	POINT OF TERMINATION OF DEMOLITION
	POINT OF CONNECTION EXISTING TO NEW
	DETAIL DESIGNATION
	SHEET WHERE DETAIL IS LOCATED

GRILLE, REGISTER & DIFFUSER SCHEDULE					
SYMBOL	TYPE	MANUFACTURER	CATALOG NO.	FINISH	REMARKS
D1	SQUARE/RECTANGULAR NECK LOUVERED FACE DIFFUSER	TITUS KRUEGER PRICE	TDC-AA-6 SSH-F21 AMD-6/VCS-3	OFF-WHITE BAKED ENAMEL	ALUMINUM CONSTRUCTION OPPOSED BLADE DAMPER DROP BEVEL FRAME
G3	GRID CORE FLANGED CEILING RETURN/ EXHAUST GRILLE	TITUS KRUEGER PRICE	50F-1 EGC-5 80-F	OFF-WHITE BAKED ENAMEL	1/2"x1/2"x1/2" ALUMINUM GRID
G10	HEAVY DUTY LOUVERED FACE RETURN/ EXHAUST GRILLE	TITUS KRUEGER PRICE	33-RL/RS S480H 91	ALUMINUM BAKED ENAMEL	STEEL CONSTRUCTION 3/8" BLADE SPACING. BLADES FIXED AT 30° TO 45° DEFLECTION BLADES IN HORIZONTAL POSITION REINFORCING BARS @8" O.C. MAX.

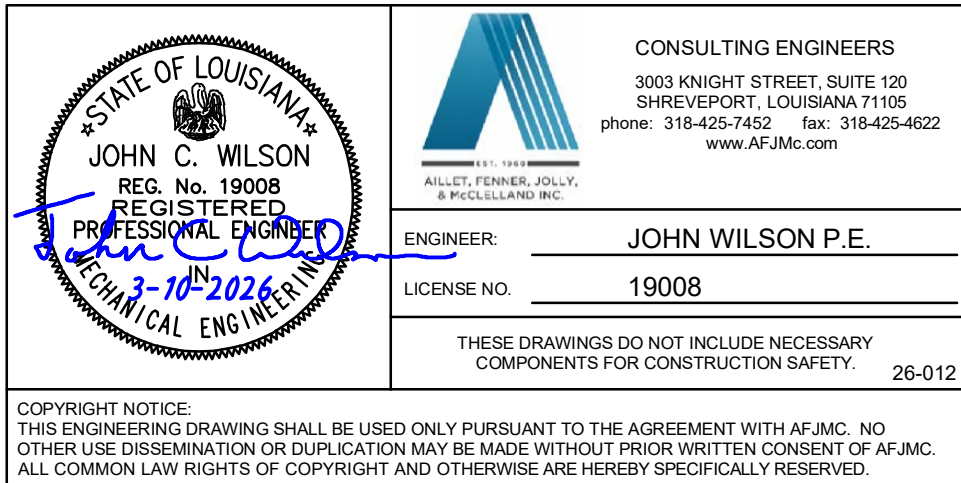


1ST FLOOR HVAC RENOVATION PLAN

SCALE: 1/8" = 1'-0"

MECHANICAL RENOVATION NOTES:

- M1 NEW SUPPLY AIR DIFFUSER.
- M2 NEW RETURN AIR GRILLE.
- M3 NEW EXHAUST GRILLE.
- M4 NEW WALL RETURN AIR GRILLE.



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Seal

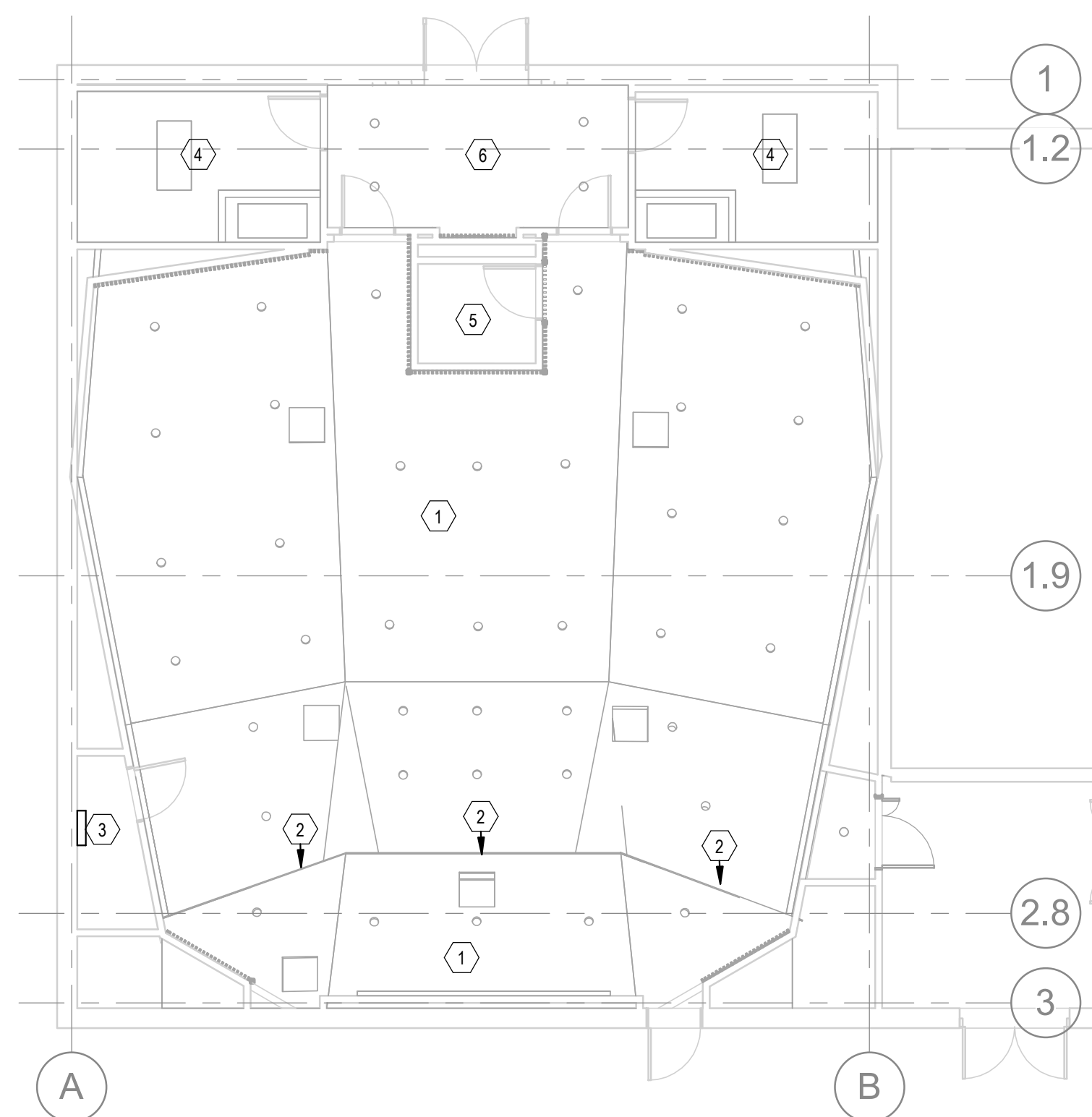
Project No.

Issue

03/10/2026

ELECTRICAL DEMO PLAN

ED1.01



SCALE: 1/8" = 1'-0"

ELECTRICAL NOTES:

1. DEMO ALL RECESSED CAN LIGHTS IN THE LECTURE HALL/STAGE AND ASSOCIATED CONDUIT/CONDUCTOR BACK TO PANELBOARD.
2. DEMO EXISTING COVE LIGHT ABOVE STAGE.
3. DEMO EXISTING LIGHTING CONTROL PANEL AT THIS LOCATION.
4. DEMO RESTROOM LIGHTS. HOLD LIGHTING BRANCH CIRCUIT FOR CONNECTION TO NEW RESTROOM LIGHTS.
5. DEMO EXISTING LIGHTING IN CONTROL BOOTH. HOLD LIGHTING BRANCH CIRCUIT FOR CONNECTION TO NEW LIGHTS.
6. DEMO EXISTING LIGHTING IN FOYER. HOLD LIGHTING BRANCH CIRCUIT FOR CONNECTION TO NEW LIGHTS.

NOTE:
ALL EXISTING FIRE ALARM DEVICES ARE TO REMAIN.



GENERAL NOTES (APPLICABLE TO ALL ELECTRICAL DRAWINGS)
THE PLANS AND SPECIFICATIONS ARE ISSUED AS A COMPLETE SET. THE CONTRACTOR SHALL THOROUGHLY REVIEW THE COMPLETE SET OF DOCUMENTS IN ASCERTAINING THE SCOPE OF WORK AND IN COORDINATION OF HIS WORK WITH THAT OF OTHER TRADES. ANY CONFLICTS SHALL BE BROUGHT TO THE IMMEDIATE ATTENTION OF THE ARCHITECT FOR RESOLUTION.
PRIOR TO SUBMITTING A BID THE CONTRACTOR SHALL VISIT THE SITE, REVIEW THE EXISTING CONDITIONS AND ALLOW FOR LABOR, MATERIAL AND COORDINATION THAT IS NECESSARY TO PROVIDE A COMPLETE AND INTEGRATED INSTALLATION OF EACH SYSTEM. CONTRACTOR SHALL TAKE CARE IN ASCERTAINING THE REQUIREMENTS TO INTEGRATE ANY NEW EQUIPMENT WITH EXISTING SYSTEMS.
REFER TO THE CONTRACT DRAWINGS FOR LOCATIONS AND SPACE REQUIREMENTS OF ELECTRICAL EQUIPMENT. COORDINATE THE INSTALLATION OF ELECTRICAL EQUIPMENT WITH OTHER TRADES.
POWER FEEDERS MAY NOT BE SHOWN ON THE DRAWINGS. REFER TO PANEL SCHEDULES OR THE SINGLE LINE DIAGRAM FOR CONDUIT AND FEEDER INFORMATION.
ELECTRICAL SERVICE EQUIPMENT SHALL BE MARKED IN THE FIELD WITH THE CALCULATED, MAXIMUM AVAILABLE FAULT CURRENT AND DATE OF THE CALCULATION. CONTRACTOR SHALL REFERENCE NFPA 70, 110.24, FOR ALL REQUIREMENTS.
ELECTRICAL EQUIPMENT SUCH AS SWITCHBOARDS, SWITCHGEAR, PANELBOARDS, CONTROL PANELS, METER SOCKET ENCLOSURES AND MOTOR CONTROL CENTERS THAT ARE LIKELY TO REQUIRE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE WHILE ENERGIZED SHALL BE FIELD OR FACTORY MARKED TO WARN QUALIFIED PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS. MARKINGS SHALL MEET NEC 110.21(B) AND SHALL BE CONSPICUOUSLY LOCATED AND CLEARLY VISIBLE.
WHERE FIXTURE QUANTITIES ARE SHOWN ON DRAWINGS THEY ARE FOR AREA FIXTURE TYPE REFERENCE ONLY. CONTRACTOR IS RESPONSIBLE FOR FIXTURE COUNT AND SHALL VERIFY ALL FIXTURE QUANTITIES PRIOR TO BIDDING.
LIGHT FIXTURES ARE SHOWN IN APPROXIMATE LOCATIONS. THE CONTRACTOR SHALL REFERENCE THE ARCHITECTURAL REFLECTED CEILING PLAN, BUILDING ELEVATIONS, AND DETAILS FOR EXACT HEIGHT AND LOCATIONS.
RECESSED LIGHT FIXTURES INSTALLED IN LAY-IN CEILINGS SHALL BE PROVIDED WITH GRID CLIPS, EVEN IF NOT SPECIFICALLY IDENTIFIED IN THE FIXTURE MODEL NUMBER.
ALL EXIT SIGNS AND THE EMERGENCY BATTERY BACK UP OF FIXTURES INDICATED BY "NL" SHALL BE CONNECTED UNSWITCHED. OTHERWISE, ALL CROSS-SHADED EMERGENCY FIXTURES SHALL BE SWITCHED NORMALLY WITH OTHER NON-EMERGENCY FIXTURES. ON LOSS OF NORMAL POWER, THE BATTERY OF THE EMERGENCY FIXTURE SHALL AUTOMATICALLY ILLUMINATE THE EMERGENCY FIXTURE REGARDLESS OF THE POSITION OF THE LIGHTING CONTROL SWITCH. ALL CIRCUITS SHALL BE CONNECTED TO THE CIRCUIT INDICATED, U.O.N.
ELECTRICAL EQUIPMENT SHOWN ON THE DRAWING HAS BEEN SELECTED BASED ON DIMENSION TO FIT THE SPACE. THE CONTRACTOR SHALL VERIFY SUCH WITH PROPOSED EQUIPMENT DIMENSIONS PRIOR TO ORDERING OF THE EQUIPMENT.
MANUFACTURER'S RECOMMENDATIONS FOR CONDUCTOR SIZING, CIRCUIT BREAKER OR FUSE PROTECTION OF ELECTRICALLY OPERATED EQUIPMENT MAY DIFFER FROM THOSE INDICATED ON DRAWINGS. CONTRACTOR SHALL CONFIRM RATINGS, PRIOR TO ORDERING EQUIPMENT. PROVIDE ELECTRICAL PROTECTION TO EQUIPMENT PER MANUFACTURER'S SPECIFICATIONS. WHERE THE MECHANICAL EQUIPMENT NAMEPLATE CIRCUIT REQUIREMENTS DIFFER FROM THE SPECIFIED EQUIPMENT, THE CIRCUIT BREAKERS, DISCONNECTS, AND WIRING SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
FUSE SIZE FOR MECHANICAL EQUIPMENT DISCONNECT SWITCHES SHALL NOT BE GREATER THAN THE EQUIPMENT'S NAMEPLATE MOCF OR MAXIMUM FUSE SPECIFICATION. FUSED DISCONNECT SWITCHES SHALL BE INSTALLED WITH CLEARANCES PER NEC. DISCONNECT SWITCHES TO BE "HEAVY DUTY" TYPE.
CONTRACTOR SHALL REVIEW THE COMPLETE SET OF DOCUMENTS AND PROVIDE CONNECTION TO ALL ELECTRICALLY OPERATED EQUIPMENT INDICATED, EVEN IF NOT SHOWN ON THE ELECTRICAL PLANS, UNLESS OTHERWISE NOTED. COORDINATE THE LOCATION AND ELECTRICAL CONNECTION REQUIREMENTS PRIOR TO ORDERING OR INSTALLATION OF ELECTRICAL EQUIPMENT.
SUSPENDED, CEILING MOUNTED, ELECTRICAL EQUIPMENT SHALL BE SUPPORTED FROM THE BUILDING STRUCTURE NOT FROM THE CEILING.
COORDINATE EXACT LOCATIONS OF ALL DEVICES, SWITCHES, RECEPTACLES, BOXES, COMM. OUTLETS, ETC. WITH OWNER/ARCHITECT PRIOR TO ROUGH-IN.
JUNCTION AND OUTLET BOXES SHALL BE SIZED IN ACCORDANCE WITH NEC SECTION 314. MINIMUM SIZE FOR JUNCTION BOXES SHALL BE 4"SQ. X 2-1/8"D. BOXES LARGER THAN MINIMUM SIZE WILL BE REQUIRED AT SOME LOCATIONS.
CIRCUITING AND HOMERUN CONDUITS SHALL BE INSTALLED AS INDICATED ON THE ELECTRICAL PLANS. DO NOT CHANGE CIRCUIT NUMBERS WITHOUT PRIOR APPROVAL FROM ENGINEER. WHERE HOMERUNS ARE SHOWN AS A SINGLE HOMERUN FOR LIGHTS OR RECEPTACLE CIRCUITS, CONTRACTOR SHOULD GROUP A MAXIMUM OF THREE CIRCUITS OR 6-CURRENT CARRYING CONDUCTORS PER HOMERUN TO CONSERVE CONDUIT SPACE AT PANEL.
JUNCTION AND PULLBOXES SHALL ONLY BE LOCATED IN ACCESSIBLE CEILING AREAS. COORDINATE WITH ARCHITECTURAL ROP PRIOR TO ROUGH-IN.
ALL CONDUIT PENETRATIONS THROUGH FIRE-RATED WALLS AND FLOORS SHALL BE SEALED FOR MAINTAINING THE RATING OF THE ASSEMBLY. DO NOT INSTALL FLUSH MOUNTED BOXES BACK-TO-BACK IN WALLS. OFFSET BOXES IN ADJACENT STUD CAVITIES. MAINTAIN AT LEAST A 24 INCH SEPARATION IN FIRE-RATED WALLS. SEE ARCHITECTURAL DRAWINGS FOR LOCATION OF FIRE-RATED WALLS.
TERMINATION OF PHASE, NEUTRAL, AND GROUNDING CONDUCTORS SHALL BE MADE TO INDIVIDUAL TERMINALS/UGS AT PANELS, DISCONNECTS, DEVICES, ETC., UNLESS MULTIPLE CONDUCTOR TERMINATIONS ARE SPECIFICALLY ALLOWED BY THE MANUFACTURER. WHERE MULTIPLE CONDUCTOR TERMINATIONS ARE ALLOWED, THE TERMINATIONS SHALL BE MADE IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
FOR BRANCH CIRCUIT WIRING THAT IS LARGER THAN#10 AWG, PROVIDE WIRE SIZE ADAPTER FOR REDUCTION TO #10 AND TERMINATION AT THE WIRING DEVICE.
OUTLET BOXES FOR CATV OUTLETS SHALL BE MINIMUM 3.5" DEEP. CONDUIT SHALL ENTER NEAR BACK OF BOX.
ALL CIRCUITS SHALL INCLUDE AN EQUIPMENT GROUND CONDUCTOR IN THE RACEWAY.
NEW CIRCUIT BREAKERS FOR EXISTING PANELS SHALL BE BY THE PANELBOARD MANUFACTURER AND UL-LISTED FOR THE USE WITH AN AIC RATING EQUAL TO THE EXISTING BREAKERS. CIRCUIT BREAKERS SERVING HVAC EQUIPMENT SHALL BE TYPE HACR. PROVIDE NEW CIRCUIT DIRECTORY OF EXISTING PANELS LISTING ALL CIRCUITS, NEW AND EXISTING.
PROVIDE 4" SQUARE RECESSED BOX WITH SINGLE GANG TRIM AND 3/4" ELBOWED INTO ACCESSIBLE CEILING SPACE FOR ALL COMMUNICATION & TELEVISION OUTLETS SHOWN. PROVIDE COMPRESSION CONDUIT CONNECTOR ON CONDUIT END, PLASTIC SCREW ON BUSHING, AND PULLSTRING. COMMUNICATION WIRING BY OTHERS.
ELECTRICAL CONTRACTOR SHALL PROVIDE ELECTRICAL LIGHTING CONTROLS SYSTEMS COMMISSIONING VIA A THIRD PARTY PER ALL REQUIREMENTS SET FORTH UNDER SECTION C408 OF 2021 IECC AND AS SPECIFIED INCLUDING, BUT NOT LIMITED TO, TESTING OF OCCUPANT SENSOR CONTROLS, TIME-SWITCH CONTROLS, AND DAYLIGHT RESPONSIVE CONTROLS. WITHIN 90 DAYS OF DATE OF RECEIPT OF CERTIFICATE OF OCCUPANCY, PROVIDE ALL NECESSARY DRAWINGS, MANUALS, AND FINAL COMMISSIONING REPORT PER SAME CODE SECTION REQUIREMENTS.

ELECTRICAL LEGEND			
SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	WALL OUTLET--DUPLEX RECEPTACLE, FLUSH MOUNTED, NEMA 5-20R		FLEXIBLE CONDUIT CONNECTION
	WALL OUTLET--DUPLEX OUTLET, WITH GROUND FAULT INTERRUPTING FEATURE		CIRCUIT RISER UP
	WALL OUTLET--DUPLEX OUTLET, WITH GROUND FAULT INTERRUPTING FEATURE. WP INDICATES WEATHERPROOF COVER PROVIDED		CIRCUIT RISER DOWN
	WALL OUTLET--DUPLEX RECEPTACLE, FLUSH MOUNTED ABOVE COUNTER, NEMA 5-20R		TIMECLOCK
	WALL OUTLET--DUPLEX RECEPTACLE, FLUSH MOUNTED UNDER COUNTER, NEMA 5-20R		PHOTOELECTRIC CELL
	WALL OUTLET--DOUBLE DUPLEX RECEPTACLE, FLUSH MOUNTED, NEMA 5-20R		LIGHTING RELAY CONTROL PANEL
	3 POLE WALL OUTLET "X" INDICATES NEMA CONFIGURATION; COORDINATE WITH EQUIP SUPPLIER FOR RECEPT CONFIG REQUIRED		LIGHTING CONTACTOR
	CEILING OUTLET, DUPLEX RECEPTACLE, FLUSH MOUNTED, NEMA 5-20R		MASS NOTIFICATION SYSTEM CONTROL PANEL
	FLOOR OUTLET - DUPLEX RECEPTACLE NEMA 5-20R		MASS NOTIFICATION SYSTEM - NOTIFICATION DEVICE
	MULTI-OUTLET ASSEMBLY WIREC @ 12" OC		MASS NOTIFICATION SYSTEM - CEILING MOUNTED NOTIFICATION DEVICE
	SWITCHBOARD OR DISTRIBUTION PANEL		FIRE ALARM CONTROL PANEL
	PANELBOARD REFER TO SCHEDULE.		FIRE ALARM REMOTE ANNUNCIATOR
	GROUNDING ELECTRODE CONNECTION		POWER SUPPLY; "FA" INDICATES FIRE ALARM, "D" INDICATES DIMMER
	COPPER WELD GROUND ROD AND INSPECTION WELL		FIRE ALARM MANUAL PULL STATION
	WELDING RECEPTACLES, 480V, 60A, 3Ø, 3W		FIRE ALARM COMBINATION HORN/STROBE - SEMI-FLUSH MOUNTED UON, 6-8" AFF TO BOTTOM OF STROBE UON SUBSCRIPT=CANDELA RATING, NO SUBSCRIPT=15CD
	DISCONNECT SWITCH, FUSIBLE		FIRE ALARM COMBINATION HORN/STROBE - CEILING MOUNTED; SUBSCRIPT=CANDELA RATING, NO SUBSCRIPT=15cd
	DISCONNECT SWITCH, NON FUSIBLE		FIRE ALARM STROBE - CEILING MOUNTED SUBSCRIPT=CANDELA RATING, NO SUBSCRIPT=15CD
	METER BASE AND METER		FIRE ALARM STROBE - SEMI-FLUSH WALL MOUNTED UON, 6-8" AFF TO BOTTOM UON; SUBSCRIPT=CANDELA RATING, NO SUBSCRIPT=15CD
	ELECTRIC VENT FAN		FIRE ALARM SYSTEM - HVAC DUCT SMOKE DETECTOR
	COMBINATION MAGNETIC MOTOR STARTER WITH FUSIBLE DISCONNECT SWITCH; INTEGER INDICATES NEMA SIZE		FIRE ALARM SMOKE DETECTOR
	MOTOR CONNECTIONS, SIZE AS SCHEDULED		FIRE ALARM HEAT DETECTOR. 195 INDICATES 195 DEGREE DETECTOR
	CEILING FAN CONNECTION		RESCUE ASSISTANCE CALL STATION
	PULL BOX WITH HINGED COVER, SIZE AS INDICATED		RESCUE ASSISTANCE ANNUNCIATOR PANEL
	DISTRIBUTION OR PAD MOUNTED TRANSFORMER		DOOR HOLD OPEN DEVICE - INTERLOCK WITH FIRE ALARM TO RELEASE ON ALARM CONDITION
	CEILING OUTLET - FLUORESCENT LUMINAIRE REFER TO FIXTURE SCHEDULE. "X" EQUAL BR CKT DESIGNATION; "a" INDICATED CONTROLLING SWITCH LEG		SINGLE MONITOR MODULE
	WALL BRACKET - FLUORESCENT LUMINAIRE REFER TO FIXTURE SCHEDULE. "X" EQUAL FIXTURE MARK		DUAL MONITOR MODULE
	FLUORESCENT STRIP FIXTURE, REFER TO FIXTURE SCHEDULE; "X" EQUAL FIXTURE MARK		RELAY MODULE
	LUMINAIRE WITH INTEGRAL EMERGENCY POWER PACK		SPRINKLER FLOW OR PRESSURE SWITCH
	CEILING MOUNTED DOUBLE-HEAD EMERGENCY LIGHT		SPRINKLER TAMPER SWITCH
	WALL BRACKET - REFER TO FIXTURE SCHEDULE; "X" EQUAL FIXTURE MARK		SPRINKLER SYSTEM - DRY PIPE AIR COMP PRESSURE SWITCH
	EXIT SIGN FIXTURE - DIRECTIONAL ARROWS AS INDICATED		INTERCOM CALL-IN STATION
	CEILING MOUNTED OCCUPANCY SENSOR W/INTEGRAL POWER PACK		INTERCOM/PA SYSTEM - CEILING SPEAKER
	WALL SWITCH--20AMP, 120/277V, SPST		INTERCOMPAGING EXTERIOR, WEATHERPROOF, HORN/SPEAKER
	WALL SWITCH--20AMP, 120/277V, DIMMING		PROGRAM CLOCK. SUBSCRIPT "2" INDICATES TWO FACES
	WALL SWITCH--20AMP, 120/277V., 3-WAY		TELEPHONE SYSTEM - TERMINAL BACKBOARD (TTB)
	MOTOR RATED WALL SWITCH--20AMP, 120/277V, WITH INTEGRAL THERMAL OVERLOAD		PROGRAM BELL
	WALL SWITCH--20AMP, 120/277V, KEY OPERATED		SHUNT TRIP COIL
	WALL SWITCH--20AMP, SPST. "a,b,c..." INDICATES CONTROLLING SWITCH. NUMBER OF LETTERS CORRESPONDS TO NUMBER OF SWITCHES REQUIRED		DOOR CONTROLLER FOR ACCESS CONTROL SYSTEM
	WALL SWITCH--LOW VOLTAGE W/MOMENTARY CONTACT		KEY PAD FOR ACCESS CONTROL SYSTEM
	WALL SWITCH--20AMP, 120/277V WITH OCCUPANCY SENSOR CONTROL		SECURITY CAMERA
	POWER POLE		FIRE/SECURITY SYSTEM KEYPAD
	EXISTING OVERHEAD LINE		SECURITY SYSTEM DOOR CONTACT
	TELECOMMUNICATIONS UNDERGROUND CONDUIT OR DUCT BANK		SECURITY PANEL
	EXISTING UNDERGROUND CONDUIT OR DUCT BANK		SECURITY SYSTEM MOTION SENSOR. "LR" INDICATES LONG RANGE.
	SURFACE METAL RACEWAY, OR WIREWAY, SIZE AS INDICATED WITH RECEPTACLES AS SHOWN		COMM OUTLET, - VOICE & DATA, RECESSED IN WALL, UON
	NEW UNDERGROUND CONDUIT OR DUCT BANK		COMM OUTLET, - VOICE ONLY, RECESSED IN WALL, UON
	CIRCUIT CONCEALED BELOW GRADE OR FLOOR (#12 AWG UNLESS NOTED OTHERWISE OR REQUIRED)		COMM OUTLET, - DATA ONLY, RECESSED IN WALL, UON
	CONDUIT CONCEALED IN WALL OR OVERHEAD (#12 AWG UNLESS NOTED OTHERWISE OR REQUIRED)		COMM FLOOR OUTLET - VOICE/DATA
	SHORT SLASHES = PHASE OR SWITCHED CONDUCTORS, LONG SLASHES = NEUTRAL CONDUCTORS, NO SLASHES=2#12,1#12G-3/4"C, U.O.N.		CODE SIZE JUNCTION BOX-SIZE AS NOTED OR REQ'D
	HOMERUN TO PANEL (CIRCUIT NUMBERS INDICATED)		TWO GANG RECESSED BOX WITH 1"C INTO ACCESSIBLE CEILING SPACE FOR TV SIGNAL
	NUMBER OF CURRENT CARRYING, INTEGER INDICATES CONDUCTOR SIZE		SINGLE GANG RECESSED BOX WITH 3/4"C INTO ACCESSIBLE CEILING SPACE FOR SOUND SYSTEM
	CABLE TRAY, SIZES AS INDICATED		RECESSED BOX WITH 1"C INTO ACCESSIBLE CEILING SPACE FOR VIDEO
	POWER DISTRIBUTION HANDHOLE OR MANHOLE, SIZE AS INDICATED		RECESSED FLOOR BOX WITH 1"C INTO ACCESSIBLE CEILING FOR VIDEO
	TELECOMMUNICATIONS HANDHOLE OR MANHOLE, SIZE AS INDICATED		ELECTRICAL KEYED NOTE REFERENCE
NOTE: ALL SYMBOLS MAY NOT BE USED			

ABBREVIATIONS	
AF	AMPERE FRAME/FUSE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AMPS INTERRUPTING CURRENT
AL	ALUMINUM
AS	AMPERE SWITCH
AT	AMPERES TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUGE
BCG	BARE COPPER GROUND
BLDG	BUILDING
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CL	CENTER LINE
CLR	CLEAR
CO	CONDUIT ONLY
CSFD	COMBINATION SMOKE/FIRE DAMPER
CTR	CENTER
CU	COPPER
DIA	DIAMETER
DP	DISTRIBUTION PANEL
DWG	DRAWING
EMS	ENERGY MANAGEMENT SYSTEM
EMT	ELECTRICAL METALLIC TUBING
ELR	END-OF-LINE RESISTOR
EPO	EMERGENCY POWER OFF
EPR	ETHYLENE PROPYLENE RUBBER
EQ	EQUAL
FA	FIRE ALARM
FAAP	FIRE ALARM ANNUNCIATOR PANEL
FACP	FIRE ALARM CONTROL PANEL
FAPS	FIRE ALARM POWER SUPPLY
FARP	FIRE ALARM REMOTE PANEL
FLA	FULL LOAD AMPERES
FVNR	FULL VOLTAGE NON-REVERSING
GRD	GROUND
GALV	GALVANIZED
RGS	RIGID GALVANIZED STEEL
GFI	GROUND FAULT INTERRUPTER
HD	HEAT DETECTOR
HH	HANDHOLE
HID	HIGH INTENSITY DISCHARGE
HO	HIGH OUTPUT
HOA	HAND-OFF-AUTO
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HSP	HOUSE SERVICE PANEL
HV	HIGH VOLTAGE
HZ	HERTZ
IC	INTEROOM
ISC	INTERRUPTING SHORT CIRCUIT
IG	ISOLATED GROUND
INST	INSTANTANEOUS
JB	JUNCTION BOX
KV	KILOVOLTS
KVA	KILOVOLT-AMPERES
KW	KILOWATTS
KWH	KILOWATT-HOURS
LCP	LIGHTING CONTROL PANEL
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCCB	MOLDED CASE CIRCUIT BREAKER
MCP	MOTOR CIRCUIT PROTECTOR
MH	MANHOLE
MIC	MICROPHONE
MLO	MAIN LUGS ONLY
MSB	MAIN SWITCHBOARD
MSG	MAIN SWITCHGEAR
N	NEUTRAL
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT (NON-SWITCHED)
NO	NORMALLY OPEN, NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OH	OVERHEAD
PA	PUBLIC ADDRESS
PB	PUSHBUTTON
PH	PHASE
POC	POINT OF CONNECTION
PVC	POLYVINYL CHLORIDE
REC	RECEPTACLE
REQ'D	REQUIRED
RSC	RIGID STEEL CONDUIT
SEC	SECONDARY
SWBD	SWITCHBOARD
SYM	SYMMETRICAL
TD	TIME DELAY
TTB	TELEPHONE TERMINAL BOARD
TTC	TELEPHONE TERMINAL CABINET
UG	UNDERGROUND
UL	UNDERWRITERS LABORATORIES
UON	UNLESS OTHERWISE NOTED
VFD	VARIABLE FREQUENCY DRIVE
WI	WITH
WH	WATER HEATER
WP	WEATHERPROOF
XFMR	TRANSFORMER
XLPE	CROSS LINKED POLYETHYLENE
XP	EXPLOSION PROOF
4'-6"	TYPICAL MOUNTING HEIGHT 4'-6" ABOVE FLOOR OR GRADE TO CENTER OF BOX

Sutton
Beebe
Babin

Architects, LLC

333 Texas Street
Suite 1200
Shreveport, LA 71101

O318.221.1623
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sbbarchitects.com

Seal

Grambling Hall Lecture Hall
Refurbishment
Grambling State University

Project No.

2602.00

Issue

Date

03/10/2026

Sheet Title

ELECTRICAL
GENERAL
NOTES

Sheet No.

E1.01

DANIEL W. BROWN
LicenseNo.41687
3.10.26

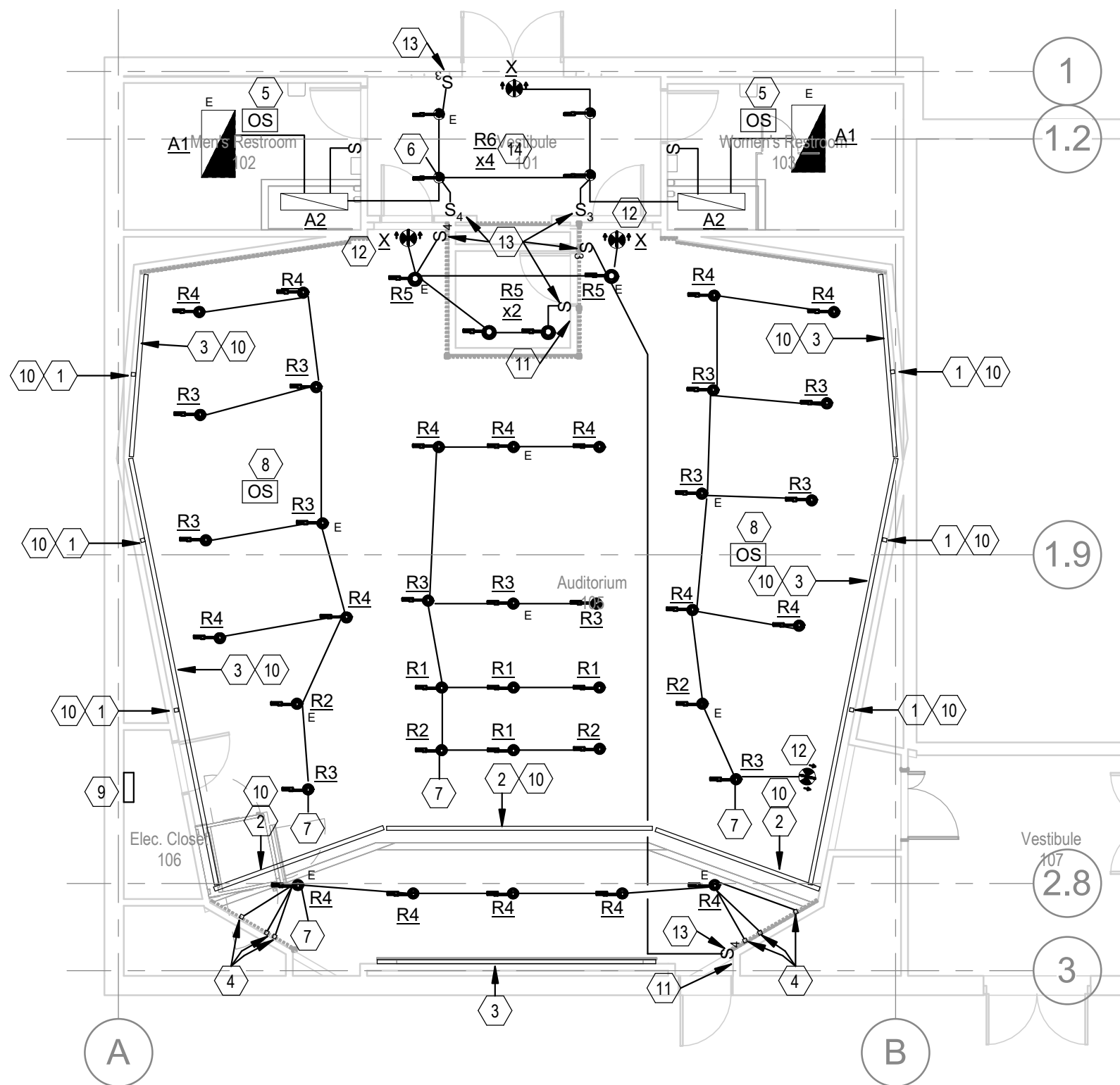
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FIRM REGISTRATION NO. 667

ENGINEER: **DANIEL W. BROWN, PE**

LICENSE NO.: **41687**

THESE DRAWINGS DO NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. 26-012



LEVEL 01 LIGHTING PLAN

SCALE: 1/8" = 1'-0"

ELECTRICAL NOTES:

- LED COVE LIGHT "L1" IN VERTICAL PILASTER, REF. DETAIL 1 ON SHEET A5.03.
- LED COVE LIGHT "L1" IN EXISTING COVE ALONG CEILING IN FRONT OF STAGE. REF. DETAIL 3 ON SHEET A6.01.
- LED COVE LIGHT "L1" IN NEW COVE ALONG WALLS. REF. DETAIL 2 ON SHEET A6.01
- LED COVE LIGHT "L1" BEHIND NEW WALL MOUNTED MONITOR.
- LINEAR LED FIXTURE "F1" MOUNTED IN SLAT WALL. REF. DETAILS 7 AND 10 ON SHEET A5.03, AND AUDITORIUM SOUTH ELEVATION DETAIL 2 ON SHEET A5.02 FOR FIXTURE LOCATION AND MOUNTING HEIGHT.
- DUAL TECHNOLOGY, SELF ADAPTIVE, CEILING MOUNTED OCCUPANCY SENSOR, WITH 500FT2 RANGE. PROVIDE POWER PACK(S) AS REQUIRED FOR LIGHTING LOAD CONTROLLED.
- CONNECT TO THE EXISTING LIGHTING BRANCH CIRCUIT THAT SERVED THE DEMO'D LIGHTS AT THIS LOCATION.
- ROUTE 2#12#12G CONDUCTORS IN 3/4" THROUGH LIGHTING RELAY PANEL THEN TO A NEW 20A/1P BREAKER IN EXISTING PANEL "C".
- DUAL TECHNOLOGY, SELF ADAPTIVE, CEILING MOUNTED OCCUPANCY SENSOR, WITH 2000FT2 RANGE. PROVIDE POWER PACK(S) AS REQUIRED FOR LIGHTING LOAD CONTROLLED. TIE OCCUPANCY SENSOR TO LIGHTING RELAY PANEL TO TURN OFF ALL LIGHTS CONTROLLED BY PANEL WHEN ROOM IS NOT OCCUPIED.
- LIGHTING RELAY PANEL SHALL HAVE MINIMUM CAPACITY TO CONTROL 8 CIRCUITS. ALLOW FOR DIMMING OF ALL CIRCUITS INDIVIDUALLY, HAVE THE CAPABILITY OF BEING CONTROLLED BY OCCUPANCY SENSORS AND WALL STATIONS.
- ALL COVE LIGHTING SHALL BE CONNECTED TO A SINGLE CIRCUIT. EXTEND 2#12#12G IN 3/4" TO A NEW 20A/1P BREAKER IN EXISTING PANEL "C". THE COVE LIGHTS SHALL BE DMX CONTROLLED AND SWITCHED AS FOLLOWS: THREE SEPARATE SWITCHES - ONE FOR TV COVE LIGHT, ONE FOR ALL ROOM COVE LIGHTS, AND ONE FOR ALL PILASTER LIGHTS. DMX SWITCHING CONTROL TO BE LOCATED IN CONTROL BOOTH.
- PROVIDE TWO WALL STATIONS TIED TO LIGHTING RELAY PANEL WITH ALL ON/OFF, AND DIMMING FOR 4 SEPARATE ZONES (STAGE, LEFT, CENTER, AND RIGHT). VERIFY WALL STATION LOCATION WITH OWNER PRIOR TO ROUGH-IN.
- EXIT LIGHTS CONNECTED TO CIRCUIT UNSWITCHED AND NOT ROUTED THROUGH THE LIGHTING RELAY PANEL.
- REPLACE EXISTING LIGHT SWITCHES AT THESE LOCATIONS WITH NEW.
- NEW LIGHT FIXTURE IN NEW LOCATION. PATCH HOLES WHERE EXISTING LIGHTS WERE LOCATED.

NOTE:
FIXTURES WITH A SUBSCRIPT "E" NEXT
TO THEM ARE EMERGENCY FIXTURES.

LEVEL 01 POWER PLAN

SCALE: 1/8" = 1'-0"

ELECTRICAL NOTES:

- J-BOX FOR POWER TO NEW WHEELCHAIR LIFT. EXTEND 2#12#12G IN 3/4" TO A NEW 20A/1P BREAKER IN EXISTING PANEL C. VERIFY WITH MANUFACTURE LOCATION OF POWER CONNECTION PRIOR TO ROUGH-IN.
- J-BOX FOR POWER TO AUTOMATIC FLUSH/FAUCET. CIRCUIT AS SHOWN AND EXTEND 2#12#12G IN 3/4" TO A NEW 20A/1P BREAKER IN EXISTING PANEL C.
- PROVIDE (3) THREE DEDICATED DUPLEX RECEPTACLES LOCATED BEHIND LED SCREEN. FOR POWER TO LED SCREEN (VERIFY EXACT LOCATION WITH AV CONTRACTOR). PROVIDE (3) DEDICATED CIRCUITS FOR LED SCREEN. PROVIDE (3) NEW 20A/1P BREAKERS IN EXISTING PANEL "C" AND EXTEND 2#12#12G FROM EACH BREAKER TO EACH RECEPTACLE IN A TOTAL OF (1) 3/4".
- NEW DEDICATED 20A RECEPTACLE FOR AMPLIFIER. VERIFY LOCATION WITH AV INSTALLER PRIOR TO ROUGH-IN. EXTEND 2#12#12G IN 3/4" TO A NEW 20A/1P BREAKER IN EXISTING PANEL "C".
- J-BOX FOR POWER TO HAND DRYER. VERIFY LOCATION AND MOUNTING HEIGHT WITH ARCHITECT PRIOR TO ROUGH-IN. EXTEND 2#12#12G IN 3/4" TO A NEW 20A/1P BREAKER IN EXISTING PANEL "C".
- PROVIDE (2) NEW DEDICATED 20A RECEPTACLES FOR AV RACK. VERIFY LOCATION WITH AV INSTALLER PRIOR TO ROUGH-IN. EXTEND 2#12#12G IN 3/4" FROM EACH RECEPTACLE TO A NEW 20A/1P BREAKER (TOTAL OF 2 BREAKERS) IN EXISTING PANEL "C".

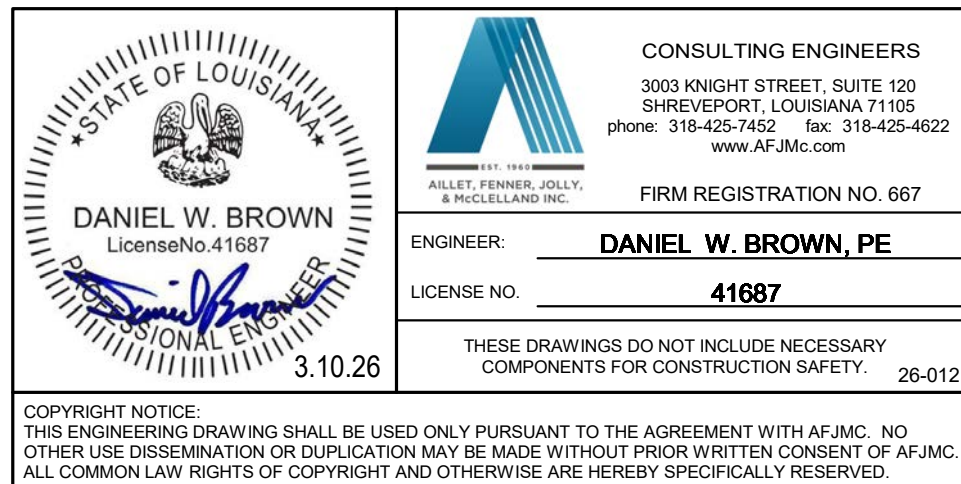
LEVEL 01 SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

ELECTRICAL NOTES:

- SINGLE GANG/J-BOX MOUNTED AT 7'AFF FOR AV CONNECTION TO LED SCREEN. EXTEND 1" FROM THREE GANG J-BOX IN SOUND BOOTH TO FIRST J-BOX BEHIND SCREEN, THEN 1" FROM FIRST J-BOX TO SECOND J-BOX BEHIND LED SCREEN AND FINALLY 1" FROM SECOND J-BOX TO THIRD J-BOX.
- PROVIDE A THREE GANG JUNCTION BOX AT 5'9" AFF AT THIS LOCATION IN SOUND BOOTH. VERIFY EXACT LOCATION WITH AV INSTALLER.
- J-BOX FOR SPEAKER AT 8'6" AFF.
- (2) J-BOXES AT THIS LOCATION. FIRST J-BOX IS MOUNTED AT 48" AFF. THE SECOND J-BOX IS LOCATED AT 18" AFF. EXTEND 1" FROM SOUND BOOTH J-BOX TO FIRST J-BOX MOUNTED AT 48" AFF. THEN EXTEND 1" FROM THE FIRST J-BOX TO THE SECOND J-BOX MOUNTED AT 18" AFF.
- CONTRACTOR TO EXTEND (2) DATA CABLES FROM THE OUTSIDE ELECTRICAL ROOM TO THE CONTROL ROOM DUPLEX DATA OUTLET. COORDINATE WITH GRAMBLING IT DEPARTMENT FOR CABLE TYPE AND HEAD END LOCATION.

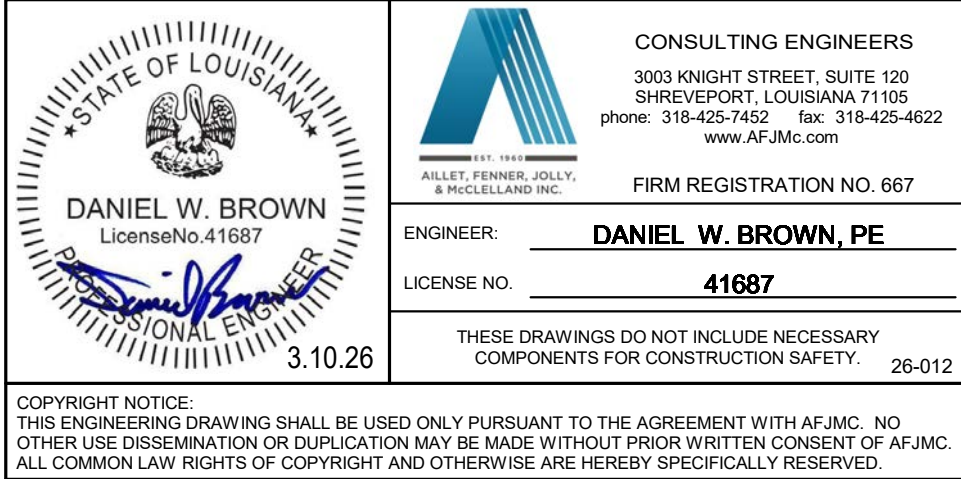
NOTE:
ALL EXISTING FIRE ALARM DEVICES ARE TO REMAIN.



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FIRM REGISTRATION NO. 667
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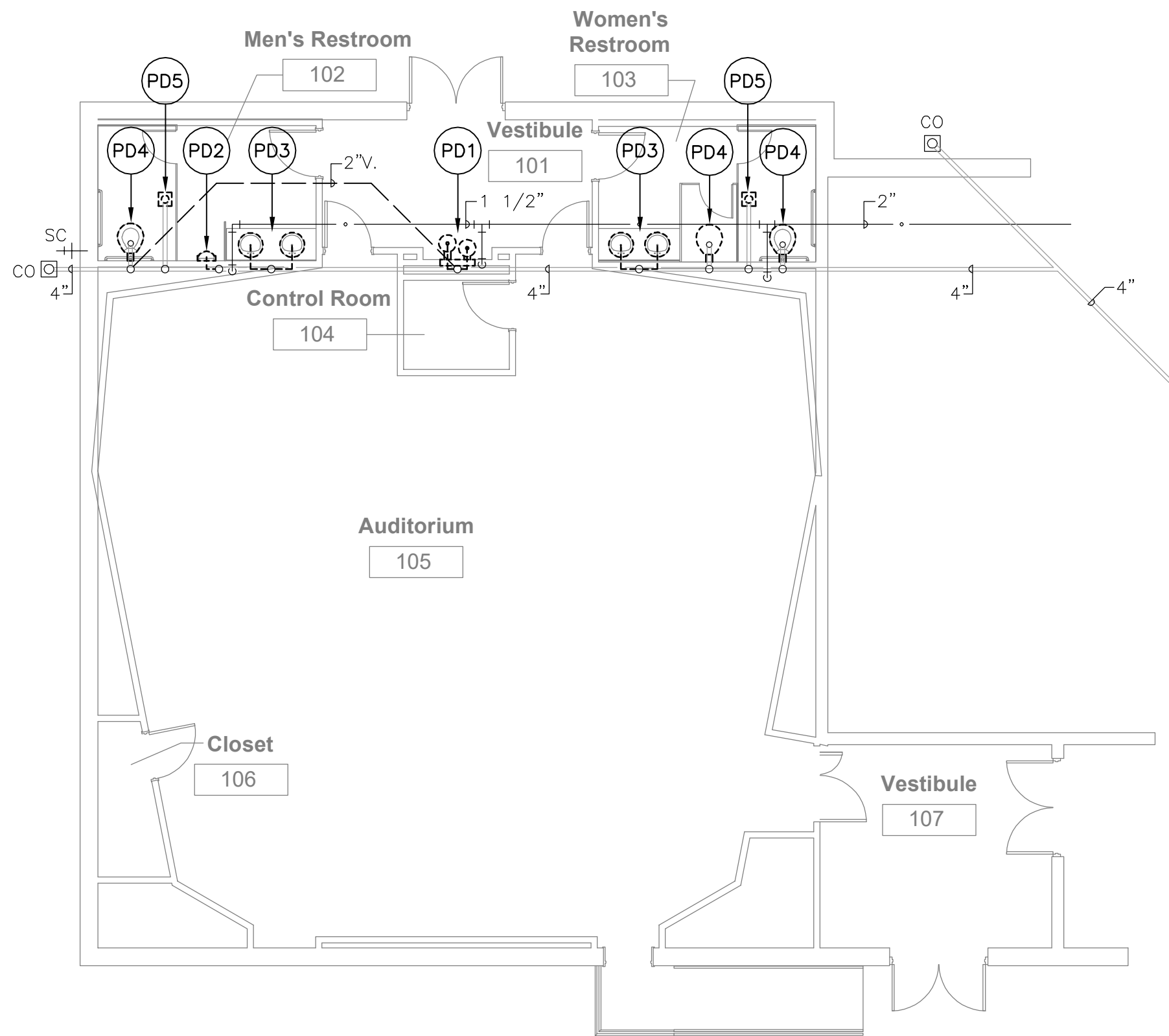
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LIGHTING SCHEDULE						
Mark	Volt	Mount	Manuf.	Catalog No.	Lamp Data	Remarks
A1	UNV	Recess	Lithonia Equal: Elite HE Williams	CPX-2X4-3200L-80CRI-40K-A12-MIN10-MVOLT-DGA14-(EW10 for emergency... 24-OT-LED-3000L-DIM10-MVOLT-40K-85-A125-24FK-(0-EMG-LED-10W for emergency) 50-F-S24-L33-8-40-S-AF12125-(EM/10W for emergency fixture)-DIM-UNV	23 Watt LED 3000 Lumens	2x4 Recessed LED Troffer in gyp ceiling.
A2	UNV	Recess	Lithonia Equal: Elite HE Williams	CPX-1X4-3200L-80CRI-40K-A12-MIN10-MVOLT-(EW10 for emergency fixture) 14-OT-LED-3400L-DIM10-MVOLT-40K-85-A12-14FK 50-F-S14-L27-8-40-S-AF12125-DIM-UNV	28 Watt LED 3000 Lumens	1x4 Recessed LED Troffer in gyp ceiling.
F1	UNV	Recess	Lumenwerx Equal: Deltalight Extant	VIA1.5RV-D-HLO-FH-SW-90CRI-350LMF-35K-4'-UNV-BF-DTL-W-* P-FTL-SF-25F-F-X-W-RMT-D1-35-FP-D-X-S-48" HTG-1RW-LP-TD-*4'-DML-MEOGC-40-VU-D	19 Watt LED 1400 Lumens	4' vertical recessed LED installed in slat wall.
L1	UNV	Cove	TROV Equal: Traxon Color Kinetics	L45-I-*-10-RGB4-MULT-120-W CLPL-1-08-1-5-0-0-1-1-4-1 Accent MX Powercore gen3, RGB	10 Watts/ft 300 Lumens/ft	RGB LED Cove light. DMX control. 120 degree. * Ref. plans for total length.
R1	UNV	Recessed	Lithonia Equal: Krillin HE Williams	LBR6-AL02(1000LM)-40K-AR-TRW-LSS WD-MVOLT-UGZ-(E10WCP for emergency fixture) LKR-06120-1000L-WFL-41K-(EI for emergency fixture) 6LDR-L10-8-40-WH-(EM/10/ITS)-DIM-UNV-R	13 Watt LED 1000 Lumens	6" retrofit recessed can LED light.
R2	UNV	Recessed	Lithonia Equal: Krillin HE Williams	LBR6-AL02(1500LM)-40K-AR-TRW-LSS WD-MVOLT-UGZ-(E10WCP for emergency fixture) LKR-06120-1500L-WFL-41K-(EI for emergency fixture) 6LDR-L15-8-40-WH-(EM/10/ITS)-DIM-UNV-R	19 Watt LED 1500 Lumens	6" retrofit recessed can LED light.
R3	UNV	Recessed	Lithonia Equal: Krillin HE Williams	LBR6-AL02(2000LM)-40K-AR-TRW-LSS WD-MVOLT-UGZ-(E10WCP for emergency fixture) LKR-06120-2000L-WFL-41K-(EI for emergency fixture) 6LDR-L20-8-40-WH-(EM/10/ITS)-DIM-UNV-R	25 Watt LED 2000 Lumens	6" retrofit recessed can LED light.
R4	UNV	Recessed	Lithonia Equal: Krillin HE Williams	LBR6-AL03(3000LM)-40K-AR-TRW-LSS WD-MVOLT-UGZ-(E10WCP for emergency fixture) LKR-06055-3500L-WFL-41K-(EI for emergency fixture) 6LDR-L30-8-40-WH-(EM/10/ITS)-DIM-UNV-R	38 Watt LED 3000 Lumens	6" retrofit recessed can LED light.
R5	UNV	Recessed	Lithonia Equal: Krillin HE Williams	LBR8-ALO3(3000LM)-40K-AR-TRW-LSS WD-MVOLT-UGZ-(E10WCP for emergency fixture) LKR-08055-3500L-WFL-41K-(EI for emergency fixture) 8DR-L30-8-TW-(EM/10W/RTS)-DIM-120-O-W-CS-MWT-R	38 Watt LED 3000 Lumens	8" retrofit recessed can LED light.
R6	UNV	Recessed	Lithonia Equal: Krillin HE Williams	LBR8-ALO2(1500LM)-40K-AR-TRW-LSS WD-MVOLT-UGZ-(E10WCP for emergency fixture) LKR-08027-1500L-WFL-41K-(EI for emergency fixture) 8DR-L15-8-TW-(EM/10W/RTS)-DIM-120-O-W-CS-MWT-R	19 Watt LED 1500 Lumens	8" retrofit recessed can LED light.
X	UNV	Universal	Lithonia Equal: Dual-Lite Sure-Lite	LQM S W 3 R 120/277 EL N SD LXURWEI LPX7SD	Integral Red LED	Injection molded, white, thermoplastic housing. Red lettering. Integral battery. Ceiling mount or mount above door as indicated on plans. Faces as required. Chevrons as indicated. Test switch. Self-diagnostics.
Notes: 1. Provide emergency battery back-up battery for for all fixtures with subscript "E", UON. 2. Coordinate all fixture colors with architect or interior designer prior to purchasing. 3. Lighting fixtures indicated on dimming switches shall be provided with dimming ballasts. 4. Recessed light fixtures installed in lay-in ceilings shall be provided with grid clips, even if not specifically identified in the fixture model number.						



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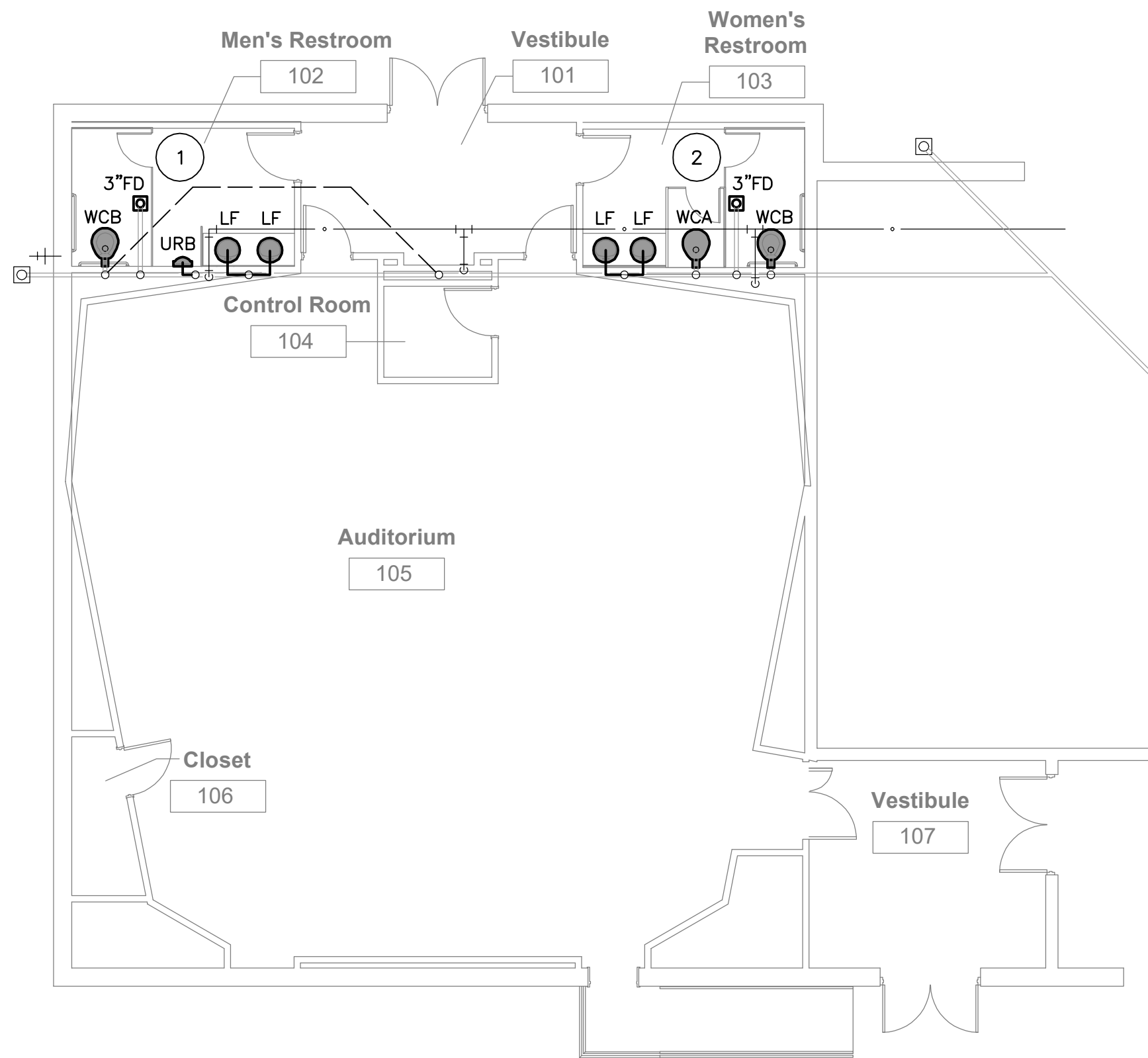


1ST FLOOR PLUMBING DEMOLITION PLAN

SCALE: 1/8" = 1'-0"

PLUMBING DEMOLITION NOTES:

- (PD1) REMOVE EXISTING ELECTRIC WATER COOLER AND ALL ASSOCIATED COLD WATER, AND WASTE PIPING. ALL SUPPLY AND WASTE PIPING SHALL BE REMOVED TO A POINT IN PLUMBING/CHASE WALL AND CAPPED.
- (PD2) REMOVE EXISTING FLOOR MOUNTED URINAL AND ALL ASSOCIATED COLD WATER AND WASTE PIPING. ALL SUPPLY AND WASTE PIPING SHALL BE REMOVED TO A POINT INSIDE PLUMBING WALL AND CAPPED.
- (PD3) REMOVE EXISTING COUNTERTOP LAVATORY(S) AND ALL ASSOCIATED HOT WATER, COLD WATER, AND WASTE PIPING. ALL SUPPLY AND WASTE PIPING SHALL BE REMOVED TO A POINT INSIDE PLUMBING WALL AND CAPPED.
- (PD4) REMOVE EXISTING WATER CLOSET AND ALL SUPPLY, AND WASTE PIPING. ALL SUPPLY PIPING SHALL BE REMOVED TO A POINT INSIDE PLUMBING WALL AND CAPPED. ALL WASTE AND VENT PIPING SHALL BE REMOVED TO A POINT INSIDE PLUMBING WALL OR BELOW THE FLOOR AND CAPPED.
- (PD5) REMOVE EXISTING FLOOR DRAIN. WASTE PIPING SHALL BE REMOVED TO A POINT BELOW THE FLOOR AND CAPPED.



1ST FLOOR PLUMBING RENOVATION PLAN

SCALE: 1/8" = 1'-0"

PLUMBING RENOVATION NOTES:

- (1) ROUGH-IN AND CONNECT NEW FLOOR DRAIN, WATER CLOSET, LAVATORIES, AND URINAL TO EXISTING HOT WATER, COLD WATER, WASTE AND VENT PIPING. PROVIDE NEW SHUT-OFF VALVES AND P-TRAPS.
- (2) ROUGH-IN AND CONNECT NEW FLOOR DRAIN, WATER CLOSET(S) AND LAVATORIES TO EXISTING HOT WATER, COLD WATER, WASTE AND VENT PIPING IN THIS AREA. PROVIDE NEW SHUT-OFF VALVES AND P-TRAPS.

PIPE AND FITTING MATERIAL SCHEDULE				
ALL PIPE AND FITTING MATERIALS SHALL CONFORM TO THE APPLICABLE PROVISIONS OF THE IPC AND THE LA. AMMENDMENTS				
SERVICE	PIPE MATERIAL	JOINT TYPE	FITTING MATERIAL	REMARKS
SOIL, WASTE & VENT ABOVE & BELOW FIRST FLOOR SLAB AND BLDG SEWER (EXTERIOR)	SCHEDULE 40 PVC, ASTM D 2665, ASTM F 891 ASTM F 1488	SOLVENT WELDED	SCHEDULE 40 PVC, ASTM D 2665 ASTM F 1866	
DOMESTIC WATER ABOVE FIRST FLOOR SLAB, INTERIOR	TYPE "L" HARD COPPER, ASTM B-88	95-5 SOLDER WITH INTERMEDIATELY CORROSIVE FLUX	WROUGHT COPPER	

PLUMBING FIXTURE SCHEDULE						
* CERTIFIED COMPLIANCE WITH ADA GUIDLINES AND ANSI A117.1 REQUIREMENTS FOR PEOPLE WITH DISABILITIES.						
(1) ALL FIXTURES SHALL COMPLY WITH THE LOUISIANA STATE LEAD LEGISLATION (HB.471)						
(2) PROVIDE ASSE 1070 CERTIFIED POINT OF USE ANTI-SCALD MIXING VALVE AT ALL LAVATORIES AND SINKS.						
FIXTURE DESIG.	MFR.	FIXTURE	FITTING OR VALVE	STRAINER	TRAP	SUPPLY PIPES
WCA FLOOR MTD. WATER CLOSET	AMSTAN KOHLER ZURN CT705E TOTO GERBER SLOAN CRANE MANSFIELD W. POTTERY	2234.001 K-4350 Z-5655 SL REGAL 111 ZURN Z6000 ST2003-1.6 3325 1311NS B432	6047.161.002 ----			1 1/2" TOP SPUD
WCB* FLOOR MTD. WATER CLOSET ADA COMPLIANT	AMSTAN KOHLER ZURN CRANE GERBER SLOAN TOTO MANSFIELD W. POTTERY	3043.102 K-4368 Z-5655 SH701 25-730 ST2023-1.6 CIL705EL 1319NS B472	6047.161 Z6000 REGAL 111 DELANY F402 DELTA 81T201			1 1/2" TOP SPUD
LF* COUNTERTOP LAVATORY ADA COMPLIANT	AMSTAN ELJER KOHLER ZURN SLOAN MANSFIELD CHICAGO SLOAN	0476.028 051-3514 K-2196 Z-5114 1287 267 ---- SS3002	5400.172H 559-2300 K-7404-K Z-81104 802-317CP	2411.015 803-0552 K-7715	8872C(M) 804-1180 K-8998 WATTS 518	2165 LK(M) 802-0325 K-7607 AMSTAN 605XTMV-1070.007 LEONARD 170-LF WEBSTONE NIBH77211WTG
URB* WALL MTD. URINAL HANDICAPPED	AMSTAN KOHLER ZURN GERBER SLOAN TOTO MANSFIELD W. POTTERY	6590.001 K-4991 Z-5755 186-1 SU1006 UT447E 410 U493	1.0 GPM FLUSH VALVE SLOAN REGAL 186-1 ZURN Z-6003 DELTA 81T231 AMSTAN 6045.101	BEEHIVE STRAINER	INTEGRAL	3/4" TOP SPUD
FD FLOOR DRAIN WITH ENLARGED STRAINER & WATERPROOF MEMBRANE	WADE SMITH ZURN JOSAM WATTS	W-1100-1 2010-A Z-415 30000-E FD-100-A-7	PROVIDE TRAP PRIMER AT ALL PUBLIC RESTROOMS, PLENUMS, OR OTHER LOCATIONS INDICATED ON DRAWINGS.	SATIN NICKEL BRONZE PROVIDE ROUND OR SQUARE TYPE AS DIRECTED BY ARCHITECT	CAST IRON DEEP SEAL P-TRAP	1/2" ROUGH STOP SEE PLAN FOR SIZE OF CONNECTION

(D)=DELTA
(SY)=SYMMONS
(W)=MCGUIRE MFG.CO.
(C)=CHICAGO FAUCET CO.

STATE OF LOUISIANA

JOHN C. WILSON

REG. NO. 19008

REGISTERED PROFESSIONAL ENGINEER

2026

MECHANICAL ENGINEERING

CONSULTING ENGINEERS

3003 KNIGHT STREET, SUITE 120

SHREVEPORT, LOUISIANA 71105

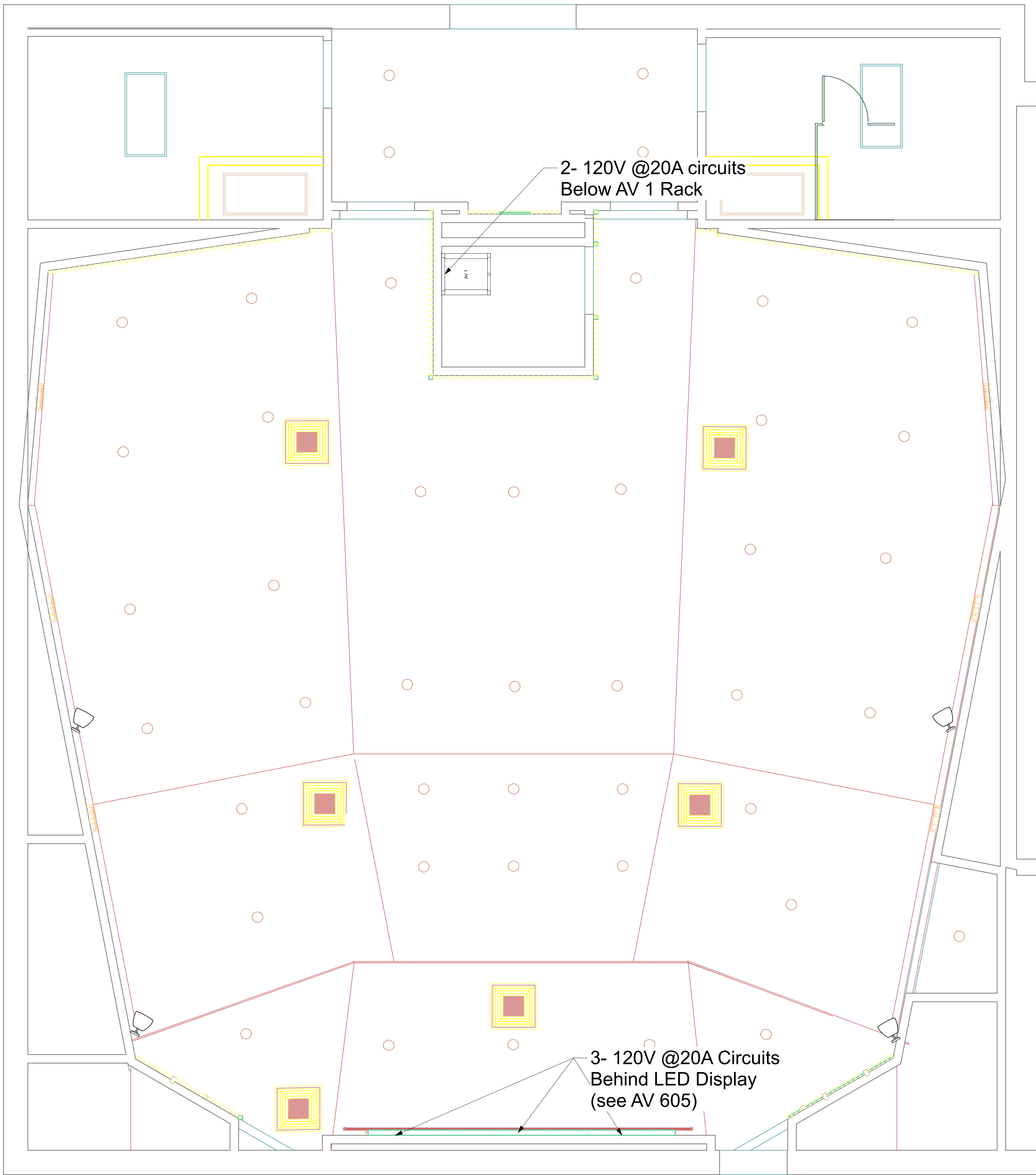
phone: 318-425-7452 fax: 318-425-4622

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ENGINEER: JOHN WILSON P.E.

LICENSE NO. 19008

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1 Electrical requirements
Scale: 3/8" = 1'-0"



6840 West 70th St.
Shreveport, LA 71129

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Project Info:

Grambling Hall

403 Main Street
Grambling, LA 71245

Project # 1027

REVISION SCHEDULE

REVI #: Date:

Date:

3/9/26

Scale: 3/8" = 1'-0"

Sheet Title:
Electrical Requirements

Sheet:

AV 601

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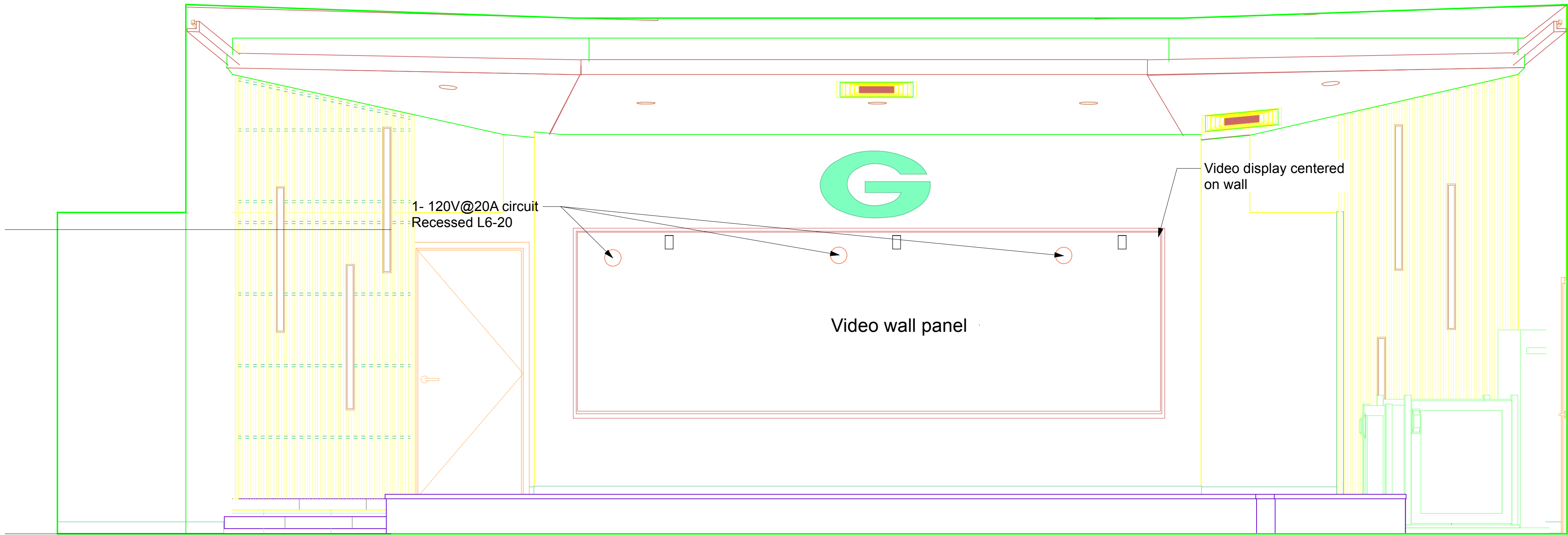
Date: 3/9/26

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

Sheet Title:
Electrical Elevation
Requirements

Sheet:

AV 602



1 South Wall AV Elevations
Scale: 1/2" = 1'-0"

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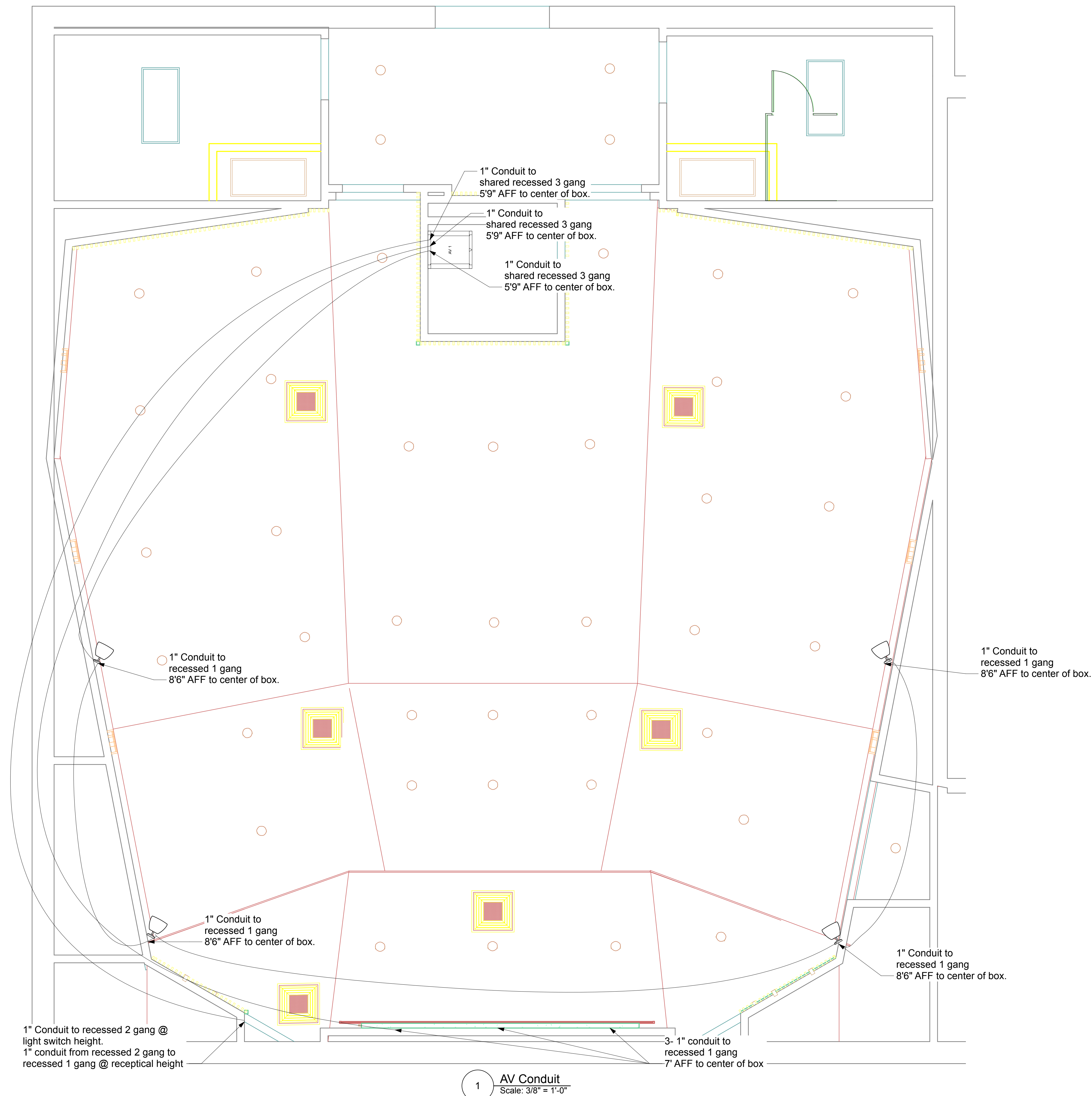
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Scale: 3/8" = 1'-0"

Sheet Title:
AV Conduit floor plan

Sheet:

AV 603



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Grambling, LA 71245

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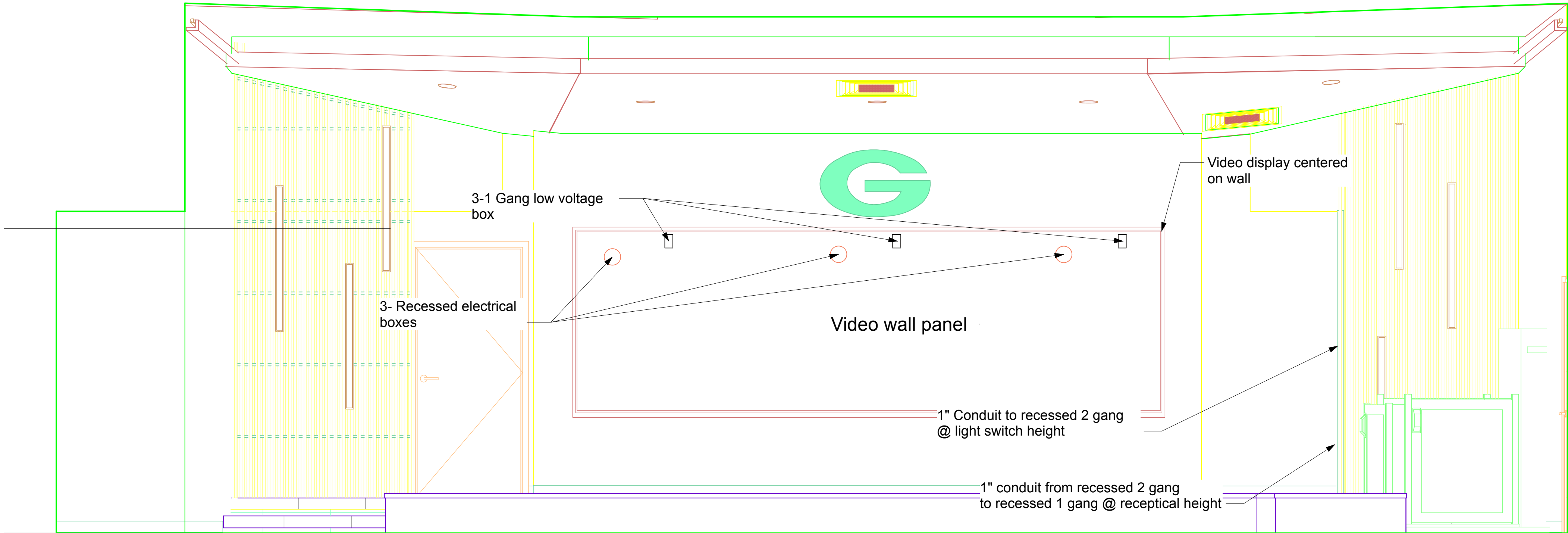
Date: 3/9/26

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

Sheet Title:
AV Conduit elevation

Sheet:

AV 604



1 South Wall AV Elevations
Scale: 1/2" = 1'-0"