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<td>G-000</td>
<td>Silver Spring – Cover Sheet</td>
</tr>
<tr>
<td>G-001</td>
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</tr>
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<td>A-101</td>
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END OF SPECIFICATION SECTION
SECTION 00 10 00
SOLICITATION

1.0 SOLICITATION INFORMATION

Schedule

Bid Documents:

All bid documents may be obtained at the East Providence School District Director of Finance Office City Hall, East Providence, RI between 8am and 4pm Monday through Friday beginning on June 28, 2021 or by email request tojspokies@jensenhughes.com.

Pre-Bid Conference:

A pre-bid conference will be held commencing at 11:00AM on Wednesday, June 30, 2021, at Silver Spring Elementary School, 120 Silver Spring Avenue, East Providence, RI. The pre-bid conference will then continue at Agnes B Hennessey Elementary School, 75 Fort Street, East Providence, RI immediately thereafter. Attendance is strongly encouraged as this will be bidders’ opportunity to visit and familiarize themselves with the facility where they will be providing services, so that they may respond accurately to this RFP.

RFP Submission Deadline:

Friday, July 9, 2021 at 3:00PM. Late submittals will be immediately disqualified.

Requests for Information:

Requests for Information during the Bidding Period will be accepted until 5:00 p.m. on Tuesday, July 6, 2021.

Requests for information or clarification must be made electronically to the attention ofjspokies@jensenhughes.com.

Answers to RFI’s received, will be forwarded electronically to all bidders who have registered and obtained a set of bid documents.

Proposals must be mailed or hand-delivered in a sealed envelope marked as follows:

Marked as:

East Providence School Department
Silver Spring ES and Hennessey ES Secure Entrances

To:

Craig Enos
East Providence School District – Director of Finance
City Hall Room 307
145 Taunton Avenue
East Providence, RI 02914-4505
**Bonds**

A Bid Bond in the amount of 5% of the bid must accompany each bid. Checks for Bid Security will not be accepted in lieu of a Bid Bond.

A 100% Payment and Performance Bond will be required by the awarded bidder along with all insurance documentation as required by the East Providence School Department.

**Miscellaneous**

The bid process and resulting contract are subject to the Rules and Regulations and General Terms and Conditions of Purchase. Submission of a bid in response to this solicitation is acknowledgement and acceptance of these Rules and Regulations and General Terms and Conditions of Purchase.

The East Providence School Department reserves the right to award on the basis of cost alone, accept or reject any or all bids, and to act in its best interest. Proposals found to be technically or substantially non-responsive at any point in the evaluation process will be rejected and not considered further. The East Providence School Department may, at its sole option, elect to require presentations(s) by bidders clearly in consideration for award.

**2.0 BIDDER INSTRUCTIONS**

It is the bidder's responsibility to examine all specifications and conditions thoroughly and comply fully with specifications and all attached terms and conditions. Bidders must comply with all Federal, State, and City laws, ordinances and regulations, and meet any and all registration requirements where required for contractors as set forth by the State of Rhode Island. Failure to make a complete submission as described herein may result in a rejection of the proposal.

All costs associated with developing or submitting a proposal in response to this Request, or to provide oral or written clarification of its content shall be borne by the bidder. The East Providence School Department assumes no responsibility for these costs.

Proposals are considered to be irrevocable for a period of not less than thirty (30) days following the opening date, and may not be withdrawn, except with the express written permission of the Director of Finance. Should any bidder object to this condition, the bidder must provide objection through a question and/or complaint to the Director of Finance prior to the proposal deadline.

All pricing submitted will be considered to be firm and fixed unless otherwise indicated herein.

The bidder has full responsibility to ensure that the proposal arrives at the stated bid location prior to the deadline set out herein. The East Providence School Department assumes no responsibility for delays caused by the U.S. Postal Service or any other delivery service.

Postmarking by the due date will not substitute for actual receipt of response by the due date. Proposals arriving after the deadline may be returned, unopened, to the bidder, or may simply be declared non-responsive and not subject to evaluation, at the sole discretion of the East Providence School Department. For the purposes of this requirement, the official time and date shall be that of the clock in the Office of the City Manager’s administrative area.

It is intended that an award pursuant to this Request will be made to a prime contractor, who will assume responsibility for all aspects of the work. Joint venture and cooperative proposals will not be considered, but subcontracts are permitted, provided that their use is clearly indicated in the bidder's proposal, and the subcontractor(s) proposed to be used are identified in the proposal.

Bidders are advised that all materials submitted to the East Providence School Department for consideration in response to this Request for Proposals shall be considered to be public records as defined in Title 38 Chapter 2 of the Rhode Island General Laws, without exception, and may be released for
inspection immediately upon request once an award has been made.

Bidders are responsible for errors and omissions in their proposals. No such error or omission shall diminish the bidder’s obligations to the East Providence School Department.

The East Providence School Department reserves the right to reject any or all proposals, or portions thereof, at any time, with no penalty. The East Providence School Department also has the right to waive immaterial defects, minor irregularities and formalities in any submitted proposal at its sole discretion. All material submitted in response to this RFP shall become the property of the East Providence School Department upon delivery to the stated bid submission location.

There will be a public bid opening immediately following the submission deadline.

3.0 OVERVIEW

The Owner (East Providence School Department) through its Owner's Project Manager (Jensen Hughes) are soliciting bids for the Silver Spring ES and Hennessey ES Secure Entrances.

The Bid Documents, consisting of the Project Manual along with the Plans and Specifications prepared by Jensen Hughes comprises the bidding and construction documentation for this project. This Invitation to Bid provides an overview of the bidding process and logistics for this project.

4.0 SCOPE OF WORK

The complete scope of work is indicated on the bid drawings and specifications. The following information includes the project team:

Project:
East Providence School Department
Silver Spring ES and Hennessey ES Secure Entrances

Owner:
East Providence School Department
145 Taunton Avenue
East Providence, RI 02914

Project Manager:
Jensen Hughes
117 Metro Center Boulevard, Suite 1002
Warwick, RI 02886

Schedule

The contract will be awarded in July 2021 with submittal preparation, approval and materials acquisition to happen immediately thereafter. Onsite work can also start immediately upon contract award following acquisition of appropriate permits and approvals. Substantial completion is required to be achieved by December 17, 2021. Final completion is required to be achieved by January 28, 2022. Liquidated damages will be applicable for failure by the contractor to meet the substantial completion date of
December 17, 2021 and/or the final completion date of January 28, 2022. Liquidated damages will be assessed in the amount of $1,500 per day.

All parking, storage and logistic items for construction will be confined to the construction areas as shown on the Bid Documents or as otherwise agreed to between the successful bidder and the East Providence School Department. Smoking on School grounds is prohibited and failure to conform to this requirement will result in removal from the Project.

**Bid Document Availability**

Project Documents will be made available in electronic format through USB drives issued by the East Providence School Department.

**Prevailing Wage**

Local wage rates apply to this project. It is the responsibility of the Contractor before bid openings to request if necessary, any additional information on local Wage Rates for those trades-people who are not covered by the applicable local Wage Decision, but who may be employed for the proposed work under this Contract. The Contractor shall obtain the latest wage rates as issued by the Department of Labor and Training.

**Collaborative for High Performance Schools**

The Collaborative for High Performance Schools (CHPS) criteria will be implemented on the project. CHPS is a leading national movement with the goal of making schools better places to learn. CHPS’ mission is to facilitate the design, construction and operation of high-performance schools: environments that are not only energy and resource efficient, but also healthy, comfortable, well lit, and containing the amenities needed for a quality education. The selected contractor shall provide all material and perform all work so as to adhere to the guidelines of the CHPS program and provide the necessary submittals and other documentation required for the project to achieve CHPS certification.

**Form of Contract**

A lump sum contract (see attached sample contract) will be executed with the successful bidder for the construction of the entire project. The sample contract included in the bid documents will be utilized. No exception to the scope of work or contract will be considered unless such notification is given before the bid due date and within the Bid Submission.

### 5.0 PROJECT REQUIREMENTS & CONDITIONS

Contractors shall not order any equipment and shall not begin any work until submittals have been reviewed to the satisfaction of Jensen Hughes. Contractors shall not perform any installation prior to the receipt of a written authority to proceed from Jensen Hughes and receipt of a written permit to proceed by the East Providence Fire Department. Initial payment shall not be made until the “Pre-Installation Documentation” submittal process has been completed.

Jensen Hughes shall review these documents for the limited purposes of checking for general conformance with the design and not to determine accuracy or completeness of other details such as dimensions and quantities. Jensen Hughes shall not approve means, methods or procedures of construction or installation; nor shall they review for safety precautions.

In the event that the Contractor’s submittal package is required to be revised and re-submitted more than once due to nonconformance with this specification, illegibility of the submittal, incomplete submittals, noncompliance with the referenced local, state and national Codes, Standards and Regulations or
nonconformance with pertinent documentation relative to the project, the Contractor may be held responsible for fees associated with additional engineering review services.

6.0 INSURANCE

The vendor shall maintain and keep in force such comprehensive general liability insurance as shall protect them from claims which may arise from operations under any contract entered into with the East Providence School Department, whether such operations be by themselves or by anyone directly or indirectly employed by them.

The amounts of insurance shall be not less than $1,000,000.00 combined single limit for any one occurrence covering both bodily injury and property damage, including accidental death.

The East Providence School Department, City of East Providence and Jensen Hughes shall be named as additional insured on the vendor's General Liability Policy.

The vendor shall maintain and keep in force such Workers’ compensation insurance limits as required by the statutes of the State of Rhode Island, and Employer's Liability with limits no less than $500,000.

7.0 ACKNOWLEDGEMENT OF RISK AND HOLD HARMLESS AGREEMENT

In addition to the indemnity provisions specified in the Contract Documents and to the fullest extent permitted by law, the selected bidder, its officers, agents, servants, employees, parents, subsidiaries, partners, officers, directors, attorneys, insurers, and/or affiliates (Releasers) agree to release, waive, discharge and covenant not to sue the East Providence School Department, City of East Providence, its officers, agents, servants or employees (Releasees) from any and all liability, claims, cross-claims, rights in law or in equity, agreements, promises demands, actions and causes of action whatsoever arising out of or related to any loss, damage, expenses (including without limitation, all legal fees, expenses, interest and penalties) or injury (including death), of any type, kind or nature whatsoever, whether based in contract, tort, warranty, or other legal, statutory, or equitable theory of recovery, which relate to or arise out of the Releasers use of or presence in and/or on East Providence School Department and/or City of East Providence property. The Releasers agree to defend, indemnify and hold harmless the Releasees from (a) any and all claims, loss, liability, damages or costs by any person, firm, corporation or other entity claiming by, through or under Releasers in any capacity whatsoever, including all subrogation claims and/or claims for reimbursement, including any court costs and attorneys fees, that may incur due to Releasers use of or presence in and on East Providence School Department and/or City of East Providence property; and (b) any and all legal actions, including third-party actions, cross-actions, and/or claims for contribution and/or indemnity with respect to any claims by any other persons, entities, parties, which relate to or arise out of Releasers use of or presence in and on East Providence School Department and/or City of East Providence property.

The Releasers acknowledge the risks that may be involved and hazards connected with use of or presence in and on East Providence School Department and/or City of East Providence property but elect to provide services under any contract with the East Providence School Department and/or City of East Providence with full knowledge of such risks. Releasers also acknowledge that any loss, damage, and/or injury sustained by Releasers are not covered by Releasees insurance. Releasers agree to become fully aware of any safety risks involved with the performance of services under any contract with the East Providence School Department and/or City of East Providence and any safety precautions that need to be followed and agree to take all such precautions. The duty to indemnify and/or hold harmless the East Providence School Department and/or City of East Providence shall not be limited by the insurance required by the Contract Documents.
8.0 ADDITIONAL INSURANCE REQUIREMENTS

In addition to the insurance provisions in the Contract Documents, the liability insurance coverage, except Professional Liability, Errors and Omissions or Workers’ Compensation insurance required for performance of a contract with the East Providence School Department and/or City of East Providence shall include the East Providence School Department, City of East Providence, its divisions, officers and employees, the Architect and Project Manager as Additional Insureds but only with respect to the selected bidder’s activities under the contract. The insurance required through a policy or endorsement shall include:

- a Waiver of Subrogation waiving any right to recovery the insurance company may have against the East Providence School Department and/or City of East Providence; and
- a provision that the selected vendor’s insurance coverage shall be primary with respect to any insurance, self-insurance or self-retention maintained by the East Providence School Department and/or City of East Providence and that any insurance, self-insurance or self-retention maintained by the East Providence School Department and/or City of East Providence shall be in excess of the selected vendor’s insurance and shall not contribute.

There shall be no cancellation, material change, potential exhaustion of aggregate limits or non-renewal without thirty (30) days written notice from the selected vendor or its insurer(s) to the East Providence School Department. Any failure to comply with the reporting provision of this clause shall be grounds for immediate termination of the contract with the East Providence School Department and/or City of East Providence.

Insurance coverage required under the contract shall be obtained from insurance companies acceptable to the East Providence School Department. The selected vendor shall pay for all deductibles, self-insured retentions and/or self-insurance included hereunder.

The East Providence School Department reserves the right to consider and accept alternative forms and plans of insurance or to require additional or more extensive coverage for any individual requirement.

9.0 STATE AND FEDERAL TAXES

The City is exempt from the payment of the Rhode Island Sales Tax under the 1956 General Laws of the State of Rhode Island, 44-18-30, Paragraph 1, as amended.

The City is exempt from the payment of any excise tax or federal transportation taxes. The price bid must be exclusive of taxes and will be so construed.

10.0 PROPERTY LOST, DAMAGED OR DESTROYED

Any property or work to be provided by bidder will remain at the bidder’s risk until written acceptance by the East Providence School Department and the bidder will replace, at bidder’s expense, all property or work lost, damaged or destroyed by any cause whatsoever.

11.0 CLOSEOUT

Final payment will not be received by the Contractors until the fire sprinkler or fire alarm system has been approved by the Local Authority, all miscellaneous “punch list” items are addressed, closeout documentation has been received by the CCF and CCF demonstration training has been completed.
12.0 PROPOSAL CONTENT AND ORGANIZATION

Pricing must include all costs as specified in this solicitation. Pricing for this proposal must be indicated on the Bid Form in Section 11.0 of this document and must be submitted in a separate, sealed envelope labeled as previously stated above.

All Bid Forms must be signed.

Bidders must include on the Bid Form a list of at least four (4) references with whom they have contracted to do similar work by including the company name, telephone number, contact person, and number of years they have served this customer.

Bidders must also include an overview of their company’s experience including, but not limited to, the number of years the company has been providing these services, the size of the company (including the number of employees and locations), a description of work undertaken that is similar to what is being requested in this RFP, and, if applicable, certifications that show a knowledge of equipment that would be serviced or provided under this contract.

If any subcontractors are to be used in the performance of any work contracted for under this RFP, please list their name(s), contractor license #, address and phone number, and specific description of the subcontract work to be performed.

Four (4) copies of your proposal, one (1) original and three (3) copies, must be submitted at the time of submission. Proposals must be in the following format:

- Bid Form Company overview
- Length of time your firm has been in business
- Length of time at current address

All licensing (List types and business license number(s)), certification and permits as required in the Scope of Work

Please state any and all additions, deletions, and exceptions, if any, that you are taking to any portion of this proposal. If not addressed specifically, the East Providence School Department assumes that the bidder will adhere to all terms and conditions listed in this RFP.

13.0 PROPOSAL EVALUATION CRITERIA

The evaluation of proposals will be conducted in an expeditious time frame convenient to the East Providence School Department.

The East Providence School Department reserves the right to award on the basis of cost alone, accept or reject any or all proposals, and to otherwise act in its best interest. Further, the East Providence School Department reserves the right to waive irregularities it may deem minor in its consideration of proposals.

Proposals found to be technically or substantially non-responsive at any point in the evaluation process will be rejected and not considered further. The East Providence School Department may elect to require presentations(s) by vendors in consideration for award.

Proposals will be evaluated in two (2) phases:

1. The first phase is an initial review to determine if the proposal, as submitted, is complete. To be complete, a proposal must meet all the requirements of this RFP.

2. The second phase is an in-depth analysis and review based on criteria below and their associated weights. The following detailed criteria will be utilized in the evaluation procedure:
a. **Relevant Experience, Qualifications and Compliance with bidding requirements**: The bidder should show previous project experience in Rhode Island Educational K-12 facilities as it relates to the scope of work outlined in the bid documents. The bidder should show previous experience related to working in occupied schools during the duration of construction. Where applicable, previous project experience for the East Providence School Department should be highlighted. The bidder should provide documentation indicating that all applicable state licenses are in good standing. The bidder should provide the length of time that the organization has been in business as well as any other names that were previously utilized. The bidder should submit a proposed project schedule as well as principals and/or project managers that will be utilized on this project. The bidder should provide any additional information that illustrates the ability to perform this scope of work, in accordance with all codes and standards and in the allocated project schedule duration.

b. **References**: The bidder should provide a minimum of four (4) references that represent clients that the bidder has previously worked with that can attest to the bidder’s work product, professionalism and timeliness. The references provided should represent clients with projects similar scopes to those listed in the bid documents. References that illustrate the bidder’s experience in educational environments in occupied buildings are strongly encouraged.

c. **Cost**: The bidder should provide a firm-fixed fee for the scope of work illustrated in the bid documents. The bidder with the low bid while also providing all documents required of the bid documents will receive the full 40% of the cost component. All other bidders will be provided with a pro-rated value for the cost component of the bid evaluation.

<table>
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<th>Evaluation Criteria</th>
<th>Weighted Value</th>
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<td>References</td>
<td>30%</td>
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<tr>
<td>Cost</td>
<td>40%</td>
</tr>
</tbody>
</table>

In the event that the East Providence School Department requires further information and/or a demonstration of any equipment or process offered in any proposal, all vendors asked for same will do so at no cost to the East Providence School Department.
14.0 BID FORM

Silver Spring ES and Hennessey ES Secure Entrances

Date: ________________________________

Submitted By: 
(Include Name, Address and Telephone No.):

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

Name and Remittance Address that will appear on Invoices:

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

Physical Address of Business:

__________________________________________________________________________
__________________________________________________________________________
__________________________________________________________________________

General Information
Is your firm a sole proprietorship doing business under a different name? _____Yes____ No

If yes, please indicate sole proprietorship, a name, and the name you are doing business under.

__________________________________________________________________________
__________________________________________________________________________

Is your firm incorporated? _____Yes____ No

Will any of the work spelled out in this bid be outsourced? _____Yes_____No

If so, please explain below:

__________________________________________________________________________
__________________________________________________________________________
Have you or your firm been subject to suspension, debarment or criminal conviction by the East Providence School Department and/or City of East Providence, the State of Rhode Island, or any other jurisdiction?
Yes: ____________  No: ____________

Have the East Providence School Department and/or City of East Providence and/or the State of Rhode Island ever terminated contracts with your firm for cause?
Yes: ____________  No: ____________

Has your firm ever withdrawn from a contract with the East Providence School Department and/or City of East Providence and/or the State of Rhode Island during its performance?
Yes: ____________  No: ____________

Have you or your firm been involved in litigation against the East Providence School Department and/or City of East Providence and/or the State of Rhode Island?
Yes: ____________  No: ____________

If you answered yes to any of the foregoing, please explain the circumstances below. If you or your firm has been involved in litigation against the East Providence School Department and/or City of East Providence and/or the State of Rhode Island, please include the case caption, case number and status. (If more space is needed, please attach separate sheet and submit with the bid.)

Liquidated Damages:
The contractor acknowledges that liquidated damages will be applicable for failure by the contractor to meet the substantial completion date of December 17, 2021 and/or the final completion date of January 28, 2022. Liquidated damages will be assessed in the amount of $1,500 per day.

Initial: __________________________

Addenda:
The following Addenda have been received. The noted modifications to the Bidding Documents have been considered and all costs are included in the Bid Sum.

Addendum #1, Dated: __________________________
Addendum #2, Dated: __________________________

References:
Please list at least four (4) entities with whom you have contracted to provide similar services. Preferably, references should be school departments, municipalities or State agencies or other public work; a website address should be included if available.
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Silver Spring ES and Hennessey ES Secure Entrance Project Proposal

Having examined the reference RFP and its applicable documents, we propose to enter into a contract to perform services per the bid specifications for the costs listed below:

A. **BASE BID**

Following careful review of the Contract Documents and consisting of Instructions to Bidders, all drawings and specifications, all addenda as specified below, and having examined the site to develop a familiarization with the working conditions, the undersigned proposes to furnish materials and provide labor to perform construction work as indicated with a 100% performance bond to complete the East Providence Schools Silver Spring ES and Hennessey ES Secure Entrances for a stipulated sum of:

\[
\$ \quad \text{,} \quad \text{,} \quad \text{.} \quad \text{.}
\]

*Written Proposal Value:*

The above fee excludes the fee associated with the scope of work indicated below as part of the **UNIT COST BID**. Undersigned agrees above stipulated sum is firm price including applicable taxes and is not subject to extras or escalator clauses.

B. **UNIT COST BID**

This section is not used.

C. **ADD ALTERNATE**

This section is not used.

D. **DEDUCT ALTERNATE**

This section is not used.

E. **ADDENDA**

This section is not used.

F. **BID BOND/PERFORMANCE AND PAYMENT BOND**

Cost for providing Performance and Payment Bond & Bid Bond:

Add \% of Total Construction Value from $ \quad \text{to maximum of $} \quad \text{.}

Add \% of next Total Construction Value from $ \quad \text{to maximum of $} \quad \text{.}

Add \% of next Total Construction Value from $ \quad \text{to maximum of $} \quad \text{.}
G. LABOR AND MATERIAL RATES

Labor: Unit rates are to be listed for major trades such as, but not limited to, abatement, carpenters, laborers, masons, heavy equipment operators, operators, electricians, HVAC technicians, Foreman/Supervisor for each trade, site superintendent and any other major trade employed in the completion of the Work. Labor rates shall include all overhead, profit, insurance and supervision costs, and shall not be subject to any further markups when utilized in the computation of a Change Order amount. The Owner reserves the right to request additional labor rates. Use additional pages if space provided below is not sufficient.

| Trade: Laborer Foreman Rate: | $_____________ per hour |
| Trade: Laborer Rate:          | $_____________ per hour |
| Trade: Carpenter Foreman Rate:| $_____________ per hour |
| Trade: Carpenter Rate:        | $_____________ per hour |
| Trade: Gypsum (Tape/ sand) Foreman Rate: | $_____________ per hour |
| Trade: Gypsum (Tape/ sand) Rate: | $_____________ per hour |
| Trade: Electrical Foreman Rate: | $_____________ per hour |
| Trade: Electrical Journeyman Rate: | $_____________ per hour |
| Trade: Fire Alarm Foreman Rate: | $_____________ per hour |
| Trade: Fire Alarm Rate:       | $_____________ per hour |
| Trade: Fire Sprinkler Foreman Rate: | $_____________ per hour |
| Trade: Fire Sprinkler Rate:   | $_____________ per hour |
| Trade: HVAC Foreman Rate:     | $_____________ per hour |
| Trade: HVAC Rate:             | $_____________ per hour |
| Trade: ATC Foreman Rate:      | $_____________ per hour |
| Trade: ATC Design Engineer Rate: | $_____________ per hour |
| Trade: ATC Programmer Rate:   | $_____________ per hour |
| Trade: ATC Technician Rate:   | $_____________ per hour |
| Trade: Pipe Fitter Rate:      | $_____________ per hour |
| Trade: Sheet Metal Foreman Rate: | $_____________ per hour |
| Trade: Sheet Metal Worker Rate: | $_____________ per hour |
| Trade: Insulator Foreman Rate: | $_____________ per hour |
| Trade: Insulator Rate:        | $_____________ per hour |
| Trade: Painting Foreman Rate: | $_____________ per hour |
| Trade: Painter Rate:          | $_____________ per hour |
| Trade: Abatement Foreman Rate: | $_____________ per hour |
| Trade: Abatement Laborer Rate:| $_____________ per hour |

Include additional trade labor rates below:

| Trade: __________________________ | Rate: $_____________ per hour |
| Trade: __________________________ | Rate: $_____________ per hour |
| Trade: __________________________ | Rate: $_____________ per hour |
| Trade: __________________________ | Rate: $_____________ per hour |
| Trade: __________________________ | Rate: $_____________ per hour |
H. FEE FOR PROJECT CHANGES

The total mark-up for each change shall not exceed 15% (10% for overhead + 5% for profit). For changes where the work is performed totally by the Undersigned Bidder’s direct forces, the 15% mark-up shall be assigned to the Undersigned Bidder as the prime contractor. For work performed by a subcontractor(s), a maximum of 10% mark-up will be assigned to all subcontractors and/or sub-subcontractors performing work and 5% will be assigned to the Undersigned Bidder and prime contractor. Unit labor costs are all-inclusive of all OH&P and shall not be subject to further mark-up. The change order mark-ups include all overhead, coordination, bond, insurance, profit and supervision costs, and these items shall not be subject to any further markups when utilized in the computation of a Change Order amount.

For changes which add additional time to the contract completion date, the General Conditions cost impact shall be as listed on the schedule of unit rates above. The unit rate for the general conditions associated with the time extension shall be inclusive of all direct and indirect costs and fees, including but not limited to all overhead, coordination, bond, insurance, cleaning, site support, management, profit and supervision costs, and shall not be subject to any further markups when utilized in the computation of a Change Order. Unit rate shall be for one (1) additional work day.
I. OTHER CERTIFICATIONS

Undersigned agrees to execute Contract for above work for the above stipulated sum provided that he be notified of acceptance of bid within ninety (30) days after time set for the receipt of bids. Undersigned agrees to execute contract and deliver it to the Owner.

Undersigned agrees by submission of this bid that the bidder is the only interested party submitting this bid, that the Contract Documents are incorporated herein, that there is no collusion, and the contract will not be assigned with written consent of the Owner.

Undersigned certifies that included within their bid are only employees and subcontractor employees that will be employed at the worksite that have successfully completed and obtained certification in a course in construction safety and health approved by the United States Occupational Safety and Health Administration as required by the laws of the state.

Undersigned certifies, under penalty of perjury, that to the best of his knowledge and belief that:

The prices in this Bid have been arrived at independently without collusion, consultation, communication or agreement with any other Bidder or competition on any matter whatsoever for the purpose of restricting competition;

Except as may be required by law, prices quoted in this Bid have not been knowingly disclosed prior to the opening of Bids; and

No attempt has been made nor will be made by the Bidder to induce any other person, partnership, or corporation to submit or to refrain from submitting a Bid for this Project.

Undersigned represents to Owner that it has the labor, machinery, equipment, supplies, and credit to meet the schedule completion requirements.

Firm: __________________________________________

Authorized
Representative: __________________________________

Title: __________________________________________

Signature: _______________________________________

Date: ___________________________________________

(Corp. Seal)  (Notary Seal)

END OF SPECIFICATION
SECTION 00 73 00
MINORITY BUSINESS ENTERPRISE REQUIREMENTS AND WOMEN BUSINESS ENTERPRISE PARTICIPATION REQUIREMENTS

Attached (See Appendix A) is the MBE, WBE and/or Disability Business Enterprise Participation Plan form. Bidders are required to complete, sign and submit with their overall proposal in a sealed envelope. Please complete separate forms for each MBE, WBE, and/or Disability Business Enterprise subcontractor/supplier to be utilized on the solicitation.

In accordance with RI Gen. Law § 37-14.1-1, it is the policy of the State of Rhode Island to support the fullest possible participation of firms owned and controlled by minorities (MBEs) and women (WBEs). Pursuant to §§ 37-14.1-2 and 37-14.1-6, MBEs and WBEs shall be included in all state purchasing, including, but not limited to, the procurement of goods, services, construction projects, or contracts funded in whole or in part with state funds, or funds which, in accordance with a federal grant or otherwise, the state expends or administers. MBEs and WBEs shall be awarded a minimum of ten percent (10%) of the dollar value of the entire procurement or project. MBE participation credit shall only be granted for firms duly certified as MBEs or WBEs by the State of Rhode Island, Department of Administration, Office of Diversity, Equity and Opportunity, MBE Compliance Office (MBECO).

The current directory of firms certified as MBEs or WBEs may be accessed at http://odeo.ri.gov/offices/mbeco/mbe-wbe.php or by contacting Dorinda Keene at the MBECO at (401) 574-8670 or via email at Dorinda.Keene@doa.ri.gov

END OF SPECIFICATION SECTION
Pursuant to RIGL 37-14.1 as well as the regulations promulgated thereto, the MBE Compliance Office requires that you complete the following table. Please note that these figures will be verified with the MBEs identified. If there are outstanding issues, such as retainage or a dispute, please indicate and attach supporting documentation for same. Also note that copies of invoice and cancelled checks for payment to all MBE subcontractors and suppliers are required.

Contractor/Vendor Name:  
Project Name & Location:  
Original Prime Contract Amount: $__________________  
Current Prime Contract Amount: $______________  
% Complete: _____

<table>
<thead>
<tr>
<th>MBE/WBE Subcontractor</th>
<th>Original Contract Amount</th>
<th>Change Orders</th>
<th>Revised Contract Value</th>
<th>% Completed To Date</th>
<th>Amount Paid To Date</th>
<th>Amount Due</th>
<th>Retainage %</th>
<th>Retainage Amount</th>
<th>Explanation</th>
</tr>
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I declare, under penalty of perjury, that the information provided in this verification form and supporting documents is true and correct.

_________________________________________  
Signature  

_________________________________________  
Date

_________________________________________  
Printed Name

Notary Certificate:

Sworn before me this ________ day of _____________ , 20___.

_________________________________________  
Notary Signature  

Commission Expires
Company Name: __________________________________________________________

Representative’s Name who administers MBE Program: ________________________________________________________________

Street Address: __________________________________________________________

City, State, Zip: ___________________________________ Telephone: _______________

Email: __________________________ Project Location: __________________________

Bid or Project #: __________________________ Date Bid Opened: ______________________

Description of Work: ______________________________________________________

Contract Value: __________________________ MBE % Assigned: ______________________

Total # of All Subcontractors/Suppliers used: _____ # of MBE Subcontractors/Suppliers used: _____

**List All Subcontractors/Suppliers/Consultants/Independent Contractors – Total Dollar Amounts – Scope of Work:**

<table>
<thead>
<tr>
<th>Subcontractor / Supplier</th>
<th>Dollar Award</th>
<th>Scope/Description of Work</th>
<th>RI Certified M/WBE Yes/No</th>
</tr>
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</tbody>
</table>

Please note that all MBE/WBE firms must be certified by the RI MBE Compliance Office, and that MBE/WBE firms must self-perform 100% of the work with their own forces or subcontract to another RI certified MBE/WBE in order to receive participation credit. Vendors may count 60% of expenditures for materials and supplies obtained from an MBE certified as a regular dealer/supplier, and 100% of such expenditures obtained from an MBE/WBE certified as a manufacturer. For firms certified as a broker, you may receive MBE participation credit only for the fees and commissions charged for the procurement of the good and materials, but not the cost of the materials themselves.

The above referenced contract will not be released until this plan has been approved by the Director of the Department of Administration or its designee.

For assistance and advice in identifying MBE/WBE firms, please call the Minority Business Enterprise Compliance Office at (401) 574-8670. The directory of all certified MBE firms is also located at [www.mbe.ri.gov](http://www.mbe.ri.gov).

Signature of Authorized Agent of Business: __________________________ Date: __________________________

**Send Completed Form to:** Dorinda Keene, Assistant Administrator - MBE
Office of Diversity, Equity and Opportunity (ODEO)
Minority Business Enterprise Compliance Office
One Capitol Hill, 3rd Floor
Providence, RI 02908
Phone: (401) 574-8670
Dorinda.Keene@doa.ri.gov
SECTION 00 95 00
PREVAILING WAGE RATES

1.0 GENERAL

1.1 Section Includes

A. Contract description.
B. Work by Owner.
C. Work under other Contracts.
D. Owner supplied products.
E. Use of Premises.
F. Contractor Use of Premises.
G. Work Restrictions.
H. Work sequence.
I. Owner occupancy.

1.2 Contract Description

A. Work of the Project includes the Hennessey ES and Silver Spring ES Secure Entrances.
B. Perform the Work of the building under a single Contract under a stipulated sum Contract with the Owner in accordance with the Conditions of Contract.
C. Project will be constructed under a single prime contract.

1.3 Work By Owner

A. The Work under this Contract includes:

1. Provide all labor, material, tools, transportation, equipment, supplies and services to create secure entrances at Hennessey Elementary School and Silver Spring Elementary School in accordance with Rhode Island State Building Code (RISBC), Rhode Island State Energy Conservation Code (RISECC), and all local applicable requirements.
   a. Equipment as identified in these Contract Documents.
2. Preparation of shop drawings, product data, record drawings, and close out documents in accordance with these Contract Documents.
3. All other items described in the Contract Documents.
1.4 Work Under Other Contracts

A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.

1.5 Use of Premises

A. Contractor shall have limited use of premises for construction operations as indicated on the Contract Documents.

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

1. Limits: Confine construction operations to areas indicated on Drawings by Contract limits.
2. Owner Occupancy: Owner will occupy Project Site during construction
3. Driveways 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 storage of materials.
   a. Schedule deliveries to minimize use of building entrances and driveways
   b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

1.6 Contractor Use of Premises

A. Limit use of premises for Work and for construction operations, to allow for work by other Contractors.

B. Limit access to site as directed by Owner’s Representative.

1.7 Work Restrictions

A. The Work within Hennessey and Silver Spring Elementary must be completed during 2nd shift (3:00pm – 11:30pm) if school is in session. All work must be coordinated so no disruption occurs to ongoing classes and other activities within the building. All work must be coordinated with Hennessey and Silver Spring Elementary School in advance. Coordination with Hennessey and Silver Spring Elementary School will be needed when working in select areas. The contractor must maintain continued work activity from the start of the project until completion, except on state of Rhode Island recognized holidays.

B. 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 to provide temporary utility services according to requirements indicated:

1. Notify Engineer and Owner not less than 3 days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner’s written permission.
1.8 Work Sequence

A. Construct the Work to accommodate the Owner’s occupancy requirements. Coordinate the construction schedule and operations with the Owner and Engineer.

1.9 Owner Occupancy

A. The Owner intends for the building to be occupied throughout construction.
B. Cooperate with the Owner to minimize conflict, and to facilitate the Owner’s operations.
C. Schedule the Work to accommodate Owner occupancy.

END OF SPECIFICATION SECTION
SECTION 01 10 00
SUMMARY OF WORK

1.0 GENERAL

1.1 Section Includes

A. Contract description.
B. Work by Owner.
C. Work under other Contracts.
D. Owner supplied products.
E. Use of Premises.
F. Contractor Use of Premises.
G. Work Restrictions.
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B. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond areas in which the Work is indicated.
   1. Limits: Confine construction operations to areas indicated on Drawings by Contract limits.
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   3. Driveways 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 storage of materials.
      a. Schedule deliveries to minimize use of building entrances and driveways.
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A. The Owner intends for the building to be occupied throughout construction.

B. Cooperate with the Owner to minimize conflict, and to facilitate the Owner’s operations.

C. Schedule the Work to accommodate Owner occupancy.

END OF SPECIFICATION
SECTION 01 11 00
GENERAL REQUIREMENTS - SUMMARY

1.0 GENERAL

1.1 Summary of Work
A. Project is to include, but not limited to, all labor and materials to complete the scope of work indicated on the design drawings and specifications.

1.2 Contract Method
A. Construct the work under a single lump sum contract.

1.3 Background Checks
A. There are a growing number of Rhode Island laws that require individuals to provide a fingerprint-based national background for purposes of employment, operating a business or serving as a caregiver. Each statute dictates where individuals may obtain the national background checks: the Office of Attorney General, the Rhode Island State Police, and/or your local police department.

B. Vendors must be sure to register their company with the RI Office of Attorney General (401-274-4400) before sending employees for their fingerprint-based national background check.

C. The following must obtain national background check at the Office of Attorney General Customer Service Center, located at 4 Howard Avenue, Cranston, RI.
1. Firefighter
2. Medical marijuana caregiver
3. Dept. of Child Youth and Families (DCYF) employees
4. Public and private school employees (full time, part time, substitute teacher, school bus drivers and monitors)
5. Third party public and private school vendors

D. Out of State: If you live out of state and require a national background check, please download and complete the forms at the bottom of http://www.riag.ri.gov/homeboxes/BackgroundChecks.php and submit with your fingerprints to the Office of Attorney General.

1.4 Existing Conditions
A. The contractor shall familiarize themselves with the building, existing conditions and other applicable information prior to the installation. Any discrepancies are to be reported to the Owner immediately.

1.5 Substitutions
A. All substitutions are to be made within 15 days after the Owner/Contractor Agreement is executed. All substitutions will be considered only when a product becomes unavailable due to no fault of the Contractor.

B. Document each request with complete data substantiating compliance of the proposed substitution with the Contract Documents.

C. Request constitutes a representation that the Contractor:
   1. Has reasonably investigated the proposed product and determined that it meets or exceeds the specified product.
   2. Will provide the same warranty for substitution as for the specified product.
   3. Will coordinate the installation and make other changes which may be required for Work to be completed in all respects.
   4. Waive claims for additional costs, which may occur.
   5. Substitutions will not be considered when they are first indicated on shop drawings or submittals without prior approval.
   6. Owner will determine the acceptability of proposed substitutions and will notify the Contractor of acceptance or rejection in writing within a reasonable time period. Decisions of the Owner as to the acceptability of the substitutions are final.

1.6 Temporary Facilities
A. If the existing building is to be used as a construction office. The location of the construction office is to be determined but will be in the immediate vicinity of the construction area.

1.7 Meetings
A. Pre-Construction Kick-Off Meeting: Following execution of the Construction Contract, the Contractor is to attend a Pre-Construction meeting to discuss the use of the site, project schedule, labor requirements and other issues related to the project.

2.0 PRODUCTS
Not Applicable

3.0 EXECUTION
Not Applicable

END OF SPECIFICATION
SECTION 01 11 15
VOLATILE ORGANIC COMPOUND (VOC) LIMITS FOR ADHESIVES, SEALANTS, PAINTS AND COATINGS

1.0 GENERAL

1.1 Summary

A. The specification section includes requirements for volatile organic compound (VOC) content in adhesives, sealants, paints and coatings used for this project.

1.2 Related Sections

A. The following Specification Sections contain requirements that relate to this Specification Section:

   1. Section 01 11 00 – General Requirements Summary
   2. Section 09 90 00 – Painting and Coating

1.3 General Requirements

A. The Contractor is required to implement practices and procedures to meet the project’s environmental goals, which include achieving NE-CHPS criteria. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in the related sections of the Contract Documents, are implemented to the fullest extent feasible.

1.4 References


1.5 VOC Requirements for Interior Adhesives

A. The volatile organic compound (VOC) content of adhesives, adhesive bonding primers or adhesive primers used in this project shall not exceed the limits defined in Rule 1168 – “Adhesive and Sealant Applications.”
B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.

1.6 General

A. Unless otherwise specified below, the VOC content of all adhesive, adhesive bonding primers and adhesive primers are to be in excess of 250 grams per liter.

B. For specified building construction related applications, allowable VOC content is as follows:

1. Architectural Applications
   a. Indoor carpet adhesive 50
   b. Carpet pad adhesive 50
   c. Wood floor adhesive 100
   d. Rubber floor adhesive 60
   e. Subfloor adhesive 50
   f. Ceramic tile adhesive 65
   g. VCT and asphalt tile adhesive 50
   h. Drywall and panel adhesive 50
   i. Cove base adhesive 50
   j. Multipurpose construction adhesive 70
   k. Structural glazing adhesive 100

1.7 VOC Requirements for Interior Sealants

A. The VOC content of sealants, or sealant primers used in this project shall not exceed the limits defined in Rule 1168 – “Adhesive and Sealant Applications.”

B. The VOC limits defined by SCAQMD are as follows. All VOC limits are defined in grams per liter, less water and less exempt compounds.

1. Sealants
   a. Architectural 250
   b. Other 420

2. Sealant Primer
   a. Architectural – Nonporous 250
   b. Architectural – Porous 775
   c. Other 750

1.8 VOC Requirements for Interior Paints

A. Paints and Primers: Paints and primers used in non-specialized interior applications (i.e., for wallboard, plaster, wood, metal doors and frames, etc.) shall meet the VOC limitations of the Green Seal Paint Standard GS-11, of Green Seal, Inc., Washington, DC. Product-specific environmental requirements are as follows:

1. Volatile Organic Compounds
a. The VOC concentrations (in grams per liter) of the product shall not exceed those listed below as determined by the U.S. Environmental Protection Agency (EPA) Reference Test Method 24.

1) Interior Paints and Primers (non-flat) – 150 g/l
2) Interior Paints and Primers (flat) – 50 g/l

B. Anti-Corrosive and Anti-Rust Paints

1. Anti-corrosive and anti-rust paints applied to interior ferrous metal substances shall meet the VOC limitations of the Green Seal Paint Standard GS-03 requirements as follows:
   a. Volatile Organic Compounds
      1) The VOC concentrations (in grams per liter) of the product shall not exceed those listed by the EPA Reference Test Method 24: Anti-Corrosive and Anti-Rust Paints – 250 g/l.

1.9 VOC Requirements for Interior Coatings

A. Clear wood finishes, floor coatings, stains, sealers and shellacs applied to the interior shall meet the VOC limitations defined in Rule 113. The VOC limits defined by SCAQMD, based on 07/09/04 amendments, are as follows. VOC limits are defined in grams per liter, less water and less exempt compounds.

1. Clear wood finishes - Varnish 350
2. Clear wood finishes – Sanding Sealers 350
3. Clear wood finishes – Lacquer 550
4. Shellac – Clear 730
5. Shellac – Pigmented 550
6. Stains 250
7. Floor Coatings 100
8. Waterproofing Sealants 250
9. Sanding Sealers 275
10. Other Sealers 200

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF SPECIFICATION
SECTION 01 20 00
PRICE AND PAYMENT PROCEDURES

1.0 GENERAL

1.1 Section Includes

A. Cash or Quantity allowances.
B. Contingency allowances.
C. Schedule of values.
D. Applications for payment.
E. Warranty inspection retainage.
F. Sales tax exemption.
G. Change procedures.
H. Defect assessment.
I. Unit prices.
J. Alternates.

1.2 Contingency Allowances

A. Contractor’s costs for products, delivery, installation, labor, insurance, payroll, taxes, bonding, equipment rental, overhead and profit will be included in Change Orders authorizing expenditure of funds from a Contingency Allowance.

B. Funds will be drawn from the Contingency Allowance only by Change Order.

C. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order.

1.3 Schedule of Values

A. Submit Schedule of Values in duplicate, one copyrighted original and one copy, prior to commencement of work.

B. Format: Utilize the Table of Contents of this Project Manual. Identify each line item with number and title of the major specification Section. Organize the Schedule of Values by trade and to reflect the general organization of the work. The Schedule of values and the Project Schedule must reflect each other in organization and break down.
C. Include in each line item, the amount of Allowances specified in this Section. For unit cost Allowances, identify quantities taken from Contract Documents multiplied by the unit cost to achieve the total for the item.

D. Include in the schedule of Values the following Specific Line Items:

3.01 Mobilization
1.02 Demobilization
1.03 Builder’s Risk Insurance
1.04 Bond
1.05 Coordination Drawings
1.06 Scheduling
1.07 Project Photographs
1.08 Preconstruction Video, Survey, Photographs
1.09 Mock ups / Bench Marks for each Trade
1.10 Field Engineering, Bench Marks
1.11 Daily Clean up in the building
1.12 Site Clean up
1.13 Safety Compliance
1.14 GC Home office Overhead and Project Profit (paid proportionally to the percent complete of the project)
1.15 Full Time Superintendent
1.16 Field office rental and operation
1.17 Monthly Progress Drawing updates
1.18 Dumpsters / Trash removal
1.19 Winter protection
1.20 Temporary Heat
1.21 Testing Allowance
1.22 Contingency Allowance
1.23 Any other Allowances from the Bid Form
1.24 Warrantee Retainage
1.25 Project Close out (Beyond As built Drawings)

F. Revise schedule to list approved Change Orders, with each Application for Payment.

1.4 Applications for Payment

A. Submit each application on an original copyrighted AIA Form G702 - Application and Certificate for Payment and AIA G703 - Continuation Sheet, accompanied by three (3) copies.

1. Individually sign and notarize, and emboss with notary’s official seal, the original and each of the three (3) copies.
2. Applications not including original copyrighted AIA G702, and G703 Forms, will be rejected, and returned for re-submittal.
3. Applications not properly signed and notarized will be rejected, and returned for re-submittal.

B. Content and Format: Utilize Schedule of Values for listing items in Application for Payment.

C. Provide one (1) hard copy and one (1) electronic copy of the updated construction schedule with each Application for Payment submission.

1. Provide a statement signed by the Contractor’s firm principal certifying that there are no unidentified outstanding claims for delay.
D. Include with each monthly Application for Payment, following the first application, one (1) copy of the Certified Monthly Payroll Record for the previous month's pay period.

E. Payment Period: Submit at intervals stipulated in the Agreement.

F. Submit with transmittal letter as specified for Submittals.

G. Substantiating Data: When the Engineer requires substantiating information, submit data justifying dollar amounts in question. Include the following with the Application for Payment:
   1. Record Documents as specified, for review by the Owner which will be returned to the Contractor.
   2. Affidavits attesting to off-site stored products.
   3. Construction progress schedules, revised and current.

1.5 Sales Tax Exemption

A. Owner is exempt from sales tax on products permanently incorporated in Work of the Project.
   1. Obtain sales tax exemption certificate number from Owner.
   2. Place exemption certificate number on invoice for materials incorporated in the Work of the Project.
   3. Furnish copies of invoices to Owner.
   4. Upon completion of Work, file a notarized statement with Owner that all purchases made under exemption certificate were entitled to be exempt.
   5. Pay legally assessed penalties for improper use of exemption certificate number.

1.6 Change Procedures

A. Submittals: Submit name of the individual authorized to receive change documents and be responsible for informing others in Contractor's employ or Subcontractors of changes to the Work.

B. The Engineer will advise of minor changes in the Work not involving an adjustment to Contract Sum or Contract Time by issuing supplemental instructions on AIA Form G710.

C. The Engineer may issue a Proposal Request which includes a detailed description of a proposed change with supplementary or revised Drawings and specifications, a change in Contract Time for executing the change with a stipulation of any overtime work required, and the period of time during which the requested price will be considered valid. Contractor will prepare and submit an estimate within fifteen (15) days.

D. The Contractor may propose changes by submitting a request for change to the Engineer, describing the proposed change and its full effect on the Work. Include a statement describing the reason for the change, and the effect on the Contract Sum and Contract Time with full documentation, and a statement describing the effect on Work by separate or other Contractors. Document any requested substitutions in accordance with Section 01 60 00.

E. Stipulated Sum Change Order: Based on Proposal Request, and Contractor's fixed price quotation, or Contractor's request for a Change Order as approved by Engineer.

F. Unit Price Change Order: For contract unit prices and quantities, the Change Order will be executed on a fixed unit price basis. For unit costs or quantities of units of work which are not pre-determined,
execute the Work under a Construction Change Directive. Changes in the Contract Sum or Contract Time will be computed as specified for a Time and Material Change Order.

G. Construction Change Directive: The Engineer may issue a directive, on AIA Form G713 Construction Change Directive signed by the Owner, instructing the Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Document will describe changes in the Work, and designate method of determining any change in the Contract Sum or Contract Time. Promptly execute the change.

H. Time and Material Change Order: Submit an itemized account and supporting data after completion of the change, within the time limits indicated in the Conditions of the Contract. The Engineer will determine the change allowable in the Contract Sum and Contract Time as provided in the Contract Documents.

I. Maintain detailed records of work done on a Time and Material basis. Provide full information required for an evaluation of the proposed changes, and to substantiate costs for the changes in the Work. Submit form “Breakdown of Hourly Rates” attached at the end of this section.

J. Document each quotation for a change in cost or time with sufficient data to allow an evaluation of the quotation. Provide detailed breakdown of costs and estimates for labor and materials including a detailed breakdown for subcontractor's or vendor's Work. Include copies of written quotations from subcontractors or vendors.

K. Change Order Forms: AIA G701 Change Order.

L. Execution of Change Orders: The Engineer will issue Change Orders for signatures of the parties as provided in the Conditions of the Contract.

M. Correlation of Contractor Submittals:

1. Promptly revise the Schedule of Values and the Application for Payment forms to record each authorized Change Order as a separate line item and adjust the Contract Sum. Promptly revise progress schedules to reflect any change in the Contract Time, revise sub-schedules to adjust times for any other items of work affected by the change, and resubmit.

2. Promptly enter changes in the Project Record Documents.

1.7 Defect Assessment

A. Replace the Work, or portions of the Work, not conforming to specified requirements.

B. If, in the opinion of the Engineer, it is not practical to remove and replace the Work, the Engineer will direct an appropriate remedy or adjust payment.

C. The defective Work may remain, but the unit sum will be adjusted to a new sum at the discretion of the Engineer.

D. The defective Work will be partially repaired to the instructions of the Engineer, and the unit sum will be adjusted to a new sum at the discretion of the Engineer.

E. The individual Specification Sections may modify these options or may identify a specific formula or percentage sum reduction.

F. The authority of the Engineer to assess the defect and identify a payment adjustment, is final.
G. Non-Payment for Rejected Products: Payment will not be made for rejected products for any of the following:

1. Products wasted or disposed of in a manner that is not acceptable.
2. Products determined as unacceptable before or after placement.
3. Products not completely unloaded from the transporting vehicle.
4. Products placed beyond the lines and levels of the required Work.
5. Products remaining on hand after completion of the Work.

1.8 Alternates

A. The Contractor shall submit separate prices for the following Add Alternates as described in Section 00 10 00 and on the bid documents.

1. The contractor shall provide a separate price as bid alternate #1 to provide Armstrong Optima 3151, or engineer approved equivalent, ceiling tiles in the Library.

END OF SPECIFICATION
SECTION 01 30 00
ADMINISTRATIVE PROCEDURES

1.0 GENERAL

1.1 Section Includes

A. Site administration
B. Construction progress schedules.
C. Coordination and project conditions.
D. Preconstruction meeting.
E. Site mobilization meeting.
F. Progress meetings.
G. Pre-installation meeting.

1.2 Site Administration

A. Maintain a daily attendance log to include the names of all project employees and guests to the site. The log sheet or sheets must clearly indicate the Project Name, and the name of the General Contractor. Each line on the log should allow for the name of each employee, the employee’s job title (use terminology used by prevailing wage job title), and the name of that employee’s employer. Each guest signing the log should indicate a brief description of the reason for the visit, and that guest’s employer or organization.

1.3 Coordination and Project Conditions

A. Coordinate the scheduling, submittals, and the Work of the various Sections of the Project Manual to ensure an efficient and orderly sequence of the demolition elements.
B. Coordinate the completion and cleanup of the Work of the separate Sections in preparation for Substantial Completion.
C. Coordinate access to the site for correction of defective Work and the Work not in accordance with the Contract Documents.

1.4 Construction Progress Schedules

A. Submit initial progress schedule in duplicate within 15 days after date of established notice to proceed for Engineer to review.
B. Revise and resubmit as required.
C. Submit revised schedules with each Application for Payment, identifying changes since previous version.
D. Submit a computerized chart with separate line for each major section of Work or operation, identifying first work day of each week.

E. Show complete sequence of construction activity, identifying Work of separate stages and other logically grouped activities. Indicate the early and late start, early and late finish, float dates, and duration.

F. Indicate estimated percentage of completion for each item of Work at each submission.

G. Indicate submittal dates required for shop drawings, product data, samples, and product delivery dates, including those furnished by the Owner and under Allowances.

1.5 Preconstruction Meeting

A. The Engineer will schedule a meeting after contract award.

B. Attendance Required: Owner, Engineer, and Contractor.

C. Agenda:
   1. Execution of the Owner-Contractor Agreement.
   2. Submission of the executed bond and insurance certificates.
   4. Submission of a list of Subcontractors, a list of products, schedule of values, and a progress schedule.
   5. Designation of the personnel representing the parties in the Contract, and the Engineer.
   6. The procedures and processing of the field decisions, submittals, substitutions, applications for payments, proposal requests, Change Orders, and Contract closeout procedures.
   7. Scheduling.

D. Record the minutes and distribute copies within two days after the meeting to the participants, with two copies to the Engineer, the Owner, the participants, and those affected by the decisions made.

1.6 Site Mobilization Meeting

A. The Contractor will schedule a meeting at the Project site prior to the Contractor's occupancy.

B. Attendance Required: The Owner, Engineer, Contractor, the Contractor's Superintendent, and major Subcontractors.

C. Agenda:
   1. Use of the premises by the Contractor.
   2. The Owner's requirements and partial occupancy.
   3. Construction facilities and controls provided by the Owner.
   4. Temporary utilities provided by the Owner.
   5. Security and housekeeping procedures.
   7. Application for payment procedures.
   8. Procedures for testing.
   9. Procedures for maintaining the record documents.

D. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Engineer, Owner, participants, and those affected by the decisions made.
1.7 Progress Meetings

A. Schedule and administer the meetings throughout the progress of the Work at maximum monthly intervals.

B. Make arrangements for the meetings, prepare the agenda with copies for the participants, and preside at the meetings.

C. Attendance Required: The job superintendent, major subcontractors and suppliers, the Owner, Engineer, as appropriate to agenda topics for each meeting.

D. Agenda:
   1. Review the minutes of previous meetings.
   2. Review of the Work progress.
   3. Field observations, problems, and decisions.
   4. Identification of the problems which impede the planned progress.
   5. Review of the submittals schedule and status of the submittals.
   7. Maintenance of the progress schedule.
   8. Corrective measures to regain the projected schedules.
   9. Planned progress during the succeeding work period.
  10. Coordination of the projected progress.
  11. Maintenance of the quality and work standards.
  12. Effect of the proposed changes on the progress schedule and coordination.
  13. Other business relating to the Work.

E. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Engineer, Owner, participants, and those affected by the decisions made.

1.8 Pre-Installation Meeting

A. When required in the individual specification Sections, convene a pre-installation meeting at the site prior to commencing the Work of the Section.

B. Require attendance of the parties directly affecting, or affected by, the Work of the specific Section.

C. Notify the Engineer four days in advance of the meeting date.

D. Prepare an agenda and preside at the meeting:
   1. Review the conditions of installation, preparation and installation procedures.
   2. Review coordination with the related work.

E. Record the minutes and distribute the copies within two days after the meeting to the participants, with two copies to the Engineer, Owner, participants, and those affected by the decisions made.

END OF SPECIFICATION
SECTION 01 31 50
NE-CHPS SUBMITTALS

1.0 GENERAL

1.1 Summary

A. This specification section specifies administrative and procedural requirements for submittals required to achieve the specified NE-CHPS certification.

B. Sustainable Design Intent: Comply with project requirements intended to achieve a Certified Rating, measured and documented according to the Northeast Collaborate for High Performance Schools Criteria (NE-CHPS) Version 3.1.

1.2 Related Sections

A. The following Specification Sections contain requirements that relate to this Specification Section:

1. Section 01 10 00 – General Requirements Summary

1.3 General Requirements

A. The Contractor is required to implement practices and procedures to meet the project’s environmental goals, which include achieving NE-CHPS criteria. Specific project goals which may impact this area of work are listed in the applicable paragraphs of this specification section. The Contractor shall ensure that the requirements related to these goals, as defined in the sections below and in the related sections of the Contract Documents, are implemented to the fullest extent feasible.

1.4 Submittal Procedures

A. NE-CHPS submittal requirements are to include submission of MATERIALS CREDITS DOCUMENTATION SHEET. Information to be supplied for this form includes, but is not limited to, the following:

1. Cost breakdowns for materials included in the contractor’s or subcontractor’s work. Cost breakdowns include total cost plus labor, equipment and material costs.
2. The amount of savaged, refurbished or reused materials and products.
3. The amount of recycled content in the supplied products, with percentages broken down to indicate post-consumer and pre-consumer percentages.
4. The location of the raw materials extracted, harvested, or recovered and then used to manufacture the supplied products.
5. The manufacture location for the supplied products.

B. Submit Letters of Certification, provided from the product manufacturer on the manufacturer’s letterhead, to verify the product information supplied for the MATERIALS CREDITS DOCUMENTATION SHEET.
C. Submit Product Data Sheets for materials that meet the NE-CHPS Building Performance criteria.

D. Submit certification required for Construction Waste Management, Construction IAQ Management and Construction Pollution Controls.

E. Submit Material Safety Data Sheets (MSDS) for all applicable products.

F. Submittals shall be provided in approved NE-CHPS format.

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF SPECIFICATION
SECTION 01 35 20
INDOOR AIR QUALITY MANAGEMENT

1.0 GENERAL

1.1 Summary
A. Section includes special requirements for Indoor Air Quality (IAQ) management during construction operations.
   1. Control of emissions during construction.
   2. Moisture control during construction.
B. Procedures for testing baseline IAQ. Baseline IAQ requirements specify maximum indoor pollutant concentrations for acceptance of the facility.

1.2 Definitions
A. Definitions pertaining to sustainable development as defined in ASTM E2114.
B. Adequate Ventilation: Ventilation, including, air circulation and air changes, required to cure materials, dissipate humidity, and prevent accumulation of particulates, dust, fumes, vapors or gases.
C. Hazardous Materials: Any material that is regulated as a hazardous material in accordance with 49 CFR 173, requires a Material Safety Data Sheet (MSDS) in accordance with 29 CFR 1910.1200.
D. Indoor Air Quality (IAQ): The composition and characteristics of the air in an enclosed space that affect the occupants of that space. The indoor air quality of a space refers to the relative quality of air in the building with respect to the contaminants and hazards and is determined by the level of indoor air pollution and other characteristics of the air.
E. Interior Final Finishes: Materials and products that will be exposed at interior, occupied spaces including flooring, wallcovering, finish carpentry and ceilings.
F. Packaged Dry Products: Materials and products that are installed in dry form and are delivered to the site in manufacturer’s packaging including carpets, resilient flooring, ceiling tiles and insulation.
G. Wet Products: Materials and products installed in wet form, including paints, sealants, adhesives, special coatings, and other materials which require curing.

1.3 Preconstruction Meeting
A. Following award of Contract and prior to commencement of project work, the Contractor is required to schedule a meeting with the Owner and project team to discuss the proposed IAQ management plan.
1.4 Submittals

A. IAQ Management Plan is to be provided prior to preconstruction meeting and is required to include the following information:
   1. Procedures for control of emissions during construction
   2. Procedures for moisture control during construction

B. Product Data:
   1. Product data for filtration media used during construction and during operations.
   2. Submit air pressure difference maps for mode of operation of HVAC.
   3. Material Safety Data Sheets
   4. Inspection test reports.

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

3.1 IAQ Management – Emissions Control

A. During construction operations, follow the recommendations in SMACNA IAQ Guidelines for Occupied Buildings under Construction.

B. HVAC Protection
   1. Seal return registers during construction
   2. Provide temporary exhaust during construction operations

C. Source Control – provide low and zero VOC materials as specified.

D. Pathway Interruption – isolate areas of work as necessary to prevent contamination of clean or occupied spaces. Provide pressure differentials, as required, to protect clean or occupied spaces.

E. Housekeeping – during construction, maintain project and building products and systems to prevent contamination of building spaces.

F. Temporary Ventilation – provide and ACH (air changes per hour) of 1.5 or more and as follows:
   1. Provide minimum 48-hour pre-ventilation of packages dry products prior to installation. Remove from packaging and ventilate in a secure, dry and ventilated space.
   2. Provide adequate ventilation during and after installation of interior wet products and interior final finishes.

G. Scheduling – schedule construction operations involving wet products prior to packaged dry products to the greatest extent possible.

H. Flush-Out – After the conclusion of construction, and prior to occupancy, perform a building flush-out by supplying a total air volume of 14,000 cubic feet of outdoor air per square foot of floor area while maintaining an internal temperature of at least 60-degrees F and relative humidity no greater than 60%.

END OF SPECIFICATION
SECTION 01 40 00
QUALITY REQUIREMENTS

1.0 GENERAL

1.1 Section Includes

A. Quality control and control of installation.
B. Verification of Credentials and Licenses.
C. Tolerances
D. References.
E. Mock-up requirements.
F. Testing and inspection services.
G. Manufacturers' field services.

1.2 Quality Control and Control of Installation

A. Monitor a quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of the specified quality.
B. Comply with the manufacturers' instructions, including each step in sequence.
C. When the manufacturers' instructions conflict with the Contract Documents, request a clarification from the Engineer before proceeding.
D. Comply with the specified standards as a minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
E. Perform the Work by persons qualified to produce the required and specified quality.
F. Verify that field measurements are as indicated on the Shop Drawings or as instructed by the manufacturer.
G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.3 Verification of Credentials and Licenses

A. An element of this oversight process is the verification that persons employed on the project site have appropriate and current credentials and licenses in their possession, at the project site, for the work they are performing.
B. Be forewarned that state resident inspectors will be checking for verification of credentials and licenses of both union and non-union persons, in their onsite inspections.
C. State resident inspectors will also be reviewing Contractor’s Certified Monthly Payroll Records for conformance with RI State Prevailing Wage Rate requirements.

D. Those persons without the appropriate credentials and licenses will be subject to dismissal from the project site.

1.4 Tolerances

A. Monitor the fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.

B. Comply with the manufacturers’ tolerances. When the manufacturers’ tolerances conflict with the Contract Documents, request a clarification from the Engineer before proceeding.

C. Adjust products to appropriate dimensions; position before securing products in place.

1.5 References

A. For products or workmanship specified by association, trade, or other consensus standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard by the date of issue current on the date of the Contract Documents, except where a specific date is established by code.

C. Obtain copies of the standards where required by the product specification Sections.

D. When the specified reference standards conflict with the Contract Documents, request a clarification from the Engineer before proceeding.

E. Neither the contractual relationships, duties, or responsibilities of the parties in the Contract, nor those of the Engineer, shall be altered from the Contract Documents by mention or inference otherwise in reference documents.

1.6 Mock-Up Requirements

A. Tests will be performed under the provisions identified in this Section and identified in the respective product specification Sections.

B. Assemble and erect the specified items with the specified attachment and anchorage devices, flashings, seals, and finishes.

C. Accepted mock-ups shall be a comparison standard for the remaining Work.

D. Where the mock-up has been accepted by the Engineer and is specified in the product specification Sections to be removed, remove the mock-up and clear the area when directed to do so by the Engineer.

1.7 Testing and Inspection Services

A. The Contractor will submit the name of an independent firm to the Engineer for approval by the Owner, to perform the testing and inspection services.
B. The independent firm will perform the tests, inspections and other services specified in the individual specification Sections and as required by the Engineer.
   1. Laboratory: Authorized to operate in the location in which the Project is located.
   2. Laboratory Staff: Maintain a full time registered Engineer on staff to review the services.
   3. Testing Equipment: Calibrated at reasonable intervals with devices of an accuracy traceable to either the National Bureau of Standards or to the accepted values of natural physical constants.

C. Testing, inspections and source quality control may occur on or off the project site. Perform off-site testing as required by the Engineer or the Owner.

D. Reports will be submitted by the independent firm to the Engineer and the Contractor, in duplicate, indicating the observations and results of tests and indicating the compliance or non-compliance with Contract Documents.

E. Cooperate with the independent firm; furnish samples of the materials, design mix, equipment, tools, storage, safe access, and the assistance by incidental labor as requested.
   1. Notify the Engineer and the independent firm 24 hours prior to the expected time for operations requiring services.
   2. Make arrangements with the independent firm and pay for additional samples and tests required for the Contractor's use.

F. Testing and employment of the testing agency or laboratory shall not relieve the Contractor of an obligation to perform the Work in accordance with the requirements of the Contract Documents.

G. Re-testing or re-inspection required because of a non-conformance to the specified requirements shall be performed by the same independent firm on instructions by the Engineer.

H. Payment for the re-testing or re-inspection will be charged to the Contractor by deducting the testing charges from the Contract Sum.

I. Agency Responsibilities:
   1. Test samples of mixes submitted by the Contractor.
   2. Provide qualified personnel at the site. Cooperate with the Engineer and the Contractor in performance of services.
   3. Perform specified sampling and testing of the products in accordance with the specified standards.
   4. Ascertain compliance of the materials and mixes with the requirements of the Contract Documents.
   5. Promptly notify the Engineer and the Contractor of observed irregularities or non-conformance of the Work or products.
   6. Perform additional tests required by the Engineer.
   7. Attend the preconstruction meetings and the progress meetings.

J. Agency Reports: After each test, promptly submit two copies of the report to the Engineer and to the Contractor. When requested by the Engineer, provide an interpretation of the test results.

K. Include the following:
   1. Date issued.
   2. Project title and number.
   3. Name of inspector.
4. Date and time of sampling or inspection.
5. Identification of product and specifications section.
6. Location in the Project.
7. Type of inspection or test.
8. Date of test.
9. Results of tests.

L. Limits On Testing Authority:
   1. Agency or laboratory may not release, revoke, alter, or enlarge on the requirements of the
      Contract Documents.
   2. Agency or laboratory may not approve or accept any portion of the Work.
   3. Agency or laboratory may not assume any duties of the Contractor.
   4. Agency or laboratory has no authority to stop the Work.

1.8 Manufacturers’ Field Services

   A. When specified in the individual specification Sections, require the material or Product suppliers, or
      manufacturers, to provide qualified staff personnel to observe the site conditions, the conditions
      of the surfaces and installation, the quality of workmanship, the start-up of equipment, or test, adjust
      and balance of equipment as applicable, and to initiate instructions when necessary.

   B. Submit the qualifications of the observer to the Engineer 30 days in advance of the required
      observations. Observer, subject to approval of Engineer.

   C. Report the observations and the site decisions or instructions given to the applicators or installers that
      are supplemental or contrary to the manufacturers’ written instructions.

END OF SPECIFICATION
SECTION 01 50 00
TEMPORARY FACILITIES AND CONTROLS

1.0 GENERAL

1.1 Section Includes

A. Temporary Utilities:
   1. Temporary electricity.
   2. Temporary lighting for construction purposes.
   3. Temporary heating.
   4. Temporary cooling.
   5. Temporary ventilation.
   6. Telephone service.
   7. Facsimile service.
   8. Temporary water service.

B. Construction Facilities:
   1. Field offices and sheds.
   2. Vehicular access.
   3. Parking.
   4. Progress cleaning and waste removal.

C. Temporary Controls:
   2. Fire detection.
   3. Water control.
   4. Dust control.
   5. Erosion and sediment control.
   6. Noise control.
   7. Pest control.
   8. Pollution control.
   9. Rodent control.

1.2 Summary

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

1.3 Temporary Electricity

A. The Owner will pay the cost of energy used. Exercise measures to conserve energy. Utilize the Owner’s existing power service.

1.4 Temporary Lighting for Construction Purposes

A. Permanent building lighting maybe utilized during construction.
1.5 Temporary Heating
   A. Existing facilities shall be used.

1.6 Temporary Cooling
   A. Existing facilities shall be used.

1.7 Temporary Ventilation
   A. Utilize the existing ventilation equipment. Extend and supplement the equipment with temporary fan units as required to maintain clean air for construction operations.

1.8 Telephone Service
   A. Not applicable.

1.9 Facsimile Service
   A. Not applicable.

1.10 Temporary Water Service
   A. The Owner will pay the cost of temporary water. Exercise measures to conserve energy. Utilize the Owner's existing water system, extend and supplement with temporary devices as needed to maintain the specified conditions for construction operations.

1.11 Temporary Sanitary Facilities
   A. The existing designated facilities located within each building may be used during construction operations. Maintain daily in a clean and sanitary condition.
   B. At the end of construction, return the facilities to the same or better condition as the original condition.

1.12 Field Offices and Sheds
   A. A designated existing space within the building may be used for field offices upon approval of Owner.

1.13 Vehicular Access
   A. Location as approved by the Owner.
   B. Provide unimpeded access for emergency vehicles. Maintain 20-foot width driveways with turning space between and around combustible materials.
   C. Provide and maintain access to fire hydrants and control valves free of obstructions.
   D. Use designated existing on-site roads for construction traffic.

1.14 Parking
   A. Locate as approved by the Owner.
B. When site space is not adequate, arrange through the Owner for additional off-site parking.

C. Use of designated existing on-site streets and driveways for construction traffic is permitted. Tracked vehicles are not allowed on paved areas.

D. Use of designated areas of existing parking facilities by construction personnel is permitted.

E. Do not allow heavy vehicles or construction equipment in parking areas.

1.15 Progress Cleaning and Waste Removal

A. Maintain areas free of waste materials, debris, and rubbish. Maintain the site in a clean and orderly condition. Building must be clear of all debris at conclusion of each day. The building will remain a fully occupied building for the duration of the project.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean the interior areas prior to the start of surface finishing and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from the site periodically, weekly, or daily, as necessary to prevent an on-site accumulation of waste material, debris, and rubbish, and dispose off-site.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.16 Security

A. Security Program:
   1. Protect the Work, the existing premises, or the Owner’s operations from theft, vandalism, and unauthorized entry.
   2. Initiate the program in coordination with the Owner’s existing security system at the mobilization.
   3. Maintain the program throughout the construction period until Owner occupancy.

B. Entry Control:
   1. Restrict the entrance of persons and vehicles into the Project site, or the existing facilities.
   2. Allow entrance only to authorized persons with the proper identification.
   3. Maintain a log of workers and visitors, make available to the Owner on request.
   4. Coordinate the access of the Owner’s personnel to the site in coordination with the Owner’s security forces.

1.17 Fire Detection

A. Each day, before beginning any construction operations that can potentially trigger the existing fire alarm detection system, the Contractor is permitted to temporarily disconnect the system in the specific areas of construction, for as long as may be necessary. The Owner shall be notified each time the existing system is disabled.

B. Failure to so notify the Owner will subject the Contractor to a monetary fine for each occurrence, should the fire detection system be activated inadvertently by a construction activity.
1.18 Water Control

A. Grade the site to drain. Maintain excavations free of water. Provide, operate, and maintain the pumping equipment.

B. Protect the site from puddling or running water. Provide water barriers as required to protect the site from soil erosion.

1.19 Dust Control

A. Execute the Work by methods to minimize raising dust from construction operations.

B. Provide positive means to prevent air-borne dust from dispersing into the atmosphere.

1.20 Erosion and Sediment Control

A. Plan and execute construction by methods to control surface drainage from cuts and fills, from borrow and waste disposal areas. Prevent erosion and sedimentation.

B. Minimize the amount of bare soil exposed at one time.

C. Provide temporary measures such as berms, dikes, and drains, to prevent water flow.

D. Construct fill and waste areas by selective placement to avoid erosive surface silts or clays.

E. Periodically inspect the earthwork to detect evidence of erosion and sedimentation; promptly apply corrective measures.

1.21 Noise Control

A. Provide methods, means, and facilities to minimize noise produced by the construction operations.

1.22 Pest Control

A. Provide methods, means, and facilities to prevent pests and insects from damaging the Work, or entering the facility.

1.23 Pollution Control

A. Provide methods, means, and facilities to prevent the contamination of soil, water, and the atmosphere from discharge of noxious, toxic substances, and pollutants produced by the construction operations.

1.24 Rodent Control

A. Provide methods, means, and facilities to prevent rodents from accessing or invading the premises.

END OF SPECIFICATION
SECTION 01 60 00
PRODUCT REQUIREMENTS

1.0 GENERAL

1.1 Section Includes
   A. Products.
   B. Product delivery requirements.
   C. Product storage and handling requirements.
   D. Product options.
   E. Product substitution procedures.

1.2 Products
   A. Products: Means new material, machinery, components, fixtures, or systems forming the Work; but does not include the machinery or equipment used for the preparation, fabrication, conveying, or erection of the Work. Products may include the existing materials or components required or specified for reuse.
   B. Furnish products of qualified manufacturers suitable for the intended use. Furnish products of each type by a single manufacturer unless specified otherwise.
   C. Do not use materials and equipment removed from the existing premises, except as specifically permitted by the Contract Documents.
   D. Furnish interchangeable components of the same manufacturer for the components being replaced.

1.3 Product Delivery Requirements
   A. Transport and handle products in accordance with the manufacturer's instructions.
   B. Promptly inspect shipments to ensure that the products comply with the requirements, the quantities are correct, and the products are undamaged.
   C. Provide equipment and personnel to handle the products by methods to prevent soiling, disfigurement, or damage.

1.4 Product Storage and Handling Requirements
   A. Store and protect the products in accordance with the manufacturers’ instructions.
   B. Store with seals and labels intact and legible.
   C. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to the product.
D. For exterior storage of fabricated products, place on sloped supports above the ground.

E. Provide bonded off-site storage and protection when the site does not permit on-site storage or protection.

F. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent the condensation and degradation of products.

G. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

H. Provide equipment and personnel to store the products by methods to prevent soiling, disfigurement, or damage.

I. Arrange storage of the products to permit access for inspection. Periodically inspect to verify that the products are undamaged and are maintained in acceptable condition.

1.5 Product Options

A. Products Specified by Reference Standards or by Description Only: Any Product meeting those standards or description.

B. Products Specified by Naming One or More Manufacturers: Products of one of the manufacturers named and meeting the specifications, no options or substitutions allowed.

C. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named in accordance with the following article.

1.6 Product Substitution Procedures

A. Instructions to Bidders specify the time restrictions for submitting requests for Substitutions during the bidding period to requirements specified in this section.

B. Substitutions may be considered only when a product becomes no longer in production following the date of receipt of the Purchase Order for this Contract. Submit certification both that specified product was carried in Bid and is no longer obtainable.

C. Document each request with complete data substantiating the compliance of a proposed Substitution with the Contract Documents.

D. A request constitutes a representation that the Bidder:
   1. Has investigated the proposed Product and determined that it meets or exceeds the quality level of the specified product.
   2. Will provide the same warranty for the Substitution as for the specified Product.
   3. Will coordinate the installation and make changes to other Work which may be required for the Work to be complete with no additional cost to the Owner.
   4. Waives claims for additional costs or time extension which may subsequently become apparent.
   5. Will reimburse the Owner and the Engineer for review or redesign services associated with re-approval by the authorities having jurisdiction.
E. Substitutions will not be considered when they are indicated or implied on the Shop Drawing or Product Data submittals, without a separate written request, or when acceptance will require revision to the Contract Documents.

F. Substitution Submittal Procedure, If Permitted Following Contract Award:

1. Submit three copies of a request for Substitution for consideration, no later than 20 working days following date of receipt of the Purchase Order for this Contract. Limit each request to one proposed Substitution.

2. Submit the Shop Drawings, Product Data, and the certified test results attesting to the proposed product equivalence. The burden of proof is on the proposer.

3. The Engineer will notify the Contractor in writing of a decision to accept or reject the request.

END OF SPECIFICATION
SECTION 01 70 00
EXECUTION REQUIREMENTS

1.0 GENERAL

1.1 Section Includes
   A. Examination.
   B. Preparation.
   C. Protection of adjacent construction.
   D. Cutting and patching.
   E. Special procedures.
   F. Progress cleaning and waste removal.
   G. Final cleaning.
   H. Starting and adjusting of systems.
   I. Demonstration and Instructions.
   J. Testing, adjusting and balancing.
   K. Protecting Installed Construction.

1.2 Examination
   A. Acceptance of Conditions:
      1. Verify that existing applicable site conditions, substrates, or substrate surfaces are acceptable or meet specific requirements of individual specifications Sections, for subsequent Work to proceed.
      2. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
      3. Examine and verify specific conditions described in individual specifications Sections.
      4. Verify that utility services are available, of correct characteristics, and in correct locations.
      5. Beginning of new Work, that relies upon the quality and proper execution of Work of a preceding trade, means acceptance of that preceding Work as appropriate for the proper execution of subsequent Work.
      6. Acceptance of preceding Work that can be shown later to have adversely affected proper performance of new Work may result in removal and repeat performance of all Work involved at no cost to the Owner.

1.3 Preparation
   A. Clean substrate surfaces prior to applying next material or substance.
B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply substrate primer, sealer, or conditioner, required or recommended by manufacturer, prior to applying any new material or substance in contact or bond.

D. Prior to the application, installation, or erection of any products and product components, perform any other preparatory operations, or surface or substrate modifications, as may be specified or directed by product manufacturers.

1.4 Protection of Adjacent Construction

A. Protect existing adjacent properties and provide special protection where specified in individual Specification Sections.

B. Provide protective coverings at wall, projections, jambs, sills, and soffits of existing openings.

C. Protect existing finished floors, stairs, and other existing surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

D. Repair adjacent properties damaged by construction operations to original condition to the satisfaction of the Owner.

E. Prohibit unnecessary traffic from existing landscaped areas.

F. Restore grassed landscaped areas damaged by construction operations to full healthy growth, by installing loam and sod to the requirements, and under the supervision of, the Owner.

1.5 Cutting and Patching

A. Employ original, or skilled and experienced installer to perform cutting and patching.

B. Submit written request in advance of cutting or altering elements which affect:
   1. Structural integrity of element.
   2. Integrity of weather-exposed or moisture-resistant elements.
   3. Efficiency, maintenance, or safety of element.
   5. Existing construction, or Work of separate contractor.

C. Execute cutting, fitting, and patching including excavation and fill, to complete Work, and to:
   1. Fit the several parts together, to integrate with other Work.
   2. Uncover Work to install or correct ill-timed Work.
   3. Remove and replace defective and non-conforming Work.
   4. Remove samples of installed Work for testing.
   5. Provide openings in elements of Work for penetrations of mechanical and electrical Work.

D. Execute Work by methods that will avoid damage to other Work and provide proper surfaces to receive patching and finishing.

E. Cut masonry, concrete, and other rigid materials using masonry saw or core drill.

F. Restore Work with new Products in accordance with requirements of Contract Documents.

G. Fit Work tight to pipes, sleeves, ducts, conduits, and other penetrations through surfaces.
H. Maintain integrity of wall, ceiling, or floor construction; completely seal voids.

I. At penetration of fire rated, partitions, ceiling, or floor construction completely seal voids with fire rated or fire-resistant material in accordance with Section 07840, to full thickness of the penetrated element.

J. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

K. Identify any hazardous substance or conditions exposed during the Work to the Engineer for decision or remedy.

1.6 Special Procedures

A. Materials: As specified in product Sections; match existing with new products, or salvaged products as appropriate, for patching and extending work.

B. Employ skilled and experienced installer to perform alteration work.

C. Cut, move, or remove items as necessary for access to alterations and renovation Work. Replace and restore at completion.

D. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.

E. Remove debris and abandoned items from area and from concealed spaces.

F. Prepare surface and remove surface finishes to provide installation of new Work and finishes.

G. Close openings in exterior surfaces to protect existing Work from weather and extremes of temperature and humidity.

H. Remove, cut, and patch Work in a manner to minimize damage and to provide means of restoring products and finishes to original or specified condition.

I. Refinish existing visible surfaces to remain in renovated rooms and spaces to specified condition for each material, with a neat transition to adjacent finishes.

J. Where new Work abuts or aligns with existing, provide a smooth and even transition. Patch Work to match existing adjacent Work in texture and appearance.

K. When finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and submit recommendation to Engineer for review.

L. Where a change of plane of 1/4 inch or more occurs, submit recommendation for providing a smooth transition to Engineer for review.

M. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.

N. Patch or replace portions of existing surfaces which are damaged, or showing other imperfections.

O. Finish the surfaces as specified in individual product Sections, or as indicated on the Drawings.
1.7 Progress Cleaning and Waste Removal

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.

D. Collect and remove waste materials, debris, and rubbish from site periodically or weekly and dispose of off-site.

E. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

1.8 Final Cleaning

A. Execute final cleaning of areas affected by the Work prior to final project assessment.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Clean equipment and fixtures to a sanitary condition using cleaning materials appropriate to the surface and material being cleaned.

D. Clean or replace filters of operating equipment as directed by Engineer.

E. Clean debris from roofs, gutters, downspouts, and drainage systems.

F. Clean site; sweep paved areas, rake clean landscaped surfaces.

G. Remove waste and surplus materials, rubbish, and construction facilities from the site.

1.9 Starting And Adjusting Of Systems

A. Coordinate schedule for starting and adjusting of various equipment and systems.

B. Notify Engineer and Owner seven days prior to starting and adjusting of each item.

C. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, or other conditions which may cause damage.

D. Verify that tests, meter readings and specified electrical characteristics agree with those required by the equipment or system manufacturer.

E. Verify wiring and support components for equipment are complete and tested.

F. Execute starting and adjusting under supervision of responsible Contractor's personnel or manufacturer's representative, in accordance with manufacturer's instructions.

G. Adjust operating Products and equipment to ensure smooth and unhindered operation.
H. When specified in individual specifications Section, require manufacturer to provide authorized representative to be present at the site to inspect, check, and approve equipment or system installation prior to starting, and to supervise placing of equipment or system in operation.

I. Submit a written report in accordance with Section 01400 that equipment or system has been properly installed and is functioning correctly.

1.10 Demonstration and Instructions

A. Demonstrate operation and maintenance of Products to Owner's personnel two weeks prior to date of Substantial Completion.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

C. Utilize operation and maintenance manuals as basis for instruction. Review contents of manuals with Owner's personnel in detail to explain all aspects of operation and maintenance.

D. Demonstrate start-up, operation, control, adjustment, trouble shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled or agreed upon times, at equipment or system location.

E. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during instruction.

1.11 Testing, Adjusting, And Balancing

A. Submit, for the Owner's approval, the name of an independent firm to perform testing, adjusting, and balancing.

B. The independent firm will perform services specified in individual specifications Sections.

C. Reports will be submitted by the independent firm to the Engineer and the Owner indicating observations and test results, indicating compliance or non-compliance with specified requirements and with the requirements of the Contract Documents.

1.12 Protecting Installed Construction

A. Protect installed Work and provide special protection where specified in individual specification sections.

B. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

C. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

D. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

E. Repair or replace installed Work damaged by construction operations, as directed by the Engineer.

END OF SPECIFICATION
SECTION 02 82 00
ASBESTOS REMEDIATION

1.0 GENERAL

1.1 Related Documents

A. All of the Contract Documents, including Drawings, General Conditions and other requirements apply to this project.

B. Known hazardous materials related to this project are limited to 10% chrysotile located on the underside of the exterior soffit as indicated in the attached report.

1.2 Asbestos Procedures

A. There is known existing asbestos containing materials (ACM) in the existing building as identified in the attached report. The Contractor shall formally notify each sub-contractor that there are reports included for review.

B. Unknown and inaccessible ACM may be encountered during the project. Where the Contractor encounters discover or encounter ACM during the scope of work the Contractor shall notify the Owner immediately. Action should be taken immediately to reduce, control or eliminate the risk of exposure of contractors and the public to ACM.

C. Responsible Person: The Contractor is required to designate one (1) qualified on-site employee to be in charge of coordination with the project team and the Contractor with regards to the ACM.

D. Responsibility for Hazardous Materials Discovery: It is the sole responsibility of the Contractor and sub-contractors to undertake whatever measures and methods of procedures are necessary to appropriately safeguard the health and safety of all workers and members of the public with respect to any ACM discovery with the project work.

E. Indemnification: To the fullest extent permitted by law, the Contractor and sub-contractor shall indemnify and hold harmless by the Owner and project team and their agents and employees from and against any claims, damages, losses and expenses including, but not limited to, attorney’s fees arising out of or relating to an such claim, damage, loss or expense if attributable to bodily injury, sickness, disease or death, or to damage to or destruction of tangible property (other than the Work itself) including the loss of use resulting therefrom, and is caused in whole or part by any negligent act or omission of the Contractor and sub-contractor anyone directly or indirectly employed by any of them or anyone whose acts any of them may be liable, regardless of whether or not it is caused in part by a party indemnified hereunder.

1.3 Lead Containing Surface Coatings and Building Components

A. The Contractor and sub-contractor shall be made aware that Lead Based Paints, other surface coatings, and building components may exist throughout the building. OSHA’s Lead Standard for the Construction Industry, Tile 29 Code of Federal Regulations 1926.62, covers lead in a variety of forms, including metallic lead, all inorganic lead components, and organic lead soaps. OSHA’s
lead in construction standard applies to all construction work where an employee may be exposed to lead. All work related to construction, alteration, or repair, including painting, is included. In construction, lead was used in many different types of building component, surfacing, coatings and applications including, but not limited to, roofs, sidings/surfaces, tank linings, and electrical conduits, plumbing fixtures, pipes and waste lines, soft solder, used chiefly for soldering tinplate and copper pipe joints, is an alloy of lead and tin, paint, varnish, shellac and other surface coating materials. Construction projects vary in their scope and potential for exposing workers to lead and other hazards. Due to the age of the building, it is assumed that there may be lead-containing building materials and surface coatings located within the interior of the building. It is the Contractor’s responsibility to protect their employees from lead exposures and to prevent the release of lead into the environment. Contractor will be responsible to follow all local, state and federal, RI Department of Environmental Management (RIDEM), Occupational and Safety and Health Administration (OSHA), and Environmental Protection Administration rules, regulations and laws concerning lead in construction activities.

B. The Contractor and respective sub-contractors are solely responsible for means and methods and techniques used for demolition.

C. The Contractor and sub-contractor shall at his own cost and expense comply with all laws, ordinance, rules and regulations or Federal, State, Regional and Local authorities during demolition, prepping, sanding, cutting, burning, scraping, paint over, grinding and regarding handling, storing and disposing of demolition/renovation debris.

1.4 Other

A. The Contractor shall be made aware that other hazardous materials may be found inside the building.

2.0 PRODUCTS

Not Applicable

3.0 EXECUTION

Not Applicable

END OF SPECIFICATION
ATTACHMENT A: ASBESTOS MATERIAL REPORT
June 2, 2021

East Providence School Department
Attn: Mr. Anthony Feola
145 Taunton Ave.
East Providence, RI 02914

Re: Limited Asbestos Sampling Report for Silver Spring and Hennessey Elementary Schools.

Mr. Feola:

Enclosed are the analytical results of the asbestos bulk samples collected by Environmental Consulting and Management (ECM) from the exterior main entryways of Silver Spring and Hennessey Elementary Schools in East Providence, RI. The inspection consisted of collecting accessible suspect materials in support of the upcoming renovations. Renovation work is slated to impact the exterior side of the main entryways. Windows, doors, caulking, brick, mortar and soffits were all evaluated during this inspection work.

**Asbestos Report:**

Suspect materials were analyzed for asbestos content utilizing Polarized Light Microscopy (PLM) in accordance with Environmental Protection Agency (EPA) method 600/R-93/116. In addition to collection, location of the samples has also been denoted within this report. Please refer to **Attachment 1** for the analytical results. Below is a chart of the samples collected.

<table>
<thead>
<tr>
<th>Building</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Asbestos %</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver Spring</td>
<td>SLV-1A, 1B, 1C</td>
<td>Caulking around outer frame of window/door</td>
<td>Front Entry around outer frame of window and doors</td>
<td>5% Chrysotile</td>
<td>Approx 2sf</td>
</tr>
<tr>
<td></td>
<td>SLV-2A, 2B</td>
<td>Caulking on inner window/door frame</td>
<td>Inner window and doors</td>
<td>None Detected</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>SLV-3A, 3B, 3C</td>
<td>Mortar</td>
<td>Front Entry Brick and Mortar Facade and Walls</td>
<td>None Detected</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>SLV-4A, 4B, 4C</td>
<td>Soffit</td>
<td>Underside of soffit front entry of building</td>
<td>None Detected</td>
<td>NA</td>
</tr>
<tr>
<td>Hennessey Elementary</td>
<td>H-1A, 1B, 1C</td>
<td>Mortar in between glass blocks</td>
<td>Left Side of Entry</td>
<td>None Detected</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>H-2A, 2B, 2C</td>
<td>Caulking</td>
<td>In between glass block and brick</td>
<td>3% Chrysotile</td>
<td>1.5sf</td>
</tr>
</tbody>
</table>

181 Amaral Street
Riverside, RI 02915

www.ecmne.com
<table>
<thead>
<tr>
<th>Building</th>
<th>Sample #</th>
<th>Material</th>
<th>Location</th>
<th>Asbestos %</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-3A, 3B, 3C</td>
<td></td>
<td>Casulking</td>
<td>On metal door frames to brick</td>
<td>None Detected</td>
<td>NA</td>
</tr>
<tr>
<td>H-4A, 4B, 4C</td>
<td></td>
<td>Caulking</td>
<td>Underside of soffit where it meets brick</td>
<td>3% Chrysotile</td>
<td>1sf</td>
</tr>
<tr>
<td>H-5A, 5B</td>
<td></td>
<td>Mortar</td>
<td>Brick mortar</td>
<td>None Detected</td>
<td>NA</td>
</tr>
</tbody>
</table>

**Asbestos Conclusion:**

**Silver Spring:** There is approximately 2sf of asbestos containing caulking located around the outer door frame at the front entry.

**Hennessey Elementary:** Asbestos containing caulking was identified around the outer edge of the glass block window, where the block meets the brick and mortar. In addition asbestos caulking was observed on the underside of the soffit where it meets the brick and mortar. ECM estimates there to be less than 3sf of this material present.

Regulatory Compliance: All asbestos containing caulking must be removed by trained personnel following all OSHA regulations. All waste material generated from the caulking removal must be disposed of as asbestos containing waste.

Since the amount of materials for each building is less than 3sf a plan will not have to be filed with the RI Department of Health and notification to the EPA is not required.

**Limitations:**

As the survey was limited, Environmental Consulting and Management cannot be held responsible for the identification of materials that are hidden, concealed or otherwise inaccessible.

This report was prepared under the request of East Providence Schools. This report should not be represented, reproduced, or disseminated without the written approval of Environmental Consulting and Management or East Providence Schools. No warranties other than those stated in the contract for this project are expressed or implied.

A hard copy of this report can be provided for your records via mail upon request. If you have any further questions feel free to contact myself at 401-304-6614.

Sincerely,

Environmental Consulting & Management

Joseph M. Lepore
ECM Project Manager
RI Inspector No. Al0661

181 Amaral Street
Riverside, RI 02915

O: 401.438.1360
F: 401.438.1316

www.ecmne.com
<table>
<thead>
<tr>
<th>Image Description</th>
<th>Location Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Silver Spring Elementary School – Caulking around edge of window/door assembly.</td>
<td></td>
</tr>
<tr>
<td>Hennessey Elementary – Asbestos caulking around edge of glass block</td>
<td></td>
</tr>
<tr>
<td>Hennessey Elementary School- Caulking under soffit</td>
<td></td>
</tr>
</tbody>
</table>
Attachment 2
Asbestos Results
Analysis Report
prepared for
Environmental Consulting & Management Inc

Report Date: 6/1/2021
Project Name: Silver Spring Elm. School
Project #: 210312
SanAir ID#: 21025555
Dear Joseph M. Lepore,

We at SanAir would like to thank you for the work you recently submitted. The 11 sample(s) were received on Tuesday, May 25, 2021 via FedEx. The final report(s) is enclosed for the following sample(s): SLV-1A, SLV-1B, SLV-1C, SLV-2A, SLV-2B, SLV-3A, SLV-3B, SLV-3C, SLV-4A, SLV-4B, SLV-4C.

These results only pertain to this job and should not be used in the interpretation of any other job. This report is only complete in its entirety. Refer to the listing below of the pages included in a complete final report.

Sincerely,

Sandra Sobrino
Asbestos & Materials Laboratory Manager
SanAir Technologies Laboratory

Final Report Includes:
- Cover Letter
- Analysis Pages
- Disclaimers and Additional Information

Sample conditions:
- 11 samples in Good condition.
### Asbestos Bulk PLM EPA 600/R-93/116

<table>
<thead>
<tr>
<th>SanAir ID / Description</th>
<th>Stereoscopic Appearance</th>
<th>Components</th>
<th>Asbestos Fibers</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLV-1A / 21025555-001</td>
<td>White Non-Fibrous Homogeneous</td>
<td>95% Other</td>
<td>5% Chrysotile</td>
</tr>
<tr>
<td>Caulk Around Outer Frame Of Window/Door</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-1B / 21025555-002</td>
<td>White Non-Fibrous Homogeneous</td>
<td>95% Other</td>
<td>5% Chrysotile</td>
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<tr>
<td>Caulk Around Outer Frame Of Window/Door</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SLV-1C / 21025555-003</td>
<td>White Non-Fibrous Homogeneous</td>
<td>95% Other</td>
<td>5% Chrysotile</td>
</tr>
<tr>
<td>Caulk Around Outer Frame Of Window/Door</td>
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<td></td>
<td></td>
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<tr>
<td>SLV-2A / 21025555-004</td>
<td>Black Non-Fibrous Homogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>Caulk On Inner Window Frame</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-2B / 21025555-005</td>
<td>Black Non-Fibrous Homogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>Caulk On Inner Window Frame</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-3A / 21025555-006</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>Mortar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-3B / 21025555-007</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
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<tr>
<td>Mortar</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>SLV-3C / 21025555-008</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
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<tr>
<td>Mortar</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-4A / 21025555-009</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>Cement On Underside Of Soffit</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SLV-4B / 21025555-010</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>Cement On Underside Of Soffit</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
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## Asbestos Bulk PLM EPA 600/R-93/116

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<th>Components</th>
<th>Asbestos Fibers</th>
</tr>
</thead>
<tbody>
<tr>
<td>SLV-4C / 21025555-011 Cement On Underside Of Soffit</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
</tr>
</tbody>
</table>

**Analyst:** Moore, Brandi

**Analysis Date:** 6/1/2021

**Approved Signatory:**

**Date:** 6/1/2021
Disclaimer

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Samples are held for a period of 60 days. Fibers smaller than 5 microns cannot be seen with this method due to scope limitations.

For NY state samples, method EPA 600/M4-82-020 is performed.

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Asbestos Certifications
NVLAP lab code 200870-0
City of Philadelphia: ALL-460
PA Department of Environmental Protection Number: 68-05397
California License Number: 2915
Colorado License Number: AL-23143
Connecticut License Number: PH-0105
Massachusetts License Number: AA000222
Maine License Number: LB-0075, LA-0084
New York ELAP lab ID: 11983
Rhode Island License Number: PCM00126, PLM00126, TEM00126
Texas Department of State Health Services License Number: 300440
Commonwealth of Virginia 3333000323
Washington State License Number: C989
West Virginia License Number: LT000616
Vermont License: AL166318
Louisiana Department of Environmental Quality: 212253, Cert 05088

Revision Date: 8/14/2020
SanAir ID Number

21025555

Company: Environmental Consulting & Management Inc

Project #: 210312

Address: 50 Kickemuit Ave

Project Name: Silver Spring Elem. School

City, St., Zip: Bristol, RI 02809

Date Collected: 5/21/2020

State of Collection: RI

Account#: 2667

P.O. Number:

Bulk

ABB PLM EPA 600/R-93/116

Positive Stop

ABEPA PLM EPA 400 Point Count

ABBIK PLM EPA 1000 Point Count

ABBEN PLM EPA NOB**

ABBCH TEM Chatfield**

ABBTM TEM EPA NOB**

ABQ PLM Qualitative

** Available on 24-hr. to 5-day TAT

Air

ABA PCM NIOSH 7400

ABA-2 OSHA w/ TWA

ABTEM TEM AHERA

ABATN TEM NIOSH 7402

ABT2 TEM Level II

Other:

New York ELAP

PLM NY PLM EPA 600/M4-82-020

ABEPA2 NY ELAP 198.1

ABENY NY ELAP 198.6 PLM NOB

ABBNY NY ELAP 198.4 TEM NOB

Soil

ABSE PLM EPA 600/R-93/116 (Qual.)

Vermiculite & Soil

ABSP PLM CARB 435 (LOD <1%)

ABSP1 PLM CARB 435 (LOD 0.25%)

ABSP2 PLM CARB 435 (LOD 0.1%)

Dust

ABWA TEM Wipe ASTM D-6480

ABDMV TEM Microvac ASTM D-5755

Water

ABHE EPA 100.2

Turn Around Times

3 HR (4 HR TEM) 6 HR (8 HR TEM) 12 HR 24 HR

☐ 2 Days ☐ 3 Days ☒ 4 Days ☐ 5 Days

Special Instructions

Sample # Sample Identification/Location Volume or Area Sample Date Flow Rate* Start – Stop Time*

SLV-1A Canv on around outer frame of window/door 1.00 ml 3/21/2021

SLV-1B 1.00 ml

SLV-1C 1.00 ml

SLV-2A Canv. on inner window frame 1.00 ml

SLV-2B 1.00 ml

SLV-3A Mortar 1.00 ml

SLV-3B 1.00 ml

SLV-3C 1.00 ml

SLV-4A Cement on underside of soffit 1.00 ml

SLV-4B 1.00 ml

SLV-4C 1.00 ml

Relinquished by Date Time Received by Date Time

Signatures and Dates

SanAir covers Standard Overnight FedEx shipping. Shipments billed to SanAir with a faster shipping rate will result in additional charges.
Analysis Report
prepared for
Environmental Consulting & Management Inc

Report Date: 5/28/2021
Project Name: Hennessey Elm.
Project #: 210312
SanAir ID#: 21025558
Dear Joseph M. Lepore,

We at SanAir would like to thank you for the work you recently submitted. The 14 sample(s) were received on Tuesday, May 25, 2021 via FedEx. The final report(s) is enclosed for the following sample(s): H-1A, H-1B, H-1C, H-2A, H-2B, H-2C, H-3A, H-3B, H-3C, H-4A, H-4B, H-4C, H-5A, H-5B.

These results only pertain to this job and should not be used in the interpretation of any other job. This report is only complete in its entirety. Refer to the listing below of the pages included in a complete final report.

Sincerely,

Sandra Sobrino
Asbestos & Materials Laboratory Manager
SanAir Technologies Laboratory

Final Report Includes:
- Cover Letter
- Analysis Pages
- Disclaimers and Additional Information

Sample conditions:
- 14 samples in Good condition.
### Asbestos Bulk PLM EPA 600/R-93/116

<table>
<thead>
<tr>
<th>SanAir ID / Description</th>
<th>Stereoscopic Appearance</th>
<th>Components</th>
<th>Asbestos Fibers</th>
</tr>
</thead>
<tbody>
<tr>
<td>H-1A / 21025558-001 Mortar Inbetween Glass Block</td>
<td>Grey Non-Fibrous Heterogeneous</td>
<td>100% Other</td>
<td>None Detected</td>
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<td>H-1B / 21025558-002 Mortar Inbetween Glass Block</td>
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<td>100% Other</td>
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<td>Grey Non-Fibrous Heterogeneous</td>
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<td>H-2A / 21025558-004 Caulk Inbetween Glass Block &amp; Brick</td>
<td>Grey Non-Fibrous Homogeneous</td>
<td>97% Other</td>
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<td>H-2B / 21025558-005 Caulk Inbetween Glass Block &amp; Brick</td>
<td>Grey Non-Fibrous Homogeneous</td>
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<td>H-2C / 21025558-006 Caulk Inbetween Glass Block &amp; Brick</td>
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<td>H-4A / 21025558-010 Caulk On Underside Of Soffit, Caulk</td>
<td>Grey Non-Fibrous Homogeneous</td>
<td>97% Other</td>
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## Asbestos Bulk PLM EPA 600/R-93/116

<table>
<thead>
<tr>
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<th>Appearance</th>
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<th>% Non-fibrous</th>
<th>Asbestos Fibers</th>
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</tr>
<tr>
<td>H-4B / 21025558-011</td>
<td>Non-Fibrous Homogeneous</td>
<td>Grey</td>
<td>97%</td>
<td>Other</td>
<td>3% Chrysotile</td>
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<tr>
<td>Caulk On Underside Of Soffit, Caulk</td>
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<tr>
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<td>Other</td>
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<tr>
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<td></td>
<td></td>
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<td></td>
</tr>
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<td>3% Chrysotile</td>
</tr>
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<td></td>
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<td></td>
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<tr>
<td>H-4C / 21025558-012</td>
<td>Non-Fibrous Homogeneous</td>
<td>White</td>
<td>100%</td>
<td>Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>Caulk On Underside Of Soffit, Caulk</td>
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<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H-5A / 21025558-013</td>
<td>Non-Fibrous Heterogeneous</td>
<td>Grey</td>
<td>100%</td>
<td>Other</td>
<td>None Detected</td>
</tr>
<tr>
<td>Mortar</td>
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<td></td>
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<td></td>
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<tr>
<td>H-5B / 21025558-014</td>
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<td>None Detected</td>
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<tr>
<td>Mortar</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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</table>

**Analyst:** Hogrefe, Sarah  
**Analysis Date:** 5/28/2021  
**Approved Signatory:**  
**Date:** 5/28/2021
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Commonwealth of Virginia 3333000323
Washington State License Number: C989
West Virginia License Number: LT000616
Vermont License: AL166318
Louisiana Department of Environmental Quality: 212253, Cert 05088

Revision Date: 8/14/2020
### Asbestos Chain of Custody

**Form 140, Rev 1, 1.20.2017**

| Company: Environmental Consulting & Management Inc | Project #: 21032 |
| Address: 50 Kickingmuit Ave | Collect by: Joe Lapcevich |
| City, St., Zip: Bristol, RI 02809 | Phone #: 401-438-1360 |
| State of Collection: RI | Fax #: 401-438-1316 |

#### Bulk

<table>
<thead>
<tr>
<th>ABB</th>
<th>PLM EPA 600 R-93/116</th>
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<tbody>
<tr>
<td>ABEP</td>
<td>PLM EPA 400 Point Count</td>
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<tr>
<td>ABB1K</td>
<td>PLM EPA 1000 Point Count</td>
</tr>
<tr>
<td>ABBEN</td>
<td>PLM EPA NOB**</td>
</tr>
<tr>
<td>ABBCCH</td>
<td>TEM Chatfield**</td>
</tr>
<tr>
<td>ABBTM</td>
<td>TEM EPA NOB**</td>
</tr>
<tr>
<td>ABQ</td>
<td>PLM Qualitative ** Available on 24-hr. to 5-day TAT</td>
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#### Air

<table>
<thead>
<tr>
<th>ABA</th>
<th>PCM NIOSH 7400</th>
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<tbody>
<tr>
<td>ABA-2</td>
<td>OSHA w/ TWA*</td>
</tr>
<tr>
<td>ABTEM</td>
<td>TEM AHERA</td>
</tr>
<tr>
<td>ABATNM</td>
<td>TEM NICSH 7402</td>
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<tr>
<td>ABT2</td>
<td>TEM Level II</td>
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<tr>
<td>Other:</td>
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#### New York ELAP

<table>
<thead>
<tr>
<th>PLM NY</th>
<th>PLM EPA 600/M4-82-020</th>
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<tbody>
<tr>
<td>ABEP2A</td>
<td>NY ELAP 198.1</td>
</tr>
<tr>
<td>ABENVY</td>
<td>NY ELAP 198.6 PLM NOB</td>
</tr>
<tr>
<td>ABBNY</td>
<td>NY ELAP 198.4 TEM NOB</td>
</tr>
</tbody>
</table>

#### Water

| ABHE | EPA 100.2 |

#### Soil

| ABSE | PLM EPA 600 R-93/116 (Qual.) |

#### Vermiculite & Soil

| ABSP | PLM CARB 435 (LOD <1%) |
| ABSP1 | PLM CARB 435 (LOD 0.25%) |
| ABSP2 | PLM CARB 435 (LOD 0.1%) |

#### Dust

| ABWA | TEM Wipe ASTM D-6480 |
| ABDMV | TEM Microvac ASTM D-5755 |

### Turn Around Times

- **3 HR (4 HR TEM)** [ ]
- **6 HR (8 HR TEM)** [ ]
- **12 HR** [ ]
- **24 HR** [ ]

### Special Instructions

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Sample Identification/Location</th>
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</thead>
<tbody>
<tr>
<td>H-1A</td>
<td>Mortar in Between Glass Block</td>
</tr>
<tr>
<td>H-1B</td>
<td></td>
</tr>
<tr>
<td>H-1C</td>
<td></td>
</tr>
<tr>
<td>H-2A</td>
<td>Caulk in between Glass Block &amp; Brick</td>
</tr>
<tr>
<td>H-2B</td>
<td></td>
</tr>
<tr>
<td>H-2C</td>
<td></td>
</tr>
<tr>
<td>H-3A</td>
<td>Caulk on metal frame (Door) to Brick</td>
</tr>
<tr>
<td>H-3B</td>
<td></td>
</tr>
<tr>
<td>H-3C</td>
<td></td>
</tr>
<tr>
<td>H-4A</td>
<td>Caulk on underside of softil</td>
</tr>
<tr>
<td>H-4B</td>
<td></td>
</tr>
<tr>
<td>H-4C</td>
<td></td>
</tr>
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**Relinquished by:**

<table>
<thead>
<tr>
<th>Date</th>
<th>Time</th>
<th>Received by</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
</table>

If no technician is provided, then the primary contact for your account will be selected. Unless scheduled, the turnaround time for all samples received after 3 pm EST Friday will begin at 8 am Monday morning. Weekend or holiday work must be scheduled ahead of time and is charged for rush turnaround time. SanAir covers Standard Overnight FedEx shipping. Shipments billed to SanAir with a faster shipping rate will result in additional charges.
<table>
<thead>
<tr>
<th>Sample #</th>
<th>Sample Identification/Location</th>
<th>Volume or Area</th>
<th>Sample Date</th>
<th>Flow Rate*</th>
<th>Start – Stop Time*</th>
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<tbody>
<tr>
<td>H - SA</td>
<td>Motor</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H - SB</td>
<td></td>
<td></td>
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SECTION 02 41 00
DEMOLITION

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Selective demolition of building elements for alterations purposes.
   B. Particular demolition logistics
   C. Legal disposal of demolished items.

1.02 RELATED REQUIREMENTS
   A. Section 01 60 00 - Product Requirements: Handling and storage of items removed for salvage and relocation.

1.03 REFERENCE STANDARDS
   A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards.

1.04 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Demolition Plan: Submit demolition plan.
      1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
      2. Include a summary of safety procedures.
   C. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

1.05 QUALITY ASSURANCE
   A. Demolition Contractor: Company specializing in the type of work required.
      1. Minimum of 5 years of documented experience.

1.06 PROJECT CONDITIONS
   A. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.
   B. Comply with other requirements specified in Section 01 73 29.

PART 2 PRODUCTS

2.01 MATERIALS
   A. Not used.

PART 3 EXECUTION

3.01 SCOPE
   A. Selective demolition of building elements for alterations purposes.
   B. Remove other items indicated, for salvage.
   C. Disturbance during demolition and construction must be limited in areas open to and adjacent to occupied areas. Restrictions and requirements may include, but is not limited to, off hour work and multiple mobilizations as necessary to limit disturbance to the occupants.

3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS
   A. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
      1. Obtain required permits.
2. Comply with applicable requirements of NFPA 241.
3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
4. Provide, erect, and maintain temporary barriers and security devices.
5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
7. Do not close or obstruct roadways or sidewalks without permit.
8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.

B. Do not begin removal until receipt of notification to proceed from Owner.
C. Do not begin removal until built elements to be salvaged or relocated have been removed.

D. Protect existing structures and other elements that are not to be removed.
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

E. If hazardous materials are discovered during removal operations, stop work and notify Architect and Owner; hazardous materials include regulated asbestos containing materials, lead, PCB's, and mercury.


G. Perform demolition in a manner that maximizes salvage and recycling of materials.
   1. Comply with requirements of Section 01 74 19 - Waste Management.
   2. Dismantle existing construction and separate materials.
   3. Set aside reusable, recyclable, and salvageable materials; store and deliver to collection point or point of reuse.

3.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.
B. Protect existing utilities to remain from damage.
C. Do not close, shut off, or disrupt existing life safety systems that are in use without permission from Owner.
D. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without permission from Owner.
E. Locate and mark utilities to remain.
F. Prepare building demolition areas by disconnecting and capping utilities outside the demolition zone; identify and mark utilities to be subsequently reconnected, in same manner as other utilities to remain.

3.04 SELECTIVE DEMOLITION FOR ALTERATIONS

A. Drawings showing existing construction and utilities are based on field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as shown.
   2. Report discrepancies to Architect before disturbing existing installation.
3. Beginning of demolition work constitutes acceptance of existing conditions.

B. Separate areas in which demolition is being conducted from other areas that are still occupied.
   1. Provide, erect, and maintain temporary dustproof partitions of construction specified in Section 01 50 00 in locations indicated on drawings.

C. Remove existing work as indicated and as required to accomplish new work.
   1. Remove rotted wood, corroded metals, and deteriorated masonry and concrete; replace with new construction specified.
   2. Remove items indicated on drawings.

D. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.
   4. Remove abandoned pipe, ducts, conduits, and equipment, including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification.

E. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

3.05 DEBRIS AND WASTE REMOVAL
   A. Remove debris, junk, and trash from site.
   B. Remove from site all materials not to be reused on site.
   C. Leave site in clean condition, ready for subsequent work.

END OF SECTION
SECTION 03 10 00
CONCRETE FORMING AND ACCESSORIES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Formwork for cast-in-place concrete, with shoring, bracing and anchorage.
   B. Openings for other work.
   C. Form accessories.
   D. Form stripping.

1.02 RELATED REQUIREMENTS
   A. Section 03 20 00 - Concrete Reinforcing.
   B. Section 03 30 00 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS
   B. ACI 347R - Guide to Formwork for Concrete.
   D. PS 1 - Structural Plywood.

1.04 SUBMITTALS
   A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

1.05 QUALITY ASSURANCE
   A. Perform work of this section in accordance with ACI 347, ACI 301, and ACI 318.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Deliver prefabricated forms and installation instructions in manufacturer’s packaging.
   B. Store prefabricated forms off ground in ventilated and protected manner to prevent deterioration from moisture.

PART 2 PRODUCTS

2.01 FORMWORK - GENERAL
   A. Provide concrete forms, accessories, shoring, and bracing as required to accomplish cast-in-place concrete work.
   B. Design and construct to provide resultant concrete that conforms to design with respect to shape, lines, and dimensions.

2.02 WOOD FORM MATERIALS
   A. Softwood Plywood: PS 1, B-B High Density Concrete Form Overlay, Class I.
   B. Lumber: HEM-FIR species; #2 grade; with grade stamp clearly visible.

2.03 REMOVABLE PREFABRICATED FORMS
   A. Preformed Steel Forms: Minimum 16 gage matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

2.04 FORMWORK ACCESSORIES
   A. Form Release Agent: Capable of releasing forms from hardened concrete without staining or discoloring concrete or forming bugholes and other surface defects, compatible with concrete and form materials, and not requiring removal for satisfactory bonding of coatings to be applied.
B. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.02 ERECTION - FORMWORK
   A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.
   B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to overstressing by construction loads.
   C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.
   D. Align joints and make watertight. Keep form joints to a minimum.
   E. Obtain approval before framing openings in structural members that are not indicated on drawings.
   F. Provide fillet strips on external corners of beams, joists, and columns.
   G. Install void forms in accordance with manufacturer's recommendations. Protect forms from moisture or crushing.
   H. Coordinate this section with other sections of work that require attachment of components to formwork.
   I. If formwork is placed after reinforcement, resulting in insufficient concrete cover over reinforcement, request instructions from Architect before proceeding.

3.03 APPLICATION - FORM RELEASE AGENT
   A. Apply form release agent on formwork in accordance with manufacturer's recommendations.
   B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

3.04 INSERTS, EMBEDDED PARTS, AND OPENINGS
   A. Provide formed openings where required for items to be embedded in passing through concrete work.
   B. Locate and set in place items that will be cast directly into concrete.
   C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other work.
   D. Install accessories in accordance with manufacturer's instructions, so they are straight, level, and plumb. Ensure items are not disturbed during concrete placement.
   E. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.
   F. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.05 FIELD QUALITY CONTROL
   A. Do not reuse wood formwork more than 2 times for concrete surfaces to be exposed to view. Do not patch formwork.
3.06 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms to prevent damage to form materials or to fresh concrete. Discard damaged forms.

END OF SECTION
SECTION 03 20 00
CONCRETE REINFORCING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Reinforcing steel for cast-in-place concrete.
B. Supports and accessories for steel reinforcement.

1.02 RELATED REQUIREMENTS
A. Section 03 10 00 - Concrete Forming and Accessories.
B. See Structural Drawings for additional Project Specifications. If Conflicting Project Specifications arise, the Project Specifications on the Structural Drawings govern.
C. Section 03 30 00 - Cast-in-Place Concrete.

1.03 REFERENCE STANDARDS
B. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.
D. CRSI (DA4) - Manual of Standard Practice.

1.04 SUBMITTALS
See Section 01 30 00 - Administrative Requirements, for submittal procedures.
A. Manufacturer's Certificate: Certify that reinforcing steel and accessories, products supplied for this project meet or exceed specified requirements.

1.05 QUALITY ASSURANCE
A. Perform work of this section in accordance with ACI 301.
   1. Maintain one copy of each document on project site.
B. Provide Architect with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection.
C. Welders' Certificates: Submit certifications for welders employed on the project, verifying AWS qualification within the previous 12 months.

PART 2 PRODUCTS

2.01 REINFORCEMENT
A. Reinforcing Steel: ASTM A615/A615M, Grade 60 - 60,000 psi.
   1. Plain billet-steel bars.
B. Stirrup Steel: ASTM A1064/A1064M steel wire, unfinished.
C. Steel Welded Wire Reinforcement: Galvanized ASTM A 185/A 185M, plain type.
   1. Flat Sheets.
D. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage.
2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
3. Provide galvanized components for placement within 1-1/2 inches of weathering surfaces.

2.02 FABRICATION
A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.
B. Locate reinforcing splices not indicated on drawings at point of minimum stress.
   1. Review locations of splices with Architect.

PART 3 EXECUTION
3.01 PLACEMENT
A. Place, support and secure reinforcement against displacement. Do not deviate from required position.
B. Accommodate placement of formed openings.
C. Conform to applicable code for concrete cover over reinforcement.

3.02 FIELD QUALITY CONTROL
A. Inspect installed reinforcement for conformance to contract documents before concrete placement.

END OF SECTION
PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Floors and slabs on grade.
   B. Concrete foundation walls and footings.
   C. Joint devices associated with concrete work.
   D. Concrete curing.

1.02 RELATED REQUIREMENTS
   A. Section 03 10 00 - Concrete Forming and Accessories: Forms and accessories for formwork.
   B. Section 03 20 00 - Concrete Reinforcing.

1.03 REFERENCE STANDARDS
   C. ACI 211.2 - Standard Practice for Selecting Proportions for Structural Lightweight Concrete.
   D. ACI 301 - Specifications for Structural Concrete.
   E. ACI 302.1R - Guide to Concrete Floor and Slab Construction.
   F. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete.
   H. ACI 308R - Guide to External Curing of Concrete.
   I. ACI 318 - Building Code Requirements for Structural Concrete and Commentary.
   J. ACI 347R - Guide to Formwork for Concrete.
   P. ASTM C173/C173M - Standard Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method.
AA. ASTM E1155 - Standard Test Method for Determining F(F) Floor Flatness and F(L) Floor Levelness Numbers.
AB. ASTM E1745 - Standard Specification for Plastic Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs.
AC. COE CRD-C 513 - COE Specifications for Rubber Waterstops.

1.04 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.
C. Mix Design: Submit proposed concrete mix design.
D. Samples: Submit samples of underslab vapor retarder to be used.
E. Test Reports: Submit report for each test or series of tests specified.
F. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.
G. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.
H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE
A. Perform work of this section in accordance with ACI 301 and ACI 318.
B. Follow recommendations of ACI 305R when concreting during hot weather.
C. For slabs required to include moisture vapor reduction admixture (MVRA), do not proceed with placement unless manufacturer's representative is present for every day of placement.

1.06 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Slabs with Moisture Vapor Reducing Admixture (MVRA): Provide warranty to cover the cost of flooring failures due to moisture migration from slabs for ten years.
   1. Include cost of repair or removal of failed flooring, placement of topical moisture remediation system, and replacement of flooring with comparable flooring system.
C. Moisture Emission Reducing Curing and Sealing Compound: Provide warranty to cover the cost of flooring delamination failures for 10 years.
   1. Include cost of repair or removal of failed flooring, remediation with a moisture vapor impermeable surface coating, and replacement of flooring with comparable flooring system.
PART 2 PRODUCTS
2.01 FORMWORK
A. Comply with requirements of Section 03 10 00.

2.02 REINFORCEMENT
A. Comply with requirements of Section 03 20 00.

2.03 CONCRETE MATERIALS
A. Cement: ASTM C150, Type I - Normal Portland type.
   1. Acquire all cement for entire project from same source.
   1. Acquire all aggregates for entire project from same source.
C. Lightweight Aggregate: ASTM C330/C330M.
D. Water: Clean and not detrimental to concrete.
E. Fiber Reinforcement: Alkali-resistant polypropylene complying with ASTM C1116/C1116M.
   1. Fiber Length: 0.25 inch, nominal.

2.04 ADMIXTURES
A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement.
B. Air Entrainment Admixture: ASTM C260/C260M.
C. High Range Water Reducing and Retarding Admixture: ASTM C494/C494M Type G.
D. Fiber Reinforcing Admixture:
E. Moisture Vapor Reduction Admixture (MVRA): Liquid, inorganic admixture free of volatile organic compounds (VOCs) and formulated to close capillary systems formed during curing to reduce moisture vapor emission and transmission, with no adverse effect on concrete properties.
   1. Provide admixture in all slabs to receive adhesively applied flooring.

2.05 ACCESSORY MATERIALS
A. Underslab Vapor Retarder: Multi-layer, fabric-, cord-, grid-, or aluminum-reinforced polyethylene or equivalent, complying with ASTM E1745, Class A; stated by manufacturer as suitable for installation in contact with soil or granular fill under concrete slabs. The use of single ply polyethylene is prohibited.
   1. Accessory Products: Vapor retarder manufacturer’s recommended tape, adhesive, mastic, prefabricated boots, etc., for sealing seams and penetrations in vapor retarder.
   2. Products:

2.06 BONDING AND JOINTING PRODUCTS
A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.
B. Epoxy Bonding System:
C. Waterstops: Rubber, complying with COE CRD-C 513.
D. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
E. Slab Isolation Joint Filler: 1/2 inch thick, height equal to slab thickness, with removable top section that will form 1/2 inch deep sealant pocket after removal.
1. **Material:** ASTM D1751, cellulose fiber.

F. **Slab Contraction Joint Device:** Preformed linear strip intended for pressing into wet concrete to provide straight route for shrinkage cracking.

G. **Slab Construction Joint Devices:** Combination keyed joint form and screed, galvanized steel, with minimum 1 inch diameter holes for conduit or rebars to pass through at 6 inches on center; ribbed steel stakes for setting.

### 2.07 CURING MATERIALS

A. **Evaporation Reducer:** Liquid thin-film-forming compound that reduces rapid moisture loss caused by high temperature, low humidity, and high winds; intended for application immediately after concrete placement.

B. **Curing Compound, Naturally Dissipating:** Clear, water-based, liquid membrane-forming compound; complying with ASTM C309.

C. **Curing and Anti-Spalling Compound:** Boiled linseed oil compound.

D. **Resin Curing Compound:** Solvent-based liquid, white pigmented, membrane-forming.

   1. For use on exterior slabs. When slab will be painted, sealed, topped, or receive other applied finish, completely remove curing compound after curing is complete and before finish coatings are applied.

E. **Curing and Sealing Compound, Moisture Emission Reducing:** Liquid, membrane-forming, clear sealer, for application to newly placed concrete; capable of providing adequate bond for flooring adhesives, initially and over the long term; with sufficient moisture vapor impermeability to prevent deterioration of flooring adhesives due to moisture emission.

   1. Use this product to cure and seal all slabs to receive adhesively applied flooring or roofing.
   2. Comply with ASTM C309 and ASTM C1315 Type I Class A.
   3. **VOC Content:** Less than 100 g/L.
   4. **Solids Content:** 25 percent, minimum.

F. **Curing and Sealing Compound:** Liquid, membrane-forming, clear, non-yellowing acrylic; complying with ASTM C309.

### 2.08 CONCRETE MIX DESIGN

A. **Proportioning Structural Lightweight Concrete:** Comply with ACI 211.2 recommendations.

B. **Concrete Strength:** Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.

   1. For trial mixtures method, employ independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

C. **Admixtures:** Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.

D. **Fiber Reinforcement:** Add to mix at rate of 1.5 pounds per cubic yard, or as recommended by manufacturer for specific project conditions.

E. **Structural Lightweight Concrete:**

   1. **Compressive Strength**, when tested in accordance with ASTM C39/C39M at 28 days:
   2. **Water-Cement Ratio**: Maximum 40 percent by weight.
   3. **Total Air Content**: 3 percent, determined in accordance with ASTM C173/C173M.
   4. **Maximum Slump**: 3 inches.
   5. **Maximum Aggregate Size**: 5/8 inch.
   6. **Maximum dry unit weight**: 115 lb per cubic foot.

### 2.09 MIXING

A. **Transit Mixers:** Comply with ASTM C94/C94M.
PART 3  EXECUTION

3.01 EXAMINATION
A. Verify lines, levels, and dimensions before proceeding with work of this section.

3.02 PREPARATION
A. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning with steel brush and applying bonding agent in accordance with manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.
B. Where new concrete with integral waterproofing is to be bonded to previously placed concrete, prepare surfaces to be treated in accordance with waterproofing manufacturer's instructions. Saturate cold joint surface with clean water, and remove excess water before application of coat of waterproofing admixture slurry. Apply slurry coat uniformly with semi-stiff bristle brush at rate recommended by waterproofing manufacturer.
C. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.
D. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches. Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
   1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as shown on the drawings. Do not use sand.

3.03 PLACING CONCRETE
A. Place concrete in accordance with ACI 304R.
B. Place concrete for floor slabs in accordance with ACI 302.1R.
C. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.
D. Place concrete continuously without construction (cold) joints wherever possible; where construction joints are necessary, before next placement prepare joint surface by removing laitance and exposing the sand and sound surface mortar, by sandblasting or high-pressure water jetting.
E. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

3.04 SLAB JOINTING
A. Locate joints as indicated on drawings.
B. Anchor joint fillers and devices to prevent movement during concrete placement.
C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.
   1. Install wherever necessary to separate slab from other building members, including columns, walls, equipment foundations, footings, stairs, manholes, sumps, and drains.
D. Load Transfer Construction and Contraction Joints: Install load transfer devices as indicated; saw cut joint at surface as indicated for contraction joints.
E. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch thick blade and cut at least 1 inch deep but not less than one quarter (1/4) the depth of the slab.
F. Contraction Joint Devices: Use preformed joint device, with top set flush with top of slab.

G. Construction Joints: Where not otherwise indicated, use metal combination screed and key form, with removable top section for joint sealant.

3.05 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Maximum Variation of Surface Flatness:
   1. Exposed Concrete Floors: 1/4 inch in 10 ft.

B. Correct the slab surface if tolerances are less than specified.

C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

3.06 CONCRETE FINISHING

A. Concrete Slabs: Finish to requirements of ACI 302.1R, and as follows:
   1. Other Surfaces to Be Left Exposed: "Steel trowel" as described in ACI 302.1R, minimizing burnish marks and other appearance defects.

3.07 CURING AND PROTECTION

A. Comply with requirements of ACI 308R. Immediately after placement, protect concrete from premature drying, excessively hot or cold temperatures, and mechanical injury.

B. Maintain concrete with minimal moisture loss at relatively constant temperature for period necessary for hydration of cement and hardening of concrete.

C. Surfaces Not in Contact with Forms:
   1. Initial Curing: Start as soon as free water has disappeared and before surface is dry. Keep continuously moist for not less than three days by water ponding, water-saturated sand, water-fog spray, or saturated burlap.
   2. Final Curing: Begin after initial curing but before surface is dry.

3.08 FIELD QUALITY CONTROL

A. Provide free access to concrete operations at project site and cooperate with appointed firm.

B. Submit proposed mix design of each class of concrete to inspection and testing firm for review prior to commencement of concrete operations.

C. Tests of concrete and concrete materials may be performed at any time to ensure conformance with specified requirements.

D. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.

E. Perform one slump test for each set of test cylinders taken, following procedures of ASTM C143/C143M.

F. Slab Testing: Cooperate with manufacturer of specified moisture vapor reduction admixture (MVRA) to allow access for sampling and testing concrete for compliance with warranty requirements.

3.09 DEFECTIVE CONCRETE

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.
D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

3.10 PROTECTION

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

END OF SECTION
SECTION 05 12 00
STRUCTURAL STEEL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Structural steel framing members.
   B. Grouting under base plates.

1.02 RELATED REQUIREMENTS
   A. Section 05 31 00 - Steel Decking: Support framing for small openings in deck.

1.03 REFERENCE STANDARDS
   D. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.
   F. ASTM A992/A992M - Standard Specification for Structural Steel Shapes.
   G. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination.
   H. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel.

1.04 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Shop Drawings:
      1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
      2. Connections not detailed.
      3. Indicate cambers and loads.
      4. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.
   C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.
   D. Mill Test Reports: Indicate structural strength, destructive test analysis and non-destructive test analysis.
   E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
   F. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.05 QUALITY ASSURANCE
   A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."
   B. Fabricate structural steel members in accordance with AISC 303, AISC 341, AISC 341s1 and RCSC's "Specification for Structural Joints Using ASTM A325 or A490 Bolts."
   C. Fabricator: Company specializing in performing the work of this section with minimum ten years of documented experience.
D. Erector: Company specializing in performing the work of this section with minimum ten years of documented experience.

PART 2 PRODUCTS

2.01 MATERIALS
   A. Steel Angles and Plates: ASTM A36/A36M.
   B. Steel W Shapes and Tees: ASTM A992/A992M.
   C. Steel Shapes, Plates, and Bars: ASTM A36/A36M and ASTM A572/A572M, Grade 50 high-strength, corrosion-resistant structural steel.
   D. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.
   E. Pipe: ASTM A53/A53M, Grade B, Finish black unless noted otherwise.

2.02 FABRICATION
   A. Shop fabricate to greatest extent possible.

2.03 FINISH
   A. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.
      1. Primer: SSP-Paint 25, Type I or Type II, Zinc Oxide, alkyd, linseed oil primer.
      2. Galvanizing Repair Paint: MP#18, MP#19, or SSPC-Paint 20, ASTM A780/A780M.

2.04 GROUT
   A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C 1107/C 1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

3.02 ERECTION
   A. Erect structural steel in compliance with AISC 303 and AISC 360.
   B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.
   C. Do not field cut or alter structural members without approval of Architect.
   D. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.
   E. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

3.03 TOLERANCES
   A. Maximum Variation From Plumb: 1/4 inch per story, non-cumulative.
   B. Maximum Offset From True Alignment: 1/4 inch.

END OF SECTION
SECTION 05 31 00
STEEL DECKING

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Roof deck.
B. Supplementary framing for openings up to and including 18 inches.
C. Bearing plates and angles.

1.02  RELATED REQUIREMENTS
A. Section 05 12 00 - Structural Steel Framing: Support framing for openings larger than 18 inches and shear stud connectors.

1.03  REFERENCE STANDARDS
C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
D. AWS D1.1/D1.1M - Structural Welding Code - Steel.
F. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel.
H. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements.
I. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.04  SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.
C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.
D. Certificates: Certify that products furnished meet or exceed specified requirements.
E. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.
F. Fabricator's Qualification Statement: Provide documentation showing steel fabricator is accredited under IAS AC172.

1.05  QUALITY ASSURANCE
A. Fabricator Qualifications: A qualified steel fabricator that is accredited by the International Accreditation Service (IAS) Fabricator Inspection Program for Structural Steel in accordance with IAS AC172.
B. Installer Qualifications: Company specializing in performing the work of this Section with minimum ten years of experience.
PART 2 PRODUCTS

2.01 MANUFACTURERS
A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   1. ASC Profiles, Inc.; a Blue Scope Steel company.
   2. Canam United States; Canam Group Inc.
   3. CMC Joist & Deck.
   5. Cordeck.
   6. DACS, Inc.
   8. Marlyn Steel Decks, Inc.
   9. New Millennium Building Systems, LLC.
   11. Roof Deck, Inc.
   12. Valley Joist; Subsidiary of EBSCO Industries, Inc.
   14. Wheeling Corrugating Company; Div. of Wheeling-Pittsburgh Steel Corporation.

2.02 STEEL DECK
A. Roof Deck: Non-composite type, fluted steel sheet:
   2. Minimum Base Metal Thickness: 22 gage, 0.0299 inch.
   3. Nominal Height: 1-1/2 inch.
   5. End Joints: Lapped, welded.

2.03 ACCESSORY MATERIALS
A. Bearing Plates and Angles: ASTM A36/A36M steel, galvanized per ASTM A123/A123M.
B. Welding Materials: AWS D1.1/D1.1M.
C. Fasteners: Galvanized hardened steel, self tapping.
D. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
   1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.
E. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
F. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.

2.04 FABRICATED DECK ACCESSORIES
A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage, 0.0299 inch thick sheet steel; of profile and size as indicated; finished same as deck.
B. Roof Sump Pans: Formed sheet steel, 14 gage, 0.0747 inch minimum thickness, flat bottom, sloped sides, recessed 1-1/2 inches below roof deck surface, bearing flange 3 inches wide, sealed watertight.
PART 3 EXECUTION

3.01 EXAMINATION
A. Verify existing conditions prior to beginning work.

3.02 INSTALLATION
A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.
B. On concrete and masonry surfaces provide minimum 4 inch bearing.
C. On steel supports provide minimum 1-1/2 inch bearing.
D. Fasten deck to steel support members at ends and intermediate supports at 12 inches on center maximum, parallel with the deck flute and at each transverse flute using methods specified.
   1. Welding: Use fusion welds through weld washers.
E. At mechanically fastened male/female side laps fasten at 24 inches on center maximum.
F. Drive mechanical sidelay connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.
G. Weld deck in accordance with AWS D1.3/D1.3M.
H. At deck openings from 6 inches to 18 inches in size, provide 2 by 2 by 1/4 inch steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.
I. At deck openings greater than 18 inches in size, provide steel angle reinforcement. as specified in Section 05 12 00.
J. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
K. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

END OF SECTION
SECTION 05 40 00
COLD-FORMED METAL FRAMING

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Formed steel stud exterior wall framing.
B. Exterior wall sheathing.
C. Formed steel joist and purlin framing and bridging.

1.02 RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Roof and wall sheathing.
B. Section 09 21 16 - Gypsum Board Assemblies: Lightweight, non-load bearing metal stud framing.
C. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.

1.03 REFERENCE STANDARDS

A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute.
C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
D. ASTM C955 - Standard Specification for Load-Bearing (Transverse and Axial) Steel Studs, Runners (Tracks), and Bracing or Bridging for Screw Application of Gypsum Panel Products and Metal Plaster Bases.
F. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic").

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's data on factory-made framing connectors, showing compliance with requirements.
C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
   1. Design data:
D. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Metal Framing:
   1. CEMCO: www.cemcosteel.com/#sle.

B. Framing Connectors and Accessories:
1. Same manufacturer as metal framing.

2.02 FRAMING SYSTEM

A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

B. Design Requirements: Provide completed framing system having the following characteristics:
1. Design: Calculate structural characteristics of cold-formed steel framing members according to AISI S100-12.
2. Structural Performance: Design, engineer, fabricate, and erect to withstand specified design loads for project conditions within required limits.
3. Design Loads: In accordance with applicable codes.
4. Live load deflection meeting the following, unless otherwise indicated:
   b. Exterior Walls: Maximum horizontal deflection under wind load of 1/180 of span.
5. Able to tolerate movement of components without damage, failure of joint seals, undue stress on fasteners, or other detrimental effects when subject to seasonal or cyclic day/night temperature ranges.
6. Able to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

2.03 FRAMING MATERIALS

A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.
   1. Gage and Depth: As required to meet specified performance levels.
   2. Galvanized in accordance with ASTM A653/A653M, G90/Z275 coating.

   1. Base Metal: Structural Steel (SS), Grade 33/230.
   2. Gage and Depth: As indicated on drawings.

C. Framing Connectors: Factory-made, formed steel sheet.
   1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gage, 0.1345 inch, and factory punched holes and slots.
   2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
   3. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.

2.04 FASTENERS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.

B. Anchorage Devices: Powder actuated.

2.05 WALL SHEATHING

A. Gypsum Board Wall Sheathing: See Section 09 21 16.

2.06 ACCESSORIES

A. Bracing, Furring, Bridging: Formed sheet steel, thickness determined for conditions encountered; finish to match framing components.
B. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, Type I - Inorganic, complying with VOC limitations of authorities having jurisdiction.

PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION OF STUDS
A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.
B. Place studs at 16 inches on center; not more than 2 inches from abutting walls and at each side of openings. Connect studs to tracks using clip and tie method.
C. Coordinate placement of insulation in multiple stud spaces made inaccessible after erection.
D. Provide deflection allowance in stud track, directly below horizontal building framing at non-load bearing framing.

3.03 INSTALLATION OF JOISTS AND PURLINS
A. Install framing components in accordance with manufacturer's instructions.
B. Make provisions for erection stresses. Provide temporary alignment and bracing.
C. Place joists at 16 inches on center; not more than 2 inches from abutting walls, and connect joists to supports using fastener method.

3.04 INSTALLATION OF WALL SHEATHING
A. Install wall sheathing with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
   1. Provide steel diagonal bracing at corners with foam insulation or gypsum board wall sheathing.

END OF SECTION
SECTION 06 10 00
ROUGH CARPENTRY

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Rough opening framing for doors, windows, and roof openings.
B. Sheathing.
C. Roofing nailers.
D. Preservative treated wood materials.
E. Fire retardant treated wood materials.
F. Miscellaneous framing and sheathing.
G. Wood nailers and curbs for roofing and items installed on roof.
H. Concealed wood blocking, nailers, and supports.
I. Miscellaneous wood nailers, furring, and grounds.

1.02 RELATED REQUIREMENTS

A. Section 05 12 00 - Structural Steel Framing: Prefabricated girders, beams, columns, and hangers for support of wood blocking.
B. Section 07 62 00 - Sheet Metal Flashing and Trim: Drip flashings.
C. Section 09 21 16 - Gypsum Board Assemblies: Gypsum-based sheathing.
D. Section 08 11 13 & 08 43 13: Door openings to receive wood blocking.

1.03 REFERENCE STANDARDS

C. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
I. AWPA C2 - Lumber, Timber, Bridge Ties and Mine Ties -- Preservative Treatment by Pressure Processes; American Wood Protection Association.
J. AWPA C9 - Plywood -- Preservative Treatment by Pressure Processes; American Wood Protection Association.
K. AWPA C20 - Structural Lumber -- Fire Retardant Treatment by Pressure Processes; American Wood-Protection Association.
L. AWPA C27 - Plywood -- Fire-Retardant Treatment by Pressure Processes; American Wood-Protection Association.
O. PS 1 - Structural Plywood.
Q. SPIB (GR) - Grading Rules.
R. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17.
S. WWPA G-5 - Western Lumber Grading Rules.

1.04 SUBMITTALS
A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide technical data on wood preservative materials and application instructions.
C. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

1.05 QUALITY ASSURANCE
A. Lumber: Comply with PS 20 and approved grading rules and inspection agencies.
   1. Lumber of other species or grades, or graded by other agencies, is acceptable provided structural and appearance characteristics are equivalent to or better than products specified.
B. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
C. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

1.06 DELIVERY, STORAGE, AND HANDLING
A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.
B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

PART 2 PRODUCTS

2.01 GENERAL REQUIREMENTS
A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Douglas Fir-Larch, unless otherwise indicated.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.
   3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.
B. Lumber fabricated from old growth timber is not permitted.
C. Provide sustainably harvested wood.

2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS
A. Grading Agency: Southern Pine Inspection Bureau, Inc. (SPIB).
B. Sizes: Nominal sizes as indicated on drawings, S4S.
C. Moisture Content: S-dry or MC19.
D. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
1. Lumber: S4S No. 2 or Standard Grade.
2. Boards: Standard or No. 3.

E. Miscellaneous Blocking, Furring, Nailers, and Curbs:
1. Lumber: S4S, No. 1 or Construction Grade.

2.03 CONSTRUCTION PANELS
A. Wall Sheathing, For roof locations at parapets: Plywood, PS 1, Grade C-D Exposure I; Exterior Exposure, Fire retardant treated.
   1. Thickness: 5/8", nominal, or as noted.

B. Other Applications:
   1. Plywood Concealed From View But Located Within Exterior Enclosure: PS 1, C-C Plugged or better, Exterior grade.
   2. Plywood Exposed to View But Not Exposed to Weather: PS 1, A-D, or better.
   3. Other Locations: PS 1, C-D Plugged or better.
   4. Electrical Component Mounting: APA rated plywood B-C sheathing, fire retardant treated.

2.04 ACCESSORIES
A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel per ASTM A 153/A 153M; or Stainless Steel for high humidity and preservative-treated wood locations, unfinished steel elsewhere.
   2. Drywall Screws: Bugle head, hardened steel, power driven type, length three times thickness of sheathing.
   3. Anchors: Toggle bolt type for anchorage to hollow masonry.

2.05 FACTORY WOOD TREATMENT
A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
   2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Fire Retardant Treatment:
   1. Manufacturers:
      d. Substitutions: Not permitted.
   2. Exterior Type: AWPA U1, Category UCFB, Commodity Specification H, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes both before and after accelerated weathering test performed in accordance with ASTM D2898.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
      b. Do not use treated wood in direct contact with the ground.
   3. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread rating of 25 when tested in accordance with
ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
   a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
   b. Treat rough carpentry items as scheduled; or as indicated.
   c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Treatment:
   1. Manufacturers:
      d. Substitutions: Not permitted.

D. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative to 0.25 lb/cu ft retention:
   1. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
   2. Treat lumber in contact with roofing, flashing, or waterproofing.
   3. Treat lumber in contact with masonry or concrete.
   4. Treat lumber less than 18 inches above grade.
      a. Treat lumber in other locations as indicated.
   5. Preservative Pressure Treatment of Plywood Above Grade: AWPA U1, Use Category UC2 and UC3B, Commodity Specification F using waterborne preservative to 0.25 lb/cu ft retention.
      a. Kiln dry plywood after treatment to maximum moisture content of 15 percent.
      b. Treat plywood in contact with masonry or concrete.
      c. Treat plywood in other locations as indicated.

PART 3 EXECUTION

3.01 INSTALLATION - GENERAL
   A. Select material sizes to minimize waste.
   B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
   C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

3.02 FRAMING INSTALLATION
   A. Select material sizes to minimize waste.
   B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.
   C. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.
   D. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.
   E. Install structural members full length without splices unless otherwise specifically detailed.
   F. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes and AFPA Wood Frame Construction Manual.
3.03 BLOCKING, NAILERS, AND SUPPORTS

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In metal stud walls, provide continuous blocking around door and window openings for anchorage of frames, securely attached to stud framing.

C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

E. Specifically, provide the following non-structural framing and blocking:
   1. Cabinets and shelf supports.
   2. Wall brackets.
   3. Handrails.
   4. Grab bars.
   5. Bath accessories.
   6. Wall-mounted door stops.
   7. Visual display and marker boards.

3.04 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

3.05 INSTALLATION OF ACCESSORIES AND MISCELLANEOUS WOOD

A. Curb roof openings except where prefabricated curbs are provided. Form corners by alternating lapping side members.

B. Coordinate curb installation with installation of decking and support of deck openings, roofing vapor retardant, and parapet construction.

3.06 INSTALLATION OF CONSTRUCTION PANELS

A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using screws.
   1. Place water-resistive barrier horizontally over wall sheathing, weather lapping edges and ends.

3.07 TOLERANCES

A. Framing Members: 1/4 inch from true position, maximum.

B. Surface Flatness of Floor: 1/8 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

C. Variation from Plane (Other than Floors): 1/4 inch in 10 feet maximum, and 1/4 inch in 30 feet maximum.

3.08 CLEANING

A. Waste Disposal: Comply with the requirements of Section 01 78 39.
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.
C. Prevent sawdust and wood shavings from entering the storm drainage system.

END OF SECTION
SECTION 06 20 00
FINISH CARPENTRY

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Door Hardware attachment.

1.02  RELATED REQUIREMENTS

1.03  REFERENCE STANDARDS
C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards.
E. BHMA A156.9 - American National Standard for Cabinet Hardware.
F. NEMA LD 3 - High-Pressure Decorative Laminates.

1.04  ADMINISTRATIVE REQUIREMENTS
A. Coordinate the work with installation of associated and adjacent components.
B. Sequence installation to ensure utility connections are achieved in an orderly and expeditious manner.

1.05  SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements for submittal procedures.

1.06  QUALITY ASSURANCE
A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.

1.07  DELIVERY, STORAGE, AND HANDLING
A. Protect work from moisture damage.

PART 2  PRODUCTS

2.01  FINISH CARPENTRY ITEMS
A. Quality Grade: Unless otherwise indicated provide products of quality specified by AWI/AWMAC/WI Architectural Woodwork Standards for Premium Grade.
B. Interior Woodwork Items:
   1. Moldings, Bases, Casings, and Miscellaneous Trim: Stained to match existing.

2.02  WOOD-BASED COMPONENTS
A. Wood fabricated from old growth timber is not permitted.
B. Provide sustainably harvested wood, certified or labeled as specified in Section 01 60 00.
C. Wood fabricated from timber recovered from riverbeds or otherwise abandoned is permitted, unless otherwise noted, provided it is clean and free of contamination; identify source; provide lumber re-graded by an inspection service accredited by the American Lumber Standard Committee, Inc.

2.03  SHEET MATERIALS
A. Particleboard: ANSI A208.1; composed of wood chips, sawdust, or flakes of medium density, made with waterproof resin binders; of grade to suit application; sanded faces.
2.04 ACCESSORIES
   A. Lumber for Shimming

2.05 WOOD TREATMENT
   A. Shims/Blocking - Wood Preservative by Pressure Treatment (PT Type): Provide AWPA U1 treatment using waterborne preservative with 0.25 percent retainage.

2.06 FABRICATION
   A. Shop assemble work for delivery to site, permitting passage through building openings.
   B. When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide trim for scribing and site cutting.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify adequacy of backing and support framing.

3.02 INSTALLATION
   A. Install work in accordance with AWI/AWMAC/WI Architectural Woodwork Standards requirements for grade indicated.
   B. Set and secure materials and components in place, plumb and level.
   C. Carefully scribe work abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim to conceal larger gaps.

3.03 TOLERANCES
   A. Maximum Variation from True Position: 1/16 inch.
   B. Maximum Offset from True Alignment with Abutting Materials: 1/32 inch.

END OF SECTION
SECTION 07 21 00
THERMAL INSULATION

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Board insulation at cavity wall construction, perimeter foundation wall, and underside of floor slabs.
   B. Batt insulation and vapor retarder in exterior wall construction.
   C. Batt insulation for filling perimeter window and door shim spaces and crevices in exterior wall and roof.
   D. Acoustic Batt insulation. See Section 09 21 16 Gypsum Board Assemblies.

1.02 RELATED REQUIREMENTS
   A. Section 06 10 00 - Rough Carpentry: Supporting construction for batt insulation.
   B. Section 07 53 00 - Elastomeric Membrane Roofing: Insulation specified as part of roofing system.
   C. Section 09 21 16 - Gypsum Board Assemblies: Acoustic insulation inside walls and partitions.

1.03 REFERENCE STANDARDS
   J. ASTM E136 - Standard Test Method for Behavior of Materials in a Vertical Tube Furnace At 750 Degrees C.
   L. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc..

1.04 SUBMITTALS
   A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.
   C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.
   D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
1.05 FIELD CONDITIONS
   A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

1.06 SEQUENCING
   A. Sequence work to ensure fireproofing, firestop, and vapor retarder materials are in place before beginning work of this section.

1.07 COORDINATION
   A. Coordinate the work with spray foam closed cell insulation application.

PART 2 PRODUCTS
2.01 MANUFACTURERS
   A. Insulation:
      1. Dow
      2. Owens Corning
      3. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 APPLICATIONS
   A. Insulation Under Concrete Slabs: Extruded polystyrene board.
   B. Insulation at Perimeter of Foundation: Extruded polystyrene board.
   C. Insulation in Metal Framed Walls: Batt insulation with integral vapor retarder.

2.03 FOAM BOARD INSULATION MATERIALS
   A. Extruded Polystyrene Board Insulation: ASTM C 578, Type IV; Extruded polystyrene board with natural skin surfaces; with the following characteristics:
      1. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
      2. Flame Spread Index: 75 or less, when tested in accordance with ASTM E84.
      3. Smoke Developed Index: 450 or less, when tested in accordance with ASTM E84.
      4. Board Size: 48 x 96 inch or 24 X 96 inch.
      5. Board Thickness: 2 inches,
      6. Board Edges: Square, Shiplap or Tongue and groove.
      7. Thermal Conductivity (k factor) at 75 degrees: or 20.
      10. Water Absorption, maximum: 0.1 percent, volume.

   B. Manufacturers:
      1. Dow Chemical Co(Design Basis):
         a. Cavity Wall - "Cavity Mate Plus", type IV
         b. Foundation and slabs - "Styrofoam Highload 40" type VI.
      2. Owens Corning Corp.
         a. Cavity Wall - "Foamular 250", type IV
         b. Foundation and Slabs - "Foamular 400 SE", type VI.
      3. Pactiv Building Products
         a. Cavity Wall - "Green Board Score Board", type IV
         b. Foundation and Slabs - Type VI.

   C. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 BATT INSULATION MATERIALS
   A. Batt Insulation: ASTM C 665; preformed batt; friction fit, conforming to the following:
      1. Material: Rock or slag fiber, or glass fiber.
2. Flame Spread Index: 25 or less, when tested in accordance with ASTM E84.
3. Smoke Developed Index: 50 or less, when tested in accordance with ASTM E84.
4. Combustibility: Non-combustible, when tested in accordance with ASTM E136.
5. Formaldehyde Content: Zero.
6. Thermal Resistance: in accordance with plans.
7. Thickness: Varies.
9. Manufacturers:
10. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 ACCESSORIES
   A. Tape: Bright aluminum; Polyethylene or Polyester self-adhering type, mesh reinforced, 2 inch wide.
   B. Insulation Fasteners: Impaling clip of galvanized steel with washer retainer and clips, to be adhered to surface to receive insulation, length to suit insulation thickness and substrate, capable of securely and rigidly fastening insulation in place.
   C. Wire Mesh: Galvanized steel, hexagonal wire mesh.
   D. Adhesive: Type recommended by insulation manufacturer for application and in compliance with Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation and adhesive.
   B. Verify substrate surfaces are flat, free of irregularities or materials or substances that may impede adhesive bond.

3.02 BOARD INSTALLATION AT FOUNDATION PERIMETER
   A. Adhere a 6 inch wide strip of polyethylene sheet over construction, control, and expansion joints with double beads of adhesive each side of joint.
      1. Tape seal joints.
      2. Extend sheet full height of joint.
   B. Apply adhesive to back of boards:
      1. Three continuous beads per board length.
      2. Full bed 1/8 inch thick.
   C. Install boards horizontally on foundation perimeter.
      1. Place boards to maximize adhesive contact.
      2. Install in running bond pattern.
      3. Butt edges and ends tightly to adjacent boards and to protrusions.
   D. Extend boards over expansion joints, unbonded to foundation on one side of joint.
   E. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

3.03 BOARD INSTALLATION AT CAVITY WALLS
   A. Adhere a 6 inch wide strip of polyethylene sheet over expansion joints with double beads of adhesive each side of joint.
      1. Tape seal joints between sheets.
      2. Extend sheet full height of joint.
B. Apply adhesive to back of boards:
   1. Three continuous beads per board length.
   2. Full bed 1/8 inch thick.
C. Install boards to fit snugly between wall ties. Wedge insulation from outside wythe, 24" O.C. both ways for tight fit against inside wythe of C.M.U.
D. Make insulation continuous, fill all voids with insulation.
   1. Place membrane surface against adhesive.
   2. Place membrane surface facing out, and tape seal board joints.
E. Install boards horizontally on walls.
   1. Place boards to maximize adhesive contact.
   2. Install in running bond pattern.
   3. Butt edges and ends tightly to adjacent boards and to protrusions.
F. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
G. Place 6 inch wide polyethylene sheet at perimeter of wall openings, from adhesive vapor retarder bed to window, door, and storefront frames. Tape seal in place to ensure continuity of vapor retarder and air seal.

3.04 BOARD INSTALLATION UNDER CONCRETE SLABS
   A. Place insulation under slabs on grade after base for slab has been compacted.
   B. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.
   C. Prevent insulation from being displaced or damaged while placing vapor retarder and placing slab.

3.05 BATT INSTALLATION
   A. Install insulation and vapor retarder in accordance with manufacturer's instructions.
   B. Install in exterior cavities at window, door, wall and roof spaces without gaps or voids. Do not compress insulation.
   C. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.
   D. Fit insulation tightly in cavities and tightly to exterior side of mechanical and electrical services within the plane of the insulation.
   E. Install with factory applied vapor retarder membrane facing warm side of building spaces. Lap ends and side flanges of membrane over framing members.
   F. Tape seal butt ends, lapped flanges, and tears or cuts in membrane.
   G. At metal framing, place vapor retarder on warm side of insulation; lap and seal sheet retarder joints over member face.
   H. Tape seal tears or cuts in vapor retarder.
   I. Extend vapor retarder tightly to full perimeter of adjacent window and door frames and other items interrupting the plane of the membrane. Tape seal in place.
   J. Coordinate work of this section with construction of air barrier seal specified in Section 07 27 26.

3.06 PROTECTION
   A. Do not permit installed insulation to be damaged prior to its concealment.

END OF SECTION
SECTION 07 25 00
WEATHER BARRIERS

PART 1  GENERAL

1.01 SECTION INCLUDES
A. Vapor Retarders: Materials to make exterior walls water vapor resistant and air tight.

1.02 DEFINITIONS
A. Weather Barrier: Assemblies that form either water-resistive barriers, air barriers, or vapor retarders.
B. Air Barrier: Air tight barrier made of material that is relatively air impermeable but water vapor permeable, both to the degree specified, with sealed seams and with sealed joints to adjacent surfaces. Note: For the purposes of this specification, vapor impermeable air barriers are classified as vapor retarders.

1.03 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on material characteristics.

1.04 FIELD CONDITIONS
A. Maintain temperature and humidity recommended by the materials manufacturers before, during and after installation.

PART 2  PRODUCTS

2.01 AIR BARRIER MATERIALS (WATER VAPOR PERMEABLE AND WATER-RESISTIVE)
A. Air Barrier Sheet, Mechanically Fastened:
   1. Air Permeance: 0.004 cubic feet per minute per square foot, maximum, when tested in accordance with ASTM E2178.
   2. Water Vapor Permeance: 5 perms, minimum, when tested in accordance with ASTM E96/E96M Procedure A (desiccant procedure).
   3. Ultraviolet (UV) and Weathering Resistance: Approved in writing by manufacturer for up to 180 days of weather exposure.
   4. Surface Burning Characteristics: Flame spread index of 25 or less, and smoke developed index of 50 or less, when tested in accordance with ASTM E84.
   5. Seam and Perimeter Tape: Polyethylene self adhering type, mesh reinforced, 2 inches wide, compatible with sheet material; unless otherwise specified.
   6. Manufacturers:
      e. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 ACCESSORIES
A. Sealants, Tapes, and Accessories for Sealing Weather Barrier and Sealing Weather Barrier to Adjacent Substrates: As specified or as recommended by weather barrier manufacturer.
PART 3 EXECUTION

3.01 EXAMINATION
A. Verify that surfaces and conditions are ready to accept the work of this section.

3.02 PREPARATION
A. Remove projections, protruding fasteners, and loose or foreign matter that might interfere with proper installation.

3.03 INSTALLATION
A. Install materials in accordance with manufacturer's instructions.
B. Air Barriers: Install continuous air tight barrier over surfaces indicated, with sealed seams and with sealed joints to adjacent surfaces.
C. Mechanically Fastened Sheets - On Exterior:
   1. Install sheets shingle-fashion to shed water, with seams generally horizontal.
   2. Overlap seams as recommended by manufacturer but at least 6 inches.
   3. Overlap at outside and inside corners as recommended by manufacturer but at least 12 inches.
   4. For applications specified to be air tight, seal seams, laps, penetrations, tears, and cuts with self-adhesive tape; use only large-headed, gasketed fasteners recommended by the manufacturer.
   5. Install air barrier and vapor retarder UNDER jamb flashings.
   6. Install head flashings under weather barrier.
   7. At openings to be filled with frames having nailing flanges, wrap excess sheet into opening; at head, seal sheet over flange and flashing.

D. Openings and Penetrations in Exterior Weather Barriers:
   1. Install flashing over sills, covering entire sill frame member, extending at least 5 inches onto weather barrier and at least 6 inches up jambs; mechanically fasten stretched edges.
   2. At openings to be filled with frames having nailing flanges, seal head and jamb flanges using a continuous bead of sealant compressed by flange and cover flanges with sealing tape at least 4 inches wide; do not seal sill flange.
   3. At openings to be filled with non-flanged frames, seal weather barrier to each side of opening framing, using flashing at least 9 inches wide, covering entire depth of framing.
   4. At head of openings, install flashing under weather barrier extending at least 2 inches beyond face of jambs; seal weather barrier to flashing.
   5. At interior face of openings, seal gap between window/door frame and rough framing, using joint sealant over backer rod.
   6. Service and Other Penetrations: Form flashing around penetrating item and seal to weather barrier surface.

3.04 PROTECTION
A. Do not leave materials exposed to weather longer than recommended by manufacturer.

END OF SECTION
SECTION 07 54 00
THERMOPLASTIC MEMBRANE ROOFING

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Adhered system with thermoplastic roofing membrane.
B. Insulation, flat and tapered.
C. Vapor retarder.
D. Deck sheathing.
E. Flashings.

1.02  DESCRIPTION

A. Adhered Roofing Systems
   1. The Adhered Roofing System incorporates maximum 12' wide white 60-mil thick reinforced Thermoplastic Polyolefin (TPO) membrane. Insulation is mechanically fastened to the roof deck and the membrane is fully adhered to the insulation with the appropriate adhesive. Adjoining sheets of membrane are overlapped approximately 2" and joined together with a minimum 1-1/2" wide heat weld.

B. General Design Considerations
   1. Metal-Edge Systems and Copings should be designed in compliance with Section 1504.5 of the International Building Code and shall be tested in accordance with ANSI/SPRI ES-1.

1.03  RELATED REQUIREMENTS

A. Section 06 10 00 - Rough Carpentry: Wood nailers and curbs.

1.04  REFERENCE STANDARDS

E. FM (AG) - FM Approval Guide.
F. FM DS 1-28 - Wind Design.
G. NRCA (RM) - The NRCA Roofing Manual.
H. NRCA (WM) - The NRCA Waterproofing Manual.
I. UL (FRD) - Fire Resistance Directory.

1.05  ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.
   1. Review preparation and installation procedures and coordinating and scheduling required with related work.

1.06  SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Along with the project submittals (shop drawings and Request for Warranty), the roofing contractor must include pullout tests when results are below the requirements identified by the manufacturer.
C. Product Data: Provide data indicating membrane materials, flashing materials, insulation, vapor retarder, surfacing, and fasteners.

D. Shop Drawings: Submit drawings that indicate joint or termination detail conditions and conditions of interface with other materials.

E. Shop drawings must be submitted to the manufacturer along with a completely executed Notice of Award for approval. Approved shop drawings are required for inspection of the roof.
   1. Shop drawings must include:
   2. Outline of roof and size
   3. Deck type (for multiple deck types)
   4. Location and type of all penetrations
   5. Perimeter and penetration details
   6. Key plan (for multiple roof areas) with roof heights indicated
      a. Along with the project submittals (shop drawing and Request for Warranty), the roofing contractor must include pullout test results when the results are below the requirements identified by the manufacturer.
      b. When field conditions necessitate modifications to originally approved shop drawings, a copy of the shop drawing outlining all modifications must be submitted to the manufacturer for revision and approval prior to inspection and warranty issuance.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Manufacturer's Installation Instructions: Indicate membrane seaming precautions and perimeter conditions requiring special attention.

H. Installer's Qualification Statement.

I. Notice of Completion
   1. After project completion, a Notice of Completion must be submitted to the manufacturer to schedule the necessary inspection of the project prior to issuance of the Warranty.

J. Warranty Documentation:
   1. Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.
   2. Submit installer's certification that installation complies with warranty conditions for waterproof membrane.

1.07 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with at least three years of documented experience.

C. After completion of the installation, upon request, an inspection shall be conducted by a Field Service Representative (FSR) to ascertain that the membrane roofing system has been installed according to manufacturer’s published specifications and details applicable at the time of bid. This inspection is to determine whether a warranty shall be issued. It is not intended as a final inspection for the benefit of the owner.

D. Coordination between various trades is essential to avoid unnecessary rooftop traffic over completed sections of the roof and to prevent subsequent damage to the membrane roofing system.

E. The solar reflectance of this roofing product may decrease over time due to environmental defacement such as dirt, biological growth, ponded water, etc. The roof should be monitored at regular intervals and maintained or cleaned when necessary to assure the maximum solar reflectance.
1.08 DELIVERY, STORAGE, AND HANDLING
A. Deliver materials in manufacturer's original containers, dry and undamaged, with seals and labels intact.
B. Store materials in weather protected environment, clear of ground and moisture.
C. Ensure storage and staging of materials does not exceed static and dynamic load-bearing capacities of roof decking.
D. Protect foam insulation from direct exposure to sunlight.
E. When loading materials onto the roof, the contractor must comply with the requirements of the specifier/owner to prevent overloading and possible disturbance to the building structure.
F. Job site storage temperatures in excess of 90° F may affect shelf life of curable materials (i.e., adhesives and sealants).
G. When the temperature is expected to fall below 40° F, outside storage boxes should be provided on the roof for temporary storage of liquid adhesives and sealants. Adhesive and sealant containers should be rotated to maintain their temperature above 40° F.
H. Do not store adhesive containers with opened lids due to the loss of solvent that will occur from flash-off.
I. Store Carlisle membrane on provided pallets in the original undisturbed plastic wrap in a cool, shaded area and cover with light-colored, breathable tarpaulins.
J. Insulation/underlayment must be stored so that it is kept dry and is protected from the elements. Store insulation on a skid and completely cover with a breathable material such as tarp or canvas. If the insulation is lightweight, it should be weighted to prevent possible wind damage.

1.09 FIELD CONDITIONS
A. Do not apply roofing membrane during unsuitable weather.
B. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is expected or occurring.
C. Do not expose materials vulnerable to water or sun damage in quantities greater than can be weatherproofed the same day.
D. Schedule applications so that no partially completed sections of roof are left exposed at end of workday.

1.10 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. A Total System Warranty is required. The total system is defined as membrane, flashings, adhesives, sealants and other products utilized in the installation.
C. System Warranty: Provide manufacturer's system warranty agreeing to repair or replace roofing that leaks or is damaged due to wind or other natural causes.
   1. Warranty Term: 20 years.
   2. For repair and replacement include costs of both material and labor in warranty.

PART 2 PRODUCTS
2.01 MANUFACTURERS
A. Thermoplastic Polyolefin (TPO) Membrane Roofing Materials: (Match existing to extend roof warrantee)
B. Insulation:
   1. BASF Corporation; BASF Neopor GPS: www.neopor.basf.us/#sle.
   2. Carlisle SynTec; SecurShield Insulation: www.carlisle-syntec.com/#sle.

2.02 ROOFING - UNBALLASTED APPLICATIONS

A. Thermoplastic Membrane Roofing: One ply membrane, fully adhered, over insulation.

B. Basis of Design: Carlisle Sure-Weld TPO Membrane meets or exceeds the requirements of ASTM D6878-11a, standard specification for Thermoplastic Polyolefin Based Sheet Roofing. Match existing to extend warrantee.

C. Roofing Assembly Requirements:
   1. Solar Reflectance Index (SRI): Minimum of 64 based on three-year aged value; if three-year aged data is not available, minimum of 82 initial value.
      b. Field applied coating may not be used to achieve specified SRI.
   2. Roof Covering External Fire Resistance Classification: UL (FRD) Class A.
   3. Factory Mutual Classification: Class 1 and windstorm resistance of 1-90, in accordance with FM DS 1-28.
   4. Insulation Thermal Resistance (R-Value): 5 per inch, minimum; provide insulation of thickness required.

D. Acceptable Insulation Types - Constant Thickness Application: Any type that meets requirements and is approved by membrane manufacturer for application.

E. Acceptable Insulation Types - Tapered Application: Any type that meets requirements and is approved by membrane manufacturer for application.

2.03 MEMBRANE ROOFING AND ASSOCIATED MATERIALS

A. Membrane Roofing Materials:
   1. TPO: Thermoplastic polyolefin (TPO) complying with ASTM D6878/D6878M, sheet contains reinforcing fabrics or scrims.
      a. Thickness: 60 mil, 0.060 inch, minimum.
   2. Sheet Width: Factory fabricated into largest sheets possible.

B. Seaming Materials: As recommended by membrane manufacturer.

C. Vapor Barrier: Material approved by roof manufacturer complying with requirements of fire rating classification; compatible with roofing and insulation materials.
   1. Fire-retardant adhesive.
   2. Air and Vapor Barrier - Equal to Carlisle VapAir Seal 725TR. A 40-mil thick composite consisting of 35-mil self-adhering rubberized asphalt membrane laminated to an 5-mil UV resistant poly film with an anti-skid surface.
   3. Low-VOC Aerosol Contact Adhesive/Primer - Carlisle CAV-GRIP III. A low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: enhancing the bond between Carlisle's VapAir Seal 725TR and various substrates.

D. Flexible Flashing Material: Same material as membrane.

2.04 SURE-WELD FLASHING

A. Non-reinforced flashing - Equal to Sure-Weld Flashing: Flashing is used for inside/outside corners and field fabricated pipe flashings when the use of pre-molded or pre-fabricated accessories is not feasible.
   1. Pressure-Sensitive Cover Strip: A nominal 40-mil thick non-reinforced TPO membrane laminated to nominal 35-mil thick cured synthetic rubber pressure-sensitive adhesive used in conjunction with TPO Primer or Low VOC TPO Primer to strip in flat metal flanges (i.e., drip edges or rows of fasteners and plates).
   2. TPO T-Joint Covers: A 60-mil thick injection molded TPO flashing formed into a 4.5" diameter circle used to seal step-offs at splice intersections. Installation is mandatory on all 60-mil TPO systems.
2.05 PRE-MOLDED ACCESSORIES:

A. Inside Corners: A pre-molded corner flashing for inside corners.
   1. Outside Corners: A one-piece injection molded corner flashing used for flashing outside corners. Available in white, gray or tan; 60-mil thick.
   2. TPO Curb Wrap Corners: Fabricated flashings are made of 60-mil thick reinforced membrane designed to reduce installation time to flash a curb when compared to conventional methods. Each corner is fabricated with a 6" wide base flange and a 12" overall height.

B. TPO Universal Corners: a pre-molded flashing for use in a variety of corner details, including inside and outside corners.

C. Pipe Flashings: A pre-molded white, gray or tan pipe flashing used for pipe penetrations.

D. Split Pipe Seals: A prefabricated flashing consisting of 60-mil thick reinforced membrane for pipes 1" - 6" in diameter. A split (cut) and overlapped tab are incorporated to allow the pipe seal to be opened and wrapped around the pipe when it is not possible to pull a standard pipe flashing over a round penetration. Custom sizes are available as a special order product requiring lead time.

E. TPO Square Tubing Wraps: Fabricated flashings made of 60-mil thick reinforced membrane for square tubing. A split (cut) and overlap tab are incorporated into these parts to allow the seals to be opened and wrapped around a square penetration.

F. Molded TPO Sealant Pocket: A pre-fabricated, interlocking, 2-piece, injection molding, flexible pocket with a rigid polypropylene vertical wall and pre-formed deck flanges. Used in conjunction with one part pourable sealer for waterproofing pipe clusters or other odd shaped penetrations.

G. Pre-fabricated Sealant Pocket: A two-piece, pre-fabricated sealant pocket that utilizes reinforced 60-mil TPO membrane and coated metal to form a rigid, oversized sealant pocket with a weldable horizontal deck flange.

2.06 PRIMERS, ADHESIVES, SEALANTS AND CLEANERS

A. Products
   1. Low VOC Bonding Adhesive for TPO: This product meets the <250 g/pl VOC (volatile organic compound) content requirements of the OTC Model Rule for Single-Ply Roofing Adhesives. A high strength, solvent- based contact adhesive that allows bonding of TPO membrane to various porous and non-porous substrates.
   2. Low-VOC Aerosol Contact Adhesive/Primer: - Equal to CAv GRIPIII. A low-VOC, methylene chloride-free adhesive that can be used for a variety of applications including: bonding membrane to various surfaces, priming unexposed asphalt prior to applying adhesive, adhering TPO membrane, horizontally, for the field of the roof, and for adhering TPO membrane to vertical walls.
   4. Water Cut-Off Mastic: Used as a mastic to prevent moisture migration at drains, compression terminations and beneath conventional metal edging.
   5. Universal Single-Ply Sealant: A 100% solids, solvent free, voc free, one part polyether sealant that provides a weather tight seal to a variety of building materials.
   6. One-Part Pourable Sealer: A one-part, moisture curing, elastomeric polyether sealant used to fill Molded Pourable Sealant Pockets.
   7. Weathered Membrane Cleaner: Used to prepare membrane for heat welding that has been exposed to the elements or to remove general construction dirt.
   8. TPO Primer: A solvent-based primer used to prepare the surface of the membrane prior to application of coverstrip.
9. TPO Low VOC Primer: A solvent-based, low solids primer used to prepare the surface of the membrane prior to application of coverstrip. This low VOC product is ideal for use in states where environmental issues are a concern.

2.07 DECK SHEATHING AND COVER BOARDS
A. Deck Sheathing: Gypsum sheathing, ASTM C1396/C1396M, Type X, special fire resistant type, paper face, 1/2 inch thick.
B. Cover Board: Polyisocyanurate (ISO) board insulation, complying with ASTM C1289, Type II, Class 4 - Faced with coated or uncoated polymer-bonded glass fiber mat facers on both major surfaces of the core foam. This product is used at a maximum thickness of 1/2 inch (12.7 mm), and the following characteristics:
   1. Compressive Strength: 110 psi.
   2. Board Size: 48 by 96 inch.
   3. Board Thickness: 1/2 inch.

2.08 INSULATION
A. General
   1. Roof insulation thickness must be determined by the thermal value required for each project and may be subject to code approval limitations. On projects where a vapor retarder is used, the specifier must calculate insulation thickness to ensure the temperature at the vapor retarder will not fall below the calculated dew point.
   2. Multiple layers of insulation are recommended with all joints staggered between layers.
   3. For minimum recommended R-Values, previously published by American Society of Heating and Air-Conditioning Engineers (ASHRAE), consult local building code official for applicable requirements.
   4. For Insulation fastening pattern and densities refer to Carlisle Applicable Details and Design Reference DR-05-11 “Insulation Fastening Patterns”.
   5. When new insulation or cover boards are specified, the use of manufacturer approved Insulation and manufacturer approved cover board is required. Any of the manufacturer’s Insulation/Underlayment may be specified subject to design restrictions included with each of the following tables.
B. Cover Boards
   1. 1/2” uniform composition of fiber-reinforced with no facer for use as a cover board or a thermal barrier.
C. Polyisocyanurate (ISO) Board Insulation: Rigid cellular foam, complying with ASTM C1289.
   1. Classifications:
      a. Type II:
         1) Class 1 - Faced with glass fiber reinforced cellulose felt facers on both major surfaces of core foam.
         2) Compressive Strength: Classes 1-2-3, Grade 1 - 16 psi (110 kPa), minimum.
         3) Thermal Resistance, R-value: At 1-1/2 inch thick; Class 1, Grades 1-2-3 - 8.4 (1.48) at 75 degrees F.
   2. Board Size: 48 by 96 inch.
   3. Board Thickness: 1.5 inch.
   4. Tapered Board: Slope as indicated; minimum thickness 2 inch; fabricate of fewest layers possible.

2.09 METAL ACCESSORIES, EDGINGS, COPING, AND TERMINATIONS
A. General
1. Products listed are to be compatible and part of a system warrantee with roof membrane manufacturer. Refer to the applicable manufacturer details and installation instruction manuals for specific installation criteria.

B. Products
1. Roof Edge: Equalt to Secure Edge 2000. A two-piece, and in some cases three-pieces will be required, assembly that includes a continuous extruded anchor bar cleat and a fascia or multiple fascia covers. Pre-painted Kynar 500-coated 0.40” formed aluminum with 22-gauge pre-punched cleats with fasteners spaced at 12” on center. ANSI/SPRI ES-1 certified.
2. Termination Bar: A 1” wide and 98-mil thick extruded aluminum bar pre-punched 6” on center which incorporates a sealant ledge to support lap sealant and provide increased stability for membrane terminations.
3. Term Bar Fascia: A 1.75” wide formed aluminum termination bar with pre-slotted fastening holes for ease of locating and installing. To be 0.040” aluminum.

2.10 ACCESSORIES
A. Sheathing Joint Tape: Paper type, 6 inch wide, self adhering.
B. Insulation Fasteners: Appropriate for purpose intended and approved by roofing manufacturer.
C. Membrane Adhesive: As recommended by membrane manufacturer.
D. Roofing Nails: Galvanized, hot dipped type, size and configuration as required to suit application.
E. Insulation Perimeter Restraint: Stainless steel edge device configured to restrain insulation boards in position and provide top flashing over ballast.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that surfaces and site conditions are ready to receive work.
B. Verify deck is supported and secure.
C. Verify deck is clean and smooth, flat, free of depressions, waves, or projections, properly sloped and suitable for installation of roof system.
D. Verify deck surfaces are dry and free of snow or ice.
E. Verify that roof openings, curbs, and penetrations through roof are solidly set, and cant strips are in place.
F. Safety Data Sheets (SDS) must be on location at all times during transportation, storage and application of materials. The applicator shall follow all safety regulations as recommended by OSHA and other agencies having jurisdiction.
G. Subject to project conditions, it is recommended to begin the application of this roofing system at the highest point of the project area and work to the lowest point to prevent water infiltration. This will include completion of all flashings, terminations and daily seals.

3.02 METAL DECK PREPARATION
A. Install deck sheathing on metal deck:
   1. Lay with long side at right angle to flutes; stagger end joints; provide support at ends.
   2. Cut sheathing cleanly and accurately at roof breaks and protrusions to provide smooth surface.
   3. Tape joints.
   4. Mechanically fasten sheathing to roof deck, in accordance with Factory Mutual recommendations and roofing manufacturer's instructions.
3.03 INSTALLATION - GENERAL
   A. Perform work in accordance with manufacturer's instructions, NRCA (RM), and NRCA (WM)
      applicable requirements.
   B. Do not apply roofing membrane during unsuitable weather.
   C. Do not apply roofing membrane when ambient temperature is outside the temperature range
      recommended by manufacturer.
   D. Do not apply roofing membrane to damp or frozen deck surface or when precipitation is
      expected or occurring.
   E. Do not expose materials vulnerable to water or sun damage in quantities greater than can be
      weatherproofed the same day.

3.04 VAPOR RETARDER AND INSULATION ON SUBSTRATE - UNDER MEMBRANE
   A. Apply vapor retarder to deck surface with adhesive in accordance with manufacturer's
      instructions.
      1. Extend vapor retarder under cant strips and blocking to deck edge.
      2. Install flexible flashing from vapor retarder to air seal material of wall construction, lap and
         seal to provide continuity of the air barrier plane.
      3. Install vapor barrier on 1/2" substrate over existing decking.
   B. Ensure vapor retarder is clean and dry, continuous, and ready for application of insulation.
   C. Attachment of Insulation:
      1. Mechanically fasten insulation to deck in accordance with roofing manufacturer's
         instructions and FM (AG) Factory Mutual requirements.
   D. Cover Boards: Mechanically fasten cover boards in accordance with roofing manufacturer's
      instructions and FM (AG) Factory Mutual requirements.
   E. Lay subsequent layers of insulation with joints staggered minimum 6 inch from joints of
      preceding layer.
   F. Place tapered insulation to the required slope pattern in accordance with manufacturer's
      instructions.
   G. On metal deck, place boards parallel to flutes with insulation board edges bearing on deck
      flutes.
   H. Lay boards with edges in moderate contact without forcing. Cut insulation to fit neatly to
      perimeter blocking and around penetrations through roof.
   I. Do not apply more insulation than can be covered with membrane in same day.

3.05 MEMBRANE APPLICATION
   A. Roll out membrane, free from wrinkles or tears. Place sheet into place without stretching over
      1/2" cover board.
   B. Shingle joints on sloped substrate in direction of drainage.
   C. Fully embed membrane in adhesive except in areas directly over or within 3 inches of expansion
      joints. Fully adhere one roll before proceeding to adjacent rolls.
   D. Overlap edges and ends and seal seams by contact adhesive, minimum 3 inches. Seal
      permanently waterproof. Apply uniform bead of sealant to joint edge.
   E. At intersections with vertical surfaces:
1. Extend membrane over cant strips and up a minimum of 4 inches onto vertical surfaces.
2. Fully adhere flexible flashing over membrane and up to nailing strips.

F. Around roof penetrations, seal flanges and flashings with flexible flashing.
G. Coordinate installation of roof drains and sumps and related flashings.

3.06 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for general requirements for field quality control and inspection.
B. Require site attendance of roofing and insulation material manufacturers daily during installation of the Work.

3.07 ROOF DECK SUBSTRATE/SHEATHING CRITERIA
A. For all projects, the substrate/sheathing must be relatively even without noticeable high spots or depressions. Accumulated water, ice or snow must be removed to prevent the absorption of moisture in the new roofing components and roofing system.
B. Prior to the placement of the vapor barrier, clear the substrate/sheathing of debris and foreign material that may be harmful to the roofing system. Gaps greater than 1/4" must be filled with an appropriate material.

3.08 VAPOR BARRIER INSTALLATION
A. Follow the respective vapor barrier manufacturer's recommended installation procedures for the installation of the product specified.

3.09 INSULATION ATTACHMENT
A. General
1. Prior to proceeding with insulation securement refer to warranty tables for attachment method and appropriate fastening density required for the specific warranty.
2. Multiple layers of insulation are recommended with all joints staggered between layers.
3. Do not install more insulation than can be covered by membrane in the same day.
4. All insulation boards must be butted together with no gaps greater than 1/4". Gaps greater than 1/4" are not acceptable.
5. Restrictions:
   a. The use of insulation by others is not acceptable when a system warranty is specified. Membrane manufacturer insulation must be used.
B. Mechanical Attachment
1. Fasteners and fastening plates are required for insulation securement. Insulation fastening density will vary based on insulation type, thickness, and required warranty. Warranty tables should be referenced for fastening density and the appropriate manufacturer details to be consulted to identify acceptable fastening pattern.
2. For code compliance and Factory Mutual (FM) approvals, increased fastening density may be required depending upon project wind speed and wind uplift requirement.

3.10 MEMBRANE PLACEMENT AND SECUREMENT
A. General
1. Ensure that water does not flow beneath any completed sections of the membrane system by completing all flashings, terminations and daily seals by the end of each workday.
2. Sweep all loose debris from the substrate.
3. Avoid discoloration of the white membrane surface resulting from adhesive residue or excess foot traffic.
4. In addition to the primary membrane securement, additional membrane securement is required at the perimeter of each roof level, roof section, curb, skylight, interior wall,
penthouse, etc., at any inside angle change where slope or combined slopes exceed 2” in one horizontal foot, and at other penetrations.

B. Membrane Placement
   1. Position membrane over the acceptable substrate.
   2. Place adjoining membrane sheets in the same manner, overlapping edges appropriately to provide for the minimum overlap width. It is recommended all overlaps be shingled to avoid bucking of water.

C. Membrane Securement / Bonding - Adhered Roofing System
   1. Adhere membrane to an acceptable substrate with bonding adhesive. Comply with Labels, Safety Data Sheet (SDS) and Product Data Sheets for installation procedures and use. Adhesive must be applied to both the membrane and the surface to which it is being bonded.
   2. Fold membrane sheet back so half the underside is exposed. Sheet fold should be smooth without wrinkles or buckles.
   3. Stir Bonding Adhesive thoroughly scraping the sides and the bottom of the can (minimum 5 minutes stirring is recommended). Bonding surfaces must be dry and clean.
   4. Apply Bonding Adhesive to the exposed underside of the membrane and the corresponding substrate area. Do not apply Bonding Adhesive along the splice edge of the membrane to be heat welded over adjoining sheet.
   5. A mechanical roller dispenser can be used to apply Bonding Adhesive when the continuous coating and coverage rate are maintained. Backrolling is required.
   6. Allow adhesive to dry until tacky but will not string or stick to a dry finger touch.
   7. Roll the coated membrane into the coated substrate while avoiding wrinkles.
   8. Brush down the bonded section of the membrane sheet immediately after rolling the membrane into the adhesive with a soft bristle push broom to achieve maximum contact.
   9. Fold back the unbonded half of the sheet and repeat the bonding procedures. Apply Bonding Adhesive to the remaining exposed underside of membrane and adjacent substrate and complete this section as described above.
   10. Install adjoining membrane sheets in the same manner, overlapping edges a minimum of 2 inches to provide for a minimum 1-1/2 inch heat weld. It is recommended that all splices be shingled to avoid bucking of water.

D. Additional Membrane Securement
   1. Securement must be provided at the perimeter of each roof level, roof section, expansion joint, curb, skylight, interior wall, penthouse, etc., at any inside angle change where slope exceeds 2 inches to one horizontal foot, and at all penetrations.
   2. Achieve securement per manufacturer’s requirements.
   3. After securing the membrane, flash in accordance with the appropriate detail.

3.11 HEAT WELDING PROCEDURES
   A. Heat weld membrane sheets using an automatic heat welder or hot air hand welder and silicone roller.
   B. Check the surfaces of the membrane to be heat welded to ensure they are properly prepared.
      1. The surfaces to be heat welded must be clean. Membrane overlaps that become contaminated with field dirt must be cleaned. No residual dirt or contaminants should be evident.
   C. Membrane Welding
      1. Position the automatic heat welder properly prior to seaming with the guide handle pointing in the same direction the machine will move along the seam. Lift the overlapping membrane sheet and insert the blower nozzle of the Automatic Heat Welder between the overlap. Machine will begin moving along the seam immediately.
2. At all splice intersections, roll the seam with a silicone roller to ensure a continuous heat welded seam (the membrane should be creased into any membrane step-off with the edge of the silicone roller). A false weld may result due to surface irregularities created by multiple thicknesses of membrane sheets.

3. When using 60-mil membrane, a TPO “T”-Joint Cover must be applied over all “T” joint splice intersections. Reinforced membrane regardless of thickness should not be used since a water tight seal will not be obtainable.

4. Perform a test weld, at least, at the start of work each morning and afternoon. Test welds should be made if any changes in substrate or weather conditions occur.

5. Prevent membrane creeping during welding.

6. Perform a test weld at least at the start of work each morning and afternoon.

7. Probing seams must be done once heat welds have thoroughly cooled.

D. Seam Sealing

1. Apply cut-edge sealant on all cut edges of the reinforced membrane (where the scrim reinforcement is exposed) after seam probing is completed.

3.12 CLEANING

A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.

B. Remove bituminous markings from finished surfaces.

C. In areas where finished surfaces are soiled by work of this section, consult manufacturer of surfaces for cleaning advice and comply with their documented instructions.

D. Repair or replace defaced or damaged finishes caused by work of this section.

3.13 FLASHINGS

A. General Considerations

1. The height of new wall flashing must extend above the anticipated water level or slush line.

2. On 20 year warranty projects, a termination bar, in conjunction with water cut-off mastic, must be utilized under all metal counterflashings and surface mounted reglets.

3. To comply with various warranty options, flashing material must equal the required minimum membrane thickness but shall not be less than 60-mils thick. For projects with 20 year or greater warranties membrane manufacturer’s pre-fabricated accessories must be used unless prohibited by a specific field condition.

4. Flashing of parapets, curbs, expansion joints and other parts of the roof must be performed using reinforced membrane. Non-reinforced membrane can be used for flashing pipe penetrations, sealant pockets and scuppers as well as inside and outside corners when the use of pre-molded accessories is not feasible.

5. When possible, all reinforced membrane splices are heat welded with the automatic heat welder. The hand held hot air welder should be utilized in hard to reach areas, smaller curbs, vertical splices and when using non-reinforced membrane.

6. The new membrane flashing must not conceal weep holes or cover existing throughwall flashing.

7. Install surface mounted reglets and compression bar terminations directly to the wall surface.

8. In areas where metal counterflashings or surface mounted reglets are used as vertical terminations, the counterflashing must be sealed with a rubber grade caulking to prevent moisture migration behind the new wall flashing.

B. Application of Bonding Adhesive

1. Membrane shall be adhered to vertical surfaces with bonding adhesive. Low-VOC aerosol adhesive may be utilized with TPO membranes. Bonding adhesive shall be applied continuously, without globs or puddles.
2. After the bonding adhesive has properly dried, roll the membrane into the adhesive.
3. Care must be taken when setting the flashing to avoid bridging greater than 3/4 inch at angle changes (i.e., where a parapet or roof penetration meets the roof deck). This can be accomplished by creasing the membrane into the angle change.
4. Terminate the edges of the installed membrane in accordance with manufacturer’s applicable details.
5. When using TPO membrane flashing only, bonding adhesive is not required when the flashing height is 12” or less. When a termination bar is used beneath the counter-flashing, bonding adhesive can be eliminated when the flashing height is 18” or less.

C. Metal Edge Terminations
   1. Factory-fabricated metal edge systems must be secured to the wood nailer as specified by the manufacturer. Shop-fabricated edging must be installed in compliance with appropriate manufacturer detail using TPO coated metal. Refer to the appropriate manufacturer’s details for other flashing options and requirements.

3.14 DAILY SEAL
   A. On phased roofing, when the completion of flashings and terminations is not possible by the end of each workday, provisions must be taken to temporarily close the membrane to prevent water infiltration.

3.15 PROTECTION
   A. Protect installed roofing and flashings from construction operations.
   B. Where traffic must continue over finished roof membrane, protect surfaces using durable materials.

END OF SECTION
SECTION 07 62 00
SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Fabricated sheet metal items, including flashings, counterflashings, and roof edges.
   B. Reglets and accessories.
   C. Precast concrete splash pads.

1.02 RELATED REQUIREMENTS
   A. Section 06 10 00 - Rough Carpentry: Wood nailers.
   B. Section - Painting and Coating: Field painting.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

1.05 QUALITY ASSURANCE
   A. Perform work in accordance with SMACNA Architectural Sheet Metal Manual requirements and standard details, except as otherwise indicated.
   B. Fabricator and Installer Qualifications: Company specializing in sheet metal work with 5 years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.
   B. Prevent contact with materials that could cause discoloration or staining.

PART 2 PRODUCTS

2.01 SHEET MATERIALS
   A. Pre-Finished Aluminum: ASTM B209 (ASTM B209M); 0.032 inch thick; plain finish shop pre-coated with modified silicone coating.
      2. Color: As selected by Architect from manufacturer's standard colors.
B. Lead Coated Copper: ASTM B101, 24 (7320) ounce-weight of bare copper, HOO (cold-rolled) temper.

2.02 ACCESSORIES
A. Fasteners: Galvanized steel, with soft neoprene washers.
B. Primer: Zinc chromate type.
C. Protective Backing Paint: Zinc molybdate alkyd.
D. Sealant: Type specified in Section .
E. Plastic Cement: ASTM D4586, Type I.

2.03 FABRICATION
A. Form sections true to shape, accurate in size, square, and free from distortion or defects.
B. Form pieces in longest possible lengths.
C. Hem exposed edges on underside 1/2 inch; miter and seam corners.
D. Form material with flat lock seams, except where otherwise indicated. At moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.
E. Fabricate corners from one piece with minimum 18 inch long legs; seam for rigidity, seal with sealant.
F. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.
B. Verify roofing termination and base flashings are in place, sealed, and secure.

3.02 PREPARATION
A. Install starter and edge strips, and cleats before starting installation.
B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION
A. Conform to drawing details.
B. Insert flashings into reglets to form tight fit. Secure in place with lead wedges. Pack remaining spaces with lead wool. Seal flashings into reglets with sealant.
C. Secure flashings in place using concealed fasteners. Use exposed fasteners only where permitted.
D. Apply plastic cement compound between metal flashings and felt flashings.
E. Fit flashings tight in place. Make corners square, surfaces true and straight in planes, and lines accurate to profiles.
F. Seal metal joints watertight.
G. Secure downsputs in place using concealed fasteners.
H. Set splash pads under downsputs.

3.04 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for field inspection requirements.
B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

END OF SECTION
SECTION 07 71 23
MANUFACTURED GUTTERS AND DOWNSPOUTS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Pre-finished aluminum gutters and downspouts.

1.02 RELATED REQUIREMENTS
A. Section 07 62 00 - Sheet Metal Flashing and Trim.

1.03 REFERENCE STANDARDS

1.04 ADMINISTRATIVE REQUIREMENTS

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on prefabricated components.
C. Shop Drawings: Indicate locations, configurations, jointing methods, fastening methods, locations, and installation details.
D. Samples: Submit two samples for color selection/verification.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Stack material to prevent twisting, bending, or abrasion, and to provide ventilation. Slope to drain.
B. Prevent contact with materials that could cause discoloration, staining, or damage.

PART 2 PRODUCTS

2.01 MATERIALS
A. Pre-Finished Aluminum Sheet or Coil Stock
   1. Color: Custom color to match existing.

2.02 COMPONENTS
A. Gutters: SMACNA square style profile.
   1. Size: 6 inch by 6 inch.
B. Downspouts: SMACNA Rectangular profile.
   1. Size: 4 inch by 4 inch.
C. Anchors and Supports: Profiled to suit gutters and downspouts.
   1. Anchoring Devices: In accordance with SMACNA requirements.
   2. Gutter Supports: Brackets.
   3. Downspout Supports: Brackets.
D. Fasteners: Stainless steel, with soft neoprene washers.

2.03 FABRICATION
A. Form gutters and downspouts of profiles and size indicated.
B. Fabricate continuous gutters.
C. Fabricate with required connection pieces.
D. Form sections square, true, and accurate in size, in maximum possible lengths, free of distortion or defects detrimental to appearance or performance. Allow for expansion at joints.
E. Hem exposed edges of metal.
F. Fabricate gutter and downspout accessories; seal watertight.

2.04 FINISHES
A. Fluoropolymer Coating: High Performance Organic Finish, AAMA 2604; multiple coat, thermally cured fluoropolymer finish system; color as indicated.
   1. Custom color to match existing.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify existing conditions before starting work.
B. Verify that surfaces are ready to receive work.

3.02 PREPARATION
A. Paint concealed metal surfaces and surfaces in contact with dissimilar metals with protective backing paint to a minimum dry film thickness of 15 mil.

3.03 INSTALLATION
A. Install gutters, downspouts, and accessories in accordance with manufacturer's instructions.
B. Sheet Metal: Join lengths with formed seams sealed watertight. Flash and seal gutters to downspouts and accessories.
C. Slope gutters to intersect existing drainage system at roof edge.

END OF SECTION
SECTION 07 84 00
FIRESTOPPING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Firestopping systems.
B. Firestopping of all joints and penetrations in fire-resistance rated and smoke-resistant assemblies, whether indicated on drawings or not, and other openings indicated.

1.02 RELATED REQUIREMENTS
A. Section 01 33 13 - LEED Submittals: Including Materials Reporting Form, VOC Reporting Form
B. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
C. Section 01 78 39 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
D. Section 01 81 13 LEED & Sustainable Design Requirements
E. Section 01 81 19 Construction IAQ Mgmt
F. Section 01 70 00 - Execution and Closeout Requirements: Cutting and patching.
G. Section 09 21 16 - Gypsum Board Assemblies: Gypsum wallboard fireproofing.

1.03 REFERENCE STANDARDS
E. ITS (DIR) - Directory of Listed Products.
F. FM 4991 - Approval Standard for Firestop Contractors.
G. FM P7825 - Approval Guide; Factory Mutual Research Corporation.
H. SCAQMD 1168 - Adhesive and Sealant Applications.
J. UL (FRD) - Fire Resistance Directory.

1.04 SUBMITTALS
A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.
B. Schedule of Firestopping: List each type of penetration, fire rating of the penetrated assembly, and firestopping test or design number.
C. Product Data: Provide data on product characteristics, performance ratings, and limitations.
D. LEED Report: Submit VOC content documentation for all non-preformed materials.
E. Manufacturer's Installation Instructions: Indicate preparation and installation instructions.
F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.
G. Certificate from authority having jurisdiction indicating approval of materials used.
H. Qualification statements for installing mechanics.
1.05 QUALITY ASSURANCE
A. Fire Testing: Provide firestopping assemblies of designs that provide the scheduled fire ratings when tested in accordance with methods indicated.
   1. Listing in the current-year classification or certification books of UL, FM, or ITS (Warnock Hersey) will be considered as constituting an acceptable test report.
   2. Valid evaluation report published by ICC Evaluation Service, Inc. (ICC-ES) at www.icc-es.org will be considered as constituting an acceptable test report.
   3. Submission of actual test reports is required for assemblies for which none of the above substantiation exists.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.
C. Installer Qualifications: Company specializing in performing the work of this section and:
   1. Approved by Factory Mutual Research under FM Standard 4991, Approval of Firestop Contractors, or meeting any two of the following requirements:
   2. With minimum 5 years documented experience installing work of this type.
   3. Able to show at least 3 satisfactorily completed projects of comparable size and type.
   4. Licensed by authority having jurisdiction.
   5. Approved by firestopping manufacturer.
D. Installing Mechanic's Qualifications: Trained by firestopping manufacturer and able to provide evidence thereof.

1.06 MOCK-UP
A. Install one firestopping assembly representative of each fire rating design required on project.
   1. Where one design may be used for different penetrating items or in different wall constructions, install one assembly for each different combination.
   2. Where firestopping is intended to fill a linear opening, install minimum of 2 linear ft.
B. Obtain approval of authority having jurisdiction before proceeding.
C. If accepted, mock-up will represent minimum standard for the Work.
D. If accepted, mock-up may remain as part of the Work. Remove and replace mock-ups not accepted.

1.07 FIELD CONDITIONS
A. Comply with firestopping manufacturer's recommendations for temperature and conditions during and after installation. Maintain minimum temperature before, during, and for 3 days after installation of materials.
B. Provide ventilation in areas where solvent-cured materials are being installed.

PART 2 PRODUCTS
2.01 FIRESTOPPING - GENERAL REQUIREMENTS
A. Manufacturers:
   2. 3M Fire Protection Products: www.3m.com/firestop.
B. Firestopping Materials with Volatile Content: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
C. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.
2.02 FIRESTOPPING ASSEMBLY REQUIREMENTS

A. Head-of-Wall Firestopping at Joints Between Non-Rated Floor and Fire-Rated Wall: Use any system that has been tested according to ASTM E2837 to have fire resistance F Rating equal to required fire rating of floor or wall, whichever is greater.
   1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.

B. Floor-to-Floor, Wall-to-Wall, and Wall-to-Floor Joints, Except Perimeter, Where Both Are Fire-Rated: Use any system that has been tested according to ASTM E1966 or UL 2079 to have fire resistance F Rating equal to required fire rating of the assembly in which the joint occurs.
   1. Movement: In addition, provide systems that have been tested to show movement capability as indicated.
   2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
   3. Watertightness: In addition, provide systems that have been tested to show W Rating as indicated.
   4. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.

C. Through Penetration Firestopping: Use any system that has been tested according to ASTM E814 to have fire resistance F Rating equal to required fire rating of penetrated assembly.
   1. Temperature Rise: In addition, provide systems that have been tested to show T Rating as indicated.
   2. Air Leakage: In addition, provide systems that have been tested to show L Rating as indicated.
   3. Listing by UL, FM, or Intertek in their certification directory will be considered evidence of successful testing.

2.03 FIRESTOPPING FOR FLOOR-TO-FLOOR, WALL-TO-FLOOR, AND WALL-TO-WALL JOINTS

A. Concrete and Concrete Masonry Walls and Floors:
   1. Top of Wall Joints at Concrete/Concrete Masonry Wall to Concrete Over Metal Deck Floor:
      a. 2 Hour Construction: UL System HW-D-0181; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
      b. 2 Hour Construction: UL System HW-D-1037; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
   2. Concrete/Concrete Masonry Wall to Wall Joints:
      a. 2 Hour Construction: UL System WW-D-0017; Hilti CFS-SP WB Firestop Joint Spray and CP 672.
      b. 2 Hour Construction: UL System WW-D-0032; Hilti CP 606 Flexible Firestop Sealant.

B. Gypsum Board Walls:
   1. Wall to Wall Joints:
      a. 2 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.
      b. 1 Hour Construction: UL System WW-D-0067; Hilti CP 606 Flexible Firestop Sealant.

2.04 FIRESTOPPING PENETRATIONS THROUGH CONCRETE AND CONCRETE MASONRY CONSTRUCTION

A. Blank Openings:
   1. In Walls:
      a. 2 Hour Construction: UL System C-AJ-0090; Hilti FS-ONE Intumescent Firestop Sealant.

B. Penetrations Through Walls By:
1. Multiple Penetrations in Large Openings:
   a. 2 Hour Construction: UL System C-AJ-8143; Hilti FS-ONE Intumescent Firestop Sealant.
2. Uninsulated Metallic Pipe, Conduit, and Tubing:
   a. 2 Hour Construction: UL System C-AJ-1421; Hilti FS-ONE Intumescent Firestop Sealant or CP 604 Self-Leveling Firestop Sealant.
   b. 2 Hour Construction: UL System C-AJ-1498; Hilti CP 680-P/M Cast-In Device.
3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
   a. 2 Hour Construction: UL System C-AJ-2109; Hilti CP 643N/644 Firestop Collar.
   b. 2 Hour Construction: UL System C-BJ-2021; Hilti CP 643N Firestop Collar.
4. Electrical Cables Not In Conduit:
   a. 2 Hour Construction: UL System C-AJ-3216; Hilti CP 658 Firestop Plug.
   b. 2 Hour Construction: UL System W-J-3198; Hilti CFS-SL RK Retrofit Sleeve Kit for existing cables.
   c. 2 Hour Construction: UL System W-J-3199; Hilti CFS-SL SK Firestop Sleeve Kit.
5. Cable Trays with Electrical Cables:
   a. 3 Hour Construction: UL System C-AJ-4035; Hilti FS-ONE Intumescent Firestop Sealant.
6. Insulated Pipes:
   a. 2 Hour Construction: UL System C-AJ-5048; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, or CP 604 Self-Leveling Firestop Sealant.
7. HVAC Ducts, Uninsulated:
   a. 2 Hour Construction: UL System C-AJ-7111; Hilti FS-ONE Intumescent Firestop Sealant.
   b. 2 Hour Construction: UL System C-AJ-7084; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CP 601S Elastomeric Firestop Sealant, or CP 604 Self-Leveling Firestop Sealant.

C. Penetrations Through Walls By:
1. Uninsulated Metallic Pipe, Conduit, and Tubing:
   a. 2 Hour Construction: UL System W-J-1067; Hilti FS-ONE Intumescent Firestop Sealant.
2. Electrical Cables Not In Conduit:
   b. 2 Hour Construction: UL System W-J-3143; Hilti CP 658T Firestop Plug.
3. Insulated Pipes:
   a. 2 Hour Construction: UL System W-J-5041; Hilti FS-ONE Intumescent Firestop Sealant.
   b. 2 Hour Construction: UL System W-J-5042; Hilti FS-ONE Intumescent Firestop Sealant.
   c. 2 Hour Construction: UL System W-J-5028; Hilti FS-ONE Intumescent Firestop Sealant.
4. HVAC Ducts, Uninsulated:
   a. 2 Hour Construction: UL System W-J-7109; Hilti FS-ONE Intumescent Firestop Sealant or CP 606 Flexible Firestop Sealant.
5. HVAC Ducts, Insulated:
   a. 2 Hour Construction: UL System W-J-7112; Hilti FS-ONE Intumescent Firestop Sealant.
2.05 FIRESTOPPING PENETRATIONS THROUGH GYPSUM BOARD WALLS

A. Blank Openings:
1. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.

B. Penetrations By:
1. Multiple Penetrations in Large Openings:
   a. 2 Hour Construction: UL System W-L-1389; Hilti FS-ONE Intumescent Firestop Sealant.
   b. 2 Hour Construction: UL System W-L-1408; Hilti FS-ONE Intumescent Firestop Sealant.
   c. 2 Hour Construction: UL System W-L-8071; Hilti FS-ONE Intumescent Firestop Sealant.
   d. 2 Hour Construction: UL System W-L-8079; Hilti FS-ONE Intumescent Firestop Sealant.
   e. 2 Hour Construction: UL System W-L-8087; Hilti FS 657 Fire Block.
2. Uninsulated Metallic Pipe, Conduit, and Tubing:
   a. 2 Hour Construction: UL System W-L-1054; Hilti FS-ONE Intumescent Firestop Sealant.
   b. 2 Hour Construction: UL System W-L-1164; Hilti FS-ONE Intumescent Firestop Sealant.
   c. 2 Hour Construction: UL System W-L-1206; Hilti FS-ONE Intumescent Firestop Sealant.
3. Uninsulated Non-Metallic Pipe, Conduit, and Tubing:
   a. 2 Hour Construction: UL System W-L-2078; Hilti CP 643N/644 Firestop Collar.
   b. 2 Hour Construction: UL System W-L-2411; Hilti CP 648-E Firestop Wrap Strip.
   c. 2 Hour Construction: UL System W-L-2128; Hilti FS-ONE Intumescent Firestop Sealant.
4. Electrical Cables Not In Conduit:
   a. 2 Hour Construction: UL System W-L-3065; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, CD 601S Elastomeric Firestop Sealant, or CP 618 Firestop Putty Stick.
   b. 2 Hour Construction: UL System W-L-3334; Hilti CP 653 Speed Sleeve.
   c. 2 Hour Construction: UL System W-L-3393; Hilti CFS-SL RK Retrofit Sleeve Kit for existing cables.
   d. 2 Hour Construction: UL System W-L-3394; Hilti CFS-SL SK Firestop Sleeve Kit.
   e. 2 Hour Construction: UL System W-L-3395; Hilti CP653 Speed Sleeve.
5. Cable Trays with Electrical Cables:
   a. 2 Hour Construction: UL System W-L-4011; Hilti FS 657 Fire Block.
   b. 2 Hour Construction: UL System W-L-4060; Hilti FS-ONE Intumescent Firestop Sealant.
6. Insulated Pipes:
   a. 2 Hour Construction: UL System W-L-5028; Hilti FS-ONE Intumescent Firestop Sealant.
   b. 2 Hour Construction: UL System W-L-5029; Hilti FS-ONE Intumescent Firestop Sealant.
   c. 2 Hour Construction: UL System W-L-5096; Hilti FS-ONE Intumescent Firestop Sealant.
   d. 2 Hour Construction: UL System W-L-5257; Hilti FS-ONE Intumescent Firestop Sealant, CP 606 Flexible Firestop Sealant, or CP 601S Elastomeric Firestop Sealant.
   e. 2 Hour Construction: UL System W-L-5244; Hilti CP 648-E Firestop Wrap Strip.
7. HVAC Ducts, Insulated:
a. 2 Hour Construction: UL System W-L-7156; Hilti FS-ONE Intumescent Firestop Sealant.

2.06 FIRESTOPPING SYSTEMS

A. Firestopping: Any material meeting requirements. Foam, caulk, putty or manufactured device.
   1. Fire Ratings: Use any system listed by UL, FM, or ITS (Warnock Hersey) or that has F Rating equal to fire rating of penetrated assembly and minimum T Rating of 0 and that meets all other specified requirements.
   2. Fire Ratings: See Drawings for required systems and ratings.
B. Firestopping at Uninsulated Metallic Pipe and Conduit Penetrations, of diameter 4 inches or less: Any material meeting requirements. Foam, caulk, putty or manufactured device.
C. Firestopping at Cable Tray Penetrations: Any material meeting requirements. Foam, caulk, putty or manufactured device.
D. Firestopping at Cable Penetrations, not in Conduit or Cable Tray: Any material meeting requirements. Foam, caulk, putty or manufactured device.
E. Firestopping at Control and Expansion Joints (without Penetrations): Any material meeting requirements and caulk.

2.07 MATERIALS

A. Firestopping Sealants: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
B. Elastomeric Silicone Firestopping: Single component silicone elastomeric compound and compatible silicone sealant.
C. Foam Firestopping: Single component silicone foam compound.
D. Fibered Compound Firestopping: Formulated compound mixed with incombustible non-asbestos fibers.
E. Fiber Firestopping: Mineral fiber insulation used in conjunction with elastomeric surface sealer forming airtight bond to opening.
F. Primers, Sleeves, Forms, Insulation, Packing, Stuffing, and Accessories: Type required for tested assembly design.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify openings are ready to receive the work of this section.

3.02 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter that could adversely affect bond of firestopping material.
B. Remove incompatible materials that could adversely affect bond.
C. Install backing materials to arrest liquid material leakage.

3.03 INSTALLATION

A. Install materials in manner described in fire test report and in accordance with manufacturer's instructions, completely closing openings.
B. Do not cover installed firestopping until inspected by authority having jurisdiction.
C. Install labeling required by code.
CLEANING

4.01 CLEAN ADJACENT SURFACES OF FIRESTOPPING MATERIALS.

4.02 PROTECTION
   A. Clean adjacent surfaces of firestopping materials.
   B. Protect adjacent surfaces from damage by material installation.

END OF SECTION
SECTION 07 90 05
JOINT SEALERS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Sealants and joint backer rods.
   B. Precompressed foam sealers.

1.02 RELATED REQUIREMENTS
   A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
   B. Section 01 78 39 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
   C. Section 01 81 19 Construction IAQ Mgmt
   D. Section 07 25 00 - Weather Barriers: Sealants required in conjunction with air barriers and vapor retarders:
   E. Section 07 62 00: Sealants required in conjunction with flashing.
   F. Section 08 80 00 - Glazing: Glazing sealants and accessories.

1.03 REFERENCE STANDARDS

1.04 ADMINISTRATIVE REQUIREMENTS
   A. Coordinate the work with other sections referencing this section.

1.05 SUBMITTALS
   A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data indicating sealant chemical characteristics, performance criteria, substrate preparation, limitations, and color availability.
   C. Samples: Submit two samples, 2 x 1/2 in size illustrating sealant colors for selection.
   D. Manufacturer's Installation Instructions: Indicate special procedures, surface preparation, and perimeter conditions requiring special attention.

1.06 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum 5 years documented experience.
   B. Applicator Qualifications: Company specializing in performing the work of this section with minimum 5 years experience.

1.07 FIELD CONDITIONS
   A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

1.08 COORDINATION
   A. Coordinate the work with all sections referencing this section.
1.09 WARRANTY
   A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
   B. Correct defective work within a five year period after Date of Substantial Completion.
   C. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Polyurethane Sealants:
      2. Bostik, Inc www.bostik-us.com
      4. Substitutions: See Section 01 60 00 - Product Requirements.
   B. Acrylic Sealants (ASTM C920):
      4. Substitutions: See Section 01 60 00 - Product Requirements.
   C. Preformed Compressible Foam Sealers and backer rods:
      2. Emseal Joint Systems, Ltd.
      4. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 SEALANTS
   A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.
   B. Type 1 - General Purpose Exterior Sealant: Polyurethane; ASTM C920, Grade NS, Class 25, Uses M, G, and A; single component.
      2. Product: Dynatrol II manufactured by Pecora.
      3. Applications: Use for:
         a. Control, expansion, and soft joints in masonry.
         b. Joints between concrete and other materials.
         c. Joints between metal frames and other materials.
         d. Other exterior joints for which no other sealant is indicated.
   C. Type 2 - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type OP, Grade NF single component, paintable.
      3. Applications: Use for:
         a. Interior wall and ceiling control joints.
         b. Joints between door and window frames and wall surfaces.
         c. Other interior joints for which no other type of sealant is indicated.
   D. Type 3 - Exterior Expansion Joint Sealer: ASTM D 2628, hollow neoprene (polychloroprene) compression gasket.
      1. Black color.
      2. Size and Shape: As indicated by drawings.
4. Applications: Use for:
   a. Exterior wall expansion joints.

E. Type 4 - Acoustical Sealant: acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, non-skinning.
   2. Applications: Use for concealed locations only:
      a. Sealant bead between top stud runner and structure and between bottom stud track and floor and where shown on plans.

F. Type 5 - Concrete Paving Joint Sealant: Polyurethane, self-leveling; ASTM C920, Class 25, Uses T, I, M and A; single component.
   2. Product: Dynatred manufactured by Pecora.
   3. Applications: Use for:
      a. Joints in sidewalks and vehicular paving.
      b. Where shown on plans.

2.03 ACCESSORIES

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application.
B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.
C. Joint Backing: Round foam rod compatible with sealant; ASTM D 1667, closed cell PVC; oversized 30 to 50 percent larger than joint width.
D. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that substrate surfaces and joint openings are ready to receive work.
B. Verify that joint backing and release tapes are compatible with sealant.

3.02 PREPARATION

A. Remove loose materials and foreign matter that could impair adhesion of sealant.
B. Clean and prime joints in accordance with manufacturer's instructions.
C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.
D. Protect elements surrounding the work of this section from damage or disfigurement.

3.03 INSTALLATION

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.
B. Perform installation in accordance with ASTM C1193.
C. Perform acoustical sealant application work in accordance with ASTM C919.
D. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer, except where specific dimensions are indicated.
E. Measure joint dimensions and size joint backers to achieve the following, unless otherwise indicated:
   2. Neck dimension no greater than 1/3 of the joint width.
   3. Surface bond area on each side not less than 75 percent of joint width.
F. Install bond breaker where joint backing is not used.
G. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.
H. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
I. Tool joints concave.
J. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face 1/8 to 1/4 inch below adjoining surface.

3.04 CLEANING
   A. Clean adjacent soiled surfaces.

3.05 PROTECTION
   A. Protect sealants until cured.

END OF SECTION
SECTION 08 11 13
HOLLOW METAL DOORS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Non-fire-rated steel door frames.
B. Steel frames for wood doors.

1.02 RELATED REQUIREMENTS

A. Section 08 71 00 - Door Hardware.
B. Section 09 90 00 - Paints and Coatings: Field painting.

1.03 REFERENCE STANDARDS

B. ANSI/SDI A250.8 - Specifications for Standard Steel Doors and Frames (SDI-100).
C. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
E. BHMA A156.115 - American National Standard for Hardware Preparation in Steel Doors and Steel Frames.
F. DHI A115 Series - Specifications for Steel Doors and Frame Preparation for Hardware; Door and Hardware Institute (ANSI/DHI A115 Series).
G. NAAMM HMMA 840 - Guide Specifications for Installation and Storage of Hollow Metal Doors and Frames.

1.04 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittal procedures.
B. Product Data: Materials and details of design and construction, hardware locations, reinforcement type and locations, anchorage and fastening methods, and finishes; and one copy of referenced grade standard.
C. Shop Drawings: Details of each opening, showing elevations, glazing, frame profiles, and identifying location of different finishes, if any.
D. Samples: Submit two samples of metal, 2 x 2 inches in size showing factory finishes, colors, and surface texture.
E. Installation Instructions: Manufacturer's published instructions, including any special installation instructions relating to this project.
F. Manufacturer's Certificate: Certification that products meet or exceed specified requirements.

1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum five years documented experience.
B. Maintain at the project site a copy of all reference standards dealing with installation.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Store in accordance with NAAMM HMMA 840.
B. Protect with resilient packaging; avoid humidity build-up under coverings; prevent corrosion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Steel Door Frames:
   4. Phillip Manufacturing Company
   5. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 DOORS AND FRAMES

A. Requirements for All Door Frames:
   2. Finish: Factory primed, for field finishing.

2.03 STEEL FRAMES

A. General:
   1. Comply with the requirements of grade specified for corresponding door.
      a. Frames for Wood Doors: Comply with frame requirements specified in ANSI A250.8 for Level 2
   2. Finish: Factory primed, for field finishing.
   3. Frames Wider than 48 Inches: Reinforce with steel channel fitted tightly into frame head, flush with top.

B. Interior Door Frames, Non-Fire-Rated: Fully welded type.
   1. Finish: Factory primed, for field finishing.

2.04 ACCESSORY MATERIALS

A. Silencers: Resilient rubber or vinyl, fitted into drilled hole; 3 on strike side of single door, 3 on center mullion of pairs, and 2 on head of pairs without center mullions.

B. Temporary Frame Spreaders: Provide for all factory- or shop-assembled frames.

2.05 FINISH MATERIALS

A. Primer: Rust-inhibiting, complying with ANSI A250.10, door manufacturer's standard, baked on.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.
B. Verify that opening sizes and tolerances are acceptable.
C. Verify that finished walls are in plane to ensure proper door alignment.

3.02 INSTALLATION

A. Coordinate frame anchor placement with wall construction.
B. Coordinate installation of hardware.
C. Touch up damaged factory finishes.

3.03 TOLERANCES

A. Maximum Diagonal Distortion: 1/16 in measured with straight edge, corner to corner.
3.04 ADJUSTING
   A. Adjust for smooth and balanced door movement.

END OF SECTION
SECTION 08 14 16
FLUSH WOOD DOORS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Flush wood doors; flush and flush glazed configuration; fire rated and smoke rated.

1.02 RELATED REQUIREMENTS
A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 01 78 39 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.
C. Section 01 81 19 Construction IAQ Mgmt
D. Section 08 11 13 - Hollow Metal Doors and Frames.
E. Section 08 71 00 - Door Hardware.
F. Section 08 80 00 - Glazing.

1.03 REFERENCE STANDARDS
A. ANSI A135.4 - American National Standard for Basic Hardboard.
C. UBC Std 7-2, Part II - Test Standard for Smoke- and Draft-control Assemblies; International Conference of Building Officials; 1997.
D. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.
E. WDMA I.S. 1A - Interior Architectural Wood Flush Doors.

1.04 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.
C. Shop Drawings: Illustrate door opening criteria, elevations, sizes, types, swings, undercuts required, special beveling, special blocking for hardware, factory machining criteria, factory finishing criteria, identify cutouts for glazing.
D. Samples: Submit two samples of door construction, 8 x 12 inch in size cut from top; or bottom corner of door.
E. Samples: Submit two samples of door veneer, 6 x 6 inch in size illustrating wood grain, stain color, and sheen.
F. Manufacturer's Installation Instructions: Indicate special installation instructions.
G. Warranty, executed in Owner's name.

1.05 QUALITY ASSURANCE
A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.
B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

1.06 DELIVERY, STORAGE, AND HANDLING
A. Package, deliver and store doors in accordance with specified quality standard.
B. Accept doors on site in manufacturer's packaging. Inspect for damage.
C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

**1.07 PROJECT CONDITIONS**

A. Coordinate the work with door opening construction, door frame and door hardware installation.

**1.08 WARRANTY**

A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Provide warranty for the following term:
   1. Interior Doors: Warranty - Provide for replacing, including cost of rehanging and refinishing, at no cost to Owner, wood doors exhibiting defects in materials or workmanship including warp and delaminating for the life of installation.

D. Include coverage for delamination of veneer, warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

A. Wood Veneer Faced Doors:
   3. VT Industries www.VTIndustries.com
   5. Substitutions: See Section 01 60 00 - Product Requirements.

**2.02 DOORS**

A. All Doors: See drawings for locations and additional requirements.
   1. Quality Level: Custom Grade, Standard Duty performance, in accordance with WDMA I.S.1-A.
   2. Wood Veneer Faced Doors: 5-ply unless otherwise indicated.

B. Interior Doors: 1-3/4 inches; thick unless otherwise indicated; flush construction.
   1. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with NFPA 252 or UL 10B - Negative (Neutral) Pressure; Underwriters Laboratories Inc. (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
   2. Wood veneer facing with factory transparent finish.

**2.03 DOOR AND PANEL CORES**

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated.

B. Fire Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

**2.04 DOOR FACINGS**

A. Wood Veneer Facing for Transparent Finish: Match existing "A", veneer grade as specified by quality standard.
   1. Cut: Plain Sliced.
   2. Veneer match: Book match and balanced.
   3. Vertical Edges: Same species as face veneer.

B. Facing Adhesive: Type I - waterproof.
2.05 ACCESSORIES
   A. Glazing Stops: Wood, of same species as door facing, butted; or mitered corners; prepared for
countersink style tamper proof screws.

2.06 DOOR CONSTRUCTION
   A. Fabricate doors in accordance with door quality standard specified.
   B. Cores Constructed with stiles and rails:
      1. Provide solid blocks at lock edge for hardware reinforcement.
      2. Provide solid blocking for other through bolted hardware.
   C. Fit door edge trim to edge of stiles after applying veneer facing.
   D. Factory machine doors for hardware other than surface-mounted hardware, in accordance with
      hardware requirements and dimensions.
   E. Factory fit doors for frame opening dimensions identified on shop drawings, with edge
      clearances in accordance with specified quality standard.
   F. Provide edge clearances in accordance with the quality standard specified.

2.07 FACTORY FINISHING - WOOD VENEER DOORS
   A. Finish work in accordance with WDMA I.S. 1A for grade specified and as follows:
   B. Factory finish doors in accordance with specified quality standard:
      1. Transparent Finish: Transparent catalyzed polyurethane, Custom quality, semi-gloss
         sheen.
   C. Factory finish doors in accordance with approved sample.
   D. Seal door top edge with color sealer to match door facing.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify existing conditions before starting work.
   B. Verify that opening sizes and tolerances are acceptable.
   C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or
      alignment.

3.02 INSTALLATION
   A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.
   C. Use machine tools to cut or drill for hardware.
   D. Coordinate installation of doors with installation of frames and hardware.
   E. Coordinate installation of glazing.

3.03 TOLERANCES
   A. Conform to specified quality standard for fit and clearance tolerances.
   B. Conform to specified quality standard for telegraphing, warp, and squareness.
   C. Maximum Diagonal Distortion (Warp): 1/8 inch measured with straight edge or taut string,
      corner to corner, over an imaginary 36 by 84 inches surface area.
   D. Maximum Vertical Distortion (Bow): 1/8 inch measured with straight edge or taut string, top to
      bottom, over an imaginary 36 by 84 inches surface area.
   E. Maximum Width Distortion (Cup): 1/8 inch measured with straight edge or taut string, edge to
      edge, over an imaginary 36 by 84 inches surface area.
3.04 ADJUSTING
   A. Adjust doors for smooth and balanced door movement.
   B. Adjust closers for full closure.

END OF SECTION
SECTION 08 43 13
ALUMINUM-FRAMED STOREFRONTS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Aluminum-framed storefront, with vision glass.
   B. Aluminum doors.
   C. Weatherstripping.

1.02 REFERENCE STANDARDS
   A. AAMA CW-10 - Care and Handling of Architectural Aluminum From Shop to Site.
   B. AAMA 611 - Voluntary Specification for Anodized Architectural Aluminum.

1.03 ADMINISTRATIVE REQUIREMENTS
   A. Coordinate with installation of other components that comprise the exterior enclosure.
   B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.04 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, door hardware, internal drainage details.
   C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.
   D. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.
   E. Design Data: Provide framing member structural and physical characteristics, engineering calculations, and dimensional limitations.
   F. Hardware Schedule: Complete itemization of each item of hardware to be provided for each door, cross-referenced to door identification numbers in Contract Documents.
   G. Manufacturer Qualifications Statement.
   H. Installer Qualifications Statement.
   I. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

1.05 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing aluminum glazing systems with minimum 20 years of documented experience.
   B. Installer Qualifications: Company specializing in performing work of type specified and with at least 10 years of documented experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING
   A. Handle products of this section in accordance with AAMA CW-10.
B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

1.07 FIELD CONDITIONS
A. Do not install sealants when ambient temperature is less than 40 degrees F. Maintain this minimum temperature during and 48 hours after installation.

1.08 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Correct defective Work within a five year period after Date of Substantial Completion.
C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.
D. Provide five year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

PART 2 PRODUCTS
2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING
A. Front-Set Style, Thermally-Broken:
   1. Basis of Design: Kawneer TriFab VG 451T.
   2. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep.
B. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 BASIS OF DESIGN -- FRAMING FOR INTERIOR NON-INSULATED GLAZING
A. Center-Set Style:
B. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 BASIS OF DESIGN -- SWINGING DOORS
A. Medium Stile, Non-Insulated Glazing:
B. Medium Stile, Insulating Glazing, Thermally-Broken:
   1. Basis of Design: Kawneer 360 Insulclad Thermal Entrance with 10" bottom rail.
   2. Thickness: 2-1/4 inches.
C. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 MANUFACTURERS
A. Aluminum-Framed Storefront and Doors:
   1. EFCO Corporation: www.efcocorp.com/#sle.
   5. Substitutions: See Section 01 60 00 - Product Requirements.

2.05 STOREFRONT
A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Finish: Class I natural anodized at Riverside. Class I dark bronze anodized at Whiteknact.
      a. Factory finish all surfaces that will be exposed in completed assemblies.
      b. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
2. Finish Color: As selected from manufacturer’s standards.
3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Structural Performance Requirements: Design and size components to withstand the following load requirements without damage or permanent set.
1. Design Wind Loads: Comply with the requirements of IBC 2012 code.

2.06 COMPONENTS
A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.
B. Glazing: As specified in Section 08 80 00.
   C. Swing Doors: Glazed aluminum.

2.07 MATERIALS
B. Fasteners: Stainless steel.
C. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

2.08 FINISHES
A. Class I Natural Anodized Finish: AAMA 611 AA-M12C22A41 Clear anodic coating not less than 0.7 mils thick.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify dimensions, tolerances, and method of attachment with other work.
B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

3.02 INSTALLATION
A. Install wall system in accordance with manufacturer’s instructions.
B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.
C. Provide alignment attachments and shims to permanently fasten system to building structure.
D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.
E. Provide thermal isolation where components penetrate or disrupt building insulation.
F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.
G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.
H. Coordinate attachment and seal of perimeter air and vapor barrier materials.
I. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.
J. Set thresholds in bed of mastic and secure.
K. Install hardware using templates provided.
L. Install glass and infill panels in accordance with Section 08 80 00, using glazing method required to achieve performance criteria.
M. Install perimeter sealant in accordance with Section 07 90 05.
N. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

3.03 TOLERANCES
A. Maximum Variation from Plumb: 0.06 inches every 3 ft non-cumulative or 1/16 inches per 10 ft, whichever is less.
B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch.

3.04 CLEANING
A. Remove protective material from pre-finished aluminum surfaces.
B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.
C. Remove excess sealant by method acceptable to sealant manufacturer.

3.05 PROTECTION
A. Protect installed products from damage during subsequent construction.

END OF SECTION
SECTION 08 71 00
DOOR HARDWARE

PART 1  GENERAL

1.01  SECTION INCLUDES
   A. Hardware for wood doors.
   B. Hardware for aluminum storefront doors.
   C. Electrically operated and controlled hardware.

1.02  RELATED REQUIREMENTS
   A. Section 08 11 13 - Hollow Metal Doors and Frames.
   B. Section 08 14 16 - Flush Wood Doors.

1.03  REFERENCE STANDARDS
   C. BHMA A156.1 - American National Standard for Butts and Hinges.
   D. BHMA A156.2 - American National Standard for Bored and Preassembled Locks & Latches.
   E. BHMA A156.3 - American National Standard for Exit Devices.
   F. BHMA A156.4 - American National Standard for Door Controls - Closers.
   G. BHMA A156.5 - American National Standard for Cylinders and Input Devices for Locks.
   H. BHMA A156.6 - American National Standard for Architectural Door Trim.
   I. BHMA A156.7 - American National Standard for Template Hinge Dimensions.
   J. BHMA A156.8 - American National Standard for Door Controls - Overhead Stops and Holders.
   K. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association (ANSI/BHMA A156.9).
   N. BHMA A156.31 - American National Standard for Electric Strikes and Frame Mounted Actuators.

1.04  ADMINISTRATIVE REQUIREMENTS
   A. Coordinate the manufacture, fabrication, and installation of products onto which door hardware will be installed.
   B. Furnish templates for door and frame preparation to manufacturers and fabricators of products requiring internal reinforcement for door hardware.
   C. Convey Owner’s keying requirements to manufacturers.
   D. Preinstallation Meeting: Convene a preinstallation meeting one week prior to commencing work of this section; require attendance by all affected installers.

1.05  SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Product Data: Manufacturer's catalog literature for each type of hardware, marked to clearly show products to be furnished for this project.
C. Hardware Schedule: Detailed listing of each item of hardware to be installed on each door. Use door numbering scheme as included in the Contract Documents. Identify electrically operated items and include power requirements.
D. Keying Schedule: Submit for approval of Owner.
E. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.
F. Maintenance Data: Include data on operating hardware, lubrication requirements, and inspection procedures related to preventative maintenance.
G. Keys: Deliver with identifying tags to Owner by security shipment direct from hardware supplier.
H. Maintenance Materials and Tools: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Tools: One set of all special wrenches or tools applicable to each different or special hardware component, whether supplied by the hardware component manufacturer or not.

1.06 QUALITY ASSURANCE
A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.
B. Hardware Supplier Personnel: Employ an Architectural Hardware Consultant (AHC) to assist in the work of this section.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Package hardware items individually; label and identify each package with door opening code to match hardware schedule.

1.08 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.

PART 2 PRODUCTS
2.01 DOOR HARDWARE - GENERAL
A. Provide all hardware specified or required to make doors fully functional, compliant with applicable codes, and secure to the extent indicated.
B. Provide all items of a single type of the same model by the same manufacturer.
C. Provide products that comply with the following:
   1. Applicable provisions of federal, state, and local codes.
   2. Hardware for Smoke and Draft Control Doors: Provide hardware that enables door assembly to comply with air leakage requirements of the applicable code.
D. Function: Lock and latch function numbers and descriptions of manufactures series as listed in hardware schedule.
E. Finishes: Identified in schedule.

2.02 LOCKS AND LATCHES
A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
   1. If no hardware set is indicated for a swinging door provide an office lockset.
   2. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
   3. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
B. Lock Cylinders: Manufacturer's standard tumbler type, six-pin standard core.
   1. Provide cams and/or tailpieces as required for locking devices required.
C. Keying: Grand master keyed.
D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".

2.03 HINGES
A. Hinges: Provide hinges on every swinging door.
   1. Provide five-knuckle full mortise butt hinges unless otherwise indicated.
   2. Provide ball-bearing hinges at all doors having closers.
   3. Provide hinges in the quantities indicated.
   4. Provide non-removable pins on exterior outswinging doors.
   5. Where electrified hardware is mounted in door leaf, provide power transfer hinges.
B. Quantity of Hinges Per Door:
   1. Doors up to 60 inches High: Two hinges.
   2. Doors From 60 inches High up to 90 inches High: Three hinges.
C. Manufacturers - Hinges:

2.04 PIVOTS
A. Pivots: Comply with BHMA A156.17.
B. Manufacturers - Pivots:

2.05 PUSH/PULLS
A. Push/Pulls: Comply with BHMA A156.6.
   1. Provide push and pull on doors not specified to have lockset, latchset, exit device, or auxiliary lock.
   2. On solid doors, provide matching push plate and pull plate on opposite faces.
B. Manufacturers - Push/Pulls:

2.06 LOCKS AND LATCHES
A. Locks: Provide a lock for every door, unless specifically indicated as not requiring locking.
   1. Hardware Sets indicate locking functions required for each door.
   2. If no hardware set is indicated for a swinging door provide an office lockset.
   3. Trim: Provide lever handle or pull trim on outside of all locks unless specifically stated to have no outside trim.
   4. Lock Cylinders: Provide key access on outside of all locks unless specifically stated to have no locking or no outside trim.
B. Lock Cylinders: Manufacturer’s standard tumbler type, six-pin standard core.
   1. Provide cams and/or tailpieces as required for locking devices required.
C. Keying: Grand master keyed.
D. Latches: Provide a latch for every door that is not required to lock, unless specifically indicated "push/pull" or "not required to latch".
2.07 CYLINDRICAL LOCKSETS
   A. Locking Functions: As defined in BHMA A156.2, and as follows:
      1. Office: F81, key not required to lock, remains locked upon exit.
   B. Manufacturers - Cylindrical Locksets:
      1. Assa Abloy Corbin Russwin, Sargent, or Yale: www.assaabloydss.com/#sle.

2.08 ELECTRIC STRIKES
   A. Electric Strikes: Complying with BHMA A156.31 and UL listed as a Burglary-Resistant Electric Door Strike; style to suit locks.
   B. Manufacturers:

2.09 CLOSERS
   A. Closers: Complying with BHMA A156.4.
      1. Provide surface-mounted, door-mounted closers unless otherwise indicated.
      2. Provide a door closer on every exterior door.
      3. Provide a door closer on every fire- and smoke-rated door. Spring hinges are not an acceptable self-closing device unless specifically so indicated.
      4. On pairs of swinging doors, if an overlapping astragal is present, provide coordinator to ensure the leaves close in proper order.
      5. At outswinging exterior doors, mount closer in inside of door.
   B. Manufacturers - Closers:

2.10 STOPS AND HOLDERS
   A. Stops: Complying with BHMA A156.8; provide a stop for every swinging door, unless otherwise indicated.
      1. Provide wall stops, unless otherwise indicated.
      2. If wall stops are not practical, due to configuration of room or furnishings, provide overhead stop.
      3. Stop is not required if positive stop feature is specified for door closer; positive stop feature of door closer is not an acceptable substitute for a stop unless specifically so stated.

2.11 GASKETING AND THRESHOLDS
   A. Gaskets: Complying with BHMA A156.22.
      1. On doors indicated as "sound-rated", "acoustical", or with an STC rating, provide sound-rated gaskets and automatic door bottom; make gaskets completely continuous, do not cut or notch gaskets for installation.

2.12 PROTECTION PLATES AND ARCHITECTURAL TRIM
   A. Protection Plates:
      1. Kickplate: Provide on push side of every door with closer, except storefront and all-glass doors.
      2. Mop Plates:
PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that doors and frames are ready to receive work; labeled, fire-rated doors and frames are present and properly installed, and dimensions are as indicated on shop drawings.
   B. Verify that electric power is available to power operated devices and of the correct characteristics.

3.02 INSTALLATION
   A. Install hardware in accordance with manufacturer's instructions and applicable codes.
   B. Use templates provided by hardware item manufacturer.
   C. Mounting heights for hardware from finished floor to center line of hardware item:

3.03 ADJUSTING
   A. Adjust work under provisions of Section 01 70 00.
   B. Adjust hardware for smooth operation.

3.04 CLEANING
   A. Clean adjacent surfaces soiled by hardware installation. Clean finished hardware per manufacturer's instructions after final adjustments has been made. Replace items that cannot be cleaned to manufacturer's level of finish quality at no additional cost.

3.05 PROTECTION
   A. Protect finished Work under provisions of Section 01 70 00.
   B. Do not permit adjacent work to damage hardware or finish.

END OF SECTION
SECTION 08 80 00
GLAZING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Glass.
B. Plastic glazing film.
C. Glazing compounds and accessories.

1.02 RELATED REQUIREMENTS
A. Section 07 92 00 - Joint Sealants: Sealants for other than glazing purposes.
B. Section 08 43 13 - Aluminum-Framed Storefronts: Glazing furnished by storefront manufacturer.

1.03 REFERENCE STANDARDS
H. ASTM E 773 - Standard Test Method for Accelerated Weathering of Sealed Insulating Glass Units.
L. GANA (GM) - GANA Glazing Manual.
M. GANA (SM) - GANA Sealant Manual.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.
C. Samples: Visit site and submit samples for initial selection by the Owner to match existing glass.
D. Samples: Submit two samples 12 x12 inch in size of glass and plastic units, showing coloration and design.

1.06 QUALITY ASSURANCE
B. Installer Qualifications: Company specializing in performing the work of this section with minimum 10 years documented experience.

1.07 FIELD CONDITIONS
A. Do not install glazing when ambient temperature is less than 50 degrees F.
B. Maintain minimum ambient temperature before, during and 24 hours after installation of glazing compounds.

1.08 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Sealed Insulating Glass Units: Provide a five (5) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

1.09 PERFORMANCE REQUIREMENTS
A. General: Provide glass capable of withstanding thermal movement and wind and impact loads (where applicable) as specified in paragraph B following.
B. Glass Design: Glass thickness designations indicated are minimums and are for detailing only. Confirm glass thicknesses by analyzing Project loads and in-service conditions. Provide glass lites in the thickness designations indicated for various size openings, but not less than thicknesses and in strengths (annealed or heat treated) required to meet or exceed the following criteria:
   1. Glass Thicknesses: Select minimum glass thicknesses to comply with ASTM E 1300, according to the following requirements:
      b. Basic Wind Speed: 120 mph.
   C. Thermal Movements: Provide glazing that allows for thermal movements resulting from ambient and surface temperatures changes acting on glass framing members and glazing components.
   D. Thermal and Optical Performance Properties: Provide glass with performance properties specified based on manufacturer's published test data, as determined according to procedures indicated below:
      1. For monolithic-glass lites, properties are based on units with lites 1/4 inch (6.0 mm) thick.
      2. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
      3. Center-of-Glass Values: Based on using LBL-44789 WINDOW 5.0 computer program for the following methodologies:
         a. U-Factors: NFRC 100 expressed as Btu/ sq. ft. per h per degree F.
PART 2 PRODUCTS

2.01 GLAZING TYPES

2.02 BASIS OF DESIGN - INSULATING GLASS UNITS

A. Type G1 - Sealed Insulating Glass Units: Tinted vision glazing, low-E.
   1. Application(s): All exterior glazing unless otherwise indicated.
   2. Substitutions: Refer to Section 01 60 00 - Product Requirements.
   3. Between-lite space filled with argon.
   4. Tint: Match Existing.
   6. Outboard Lite: Annealed float glass, 1/4 inch thick.
      a. Coating: SunGuard SNX 62/27 on #2 surface.
   7. Inboard Lite: Annealed float glass, 1/4 inch thick.
   8. Tempered: Provide tempered glass at both outboard and inboard lite as noted on drawings, at glass 18" or less above the floor, at glass in doors, at glass withing 24" of swinging doors, and as otherwise required by code.
   9. Total Thickness: 1 inch.

B. Type G3 - Single Vision Glazing:
   1. Applications: All interior glazing unless otherwise indicated.
   2. Type: Fully tempered float glass.
   3. Tint: Clear.
   4. Thickness: 1/4 inch.

2.03 GLASS MATERIALS

A. Float Glass Manufacturers:
   4. Substitutions: Refer to Section 01 60 00 - Product Requirements.

B. Float Glass: All glazing is to be float glass unless otherwise indicated.
   2. Tinted Types: Color and performance characteristics as indicated.
   3. Thicknesses: As indicated; for exterior glazing comply with specified requirements for wind load design regardless of specified thickness.

2.04 SEALED INSULATING GLASS UNITS

A. Manufacturers:
   1. Any of the manufacturers specified for float glass.
   2. Substitutions: Refer to Section 01 60 00 - Product Requirements.

B. Sealed Insulating Glass Units: Types as indicated.
   1. Durability: Certified by an independent testing agency to comply with ASTM E2190.
   2. Edge Spacers: Aluminum, bent and soldered corners.
   3. Edge Seal: Glass to elastomer with supplementary silicone sealant.
   4. Purge interpane space with dry hermetic air.

2.05 PLASTIC FILMS

A. Manufacturers:
   1. 3M Window Film: www.3m.com/US/arch_construct/scpd/windowfilm.
   2. Solyx.
   3. Substitutions: Refer to Section 01 60 00 - Product Requirements.

B. Plastic Film Types

2.06 GLAZING COMPOUNDS

A. Manufacturers:
   4. Substitutions: Refer to Section 01 60 00 - Product Requirements.

B. Butyl Sealant: Single component; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; Shore A hardness of 10 to 20; black color; non-skinning.

2.07 GLAZING ACCESSORIES

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness, ASTM C864 Option I. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness, ASTM C 864 Option I. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.
   1. Manufacturers:
      c. Substitutions: Refer to Section 01 60 00 - Product Requirements.

D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option I; black color.

E. Glazing Clips: Manufacturer's standard type.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that openings for glazing are correctly sized and within tolerance.
B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

3.02 PREPARATION

A. Clean contact surfaces with solvent and wipe dry.
B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.
C. Prime surfaces scheduled to receive sealant.
D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.
E. Install sealant in accordance with manufacturer's instructions.

3.03 GLAZING METHODS

3.04 INSTALLATION - EXTERIOR DRY METHOD (TAPE AND GASKET SPLINE GLAZING)

A. Cut glazing tape to length; install on glazing pane. Seal corners by butting tape and sealing junctions with butyl sealant.
B. Place setting blocks at 1/4 points with edge block no more than 6 inches from corners.
C. Rest glazing on setting blocks and push against fixed stop with sufficient pressure to attain full contact.
D. Install removable stops without displacing glazing spline. Exert pressure for full continuous contact.
E. Trim protruding tape edge.

3.05 CLEANING
A. Remove glazing materials from finish surfaces.
B. Remove labels after Work is complete.
C. Clean glass and adjacent surfaces.

3.06 PROTECTION
A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

END OF SECTION
SECTION 08 87 23
SAFETY AND SECURITY FILMS

PART 1  GENERAL

1.01  SECTION INCLUDES

A. Glazing film applied to new glazing assemblies.
B. New Glazing: Factory or shop install film to glazing before installation in frames.
C. Glazing assemblies to receive film are indicated on drawings.

1.02  RELATED REQUIREMENTS

A. Section 08 44 13 - Glazed Aluminum Curtain Walls: New glazing to receive film.
B. Section 08 80 00 - Glazing: New glazing to receive film.

1.03  ABBREVIATIONS AND ACRONYMS

B. GSA - General Services Administration.

1.04  REFERENCE STANDARDS

F. GSA TS01 - Standard Test Method for Glazing and Window Systems Subject to Dynamic Overpressure Loadings; General Services Administration.

1.05  SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Record of product certification for safety requirements.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods.
C. Samples: For each film product to be used, minimum size 4 inches by 6 inches, representing actual product, color, and patterns.
D. Test Reports: Detailed reports of full-scale chamber tests to specified criteria, using assemblies identical to those required for this project.
E. Specimen Warranty.

1.06  QUALITY ASSURANCE

A. Manufacturer Qualifications: Glazing film manufacturer specializing in manufacture of safety glazing films with minimum 10 years successful experience.
B. Installer Qualifications: Certified by glazing film manufacturer.

1.07  DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.
B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of authorities having jurisdiction.
1.08 FIELD CONDITIONS
   A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

1.09 WARRANTY
   A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
   B. Provide 10 year manufacturer's replacement warranty to cover film against peeling, cracking, discoloration, and deterioration.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. 3M Window Film; ______: www.solutions.3m.com/#sle.
   B. Flexvue Films; ______: www.flexvuefilms.com/#sle.
   C. Madico, Inc; ______: www.madico.com/#sle.

2.02 SAFETY AND SECURITY GLAZING FILM
   A. Blast Resistant Glazing at Ground Level: Provide new glazing assemblies to provide Level 2 blast resistance when tested in accordance with GSA TS01 at a peak pressure of ___ psi, and a positive phase impulse of ____; and impact resistance complying with ANSI Z97.1 and 16 CFR 1201, Category II, as specified.
      1. Surface applied film.

2.03 MATERIALS
   A. Glazing Film: Transparent polyester film for permanent bonding to glass.
      1. Thickness: 0.008 inch, minimum.
      2. Color: Clear.
      4. Adhesive Type: Pressure sensitive acrylic.
   B. Accessory Materials: As recommended or required by film manufacturer.
   C. Glass Cleaner: As recommended by glazing film manufacturer.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Field -Applied Film: Verify that existing conditions are adequate for proper application and performance of film.
   B. Examine glass and frames. Verify that existing conditions are adequate for proper application and performance of film.
   C. Verify glass is not cracked, chipped, broken, or damaged.
   D. Verify that frames are securely anchored and free of defects.
   E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION
   A. Clean glass of dust, dirt, paint, oil, grease, mildew, mold, and other contaminants that would inhibit adhesion.
   B. Immediately prior to applying film, thoroughly wash glass with neutral cleaning solution.
   C. Protect adjacent surfaces.
   D. Do not begin installation until substrates have been properly prepared.
3.03 INSTALLATION
   A. Do not apply glazing film when surface temperature is less that 40 degrees F or if precipitation is imminent.
   B. Install in accordance with manufacturer's instructions, without air bubbles, wrinkles, streaks, bands, thin spots, pinholes, or gaps, as required to achieve specified performance.
   C. Accurately cut film with straight edges to required sizes allowing 1/16 inch to 1/8 inch gap at perimeter of glazed panel unless otherwise required by anchorage method.
   D. Seams: Seam film only as required to accommodate material sizes; form seams vertically without overlaps and gaps; do not install with horizontal seams.
   E. Clean glass and anchoring accessories following installation. Remove excess sealants and other glazing materials from adjacent finished surfaces.
   F. Remove labels and protective covers.

3.04 PROTECTION
   A. Protect installed products until completion of project.
   B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

END OF SECTION
SECTION 09 21 16
GYPSUM BOARD ASSEMBLIES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Metal stud wall, ceiling and soffit framing.
B. Metal framing for top of wall bracing and ceiling framing.
C. Acoustic insulation.
D. Gypsum sheathing.
E. Gypsum wallboard.
F. Cementitious backer board.
G. Joint treatment and accessories.

1.02 RELATED REQUIREMENTS
A. Section 06 10 00 - Rough Carpentry: Building Framing and Wood blocking.
B. Section 06 10 00 - Rough Carpentry: Wood blocking product and execution requirements.
C. Section - Joint Sealers: Acoustic sealant.

1.03 REFERENCE STANDARDS
A. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute. (replaced SG-971)
B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
I. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs From 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness.
J. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs.


S. ASTM E413 - Classification for Rating Sound Insulation.

T. GA-214 - Recommended Levels of Gypsum Board Finish; Gypsum Association.


1.04 SUBMITTALS

A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate special details associated with vertical deflection joints and acoustic seals. Provide special details for suspended ceilings. Indicate layout, anchorage to structure, type and location of fasteners, framed openings, accessories, and items of related work.

C. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

D. Product Data: Provide manufacturer's data on partition head to structure connectors, showing compliance with requirements.

1.05 QUALITY ASSURANCE

A. Perform in accordance with ASTM C 840. Comply with requirements of GA-600 for fire-rated assemblies.

B. Installer Qualifications: Company specializing in performing gypsum board application and finishing, with minimum 5 years of documented experience.

PART 2 PRODUCTS

2.01 GYPSUM BOARD ASSEMBLIES

A. Provide completed assemblies per drawings.

2.02 METAL FRAMING MATERIALS

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/360 at 5 psf.
   1. Exception: The minimum metal thickness and section properties requirements of ASTM C 645 are waived provided steel of 40 ksi minimum yield strength is used, the metal is continuously dimpled, the effective thickness is at least twice the base metal thickness, and maximum stud heights are determined by testing in accordance with ASTM E 72 using assemblies specified by ASTM C 754.
      a. Acceptable Products:
      2. Studs: "C" shaped with flat or formed webs with knurled faces.
5. Furring: Hat-shaped sections, minimum depth of 7/8 inch.

C. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

D. Partition Head to Structure Connections: Provide mechanical anchorage devices that accommodate deflection using slotted holes, screws and anti-friction bushings, preventing rotation of studs while maintaining structural performance of partition.
   1. Structural Performance: Maintain lateral load resistance and vertical movement capacity required by applicable code, when evaluated in accordance with AISI North American Specification for the Design of Cold-Formed Steel Structural Members.
   3. Provide kickers / framing for top of wall and soffits as necessary.

2.03 BOARD MATERIALS

A. Manufacturers - Gypsum-Based Board:
   5. Substitutions: See Section 01 60 00 - Product Requirements.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
   1. Application: Use for ceilings, unless otherwise indicated.
   2. Thickness:
      a. Ceilings: 1/2 inch.

C. Impact-Rated Wallboard: Tested to Level 3 soft-body and hard-body impact in accordance with ASTM C1629.
   1. Application: Walls.
   2. Paper-Faced Type: Gypsum wallboard as defined in ASTM C1396/C1396M.
   3. Type: Fire resistance rated Type X, UL or WH listed.
   5. Edges: Tapered.
   6. Products:
      b. USG Corporation; Fiberock Brand Panels--VHI Abuse-Resistant.

D. Backing Board For Wet Areas: One of the following products:
   1. Application: Surfaces behind tile in wet areas.
   2. ANSI Cement-Based Board: Non-gypsum-based; aggregated Portland cement panels with glass fiber mesh embedded in front and back surfaces complying with ANSI A118.9-SystemDeleted or ASTM C1325.
      a. Thickness: 1/2 inch.
      b. Products:
         1) Custom Building Products; Wonderboard.
         2) National Gypsum Company; PermaBase Brand Cement Board.
         3) National Gypsum Company; PermaBase Flex Brand Cement Board.
         4) Substitutions: See Section 01 60 00 - Product Requirements.
   3. ASTM Cement-Based Board: Non-gypsum-based, cementitious board complying with ASTM C1288.
      a. Thickness: 1/2 inch.
E. Gypsum Wallboard: ASTM C 1396/C 1396M. Sizes to minimize joints in place; ends square cut.
   1. Ceiling Board: Special sag-resistant type.
      a. Application: Ceilings, and soffits.
      b. Thickness: 1/2" inch.
      c. Edges: Tapered.
   2. Impact-Rated Type: Gypsum wallboard especially formulated for increased impact resistance, with enhanced gypsum core and heavy duty face and back paper.
      b. Core Type: Regular and Type X, as indicated.
      c. Thickness: 5/8 inch.
      d. Edges: Tapered.

F. Exterior Sheathing Board: Sizes to minimize joints in place; ends square cut.
   1. Application: Exterior sheathing, unless otherwise indicated.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Glass-Mat-Faced Sheathing: Glass mat faced gypsum substrate as defined in ASTM C1177/C1177M.
   4. Core Type: Regular.
   5. Regular Board Thickness: 1/2 inch and 5/8"
   6. Edges: Square, for vertical application.
   7. Glass-Mat-Faced Products:
      a. CertainTeed Corporation; GlasRoc Brand.
      b. Georgia-Pacific Gypsum; DensGlass Sheathing.
      c. National Gypsum Company; Gold Bond Brand e2XP Extended Exposure Sheathing.
      d. Temple-Inland Inc; GreenGlass Exterior Sheathing.
      e. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 ACCESSORIES

A. Acoustic Insulation: ASTM C 665; preformed glass fiber, friction fit type, unfaced. Thickness to fit cavity. As specified in Section 07 21 00.

B. Acoustic Sealant: As specified in Section .

C. Water-Resistive Barrier: As specified in Section 07 25 00.

D. Finishing Accessories: ASTM C1047, rigid plastic, unless otherwise indicated.
   1. Types: As detailed or required for finished appearance.
   2. Special Shapes: In addition to conventional cornerbead and control joints, provide U-bead at exposed panel edges.

E. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
   1. Tape: 2 inch wide, coated glass fiber tape for joints and corners, except as otherwise indicated.
   2. Tape: 2 inch wide, creased paper tape for joints and corners, except as otherwise indicated.
   5. Chemical hardening type compound.

F. Screws for Attachment to Steel Members Less Than 0.03 inch in Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.
G. Screws for Attachment to Steel Members From 0.033 to 0.112 Inch in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

H. Screws: ASTM C 1002; self-piercing tapping type; cadmium-plated for exterior locations.

I. Staples: ASTM C 840.

J. Anchorage to Substrate: Tie wire, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that project conditions are appropriate for work of this section to commence.

3.02 FRAMING INSTALLATION

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
   1. Level ceiling system to a tolerance of 1/600.
   2. Laterally brace entire suspension system, to structure above.
   3. Install bracing as required at exterior locations to resist wind uplift.

C. Studs: Space studs as indicated.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling framing in accordance with details.
   3. Partitions Terminating at Structure: Attach extended leg top runner to structure, maintain clearance between top of studs and structure, and brace both flanges of studs with continuous bridging.
   4. Partitions Terminating at Structure: Attach top runner to structure, maintain clearance between top of studs and structure, and connect studs to track using specified mechanical devices in accordance with manufacturer's instructions; verify free movement of top of stud connections; do not leave studs unattached to track.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Connections: Minimum (4) #12 screws per connection of cold formed metal framing members.

F. Blocking: Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, wood frame openings, toilet accessories, and hardware. Comply with Section 06 10 00 for wood blocking.

3.03 ACOUSTIC ACCESSORIES INSTALLATION

A. Acoustic Insulation: Place tightly within spaces, around cut openings, behind and around electrical and mechanical items within partitions, and tight to items passing through partitions.

B. Acoustic Sealant: Install as follows:
   1. Place two beads continuously on substrate before installation of perimeter framing members.
   2. Place continuous bead at perimeter of each layer of gypsum board.
   3. In non-fire-rated construction, seal around all penetrations by conduit, pipe, ducts, and rough-in boxes; and other penetrations.

3.04 BOARD INSTALLATION

A. Comply with ASTM C 840 and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
1. Exception: Tapered edges to receive joint treatment at right angles to framing.

C. Installation on Metal Framing: Use screws for attachment of all gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.

D. Curved Surfaces: Apply gypsum board to curved substrates in accordance with GA-226.

### 3.05 INSTALLATION OF TRIM AND ACCESSORIES

A. Control Joints: Place control joints consistent with lines of building spaces and as directed.
   1. Not more than 30 feet apart on walls and ceilings over 50 feet long.

B. Corner Beads: Install at external corners, using longest practical lengths.

C. Edge Trim: Install at locations where gypsum board abuts dissimilar materials and as indicated.

### 3.06 JOINT TREATMENT

A. Paper Faced Gypsum Board: Use fiberglass joint tape, bedded with ready-mixed vinyl-based; or powder-type vinyl-based; or chemical hardening type joint compound and finished with ready-mixed vinyl-based; or powder-type vinyl-based; or chemical hardening type joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   2. Level 2: In utility areas, behind cabinetry, and on backing board to receive tile finish or where FRP panel to be installed.
   3. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

C. Finish gypsum board in scheduled areas in accordance with levels defined in GA-214; or ASTM C 840 and as scheduled below.
   1. Above Finished Ceilings Concealed From View: Level 1.
   2. Utility Areas and Areas Behind Cabinetry: Level 2.

D. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch.
   2. Taping, filling, and sanding is not required at surfaces behind adhesive applied ceramic tile and fixed cabinetry.
   3. Taping, filling and sanding is not required at base layer of double layer applications.

### 3.07 TOLERANCES

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet in any direction.

### 3.08 FINISH LEVEL SCHEDULE (SEE 1.03 REFERENCES FOR DEFINITION)

A. Level 1: Above finished ceilings concealed from view.

B. Level 2: Utility areas and areas behind cabinetry or where FRP will be applied.

C. Level 4: Walls and ceilings scheduled to receive flat paint finish.

END OF SECTION
SECTION 09 24 00
CEMENT PLASTERING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Cement plastering.

1.02 RELATED REQUIREMENTS
A. Section 05 40 00 - Cold-Formed Metal Framing: Structural metal framing for plaster.
B. Section 07 25 00 - Weather Barriers.
C. Section 09 21 16 - Gypsum Board Assemblies: Metal stud framing and furring for plaster.
D. Section 09 22 36 - Lath: Lath, furring, beads, screeds, and joint accessories for plaster base.

1.03 REFERENCE STANDARDS

1.04 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittals procedures.
B. Product Data: Provide data on plaster materials and trim accessories.
C. Samples:
   1. Submit two samples, 12 by 12 inch in size illustrating finish color and texture.

1.05 QUALITY ASSURANCE
A. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.
B. Copies of Documents at Project Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

1.06 MOCK-UP
A. Construct mock-up of exterior and interior wall, 2 feet long by 2 feet wide, illustrating surface finish.
   1. Locate where directed.
   2. Mock-up may remain as part of this work.

1.07 FIELD CONDITIONS
A. Exterior Plaster Work: Do not apply plaster when substrate or ambient air temperature is 40 degrees F or lower, or when temperature is expected to drop below 40 degrees F within 48 hours of application.
PART 2 PRODUCTS

2.01 CEMENT PLASTER APPLICATIONS

A. Solid Plaster Base: Concrete masonry.
   1. Plaster Type: Jobsite mixed plaster.
   2. Number of Coats: Three.
   3. First Coat: Apply to a nominal thickness of 1/4 inch.
   4. Second Coat: Apply to a nominal thickness of 1/4 inch.
   5. Leveling Coat: Apply to a nominal thickness of 1/32 to 1/16 inch.
   6. Finish Coat: Apply to a nominal thickness of 1/8 inch.
      a. Texture: Smooth.

2.02 FACTORY PREPARED CEMENT PLASTER

A. Exterior Portland cement plaster system made of scratch and brown base coat, leveling coat
   with reinforcing mesh, and acrylic finish coat; install in accordance with ASTM C926.
   1. Provide weather resistant barrier as part of the system, by the same manufacturer.
   2. Manufacturer - Basis of Design:
      a. BASF Wall Systems; Senergy Platinum CI Stucco Ultra:
         www.wallsystems.basf.com/#sle.
      b. Lahabra; FastWall 300: www.lahabastucco.com/#sle.
      c. Parex USA, Inc; Armourwall 300: www.parexusa.com/#sle.

B. Premixed One-Coat Base: Mixture of Type I Portland cement complying with ASTM
   C150/C150M, hydrated lime complying with ASTM C207, fibers and other approved ingredients;
   install in accordance with ASTM C926.

C. Premixed Base Coats: Mixture of cement, aggregate, fibers, and proprietary admixtures for
   scratch and brown coats; install in accordance with ASTM C926.

D. Premixed Leveling Coat: Acrylic polymer-based blend approved for use with plaster
   manufacturer's base coat and finish materials.

E. Premixed Finish Coating: Same product as base coat.

2.03 JOBSITE MIXED CEMENT PLASTER

A. Materials:
   1. Portland Cement: ASTM C150/C150M, Type I.
   2. Masonry Cement: ASTM C91/C91M, Type N.
   3. Plastic Cement: ASTM C1328/C1328M.
   4. Lime: ASTM C206, Type S.
   5. Sand: Clean, well graded, and complying with ASTM C897.
   6. Water: Clean, fresh, potable, and free of mineral or organic matter that could adversely
      affect plaster.

2.04 ACCESSORIES

A. Beads, Screeds, and Joint Accessories: As specified in Section 09 22 36.

B. Bonding Compound: Provide type recommended for bonding plaster to solid surfaces,
   complying with ASTM C932.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions are acceptable prior to starting this work.

B. Verify lath is flat, secured to substrate, and joint and surface perimeter accessories are properly
   in place.
3.02 PREPARATION
   A. Roughen smooth concrete surfaces and apply bonding compound in accordance with
      manufacturer's written installation instructions.

3.03 MIXING
   A. Mix only as much plaster as can be used prior to initial set.
   B. Mix materials dry, to uniform color and consistency, before adding water.
   C. Protect mixtures from frost or freezing temperatures, contamination, and excessive evaporation.

3.04 APPLICATION
   A. Apply plaster in accordance with manufacturer's written instructions and comply with ASTM C926.
   B. Leveling Coat:
      1. Apply leveling coat to specified thickness.
   C. Finish Coats:
      1. Cement Plaster:
         a. Apply with sufficient material and pressure to ensure complete coverage of base to
            specified thickness.
         b. Apply desired surface texture while mix is still workable.

3.05 TOLERANCES
   A. Maximum Variation from True Flatness: 1/4 inch in 10 feet.

3.06 REPAIR
   A. Patching: Remove loose, damaged or defective plaster and replace with plaster of same
      composition; finish to match surrounding area.

END OF SECTION
SECTION 09 51 00
ACOUSTICAL CEILINGS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Suspended metal grid ceiling system.
   B. Acoustical units.
   C. Support hangers, channels, and wires.

1.02 REFERENCE STANDARDS
   C. ASTM E1264 - Standard Classification for Acoustical Ceiling Products.

1.03 SUBMITTALS
   A. See Section 01 30 00 - General Conditions, for submittal procedures.
   B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.
   C. Product Data: Provide data on suspension system components and acoustical units.
   D. Samples: Submit two samples 4x4 inch in size illustrating material and finish of acoustical units.
   E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

1.04 QUALITY ASSURANCE
   A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.
   B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.

1.05 FIELD CONDITIONS
   A. Maintain uniform temperature of minimum 60 degrees F, and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

1.06 PROJECT CONDITIONS
   A. Sequence work to ensure acoustical ceilings are not installed until building is enclosed, sufficient heat is provided, dust generating activities have terminated, and overhead work is completed, tested, and approved.
   B. Install acoustical units after interior wet work is dry.

1.07 EXTRA MATERIALS
   A. See Section 01 60 00 - Product Requirements, for additional provisions.
   B. Provide (2) cartons of extra ceiling tiles of each type used for Owner's use in maintenance of project.

PART 2 PRODUCTS

2.01 ACOUSTICAL UNITS
   A. Manufacturers:
2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Acoustical Units - General: ASTM E1264, Class A.

C. Acoustical Tile: Painted mineral fiber, ASTM E 1264 Type III, with to the following characteristics and match existing.
   1. Size: 24 x 48 inches.
   2. Thickness: 3/4 inches.
   3. Edge: Square.
   5. Surface Pattern: Fissured.

2.02 SUSPENSION SYSTEM(S) UNLESS NOTED OTHERWISE ABOVE.

A. Manufacturers:
   1. Same as for acoustical units.
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Suspension Systems - General: ASTM C 635; die cut and interlocking components, with stabilizer bars, clips, splices, perimeter moldings, and hold down clips as required.

C. Exposed Tee Steel Suspension System: Formed galvanized steel, commercial quality cold rolled; heavy-duty.
   1. Profile: Tee; for square edge panels 15/16 inch wide face.
   2. Construction: Double web.
   4. Product: Prelude XL, 15/16" by Armstrong.

2.03 ACCESSORIES

A. Support Channels and Hangers: Galvanized steel; size and type to suit application and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.

C. Acoustical Sealant For Perimeter Moldings: Specified in Section [].

D. Gasket For Perimeter Moldings: Closed cell rubber sponge tape.

E. Touch-up Paint: Type and color to match acoustical and grid units.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

3.02 INSTALLATION - SUSPENSION SYSTEM

A. Install suspension system in accordance with ASTM C 636, ASTM E 580, and manufacturer's instructions and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:240.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Locate system on room axis according to reflected plan.

E. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.
F. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

G. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

H. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

I. Support fixture loads using supplementary hangers located within 6 inches of each corner, or support components independently.

J. Do not eccentrically load system or induce rotation of runners.

K. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Install in bed of acoustical sealant or with continuous gasket.
   2. Use longest practical lengths.
   3. Miter or Overlap and rivet corners.

L. Form expansion joints as detailed. Form to accommodate plus or minus 1 inch movement. Maintain visual closure.

3.03 INSTALLATION - ACOUSTICAL UNITS

A. Install acoustical units in accordance with manufacturer’s instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.
   3. Double cut and field paint exposed reveal edges.

G. Where round obstructions and bullnose corners occur, provide preformed closures to match perimeter molding.

H. Lay acoustical insulation for a distance of 48 inches either side of acoustical partitions as indicated.

I. Install hold-down clips on panels within 20 ft of an exterior door.

3.04 TOLERANCES

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet.

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

END OF SECTION
SECTION 09 90 00
PAINTS AND COATINGS

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Surface preparation.
B. Field application of paints.
C. Scope: Finish all interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
D. Do Not Paint or Finish the Following Items:
   1. Items fully factory-finished unless specifically so indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne, and lead items.
   6. Floors, unless specifically so indicated.
   7. Glass.
   8. Acoustical materials, unless specifically so indicated.
   9. Concealed pipes, ducts, and conduits.
E. Painting materials and methods for conduit identification specified in Section 26 05 53.

1.02 RELATED REQUIREMENTS
A. Section 01 61 16 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 01 74 19 - Construction Waste Management and Disposal: Limitations on disposal of removed materials; requirements for recycling.

1.03 REFERENCE STANDARDS
C. NACE (IMP) - Industrial Maintenance Painting; NACE International; Edition date unknown.
D. SSPC (PM1) - Good Painting Practice: SSPC Painting Manual, Vol. 1; Society for Protective Coatings.

1.04 DEFINITIONS
A. Conform to ASTM D 16 for interpretation of terms used in this section.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on all finishing products and special coatings, including VOC content.
C. Samples: Submit two paper chip samples, 1 X 1 inch in size illustrating range of colors and textures available for each surface finishing product scheduled.
D. Samples: Submit two painted samples, illustrating selected colors and textures for each color and system selected with specified coats cascaded. Submit on aluminum sheet, 6 x 6 inch in size.
E. Certification: By manufacturer that all paints and coatings comply with VOC limits specified.
F. Certification: By manufacturer that all paints and coatings do not contain any of the prohibited chemicals specified; GreenSeal GS-11 certification is not required but if provided shall constitute acceptable certification.

G. Manufacturer's Instructions: Indicate special surface preparation procedures and substrate conditions requiring special attention.

H. Maintenance Data: Submit data on cleaning, touch-up, and repair of painted and coated surfaces.

1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum 5 years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 5 years experience.

1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for flame and smoke rating requirements for products and finishes.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F and a maximum of 90 degrees F, in ventilated area, and as required by manufacturer's instructions.

1.09 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Minimum Application Temperatures for Latex Paints: 45 degrees F for interiors; 50 degrees F for exterior; unless required otherwise by manufacturer's instructions.

D. Minimum Application Temperature for Varnish Finishes: 65 degrees F for interior or exterior, unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles measured mid-height at substrate surface.

1.10 EXTRA MATERIALS

A. See Section 01 60 00 - Product Requirements, for additional provisions.

B. Supply 1 gallon of each color; store where directed.

C. Label each container with color, type, texture, and room locations in addition to the manufacturer's label.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Provide all paint and coating products used in any individual system from the same manufacturer; no exceptions.

B. Paints:

1. ICI Paints North America: www.icipaints.com
C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 PAINTS AND COATINGS - GENERAL
A. Paints and Coatings: Ready mixed, unless intended to be a field-catalyzed coating.
  1. Provide paints and coatings of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
  2. For opaque finishes, tint each coat including primer coat and intermediate coats, one-half shade lighter than succeeding coat, with final finish coat as base color.
  3. Supply each coating material in quantity required to complete entire project's work from a single production run.
  4. Do not reduce, thin, or dilute coatings or add materials to coatings unless such procedure is specifically described in manufacturer's product instructions.
B. Primers: Where the manufacturer offers options on primers for a particular substrate, use primer categorized as "best" by the manufacturer.
C. Volatile Organic Compound (VOC) Content: Comply with Section 01 61 16.
D. Chemical Content: The following compounds are prohibited:
   1. Aromatic Compounds: In excess of 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
   2. Acrolein, acrylonitrile, antimony, benzene, butyl benzyl phthalate, cadmium, di (2-ethylhexyl) phthalate, di-n-butyl phthalate, di-n-octyl phthalate, 1,2-dichlorobenzene, diethyl phthalate, dimethyl phthalate, ethylbenzene, formaldehyde, hexavalent chromium, isophorone, lead, mercury, methyl ethyl ketone, methyl isobutyl ketone, methylene chloride, naphthalene, toluene (methylbenzene), 1,1,1-trichloroethane, vinyl chloride.
E. Colors: As indicated on drawings

2.03 PAINT SYSTEMS - INTERIOR
A. Paint WI-OP-3A - Wood, Opaque, Alkyd, 3 Coat:
   1. One coat alkyd primer sealer.
   2. Gloss: Two coats of alkyd enamel.
B. Paint MI-OP-2L - Ferrous Metals, Primed, Latex, 2 Coat:
   1. Touch-up with latex primer or manufacturer recommended.
   2. Flat: Two coats of latex enamel.
C. Paint GI-OP-3L - Gypsum Board/Plaster, Latex, 3 Coat:
   1. One coat of alkyd or latex primer sealer.
   2. Eggshell: Two coats of latex enamel.

2.04 ACCESSORY MATERIALS
A. Accessory Materials: Provide all primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials required to achieve the finishes specified whether specifically indicated or not; commercial quality.
B. Patching Material: Latex filler.
C. Fastener Head Cover Material: Latex filler.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that surfaces are ready to receive work as instructed by the product manufacturer.
B. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially affect proper application.

C. Test shop-applied primer for compatibility with subsequent cover materials.

D. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Interior Wood: 15 percent, measured in accordance with ASTM D4442.

3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to coating application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

D. Surfaces: Correct defects and clean surfaces which affect work of this section. Remove or repair existing coatings that exhibit surface defects.

E. Marks: Seal with shellac or stain blocker those which may bleed through surface finishes.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Gypsum Board Surfaces to be Painted: Fill minor defects with filler compound. Spot prime defects after repair.

H. Shop-Primed Steel Surfaces to be Finish Painted: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.

I. Interior Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

J. Interior Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

K. Wood Doors to be Field-Finished: Seal wood door top and bottom edge surfaces with clear sealer.

3.03 APPLICATION

A. Exterior Wood to Receive Opaque Finish: If final painting must be delayed more than 2 weeks after installation of woodwork, apply primer within 2 weeks and final coating within 4 weeks.

B. Apply products in accordance with manufacturer's instructions.

C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance.

F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

G. Sand wood and metal surfaces lightly between coats to achieve required finish.

H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.
I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

3.04 FIELD QUALITY CONTROL
   A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection.

3.05 CLEANING
   A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

3.06 PROTECTION
   A. Protect finished coatings until completion of project.
   B. Touch-up damaged coatings after Substantial Completion.

3.07 SCHEDULE - SURFACES TO BE FINISHED
   A. Do Not Paint or Finish the Following Items:
      1. Items fully factory-finished unless specifically noted.
      2. Fire rating labels, equipment serial number and capacity labels.
      3. Stainless steel items.
   B. Paint the surfaces described below under Schedule - Paint Systems.
   C. Mechanical and Electrical: Use paint systems defined for the substrates to be finished.
      1. Paint all insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment occurring in finished areas to match background surfaces, unless otherwise indicated.
      2. Paint all equipment, including that which is factory-finished, exposed to weather or to view on the roof and outdoors.
      3. Paint shop-primed items occurring in finished areas.
      4. Paint interior surfaces of air ducts and convector and baseboard heating cabinets that are visible through grilles and louvers with one coat of flat black paint to visible surfaces.
      5. Paint dampers exposed behind louvers, grilles, and convector and baseboard cabinets to match face panels.
   D. Paint both sides and edges of plywood backboards for electrical and telephone equipment before installing equipment.

END OF SECTION
SECTION 09 96 00
TEXTURED ACRYLIC WALL FINISH

PART 1 - GENERAL

1.01 SCOPE
A. Provide all labor, materials and equipment necessary to apply the tinted Primer™ and Granyte finish over interior drywall or cementitious substrate or exterior concrete, stucco, or masonry.

1.02 REFERENCES
A. ASTM E 96 - Tests for Water Vapor Transmission of Materials
B. ASTM D 2247 - Method of Testing Coated Metal Specimens at 100% Relative Humidity
C. ASTM D 968 - Test Method For Abrasion Resistance of Organic Coatings by the Falling Abrasive Tester
D. ASTM G 23 - Recommended Practice for Operating Light and Water Exposure Apparatus (Carbon-Arc Type) for Exposure of Non-Metallic Materials
E. ASTM E 84 - Test Method for Surface Burning Characteristics of Building Materials
F. MIL STD 810B - Environmental Test Methods

1.03 DESCRIPTION
A. The TRIARCH Granyte finish is an architectural finish consisting of a blend of naturally colored quartz aggregates with large mica chips and a clear 100% acrylic binder.
B. Granyte is offered in ten design colors.

1.04 SUBMITTALS
A. Samples: The applicator shall make and submit two (2) (2'x4') samples of the proposed finish to the architect and/or owner for approval.
B. Mock-up: A minimum 2.4m x 2.4m (8'x8') area of actual project or mock-up wall shall be coated by the applicator/contractor with the Granyte finish to establish a standard of acceptance by the owner, architect or project manager.
C. Manufacturer's Information: Submit manufacturer's product information and specifications.

1.05 QUALITY ASSURANCE
A. Qualifications: System manufacturer shall be TRIARCH. All materials shall be manufactured or sold by TRIARCH and shall be purchased from TRIARCH or its authorized distributor.
B. Materials shall be manufactured at a facility covered by a current ISO 9001:2000 Certification. Certification of the facility shall be done by a registrar accredited by the American National Standards Institute, Registrar Accreditation Board (ANSI-RAB).
C. All bidding applicators should have attended a Triarch product application training session and qualified to apply materials prior to submitting bid. Applicator shall submit a photocopy of factory certificate as proof of attendance. However, Triarch does not warrant the workmanship of the applicator.
D. Purchase all necessary Granyte materials at one time to avoid any natural color variation.
E. Substrates: Application of the Granyte finish shall be applied to the following substrates when prepared in accordance with this specification.
   1. Interior uses:
      a. Drywall
      b. Plaster
      c. Unit Masonry
2. The applicator shall verify that the proposed substrate is acceptable prior to application of Granyte.

1.06 PERFORMANCE REQUIREMENTS
   A. Water Vapor Transmission (ASTM E 96) - Water Vapor Permeable
   B. Moisture Resistance (ASTM D 2247) - 14 days exposure, no deleterious effects.
   C. Salt Spray Resistance (ASTM B 117) - 300 hours, no deleterious effects.
   D. Accelerated Weathering (ASTM G 23) - 2000 hours, no deleterious effects.
   E. Flame Spread (ASTM E 84) - <25 Class 1

1.07 DELIVERY AND STORAGE
   A. ALL MATERIALS shall be delivered to the job site in the original, unopened packages with labels intact. Upon arrival, materials shall be inspected for physical damage, freezing or overheating. Questionable materials shall not be used.
   B. ALL MATERIALS shall be stored in a cool, dry location, out of direct sunlight and protected from weather and other damage.
   C. MINIMUM STORAGE temperature shall be (54° F). Maximum storage temperature shall be (100°F).

1.08 JOB CONDITIONS
   A. Existing Conditions: The applicator shall have access to electric power, clean water and a clean work area at the location where the Granyte materials are to be applied.
   B. Environmental Conditions: The ambient air and wall temperatures shall be minimum (54° F) for the application of Primer™ and Granyte. The temperature shall remain so for at least 24 hours thereafter or longer if necessary for the materials to sufficiently dry.
   C. Protection: Adjacent areas and materials shall be protected from damage, drops and spills.
   D. The Granyte materials shall be protected by permanent or temporary means from weather and other damage prior to, during, and immediately after application. Care must be taken to provide adequate ventilation to prevent condensation and/or heat build up when using tarp or plastic as protection.
   E. Sequencing and Scheduling: Application shall be coordinated with other construction trades.
   F. Sufficient material, labor, and equipment shall be employed to ensure a continuous operation, free of cold joints, texture variations, scaffold lines, etc.

1.09 LIMITED MATERIALS WARRANTY
   A. TRIARCH shall offer a written 5 Year Limited Materials Warranty upon receipt of a properly executed warranty request and completed project form. Contact TRIARCH Warranty Services Department for full details.

1.10 MAINTENANCE
   A. All TRIARCH products are designed to require low maintenance. However, as with all building products, depending on location, some cleaning may be required.

PART II - PRODUCTS
2.01 GENERAL
   A. All products shall be supplied by and obtained from TRIARCH or its authorized distributors. Substitutions or addition of other materials will void the warranty.

2.02 COMPONENTS
   A. Granyte Finish: An architectural finish consisting of a blend of naturally colored quartz aggregates and a clear 100% acrylic binder.
B. Color: #155 Nordic Green w/ Gold Mica
C. Primer™: A pigmented, exterior/interior acrylic emulsion primer supplied by TRIARCH called Primer™.

2.03 MATERIALS
A. Water shall be clean and potable.

2.04 EQUIPMENT
A. Mixing shall be done with a clean Goldblatt Jiffler mixer #15311H7 or equivalent powered by a (1/2") drill at 400-500 RPM.
B. Tools associated with the plastering and painting trades.
C. Spray equipment appropriate for aggregate finishes.

PART III - EXECUTION

3.01 INSPECTION
A. Examination of Substrate: Ensure that the substrate is of a type and condition listed in Section 1.05.E.
B. Ensure that minimum application temperatures are met per Section 1.08.B.

3.02 SUBSTRATE PREPARATION
A. Interior Surfaces
   1. Drywall shall have its joints taped and fasteners spotted with drywall joint compound to provide a smooth base.
   2. Interior plaster shall be finished smooth. Interior masonry or cement shall be cleaned to remove all dirt, dust, efflorescence or any other foreign matter which may interfere with application of a surface coating. Rough surfaces shall be skimmed with TRIARCH's SKIMM to provide a smooth, flat and level base in accordance with published system's application instructions.
   3. Stucco, masonry, and concrete
      a. Stucco and concrete walls shall have cured per manufacturer’s instructions prior to application of TRIARCH’S Primer and Granyte finish.
      b. Walls shall be cleaned to remove all dirt, dust, efflorescence, or any other matter which may interfere with the bond of a surface coating.
      c. Rough surfaces shall be skimmed with TRIARCH's SKIMM to provide a smooth, flat, and level base in accordance with published system's application instructions.

3.03 APPLICATION
A. Primer™ Application
   1. The specified color coordinated Primer shall be applied to the surface prior to Granyte application.
   2. Stir to a smooth, homogeneous consistency.
   3. Apply using a brush, or paint roller.
   4. Allow to completely dry (minimum 4 hours) prior to Granyte application.
B. Granyte™ Finish Application
   1. Granyte shall be stirred for no more than 30 seconds to 1 minute to ensure uniformity using a Goldblatt Jiffler Mixer powered by a (1/2") drill at 400-500 RPM, just prior to application. DO NOT OVER MIX OR MIX AT HIGH SPEED. High speed mixing will shear the mica chips.
   2. Granyte should be applied in one trowel coat. Apply a tight coat of Granyte with a stainless steel trowel. This coat must be free of trowel lines, voids and imperfections. With a clean plastic float or plastic knock down blade, lightly float the surface of the Granyte finish using...
a tight figure 8 pattern. Lightly float over the finish several times, cleaning the float frequently in the process. This will bring to the surface the large mica and enhance the granite appearance. Allow the Granyte to dry a minimum of 24 hours under average drying conditions, [(70 °F), 50% R.H.] Cool, damp conditions may require longer drying time.

3. Do not apply Granyte on surfaces which will receive sealants or caulks. Those surfaces shall be coated with color coordinated Primer.

4. If additional dirt pickup resistance is desired, a coat of Acrylic Sealer as manufactured by TRIARCH may be applied by spray or roller.

5. Avoid mixing batches. Granyte contains naturally colored aggregate and slight color variations may occur. Order in single batches when possible, or at least avoid using more than one batch elevation.

3.04 FIELD QUALITY CONTROL

A. TRIARCH assumes no responsibility for on-site inspections. TRIARCH and/or its distributors will provide field service support with sufficient notice from the applicator if a specific job problem develops. The designer, general contractor, or their appointed representative should make periodic on-site inspections to ensure that the TRIARCH materials are being installed in strict accordance with TRIARCH's specifications. The applicator shall be responsible for the proper application of the TRIARCH materials. TRIARCH does not warrant the applicator's workmanship.

B. If requested, the applicator shall certify in writing the quality of work performed relative to the substrate system, details, installation procedures and workmanship is in accordance with project specifications and manufacturer's instructions.

3.05 CLEAN-UP

A. Materials left over by the applicator at the job site shall be removed by the applicator and disposed of in accordance with all local, state, and federal requirements.

B. The applicator shall clean adjacent materials and surfaces and the work area of foreign materials resulting from their work.

END OF SECTION
SECTION 10 14 00
SIGNAGE

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Building identification signs on wall.

1.02 REFERENCE STANDARDS

1.03 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Product Data: Manufacturer's printed product literature for each type of sign, indicating sign
      styles, font, foreground and background colors, locations, overall dimensions of each sign.
   C. Signage Schedule: Provide information sufficient to completely define each sign for fabrication,
      including room number, room name, other text to be applied, sign and letter sizes, fonts, and
      colors.
      1. When room numbers to appear on signs differ from those on drawings, include the
         drawing room number on schedule.
      2. Submit for approval by Owner through Architect prior to fabrication.

1.04 QUALITY ASSURANCE
   A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in
      this section with minimum ten years of documented experience.

1.05 DELIVERY, STORAGE, AND HANDLING
   A. Package signs as required to prevent damage before installation.
   B. Store tape adhesive at normal room temperature.

1.06 FIELD CONDITIONS
   A. Do not install tape adhesive when ambient temperature is lower than recommended by
      manufacturer.
   B. Maintain this minimum temperature during and after installation of signs.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Dimensional Letter Signs on Wall:
      2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 SIGNAGE APPLICATIONS
   A. Building Identification Signs on Wall:
      1. Use individual metal letters.
      2. Mount on outside wall in location shown on drawings.

2.03 DIMENSIONAL LETTERS FOR WALL (2 LOCATIONS)
   A. Metal Letters:
      1. Metal: Aluminum casting.
      2. Finish: Brushed, satin.
      3. Mounting: Wall mount with stand offs for wall mounted letters
      4. Size: 9"
2.04 ACCESSORIES
   A. Concealed Screws: Stainless steel, galvanized steel, chrome plated, or other non-corroding metal.
   B. Tape Adhesive: Double sided tape, permanent adhesive.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that substrate surfaces are ready to receive work.

3.02 INSTALLATION
   A. Install in accordance with manufacturer’s instructions.
   B. Install neatly, with horizontal edges level.
   C. Locate signs where indicated:
      1. If no location is indicated obtain Owner’s instructions.
   D. Protect from damage until Substantial Completion; repair or replace damage items.
   E. When flat sign must be glass mounted, provide blank sign for other side of glass to cover tape adhesive.

END OF SECTION
SECTION 12 48 13
ENTRANCE FLOOR MATS AND FRAMES

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Recycled rubber tiles/mat.

1.02 RELATED SECTIONS AND SUBMITTALS
   A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide data indicating properties of walk-off surface, component dimensions and recessed frame characteristics.
   C. Samples: Submit two samples, 4x4 inch in size illustrating pattern, color, finish, edging.
   D. Maintenance Data: Include cleaning instructions, stain removal procedures.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   A. Recycled rubber tiles/mat:
      1. Flexco - www.flexcofloors.com; Product Flexco FlexTuft Rubber Tile
      2. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 RECYCLED RUBBER TILES/MAT
   A. Recycled Rubber Tile/Mat: 1/2 inch thick; 12"x12" tiles; corrugated surface texture; square edges.
      1. Color: As selected by Architect from manufacturer's standard range.

2.03 ACCESSORIES
   A. Transitions: Provide sloping, accessible, transitions to adjacent floor finish. Brushed Stainless Stee.

PART 3 EXECUTION

3.01 EXAMINATION

3.02 PREPARATION
   A. Verify size of floor recess before laying tiles

3.03 INSTALLATION
   A. Install walk-off surface after cleaning of finish flooring.

END OF SECTION
SECTION 26 05 05
SELECTIVE DEMOLITION FOR ELECTRICAL

PART 1 GENERAL
1.01 SECTION INCLUDES
   A. Electrical demolition.

1.02 RELATED REQUIREMENTS
   A. Section 01 70 00 - Execution and Closeout Requirements: Additional requirements for alterations work.

1.03 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS
2.01 MATERIALS AND EQUIPMENT
   A. Materials and equipment for patching and extending work: As specified in individual sections.

PART 3 EXECUTION
3.01 EXAMINATION
   A. Verify field measurements and circuiting arrangements are as indicated.
   B. Verify that abandoned wiring and equipment serve only abandoned facilities.
   C. Demolition drawings are based on casual field observation and existing record documents.
   D. Report discrepancies to Owner before disturbing existing installation.
   E. Beginning of demolition means installer accepts existing conditions.

3.02 PREPARATION
   A. Disconnect electrical systems in walls, floors, and ceilings to be removed.
   B. Coordinate utility service outages with utility company.
   C. Provide temporary wiring and connections to maintain existing systems in service during construction. When work must be performed on energized equipment or circuits, use personnel experienced in such operations.
   D. Existing Electrical Service: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
      1. Obtain permission from Owner at least 24 hours before partially or completely disabling system.
      2. Make temporary connections to maintain service in areas adjacent to work area.
   E. Existing Fire Alarm System: Maintain existing system in service until new system is accepted. Disable system only to make switchovers and connections. Minimize outage duration.
      1. Notify Owner before partially or completely disabling system.
      2. Notify local fire service.
      3. Make notifications at least 24 hours in advance.
      4. Make temporary connections to maintain service in areas adjacent to work area.
   F. Existing Telephone System: Maintain existing system in service until new system is complete and ready for service. Disable system only to make switchovers and connections. Minimize outage duration.
      1. Notify Owner at least 24 hours before partially or completely disabling system.
      2. Notify telephone utility company at least 24 hours before partially or completely disabling system.
3. Make temporary connections to maintain service in areas adjacent to work area.

3.03 DEMOLITION AND EXTENSION OF EXISTING ELECTRICAL WORK
   A. Remove, relocate, and extend existing installations to accommodate new construction.
   B. Remove abandoned wiring to source of supply.
   C. Remove exposed abandoned conduit, including abandoned conduit above accessible ceiling finishes. Cut conduit flush with walls and floors, and patch surfaces.
   D. Disconnect abandoned outlets and remove devices. Remove abandoned outlets if conduit servicing them is abandoned and removed. Provide blank cover for abandoned outlets that are not removed.
   E. Disconnect and remove abandoned panelboards and distribution equipment.
   F. Disconnect and remove electrical devices and equipment serving utilization equipment that has been removed.
   G. Disconnect and remove abandoned luminaires. Remove brackets, stems, hangers, and other accessories.
   H. Repair adjacent construction and finishes damaged during demolition and extension work.
   I. Maintain access to existing electrical installations that remain active. Modify installation or provide access panel as appropriate.

3.04 CLEANING AND REPAIR
   A. See Section 01 74 19 - Construction Waste Management and Disposal for additional requirements.
   B. Clean and repair existing materials and equipment that remain or that are to be reused.
   C. Panelboards: Clean exposed surfaces and check tightness of electrical connections. Replace damaged circuit breakers and provide closure plates for vacant positions. Provide typed circuit directory showing revised circuiting arrangement.
   D. Luminaires: Remove existing luminaires for cleaning. Use mild detergent to clean all exterior and interior surfaces; rinse with clean water and wipe dry. Replace lamps, ballasts and broken electrical parts.

END OF SECTION
SECTION 26 05 19
LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Single conductor building wire.
B. Underground feeder and branch-circuit cable.
C. Service entrance cable.
D. Armored cable.
E. Metal-clad cable.
F. Wiring connectors.
G. Electrical tape.
H. Heat shrink tubing.
I. Oxide inhibiting compound.
J. Wire pulling lubricant.
K. Cable ties.

1.02 RELATED REQUIREMENTS
A. Section 07 84 00 - Firestopping.
B. Section 26 05 05 - Selective Demolition for Electrical: Disconnection, removal, and/or extension of existing electrical conductors and cables.
C. Section 26 05 26 - Grounding and Bonding for Electrical Systems: Additional requirements for grounding conductors and grounding connectors.
D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
E. Section 28 31 00 - Fire Detection and Alarm: Fire alarm system conductors and cables.
F. Section 31 23 16 - Excavation.
H. Section 31 23 23 - Fill: Bedding and backfilling.

1.03 REFERENCE STANDARDS
A. ASTM B3 - Standard Specification for Soft or Annealed Copper Wire.
G. NECA 1 - Standard for Good Workmanship in Electrical Construction.
H. NECA 120 - Standard for Installing Armored Cable (AC) and Metal-Clad Cable (MC).
I. NECA 121 - Standard for Installing Nonmetallic-Sheathed Cable (Type NM-B) and Underground Feeder and Branch-Circuit Cable (Type UF).
L. NFPA 70 - National Electrical Code.
M. UL 4 - Armored Cable.
N. UL 44 - Thermoset-Insulated Wires and Cables.
O. UL 83 - Thermoplastic-Insulated Wires and Cables.
P. UL 486A-486B - Wire Connectors.
Q. UL 486C - Splicing Wire Connectors.
R. UL 486D - Sealed Wire Connector Systems.
S. UL 493 - Thermoplastic-Insulated Underground Feeder and Branch-Circuit Cables.
T. UL 510 - Polyvinyl Chloride, Polyethylene, and Rubber Insulating Tape.
U. UL 1569 - Metal-Clad Cables.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate sizes of raceways, boxes, and equipment enclosures installed under other sections with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate with electrical equipment installed under other sections to provide terminations suitable for use with the conductors to be installed.
   3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.
C. Sustainable Design Documentation: Submit manufacturer's product data on conductor and cable showing compliance with specified lead content requirements.
D. Design Data: Indicate voltage drop and ampacity calculations for aluminum conductors substituted for copper conductors. Include proposed modifications to raceways, boxes, wiring gutters, enclosures, etc. to accommodate substituted conductors.
E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
F. Project Record Documents: Record actual installed circuiting arrangements. Record actual routing for underground circuits.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING
   A. Receive, inspect, handle, and store conductors and cables in accordance with manufacturer's instructions.

1.08 FIELD CONDITIONS
   A. Do not install or otherwise handle thermoplastic-insulated conductors at temperatures lower than 14 degrees F, unless otherwise permitted by manufacturer's instructions. When installation below this temperature is unavoidable, notify Architect and obtain direction before proceeding with work.

PART 2 PRODUCTS

2.01 CONDUCTOR AND CABLE APPLICATIONS
   A. Do not use conductors and cables for applications other than as permitted by NFPA 70 and product listing.
   B. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.

2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS
   A. Provide products that comply with requirements of NFPA 70.
   B. Provide products listed, classified, and labeled as suitable for the purpose intended.
   C. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
   D. Comply with NEMA WC 70.
   E. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
   F. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
   G. Conductors for Grounding and Bonding: Also comply with Section 26 05 26.
   H. Conductors and Cables Installed Exposed in Spaces Used for Environmental Air (only where specifically permitted): Plenum rated, listed and labeled as suitable for use in return air plenums.
   I. Conductor Material:
      1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
      2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B 787M unless otherwise indicated.
      3. Tinned Copper Conductors: Comply with ASTM B33.
   J. Minimum Conductor Size:
      1. Branch Circuits: 12 AWG.
         a. Exceptions:
            1) 20 A, 120 V circuits longer than 75 feet: 10 AWG, for voltage drop.
            2) 20 A, 120 V circuits longer than 150 feet: 8 AWG, for voltage drop.
            3) 20 A, 277 V circuits longer than 150 feet: 10 AWG, for voltage drop.
      2. Control Circuits: 14 AWG.
   K. Conductor Color Coding:
1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.

   a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.

3. Color Code:
   a. 480Y/277 V, 3 Phase, 4 Wire System:
      1) Phase A: Brown.
      2) Phase B: Orange.
      3) Phase C: Yellow.
      4) Neutral/Grounded: Gray.
   b. 208Y/120 V, 3 Phase, 4 Wire System:
      1) Phase A: Black.
      2) Phase B: Red.
      3) Phase C: Blue.
      4) Neutral/Grounded: White.
   c. Equipment Ground, All Systems: Green.
   d. Isolated Ground, All Systems: Green with yellow stripe.
   e. Travelers for 3-Way and 4-Way Switching: Pink.
   f. For control circuits, comply with manufacturer's recommended color code.

2.03 SINGLE CONDUCTOR BUILDING WIRE

A. Manufacturers:
   1. Copper Building Wire:
      c. Houston Wire & Cable co.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: Single conductor insulated wire.

C. Conductor Stranding:
   1. Feeders and Branch Circuits:
      b. Size 8 AWG and Larger: Stranded.
   2. Control Circuits: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation:
   1. Copper Building Wire: Type THHN/THWN or THHN/THWN-2, except as indicated below.
      a. Size 4 AWG and Larger: Type XHHW-2.
      b. Fixture Wiring Within Luminaires: Type TFFN/TFN for luminaires with labeled maximum temperature of 90 degrees C; Approved suitable type for luminaires with labeled maximum temperature greater than 90 degrees C.

2.04 UNDERGROUND FEEDER AND BRANCH-CIRCUIT CABLE

A. Manufacturers:
   3. Houston Wire & Cable co..
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type UF multiple-conductor cable listed and labeled as complying with UL 493, Type UF-B.
C. Provide equipment grounding conductor unless otherwise indicated.

D. Conductor Stranding:
   2. Size 8 AWG and Larger: Stranded.

E. Insulation Voltage Rating: 600 V.

2.05 ARMORED CABLE

A. Manufacturers:
   1. AFC Cable Systems Inc: www.afcweb.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type AC cable listed and labeled as complying with UL 4, and listed for use in classified firestop systems to be used.

C. Conductor Stranding:
   2. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation: Type THHN.

F. Grounding: Combination of interlocking armor and integral bonding wire.
   1. Provide additional full-size integral insulated equipment grounding conductor for redundant grounding, suitable for general purpose, non-essential electrical systems in non-hazardous patient care areas of health care facilities.

G. Armor: Steel, interlocked tape.

2.06 METAL-CLAD CABLE

A. Manufacturers:
   1. AFC Cable Systems Inc: www.afcweb.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type MC cable listed and labeled as complying with UL 1569, and listed for use in classified firestop systems to be used.

C. Conductor Stranding:
   2. Size 8 AWG and Larger: Stranded.

D. Insulation Voltage Rating: 600 V.

E. Insulation: Type THHN, THHN/THWN, or THHN/THWN-2.

F. Provide dedicated neutral conductor for each phase conductor where indicated or required.

G. Grounding: Full-size integral equipment grounding conductor.
   1. Provide additional isolated/insulated grounding conductor where indicated or required.

H. Armor: Steel, interlocked tape.

I. Provide PVC jacket applied over cable armor where indicated or required for environment of installed location.
2.07 WIRING CONNECTORS

A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

B. Connectors for Grounding and Bonding: Comply with Section 26 05 26.

C. Wiring Connectors for Splices and Taps:
   1. Copper Conductors Sizes 10 and under: Use twist-on insulated spring connectors.
   2. Copper Conductors Sizes 8 and larger: Use mechanical connectors.

D. Wiring Connectors for Terminations:
   1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
   2. Provide compression adapters for connecting conductors to equipment furnished with mechanical lugs when only compression connectors are specified.
   3. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
   4. Conductors for Control Circuits: Use crimped terminals for all connections.

E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.

F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.

G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
   1. Manufacturers:
      a. 3M: www.3m.com/#sle.
      c. NSI Industries LLC: www.nsiindustries.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

H. Mechanical Connectors: Provide bolted type or set-screw type.
   1. Manufacturers:
      d. Substitutions: See Section 01 60 00 - Product Requirements.

I. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.
   1. Manufacturers:
      d. Substitutions: See Section 01 60 00 - Product Requirements.

2.08 WIRING ACCESSORIES

A. Electrical Tape:
   1. Manufacturers:
      a. 3M: www.3m.com/#sle.
      c. Substitutions: See Section 01 60 00 - Product Requirements.
2. Vinyl Color Coding Electrical Tape: Integrimly colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
   a. Product: 3 M.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

3. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
   a. Product: 3 M.
   b. Substitutions: See Section 01 60 00 - Product Requirements.

4. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.

5. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.

6. Varnished Cambric Electrical Tape: Cotton cambric fabric tape, with or without adhesive, oil-primed and coated with high-grade insulating varnish; minimum thickness of 7 mil; suitable for continuous temperature environment up to 221 degrees F.

7. Moisture Sealing Electrical Tape: Insulating mastic compound laminated to flexible, all-weather vinyl backing; minimum thickness of 90 mil.

B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
   1. Manufacturers:
      a. 3M: www.3m.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

C. Oxide Inhibiting Compound: Listed; suitable for use with the conductors or cables to be installed.
   1. Manufacturers:
      d. Substitutions: See Section 01 60 00 - Product Requirements.

D. Wire Pulling Lubricant: Listed; suitable for use with the conductors or cables to be installed and suitable for use at the installation temperature.
   1. Manufacturers:
      a. 3M: www.3m.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.

E. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that interior of building has been protected from weather.

B. Verify that work likely to damage wire and cable has been completed.

C. Verify that raceways, boxes, and equipment enclosures are installed and are properly sized to accommodate conductors and cables in accordance with NFPA 70.
D. Verify that field measurements are as shown on the drawings.
E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION
A. Clean raceways thoroughly to remove foreign materials before installing conductors and cables.

3.03 INSTALLATION
A. Circuiting Requirements:
   1. Unless dimensioned, circuit routing indicated is diagrammatic.
   2. When circuit destination is indicated and routing is not shown, determine exact routing required.
   3. Arrange circuiting to minimize splices.
   4. Include circuit lengths required to install connected devices within 10 ft of location shown.
   5. Maintain separation of Class 1, Class 2, and Class 3 remote-control, signaling, and power-limited circuits in accordance with NFPA 70.
   6. Maintain separation of wiring for emergency systems in accordance with NFPA 70.
   7. Circuiting Adjustments: Unless otherwise indicated, when branch circuits are shown as separate, combining them together in a single raceway is not permitted.
B. Install products in accordance with manufacturer's instructions.
C. Install conductors and cable in a neat and workmanlike manner in accordance with NECA 1.
D. Install underground feeder and branch-circuit cable (Type UF-B) in accordance with NECA 121.
E. Install armored cable (Type AC) in accordance with NECA 120.
F. Install metal-clad cable (Type MC) in accordance with NECA 120.
G. Installation in Raceway:
   1. Tape ends of conductors and cables to prevent infiltration of moisture and other contaminants.
   2. Pull all conductors and cables together into raceway at same time.
   3. Do not damage conductors and cables or exceed manufacturer's recommended maximum pulling tension and sidewall pressure.
   4. Use suitable wire pulling lubricant where necessary, except when lubricant is not recommended by the manufacturer.
H. Paralleled Conductors: Install conductors of the same length and terminate in the same manner.
I. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
J. Terminate cables using suitable fittings.
   1. Armored Cable (Type AC):
      a. Use listed fittings and anti-short, insulating bushings.
      b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
   2. Metal-Clad Cable (Type MC):
      a. Use listed fittings.
      b. Cut cable armor only using specialized tools to prevent damaging conductors or insulation. Do not use hacksaw or wire cutters to cut armor.
K. Install conductors with a minimum of 12 inches of slack at each outlet.
L. Where conductors are installed in enclosures for future termination by others, provide a minimum of 5 feet of slack.
M. Neatly train and bundle conductors inside boxes, wireways, panelboards and other equipment enclosures.

N. Group or otherwise identify neutral/grounded conductors with associated ungrounded conductors inside enclosures in accordance with NFPA 70.

O. Make wiring connections using specified wiring connectors.
   1. Make splices and taps only in accessible boxes. Do not pull splices into raceways or make splices in conduit bodies or wiring gutters.
   2. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors.
   3. Do not remove conductor strands to facilitate insertion into connector.
   4. Clean contact surfaces on conductors and connectors to suitable remove corrosion, oxides, and other contaminates. Do not use wire brush on plated connector surfaces.
   5. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   6. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.

P. Insulate splices and taps that are made with uninsulated connectors using methods suitable for the application, with insulation and mechanical strength at least equivalent to unspliced conductors.
   1. Dry Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
      a. For taped connections, first apply adequate amount of rubber splicing electrical tape or electrical filler tape, followed by outer covering of vinyl insulating electrical tape.
      b. For taped connections likely to require re-entering, including motor leads, first apply varnished cambric electrical tape, followed by adequate amount of rubber splicing electrical tape, followed by outer covering of vinyl insulating electrical tape.
   2. Damp Locations: Use insulating covers specifically designed for the connectors, electrical tape, or heat shrink tubing.
      a. For connections with insulating covers, apply outer covering of moisture sealing electrical tape.
      b. For taped connections, follow same procedure as for dry locations but apply outer covering of moisture sealing electrical tape.

Q. Insulate ends of spare conductors using vinyl insulating electrical tape.

R. Field-Applied Color Coding: Where vinyl color coding electrical tape is used in lieu of integrally colored insulation as permitted in Part 2 under "Color Coding", apply half overlapping turns of tape at each termination and at each location conductors are accessible.

S. Identify conductors and cables in accordance with Section 26 05 53.

T. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

U. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

3.04 FIELD QUALITY CONTROL
   A. See Section 01 40 00 - Quality Requirements, for additional requirements.
   B. Inspect and test in accordance with NETA ATS, except Section 4.
   C. Perform inspections and tests listed in NETA ATS, Section 7.3.2. The insulation resistance test is required for all conductors. The resistance test for parallel conductors listed as optional is not required.
D. Correct deficiencies and replace damaged or defective conductors and cables.

END OF SECTION
SECTION 26 05 26
GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Grounding and bonding requirements.
B. Conductors for grounding and bonding.
C. Connectors for grounding and bonding.
D. Ground rod electrodes.
E. Ground access wells.
F. Grounding and bonding components.
G. Provide all components necessary to complete the grounding system(s) consisting of:
   1. Existing metal underground water pipe.
   2. Metal frame of the building.
   3. Existing metal underground gas piping system.
   4. Metal underground gas piping system.

1.02 RELATED REQUIREMENTS

A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Additional requirements for conductors for grounding and bonding, including conductor color coding.
B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
C. Section 26 56 00 - Exterior Lighting: Additional grounding and bonding requirements for pole-mounted luminaires.

1.03 REFERENCE STANDARDS

B. NECA 1 - Standard for Good Workmanship in Electrical Construction.
E. NFPA 70 - National Electrical Code.
F. UL 467 - Grounding and Bonding Equipment.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Verify exact locations of underground metal water service pipe entrances to building.
   2. Coordinate the work with other trades to provide steel reinforcement complying with specified requirements for concrete-encased electrode.
   3. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 PERFORMANCE REQUIREMENTS

A. Grounding System Resistance: 5 ohms.

1.06 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

C. Shop Drawings:

D. Product Data: Provide for grounding electrodes and connections.

E. Test Reports: Indicate overall resistance to ground and resistance of each electrode.

F. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

G. Project Record Documents: Record actual locations of grounding electrode system components and connections.

H. Project Record Documents: Record actual locations of components and grounding electrodes.

1.07 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

D. Installer Qualifications for Signal Reference Grids: Company with minimum five years documented experience with high frequency grounding systems.

E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

A. Do not use products for applications other than as permitted by NFPA 70 and product listing.

B. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.

C. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

D. Grounding System Resistance:
   1. Achieve specified grounding system resistance under normally dry conditions unless otherwise approved by Architect. Precipitation within the previous 48 hours does not constitute normally dry conditions.
   2. Grounding Electrode System: Not greater than 5 ohms to ground, when tested according to IEEE 81 using "fall-of-potential" method.
   3. Between Grounding Electrode System and Major Electrical Equipment Frames, System Neutral, and Derived Neutral Points: Not greater than 0.5 ohms, when tested using "point-to-point" methods.

E. Grounding Electrode System:
   1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
      a. Provide continuous grounding electrode conductors without splice or joint.
b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.

2. Metal Underground Water Pipe(s):
   a. Provide connection to underground metal domestic and fire protection (where present) water service pipe(s) that are in direct contact with earth for at least 10 feet at an accessible location not more than 5 feet from the point of entrance to the building.
   b. Provide bonding jumper(s) around insulating joints/pipes as required to make pipe electrically continuous.
   c. Provide bonding jumper around water meter of sufficient length to permit removal of meter without disconnecting jumper.

3. Metal Building or Structure Frame:
   a. Provide connection to metal building or structure frame effectively grounded in accordance with NFPA 70 at nearest accessible location.

4. Ground Rod Electrode(s):
   a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
   b. Space electrodes not less than 10 feet from each other and any other ground electrode.
   c. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.
   d. Provide ground access well for each electrode.

5. Provide additional ground electrode(s) as required to achieve specified grounding electrode system resistance.

F. Service-Supplied System Grounding:
   1. For each service disconnect, provide grounding electrode conductor to connect neutral (grounded) service conductor to grounding electrode system. Unless otherwise indicated, make connection at neutral (grounded) bus in service disconnect enclosure.
   2. For each service disconnect, provide main bonding jumper to connect neutral (grounded) bus to equipment ground bus where not factory-installed. Do not make any other connections between neutral (grounded) conductors and ground on load side of service disconnect.

G. Bonding and Equipment Grounding:
   1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
   2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
   3. Where circuit conductor sizes are increased for voltage drop, increase size of equipment grounding conductor proportionally in accordance with NFPA 70.
   4. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.
   5. Terminate branch circuit equipment grounding conductors on solidly bonded equipment ground bus only. Do not terminate on neutral (grounded) or isolated/insulated ground bus.
   6. Provide bonding jumper across expansion or expansion/deflection fittings provided to accommodate conduit movement.
   7. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
b. Metal gas piping.
8. Provide bonding for interior metal air ducts.
9. Provide bonding for metal building frame where not used as a grounding electrode.
H. Pole-Mounted Luminaires: Also comply with Section 26 56 00.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:
1. Provide products listed, classified, and labeled by Underwriter’s Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
2. Provide products listed and labeled as complying with UL 467 where applicable.

B. Conductors for Grounding and Bonding, in addition to requirements of Section 26 05 19:
1. Use insulated copper conductors unless otherwise indicated.
   a. Exceptions:
      1) Use bare copper conductors where installed underground in direct contact with earth.
      2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:
1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
   a. Exceptions:
      1) Use mechanical connectors for connections to electrodes at ground access wells.
3. Unless otherwise indicated, use exothermic welded connections for accessible connections.
   a. Exceptions:
      1) Use exothermic welded connections for connections to metal building frame.

4. Manufacturers - Mechanical and Compression Connectors:
   d. Substitutions: See Section 01 60 00 - Product Requirements.

5. Manufacturers - Exothermic Welded Connections:
   d. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 MANUFACTURERS

D. Substitutions: See Section 01 60 00 - Product Requirements.

2.04 CONNECTORS AND ACCESSORIES

A. Mechanical Connectors: Bronze.
   1. Substitutions: See Section 01 60 00 - Product Requirements.
B. Wire: Stranded copper.
C. Grounding Electrode Conductor: Size to meet NFPA 70 requirements.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that work likely to damage grounding and bonding system components has been completed.
B. Verify that field measurements are as shown on the drawings.
C. Verify that conditions are satisfactory for installation prior to starting work.
D. Verify existing conditions prior to beginning work.
E. Verify that final backfill and compaction has been completed before driving rod electrodes.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.
B. Install grounding and bonding system components in a neat and workmanlike manner in accordance with NECA 1.
C. Make grounding and bonding connections using specified connectors.
   1. Remove appropriate amount of conductor insulation for making connections without cutting, nicking or damaging conductors. Do not remove conductor strands to facilitate insertion into connector.
   2. Remove nonconductive paint, enamel, or similar coating at threads, contact points, and contact surfaces.
   3. Exothermic Welds: Make connections using molds and weld material suitable for the items to be connected in accordance with manufacturer's recommendations.
   4. Mechanical Connectors: Secure connections according to manufacturer's recommended torque settings.
   5. Compression Connectors: Secure connections using manufacturer's recommended tools and dies.
D. Identify grounding and bonding system components in accordance with Section 26 05 53.
E. Provide bonding to meet requirements described in Quality Assurance.
F. Equipment Grounding Conductor: Provide separate, insulated conductor within each feeder and branch circuit raceway. Terminate each end on suitable lug, bus, or bushing. Each of branch circuits and feeder circuits shall have dedicated equipment grounding conductor, sharing this conductor with other grounding conductors is not permitted.

3.03 FIELD QUALITY CONTROL

A. Perform inspection in accordance with Section 01 40 00.
B. Inspect and test in accordance with NETA STD ATS except Section 4.
C. Perform inspections and tests listed in NETA STD ATS, Section 7.13.
D. Perform ground electrode resistance tests under normally dry conditions. Precipitation within the previous 48 hours does not constitute normally dry conditions.
E. Investigate and correct deficiencies where measured ground resistances do not comply with specified requirements.

END OF SECTION
SECTION 26 05 29
HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Support and attachment components for equipment, conduit, cable, boxes, and other electrical work.

1.02 RELATED REQUIREMENTS

A. Section 03 30 00 - Cast-in-Place Concrete: Concrete equipment pads.
B. Section 05 50 00 - Metal Fabrications: Materials and requirements for fabricated metal supports.
C. Section 26 05 34 - Conduit: Additional support and attachment requirements for conduits.
D. Section 26 05 37 - Boxes: Additional support and attachment requirements for boxes.
E. Section 26 51 00 - Interior Lighting: Additional support and attachment requirements for interior luminaires.
F. Section 26 56 00 - Exterior Lighting: Additional support and attachment requirements for exterior luminaires.

1.03 REFERENCE STANDARDS

D. MFMA-4 - Metal Framing Standards Publication.
E. NECA 1 - Standard for Good Workmanship in Electrical Construction.
F. NFPA 70 - National Electrical Code.
G. UL 5B - Strut-Type Channel Raceways and Fittings.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate sizes and arrangement of supports and bases with the actual equipment and components to be installed.
   2. Coordinate the work with other trades to provide additional framing and materials required for installation.
   3. Coordinate compatibility of support and attachment components with mounting surfaces at the installed locations.
   4. Coordinate the arrangement of supports with ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.
B. Sequencing:
   1. Do not install products on or provide attachment to concrete surfaces until concrete has fully cured in accordance with Section 03 30 00.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer’s standard catalog pages and data sheets for metal channel (strut) framing systems, non-penetrating rooftop supports, and post-installed concrete and masonry anchors.

C. Shop Drawings: Include details for fabricated hangers and supports where materials or methods other than those indicated are proposed for substitution.

D. Installer’s Qualifications: Include evidence of compliance with specified requirements.

E. Product Data: Provide manufacturer’s catalog data for fastening systems.

F. Manufacturer’s Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.06 QUALITY ASSURANCE

A. Comply with NFPA 70.

B. Comply with applicable building code.

C. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

D. Installer Qualifications for Powder-Actuated Fasteners (when specified): Certified by fastener system manufacturer with current operator’s license.

E. Installer Qualifications for Field-Welding: As specified in Section 05 50 00.

F. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer’s instructions.

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

A. General Requirements:
   1. Provide all required hangers, supports, anchors, fasteners, fittings, accessories, and hardware as necessary for the complete installation of electrical work.
   2. Provide products listed, classified, and labeled by Underwriter’s Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated, where applicable.
   3. Where support and attachment component types and sizes are not indicated, select in accordance with manufacturer’s application criteria as required for the load to be supported with a minimum safety factor of 1.5. Include consideration for vibration, equipment operation, and shock loads where applicable.
   4. Do not use products for applications other than as permitted by NFPA 70 and product listing.
   5. Steel Components: Use corrosion resistant materials suitable for the environment where installed.
      a. Indoor Dry Locations: Use zinc-plated steel or approved equivalent unless otherwise indicated.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel, stainless steel, or approved equivalent unless otherwise indicated.
      c. Zinc-Plated Steel: Electroplated in accordance with ASTM B633.
      d. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.
B. Materials for Metal Fabricated Supports: Comply with Section 05 50 00.

C. Conduit and Cable Supports: Straps, clamps, etc. suitable for the conduit or cable to be supported.
   1. Conduit Straps: One-hole or two-hole type; steel or malleable iron.
   2. Conduit Clamps: Bolted type unless otherwise indicated.
   3. Manufacturers:
      e. Substitutions: See Section 01 60 00 - Product Requirements.

D. Outlet Box Supports: Hangers, brackets, etc. suitable for the boxes to be supported.
   1. Manufacturers:
      e. Substitutions: See Section 01 60 00 - Product Requirements.

E. Metal Channel (Strut) Framing Systems: Factory-fabricated continuous-slot metal channel (strut) and associated fittings, accessories, and hardware required for field-assembly of supports.
   2. Channel (Strut) Used as Raceway (only where specifically indicated): Listed and labeled as complying with UL 5B.
   3. Channel Material:
      a. Indoor Dry Locations: Use painted steel, zinc-plated steel, or galvanized steel.
      b. Outdoor and Damp or Wet Indoor Locations: Use galvanized steel.
   4. Minimum Channel Thickness: Steel sheet, 12 gage, 0.1046 inch.
   6. Manufacturers:
      c. Unistrut, a brand of Atkore International Inc: www.unistrut.com/#sle.
      d. Substitutions: See Section 01 60 00 - Product Requirements.
      e. Source Limitations: Furnish channels (struts) and associated fittings, accessories, and hardware produced by a single manufacturer.

F. Hanger Rods: Threaded zinc-plated steel unless otherwise indicated.
   1. Minimum Size, Unless Otherwise Indicated or Required:
      a. Equipment Supports: 1/2 inch diameter.
      b. Single Conduit up to 1 inch (27mm) trade size: 1/4 inch diameter.
      c. Single Conduit larger than 1 inch (27mm) trade size: 3/8 inch diameter.
      d. Trapeze Support for Multiple Conduits: 3/8 inch diameter.
      e. Outlet Boxes: 1/4 inch diameter.
      f. Luminaires: 1/4 inch diameter.

G. Anchors and Fasteners:
1. Unless otherwise indicated and where not otherwise restricted, use the anchor and fastener types indicated for the specified applications.
2. Concrete: Use preset concrete inserts, expansion anchors, or screw anchors.
3. Solid or Grout-Filled Masonry: Use expansion anchors or screw anchors.
6. Steel: Use beam clamps, machine bolts, or welded threaded studs.
7. Sheet Metal: Use sheet metal screws.
8. Powder-actuated fasteners are not permitted.
9. Hammer-driven anchors and fasteners are not permitted.
10. Preset Concrete Inserts: Continuous metal channel (strut) and spot inserts specifically designed to be cast in concrete ceilings, walls, and floors.
   b. Channel Material: Use galvanized steel.
   c. Manufacturer: Same as manufacturer of metal channel (strut) framing system.

2.02 MANUFACTURERS
C. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 MATERIALS
A. Hangers, Supports, Anchors, and Fasteners - General: Corrosion-resistant materials of size and type adequate to carry the loads of equipment and conduit, including weight of wire in conduit.
B. Supports: Fabricated of structural steel or formed steel members; galvanized.
C. Anchors and Fasteners:
   1. Do not use powder-actuated anchors.
   2. Obtain permission from Architect before using powder-actuated anchors.
   3. Concrete Structural Elements: Use precast inserts.
   4. Steel Structural Elements: Use beam clamps.
   5. Concrete Surfaces: Use self-drilling anchors or expansion anchors.
   7. Solid Masonry Walls: Use expansion anchors.
D. Formed Steel Channel:
   2. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that field measurements are as shown on the drawings.
B. Verify that mounting surfaces are ready to receive support and attachment components.
C. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION
A. Install products in accordance with manufacturer's instructions.
B. Install support and attachment components in a neat and workmanlike manner in accordance with NEC A 1.
C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.

D. Unless specifically indicated or approved by Architect, do not provide support from suspended ceiling support system or ceiling grid.

E. Unless specifically indicated or approved by Architect, do not provide support from roof deck.

F. Do not penetrate or otherwise notch or cut structural members without approval of Structural Engineer.

G. Equipment Support and Attachment:
   1. Use metal fabricated supports or supports assembled from metal channel (strut) to support equipment as required.
   2. Use metal channel (strut) secured to studs to support equipment surface-mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
   3. Use metal channel (strut) to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
   4. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.

H. Conduit Support and Attachment: Also comply with Section 26 05 34.

I. Box Support and Attachment: Also comply with Section 26 05 37.

J. Interior Luminaire Support and Attachment: Also comply with Section 26 51 00.

K. Exterior Luminaire Support and Attachment: Also comply with Section 26 56 00.

L. Preset Concrete Inserts: Use manufacturer provided closure strips to inhibit concrete seepage during concrete pour.

M. Secure fasteners according to manufacturer's recommended torque settings.

N. Remove temporary supports.

O. Identify independent electrical component support wires above accessible ceilings (only where specifically indicated or permitted) with color distinguishable from ceiling support wires in accordance with NFPA 70.

3.03 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect support and attachment components for damage and defects.

C. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.

D. Correct deficiencies and replace damaged or defective support and attachment components.

END OF SECTION
SECTION 26 05 33.23
SURFACE RACEWAYS FOR ELECTRICAL SYSTEMS

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Surface raceway systems.
   B. Wireways.

1.02 RELATED REQUIREMENTS
   A. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
   B. Section 26 05 29 - Hangers and Supports for Electrical Systems.
   C. Section 26 05 34 - Conduit.
   D. Section 26 05 37 - Boxes.
   E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
   F. Section 26 27 26 - Wiring Devices: Receptacles.

1.03 REFERENCE STANDARDS
   A. NECA 1 - Standard for Good Workmanship in Electrical Construction.
   B. NFPA 70 - National Electrical Code.
   C. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
   D. UL 5 - Surface Metal Raceways and Fittings.
   E. UL 111 - Outline of Investigation for Multioutlet Assemblies.
   F. UL 870 - Wireways, Auxiliary Gutters, and Associated Fittings.

1.04 ADMINISTRATIVE REQUIREMENTS
   A. Coordination:
      1. Coordinate the placement of raceways with millwork, furniture, equipment, etc. installed under other sections or by others.
      2. Coordinate rough-in locations of outlet boxes provided under Section 26 05 37 and conduit provided under Section 26 05 34 as required for installation of raceways provided under this section.
      3. Verify minimum sizes of raceways with the actual conductors and components to be installed.
      4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

   B. Sequencing:
      1. Do not install raceways until final surface finishes and painting are complete.
      2. Do not begin installation of conductors and cables until installation of raceways is complete between outlet, junction and splicing points.

1.05 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Product Data: Provide manufacturer's standard catalog pages and data sheets including dimensions, knockout sizes and locations, materials, fabrication details, finishes, service condition requirements, and accessories.
      1. Surface Raceway Systems: Include information on fill capacities for conductors and cables.
C. Shop Drawings:
D. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
D. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS
2.01 RACEWAY REQUIREMENTS
A. Provide all components, fittings, supports, and accessories required for a complete raceway system.
B. Provide products listed, classified, and labeled as suitable for the purpose intended.
C. Do not use raceways for applications other than as permitted by NFPA 70 and product listing.

2.02 SURFACE RACEWAY SYSTEMS
A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. Surface Metal Raceways: Listed and labeled as complying with UL 5.
C. Multoutlet Assemblies: Listed and labeled as complying with UL 111.

2.03 WIREWAYS
A. Manufacturers:
   3. Schneider Electric; Square D Products: www.schneider-electric.us/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. Description: Lay-in wireways and wiring troughs with removable covers; listed and labeled as complying with UL 870.
C. Wireway Type, Unless Otherwise Indicated:
   1. Indoor Clean, Dry Locations: NEMA 250, Type 1, painted steel with screw-cover.
D. Finish for Painted Steel Wireways: Manufacturer's standard grey unless otherwise indicated.
E. Where wireway size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
2.04 SOURCE QUALITY CONTROL
   A. See Section 01 40 00 - Quality Requirements, for additional requirements.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that field measurements are as indicated.
   B. Verify that outlet boxes and conduit terminations are installed in proper locations and are properly sized in accordance with NFPA 70 to accommodate raceways.
   C. Verify that mounting surfaces are ready to receive raceways and that final surface finishes are complete, including painting.
   D. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION
   A. Install products in accordance with manufacturer's instructions.
   B. Perform work in accordance with NECA 1 (general workmanship).
   C. Install raceways plumb and level.
   D. Arrange wireways and associated raceway connections to comply with NFPA 70, including but not limited to requirements for deflected conductors and wireways used as pullboxes. Increase size of wireway where necessary.
   E. Secure and support raceways in accordance with Section 26 05 29 at intervals complying with NFPA 70 and manufacturer's requirements.
   F. Close unused raceway openings.
   G. Provide grounding and bonding in accordance with Section 26 05 26.
   H. Identify raceways in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL
   A. See Section 01 40 00 - Quality Requirements, for additional requirements.
   B. Inspect raceways for damage and defects.
   C. Surface Raceway Systems with Integrated Devices: Test each wiring device to verify operation and proper polarity.
   D. Correct wiring deficiencies and replace damaged or defective raceways.

3.04 CLEANING
   A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.05 PROTECTION
   A. Protect installed raceways from subsequent construction operations.

END OF SECTION
SECTION 26 05 34
CONDUIT

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Galvanized steel rigid metal conduit (RMC).
B. Flexible metal conduit (FMC).
C. Liquidtight flexible metal conduit (LFMC).
D. Electrical metallic tubing (EMT).
E. Rigid polyvinyl chloride (PVC) conduit.
F. Conduit fittings.
G. Accessories.
H. Conduit, fittings and conduit bodies.

1.02 RELATED REQUIREMENTS
A. Section 03 30 00 - Cast-in-Place Concrete: Concrete encasement of conduits.
B. Section 07 84 00 - Firestopping.
C. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Metal clad cable (Type MC), armored cable (Type AC), and manufactured wiring systems, including uses permitted.
D. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
E. Section 26 05 29 - Hangers and Supports for Electrical Systems.
F. Section 26 05 37 - Boxes.
G. Section 26 05 33.23 - Surface Raceways for Electrical Systems.
H. Section 26 0553 - Identification for Electrical Systems.
I. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.

1.03 REFERENCE STANDARDS
A. ANSI C80.1 - American National Standard for Electrical Rigid Steel Conduit (ERSC).
B. ANSI C80.3 - American National Standard for Electrical Metallic Tubing -- Steel (EMT-S).
C. ANSI C80.5 - American National Standard for Electrical Rigid Metal Conduit -- Aluminum (ERMC-A).
D. NECA 1 - Standard for Good Workmanship in Electrical Construction.
E. NECA 101 - Standard for Installing Steel Conduits (Rigid, IMC, EMT).
F. NECA 111 - Standard for Installing Nonmetallic Raceways (RNC, ENT, LFNC).
G. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable.
H. NFPA 70 - National Electrical Code.
I. UL 1 - Flexible Metal Conduit.
J. UL 6 - Electrical Rigid Metal Conduit-Steel.
K. UL 360 - Liquid-Tight Flexible Steel Conduit.
L. UL 514B - Conduit, Tubing, and Cable Fittings.
M. UL 651 - Schedule 40, 80, Type EB and A Rigid PVC Conduit and Fittings.
N. UL 797 - Electrical Metallic Tubing-Steel.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate minimum sizes of conduits with the actual conductors to be installed, including adjustments for conductor sizes increased for voltage drop.
   2. Coordinate the arrangement of conduits with structural members, ductwork, piping, equipment and other potential conflicts installed under other sections or by others.
   3. Verify exact conduit termination locations required for boxes, enclosures, and equipment installed under other sections or by others.
   4. Coordinate the work with other trades to provide roof penetrations that preserve the integrity of the roofing system and do not void the roof warranty.
   5. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

B. Sequencing:
   1. Do not begin installation of conductors and cables until installation of conduit is complete between outlet, junction and splicing points.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements for submittals procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.

C. Shop Drawings:
   1. Indicate proposed arrangement for conduits to be installed within structural concrete slabs, where permitted.
   2. Include proposed locations of roof penetrations and proposed methods for sealing.

D. Project Record Documents: Record actual routing for conduits installed underground, conduits embedded within concrete slabs, and conduits 2 inch (53 mm) trade size and larger.

E. Product Data: Provide for metallic conduit and flexible metal conduit.

F. Samples of Materials Actually Delivered to Site:
   1. Two pieces each of conduit, 2 feet long.

G. Project Record Documents: Accurately record actual routing of conduits larger than 2 inches.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

D. Products: Listed and classified by Underwriters Laboratories Inc. as suitable for purpose specified and shown.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store conduit and fittings in accordance with manufacturer's instructions.

B. Accept conduit on site. Inspect for damage.

C. Protect conduit from corrosion and entrance of debris by storing above grade. Provide appropriate covering.
D. Protect PVC conduit from sunlight.

PART 2 PRODUCTS

2.01 CONDUIT APPLICATIONS

A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70 and product listing.

B. Unless otherwise indicated and where not otherwise restricted, use the conduit types indicated for the specified applications. Where more than one listed application applies, comply with the most restrictive requirements. Where conduit type for a particular application is not specified, use galvanized steel rigid metal conduit.

C. Underground:
   1. Under Slab on Grade: Use rigid PVC conduit.
   2. Exterior, Direct-Buried: Use rigid PVC conduit.
   3. Exterior, Embedded Within Concrete: Use rigid PVC conduit.
   4. Where rigid polyvinyl (PVC) conduit is provided, transition to galvanized steel rigid metal conduit where emerging from underground.
   5. Where rigid polyvinyl (PVC) conduit larger than 2 inch (53 mm) trade size is provided, use galvanized steel rigid metal conduit elbows for bends.

D. Concealed Within Masonry Walls: Use galvanized steel rigid metal conduit.

E. Concealed Within Hollow Stud Walls: Use electrical metallic tubing (EMT).

F. Concealed Above Accessible Ceilings: Use electrical metallic tubing (EMT).

G. Interior, Damp or Wet Locations: Use galvanized steel rigid metal conduit.

H. Exposed, Interior, Not Subject to Physical Damage: Use galvanized steel rigid metal conduit.

I. Exposed, Interior, Subject to Physical Damage: Use galvanized steel rigid metal conduit.
   1. Locations subject to physical damage include, but are not limited to:
      a. Where exposed below 8 feet, except within electrical and communication rooms or closets.

J. Exposed, Exterior: Use galvanized steel rigid metal conduit.

K. Concealed, Exterior, Not Embedded in Concrete or in Contact With Earth: Use galvanized steel rigid metal conduit.

L. Connections to Luminaires Above Accessible Ceilings: Use flexible metal conduit.
   1. Maximum Length: 6 feet.

M. Connections to Vibrating Equipment:
   1. Dry Locations: Use flexible metal conduit.
   2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit.
   3. Maximum Length: 6 feet unless otherwise indicated.
   4. Vibrating equipment includes, but is not limited to:
      a. Transformers.
      b. Motors.
      c. HVAC equipment.

N. Fished in Existing Walls, Where Necessary: Use flexible metal conduit.

2.02 CONDUIT REQUIREMENTS

A. Provide all conduit, fittings, supports, and accessories required for a complete raceway system.

B. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.

C. Minimum Conduit Size, Unless Otherwise Indicated:
1. Branch Circuits: 3/4 inch (21 mm) trade size.
2. Branch Circuit Homeruns: 3/4 inch (21 mm) trade size.
3. Control Circuits: 1/2 inch (16 mm) trade size.
4. Flexible Connections to Luminaires: 1/2 inch (16 mm) trade size.
5. Underground, Interior: 3/4 inch (21 mm) trade size.
6. Underground, Exterior: 1 inch (27 mm) trade size.

D. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.

C. Fittings:
   1. Manufacturers:
      d. Substitutions: See Section 01 60 00 - Product Requirements.
   2. Non-Hazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
   3. Material: Use steel or malleable iron.
   4. Connectors and Couplings: Use threaded type fittings only. Threadless set screw and compression (gland) type fittings are not permitted.

2.04 METAL CONDUIT

A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Rigid Steel Conduit: ANSI C80.1.

C. Fittings and Conduit Bodies: NEMA FB 1; material to match conduit.

2.05 FLEXIBLE METAL CONDUIT (FMC)

A. Manufacturers:
   1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type FMC standard wall steel flexible metal conduit listed and labeled as complying with UL 1, and listed for use in classified firestop systems to be used.

C. Fittings:
   1. Manufacturers:
2.06 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

A. Manufacturers:
   1. AFC Cable Systems, Inc: www.afcweb.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.

C. Fittings:
   1. Manufacturers:
      d. Substitutions: See Section 01 60 00 - Product Requirements.

   2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

   3. Material: Use steel or malleable iron.

D. Description: Interlocked steel construction.

E. Fittings: NEMA FB 1.

2.07 ELECTRICAL METALLIC TUBING (EMT)

A. Manufacturers:
   3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type EMT steel electrical metallic tubing complying with ANSI C80.3 and listed and labeled as complying with UL 797.

C. Fittings:
   1. Manufacturers:
      d. Substitutions: See Section 01 60 00 - Product Requirements.

   2. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.

   3. Material: Use steel or malleable iron.

   4. Connectors and Couplings: Use compression (gland) or set-screw type.
      a. Do not use indenter type connectors and couplings.

   5. Damp or Wet Locations (where permitted): Use fittings listed for use in wet locations.
6. Embedded Within Concrete (where permitted): Use fittings listed as concrete-tight. Fittings that require taping to be concrete-tight are acceptable.

2.08 RIGID POLYVINYL CHLORIDE (PVC) CONDUIT

A. Manufacturers:
4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: NFPA 70, Type PVC rigid polyvinyl chloride conduit complying with NEMA TC 2 and listed and labeled as complying with UL 651; Schedule 40 unless otherwise indicated, Schedule 80 where subject to physical damage; rated for use with conductors rated 90 degrees C.

C. Fittings:
1. Manufacturer: Same as manufacturer of conduit to be connected.
2. Description: Fittings complying with NEMA TC 3 and listed and labeled as complying with UL 651; material to match conduit.

2.09 ACCESSORIES

A. Conduit Joint Compound: Corrosion-resistant, electrically conductive; suitable for use with the conduit to be installed.

B. Solvent Cement for PVC Conduit and Fittings: As recommended by manufacturer of conduit and fittings to be installed.

C. Pull Strings: Use nylon cord with average breaking strength of not less than 200 pound-force.

D. Sealing Compound for Sealing Fittings: Listed for use with the particular fittings to be installed.

E. Modular Seals for Conduit Penetrations: Rated for minimum of 40 psig; Suitable for the conduits to be installed.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as shown on drawings.
B. Verify that mounting surfaces are ready to receive conduits.
C. Verify that conditions are satisfactory for installation prior to starting work.
D. Verify routing and termination locations of conduit prior to rough-in.
E. Conduit routing is shown on drawings in approximate locations unless dimensioned. Route as required to complete wiring system.

3.02 INSTALLATION

A. Install products in accordance with manufacturer's instructions.
B. Install conduit in a neat and workmanlike manner in accordance with NECA 1.
C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
D. Install rigid polyvinyl chloride (PVC) conduit in accordance with NECA 111.
E. Conduit Routing:
1. Unless dimensioned, conduit routing indicated is diagrammatic.
2. When conduit destination is indicated and routing is not shown, determine exact routing required.
3. Conceal all conduits unless specifically indicated to be exposed.
4. Conduits in the following areas may be exposed, unless otherwise indicated:
a. Electrical rooms.
b. Mechanical equipment rooms.
c. Within joists in areas with no ceiling.

5. Unless otherwise approved, do not route conduits exposed:
   a. Across floors.
   b. Across roofs.
   c. Across top of parapet walls.
   d. Across building exterior surfaces.

6. Arrange conduit to maintain adequate headroom, clearances, and access.
7. Arrange conduit to provide no more than the equivalent of four 90 degree bends between pull points.
8. Arrange conduit to provide no more than 150 feet between pull points.
9. Route conduits above water and drain piping where possible.
10. Arrange conduit to prevent moisture traps. Provide drain fittings at low points and at sealing fittings where moisture may collect.
11. Maintain minimum clearance of 6 inches between conduits and piping for other systems.
12. Maintain minimum clearance of 12 inches between conduits and hot surfaces. This includes, but is not limited to:
   a. Heaters.
   b. Hot water piping.
   c. Flues.

13. Group parallel conduits in the same area together on a common rack.

F. Conduit Support:
   1. Secure and support conduits in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
   4. Use conduit strap to support single surface-mounted conduit.
      a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
   5. Use metal channel (strut) with accessory conduit clamps to support multiple parallel surface-mounted conduits.
   6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
   7. Use trapeze hangers assembled from threaded rods and metal channel (strut) with accessory conduit clamps to support multiple parallel suspended conduits.
   8. Use of spring steel conduit clips for support of conduits is not permitted.
   9. Use of wire for support of conduits is not permitted.
      a. For securing conduits to studs in hollow stud walls.
      b. For suspending conduits supported by spring steel conduit clips (only where specifically indicated or permitted).

G. Connections and Terminations:
   1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
   2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
   3. Use suitable adapters where required to transition from one type of conduit to another.
   4. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
5. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.

6. Provide insulating bushings or insulated throats at all conduit terminations to protect conductors.

7. Secure joints and connections to provide maximum mechanical strength and electrical continuity.

H. Penetrations:
   1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
   2. Make penetrations perpendicular to surfaces unless otherwise indicated.
   3. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
   4. Conceal bends for conduit risers emerging above ground.
   5. Seal interior of conduits entering the building from underground at first accessible point to prevent entry of moisture and gases.
   6. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
   7. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty. Include proposed locations of penetrations and methods for sealing with submittals.
   8. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.

I. Underground Installation:
   1. Provide trenching and backfilling in accordance with Section 31 23 16.13.
   2. Minimum Cover, Unless Otherwise Indicated or Required:
      b. Under Slab on Grade: 12 inches to bottom of slab.
   3. Provide underground warning tape in accordance with Section 26 05 53 along entire conduit length.

J. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Section 03 30 00 with minimum concrete cover of 3 inches on all sides unless otherwise indicated.

K. Hazardous ( Classified) Locations: Where conduits cross boundaries of hazardous (classified) locations, provide sealing fittings located as indicated or in accordance with NFPA 70.

L. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:
   1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
   2. Where conduits are subject to earth movement by settlement or frost.

M. Condensation Prevention: Where conduits cross barriers between areas of potential substantial temperature differential, provide sealing fitting or approved sealing compound at an accessible point near the penetration to prevent condensation. This includes, but is not limited to:
   1. Where conduits pass from outdoors into conditioned interior spaces.
   2. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

N. Provide pull string in all empty conduits and in conduits where conductors and cables are to be installed by others. Leave minimum slack of 12 inches at each end.

O. Provide grounding and bonding in accordance with Section 26 05 26.
P. Identify conduits in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for additional requirements.
B. Repair cuts and abrasions in galvanized finishes using zinc-rich paint recommended by manufacturer. Replace components that exhibit signs of corrosion.
C. Correct deficiencies and replace damaged or defective conduits.

3.04 CLEANING
A. Clean interior of conduits to remove moisture and foreign matter.

3.05 PROTECTION
A. Immediately after installation of conduit, use suitable manufactured plugs to provide protection from entry of moisture and foreign material and do not remove until ready for installation of conductors.

3.06 INTERFACE WITH OTHER PRODUCTS
A. Install conduit to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 8400.
B. Route conduit through roof openings for piping and ductwork wherever possible. Where separate roofing penetration is required, coordinate location and installation method with roofing installation specified in Section roofing section.

END OF SECTION
SECTION 26 05 37
BOXES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Outlet and device boxes up to 100 cubic inches, including those used as junction and pull boxes.
B. Cabinets and enclosures, including junction and pull boxes larger than 100 cubic inches.
C. Wall and ceiling outlet boxes.
D. Floor boxes.
E. Pull and junction boxes.

1.02 RELATED REQUIREMENTS
A. Section 07 84 00 - Firestopping.
B. Section 08 31 00 - Access Doors and Panels: Panels for maintaining access to concealed boxes.
C. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
D. Section 26 05 29 - Hangers and Supports for Electrical Systems.
E. Section 26 05 34 - Conduit:
   1. Conduit bodies and other fittings.
   2. Additional requirements for locating boxes to limit conduit length and/or number of bends between pulling points.
F. Section 26 05 33.23 - Surface Raceways for Electrical Systems:
G. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
H. Section 26 27 26 - Wiring Devices:
   1. Wall plates.
I. Section 26 2716 - Electrical Cabinets and Enclosures.
J. Section 26 2726 - Wiring Devices: Wall plates in finished areas, floor box service fittings, fire-rated poke-through fittings, and access floor boxes.

1.03 REFERENCE STANDARDS
A. NECA 1 - Standard for Good Workmanship in Electrical Construction.
B. NECA 130 - Standard for Installing and Maintaining Wiring Devices.
C. NEMA FB 1 - Fittings, Cast Metal Boxes, and Conduit Bodies for Conduit, Electrical Metallic Tubing, and Cable.
D. NEMA OS 1 - Sheet-Steel Outlet Boxes, Device Boxes, Covers, and Box Supports.
E. NEMA OS 2 - Nonmetallic Outlet Boxes, Device Boxes, Covers and Box Supports.
F. NEMA 250 - Enclosures for Electrical Equipment (1000 Volts Maximum).
G. NFPA 70 - National Electrical Code.
H. UL 50 - Enclosures for Electrical Equipment, Non-Environmental Considerations.
I. UL 50E - Enclosures for Electrical Equipment, Environmental Considerations.
J. UL 508A - Industrial Control Panels.
K. UL 514A - Metallic Outlet Boxes.
1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate the work with other trades to avoid placement of ductwork, piping, equipment, or other potential obstructions within the dedicated equipment spaces and working clearances for electrical equipment required by NFPA 70.
   2. Coordinate arrangement of electrical equipment with the dimensions and clearance requirements of the actual equipment to be installed.
   3. Coordinate minimum sizes of boxes with the actual installed arrangement of conductors, clamps, support fittings, and devices, calculated according to NFPA 70.
   4. Coordinate minimum sizes of pull boxes with the actual installed arrangement of connected conduits, calculated according to NFPA 70.
   5. Coordinate the placement of boxes with millwork, furniture, devices, equipment, etc. installed under other sections or by others.
   6. Coordinate the work with other trades to preserve insulation integrity.
   7. Coordinate the work with other trades to provide walls suitable for installation of flush-mounted boxes where indicated.
   8. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's standard catalog pages and data sheets for cabinets and enclosures, boxes for hazardous (classified) locations, floor boxes, and underground boxes/enclosures.
C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
D. Project Record Documents: Record actual locations for outlet and device boxes, pull boxes, cabinets and enclosures, floor boxes, and underground boxes/enclosures.
E. Project Record Documents: Record actual locations and mounting heights of outlet, pull, and junction boxes on project record documents.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

PART 2 PRODUCTS
2.01 BOXES
A. General Requirements:
   1. Do not use boxes and associated accessories for applications other than as permitted by NFPA 70 and product listing.
   2. Provide all boxes, fittings, supports, and accessories required for a complete raceway system and to accommodate devices and equipment to be installed.
3. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
4. Where box size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
5. Provide grounding terminals within boxes where equipment grounding conductors terminate.

B. Outlet and Device Boxes Up to 100 cubic inches, Including Those Used as Junction and Pull Boxes:
1. Use sheet-steel boxes for dry locations unless otherwise indicated or required.
2. Use cast iron boxes or cast aluminum boxes for damp or wet locations unless otherwise indicated or required; furnish with compatible weatherproof gasketed covers.
3. Use suitable concrete type boxes where flush-mounted in concrete.
4. Use suitable masonry type boxes where flush-mounted in masonry walls.
5. Use raised covers suitable for the type of wall construction and device configuration where required.
6. Use shallow boxes where required by the type of wall construction.
7. Do not use "through-wall" boxes designed for access from both sides of wall.
8. Sheet-Steel Boxes: Comply with NEMA OS 1, and list and label as complying with UL 514A.
9. Cast Metal Boxes: Comply with NEMA FB 1, and list and label as complying with UL 514A; furnish with threaded hubs.
10. Boxes for Supporting Luminaires and Ceiling Fans: Listed as suitable for the type and weight of load to be supported; furnished with fixture stud to accommodate mounting of luminaire where required.
12. Minimum Box Size, Unless Otherwise Indicated:
   a. Wiring Devices (Other Than Communications Systems Outlets): 4 inch square by 2-1/8 inch deep (100 by 54 mm) trade size.
14. Manufacturers:
   b. Hubbell Incorporated; Bell Products: www.hubbell-rtb.com/#sle.
   e. Substitutions: See Section 01 60 00 - Product Requirements.

C. Cabinets and Enclosures, Including Junction and Pull Boxes Larger Than 100 cubic inches:
1. Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E, or UL 508A.
2. NEMA 250 Environment Type, Unless Otherwise Indicated:
   a. Indoor Clean, Dry Locations: Type 1, painted steel.
   b. Outdoor Locations: Type 3R, painted steel.
3. Junction and Pull Boxes Larger Than 100 cubic inches:
   a. Provide screw-cover or hinged-cover enclosures unless otherwise indicated.

2.02 MANUFACTURERS
B. Steel City
C. Substitutions: Reco, Inc. See Section 01 60 00 - Product Requirements.
2.03 OUTLET BOXES
A. Sheet Metal Outlet Boxes: NEMA OS 1, galvanized steel.
   1. Luminaire and Equipment Supporting Boxes: Rated for weight of equipment supported; include 1/2 inch male fixture studs where required.
   2. Concrete Ceiling Boxes: Concrete type.
B. Nonmetallic Outlet Boxes: NEMA OS 2.
C. Cast Boxes: NEMA FB 1, Type FD, aluminum. Provide gasketed cover by box manufacturer. Provide threaded hubs.
D. Wall Plates for Finished Areas: As specified in Section 26 2726.

2.04 FLOOR BOXES
A. Floor Boxes: NEMA OS 1, fully adjustable, __4 inches deep.
B. Material: Cast metal.
C. Shape: Rectangular.
D. Service Fittings: As specified in Section 26 2726.

2.05 PULL AND JUNCTION BOXES
A. Sheet Metal Boxes: NEMA OS 1, galvanized steel.
B. Hinged Enclosures: As specified in Section 26 2716.
C. Surface Mounted Cast Metal Box: NEMA 250, Type 4; flat-flanged, surface mounted junction box:
   1. Material: Galvanized cast iron; Cast Aluminum.
   2. Cover: Furnish with ground flange, neoprene gasket, and stainless steel cover screws.
D. In-Ground Cast Metal Box: NEMA 250, Type 6, outside flanged, recessed cover box for flush mounting:
   1. Material: Galvanized cast iron; Cast Aluminum.
   2. Cover: Nonskid cover with neoprene gasket and stainless steel cover screws.
   3. Cover Legend: "ELECTRIC".

PART 3 EXECUTION
3.01 EXAMINATION

3.02
A. Verify that field measurements are as shown on drawings.
B. Verify that mounting surfaces are ready to receive boxes.
C. Verify that conditions are satisfactory for installation prior to starting work.
D. Verify locations of floor boxes and outlets in offices and work areas prior to rough-in.

3.03 INSTALLATION
A. Install products in accordance with manufacturer's instructions.
B. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards where mounting heights are not indicated.
C. Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
D. Provide separate boxes for emergency power and normal power systems.
E. Unless otherwise indicated, provide separate boxes for line voltage and low voltage systems.
F. Unless otherwise indicated, boxes may be surface-mounted where exposed conduits are indicated or permitted.

G. Box Locations:
   1. Locate boxes to be accessible. Provide access panels in accordance with Section 08 31 00 as required where approved by the Architect.
   2. Unless dimensioned, box locations indicated are approximate.
   3. Locate boxes so that wall plates do not span different building finishes.
   4. Locate boxes so that wall plates do not cross masonry joints.
   5. Unless otherwise indicated, where multiple outlet boxes are installed at the same location at different mounting heights, install along a common vertical center line.
   6. Do not install flush-mounted boxes on opposite sides of walls back-to-back. Provide minimum 6 inches horizontal separation unless otherwise indicated.
   7. Fire Resistance Rated Walls: Install flush-mounted boxes such that the required fire resistance will not be reduced.
      a. Do not install flush-mounted boxes on opposite sides of walls back-to-back; provide minimum 24 inches separation where wall is constructed with individual noncommunicating stud cavities or protect both boxes with listed putty pads.
      b. Do not install flush-mounted boxes with area larger than 16 square inches or such that the total aggregate area of openings exceeds 100 square inches for any 100 square feet of wall area.
   8. Locate junction and pull boxes as indicated, as required to facilitate installation of conductors, and to limit conduit length and/or number of bends between pulling points in accordance with Section 26 05 34.
   9. Locate junction and pull boxes in the following areas, unless otherwise indicated or approved by the Architect:
      a. Concealed above accessible suspended ceilings.
      b. Mechanical equipment rooms.
      c. __________.

H. Box Supports:
   1. Secure and support boxes in accordance with NFPA 70 and Section 26 05 29 using suitable supports and methods approved by the authority having jurisdiction.
   2. Provide independent support from building structure except for cast metal boxes (other than boxes used for fixture support) supported by threaded conduit connections in accordance with NFPA 70. Do not provide support from piping, ductwork, or other systems.
   3. Installation Above Suspended Ceilings: Do not provide support from ceiling grid or ceiling support system.

I. Install boxes plumb and level.

J. Flush-Mounted Boxes:
   1. Install boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that front edge of box or associated raised cover is not set back from finished surface more than 1/4 inch or does not project beyond finished surface.
   2. Install boxes in combustible materials such as wood so that front edge of box or associated raised cover is flush with finished surface.
   3. Repair rough openings around boxes in noncombustible materials such as concrete, tile, gypsum, plaster, etc. so that there are no gaps or open spaces greater than 1/8 inch at the edge of the box.

K. Install boxes as required to preserve insulation integrity.
L. Install permanent barrier between ganged wiring devices when voltage between adjacent
devices exceeds 300 V.
M. Install firestop to preserve fire resistance rating of partitions and other elements, using
materials and methods specified in Section 07 84 00.
N. Close unused box openings.
O. Install blank wall plates on junction boxes and on outlet boxes with no devices or equipment
installed or designated for future use.
P. Provide grounding and bonding in accordance with Section 26 05 26.
Q. Identify boxes in accordance with Section 26 05 53.
R. Install boxes securely, in a neat and workmanlike manner, as specified in NECA 1.
S. Install in locations as shown on Drawings, and as required for splices, taps, wire pulling,
equipment connections, and as required by NFPA 70.
T. Coordinate installation of outlet boxes for equipment connected under Section 26 2717.
U. Set wall mounted boxes at elevations to accommodate mounting heights indicated.
V. Electrical boxes are shown on Drawings in approximate locations unless dimensioned.
1. Adjust box locations up to 10 feet if required to accommodate intended purpose.
W. Orient boxes to accommodate wiring devices oriented as specified in Section 26 2726.
X. Maintain headroom and present neat mechanical appearance.
Y. Install pull boxes and junction boxes above accessible ceilings and in unfinished areas only.
Z. Inaccessible Ceiling Areas: Install outlet and junction boxes no more than 6 inches from ceiling
access panel or from removable recessed luminaire.
AA. Install boxes to preserve fire resistance rating of partitions and other elements, using materials
and methods specified in Section 07 8400.
AB. Coordinate mounting heights and locations of outlets mounted above counters, benches, and
backsplashes.
AC. Locate outlet boxes to allow luminaires positioned as shown on reflected ceiling plan.
AD. Align adjacent wall mounted outlet boxes for switches, thermostats, and similar devices.
AE. Use flush mounting outlet box in finished areas.
AF. Locate flush mounting box in masonry wall to require cutting of masonry unit corner only.
Coordinate masonry cutting to achieve neat opening.
AG. Do not install flush mounting box back-to-back in walls; provide minimum 6 inches separation.
Provide minimum 24 inches separation in acoustic rated walls.
AH. Secure flush mounting box to interior wall and partition studs. Accurately position to allow for
surface finish thickness.
AI. Use stamped steel bridges to fasten flush mounting outlet box between studs.
AJ. Install flush mounting box without damaging wall insulation or reducing its effectiveness.
AK. Use adjustable steel channel fasteners for hung ceiling outlet box.
AL. Do not fasten boxes to ceiling support wires.
AM. Support boxes independently of conduit, except cast box that is connected to two rigid metal
conduits both supported within 12 inches of box.
AN. Use gang box where more than one device is mounted together. Do not use sectional box.
AO. Use gang box with plaster ring for single device outlets.
AP. Use cast outlet box in exterior locations exposed to the weather and wet locations.

AQ. Use cast floor boxes for installations in slab on grade; formed steel boxes are acceptable for other installations.

AR. Set floor boxes level.

AS. Large Pull Boxes: Use hinged enclosure in interior dry locations, surface-mounted cast metal box in other locations.

3.04 ADJUSTING
   A. Adjust floor boxes flush with finish flooring material.
   B. Adjust flush-mounting outlets to make front flush with finished wall material.
   C. Install knockout closures in unused box openings.

3.05 CLEANING
   A. Clean interior of boxes to remove dirt, debris, plaster and other foreign material.

3.06 PROTECTION
   A. Immediately after installation, protect boxes from entry of moisture and foreign material until ready for installation of conductors.

END OF SECTION
SECTION 26 05 53
IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1  GENERAL

1.01  SECTION INCLUDES
A. Electrical identification requirements.
B. Identification nameplates and labels.
C. Wire and cable markers.
D. Voltage markers.
E. Warning signs and labels.
F. Field-painted identification of conduit.

1.02  RELATED REQUIREMENTS
A. Section 09 90 00 - Paints and Coatings.

1.03  REFERENCE STANDARDS
C. NFPA 70 - National Electrical Code.
D. UL 969 - Marking and Labeling Systems.

1.04  SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements for submittals procedures.
B. Product Data: Provide catalog data for nameplates, labels, and markers.
C. Manufacturer's Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation and installation of product.

1.05  QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.

1.06  EXTRA MATERIALS
A. See Section 01 6000 - Product Requirements for additional requirements.

PART 2  PRODUCTS

2.01  IDENTIFICATION REQUIREMENTS
A. Identification for Equipment:
   1. Use identification nameplate to identify each piece of electrical distribution and control equipment and associated sections, compartments, and components.
B. Identification for Conductors and Cables:
   1. Color Coding for Power Conductors 600 V and Less: Comply with Section 26 05 19.
   2. Use identification nameplate or identification label to identify color code for ungrounded and grounded power conductors inside door or enclosure at each piece of feeder or branch-circuit distribution equipment when premises has feeders or branch circuits served by more than one nominal voltage system.

2.02  MANUFACTURERS
2.03 IDENTIFICATION NAMEPLATES AND LABELS

A. Identification Nameplates:
   1. Materials:
   2. Mounting Holes for Mechanical Fasteners: Two, centered on sides for sizes up to 1 inch high; Four, located at corners for larger sizes.

B. Identification Labels:
   1. Materials: Use self-adhesive laminated plastic labels; UV, chemical, water, heat, and abrasion resistant.
   2. Text: Use factory pre-printed or machine-printed text. Do not use handwritten text unless otherwise indicated.

C. Nameplates: Engraved three-layer laminated plastic, black letters on white background.

D. Locations:
   1. Each electrical distribution and control equipment enclosure.
   2. Communication cabinets.
   3. Disconnect switches, and starters.

E. Letter Size:
   1. Use 1/8 inch letters for identifying individual equipment and loads.
   2. Use 1/4 inch letters for identifying grouped equipment and loads.

2.04 WIRE AND CABLE MARKERS

A. Manufacturers:
   1. Panduit Corp.
   2. Substitutions: See Section 01 60 00 - Product Requirements.

B. Markers for Conductors and Cables: Use wrap-around self-adhesive vinyl cloth, wrap-around self-adhesive vinyl self-laminating, heat-shrink sleeve, plastic sleeve, plastic clip-on, or vinyl split sleeve type markers suitable for the conductor or cable to be identified.

C. Markers for Conductor and Cable Bundles: Use plastic marker tags secured by nylon cable ties.

D. Legend: Power source and circuit number or other designation indicated.

E. Text: Use factory pre-printed or machine-printed text, all capitalized unless otherwise indicated.

F. Minimum Text Height: 1/8 inch.

G. Color: Black text on white background unless otherwise indicated.

H. Description: split sleeve type wire markers.

I. Locations: Each conductor at panelboard gutters, pull boxes, outlet boxes, and junction boxes each load connection.

J. Legend:
   1. Power and Lighting Circuits: Branch circuit or feeder number indicated on drawings.
   2. Control Circuits: Control wire number indicated on shop drawings.

2.05 VOLTAGE MARKERS

A. Manufacturers: Panduit Corp.
   1. Substitutions: See Section 01 60 00 - Product Requirements.

B. Minimum Size:
   1. Markers for Equipment: 1 1/8 by 4 1/2 inches.
   2. Markers for Conduits: As recommended by manufacturer for conduit size to be identified.
3. Markers for Pull Boxes: 1 1/8 by 4 1/2 inches.

C. Legend:
1. Markers for Voltage Identification: Highest voltage present.
2. Markers for System Identification:
   a. Emergency Power System: Text "EMERGENCY".
   b. Other Systems: Type of service.

D. Color: Black text on orange background unless otherwise indicated.
E. Location: Furnish markers for each conduit longer than 6 feet.
F. Spacing: 20 feet on center.
G. Color:
   1. 480 Volt System: Brown.
   2. 208 Volt System: Yellow.

H. Legend:
   1. 480 Volt System: brown.
   2. 208 Volt System: yellow.

2.06 WARNING SIGNS AND LABELS
A. Comply with ANSI Z535.2 or ANSI Z535.4 as applicable.
B. Warning Signs:
   1. Materials:
   2. Minimum Size: 7 by 10 inches unless otherwise indicated.
C. Warning Labels:
   1. Materials: Use factory pre-printed or machine-printed self-adhesive polyester or self-adhesive vinyl labels; UV, chemical, water, heat, and abrasion resistant; produced using materials recognized to UL 969.
   3. Minimum Size: 2 by 4 inches unless otherwise indicated.

PART 3 EXECUTION
3.01 PREPARATION
A. Clean surfaces to receive adhesive products according to manufacturer's instructions.
B. Degrease and clean surfaces to receive nameplates and labels.

3.02 INSTALLATION
A. Install products in accordance with manufacturer's instructions.
B. Install identification products to be plainly visible for examination, adjustment, servicing, and maintenance. Unless otherwise indicated, locate products as follows:
   3. Free-Standing Equipment: Enclosure front; also enclosure rear for equipment with rear access.
   4. Elevated Equipment: Legible from the floor or working platform.
   5. Interior Components: Legible from the point of access.
   6. Conductors and Cables: Legible from the point of access.
C. Install identification products centered, level, and parallel with lines of item being identified.
D. Secure nameplates to exterior surfaces of enclosures using stainless steel screws and to interior surfaces using self-adhesive backing or epoxy cement.

E. Install self-adhesive labels and markers to achieve maximum adhesion, with no bubbles or wrinkles and edges properly sealed.

END OF SECTION
SECTION 26 27 26
WIRING DEVICES

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Wall switches.
B. Wall dimmers.
C. Receptacles.
D. Wall plates.
E. Floor box service fittings.

1.02 RELATED REQUIREMENTS
A. Section 26 05 19 - Low-Voltage Electrical Power Conductors and Cables: Manufactured wiring systems for use with access floor boxes with compatible pre-wired connectors.
B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
C. Section 26 05 33.23 - Surface Raceways: Surface raceway systems, including multioutlet assemblies.
D. Section 26 05 37 - Boxes.
E. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
F. Section 26 09 23 - Lighting Control Devices: Devices for automatic control of lighting, including occupancy sensors, in-wall time switches, and in-wall interval timers.
G. Section 26 05 83 - Equipment Wiring: Cords and plugs for equipment.
I. Section 27 10 05 - Structured Cabling for Voice and Data - Inside-Plant: Voice and data jacks.

1.03 REFERENCE STANDARDS
B. FS W-S-896 - Switches, Toggle (Toggle and Lock), Flush-mounted (General Specification).
C. NECA 1 - Standard for Good Workmanship in Electrical Construction.
D. NECA 130 - Standard for Installing and Maintaining Wiring Devices.
E. NEMA WD 1 - General Color Requirements for Wiring Devices.
F. NEMA WD 6 - Wiring Devices - Dimensional Specifications.
G. NFPA 70 - National Electrical Code.
H. UL 20 - General-Use Snap Switches.
I. UL 498 - Attachment Plugs and Receptacles.
J. UL 514D - Cover Plates for Flush-Mounted Wiring Devices.
K. UL 943 - Ground-Fault Circuit-Interrupters.
L. UL 1472 - Solid-State Dimming Controls.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate the placement of outlet boxes with millwork, furniture, equipment, etc. installed under other sections or by others.
2. Coordinate wiring device ratings and configurations with the electrical requirements of actual equipment to be installed.
3. Coordinate the placement of outlet boxes for wall switches with actual installed door swings.
4. Coordinate the installation and preparation of uneven surfaces, such as split face block, to provide suitable surface for installation of wiring devices.
5. Coordinate the core drilling of holes for poke-through assemblies with the work covered under other sections.
6. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

B. Sequencing:
1. Do not install wiring devices until final surface finishes and painting are complete.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide manufacturer's catalog information showing dimensions, colors, and configurations.
C. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
D. Operation and Maintenance Data:
   1. GFCI Receptacles: Include information on status indicators.
E. Project Record Documents: Record actual installed locations of wiring devices.
F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Wall Plates: One of each style, size, and finish.
   3. Extra Flush Floor Service Fittings: Two of each type.

1.06 QUALITY ASSURANCE
A. Conform to requirements of NFPA 70.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
D. Products: Listed, classified, and labeled as suitable for the purpose intended.
E. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.07 DELIVERY, STORAGE, AND PROTECTION
A. Store in a clean, dry space in original manufacturer's packaging until ready for installation.

1.08 EXTRA MATERIALS
A. See Section 01 6000 - Product Requirements, for additional provisions.
B. Furnish two of each style, size, and finish wall plate.

PART 2 PRODUCTS
2.01 MANUFACTURERS
D. Pass & Seymour, a brand of Legrand North America, Inc; www.legrand.us
G. Substitutions: See Section 01 60 00 - Product Requirements.
H. Source Limitations: Where possible, for each type of wiring device furnish products produced by a single manufacturer and obtained from a single supplier.

2.02 APPLICATIONS
A. Provide wiring devices suitable for intended use and with ratings adequate for load served.
B. For single receptacles installed on an individual branch circuit, provide receptacle with ampere rating not less than that of the branch circuit.
C. Provide weather resistant GFI receptacles with specified weatherproof covers for all receptacles installed outdoors or in damp or wet locations.
D. Provide GFI protection for all receptacles installed within 6 feet of sinks.
E. Provide GFCI protection for receptacles serving electric drinking fountains.
F. Unless noted otherwise, do not use combination switch/receptacle devices.
G. For flush floor service fittings, use carpet flanges for installations in carpeted floors.

2.03 ALL WIRING DEVICES
A. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

2.04 WALL SWITCHES
A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. All Wall Switches: AC only, quiet operating, general-use snap switches with silver alloy contacts, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 20 and where applicable, FS W-S-896; types as indicated on the drawings.
   1. Wiring Provisions: Terminal screws for side wiring and screw actuated binding clamp for back wiring with separate ground terminal screw.
C. Standard Wall Switches: Commercial specification grade, 20 A, 120/277 V with standard toggle type switch actuator and maintained contacts; single pole single throw, double pole single throw, three way, or four way as indicated on the drawings.
D. Wall Switches: Heavy Duty, AC only general-use snap switch, complying with NEMA WD 6 and WD 1.
   1. Body and Handle: Black plastic with toggle handle.
   2. Ratings:
      a. Voltage: 120 - 277 volts, AC.
   3. Ratings: Match branch circuit and load characteristics.
E. Switch Types: Single pole, double pole, 3-way, and 4-way.
2.05 WALL DIMMERS
A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. All Wall Dimmers: Solid-state with continuous full-range even control following square law dimming curve, integral radio frequency interference filtering, power failure preset memory, air gap switch accessible without removing wall plate, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 1472; types and ratings suitable for load controlled as indicated on the drawings.
C. Control: Slide control type with separate on/off switch.

2.06 RECEPTACLES
A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.
B. All Receptacles: Self-grounding, complying with NEMA WD 1 and NEMA WD 6, and listed as complying with UL 498, and where applicable, FS W-C-596; types as indicated on the drawings.
   1. Wiring Provisions: Terminal screws for side wiring or screw actuated binding clamp for back wiring with separate ground terminal screw.
   2. NEMA configurations specified are according to NEMA WD 6.
C. Convenience Receptacles:
   1. Standard Convenience Receptacles: Industrial specification grade, 20A, 125V, NEMA 5-20R; single or duplex as indicated on the drawings.
      a. Products:
         1) Hubbell Wiring Devices.
         2) Leviton.
         3) Pass & Saymore.
         4) Substitutions: See Section 01 60 00 - Product Requirements.
D. GFI Receptacles:
   1. All GFI Receptacles: Provide with feed-through protection, light to indicate ground fault tripped condition and loss of protection, and list as complying with UL 943, class A.
E. Receptacles: Heavy duty, complying with NEMA WD 6 and WD 1.
   1. Device Body: Black plastic.
   2. Configuration: NEMA WD 6, type as specified and indicated.
F. Convenience Receptacles: Type 5 - 20.
G. Single Convenience Receptacles.
H. Duplex Convenience Receptacles.
I. GFCI Receptacles: Convenience receptacle with integral ground fault circuit interrupter to meet regulatory requirements.

2.07 TELEPHONE JACKS
A. Product: AMP manufacturing
B. Substitutions: See Section 01 60 00 - Product Requirements.

2.08 WALL PLATES

A. Manufacturers:
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. All Wall Plates: Comply with UL 514D.

1. Configuration: One piece cover as required for quantity and types of corresponding wiring devices.
2. Size: Standard;
3. Screws: Metal with slotted heads finished to match wall plate finish.

C. Stainless Steel Wall Plates: Brushed satin finish, Type 302 stainless steel.

D. Weatherproof Covers for Damp Locations: Gasketed, cast aluminum, with self-closing hinged cover and corrosion-resistant screws; listed as suitable for use in wet locations with cover closed.

E. Weatherproof Covers for Wet Locations: Gasketed, cast aluminum, with hinged lockable cover and corrosion-resistant screws; listed as suitable for use in wet locations while in use with attachment plugs connected and identified as extra-duty type.

F. Decorative Cover Plates: stainless steel.

G. Jumbo Cover Plates: stainless steel.

H. Weatherproof Cover Plates: Gasketed cast metal with hinged cover.

2.09 FLOOR BOX SERVICE FITTINGS

A. Manufacturers:
   3. Wiremold, a brand of Legrand North America, Inc; www.legrand.us/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: Service fittings compatible with floor boxes provided under Section 26 05 37 with all components, adapters, and trims required for complete installation.

C. Flush Floor Service Fittings:
   1. Dual Service Flush Combination Outlets:
      a. Cover: Rectangular.
      b. Configuration:
         1) Power: One standard convenience duplex receptacle(s) with duplex flap opening(s).
         2) Communications: Two Data Drops.
         3) Voice and Data Jacks: As specified in Section 27 10 00.
   2. Accessories:
      a. Carpet Flanges: Finish to match covers; configuration as required to accommodate specified covers.

2.10 POKE-THROUGH ASSEMBLIES

A. Description: Assembly comprising floor service fitting, poke-through component, fire stops and smoke barriers, and junction box for conduit termination; fire rating listed to match fire rating of floor and suitable for floor thickness where installed.

B. Flush Floor Service Fittings:
1. Dual Service Flush Combination Outlets:
   a. Cover: Hinged door(s).
   b. Configuration:
      1) Power: One standard convenience duplex receptacle(s).
      2) Communications: Two data drops.
      3) Voice and Data Jacks: As specified in Section 27 10 00.

2. Accessories:
   a. Closure Plugs: Size and fire rating as required to seal unused core hole and maintain fire rating of floor.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify that field measurements are as shown on the drawings.
   B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate devices and conductors in accordance with NFPA 70.
   C. Verify that wall openings are neatly cut and will be completely covered by wall plates.
   D. Verify that final surface finishes are complete, including painting.
   E. Verify that floor boxes are adjusted properly.
   F. Verify that branch circuit wiring installation is completed, tested, and ready for connection to wiring devices.
   G. Verify that openings in access floor are in proper locations.
   H. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION
   A. Provide extension rings to bring outlet boxes flush with finished surface.
   B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION
   A. Perform work in a neat and workmanlike manner in accordance with NECA 1 and, where applicable, NECA 130, including mounting heights specified in those standards unless otherwise indicated.
   B. Perform work in a neat and workmanlike manner in accordance with NECA 1, including mounting heights specified in that standard unless otherwise indicated.
   C. Coordinate locations of outlet boxes provided under Section 26 05 37 as required for installation of wiring devices provided under this section.
      1. Orient outlet boxes for vertical installation of wiring devices unless otherwise indicated.
      2. Locate wall switches on strike side of door with edge of wall plate 3 inches from edge of door frame. Where locations are indicated otherwise, notify Architect to obtain direction prior to proceeding with work.
   D. Install wiring devices in accordance with manufacturer's instructions.
   E. Install permanent barrier between ganged wiring devices when voltage between adjacent devices exceeds 300 V.
   F. Where required, connect wiring devices using pigtails not less than 6 inches long. Do not connect more than one conductor to wiring device terminals.
   G. Connect wiring devices by wrapping conductor clockwise 3/4 turn around screw terminal and tightening to proper torque specified by the manufacturer. Where present, do not use push-in pressure terminals that do not rely on screw-actuated binding.
H. Unless otherwise indicated, connect wiring device grounding terminal to branch circuit equipment grounding conductor and to outlet box with bonding jumper.

I. For isolated ground receptacles, connect wiring device grounding terminal only to identified branch circuit isolated equipment grounding conductor. Do not connect grounding terminal to outlet box or normal branch circuit equipment grounding conductor.

J. Unless otherwise indicated, GFCI receptacles may be connected to provide feed-through protection to downstream devices. Label such devices to indicate they are protected by upstream GFCI protection.

K. Install securely, in a neat and workmanlike manner, as specified in NECA 1.

L. Install wiring devices plumb and level with mounting yoke held rigidly in place.

M. Install wall switches with OFF position down.

N. Do not share neutral conductor on branch circuits utilizing wall dimmers.

O. Install vertically mounted receptacles with grounding pole on top and horizontally mounted receptacles with grounding pole on left.

P. Install wall plates to fit completely flush to wall with no gaps and rough opening completely covered without strain on wall plate. Repair or reinstall improperly installed outlet boxes or improperly sized rough openings. Do not use oversized wall plates in lieu of meeting this requirement.

Q. Install blank wall plates on junction boxes and on outlet boxes with no wiring devices installed or designated for future use.

R. Install poke-through closure plugs in each unused core holes to maintain fire rating of floor.

S. Install receptacles with grounding pole on top.

T. Connect wiring device grounding terminal to outlet box with bonding jumper.

U. Install decorative plates on switch, receptacle, and blank outlets in finished areas.

V. Connect wiring devices by wrapping conductor around screw terminal.

W. Use jumbo size plates for outlets installed in masonry walls.

X. Install galvanized steel plates on outlet boxes and junction boxes in unfinished areas, above accessible ceilings, and on surface mounted outlets.

3.04 INTERFACE WITH OTHER PRODUCTS

A. Coordinate locations of outlet boxes provided under Section 26 05 37 to obtain mounting heights.

B. Install wall switch 48 inches above finished floor.

C. Install convenience receptacle 18 inches above finished floor.

D. Install convenience receptacle 6 inches above backsplash of counter.

E. Install telephone jack 18 inches above finished floor.

F. Install telephone jack for side-reach wall telephone to position top of telephone at 54 inches above finished floor.

G. Install telephone jack for forward-reach wall telephone to position top of telephone at 48 inches above finished floor.

H. Coordinate installation of access floor boxes with access floor system provided under Section 09 6900.

I. Coordinate the installation of wiring devices with underfloor duct service fittings provided under Section 26 0540.
3.05 FIELD QUALITY CONTROL
   A. Perform field inspection, testing, adjusting, and balancing in accordance with Section 01 40 00.
   B. Inspect each wiring device for damage and defects.
   C. Operate each wall switch, wall dimmer, and fan speed controller with circuit energized to verify proper operation.
   D. Operate each wall switch with circuit energized and verify proper operation.
   E. Verify that each receptacle device is energized.
   F. Test each receptacle to verify operation and proper polarity.
   G. Test each GFCI receptacle for proper tripping operation according to manufacturer's instructions.
   H. Correct wiring deficiencies and replace damaged or defective wiring devices.
   I. Verify that each telephone jack is properly connected and circuit is operational.

3.06 ADJUSTING
   A. Adjust devices and wall plates to be flush and level.

3.07 CLEANING
   A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

END OF SECTION
SECTION 26 51 00
INTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Interior luminaires.
B. Emergency lighting units.
C. Exit signs.
D. Ballasts.
E. Lamps.
F. Luminaire accessories.

1.02 RELATED REQUIREMENTS
A. Section 26 05 37 - Boxes.
B. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
C. Section 26 09 23 - Lighting Control Devices: Automatic controls for lighting including occupancy sensors, outdoor motion sensors, time switches, outdoor photo controls, and daylighting controls.
D. Section 26 27 26 - Wiring Devices: Manual wall switches and wall dimmers.

1.03 REFERENCE STANDARDS
C. ANSI C82.4 - American National Standard for Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps (Multiple-Supply Type).
D. ANSI C82.11 - American National Standard for Lamp Ballasts - High Frequency Fluorescent Lamp Ballasts - Supplements.
E. IEEE C62.41.2 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000 V and less) AC Power Circuits.
H. NECA 1 - Standard for Good Workmanship in Electrical Construction.
I. NECA/IESNA 500 - Standard for Installing Indoor Commercial Lighting Systems.
K. NEMA LE 4 - Recessed Luminaires, Ceiling Compatibility.
L. NEMA WD 6 - Wiring Devices - Dimensional Requirements; National Electrical Manufacturers Association.
M. NFPA 70 - National Electrical Code.
O. UL 924 - Emergency Lighting and Power Equipment.
P. UL 935 - Fluorescent-Lamp Ballasts.
Q. UL 1598 - Luminaires.

1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination:
   1. Coordinate the installation of luminaires with mounting surfaces installed under other sections or by others. Coordinate the work with placement of supports, anchors, etc. required for mounting. Coordinate compatibility of luminaires and associated trims with mounting surfaces at installed locations.
   2. Coordinate the placement of luminaires with structural members, ductwork, piping, equipment, diffusers, fire suppression system components, and other potential conflicts installed under other sections or by others.
   3. Coordinate the placement of exit signs with furniture, equipment, signage or other potential obstructions to visibility installed under other sections or by others.
   4. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS

A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Shop Drawings:
   1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
   2. Provide photometric calculations where luminaires are proposed for substitution upon request.
C. Shop Drawings: Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
D. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, installed accessories, and ceiling compatibility; include model number nomenclature clearly marked with all proposed features.
   1. LED Luminaires:
      a. Include estimated useful life, calculated based on IES LM-80 test data.
      b. Include IES LM-79 test report upon request.
E. Sustainable Design Documentation: Submit manufacturer's product data on lamp mercury content and rated lamp life, showing compliance with specified requirements.
F. Field Quality Control Reports.
G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, and installation of product.
H. Operation and Maintenance Data: Instructions for each product including information on replacement parts.
I. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.
   2. Extra Lenses and Louvers: Two percent of total quantity installed for each type, but not less than one of each type.
   3. Extra Lamps: Ten percent of total quantity installed for each type, but not less than two of each type.
4. Extra Ballasts: Two percent of total quantity installed for each type, but not less than one of each type.

J. Project Record Documents: Record actual connections and locations of luminaires and any associated remote components.

1.06 QUALITY ASSURANCE
   A. Conform to requirements of NFPA 70.
   B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
   C. Conform to requirements of NFPA 70 and NFPA 101.
   D. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND PROTECTION
   A. Receive, handle, and store products according to NECA/IESNA 500 (commercial lighting), NECA/IESNA 502 (industrial lighting), and manufacturer's written instructions.
   B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

1.08 FIELD CONDITIONS
   A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.09 WARRANTY
   A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
   B. Provide two year manufacturer warranty for all linear fluorescent ballasts.

1.10 EXTRA MATERIALS
   A. See Section 01 6000 - Product Requirements, for additional provisions.
   B. Furnish two of each plastic lens type.
   C. Furnish one replacement lamps for each lamp type.
   D. Furnish two of each ballast type.

PART 2 PRODUCTS

2.01 MANUFACTURERS
   E. Columbia Lighting.
   F. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 LUMINAIRES
   A. Manufacturers:
      2. Cooper Lighting, a division of Cooper Industries; www.cooperindustries.com/#sle.
      4. Substitutions: See Section 01 60 00 - Product Requirements.
   B. Provide products that comply with requirements of NFPA 70.
C. Provide products that are listed and labeled as complying with UL 1598, where applicable.

D. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.

E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, supports, trims, accessories, etc. as necessary for a complete operating system.

G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

H. Recessed Luminaires:
   2. Luminaires Recessed in Insulated Ceilings: Listed and labeled as IC-rated, suitable for direct contact with insulation and combustible materials.

I. LED Luminaires:
   1. Components: UL 8750 recognized or listed as applicable.
   2. Tested in accordance with IES LM-79 and IES LM-80.
   3. LED Estimated Useful Life: Minimum of 200,000 hours at 70 percent lumen maintenance, calculated based on IES LM-80 test data.

J. LED Luminaires: Listed and labeled as complying with UL 8750.

K. Track Lighting Systems: Provide track compatible with specified track heads, with all connectors, power feed fittings, dead ends, hangers and canopies as necessary to complete installation.

L. Luminaires Mounted in Continuous Rows: Provide quantity of units required for length indicated, with all accessories required for joining and aligning.

2.03 EMERGENCY LIGHTING UNITS

A. Manufacturers:
   2. Cooper Lighting, a division of Cooper Industries; www.cooperindustries.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. Description: Emergency lighting units complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924. Emergency and Exit light combination unit with (2) unit mounted lamps and LED exit light with battery backup. This combination unit shall have spare capacity to power remote emergency lamp heads.

C. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.

D. Battery:
   1. Sealed maintenance-free nickel cadmium unless otherwise indicated.
   2. Size battery to supply all connected lamps, including emergency remote heads where indicated.

E. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
F. Provide low-voltage disconnect to prevent battery damage from deep discharge.

G. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status.

H. Accessories:
   1. Provide compatible accessory mounting brackets where indicated or required to complete installation.
   2. Provide compatible accessory high impact polycarbonate vandal shields where indicated.
   3. Provide compatible accessory wire guards where indicated.
   4. Where indicated, provide emergency remote heads that are compatible with the emergency lighting unit they are connected to and suitable for the installed location.

2.04 LUMINAIRES

A. Furnish products as indicated in Schedule attached to this section.

B. Substitutions: See Section 01 60 00 - Product Requirements.
   1. Input Voltage: 120 or 277 volts.

2.05 EXIT SIGNS

A. Manufacturers:
   2. Cooper Lighting, a division of Cooper Industries; www.cooperindustries.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. All Exit Signs: Internally illuminated with LEDs unless otherwise indicated; complying with NFPA 101 and all applicable state and local codes, and listed and labeled as complying with UL 924.
   1. Number of Faces: Single or double as indicated or as required for the installed location.
   2. Directional Arrows: As indicated or as required for the installed location.

C. Self-Powered Exit Signs:
   1. Operation: Upon interruption of normal power source or brownout condition exceeding 20 percent voltage drop from nominal, solid-state control automatically switches connected lamps to integral battery power for minimum of 90 minutes of rated emergency illumination, and automatically recharges battery upon restoration of normal power source.
   2. Battery: Sealed maintenance-free nickel cadmium unless otherwise indicated.
   3. Diagnostics: Provide power status indicator light and accessible integral test switch to manually activate emergency operation.
   4. Provide low-voltage disconnect to prevent battery damage from deep discharge.
   5. Self-Diagnostics: Provide units that self-monitor functionality and automatically perform testing required by NFPA 101 where indicated; provide indicator light(s) to report test and diagnostic status.

D. Accessories:
   1. Provide compatible accessory high impact polycarbonate vandal shields where indicated.
   2. Provide compatible accessory wire guards where indicated.

E. Manufacturers: As indicated on lighting fixture schedule.
   1. Substitutions: See Section 01 60 00 - Product Requirements.

F. Exit Signs: Exit sign fixture.
   2. Face: Translucent glass face with red letters on white background.
   3. Face: Aluminum stencil face with red letters.
   4. Directional Arrows: Universal type for field adjustment.
5. Mounting: Universal, for field selection.
6. Battery: 12 volt, nickel-cadmium type, with 1.5 hour capacity.
7. Battery Charger: Dual-rate type, with sufficient capacity to recharge discharged battery to full charge within twelve hours.
8. Lamps: Manufacturer's standard.

2.06 BALLASTS

A. Manufacturers:
   2. Osram Sylvania; : www.sylvania.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.
   5. Manufacturer Limitations: Where possible, for each type of luminaire provide ballasts produced by a single manufacturer.

B. All Ballasts:
   1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
   2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

C. Fluorescent Ballasts:
   1. All Fluorescent Ballasts: Unless otherwise indicated, provide high frequency electronic ballasts complying with ANSI C82.11 and listed and labeled as complying with UL 935.
      a. Input Voltage: Suitable for operation at voltage of connected source, with variation tolerance of plus or minus 10 percent.
      b. Total Harmonic Distortion: Not greater than 10 percent.
      c. Power Factor: Not less than 0.95.
      d. Thermal Protection: Listed and labeled as UL Class P, with automatic reset for integral thermal protectors.
      e. Sound Rating: Class A, suitable for average ambient noise level of 20 to 24 decibels.
      f. Lamp Compatibility: Specifically designed for use with the specified lamp, with no visible flicker.
      g. Lamp Operating Frequency: Greater than 20 kHz, except as specified below.
         1) Do not operate lamp(s) within the frequencies from 30 kHz through 40 kHz in order to avoid interference with infrared devices.
      h. Lamp Current Crest Factor: Not greater than 1.7.
      i. Provide automatic restart capability to restart replaced lamp(s) without requiring resetting of power.
      j. Provide end of lamp life automatic shut down circuitry for T5 and smaller diameter lamp ballasts.
      k. Surge Tolerance: Capable of withstanding characteristic surges according to IEEE C62.41.2, location category A.
      l. Electromagnetic Interference/Radio Frequency Interference (EMI/RFI) Limits: Comply with FCC requirements of CFR, Title 47, Part 18, for Class A, non-consumer application.
      m. Provide high efficiency T8 lamp ballasts certified as NEMA premium where indicated.
      n. Ballast Marking: Include wiring diagrams with lamp connections.
   2. Non-Dimming Fluorescent Ballasts:
      a. Lamp Starting Method:
         1) T8 Lamp Ballasts: Programmed start unless otherwise indicated.
         2) T5 Lamp Ballasts: Programmed start unless otherwise indicated.
3) Compact Fluorescent Lamp Ballasts: Programmed start unless otherwise indicated.
   b. Lamp Starting Temperature: Capable of starting standard lamp(s) at a minimum of 0 degrees F, and energy saving lamp(s) at a minimum of 60 degrees F unless otherwise indicated.

2.07 LAMPS
A. Manufacturers:
   5. Substitutions: See Section 01 60 00 - Product Requirements.
B. All Lamps:
   1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
   2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
   3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
   4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Architect to be inconsistent in perceived color temperature.

2.08 ACCESSORIES
A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2” size, factory finished to match luminaire or field-painted as directed.
B. Threaded Rods for Suspended Luminaires: Zinc-plated steel, minimum 1/4” size, field-painted as directed.
C. Provide accessory plaster frames for luminaires recessed in plaster ceilings.
D. Tube Guards for Linear Fluorescent Lamps: Provide clear virgin polycarbonate sleeves with endcaps where indicated.
E. Product: As indicated in lighting fixture schedule.
   1. Substitutions: See Section 01 60 00 - Product Requirements.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that field measurements are as shown on the drawings.
B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
C. Verify that suitable support frames are installed where required.
D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION
A. Provide extension rings to bring outlet boxes flush with finished surface.
B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.
3.03 INSTALLATION

A. Coordinate locations of outlet boxes provided under Section 26 05 37 as required for installation of luminaires provided under this section.

B. Install products according to manufacturer’s instructions.

C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship), NECA 500 (commercial lighting), and NECA 502 (industrial lighting).

D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.

E. Suspended Ceiling Mounted Luminaires:
   1. Do not use ceiling tiles to bear weight of luminaires.
   2. Do not use ceiling support system to bear weight of luminaires unless ceiling support system is certified as suitable to do so.
   3. Secure pendant-mounted luminaires to building structure.
   4. Secure lay-in luminaires to ceiling support channels using listed safety clips at four corners.
   5. In addition to ceiling support wires, provide two galvanized steel safety wire(s), minimum 12 gage, connected from opposing corners of each recessed luminaire to building structure.
   6. See appropriate Division 9 section where suspended grid ceiling is specified for additional requirements.

F. Recessed Luminaires:
   1. Install trims tight to mounting surface with no visible light leakage.
   2. Non-IC Rated Luminaires: Maintain required separation from insulation and combustible materials according to listing.
   3. Luminaires Recessed in Fire-Rated Ceilings: Install using accessories and firestopping materials to meet regulatory requirements for fire rating.

G. Suspended Luminaires:
   1. Install using the suspension method indicated, with support lengths and accessories as required for specified mounting height.
   2. Install canopies tight to mounting surface.

H. Wall-Mounted Luminaires: Unless otherwise indicated, specified mounting heights are to center of luminaire.

I. Install fixtures securely, in a neat and workmanlike manner, as specified in NECA 500 (commercial lighting).

J. Install suspended luminaires and exit signs using pendants supported from swivel hangers. Provide pendant length required to suspend luminaire at indicated height.

K. Support luminaires independent of ceiling framing.

L. Locate recessed ceiling luminaires as indicated on reflected ceiling plan.

M. Install surface mounted luminaires and exit signs plumb and adjust to align with building lines and with each other. Secure to prevent movement.

N. Exposed Grid Ceilings: Support surface mounted luminaires in grid ceiling directly from building structure.

O. Exposed Grid Ceilings: Provide auxiliary members spanning ceiling grid members to support surface mounted luminaires.

P. Exposed Grid Ceilings: Fasten surface mounted luminaires to ceiling grid members using bolts, screws, rivets, or suitable clips.

Q. Install recessed luminaires to permit removal from below.
R. Install recessed luminaires using accessories and firestopping materials to meet regulatory requirements for fire rating.

S. Install clips to secure recessed grid-supported luminaires in place.

T. Install wall mounted luminaires, emergency lighting units, and exit signs at height as scheduled.

U. Install accessories furnished with each luminaire.

V. Make wiring connections to branch circuit using building wire with insulation suitable for temperature conditions within luminaire.

W. Bond products and metal accessories to branch circuit equipment grounding conductor.

X. Install specified lamps in each emergency lighting unit, exit sign, and luminaire.

Y. Air Handling Luminaires: Interface with air handling accessories furnished and installed under Section 23 36 00.

Z. Emergency Lighting Units:
   1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

AA. Exit Signs:
   1. Unless otherwise indicated, connect unit to unswitched power from same circuit feeding normal lighting in same room or area. Bypass local switches, contactors, or other lighting controls.

AB. Install lamps in each luminaire.

AC. Lamp Burn-In: Operate lamps at full output for prescribed period per manufacturer's recommendations prior to use with any dimming controls. Replace lamps that fail prematurely due to improper lamp burn-in.

3.04 FIELD QUALITY CONTROL

A. See Section 01 40 00 - Quality Requirements, for additional requirements.

B. Inspect each product for damage and defects.

C. Perform field inspection, testing, and adjusting in accordance with Section 01 4000.

D. Operate each luminaire after installation and connection to verify proper operation.

E. Test self-powered exit signs, emergency lighting units, and fluorescent emergency power supply units to verify proper operation upon loss of normal power supply.

F. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.05 ADJUSTING

A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

B. Aim and position adjustable emergency lighting unit lamps to achieve optimum illumination of egress path as required or as directed by Architect or authority having jurisdiction.

C. Exit Signs with Field-Selectable Directional Arrows: Set as indicated or as required to properly designate egress path as directed by Architect or authority having jurisdiction.

D. Aim and adjust luminaires as indicated.

E. Position exit sign directional arrows as indicated.
3.06 CLEANING
   A. Clean surfaces according to NECA 500 (commercial lighting), NECA 502 (industrial lighting), and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.
   B. Clean electrical parts to remove conductive and deleterious materials.
   C. Remove dirt and debris from enclosures.
   D. Clean photometric control surfaces as recommended by manufacturer.
   E. Clean finishes and touch up damage.

3.07 CLOSEOUT ACTIVITIES
   A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
   B. Just prior to Substantial Completion, replace all lamps that have failed.

3.08 PROTECTION
   A. Protect installed luminaires from subsequent construction operations.

3.09 PROTECTION
   A. Relamp luminaires that have failed lamps at Substantial Completion.

3.10 SCHEDULE - ATTACHED

END OF SECTION
SECTION 26 56 00
EXTERIOR LIGHTING

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Exterior luminaires.
   B. Ballasts.
   C. Lamps.
   D. Luminaire accessories.

1.02 RELATED REQUIREMENTS
   A. Section 03 30 00 - Cast-in-Place Concrete: Materials and installation requirements for concrete bases for poles.
   B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
   C. Section 26 05 37 - Boxes.
   D. Section 26 06 50.16 - Lighting Fixture Schedule.
   E. Section 26 06 50.16 - Luminaire Schedule.

1.03 REFERENCE STANDARDS
   B. IESNA LM-63 - ANSI Approved Standard File Format for Electronic Transfer of Photometric Data and Related Information.
   C. IESNA LM-64 - Photometric Measurements of Parking Areas.
   D. NECA 1 - Standard for Good Workmanship in Electrical Construction.
   F. NFPA 70 - National Electrical Code.
   G. UL 1598 - Luminaires.
   H. UL 8750 - Light Emitting Diode (LED) Equipment for Use in Lighting Products.

1.04 ADMINISTRATIVE REQUIREMENTS
   A. Coordination:
      1. Coordinate placement of poles and associated foundations with utilities, curbs, sidewalks, trees, walls, fences, striping, etc. installed under other sections or by others. Coordinate elevation to obtain specified foundation height.
      2. Notify Architect of any conflicts or deviations from the contract documents to obtain direction prior to proceeding with work.

1.05 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
   B. Shop Drawings:
      1. Indicate dimensions and components for each luminaire that is not a standard product of the manufacturer.
      2. Provide photometric calculations where luminaires are proposed for substitution.
   C. Product Data: Provide manufacturer's standard catalog pages and data sheets including detailed information on luminaire construction, dimensions, ratings, finishes, mounting requirements, listings, service conditions, photometric performance, weight, effective projected area (EPA), and installed accessories; include model number nomenclature clearly marked with all proposed features.
1. Provide electronic files of photometric data certified by a National Voluntary Laboratory Accreditation Program (NVLAP) lab or independent testing agency in IESNA LM-63 standard format upon request.

2. Lamps: Include rated life and initial and mean lumen output.

D. Certificates for Poles and Accessories: Manufacturer's documentation that products are suitable for the luminaires to be installed and comply with designated structural design criteria.

E. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and starting of product.

F. Operation and Maintenance Data: Instructions for each product including information on replacement parts.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 01 60 00 - Product Requirements, for additional provisions.

H. Project Record Documents: Record actual connections and locations of pole foundations, luminaires, and any pull or junction boxes.

1.06 QUALITY ASSURANCE

A. Conform to requirements of NFPA 70.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

1.07 DELIVERY, STORAGE, AND HANDLING

A. Receive, handle, and store products according to NECA/IESNA 501 and manufacturer's written instructions.

B. Keep products in original manufacturer's packaging and protect from damage until ready for installation.

C. Receive, handle, and store wood poles in accordance with ANSI O5.1.

PART 2 PRODUCTS

2.01 MANUFACTURERS


C. Substitutions: See Section 01 60 00 - Product Requirements.

2.02 LUMINAIRE TYPES

A. Furnish products as indicated in luminaire schedule included on the Drawings.

B. Substitutions: See Section 01 60 00 - Product Requirements.

2.03 LUMINAIRES

A. Manufacturers:


3. Substitutions: See Section 01 60 00 - Product Requirements.

B. Provide products that comply with requirements of NFPA 70.

C. Provide products that are listed and labeled as complying with UL 1598, where applicable.

D. Provide products listed and classified by Underwriters Laboratories Inc. as suitable for the purpose specified and indicated.
E. Unless otherwise indicated, provide complete luminaires including lamp(s) and all sockets, ballasts, reflectors, lenses, housings and other components required to position, energize and protect the lamp and distribute the light.

F. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, hardware, poles, foundations, supports, trims, accessories, etc. as necessary for a complete operating system.

G. Provide products suitable to withstand normal handling, installation, and service without any damage, distortion, corrosion, fading, discoloring, etc.

H. Provide luminaires listed and labeled as suitable for wet locations unless otherwise indicated.

I. LED Luminaire Components: UL 8750 recognized or listed as applicable.

J. Exposed Hardware: Stainless steel.

2.04 BALLASTS
A. Manufacturers:
   2. Osram Sylvania; www.sylvania.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. All Ballasts:
   1. Provide ballasts containing no polychlorinated biphenyls (PCBs).
   2. Minimum Efficiency/Efficacy: Provide ballasts complying with all current applicable federal and state ballast efficiency/efficacy standards.

2.05 LAMPS
A. Manufacturers:
   2. Osram Sylvania; www.sylvania.com/#sle.
   4. Substitutions: See Section 01 60 00 - Product Requirements.

B. All Lamps:
   1. Unless explicitly excluded, provide new, compatible, operable lamps in each luminaire.
   2. Verify compatibility of specified lamps with luminaires to be installed. Where lamps are not specified, provide lamps per luminaire manufacturer's recommendations.
   3. Minimum Efficiency: Provide lamps complying with all current applicable federal and state lamp efficiency standards.
   4. Color Temperature Consistency: Unless otherwise indicated, for each type of lamp furnish products which are consistent in perceived color temperature. Replace lamps that are determined by the Architect to be inconsistent in perceived color temperature.

2.06 ACCESSORIES
A. Stems for Suspended Luminaires: Steel tubing, minimum 1/2" size, factory finished to match luminaire or field-painted as directed.

PART 3 EXECUTION
3.01 EXAMINATION
A. Verify that field measurements are as shown on the drawings.
B. Verify that outlet boxes are installed in proper locations and at proper mounting heights and are properly sized to accommodate conductors in accordance with NFPA 70.
C. Verify that suitable support frames are installed where required.
D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to luminaires.
E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 PREPARATION
A. Provide extension rings to bring outlet boxes flush with finished surface.
B. Clean dirt, debris, plaster, and other foreign materials from outlet boxes.

3.03 INSTALLATION
A. Coordinate locations of outlet boxes provided under Section 26 05 37 as required for installation of luminaires provided under this section.
B. Install products according to manufacturer's instructions.
C. Install luminaires securely, in a neat and workmanlike manner, as specified in NECA 1 (general workmanship) and NECA/IESNA 501 (exterior lighting).
D. Install luminaires plumb and square and aligned with building lines and with adjacent luminaires.
E. Install accessories furnished with each luminaire.
F. Bond products and metal accessories to branch circuit equipment grounding conductor.
G. Install lamps in each luminaire.

3.04 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for additional requirements.
B. Inspect each product for damage and defects.
C. Operate each luminaire after installation and connection to verify proper operation.
D. Correct wiring deficiencies and repair or replace damaged or defective products. Repair or replace excessively noisy ballasts as determined by Architect.

3.05 ADJUSTING
A. Aim and position adjustable luminaires to achieve desired illumination as indicated or as directed by Architect. Secure locking fittings in place.

3.06 CLEANING
A. Clean surfaces according to NECA/IESNA 501 and manufacturer's instructions to remove dirt, fingerprints, paint, or other foreign material and restore finishes to match original factory finish.

3.07 CLOSEOUT ACTIVITIES
A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
B. See Section 01 79 00 - Demonstration and Training, for additional requirements.

3.08 PROTECTION
A. Protect installed luminaires from subsequent construction operations.

END OF SECTION
SECTION 28 13 00
ACCESS CONTROL

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Access control system requirements.
B. Access control units and software.
C. Access control point peripherals, including readers.
D. Accessories.

1.02 RELATED REQUIREMENTS
A. Section 07 84 00 - Firestopping.
B. Section 26 05 26 - Grounding and Bonding for Electrical Systems.
C. Section 26 05 34 - Conduit.
D. Section 26 05 53 - Identification for Electrical Systems: Identification products and requirements.
E. Section 28 16 00 - Building Intrusion Detection: For interface with access control system.

1.03 REFERENCE STANDARDS
A. NECA 1 - Standard for Good Workmanship in Electrical Construction.
B. NFPA 70 - National Electrical Code.
D. UL 294 - Access Control System Units.

1.04 ADMINISTRATIVE REQUIREMENTS
A. Coordination:
   1. Coordinate the work with other installers to provide suitable door hardware as required for both access control functionality and code compliance.
   2. Coordinate the placement of readers with millwork, furniture, equipment, etc. installed under other sections or by others.
   3. Coordinate the work with other installers to provide power for equipment at required locations.
   4. Notify Architect of any conflicts with or deviations from the contract documents. Obtain direction before proceeding with work.

1.05 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Shop Drawings: Include plan views indicating locations of system components and proposed size, type, and routing of conduits and/or cables. Include elevations and details of proposed equipment arrangements. Include system interconnection schematic diagrams. Include requirements for interface with other systems.
C. Product Data: Provide manufacturer's standard catalog pages and data sheets for each system component. Include ratings, configurations, standard wiring diagrams, dimensions, finishes, service condition requirements, and installed features.
D. Design Data: Standby battery/UPS calculations.
E. Certify that proposed system design and components meet or exceed specified requirements.
F. Evidence of qualifications for installer.
G. Evidence of qualifications for maintenance contractor (if different entity from installer).
H. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.
I. Manufacturer's detailed field testing procedures.
J. Field quality control test reports.
K. Maintenance contracts.
L. Project Record Documents: Record actual locations of system components and installed wiring arrangements and routing.
M. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and intervals.
   1. Include contact information for entity that will be providing contract maintenance and trouble call-back service.
N. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.
O. Software: One copy of software not resident in read-only memory.
P. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 60 00 - Product Requirements, for additional provisions.

1.06 QUALITY ASSURANCE
A. Comply with the following:
   1. NFPA 70
   3. The requirements of the local authorities having jurisdiction.
   4. Applicable TIA/EIA standards.
B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.
C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.
D. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with access control systems of similar size, type, and complexity and providing contract maintenance service as a regular part of their business; authorized manufacturer's representative.
   1. Contract maintenance office located within 100 miles of project site.
E. Maintenance Contractor Qualifications: Same entity as installer.

1.07 DELIVERY, STORAGE, AND HANDLING
A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.
B. Store products in manufacturer's unopened packaging, keep dry and protect from damage until ready for installation.

1.08 FIELD CONDITIONS
A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.09 WARRANTY
A. See Section 01 78 00 - Closeout Submittals, for additional warranty requirements.
B. Provide minimum one year manufacturer warranty covering repair or replacement due to defective materials or workmanship.
PART 2 PRODUCTS

2.01 MANUFACTURERS
  A. Access Control System - Match/extend existing system. Contractor to verify type and components in field.
  B. Products other than basis of design are subject to compliance with specified requirements and prior approval of Engineer. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.
  C. Source Limitations: Where possible, furnish system components and accessories produced by a single manufacturer and obtained from a single supplier.

2.02 ACCESS CONTROL SYSTEM REQUIREMENTS
  A. Provide modifications and extensions to existing access control system consisting of all required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.
  B. Access Control Points:
     1. See drawings.
  C. Provide products listed, classified, and labeled by Underwriter's Laboratories Inc. (UL) or testing firm acceptable to authority having jurisdiction as suitable for the purpose indicated.
     1. Access Control Units and Readers: Listed and labeled as complying with UL 294.

2.03 ACCESS CONTROL UNITS AND SOFTWARE
  A. Provide access control units and associated software compatible with readers to be connected.

2.04 ACCESS CONTROL POINT PERIPHERALS
  A. Provide devices compatible with control units.
  B. Provide devices suitable for operation under the service conditions at the installed location.
  C. Provide readers compatible with credentials to be used and match existing.
  D. Proximity Readers:
     1. Utilizes 125 kHz RF communication with compatible credentials.

2.05 ACCESSORIES
  A. Provide components as indicated or as required for connection of access control system to devices and other systems indicated.
  B. Unless otherwise indicated, credentials to be provided by Contractor.
     1. Provide credentials compatible with readers and control units/software to be used.
  C. Provide cables as indicated or as required for connections between system components.
  D. Provide accessory racks/cabinets as indicated or as required for equipment mounting.

PART 3 EXECUTION

3.01 EXAMINATION
  A. Verify that field measurements are as shown on the drawings.
  B. Verify that ratings and configurations of system components are consistent with the indicated requirements.
  C. Verify that mounting surfaces are ready to receive system components.
  D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to system.
E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION
A. Install access control system in accordance with NECA 1 (general workmanship).
B. Install products in accordance with manufacturer's instructions.
C. Wiring Method: Unless otherwise indicated, use wiring in conduit.
   1. Use suitable listed cables in wet locations, including underground raceways.
   2. Use suitable listed cables for vertical riser applications.
   3. Conduit: Comply with Section 26 05 34.
   4. Use power transfer hinges complying with Section 08 71 00 for concealed connections to door hardware.
   5. Do not exceed manufacturer's recommended maximum cable length between components.
D. Provide grounding and bonding in accordance with Section 26 05 26.
E. Install firestopping to preserve fire resistance rating of partitions and other elements, using materials and methods specified in Section 07 84 00.
F. Identify system wiring and components in accordance with Section 26 05 53.

3.03 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for additional requirements.
B. Provide services of a manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.
C. Prepare and start system in accordance with manufacturer's instructions.
D. Program system parameters according to requirements of Owner.
E. Test for proper interface with other systems.
F. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.
G. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.04 CLEANING
A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.05 CLOSEOUT ACTIVITIES
A. See Section 01 78 00 - Closeout Submittals, for closeout submittals.
B. See Section 01 79 00 - Demonstration and Training, for additional requirements.
C. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.
D. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.
   1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.
   2. Provide minimum of four hours of training.
   3. Instructor: Manufacturer's authorized representative.
   4. Location: At project site.

3.06 PROTECTION
A. Protect installed system components from subsequent construction operations.
3.07 MAINTENANCE

A. See Section 01 70 00 - Execution Requirements, for additional requirements relating to maintenance service.

B. Provide to Owner, a proposal as an alternate to the base bid, a separate maintenance contract for the service and maintenance of access control system for two years from date of Substantial Completion; Include a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.

C. Conduct site visit at least once every three months to perform inspection, testing, and preventive maintenance. Submit report to Owner indicating maintenance performed along with evaluations and recommendations.

D. Provide trouble call-back service upon notification by Owner:
   1. Include allowance for call-back service during normal working hours at no extra cost to Owner.
   2. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

END OF SECTION
SECTION 31 10 00
SITE CLEARING

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Clearing and protection of vegetation.
   B. Removal of existing debris.

1.02 RELATED REQUIREMENTS
   A. Section 31 22 00 - Grading: Topsoil removal.
   B. Section 31 22 00 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.
   C. See Civil Drawings for additional Project Specifications. If Conflicting Project Specifications arise, the Project Specifications on the Structural Drawings govern.

1.03 SUBMITTALS
   A. See Section 01 33 00 - Administrative Requirements, for submittal procedures.

PART 2 PRODUCTS

2.01 MATERIALS
   A. Fill Material: As specified in Section 31 22 00 - Grading

PART 3 EXECUTION

3.01 SITE CLEARING
   A. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

3.02 VEGETATION
   A. Scope: Remove trees, shrubs, and brush, in areas to be covered by paving.
   B. Do not begin clearing until vegetation to be relocated has been removed.
   C. Do not remove or damage vegetation beyond the following limits:
      1. 10 feet each side of surface walkways.
   D. In areas where vegetation must be removed but no construction will occur other than pervious paving, remove vegetation with minimum disturbance of the subsoil.
   E. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   F. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

3.03 DEBRIS
   A. Remove debris, junk, and trash from site.
   B. Leave site in clean condition, ready for subsequent work.
   C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION
SECTION 31 22 00
GRADING

PART 1  GENERAL
1.01  SECTION INCLUDES
   A. Removal of topsoil.
   B. Rough grading the site for sidewalks.
   C. Finish grading.

1.02  RELATED REQUIREMENTS
   A. Section 31 10 00 - Site Clearing.
   B. Section 31 23 23 - Fill: Filling and compaction.
   C. Section 32 92 19 - Seeding: Finish ground cover.
   D. See Civil Drawings for additional Project Specifications. If Conflicting Project Specifications arise, the Project Specifications on the Structural Drawings govern.

1.03  SUBMITTALS
   A. Project Record Documents: Accurately record actual locations of utilities remaining by horizontal dimensions, elevations or inverts, and slope gradients.

PART 2  PRODUCTS
2.01  MATERIALS
   A. Topsoil: See Section 31 23 23.

PART 3  EXECUTION
3.01  EXAMINATION
   A. Verify that survey bench mark and intended elevations for the Work are as indicated.
   B. Verify the absence of standing or ponding water.

3.02  PREPARATION
   A. Identify required lines, levels, contours, and datum.
   B. Stake and flag locations of known utilities.
   C. Locate, identify, and protect from damage above- and below-grade utilities to remain.
   D. Provide temporary means and methods to remove all standing or ponding water from areas prior to grading.
   E. Protect site features to remain, including but not limited to existing structures, sidewalks, paving, and curbs, from damage by grading equipment and vehicular traffic.
   F. Protect trees to remain by providing substantial barrier around entire tree at the outer tips of its branches; no grading is to be performed inside this line.
   G. Protect plants, lawns, and other features to remain as a portion of final landscaping.

3.03  ROUGH GRADING
   A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.
   B. Do not remove topsoil when wet.
   C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.
   D. Do not remove wet subsoil, unless it is subsequently processed to obtain optimum moisture content.
E. When excavating through roots, perform work by hand and cut roots with sharp axe.
F. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.
G. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack surface water control.

3.04 SOIL REMOVAL
A. Stockpile excavated topsoil on site.
B. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.05 FINISH GRADING
A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.
B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.
C. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.
D. Lightly compact placed topsoil.
E. Maintain stability of topsoil during inclement weather. Replace topsoil in areas where surface water has eroded thickness below specifications.

3.06 REPAIR AND RESTORATION
A. Existing Facilities, Utilities, and Site Features to Remain: If damaged due to this work, repair or replace to original condition.
B. Other Existing Vegetation to Remain: If damaged due to this work, replace with vegetation of equivalent species and size.

3.07 CLEANING
A. Remove unused stockpiled topsoil. Grade stockpile area to prevent standing water.
B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION
SECTION 31 23 23
FILL

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Filling and compacting for concrete paving.

1.02 RELATED REQUIREMENTS
A. Section 31 22 00 - Grading: Removal and handling of soil to be re-used.
B. Section 31 22 00 - Grading: Site grading.
C. See Civil Drawings for additional Project Specifications. If Conflicting Project Specifications arise, the Project Specifications on the Structural Drawings govern.

1.03 REFERENCE STANDARDS
B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft³ (600 kN-m/m³)).
C. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft³ (2,700 kN m/m³)).

1.04 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Materials Sources: Submit name of imported materials source.

1.05 DELIVERY, STORAGE, AND HANDLING
A. When necessary, store materials on site in advance of need.

PART 2 PRODUCTS

2.01 FILL MATERIALS
A. General Fill: Subsoil excavated on-site.
B. Topsoil: See Section 31 22 00.

PART 3 EXECUTION

3.01 EXAMINATION
A. Identify required lines, levels, contours, and datum locations.
B. See Section 31 22 00 for additional requirements.
C. Verify areas to be filled are not compromised with surface or ground water.

3.02 PREPARATION
A. Scarify subgrade surface to a depth of 6 inches to identify soft spots.
B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.
C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

3.03 FILLING
A. Fill to contours and elevations indicated using unfrozen materials.
B. Employ a placement method that does not disturb or damage other work.
C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.
D. Maintain optimum moisture content of fill materials to attain required compaction density.
E. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise. Make gradual grade changes. Blend slope into level areas.
F. Correct areas that are over-excavated.
   1. Other areas: Use general fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.
G. Compaction Density Unless Otherwise Specified or Indicated:
H. Maintain temporary means and methods, as required, to remove all water while fill is being placed as required, or until directed by the Architect. Remove and replace soils deemed unsuitable by classification and which are excessively moist due to lack of dewatering or surface water control.

3.04 FILL AT SPECIFIC LOCATIONS
A. Use general fill unless otherwise specified or indicated.
B. At Lawn Areas:
   1. Use general fill.
   2. Compact to 95 percent of maximum dry density.
   3. See Section 31 22 00 for topsoil placement.
C. Under Sidewalks:
   1. Use general fill.
   2. Fill up to subgrade elevation.
   3. Compact to 95 percent of maximum dry density.

3.05 TOLERANCES
A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.
B. Top Surface of Filling Under Paved Areas: Plus or minus 1 inch from required elevations.

3.06 FIELD QUALITY CONTROL
A. See Section 01 40 00 - Quality Requirements, for general requirements for field inspection and testing.

3.07 CLEANING
A. See Section 01 74 19 - Construction Waste Management and Disposal, for additional requirements.
B. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.
C. Leave borrow areas in a clean and neat condition. Grade to prevent standing surface water.

END OF SECTION
SECTION 32 13 13
CONCRETE PAVING

PART 1 GENERAL

1.01 SECTION INCLUDES
A. Concrete sidewalks.

1.02 RELATED REQUIREMENTS
A. Section 03 10 00 - Concrete Forming and Accessories.
B. Section 03 20 00 - Concrete Reinforcing.
C. Section - Joint Sealers: Sealant for joints.
D. Section 31 22 00 - Grading: Preparation of site for paving.
E. See Civil Drawings for additional Project Specifications. If Conflicting Project Specifications arise, the Project Specifications on the Structural Drawings govern.

1.03 REFERENCE STANDARDS
C. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement.

1.04 SUBMITTALS
A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.
B. Product Data: Provide data on joint filler, admixtures, and curing compound.

PART 2 PRODUCTS

2.01 PAVING ASSEMBLIES
A. Concrete Sidewalks: 3,000 psi 28 day concrete, 4 inches thick.

2.02 FORM MATERIALS
A. Wood form material, profiled to suit conditions.
B. Joint Filler: Preformed; non-extruding bituminous type (ASTM D1751) or sponge rubber or cork (ASTM D1752).
   1. Thickness: 1/2 inch.

2.03 REINFORCEMENT
A. Reinforcing Steel and Welded Wire Reinforcement: Types specified in Section 03 20 00.

2.04 CONCRETE MATERIALS
A. Obtain cementitious materials from same source throughout.
B. Concrete Materials: As specified in Section 03 30 00.

PART 3 EXECUTION

3.01 EXAMINATION
   A. Verify compacted subgrade is acceptable and ready to support paving and imposed loads.
   B. Verify gradients and elevations of base are correct.

3.02 SUBBASE
   A. See Section 32 11 23 for construction of base course for work of this Section.

3.03 PREPARATION
   A. Moisten base to minimize absorption of water from fresh concrete.

3.04 FORMING
   A. Place and secure forms to correct location, dimension, profile, and gradient.
   B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.
   C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

3.05 REINFORCEMENT
   A. Place reinforcement at top of slabs-on-grade.
   B. Interrupt reinforcement at contraction joints.
   C. Place dowels to achieve pavement and curb alignment as detailed.

3.06 PLACING CONCRETE
   A. Do not place concrete when base surface is wet.
   B. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.
   C. Place concrete continuously over the full width of the panel and between predetermined construction joints. Do not break or interrupt successive pours such that cold joints occur.

3.07 JOINTS
   A. Align sidewalk joints.
   B. Place 1/2 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components.
      1. Form joints with joint filler extending from bottom of pavement to within 1/2 inch of finished surface.
      2. Secure to resist movement by wet concrete.
   C. Provide scored joints:
      1. At 3 feet intervals.
      2. Between new sidewalk and existing sidewalk.

3.08 FINISHING
   A. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.

3.09 JOINT SEALING
   A. See Section for joint sealer requirements.

3.10 TOLERANCES
   A. Maximum Variation of Surface Flatness: 1/4 inch in 10 ft.
B. Maximum Variation From True Position: 1/4 inch.

3.11 FIELD QUALITY CONTROL

A. Compressive Strength Tests: ASTM C39/C39M. For each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.

B. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

3.12 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

B. Do not permit pedestrian traffic over pavement until 75 percent design strength of concrete has been achieved.

END OF SECTION
SECTION 32 92 19
SEEDING

PART 1 GENERAL

1.01 SECTION INCLUDES
   A. Preparation of subsoil.
   B. Placing topsoil.
   C. Seeding.

1.02 RELATED REQUIREMENTS
   A. Section 31 22 00 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.
   B. Section 31 23 23 - Fill: Topsoil material.
   C. See Civil Drawings for additional Project Specifications. If Conflicting Project Specifications arise, the Project Specifications on the Structural Drawings govern.

1.03 SUBMITTALS
   A. See Section 01 30 00 - Administrative Requirements, for submittal procedures.

1.04 DELIVERY, STORAGE, AND HANDLING
   A. Deliver grass seed mixture in sealed containers. Seed in damaged packaging is not acceptable. Deliver seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location of packaging.

PART 2 PRODUCTS

2.01 SEED MIXTURE
   A. Seed Mixture:
      1. Kentucky Blue Grass: 50 percent.
      2. Creeping Red Fescue Grass: 10 percent.

2.02 ACCESSORIES
   A. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.
   B. Erosion Fabric: Jute matting, open weave.

PART 3 EXECUTION

3.01 PREPARATION
   A. Prepare subgrade in accordance with Section 31 22 00.
   B. Place topsoil in accordance with Section 31 22 00.

3.02 SEEDING
   A. Apply seed at a rate of 2 to 3 lbs per 1000 sq ft evenly in two intersecting directions. Rake in lightly.
   B. Do not seed areas in excess of that which can be mulched on same day.
   C. Do not sow immediately following rain, when ground is too dry, or during windy periods.
   D. Immediately following seeding and compacting, apply mulch to a thickness of 1/8 inches. Maintain clear of shrubs and trees.
   E. Apply water with a fine spray immediately after each area has been mulched. Saturate to 4 inches of soil.
F. Following germination, immediately re-seed areas without germinated seeds that are larger than 4 by 4 inches.

3.03 PROTECTION
   A. Lay fabric smoothly on surface, bury top end of each section in 6 inch deep excavated topsoil trench. Provide 12 inch overlap of adjacent rolls. Backfill trench and rake smooth, level with adjacent soil.
   B. Secure outside edges and overlaps at 36 inch intervals with stakes.
   C. Lightly dress slopes with topsoil to ensure close contact between fabric and soil.

3.04 MAINTENANCE
   A. Water to prevent grass and soil from drying out.
   B. Roll surface to remove minor depressions or irregularities.
   C. Immediately reseed areas that show bare spots.

END OF SECTION