APPENDIX A
PROJECT MANUAL

GOVERNMENT OF THE VIRGIN ISLANDS

NINETY-NINE STEPS
RENOVATION
ST. THOMAS, U.S. VIRGIN ISLANDS

V · I · P · F · A
VIRGIN ISLANDS PUBLIC FINANCE AUTHORITY

Honorable Commissioner Derek Gabriel
GOVERNMENT OF THE UNITED STATES VIRGIN ISLANDS
DEPARTMENT OF PUBLIC WORKS
8244 SUBBASE
ST. THOMAS, VIRGIN ISLANDS 00802

FOR

Honorable Director Nathan Simmonds
GOVERNMENT OF THE UNITED STATES VIRGIN ISLANDS
VIRGIN ISLANDS PUBLIC FINANCE AUTHORITY
5033 KONGENS GADE, GOVERNMENT HILL
ST. THOMAS, V.I. 00802

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SECTION 1: SCOPE OVERVIEW

The Contractor shall renovate and restore the appearance of the Ninety-Nine Steps landmark site. The work includes Mobilization, Removal of Mortar Layer on the Steps & Adjacent Low Side Walls, Debris & Grime Removal on Steps, Restoring/Replacing Step Bricks, Removal & Replacement of Handrails, and Installation of Concrete Pads for Lighting. The work also consists of Swale Clearing, Installation of Solar Lamp Posts, Replacement of Sewage Lids, Landscaping, Painting/Refurbishing Signage Posts, Installation of Knee Wall for Seating, and other Miscellaneous Work. All work shall be performed in accordance with the Scope of Work, Manufactures Specifications, Bid Schedule, U.S. Virgin Islands Building Code, International Building Code, and the direction of the Project Architect/ Engineer in writing.

NOTE: See all attachments for additional information and field verify all quantities, dimension and conditions.

SECTION 2: GENERAL BIDDER'S INSTRUCTIONS AND REQUIREMENTS

1. Prior to the commencement of Work by Contractor, contractor will have all applicable bonds, licenses,
   sureties and permits in place prior to the commencement of work.

2. Contractor shall be exclusively responsible for the safety, security, and condition of all of materials and equipment and personal stored/working on the construction site, and no such stored or loose materials shall be deemed a part of the Project until after the same have been properly installed by the Contractor in the Project, accepted and paid for by the Contractor. Contractor shall exclusively bear the risk of loss of such stored materials prior to proper installation even if the stored material has been paid for by the contractor.

3. Further, Contractor shall be responsible for any damages done to material, equipment or property by its workforce, subcontractors, or vendors.

4. Unless otherwise authorized in writing in advance by the Contractor, Contractor states that the Work performed under this Agreement will be performed by the Contractor and his regularly employed employees.

5. Not later than the time of delivery of materials to the job site, Contractor shall provide all "materials safety data sheets" pertaining to materials being brought onto the site. Contractor further agrees that it shall comply with all local, federal laws, ordinances and regulations in connection with the Contractor's Work including, but -not limited to OSHA Standards, Rules and Regulations.

6. During the term of this Agreement, Contractor shall pay particular attention to the daily clean up and removal of all trash and rubbish generated on the job site by the Contractor or its vendors. Contractor shall be responsible for the removal of all rubbish and trash it has generated, from its work area on a daily basis and place all such rubbish and trash in waste containers located throughout the Project. In the event Contractor fails to perform this daily cleaning and trash removal agreement, Contractor may assess a portion of the cost of daily clean-up of the job site including, but not limited to, the cost of the maintenance of said trash and rubbish receptacles against the Contractor in the form of a negative change order after fair and prior notice has been given.

7. Upon the completion of the Contractor's Work, and when practical, the Contractor shall furnish the User Agency with a warranty acceptable in all respects to the User Agency to repair and/or -replace at the Contractor's sole expense all defects in materials and labor in the Contractor's Work appearing or occurring within one (1) year after the issuance of the certificate of occupancy of the premises upon which Subcontractor's Work is performed. Additionally, in the event the manufacturer of any material supplied by the Contractor to the Project exceeds the term of the Subcontractor's letter of credit or warranty, The Contractor shall further assign and deliver to the User Agency said manufacturer's warranty. Performance of warranty repair work and replacement of materials for defects occurring within the warranty period shall be the Contractor's sole and exclusive responsibility at the Contractor's sole and exclusive expense.

8. Any Work that is in addition to the work required by this Subcontract shall be construed as extra work **("Extra Work").** Extra Work will be subject to prior written approval by the Department of Public Works and shall be granted or denied prior to the execution of any such Extra Work. Approved Extra Work shall be subject to the execution of a change order signed by an authorized representative of the Contractor and the Owner or Contractor which shall be executed prior to the furnishing of such materials or performance of such labor or both. Any Extra Work not so authorized in advance shall be performed or furnished at the sole expense of the Contractor, and neither the Contractor nor the Owner shall be liable or responsible to the Contractor for the payment of any such Extra Work. Extra work must be approved before it is done.

9. All materials supplied or used by the Contractor in the performance of its Work shall be as specified and approved by the Department of Public Works. Contractor shall submit all such materials to the Department of Public Works for approval prior to the installation thereof on the premises unless otherwise agreed or waived by the Department of Public Works in writing. All work and materials will be per the plans and specifications provided unless authorized in writing prior to starting the work.

10. If job is subject to inclement weather it is the responsibility of the Contractor to keep track of these days and present to the Department of Public Works on a weekly basis to compare

against their daily log. Days that are in agreement will be placed in a change order format and will be presented with scheduled monthly payment.

11. The Contractor is contracted to provide complete construction, including code requirements, and workmanship of equal or better finishes based on the VI Building Code and to the intent of the contract documents. It is common and known that items of importance are sometimes overlooked in drawings and in specifications. If missing items would normally be included in a particular scope of work, or required for the completion of a particular trades work, then it is included in this contract and not an opportunity for change order.

12. Contractor agrees to perform all work in a good and workmanlike manner and in accordance with the highest standards of the industry in their trades, and as a minimum, the work shall be in accordance with all local, national codes, laws, ordinance and regulations, whichever governs, whether or not so indicated in the plans and specifications. It is the intent that the work be completed in all respects for the use intended as a part of this general scope.

13. Contractor agrees to furnish all labor, supervision, fasteners, tools, taxes, equipment, fuel fees, licenses, insurance and all other costs as required to perform all work covered in the construction scope of the applicable division that this Contractor represents itself as having expert knowledge in and regular engagement with.

14. Contractor shall call and cause all required inspections for his own work and convey all inspection results to the DPW Inspector/Engineer. If unsatisfactory results are discovered, this Contractor will immediately suspend its construction activities until such work is corrected and inspections are passed.

15. Upon reward of this contract, Contractor shall perform due diligence and shall prepare all necessary basic diagrams or layouts outlining his/her concerns. If value engineering or alterations to the plans/specifications is involved, such shall be presented to the Department of Public Works prior to the execution of the contract.

16. Contractor shall commence the work to be performed per the contract documents in accordance to the terms of this agreement commencing on the date specified and provided by the User Agency and shall complete all work by the finish date specified on the Construction Schedule or as adjusted from time to time by the Department of Public Works.

17. Under **NO Circumstances** will there be additional money granted for extra work without previous written authorization and executed change order from the User Agency.

18. Contractor shall be completely responsible and provide equipment for receiving, unloading, taking inventory, storing, protecting and signing for all materials installed under this agreement.

19. This Contractor will verify all detail and dimensions for fit of work in all regards.

20. Contractor acknowledges that he will provide the necessary manpower, required to maintain the project schedule in all phases of his work to include any required overtime.

21. Hard Hats are a requirement of this contract.

22. Provide Material Safety Data Sheets (MSDS) for all materials being provided or utilized under this Contract agreement, its written OSHA policy and written Hazardous Materials Policy before work commences.

23. Contractor will keep onsite material stockpiles and building workspace stockpiles to a minimum, organized and out of the way so as not to impede any other trades, and as directed by the Construction Manager.

24. Contractor is responsible for loss, theft and damage of all materials installed or otherwise until such material has been installed, approved and paid for by Contractor.

25. Contractor reserves the right, to supplement work after proper notification of non-performance has been given.

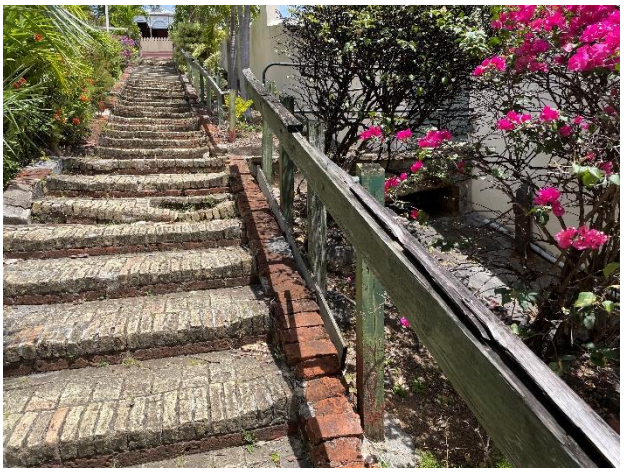
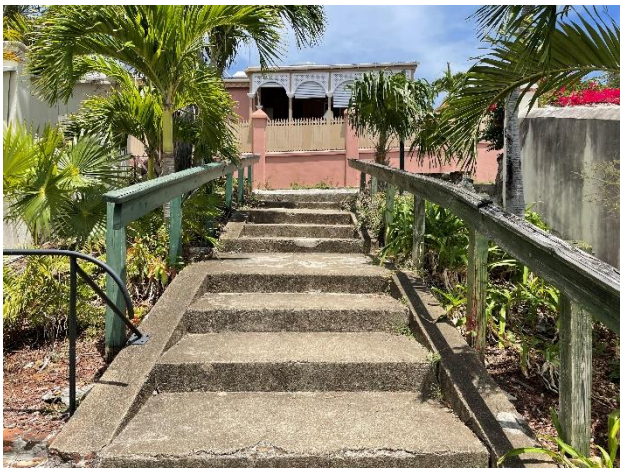
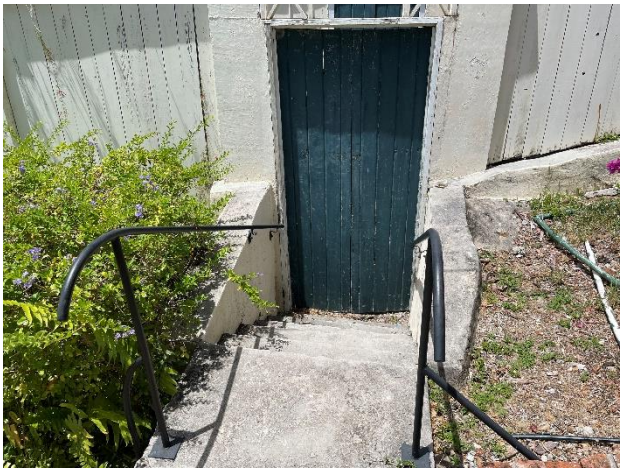
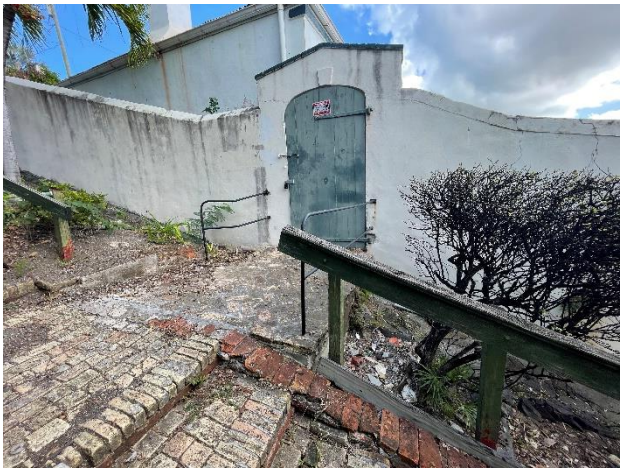
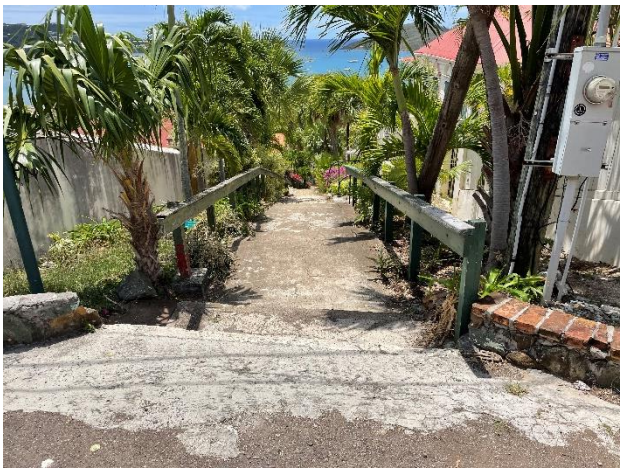
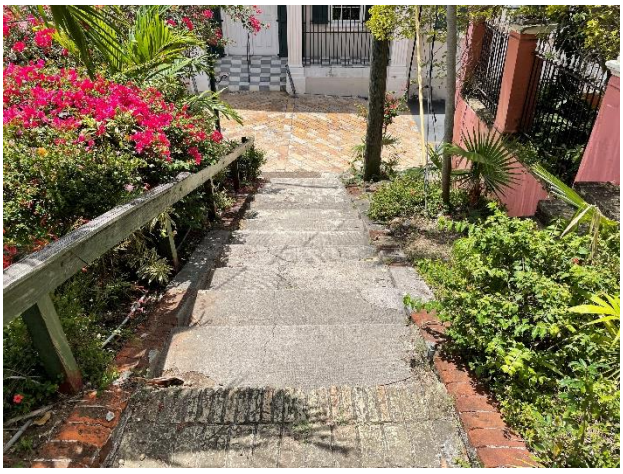
26. Contractor will furnish the names of the Subcontractors it introduces to the project.

27. Contractor will disclose the amounts of money owed to each subcontractor and submit proper lien waivers.

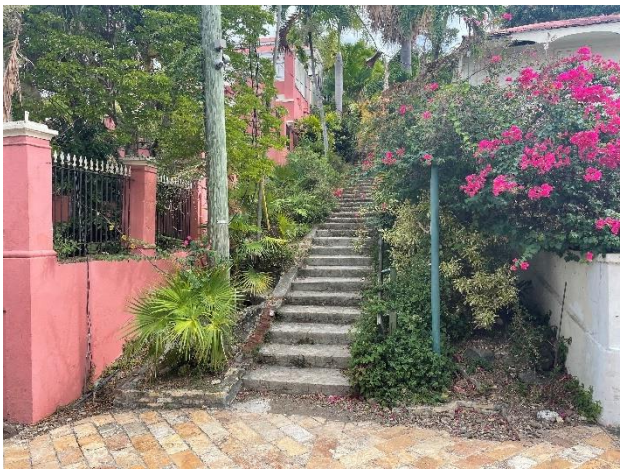
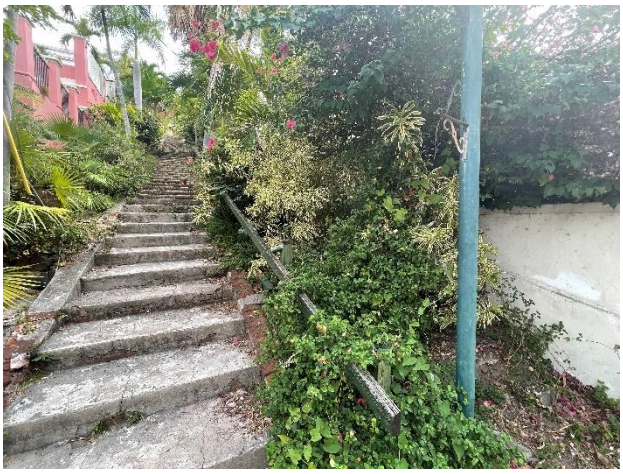
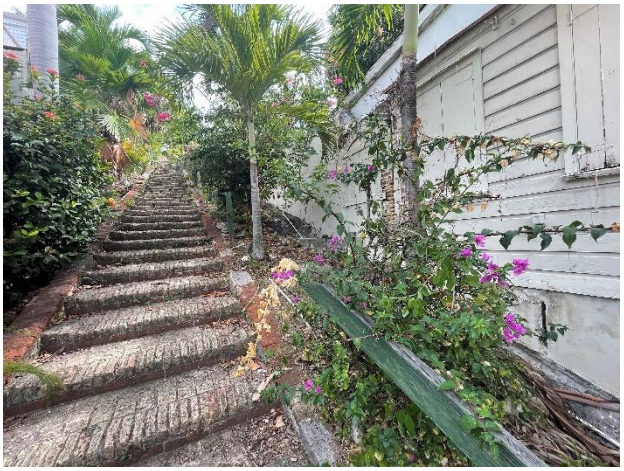
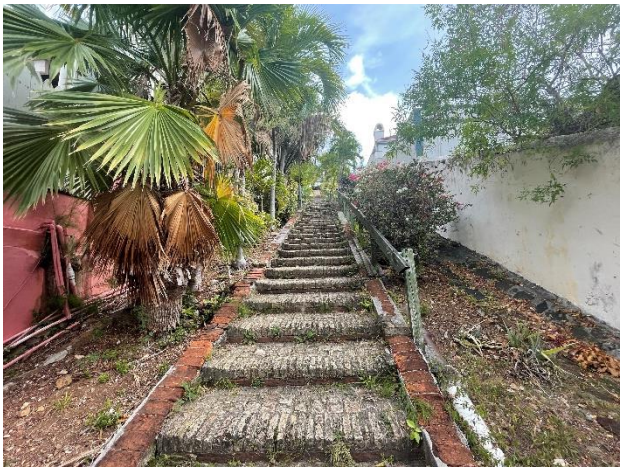
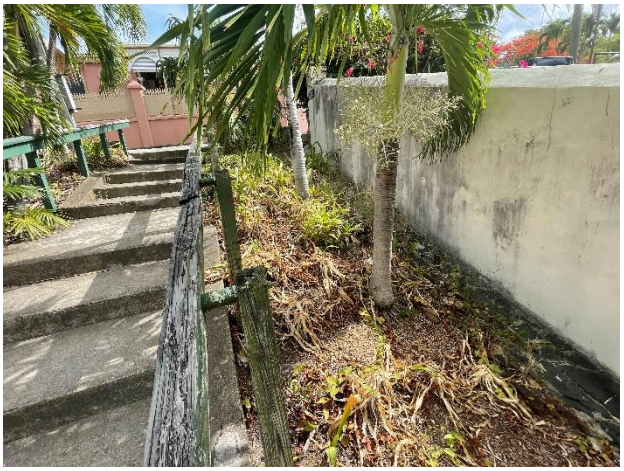
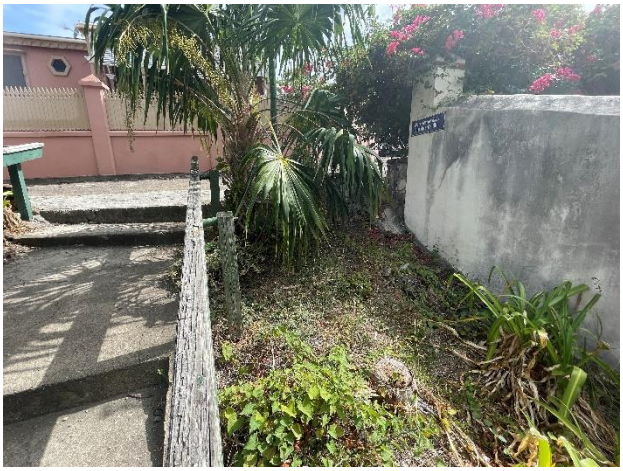
28. Contractor shall make himself/herself available for either weekly or biweekly meetings (as mutually agreed upon with the Department of Public Works) to discuss project progress/concerns. Any problems deemed an emergency shall be **IMMEDIATELY** made known to the Department of Public Works.

The undersigned Contractor shall furnish all labor, equipment, machinery, material, and miscellaneous items for the completion of the Project as outlined in the Scope of Work and Bid Schedule.

NINETY-NINE STEPS RENOVATION - SITE PHOTOS

NINETY-NINE STEPS RENOVATION – SITE LANDSCAPE PHOTOS
CONDITIONS AS OF JULY 13, 2022

GOVERNMENT OF THE VIRGIN ISLANDS OF THE UNITED STATES

VIRGIN ISLANDS PUBLIC FINANCE AUTHORITY

NINETY-NINE STEPS RENOVATION

BID SCHEDULE - DECEMBER 2023

DECLARATION NO.			PW REF #	FIPS No.	CATEGORY
		VI			
	APPLICANT			DISTRICT	PW-ESTIMATED COST
	V.I. PUBLIC FINANCE AUTHORITY / ST THOMAS			**St. Thomas**	

Item No.	Item Description Title / Component Description	Qty	Units	Unit Price	Total Cost
	Mobilization				
1	**Mobilization or demobilization**	1	L.S.		
	Carpentry & Masonry				
2	**Remove mortar layer on steps and adjacent low side walls:** Selective demolition, cutout, concrete, elevated over 220 C.F. [493 SQ FT Total, 1/2 IN Thick]. Where required, repair brick if loosen or missing. (See Sheet 2/A1 and Image 5B/D1 on Architectural Drawings)	220	C.F.		
3	**Remove grime and debris on steps:** Pressure wash brick steps for cleaning. 1,380 C.F. Crew - one laborer.	1	L.S.		
4	**Remove debris and sunken/damaged bricks on steps:** Removal of damaged bricks and mortar [6 FT Wide, 6 IN Depth]. **Install bricks:** Prepare opening, install new bricks, and re-install sunken bricks.	9	C.F.		
5	**Remove handrails:** Demolition, millwork and trim, railings (186 L.F). **Replace handrails**: Railing, pipe, aluminum, powder coated, 3'-2" high, 1-1/2" diameter, shop fabricated (381 L.F.), Mount post into bricks.	381	L.F.		
6	**Install concrete pad for solar lamp posts:** Non-structural concrete, in place, column (4000 psi), square, up to 1% reinforcing by area, 12"x12"x24" includes forms (4 uses), Rebar reinforcement, concrete (Portland cement Type I), placing and finishing. Quantity: 7.	19	C.F.		
7	**Install Knee High Wall For Seating:** Construct brick wall and mortar to matching existing structure. (See Detail 4/D1 on Architectural Drawings)	1	L.S.		
8	**Install Masonry Curb:** Install masonry curb to match existing structure. Dispose existing masonry curb debris from area. (See Detail 5A/D1 on Architectural Drawings)	1	L.S.		
	Lighting				
9	**Install solar lamp post:** Solar light fixture with pole; 8 FT High. Traditional style. Powder coated aluminum; Black. Lumens: 800LM - 2000LM; Color temperature: 2200K - 2700K.	7	Ea.		

BID SCHEDULE - DECEMBER 2023					
DECLARATION NO.			PW REF #	FIPS No.	CATEGORY
		VI			
	APPLICANT			DISTRICT	PW-ESTIMATED COST
	V.I. PUBLIC FINANCE AUTHORITY / ST THOMAS			St. Thomas	
	Drainage/Waste Management				
10	**Remove dirt and debris:** Clear out clogged swales to improve site drainage. Crew - two laborers; One day.	1	L.S.		
11	**Replace existing sewage lids:** Replace decaying sewage lids for sewage treatment system. 20 IN x 24 IN x 4 IN	2	Ea.		
	Landscaping				
12	**Site landscaping:** Hedge and prune shrubs, trim grass, disposal of vegetation debris and clippings, and installation of ground cover vegetation. Selection of the ground cover vegetation is recommended by landscape/nursery contractor and consultation from a landscape/nursery contractor is required.	1	L.S.		
	Misscellaneous				
13	**Paint/Refurbish existing signage poles:** Refurbish existing signage poles for future installation of wayfinding signage. Paints and protective coatings, alkyd primer, sprayed AND Paints and protective coatings, gloss topcoat, sprayed. 16 FT High Max., Qty: 2 poles.	2	EA.		
				TOTAL ESTIMATED REPAIR COST:	

Contractor: _____

PART 1 - GENERAL

1.1 SUMMARY

In the Ninety-Nine Steps Renovation in the St. Thomas district of the Virgin Islands, repairs are to be done to restore and enhance the appearance of the landmark site to reflect its history and to improve its functionality. The renovation includes the exterior restoration of the VIPFA buildings and site walls adjacent to the 99 Steps site.

Section includes administrative and procedural requirements for alternates.

1.2 DEFINITIONS

A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if the Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternates into the Work. No other adjustments are made to the Contract Sum.

1.3 PROCEDURES

A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.

1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.

B. Execute accepted alternates under the same conditions as other work of the Contract.

PART 2 - PRODUCTS (Not Used)

END OF SECTION 012300

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for substitutions.

1.2 DEFINITIONS

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

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.

1.3 ACTION SUBMITTALS

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

1. Documentation: Show compliance with requirements for substitutions and the following, as applicable:

a. Statement indicating why specified product or fabrication or installation method cannot be provided, if applicable.
b. Coordination of information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
c. Detailed comparison of significant qualities of proposed substitutions with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes, such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
e. Samples, where applicable or requested.
f. Certificates and qualification data, where applicable or requested.

g. List of similar installations for completed projects, with project names and addresses as well as names and addresses of architects and owners.
h. Material test reports from a qualified testing agency, indicating and interpreting test results for compliance with requirements indicated.
i. Research reports evidencing compliance with building code in effect for Project, from IBC 2018 and all of the applicable codes.
j. Detailed comparison of Contractor's construction schedule using proposed substitutions with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
k. Cost information, including a proposal of change, if any, in the Contract Sum.
l. Contractor's certification that proposed substitution complies with requirements in the Contract Documents, except as indicated in substitution request, is compatible with related materials and is appropriate for applications indicated.
m. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

2. Owner’s Construction Manager Action: If necessary, Owner’s Construction Manager will request additional information or documentation for evaluation within seven days of receipt of a request for substitution. Owner’s Construction Manager will notify Contractor of acceptance or rejection of proposed substitution within seven days of receipt of additional information or documentation, whichever is later.

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

1.4 QUALITY ASSURANCE

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

1.5 PROCEDURES

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

1.6 SUBSTITUTIONS

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

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

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

C. Substitutions for Convenience: Not allowed.
a. Requested substitution will not adversely affect Contractor's construction schedule.
b. Requested substitution has received necessary approvals of authorities having jurisdiction.
c. Requested substitution is compatible with other portions of the Work.
d. Requested substitution has been coordinated with other portions of the Work.
e. Requested substitution provides specified warranty.
f. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012500

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 MINOR CHANGES IN THE WORK

A. Owner's Construction Manager will issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on AIA Document G710.

1. Work Change Proposal Requests issued by Owner's Construction Manager are not instructions either to stop work in progress or to execute the proposed change.

1.3 PROPOSAL REQUESTS

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

1. Work Change Proposal Requests issued by Owner's Construction Manager are not instructions either to stop work in progress or to execute the proposed change.
2. Within time specified in Proposal Request or 20 days, when not otherwise specified, after receipt of Proposal Request, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.

a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
b. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
c. Include costs of labor and supervision directly attributable to the change.
d. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.

B. Contractor-Initiated Proposals: If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a request for a change to Owner's Construction Manager.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's construction schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Section 012500 "Substitution Procedures" if the proposed change requires substitution of one product or system for product or system specified.

1.4 CHANGE ORDER PROCEDURES

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

1.5 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Owner’s Construction Manager may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.6 WORK CHANGE DIRECTIVE

A. Work Change Directive: Owner’s Construction Manager may issue a Work Change Directive. Work Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Work Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Work Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012600

PART 1 - GENERAL

1.1 SUMMARY

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

1.2 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the schedule of values with preparation of Contractor's construction schedule.

1. Coordinate line items in the schedule of values with items required to be indicated as separate activities in Contractor's construction schedule.
2. Submit the schedule of values to Owner's Construction Manager at earliest possible date, but no later than seven days before the date scheduled for submittal of initial Applications for Payment.

B. Format and Content: Use Project Manual table of contents as a guide to establish line items for the schedule of values. Provide at least one line item for each Specification Section.

1. Arrange schedule of values consistent with format of AIA Document G703.
2. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Provide multiple line items for principal subcontract amounts in excess of five percent of the Contract Sum.
3. Provide a separate line item in the schedule of values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

    a. Differentiate between items stored on-site and items stored off-site.
4. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
5. Overhead Costs: Show cost of temporary facilities and other major cost items that are not direct cost of actual work-in-place as separate line items.
6. Closeout Costs. Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
7. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.3 APPLICATIONS FOR PAYMENT

A. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Owner's Construction Manager and paid for by Owner.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Times: Submit Application for Payment to Architect by the 25th of the month. The period covered by each Application for Payment is one month, ending on the last day of the month.

1. Submit draft copy of Application for Payment **five** days prior to due date for review by Owner's Construction Manager.

D. Application for Payment Forms: Use AIA Document G702 and AIA Document G703 as form for Applications for Payment.

E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Owner's Construction Manager will return incomplete applications without action.

1. Entries shall match data on the schedule of values and Contractor's construction schedule. Use updated schedules if revisions were made.
2. Include amounts for work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
3. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

F. Transmittal: Submit three signed and notarized original copies of each Application for Payment to Owner's Construction Manager by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Waivers of Mechanic's Lien: With each Application for Payment, submit waivers of mechanic's lien from subcontractors, sub-subcontractors, and suppliers for construction period covered by the previous application.

1. Submit partial waivers on each item for amount requested in previous application, after deduction for retainage, on each item.
2. When an application shows completion of an item, submit conditional final or full waivers.

3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or preceded by conditional final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
5. Waiver Forms: Submit executed waivers of lien on forms acceptable to Owner.

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

1. List of subcontractors.
2. Schedule of values.
3. Contractor's construction schedule (preliminary if not final).
4. Products list (preliminary if not final).
5. Schedule of unit prices.
6. Submittal schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Report of preconstruction conference.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds.
15. Data needed to acquire Owner's insurance.

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

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificate(s) of Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: After completing Project closeout requirements, submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706.
5. AIA Document G706A.
6. AIA Document G707.
7. Evidence that claims have been settled.

8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final liquidated damages settlement statement.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 012900

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:

1. General coordination procedures.
2. Coordination drawings.
3. RFIs.
4. Digital project management procedures.
5. Project meetings.

B. Related Requirements:

1. Section 017300 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.2 INFORMATIONAL SUBMITTALS

A. Subcontract List: Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, telephone number, and email address of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.

1.3 GENERAL COORDINATION PROCEDURES

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

1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
3. Make adequate provisions to accommodate items scheduled for later installation.

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

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

1.4 COORDINATION DRAWINGS

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.

1. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:

a. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
b. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.

1.5 REQUEST FOR INFORMATION (RFI)

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

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

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

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

C. RFI Forms: AIA Document G716 Form.

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

1. The following Contractor-generated RFIs will be returned without action:

    a. Requests for approval of submittals.
    b. Requests for approval of substitutions.
    c. Requests for approval of Contractor's means and methods.
    d. Requests for coordination information already indicated in the Contract Documents.
    e. Requests for adjustments in the Contract Time or the Contract Sum.
    f. Requests for interpretation of Architect's actions on submittals.
    g. Incomplete RFIs or inaccurately prepared RFIs.

2. Owner's Construction Manager action on RFIs that may result in a change to the Contract Time or the Contract Sum may be eligible for Contractor to submit Change Proposal according to Section 012600 "Contract Modification Procedures".

    a. If Contractor believes the RFI response warrants change in the Contract Time or the Contract Sum, notify Owner's Construction Manager in writing within five days of receipt of the RFI response.

E. On receipt of Owner's Construction Manager's action, update the RFI log and immediately distribute the RFI response to affected parties. Review response and notify Owner's Construction Manager within seven days if Contractor disagrees with response.

1.6 DIGITAL PROJECT MANAGEMENT PROCEDURES

A. PDF Document Preparation: Where PDFs are required to be submitted to Architect, prepare as follows:

1. Assemble complete submittal package into a single indexed file incorporating submittal requirements of a single Specification Section and transmittal form with links enabling navigation to each item.
2. Name file with submittal number or other unique identifier, including revision identifier.
3. Certifications: Where digitally submitted certificates and certifications are required, provide a digital signature with digital certificate on where indicated.

1.7 PROJECT MEETINGS

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

B. Preconstruction Conference: Owner's Construction Manager will schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner and Owner's Construction Manager but no later than 15 days after execution of the Agreement.

1. Attendees: Authorized representatives of Owner and Owner's Construction Manager. Contractor and its superintendent; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
2. Agenda: Discuss items of significance that could affect progress, including the following:

a. Responsibilities and personnel assignments.
b. Tentative construction schedule.
c. Phasing.
d. Critical work sequencing and long lead items.
e. Designation of key personnel and their duties.
f. Lines of communications.
g. Procedures for processing field decisions and Change Orders.
h. Procedures for RFIs.
i. Procedures for testing and inspecting.
j. Procedures for processing Applications for Payment.
k. Distribution of the Contract Documents.
l. Submittal procedures.
m. Sustainable design requirements.
n. Preparation of Record Documents.
o. Use of the premises.

p. Work restrictions.
q. Working hours.
r. Owner's occupancy requirements.
s. Responsibility for temporary facilities and controls.
t. Procedures for moisture and mold control.
u. Procedures for disruptions and shutdowns.
v. Construction waste management and recycling.
w. Parking availability.
x. Office, work, and storage areas.
y. Equipment deliveries and priorities.
z. First aid.
aa. Security.
bb. Progress cleaning.

3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes.

C. Preinstallation Conferences: Conduct a preinstallation conference at Project site before each construction activity when required by other sections and when required for coordination with other construction.

1. Attendees: Installer and representatives of manufacturers and fabricators involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Owner’s Construction Manager of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:

a. Contract Documents.
b. Options.
c. Related RFIs.
d. Related Change Orders.
e. Purchases.
f. Deliveries.
g. Submittals.
h. Possible conflicts.
i. Compatibility requirements.
j. Time schedules.
k. Weather limitations.
l. Manufacturer's written instructions.
m. Warranty requirements.
n. Compatibility of materials.
o. Acceptability of substrates.
p. Temporary facilities and controls.
q. Space and access limitations.
r. Regulations of authorities having jurisdiction.
s. Testing and inspecting requirements.
t. Installation procedures.

u. Coordination with other work.
v. Required performance results.
w. Protection of adjacent work.
x. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements, including required corrective measures and actions.
4. Reporting: Distribute minutes of the meeting to each party present and to other parties requiring information.
5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

D. Progress Meetings: Owner's Construction Manager will conduct progress meetings at biweekly intervals.

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

a. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's construction schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.

1) Review schedule for next period.

b. Review present and future needs of each entity present, including the following:

1) Interface requirements.
2) Sequence of operations.
3) Status of submittals.
4) Deliveries.
5) Off-site fabrication.
6) Access.
7) Site use.
8) Temporary facilities and controls.
9) Progress cleaning.
10) Quality and work standards.
11) Status of correction of deficient items.

12) Field observations.
13) Status of RFIs.
14) Status of Proposal Requests.
15) Pending changes.
16) Status of Change Orders.
17) Pending claims and disputes.
18) Documentation of information for payment requests.

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

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013100

PART 1 - GENERAL

1.1 SUMMARY

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

1. Contractor's Construction Schedule.
2. Construction schedule updating reports.
3. Daily construction reports.
4. Site condition reports.

1.2 DEFINITIONS

A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction Project. Activities included in a construction schedule consume time and resources.

1. Critical Activity: An activity on the critical path that must start and finish on the planned early start and finish times.
2. Predecessor Activity: An activity that precedes another activity in the network.
3. Successor Activity: An activity that follows another activity in the network.

B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.

C. Critical Path: The longest connected chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.

D. Event: The starting or ending point of an activity.

E. Float: The measure of leeway in starting and completing an activity.

1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the successor activity.
3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.

1.3 INFORMATIONAL SUBMITTALS

A. Contractor's Construction Schedule: Initial schedule, of size required to display entire schedule for entire construction period.

B. CPM Reports: Concurrent with CPM schedule, submit each of the following reports. Format for each activity in reports shall contain activity number, activity description, original duration, remaining duration, early start date, early finish date, late start date, late finish date, and total float in calendar days.

1. Activity Report: List of activities sorted by activity number and then early start date, or actual start date if known.
2. Logic Report: List of preceding and succeeding activities for each activity, sorted in ascending order by activity number and then by early start date, or actual start date if known.
3. Total Float Report: List of activities sorted in ascending order of total float.

C. Construction Schedule Updating Reports: Submit with Applications for Payment.

D. Daily Construction Reports: Submit at bi-weekly intervals.

E. Site Condition Reports: Submit at time of discovery of differing conditions.

1.4 COORDINATION

A. Coordinate Contractor's Construction Schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.

1. Secure time commitments for performing critical elements of the Work from entities involved.
2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

1.5 CONTRACTOR'S CONSTRUCTION SCHEDULE

A. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules.

B. Time Frame: Extend schedule from date established for the Notice of Award to date of final completion.

1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.

C. Activities: Treat each separate area as a separate numbered activity for each main element of the Work. Comply with the following:

1. Activity Duration: Define activities so no activity is longer than required by contractor and sub-contractors.
2. Procurement Activities: Include procurement process activities for the long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
3. Submittal Review Time: Include review and resubmittal times indicated in Section 013300 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with submittal schedule.
4. Startup and Testing Time: Include no fewer than 15 days for startup and testing (scoreboard and lights)
5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion, and allow time for Owner’s Construction Manager's administrative procedures necessary for certification of Substantial Completion.
6. Punch List and Final Completion: Include not more than 30 days for completion of punch list items and final completion.

D. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.

1. Phasing: Arrange list of activities on schedule by phase.
2. Work Restrictions: Show the effect of the following items on the schedule:

    a. Coordination with existing construction.
    b. Seasonal variations.

E. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, Substantial Completion, and final completion**.**

F. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:

1. Unresolved issues.
2. Unanswered Requests for Information.
3. Rejected or unreturned submittals.
4. Notations on returned submittals.
5. Pending modifications affecting the Work and the Contract Time.

G. Contractor's Construction Schedule Updating: At bi-weekly intervals, update schedule to reflect actual construction progress and activities. Issue schedule 3 days before each regularly scheduled progress meeting.

1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
3. As the Work progresses, indicate final completion percentage for each activity.

H. Recovery Schedule: When periodic update indicates the Work is 14 or more calendar days behind the current approved schedule, submit a separate recovery schedule indicating means by which Contractor intends to regain compliance with the schedule. Indicate changes to working hours, working days, crew sizes, equipment required to achieve compliance, and date by which recovery will be accomplished.

I. Distribution: Distribute copies of approved schedule to Owner's Construction Manager, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.

1. Post copies in Project meeting rooms and temporary field offices.
2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

1.6 GANTT-CHART SCHEDULE REQUIREMENTS

A. Gantt-Chart Schedule: Submit a comprehensive, fully developed, horizontal, Gantt-chart-type, Contractor's Construction Schedule within **30** days of date established for **commencement of the Work**.

B. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.

1.7 REPORTS

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

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions, including presence of rain or snow.
7. Testing and inspection.
8. Accidents.

9. Meetings and significant decisions.
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial completions and occupancies.
19. Substantial Completions authorized.

B. Site Condition Reports: Immediately on discovery of a difference between site conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request for Information. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013200

SECTION 013233 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 SUMMARY

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

1. Preconstruction photographs.
2. Concealed Work photographs.
3. Periodic construction photographs.
4. Final completion construction photographs.

B. Related Requirements:
1. Section 024119 "Selective Demolition" for photographic documentation before selective demolition operations commence.
2. Section 311000 "Site Clearing" for photographic documentation before site clearing operations commence.

1.2 INFORMATIONAL SUBMITTALS

A. Digital Photographs: Submit image files within **three** days of taking photographs.

1. Submit photos **by uploading to web-based Project management software site**. Include copy of key plan indicating each photograph's location and direction.

2. Identification: Provide the following information with each image description:

a. Name of Project.
b. Name of Contractor.
c. Date photograph was taken.

1.3 FORMATS AND MEDIA

A. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.

B. Metadata: Record accurate date and time from camera.

1.4 CONSTRUCTION PHOTOGRAPHS

A. Preconstruction Photographs: Before commencement of the Work, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points.

1. Flag **construction limits** before taking construction photographs.
2. Take **20** photographs to show existing conditions adjacent to property before starting the Work.
3. Take **20** photographs of existing buildings either on or adjoining property to accurately record physical conditions at start of construction.
4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.

B. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:

1. Underground utilities.
2. Underslab services.
3. Piping.
4. Electrical conduit.
5. Waterproofing and weather-resistant barriers.

C. Periodic Construction Photographs: Take **20** photographs **monthly**. Select vantage points to show status of construction and progress since last photographs were taken.

D. Final Completion Construction Photographs: Take photographs after date of Substantial Completion for submission as Project Record Documents.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013233

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

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

1.2 DEFINITIONS

A. Action Submittals: Written and graphic information and physical samples that require Owner’s Construction Manager's responsive action. Action submittals are those submittals indicated in individual Specification Sections as "action submittals."

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

1.3 SUBMITTAL SCHEDULE

A. Submittal Schedule: Submit, as an action submittal, a list of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or revisions to submittals noted by Owner’s Construction Manager and additional time for handling and reviewing submittals required by those corrections.

1.4 SUBMITTAL FORMATS

A. Submittal Information: Include the following information in each submittal:

1. Project name.
2. Date.
3. Name of Construction Manager.
4. Name of Contractor.
5. Name of firm or entity that prepared submittal.
6. Names of subcontractor, manufacturer, and supplier.
7. Unique submittal number, including revision identifier. Include Specification Section number with sequential alphanumeric identifier; and alphanumeric suffix for resubmittals.
8. Category and type of submittal.

9. Submittal purpose and description.
10. Number and title of Specification Section, with paragraph number and generic name for each of multiple items.
11. Drawing number and detail references, as appropriate.
12. Indication of full or partial submittal.
13. Location(s) where product is to be installed, as appropriate.
14. Other necessary identification.
15. Remarks.
16. Signature of transmitter.

B. Options: Identify options requiring selection by Owner's Construction Manager.

C. Deviations and Additional Information: On each submittal, clearly indicate deviations from requirements in the Contract Documents, including minor variations and limitations; include relevant additional information and revisions, other than those requested by Owner's Construction Manager on previous submittals. Indicate by highlighting on each submittal or noting on attached separate sheet.

D. Electronic Submittals: Prepare submittals as PDF package, incorporating complete information into each PDF file. Name PDF file with submittal number.

1.5 SUBMITTAL PROCEDURES

A. Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.

1. Email: Prepare submittals as PDF package, and transmit to Architect by sending via email. Include PDF transmittal form. Include information in email subject line as requested by Architect.

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

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Submit all submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.

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

1. Initial Review: Allow 15 days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Owner's Construction Manager

will advise Contractor when a submittal being processed must be delayed for coordination.

2. Resubmittal Review: Allow 15 days for review of each resubmittal.

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

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

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

1.6 SUBMITTAL REQUIREMENTS

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

1. If information must be specially prepared for submittal because standard published data are unsuitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

    a. Manufacturer's catalog cuts.
    b. Manufacturer's product specifications.
    c. Standard color charts.
    d. Statement of compliance with specified referenced standards.
    e. Testing by recognized testing agency.
    f. Application of testing agency labels and seals.
    g. Notation of coordination requirements.
    h. Availability and delivery time information.

4. For equipment, include the following in addition to the above, as applicable:

    a. Wiring diagrams that show factory-installed wiring.
    b. Printed performance curves.
    c. Operational range diagrams.
    d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.

5. Submit Product Data before Shop Drawings, and before or concurrent with Samples.

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

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

a. Identification of products.
b. Schedules.
c. Compliance with specified standards.
d. Notation of coordination requirements.
e. Notation of dimensions established by field measurement.
f. Relationship and attachment to adjoining construction clearly indicated.
g. Seal and signature of professional engineer if specified.

2. Paper Sheet Size: Except for templates, patterns, and similar full-size Drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches, but no larger than 30 by 42 inches.

a. Two opaque (bond) copies of each submittal. Owner's Construction Manager, will return one copy.

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

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Permanently attach label on unexposed side of Samples that includes the following:

a. Project name and submittal number.
b. Generic description of Sample.
c. Product name and name of manufacturer.
d. Sample source.
e. Number and title of applicable Specification Section.
f. Specification paragraph number and generic name of each item.

3. Email Transmittal: Provide PDF transmittal. Include digital image file illustrating Sample characteristics, and identification information for record.
4. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

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

a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Owner's Construction Manager, will return submittal with options selected.

6. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit three sets of Samples. Owner's Construction Manager will retain two Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a project record Sample.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least sets of paired units that show approximate limits of variations.

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

E. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, contact information of architects and owners, and other information specified.

F. Design Data: Prepare and submit written and graphic information indicating compliance with indicated performance and design criteria in individual Specification Sections. Include list of assumptions and summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Number each page of submittal.

G. Certificates:

1. Certificates and Certifications Submittals: Submit a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity. Provide a notarized signature where indicated.
2. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
3. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
4. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.
5. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

6. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification and Procedure Qualification Record on AWS forms. Include names of firms and personnel certified.

H. Test and Research Reports:

1. Compatibility Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for substrate preparation and primers required.
2. Field Test Reports: Submit written reports indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
3. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
4. Preconstruction Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
5. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
6. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

    a. Name of evaluation organization.
    b. Date of evaluation.
    c. Time period when report is in effect.
    d. Product and manufacturers' names.
    e. Description of product.
    f. Test procedures and results.
    g. Limitations of use.

1.7 DELEGATED-DESIGN SERVICES

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

1. If criteria indicated are insufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Services Certification: In addition to Shop Drawings, Product Data, and other required submittals, submit digitally signed PDF file and three paper copies of certificate,

signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

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

1.8 CONTRACTOR'S REVIEW

A. Action Submittals and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Owner's Construction Manager.

B. Contractor's Approval: Indicate Contractor's approval for each submittal with a uniform approval stamp. Include name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

1. Owner's Construction Manager will not review submittals received from Contractor that do not have Contractor's review and approval.

1.9 OWNER'S CONSTRUCTION MANAGER'S REVIEW

A. Action Submittals: Owner's Construction Manager will review each submittal, indicate corrections or revisions required**,** and return it.

1. PDF Submittals: Owner's Construction Manager will indicate, via markup on each submittal, the appropriate action**,** as follows:

a. Insert description of each action indicated on Owner's Construction Manager's stamp.

B. Informational Submittals: Owner's Construction Manager will review each submittal and will not return it, or will return it if it does not comply with requirements. Owner's Construction Manager will forward each submittal to appropriate party.

C. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Owner's Construction Manager.

D. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.

E. Owner's Construction Manager will return without review submittals received from sources other than Contractor.

F. Submittals not required by the Contract Documents will be returned by Owner's Construction Manager without action.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 013300

PART 1 - GENERAL

1.1 SUMMARY

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

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

1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and quality-control procedures that facilitate compliance with the Contract Document requirements.
2. Requirements for Contractor to provide quality-assurance and quality-control services required by Owner and Owner’s Construction Manager, or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

A. Experienced: When used with an entity or individual, "experienced" unless otherwise further described means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.

B. Field Quality-Control Tests and Inspections: Tests and inspections that are performed on-site for installation of the Work and for completed Work.

C. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, assembly, and similar operations.

1. Use of trade-specific terminology in referring to a Work result does not require that certain construction activities specified apply exclusively to specific trade(s).

D. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria. Unless otherwise indicated, copies of reports of tests or inspections performed for other than the Project do not meet this definition.

E. Product Tests: Tests and inspections that are performed by a nationally recognized testing laboratory (NRTL) according to 29 CFR 1910.7, by a testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program (NVLAP), or by a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.

F. Source Quality-Control Tests and Inspections: Tests and inspections that are performed at the source; for example, plant, mill, factory, or shop.

G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall have the same meaning as testing agency.

H. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and substantiate that proposed construction will comply with requirements.

I. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that actual products incorporated into the Work and completed construction comply with requirements. Contractor's quality-control services do not include contract administration activities performed by Owner’s Construction Manager.

1.3 DELEGATED-DESIGN SERVICES

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

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Owner’s Construction Manager.

B. Delegated-Design Services Statement: Submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

1.4 CONFLICTING REQUIREMENTS

A. Conflicting Standards and Other Requirements: If compliance with two or more standards or requirements is specified and the standards or requirements establish different or conflicting requirements for minimum quantities or quality levels, inform the Owner’s Construction Manager regarding the conflict and obtain clarification prior to proceeding with the Work. Refer conflicting requirements that are different, but apparently equal, to Owner’s Construction Manager for clarification before proceeding.

B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Owner’s Construction Manager for a decision before proceeding.

1.5 INFORMATIONAL SUBMITTALS

A. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

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

1.6 REPORTS AND DOCUMENTS

A. Test and Inspection Reports: Prepare and submit certified written reports specified in other Sections. Include the following:

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

B. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:

1. Statement on condition of substrates and their acceptability for installation of product.
2. Statement that products at Project site comply with requirements.
3. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
4. Results of operational and other tests and a statement of whether observed performance complies with requirements.
5. Other required items indicated in individual Specification Sections.

C. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:

1. Statement that equipment complies with requirements.
2. Results of operational and other tests and a statement of whether observed performance complies with requirements.
3. Other required items indicated in individual Specification Sections.

1.7 QUALITY ASSURANCE

A. Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.

B. Manufacturer Qualifications: A firm experienced in manufacturing products or systems similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units. As applicable, procure products from manufacturers able to meet qualification requirements, warranty requirements, and technical or factory-authorized service representative requirements.

C. Fabricator Qualifications: A firm experienced in producing products similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

D. Installer Qualifications: A firm or individual experienced in installing, erecting, applying, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.

E. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or product that are similar in material, design, and extent to those indicated for this Project.

F. Specialists: Certain Specification Sections require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.

1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.

G. Testing and Inspecting Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspection indicated, as documented according to ASTM E329; and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.

H. Manufacturer's Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to observe and inspect installation of manufacturer's products that are similar in material, design, and extent to those indicated for this Project.

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

1. Contractor responsibilities include the following:

   a. Provide test specimens representative of proposed products and construction.
   b. Submit specimens in a timely manner with sufficient time for testing and analyzing results to prevent delaying the Work.

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

J. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities, whether specified or not, to verify and document that the Work complies with requirements.

1. Engage a qualified testing agency to perform quality-control services.

2. Notify testing agencies at least 48 hours in advance of time when Work that requires testing or inspection will be performed.
3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
4. Testing and inspection requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.

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

L. Testing Agency Responsibilities: Cooperate with Owner's Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.

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

M. Manufacturer's Field Services: Where indicated, engage a factory-authorized service representative to inspect field-assembled components and equipment installation, including service connections. Report results in writing as specified in Section 013300 "Submittal Procedures."

N. Manufacturer's Technical Services: Where indicated, engage a manufacturer's technical representative to observe and inspect the Work. Manufacturer's technical representative's services include participation in preinstallation conferences, examination of substrates and conditions, verification of materials, observation of Installer activities, inspection of completed portions of the Work, and submittal of written reports.

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

1. Access to the Work.
2. Incidental labor and facilities necessary to facilitate tests and inspections.
3. Adequate quantities of representative samples of materials that require testing and inspection. Assist agency in obtaining samples.
4. Facilities for storage and field curing of test samples.
5. Preliminary design mix proposed for use for material mixes that require control by testing agency.
6. Security and protection for samples and for testing and inspection equipment at Project site.

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

1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

A. Special Tests and Inspections: Owner will engage a qualified testing agency to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in the Statement of Special Inspections attached to this Section, and as follows:

1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviewing the completeness and adequacy of those procedures to perform the Work.
2. Notifying Owner’s Construction Manager, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
3. Submitting a certified written report of each test, inspection, and similar quality-control service to Owner’s Construction Manager, with copy to Contractor and to authorities having jurisdiction.
4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.

5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
6. Retesting and re-inspecting corrected Work.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION

3.1 TEST AND INSPECTION LOG

A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:

1. Date test or inspection was conducted.
2. Description of the Work tested or inspected.
3. Date test or inspection results were transmitted to Owner’s Construction Manager.
4. Identification of testing agency or special inspector conducting test or inspection.

B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Owner’s Construction Manager's and authorities' having jurisdiction reference during normal working hours.

1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

A. General: On completion of testing, inspection, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 017300 "Execution."

B. Protect construction exposed by or for quality-control service activities.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION 014000

PART 1 - GENERAL

1.1 DEFINITIONS

A. General: Basic Contract definitions are included in the Conditions of the Contract.

B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.

C. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."

D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."

E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.

H. "Provide": Furnish and install, complete and ready for the intended use.

I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.

C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

1.3 ABBREVIATIONS AND ACRONYMS

A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."

B. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Abbreviations and acronyms not included in this list shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States." The information in this list is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. AABC - Associated Air Balance Council; www.aabc.com.
2. AAMA - American Architectural Manufacturers Association; www.aamanet.org.
3. AAPFCO - Association of American Plant Food Control Officials; www.aapfco.org.
4. AASHTO - American Association of State Highway and Transportation Officials; www.transportation.org.
5. AATCC - American Association of Textile Chemists and Colorists; www.aatcc.org.
6. ABMA - American Bearing Manufacturers Association; www.americanbearings.org.
7. ABMA - American Boiler Manufacturers Association; www.abma.com.
8. ACI - American Concrete Institute; (Formerly: ACI International); www.concrete.org.
9. ACPA - American Concrete Pipe Association; www.concrete-pipe.org.
10. AEIC - Association of Edison Illuminating Companies, Inc. (The); www.aeic.org.
11. AF&PA - American Forest & Paper Association; www.afandpa.org.
12. AGA - American Gas Association; www.aga.org.
13. AHAM - Association of Home Appliance Manufacturers; www.aham.org.
14. AHRI - Air-Conditioning, Heating, and Refrigeration Institute (The); www.ahrinet.org.
15. AI - Asphalt Institute; www.asphaltinstitute.org.
16. AIA - American Institute of Architects (The); www.aia.org.
17. AISC - American Institute of Steel Construction; www.aisc.org.
18. AISI - American Iron and Steel Institute; www.steel.org.
19. AITC - American Institute of Timber Construction; www.aitc-glulam.org.
20. AMCA - Air Movement and Control Association International, Inc.; www.amca.org.
21. ANSI - American National Standards Institute; www.ansi.org.
22. AOSA - Association of Official Seed Analysts, Inc.; www.aosaseed.com.
23. APA - APA - The Engineered Wood Association; www.apawood.org.
24. APA - Architectural Precast Association; www.archprecast.org.

25. API - American Petroleum Institute; www.api.org.
26. ARI - Air-Conditioning & Refrigeration Institute; (See AHRI).
27. ARI - American Refrigeration Institute; (See AHRI).
28. ARMA - Asphalt Roofing Manufacturers Association; www.asphaltroofing.org.
29. ASCE - American Society of Civil Engineers; www.asce.org.
30. ASCE/SEI - American Society of Civil Engineers/Structural Engineering Institute; (See ASCE).
31. ASHRAE - American Society of Heating, Refrigerating and Air-Conditioning Engineers; www.ashrae.org.
32. ASME - ASME International; (American Society of Mechanical Engineers); www.asme.org.
33. ASSE - American Society of Safety Engineers (The); www.asse.org.
34. ASSE - American Society of Sanitary Engineering; www.asse-plumbing.org.
35. ASTM - ASTM International; www.astm.org.
36. ATIS - Alliance for Telecommunications Industry Solutions; www.atis.org.
37. AWEA - American Wind Energy Association; www.awea.org.
38. AWI - Architectural Woodwork Institute; www.awinet.org.
39. AWMAC - Architectural Woodwork Manufacturers Association of Canada; www.awmac.com.
40. AWPA - American Wood Protection Association; www.awpa.com.
41. AWS - American Welding Society; www.aws.org.
42. AWWA - American Water Works Association; www.awwa.org.
43. BHMA - Builders Hardware Manufacturers Association; www.buildershardware.com.
44. BIA - Brick Industry Association (The); www.gobrick.com.
45. BICSI - BICSI, Inc.; www.bicsi.org.
46. BIFMA - BIFMA International; (Business and Institutional Furniture Manufacturer's Association); www.bifma.org.
47. BISSC - Baking Industry Sanitation Standards Committee; www.bissc.org.
48. BWF - Badminton World Federation; (Formerly: International Badminton Federation); www.bissc.org.
49. CDA - Copper Development Association; www.copper.org.
50. CE - Conformite Europeenne; http://ec.europa.eu/growth/single-market/ce-marking/.
51. CEA - Canadian Electricity Association; www.electricity.ca.
52. CEA - Consumer Electronics Association; www.ce.org.
53. CFFA - Chemical Fabrics and Film Association, Inc.; www.chemicalfabricsandfilm.com.
54. CFSEI - Cold-Formed Steel Engineers Institute; www.cfsei.org.
55. CGA - Compressed Gas Association; www.cganet.com.
56. CIMA - Cellulose Insulation Manufacturers Association; www.cellulose.org.
57. CISCA - Ceilings & Interior Systems Construction Association; www.cisca.org.
58. CISPI - Cast Iron Soil Pipe Institute; www.cispi.org.
59. CLFMI - Chain Link Fence Manufacturers Institute; www.chainlinkinfo.org.
60. CPA - Composite Panel Association; www.pbmdf.com.
61. CRI - Carpet and Rug Institute (The); www.carpet-rug.org.
62. CRRC - Cool Roof Rating Council; www.coolroofs.org.
63. CRSI - Concrete Reinforcing Steel Institute; www.crsi.org.
64. CSA - CSA Group; www.csagroup.com.
65. CSA - CSA International; www.csa-international.org.
66. CSI - Construction Specifications Institute (The); www.csinet.org.

67. CSSB - Cedar Shake & Shingle Bureau; www.cedarbureau.org.
68. CTI - Cooling Technology Institute; (Formerly: Cooling Tower Institute); www.cti.org.
69. CWC - Composite Wood Council; (See CPA).
70. DASMA - Door and Access Systems Manufacturers Association; www.dasma.com.
71. DHI - Door and Hardware Institute; www.dhi.org.
72. ECA - Electronic Components Association; (See ECIA).
73. ECAMA - Electronic Components Assemblies & Materials Association; (See ECIA).
74. ECIA - Electronic Components Industry Association; www.eciaonline.org.
75. EIA - Electronic Industries Alliance; (See TIA).
76. EIMA - EIFS Industry Members Association; www.eima.com.
77. EJMA - Expansion Joint Manufacturers Association, Inc.; www.ejma.org.
78. ESD - ESD Association; (Electrostatic Discharge Association); www.esda.org.
79. ESTA - Entertainment Services and Technology Association; (See PLASA).
80. ETL - Intertek (See Intertek); www.intertek.com.
81. EVO - Efficiency Valuation Organization; www.evo-world.org.
82. FCI - Fluid Controls Institute; www.fluidcontrolsinstitute.org.
83. FIBA - Federation Internationale de Basketball; (The International Basketball Federation); www.fiba.com.
84. FIVB - Federation Internationale de Volleyball; (The International Volleyball Federation); www.fivb.org.
85. FM Approvals - FM Approvals LLC; www.fmglobal.com.
86. FM Global - FM Global; (Formerly: FMG - FM Global); www.fmglobal.com.
87. FRSA - Florida Roofing, Sheet Metal & Air Conditioning Contractors Association, Inc.; www.floridaroof.com.
88. FSA - Fluid Sealing Association; www.fluidsealing.com.
89. FSC - Forest Stewardship Council U.S.; www.fscus.org.
90. GA - Gypsum Association; www.gypsum.org.
91. GANA - Glass Association of North America; www.glasswebsite.com.
92. GS - Green Seal; www.greenseal.org.
93. HI - Hydraulic Institute; www.pumps.org.
94. HI/GAMA - Hydronics Institute/Gas Appliance Manufacturers Association; (See AHRI).
95. HMMA - Hollow Metal Manufacturers Association; (See NAAMM).
96. HPVA - Hardwood Plywood & Veneer Association; www.hpva.org.
97. HPW - H. P. White Laboratory, Inc.; www.hpwhite.com.
98. IAPSC - International Association of Professional Security Consultants; www.iapsc.org.
99. IAS - International Accreditation Service; www.iasonline.org.
100. ICBO - International Conference of Building Officials; (See ICC).
101. ICC - International Code Council; www.iccsafe.org.
102. ICEA - Insulated Cable Engineers Association, Inc.; www.icea.net.
103. ICPA - International Cast Polymer Alliance; www.icpa-hq.org.
104. ICRI - International Concrete Repair Institute, Inc.; www.icri.org.
105. IEC - International Electrotechnical Commission; www.iec.ch.
106. IEEE - Institute of Electrical and Electronics Engineers, Inc. (The); www.ieee.org.
107. IES - Illuminating Engineering Society; (Formerly: Illuminating Engineering Society of North America); www.ies.org.
108. IESNA - Illuminating Engineering Society of North America; (See IES).
109. IEST - Institute of Environmental Sciences and Technology; www.iest.org.
110. IGMA - Insulating Glass Manufacturers Alliance; www.igmaonline.org.

111. IGSHPA - International Ground Source Heat Pump Association; www.igshpa.okstate.edu.
112. ILI - Indiana Limestone Institute of America, Inc.; www.iliai.com.
113. Intertek - Intertek Group; (Formerly: ETL SEMCO; Intertek Testing Service NA); www.intertek.com.
114. ISA - International Society of Automation (The); (Formerly: Instrumentation, Systems, and Automation Society); www.isa.org.
115. ISAS - Instrumentation, Systems, and Automation Society (The); (See ISA).
116. ISFA - International Surface Fabricators Association; (Formerly: International Solid Surface Fabricators Association); www.isfanow.org.
117. ISO - International Organization for Standardization; www.iso.org.
118. ISSFA - International Solid Surface Fabricators Association; (See ISFA).
119. ITU - International Telecommunication Union; www.itu.int/home.
120. KCMA - Kitchen Cabinet Manufacturers Association; www.kcma.org.
121. LMA - Laminating Materials Association; (See CPA).
122. LPI - Lightning Protection Institute; www.lightning.org.
123. MBMA - Metal Building Manufacturers Association; www.mbma.com.
124. MCA - Metal Construction Association; www.metalconstruction.org.
125. MFMA - Maple Flooring Manufacturers Association, Inc.; www.maplefloor.org.
126. MFMA - Metal Framing Manufacturers Association, Inc.; www.metalframingmfg.org.
127. MHIA - Material Handling Industry of America; www.mhia.org.
128. MIA - Marble Institute of America; www.marble-institute.com.
129. MMPA - Moulding & Millwork Producers Association; www.wmmpa.com.
130. MPI - Master Painters Institute; www.paintinfo.com.
131. MSS - Manufacturers Standardization Society of The Valve and Fittings Industry Inc.; www.mss-hq.org.
132. NAAMM - National Association of Architectural Metal Manufacturers; www.naamm.org.
133. NACE - NACE International; (National Association of Corrosion Engineers International); www.nace.org.
134. NADCA - National Air Duct Cleaners Association; www.nadca.com.
135. NAIMA - North American Insulation Manufacturers Association; www.naima.org.
136. NBGQA - National Building Granite Quarries Association, Inc.; www.nbgqa.com.
137. NBI - New Buildings Institute; www.newbuildings.org.
138. NCAA - National Collegiate Athletic Association (The); www.ncaa.org.
139. NCMA - National Concrete Masonry Association; www.ncma.org.
140. NEBB - National Environmental Balancing Bureau; www.nebb.org.
141. NECA - National Electrical Contractors Association; www.necanet.org.
142. NeLMA - Northeastern Lumber Manufacturers Association; www.nelma.org.
143. NEMA - National Electrical Manufacturers Association; www.nema.org.
144. NETA - InterNational Electrical Testing Association; www.netaworld.org.
145. NFHS - National Federation of State High School Associations; www.nfhs.org.
146. NFPA - National Fire Protection Association; www.nfpa.org.
147. NFPA - NFPA International; (See NFPA).
148. NFRC - National Fenestration Rating Council; www.nfrc.org.
149. NHLA - National Hardwood Lumber Association; www.nhla.com.
150. NLGA - National Lumber Grades Authority; www.nlga.org.
151. NOFMA - National Oak Flooring Manufacturers Association; (See NWFA).

152. NOMMA - National Ornamental & Miscellaneous Metals Association; www.nomma.org.
153. NRCA - National Roofing Contractors Association; www.nrca.net.
154. NRMCA - National Ready Mixed Concrete Association; www.nrmca.org.
155. NSF - NSF International; www.nsf.org.
156. NSPE - National Society of Professional Engineers; www.nspe.org.
157. NSSGA - National Stone, Sand & Gravel Association; www.nssga.org.
158. NTMA - National Terrazzo & Mosaic Association, Inc. (The); www.ntma.com.
159. NWFA - National Wood Flooring Association; www.nwfa.org.
160. PCI - Precast/Prestressed Concrete Institute; www.pci.org.
161. PDI - Plumbing & Drainage Institute; www.pdionline.org.
162. PLASA - PLASA; (Formerly: ESTA - Entertainment Services and Technology Association); www.plasa.org.
163. RCSC - Research Council on Structural Connections; www.boltcouncil.org.
164. RFCI - Resilient Floor Covering Institute; www.rfci.com.
165. RIS - Redwood Inspection Service; www.redwoodinspection.com.
166. SAE - SAE International; www.sae.org.
167. SCTE - Society of Cable Telecommunications Engineers; www.scte.org.
168. SDI - Steel Deck Institute; www.sdi.org.
169. SDI - Steel Door Institute; www.steeldoor.org.
170. SEFA - Scientific Equipment and Furniture Association (The); www.sefalabs.com.
171. SEI/ASCE - Structural Engineering Institute/American Society of Civil Engineers; (See ASCE).
172. SIA - Security Industry Association; www.siaonline.org.
173. SJI - Steel Joist Institute; www.steeljoist.org.
174. SMA - Screen Manufacturers Association; www.smainfo.org.
175. SMACNA - Sheet Metal and Air Conditioning Contractors' National Association; www.smacna.org.
176. SMPTE - Society of Motion Picture and Television Engineers; www.smpte.org.
177. SPFA - Spray Polyurethane Foam Alliance; www.sprayfoam.org.
178. SPIB - Southern Pine Inspection Bureau; www.spib.org.
179. SPRI - Single Ply Roofing Industry; www.spri.org.
180. SRCC - Solar Rating & Certification Corporation; www.solar-rating.org.
181. SSINA - Specialty Steel Industry of North America; www.ssina.com.
182. SSPC - SSPC: The Society for Protective Coatings; www.sspc.org.
183. STI - Steel Tank Institute; www.steeltank.com.
184. SWI - Steel Window Institute; www.steelwindows.com.
185. SWPA - Submersible Wastewater Pump Association; www.swpa.org.
186. TCA - Tilt-Up Concrete Association; www.tilt-up.org.
187. TCNA - Tile Council of North America, Inc.; www.tileusa.com.
188. TEMA - Tubular Exchanger Manufacturers Association, Inc.; www.tema.org.
189. TIA - Telecommunications Industry Association (The); (Formerly: TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance); www.tiaonline.org.
190. TIA/EIA - Telecommunications Industry Association/Electronic Industries Alliance; (See TIA).
191. TMS - The Masonry Society; www.masonrysociety.org.
192. TPI - Truss Plate Institute; www.tpinst.org.
193. TPI - Turfgrass Producers International; www.turfgrasssod.org.

194. TRI - Tile Roofing Institute; www.tileroofing.org.
195. UL - Underwriters Laboratories Inc.; www.ul.com.
196. UNI - Uni-Bell PVC Pipe Association; www.uni-bell.org.
197. USAV - USA Volleyball; www.usavolleyball.org.
198. USGBC - U.S. Green Building Council; www.usgbc.org.
199. USITT - United States Institute for Theatre Technology, Inc.; www.usitt.org.
200. WA - Wallcoverings Association; www.wallcoverings.org.
201. WASTEC - Waste Equipment Technology Association; www.wastec.org.
202. WCLIB - West Coast Lumber Inspection Bureau; www.wclib.org.
203. WCMA - Window Covering Manufacturers Association; www.wcmanet.org.
204. WDMA - Window & Door Manufacturers Association; www.wdma.com.
205. WI - Woodwork Institute; www.wicnet.org.
206. WSRCA - Western States Roofing Contractors Association; www.wsrca.com.
207. WWPA - Western Wood Products Association; www.wwpa.org.

C. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is believed to be accurate as of the date of the Contract Documents.

1. DIN - Deutsches Institut fur Normung e.V.; www.din.de.
2. IAPMO - International Association of Plumbing and Mechanical Officials; www.iapmo.org.
3. ICC - International Code Council; www.iccsafe.org.
4. ICC-ES - ICC Evaluation Service, LLC; www.icc-es.org.

D. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Information is subject to change and is up to date as of the date of the Contract Documents.

1. COE - Army Corps of Engineers; www.usace.army.mil.
2. CPSC - Consumer Product Safety Commission; www.cpsc.gov.
3. DOC - Department of Commerce; National Institute of Standards and Technology; www.nist.gov.
4. DOD - Department of Defense; www.quicksearch.dla.mil.
5. DOE - Department of Energy; www.energy.gov.
6. EPA - Environmental Protection Agency; www.epa.gov.
7. FAA - Federal Aviation Administration; www.faa.gov.
8. FG - Federal Government Publications; www.gpo.gov/fdsys.
9. GSA - General Services Administration; www.gsa.gov.
10. HUD - Department of Housing and Urban Development; www.hud.gov.
11. LBL - Lawrence Berkeley National Laboratory; Environmental Energy Technologies Division; www.eetd.lbl.gov.
12. OSHA - Occupational Safety & Health Administration; www.osha.gov.
13. SD - Department of State; www.state.gov.
14. TRB - Transportation Research Board; National Cooperative Highway Research Program; The National Academies; www.trb.org.
15. USDA - Department of Agriculture; Agriculture Research Service; U.S. Salinity Laboratory; www.ars.usda.gov.

16. USDA - Department of Agriculture; Rural Utilities Service; www.usda.gov.
17. USDOJ - Department of Justice; Office of Justice Programs; National Institute of Justice; www.ojp.usdoj.gov.
18. USP - U.S. Pharmacopeial Convention; www.usp.org.
19. USPS - United States Postal Service; www.usps.com.

E. Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the standards and regulations in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CFR - Code of Federal Regulations; Available from Government Printing Office; www.gpo.gov/fdsys.
2. DOD - Department of Defense; Military Specifications and Standards; Available from DLA Document Services; www.quicksearch.dla.mil.
3. DSCC - Defense Supply Center Columbus; (See FS).
4. FED-STD - Federal Standard; (See FS).
5. FS - Federal Specification; Available from DLA Document Services; www.quicksearch.dla.mil.

    a. Available from Defense Standardization Program; www.dsp.dla.mil.
    b. Available from General Services Administration; www.gsa.gov.
    c. Available from National Institute of Building Sciences/Whole Building Design Guide; www.wbdg.org.

6. MILSPEC - Military Specification and Standards; (See DOD).
7. USAB - United States Access Board; www.access-board.gov.
8. USATBCB - U.S. Architectural & Transportation Barriers Compliance Board; (See USAB).

F. State Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. This information is subject to change and is believed to be accurate as of the date of the Contract Documents.

1. CBHF; State of California; Department of Consumer Affairs; Bureau of Electronic and Appliance Repair, Home Furnishings and Thermal Insulation; www.bearhfti.ca.gov.
2. CCR; California Code of Regulations; Office of Administrative Law; California Title 24 Energy Code; www.calregs.com.
3. CDHS; California Department of Health Services; (See CDPH).
4. CDPH; California Department of Public Health; Indoor Air Quality Program; www.cal-iaq.org.
5. CPUC; California Public Utilities Commission; www.cpuc.ca.gov.
6. SCAQMD; South Coast Air Quality Management District; www.aqmd.gov.
7. TFS; Texas A&M Forest Service; Sustainable Forestry and Economic Development; www.txforestservice.tamu.edu.

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 014200

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Requirements:

1. Section 011000 "Summary" for work restrictions and limitations on utility interruptions.

1.2 USE CHARGES

A. Installation, removal, and use charges for temporary facilities shall be included in the Contract Sum unless otherwise indicated. Allow other entities engaged in the Project to use temporary services and facilities without cost, including, but not limited to, testing agencies, and authorities having jurisdiction.

B. Water and Sewer Service from Existing System: Water from Owner's existing water system is available for use with metering. Provide connections and extensions of services and metering as required for construction operations.

C. Electric Power Service from Existing System: Electric power from Owner's existing system is available for use with metering. Provide connections and extensions of services and metering as required for construction operations.

1.3 INFORMATIONAL SUBMITTALS

A. Site Utilization Plan: Show temporary facilities, temporary utility lines and connections, staging areas, construction site entrances, vehicle circulation, and parking areas for construction personnel.

B. Project Identification and Temporary Signs: Show fabrication and installation details, including plans, elevations, details, layouts, typestyles, graphic elements, and message content.

C. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

D. Moisture and Mold-Protection Plan: Describe procedures and controls for protecting materials and construction from water absorption and damage and mold. Describe delivery, handling, storage, installation, and protection provisions for materials subject to water absorption or water damage.

1. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and requirements for replacing water-damaged Work.
2. Indicate sequencing of work that requires water, such as sprayed fire-resistive materials, plastering, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
3. Indicate methods to be used to avoid trapping water in finished work.

1.4 QUALITY ASSURANCE

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

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

C. Accessible Temporary Egress: Comply with applicable provisions in [the United States Access Board's ADA-ABA Accessibility Guidelines] [and] [ICC/ANSI A117.1].

1.5 PROJECT CONDITIONS

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

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

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

B. Common-Use Field Office: Of sufficient size to accommodate needs of Owner, Owner’s Construction Manager, and construction personnel office activities and to accommodate Project meetings specified in other Division 01 Sections. Keep office clean and orderly. Furnish and equip offices as follows:

1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with no less than one

receptacle on each wall. Furnish room with conference table, chairs, and 4-foot square tack and marker boards.
3. Drinking water and private toilet.
4. Cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg. F.
5. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.

2.2 EQUIPMENT

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

B. HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.

1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
2. Heating, Cooling, and Dehumidifying Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
3. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction, provide filter with MERV of 8 at each return-air grille in system and remove at end of construction and clean HVAC system as required in Section 017700 "Closeout Procedures."

C. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

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

1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

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

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

3.3 TEMPORARY UTILITY INSTALLATION

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

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

B. Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

1. Connect temporary sewers to municipal system or private system as directed by authorities having jurisdiction.

C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction.

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

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

1. Provide temporary dehumidification systems when required to reduce ambient and substrate moisture levels to level required to allow installation or application of finishes and their proper curing or drying.

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

1. Install electric power service overhead unless otherwise indicated.

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

1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

H. Telephone Service: Install WiFi cell phone access equipment and one land-based telephone line(s) for each field office.

I. Electronic Communication Service: Provide secure WiFi wireless connection to internet with provisions for access by Owner.

3.4 SUPPORT FACILITIES INSTALLATION

A. Comply with the following:

1. Provide construction for temporary field offices, shops, and sheds located within construction area or within 30 feet of building lines that is noncombustible according to ASTM E136. Comply with NFPA 241.
2. Maintain support facilities until Owner's Construction Manager schedules Substantial Completion inspection. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.

~~B.~~ Temporary Roads and Paved Areas: Construct and maintain temporary roads and paved areas adequate for construction operations.

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

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

1. Protect existing site improvements to remain including curbs, pavement, and utilities.
2. Maintain access for fire-fighting equipment and access to fire hydrants.

D. Parking: Use designated areas of Owner's existing parking areas for construction personnel.

E. Storage and Staging: Use designated areas of Project site for storage and staging needs.

F. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.

1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties or endanger permanent Work or temporary facilities.

G. Project Signs: Provide Project signs as indicated. Unauthorized signs are not permitted.

1. Identification Signs: Provide Project identification signs as indicated on Drawings.

2. Temporary Signs: Provide other signs as indicated and as required to inform public and individuals seeking entrance to Project.

    a. Provide temporary, directional signs for construction personnel and visitors.

3. Maintain and touch up signs so they are legible at all times.

H. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction.

I. Lifts and Hoists: Provide facilities necessary for hoisting materials and personnel.

1. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.

Temporary Elevator Use: Use of elevators is not permitted

J. Temporary Use of Permanent Stairs: Use of new stairs for construction traffic will be permitted, provided stairs are protected and finishes restored to new condition at time of Substantial Completion.

3.5 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Protection of Existing Facilities: Protect existing vegetation, equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.

1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.

B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction as required to comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.

C. Temporary Erosion and Sedimentation Control: Comply with requirements of EPA Construction General Permit or authorities having jurisdiction, whichever is more stringent and requirements specified in Section 311000 "Site Clearing."

1. Verify that flows of water redirected from construction areas or generated by construction activity do not enter or cross tree- or plant-protection zones.
2. Inspect, repair, and maintain erosion- and sedimentation-control measures during construction until permanent vegetation has been established.
3. Clean, repair, and restore adjoining properties and roads affected by erosion and sedimentation from Project site during the course of Project.
4. Remove erosion and sedimentation controls and restore and stabilize areas disturbed during removal.

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

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

F. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Substantial Completion. Perform control operations lawfully, using materials approved by authorities having jurisdiction.

G. Site Enclosure Fence: Before construction operations begin and Prior to commencing earthwork, furnish and install site enclosure fence in a manner that will prevent people from easily entering site except by entrance gates.

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

H. Security Enclosure and Lockup: Install temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.

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

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

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

1. Prohibit smoking in construction areas. Comply with additional limits on smoking specified in other Sections.
2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and -protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.
4. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.

3.6 MOISTURE AND MOLD CONTROL

A. Moisture and Mold Protection: Protect stored materials and installed Work in accordance with Moisture and Mold Protection Plan.

B. Exposed Construction Period: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:

1. Protect porous materials from water damage.
2. Protect stored and installed material from flowing or standing water.
3. Keep porous and organic materials from coming into prolonged contact with concrete.
4. Remove standing water from decks.
5. Keep deck openings covered or dammed.

C. Partially Enclosed Construction Period: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:

1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
2. Keep interior spaces reasonably clean and protected from water damage.
3. Periodically collect and remove waste containing cellulose or other organic matter.
4. Discard or replace water-damaged material.
5. Do not install material that is wet.
6. Discard and replace stored or installed material that begins to grow mold.
7. Perform work in a sequence that allows wet materials adequate time to dry before enclosing the material in gypsum board or other interior finishes.

D. Controlled Construction Period: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:

1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
2. Use temporary or permanent HVAC system to control humidity within ranges specified for installed and stored materials.
3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.

3.7 OPERATION, TERMINATION, AND REMOVAL

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

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

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

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

1. Materials and facilities that constitute temporary facilities are property of Contractor. Owner reserves right to take possession of Project identification signs.
2. At Substantial Completion, repair, renovate, and clean permanent facilities used during construction period. Comply with final cleaning requirements specified in Section 017700 "Closeout Procedures."

END OF SECTION 015000

PART 1 - GENERAL

1.1 SUMMARY

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

B. Related Requirements:

1. Section 012500 "Substitution Procedures" for requests for substitutions.

1.2 DEFINITIONS

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

1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature that is current as of date of the Contract Documents.
2. New Products: Items that have not previously been incorporated into another project or facility. Salvaged items or items reused from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
3. Comparable Product: Product by named manufacturer that is demonstrated and approved through the comparable product submittal process described in Part 2 "Comparable Products" Article, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.

B. Comparable Product Request Submittal: An action submittal requesting consideration of a comparable product, including the following information:

1. Identification of basis-of-design product or fabrication or installation method to be replaced, including Specification Section number and title and Drawing numbers and titles.
2. Data indicating compliance with the requirements specified in Part 2 "Comparable Products" Article.

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

1.3 QUALITY ASSURANCE

A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.

1.4 PRODUCT DELIVERY, STORAGE, AND HANDLING

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

1.5 PRODUCT WARRANTIES

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

1. Manufacturer's Warranty: Written standard warranty form furnished by individual manufacturer for a particular product and issued in the name of the Owner or endorsed by manufacturer to Owner.
2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner and issued in the name of the Owner or endorsed by manufacturer to Owner.

B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.

1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
2. Specified Form: When specified forms are included in the Project Manual, prepare a written document, using indicated form properly executed.
3. See other Sections for specific content requirements and particular requirements for submitting special warranties.

PART 2 - PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

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

1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
3. Owner reserves the right to limit selection to products with warranties meeting requirements of the Contract Documents.
4. Where products are accompanied by the term "as selected," Owner's Construction Manager will make selection.
5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.

B. Product Selection Procedures:

1. Sole Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole product may be indicated by the phrase "Subject to compliance with requirements, provide the following."

2. Sole Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.

    a. Sole manufacturer/source may be indicated by the phrase "Subject to compliance with requirements, provide products by the following."

3. Limited List of Products: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience **will not** be considered.

4. Non-Limited List of Products: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed or an unnamed product that complies with requirements.

    a. Non-limited list of products is indicated by the phrase "Subject to compliance with requirements, available products that may be incorporated in the Work include, but are not limited to, the following."
    b. Provision of an unnamed product is not considered a substitution, if the product complies with requirements.

5. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications may additionally indicate sizes, profiles, dimensions, and

other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.

a. For approval of products by unnamed manufacturers, comply with requirements in Section 012500 "Substitution Procedures" for substitutions for convenience.

C. Visual Matching Specification: Where Specifications require the phrase "match Architect's sample," provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.

1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 012500 "Substitution Procedures" for proposal of product.

D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or a similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

2.2 COMPARABLE PRODUCTS

A. Conditions for Consideration of Comparable Products: Owner's Construction Manager will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Owner's Construction Manager may return requests without action, except to record noncompliance with the following requirements:

1. Evidence that proposed product does not require revisions to the Contract Documents, is consistent with the Contract Documents, will produce the indicated results, and is compatible with other portions of the Work.
2. Detailed comparison of significant qualities of proposed product with those of the named basis-of-design product. Significant product qualities include attributes, such as type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other specific features and requirements.
3. Evidence that proposed product provides specified warranty.
4. List of similar installations for completed projects, with project names and addresses and names and addresses of architects and owners, if requested.
5. Samples, if requested.

B. Owner's Construction Manager Action on Comparable Products Submittal: If necessary, Owner's Construction Manager will request additional information or documentation for evaluation, as specified in Section 013300 "Submittal Procedures."

1. Form of Approval of Submittal: As specified in Section 013300 "Submittal Procedures."

PART 3 - EXECUTION (Not Used)

END OF SECTION 016000

PART 1 - GENERAL

1.1 SUMMARY

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

1. Construction layout.
2. Field engineering and surveying.
3. Installation of the Work.
4. Cutting and patching.
5. Progress cleaning.
6. Starting and adjusting.
7. Protection of installed construction.

B. Related Requirements:

1. Section 011000 "Summary" for coordination and limits on use of Project site.
2. Section 017700 "Closeout Procedures" for submitting final property survey with Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, replacing defective work, and final cleaning.
3. Section 024119 "Selective Demolition" for demolition and removal of selected portions of the building.

1.2 DEFINITIONS

A. Cutting: Removal of in-place construction necessary to permit installation or performance of subsequent work.

B. Patching: Fitting and repair work required to restore construction to original conditions after installation of subsequent work.

1.3 CLOSEOUT SUBMITTALS

A. Final Property Survey: Submit 3 copies showing the Work performed and record survey data.

1.4 QUALITY ASSURANCE

A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.

1. Structural Elements: When cutting and patching structural elements, or when encountering the need for cutting and patching of elements whose structural function is not known, notify Owner's Construction Manager of locations and details of cutting and await directions from Owner's Construction Manager before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection.
2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety.
4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Owner's Construction Manager Opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.

B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of specified products and equipment.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Comply with requirements specified in other Sections.

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

1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Owner's Construction Manager for the visual and functional performance of in-place materials. Use materials that are not considered hazardous.

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

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 EXAMINATION

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

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, gas service piping, and water-service piping; underground electrical services; and other utilities.
2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

B. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.

C. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

1. Description of the Work, including Specification Section number and paragraph, and Drawing sheet number and detail, where applicable.
2. List of detrimental conditions, including substrates.
3. List of unacceptable installation tolerances.
4. Recommended corrections.

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

3.2 PREPARATION

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

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

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

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Owner's Construction Manager in accordance with requirements in Section 013100 "Project Management and Coordination."

3.3 CONSTRUCTION LAYOUT

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

B. Engage a land surveyor experienced in laying out the Work, using the following accepted surveying practices:

1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
2. Establish limits on use of Project site.
3. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required dimensions.
4. Inform installers of lines and levels to which they must comply.
5. Check the location, level and plumb, of every major element as the Work progresses.
6. Notify Owner's Construction Manager when deviations from required lines and levels exceed allowable tolerances.
7. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.

C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and rim and invert elevations.

D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.

E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and

duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Owner's Construction Manager.

3.4 FIELD ENGINEERING

A. Identification: Owner will identify existing benchmarks, control points, and property corners.

B. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.

1. Do not change or relocate existing benchmarks or control points without prior written approval of Owner's Construction Manager. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Owner's Construction Manager before proceeding.
2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.

C. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.

1. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.

3.5 INSTALLATION

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

1. Make vertical work plumb, and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas unless otherwise indicated.
4. Maintain minimum headroom clearance of 96 inches in occupied spaces and 90 inches in unoccupied spaces, unless otherwise indicated on Drawings.

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

C. Install products at the time and under conditions that will ensure satisfactory results as judged by Owner's Construction Manager. Maintain conditions required for product performance until Substantial Completion.

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

E. Sequence the Work and allow adequate clearances to accommodate movement of construction items on-site and placement in permanent locations.

F. Tools and Equipment: Select tools or equipment that minimize production of excessive noise levels.

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

H. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions with manufacturer.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Owner's Construction Manager.
2. Allow for building movement, including thermal expansion and contraction.
3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

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

J. Repair or remove and replace damaged, defective, or nonconforming Work.

1. Comply with Section 017700 "Closeout Procedures" for repairing or removing and replacing defective Work.

3.6 CUTTING AND PATCHING

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

1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

B. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during installation or cutting and patching operations, by methods and with materials so as not to void existing warranties.

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

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

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

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

1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill.
4. Excavating and Backfilling: Comply with requirements in applicable Sections where required by cutting and patching operations.
5. Proceed with patching after construction operations requiring cutting are complete.

G. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other Work. Patch with durable seams that are as invisible as practicable, as judged by Owner’s Construction Manager. Provide materials and comply with installation requirements specified in other Sections, where applicable.

1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.

    a. Clean piping, conduit, and similar features before applying paint or other finishing materials.
    b. Restore damaged pipe covering to its original condition.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.

    a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch, corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.

4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
5. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.

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

3.7 PROGRESS CLEANING

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

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

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

4. Coordinate progress cleaning for joint-use areas where Contractor and other contractors are working concurrently.

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

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

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

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

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

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

G. Waste Disposal: Do not bury or burn waste materials on-site. Do not wash waste materials down sewers or into waterways. Comply with waste disposal requirements in **Section 015000 "Temporary Facilities and Controls."** And **Section 017419 "Construction Waste Management and Disposal."**]

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

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

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

3.8 STARTING AND ADJUSTING

A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 019113 "General Commissioning Requirements."

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

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

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

E. Manufacturer's Field Service: Comply with qualification requirements in Section 014000 "Quality Requirements."

3.9 PROTECTION AND REPAIR OF INSTALLED CONSTRUCTION

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

B. Repair Work previously completed and subsequently damaged during construction period. Repair to like-new condition.

C. Protection of Existing Items: Provide protection and ensure that existing items to remain undisturbed by construction are maintained in condition that existed at commencement of the Work.

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

END OF SECTION 017300

SECTION 017419 - CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes administrative and procedural requirements for the following:
   1. Disposing of nonhazardous demolition and construction waste.

B. Related Requirements:
   1. Section 311000 "Site Clearing" for disposition of waste resulting from site clearing and removal of above- and below-grade improvements.

1.2 DEFINITIONS

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

B. Demolition Waste: Building, structure, and site improvement materials resulting from demolition operations.

~~C.~~ Disposal: Removal of demolition or construction waste and subsequent salvage, sale, recycling, or deposit in landfill, ~~incinerator acceptable to authorities having jurisdiction, or designated spoil areas on Owner's property.~~

1.3 ACTION SUBMITTALS

A. Waste Management Plan: Submit plan within 7 days of date established for commencement of the Work.

1.4 INFORMATIONAL SUBMITTALS

A. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

1.5 QUALITY ASSURANCE

A. Waste Management Coordinator Qualifications: Experienced firm, or individual employed and assigned by General Contractor, with a record of successful waste management coordination of projects with similar requirements.

1.6 WASTE MANAGEMENT PLAN

A. General: Develop a waste management plan according to requirements in this Section. Plan shall consist of waste identification, waste reduction work plan, and cost/revenue analysis. Distinguish between demolition and construction waste. Indicate quantities by weight or volume, but use same units of measure throughout waste management plan.

B. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.

1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work.
2. Salvaged Materials for Sale: For materials that will be sold to individuals and organizations, include list of their names, addresses, and telephone numbers.
3. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
4. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
5. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
6. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

PART 2 - EXECUTION

2.1 PLAN IMPLEMENTATION

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

B. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
1. Comply with Section 015000 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

2.2 DISPOSAL OF WASTE

A. General: Except for items or materials to be salvaged or recycled, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.

1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.

B. General: Except for items or materials to be salvaged or recycled, remove waste materials and legally dispose of at designated spoil areas on Owner’s property.

C. Burning: Do not burn waste materials.

D. Burning: Burning of waste materials is permitted only at designated areas on Owner's property, provided required permits are obtained. Provide full-time monitoring for burning materials until fires are extinguished.

2.3 ATTACHMENTS

END OF SECTION 017419

SECTION 017700 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

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

1. Substantial Completion procedures.
2. Final completion procedures.
3. Warranties.
4. Final cleaning.

B. Related Requirements:

1. Section 017823 "Operation and Maintenance Data" for additional operation and maintenance manual requirements.
2. Section 017839 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
3. Section 017900 "Demonstration and Training" for requirements to train the Owner's maintenance personnel to adjust, operate, and maintain products, equipment, and systems.

1.2 ACTION SUBMITTALS

A. Contractor's List of Incomplete Items: Initial submittal at Substantial Completion.

B. Certified List of Incomplete Items: Final submittal at Final Completion.

1.3 CLOSEOUT SUBMITTALS

A. Certificates of Release: From authorities having jurisdiction.

B. Certificate of Insurance: For continuing coverage.

C. Field Report: For pest-control inspection.

1.4 SUBSTANTIAL COMPLETION PROCEDURES

A. Contractor's List of Incomplete Items: Prepare and submit a list of items to be completed and corrected (Contractor's "punch list"), indicating the value of each item on the list and reasons why the Work is incomplete.

B. Submittals Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Certificates of Release: Obtain and submit releases from authorities having jurisdiction, permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
2. Submit closeout submittals specified in other Division 01 Sections, including Project Record Documents, operation and maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.
3. Submit closeout submittals specified in individual Sections, including specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
4. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Construction Manager. Label with manufacturer's name and model number.
5. Submit testing, adjusting, and balancing records.
6. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.

C. Procedures Prior to Substantial Completion: Complete the following a minimum of 10 days prior to requesting inspection for determining date of Substantial Completion. List items below that are incomplete at time of request.

1. Advise Owner of pending insurance changeover requirements.
2. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
3. Complete startup and testing of systems and equipment.
4. Perform preventive maintenance on equipment used prior to Substantial Completion.
5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training video recordings specified in Section 017900 "Demonstration and Training."
6. Advise Owner of changeover in utility services.
7. Participate with Owner in conducting inspection and walkthrough with local emergency responders.
8. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
9. Complete final cleaning requirements.
10. Touch up paint and otherwise repair and restore marred exposed finishes to eliminate visual defects.

D. Inspection: Submit a written request for inspection to determine Substantial Completion a minimum of 10 days prior to date the Work will be completed and ready for final inspection and tests. On receipt of request, Construction Manager will either proceed with inspection or notify Contractor of unfulfilled requirements. Construction Manager will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Construction Manager, that must be completed or corrected before certificate will be issued.

1.5 FINAL COMPLETION PROCEDURES

A. Submittals Prior to Final Completion: Before requesting final inspection for determining Final Completion, complete the following:

1. Submit a final Application for Payment in accordance with Section 012900 "Payment Procedures."
2. Certified List of Incomplete Items: Submit certified copy of Substantial Completion inspection list of items to be completed or corrected (punch list). Certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
3. Certificate of Insurance: Submit evidence of final, continuing insurance coverage complying with insurance requirements.
4. Submit pest-control final inspection report.

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

1.6 LIST OF INCOMPLETE ITEMS

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

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

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

4. Submit list of incomplete items in the following format:
   a. PDF Electronic File: Construction Manager will return annotated file.

1.7 SUBMITTAL OF PROJECT WARRANTIES

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

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

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

D. Warranties in Paper Form:

1. Bind warranties and bonds in heavy-duty, three-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch (215-by-280-mm) paper.

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

PART 2 - PRODUCTS

2.1 MATERIALS

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

1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. Perform final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.

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

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for entire Project or for a designated portion of Project:

a. Clean Project site of rubbish, waste material, litter, and other foreign substances.
b. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
c. Remove debris and surface dust from limited-access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
d. Clean flooring, removing debris, dirt, and staining; clean according to manufacturer's recommendations.
e. Vacuum and mop concrete.
f. Vacuum carpet and similar soft surfaces, removing debris and excess nap; clean according to manufacturer's recommendations if visible soil or stains remain.
g. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Polish mirrors and glass, taking care not to scratch surfaces.
h. Remove labels that are not permanent.
i. Wipe surfaces of mechanical and electrical equipment[, elevator equipment,] and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
j. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
k. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
l. Clean ducts, blowers, and coils if units were operated without filters during construction or that display contamination with particulate matter on inspection]

m. Clean luminaires, lamps, globes, and reflectors to function with full efficiency.
n. Clean strainers.
o. Leave Project clean and ready for occupancy.

C. Pest Control: Comply with pest control requirements in Section 015000 "Temporary Facilities and Controls." Prepare written report.

D. Construction Waste Disposal: Comply with waste-disposal requirements in Section 015000 "Temporary Facilities and Controls and Section 017419 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

A. Complete repair and restoration operations required by Section 017300 "Execution" before requesting inspection for determination of Substantial Completion.

END OF SECTION 017700

SECTION 017823 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 SUMMARY

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

1. Operation and maintenance documentation directory manuals.
2. Emergency manuals.
3. Systems and equipment operation manuals.
4. Systems and equipment maintenance manuals.
5. Product maintenance manuals.

1.2 CLOSEOUT SUBMITTALS

A. Submit operation and maintenance manuals indicated. Provide content for each manual as specified in individual Specification Sections, and as reviewed and approved at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
1. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.

B. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least **15** days before commencing demonstration and training.

C. Comply with Section 017700 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

1.3 FORMAT OF OPERATION AND MAINTENANCE MANUALS

A. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.

1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
2. File Names and Bookmarks: Bookmark individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting

bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

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

1. Binders: Heavy-duty, three-ring, vinyl-covered, **loose-leaf** binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch (215-by-280-mm) paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
2. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

    a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
    b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

1.4 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS A.

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

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

B. Title Page: Include the following information:

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

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

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

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

1.5 EMERGENCY MANUALS

A. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

B. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

C. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

D. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

E. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

1.6 SYSTEMS AND EQUIPMENT OPERATION MANUALS

A. Systems and Equipment Operation Manual: Assemble a complete set of data indicating operation of each system, subsystem, and piece of equipment not part of a system. Include information required for daily operation and management, operating standards, and routine and special operating procedures.

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

1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
2. Performance and design criteria if Contractor has delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

C. Descriptions: Include the following:

1. Product name and model number. Use designations for products indicated on Contract Documents.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

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

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

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

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

1.7 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

A. Systems and Equipment Maintenance Manuals: Assemble a complete set of data indicating maintenance of each system, subsystem, and piece of equipment not part of a system. Include manufacturers' maintenance documentation, preventive maintenance procedures and frequency, repair procedures, wiring and systems diagrams, lists of spare parts, and warranty information.

B. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranties and bonds, as described below.

C. Manufacturers' Maintenance Documentation: Include the following information for each component part or piece of equipment:

1. Standard maintenance instructions and bulletins; include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

    a. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

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

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

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training video recording, if available.

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

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

G. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

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

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

1.8 PRODUCT MAINTENANCE MANUALS

A. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

B. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017823

SECTION 017839 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 SUMMARY

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

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

B. Related Requirements:

1. Section 017823 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.2 CLOSEOUT SUBMITTALS

A. Record Drawings: Comply with the following:

1. Number of Copies: Submit one set(s) of marked-up record prints.

B. Record Specifications: Submit annotated PDF electronic files of Project's Specifications, including addenda and Contract modifications.

C. Record Product Data: Submit annotated PDF electronic files and directories of each submittal.

1. Where record Product Data are required as part of operation and maintenance manuals, submit duplicate marked-up Product Data as a component of manual.

1.3 RECORD DRAWINGS

A. Record Prints: Maintain one set of marked-up paper copies of the Contract Drawings and Shop Drawings, incorporating new and revised drawings as modifications are issued.

1. Preparation: Mark record prints to show the actual installation, where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to provide information for preparation of corresponding marked-up record prints.

a. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
b. Accurately record information in an acceptable drawing technique.

c. Record data as soon as possible after obtaining it.
d. Record and check the markup before enclosing concealed installations.
e. Cross-reference record prints to corresponding photographic documentation.

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

a. Dimensional changes to Drawings.
b. Revisions to details shown on Drawings.
c. Depths of foundations.
d. Locations and depths of underground utilities.
e. Revisions to routing of piping and conduits.
f. Revisions to electrical circuitry.
g. Actual equipment locations.
h. Duct size and routing.
i. Locations of concealed internal utilities.
j. Changes made by Change Order or Change Directive.
k. Changes made following Architect's written orders.
l. Details not on the original Contract Drawings.
m. Field records for variable and concealed conditions.
n. Record information on the Work that is shown only schematically.

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

B. Record Digital Data Files: Immediately before inspection for Certificate of Substantial Completion, review marked-up record prints with Construction Manager. When authorized, prepare a full set of corrected digital data files of the Contract Drawings, as follows:
1. Format: Annotated PDF electronic file.

C. Format: Identify and date each Record Drawing; include the designation "PROJECT RECORD DRAWING" in a prominent location.
1. Format: Annotated PDF electronic file.
2. Identification: As follows:

a. Project name.
b. Date.
c. Designation "PROJECT RECORD DRAWINGS."
d. Name of Architect and Construction Manager.
e. Name of Contractor.

1.4 RECORD SPECIFICATIONS

A. Preparation: Mark Specifications to indicate the actual product installation, where installation varies from that indicated in Specifications, addenda, and Contract modifications.

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
5. Note related Change Orders and Record Drawings where applicable.

B. Format: Submit record specifications as annotated PDF electronic file.

1.5 RECORD PRODUCT DATA

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

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

1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
3. Note related Change Orders, Record Specifications, and Record Drawings where applicable.

C. Format: Submit Record Product Data as annotated PDF electronic file.

1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

1.6 MAINTENANCE OF RECORD DOCUMENTS

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

PART 2 - PRODUCTS (Not Used)

PART 3 - EXECUTION (Not Used)

END OF SECTION 017839

SECTION 017900 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 SUMMARY

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

1. Instruction in operation and maintenance of systems, subsystems, and equipment.
2. Demonstration and training video recordings.

1.2 INFORMATIONAL SUBMITTALS

A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. Indicate proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.

1.3 CLOSEOUT SUBMITTALS

A. Demonstration and Training Video Recordings:

1. At completion of training, submit complete training manual(s) for Owner's use prepared in same **PDF file** format required for operation and maintenance manuals specified in Section 017823 "Operation and Maintenance Data."

1.4 QUALITY ASSURANCE

A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 014000 "Quality Requirements," experienced in operation and maintenance procedures and training.

B. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Architect.

1.6 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Systems and equipment operation manuals.
    c. Systems and equipment maintenance manuals.
    d. Product maintenance manuals.
    e. Project Record Documents.
    f. Identification systems.
    g. Warranties and bonds.
    h. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

a. Instructions on meaning of warnings, trouble indications, and error messages.
b. Instructions on stopping.
c. Shutdown instructions for each type of emergency.
d. Operating instructions for conditions outside of normal operating limits.
e. Sequences for electric or electronic systems.
f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

a. Startup procedures.
b. Equipment or system break-in procedures.
c. Routine and normal operating instructions.
d. Regulation and control procedures.
e. Control sequences.
f. Safety procedures.
g. Instructions on stopping.
h. Normal shutdown instructions.
i. Operating procedures for emergencies.
j. Operating procedures for system, subsystem, or equipment failure.
k. Seasonal and weekend operating instructions.
l. Required sequences for electric or electronic systems.
m. Special operating instructions and procedures.

5. Adjustments: Include the following:

a. Alignments.
b. Checking adjustments.
c. Noise and vibration adjustments.
d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

a. Diagnostic instructions.
b. Test and inspection procedures.

7. Maintenance: Include the following:

a. Inspection procedures.
b. Types of cleaning agents to be used and methods of cleaning.
c. List of cleaning agents and methods of cleaning detrimental to product.
d. Procedures for routine cleaning.
e. Procedures for preventive maintenance.
f. Procedures for routine maintenance.
g. Instruction on use of special tools.

8. Repairs: Include the following:

a. Diagnosis instructions.

b. Repair instructions.
c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
d. Instructions for identifying parts and components.
e. Review of spare parts needed for operation and maintenance.

1.7 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 017823 "Operation and Maintenance Data."

B. Set up instructional equipment at instruction location.

1.8 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

C. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.

D. Restore systems and equipment to condition existing before initial training use.

END OF SECTION 017900

SECTION 024119 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.1 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with all applicable requirements and standards.

1.2 SUBMITTALS

A. Record Documents:

1. Schedule indicating proposed sequence of operations for selective demolition Work to Owner's Representative for review prior to start of Work. Include coordination for shutoff, capping, and continuation of utility services as required, together with details for dust and noise control protection.

   a. Provide detailed sequence of demolition and removal Work to ensure uninterrupted progress of Owner's on-site operations.

   b. Coordinate with Owner's continuing occupation of portions of existing building and with Owner's partial occupancy of completed new addition.

   c. Photographs of existing conditions of structure surfaces, equipment, and adjacent improvements that might be misconstrued as damage related to removal operations. File with Owner's Representative prior to start of Work.

1.3 PROJECT CONDITIONS

A. Owner will occupy portions of the building immediately adjacent to areas of selective demolition. Conduct selective demolition Work in manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities that will affect Owner's normal operations.

B. Owner assumes no responsibility for actual condition of items or structures to be demolished.

1. Conditions existing at time of inspection for bidding purposes will be maintained by Owner insofar as practicable. However, minor variations within structure may occur by Owner's removal and salvage operations prior to start of selective demolition Work.

C. Promptly repair damages caused to adjacent facilities by demolition Work.

D. Conduct selective demolition operations and debris removal to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

1. Do not close, block, or otherwise obstruct streets, walks, or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

E. Do not use cutting torches for removal until Work area is cleared of flammable materials. At concealed spaces, such as interior of ducts and pipe spaces, verify condition of hidden space before starting flame cutting operations. Maintain portable fire suppression devices during flame cutting operations.

F. Maintain existing utilities indicated to remain in service and protect them against damage during demolition operations.

1. Do not interrupt utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

2. Maintain fire protection services during selective demolition operations.

3. Use water sprinkling, temporary enclosures, and other methods to limit dust and dirt migration. Comply with governing regulations pertaining to environmental protection.

a. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 - PRODUCTS

A. GENERAL

1. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. MATERIAL OWNERSHIP

1. Except for items or materials indicated to be reused, salvaged, or otherwise indicated to remain the Owner's property, demolished materials shall be become the Contractor's property and shall be removed from the Site with further disposition of the Construction's option.

2. Historical items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to the Owner, which may be encountered during demolition, remain the Owner's property. Carefully remove and salvage each item or object in a manner to prevent damage and deliver promptly to the Owner.

PART 3 - EXECUTION

3.1 PREPARATION

A. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of areas to be demolished and adjacent facilities to remain.

B. Cease operations and notify Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

C. Locate, identify, stub off, and disconnect utility services that are not indicated to remain.

1. Provide bypass connections as necessary to maintain continuity of service to occupied areas of building. Provide minimum of 72 hours advance notice to Owner if shutdown of service is necessary during changeover.

3.2 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer’s published recommendations.

3.3 DEMOLITION

A. Perform selective demolition Work in a systematic manner. Use such methods as required to complete Work indicated on Drawings in accordance with demolition schedule and governing regulations.

B. Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power driven masonry saw or hand tools; do not use power driven impact tools.

C. Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors, or framing.

D. Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

E. Demolish foundation walls to a depth of not less than 12 inches below existing ground surface. Demolish and remove below grade wood or metal construction. Break up below grade concrete slabs.

F. For interior slabs on grade, use removal methods that will not crack or structurally disturb adjacent slabs or partitions. Use power saw where possible.

G. Completely fill below grade areas and voids resulting from demolition Work. Provide fill consisting of approved earth, gravel, or sand, free of trash and debris, stones over 6 inches in diameter, roots, or other organic matter.

H. Remove culvert or sewer pipe for reuse by careful excavation of all material on the top and sides so that the pipe will not be damaged. Removal of sewer appurtenances shall be included for removal with the pipe. Remove pipe which are unsatisfactory for reuse, and dispose of, off the Project Site.

I. Concrete parts of structures below the permanent ground-line shall be neatly squared off with reinforcement cut off close to the concrete.

J. Dismantle steel structures or steel portions of structures in sections determined by the Owner's Representative.

1. The sections shall be of such weight and dimensions which permit convenient handling, hauling and storing.

2. Rivet and bolts connecting steel rail members, steel beams or girder spans and steel stringers of truss spans will be removed by cutting the heads with a cold cut then punching or drilling by a method that will not injure the member for reuse.

3. The removal of rivets and bolts from connections will not be required unless specifically indicated.

4. Unless otherwise specified, the Contractor shall have the option of dismantling these members by flame cutting immediately adjacent to the connection.

5. Flame-cutting will not be permitted when Drawings call for the structural unit to be salvaged in such a manner as to permit re-erection. In such cases, all members shall be carefully dismantled without damage, match marked with paint, and all rivets and bolts removed from the connections.

K. Remove brick and stone structures by sledging the masonry into removal sizes. Portions of such structures below the permanent ground-line, which will not in any manner interfere with the proposed construction, may be left in place, but removal shall be carried at least two feet below the permanent ground-line and neatly squared off.

L. If unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative, rearrange selective demolition schedule as necessary to continue overall job progress without undue delay.

3.4 EXCAVATION AND BACKFILL

A. Back-fill to the level of the original ground-line, all excavation made in, and all openings below, the natural ground-line caused by the removal of old structures or portions thereof.

B. That portion of the back-fill which will support any portion of the roadbed or paving shall be placed in layers of the same thickness as those required subgrade preparation.

1. Material in each layer shall be wetted uniformly, if required, and shall be compacted to the density required in the adjoining embankment. In places inaccessible to blading and rolling equipment, mechanical or hand tampers shall be used to obtain the required compaction.

2. Place that portion of the back-fill which will not support any portion of the roadbed or paving in such a manner, and compact, to preclude settling.

3.5 DISPOSAL OF DEMOLISHED MATERIALS

A. Remove from building Site debris, rubbish, and other materials resulting from demolition operations. Transport and legally dispose off Site.

   1. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning removal, handling, and protection against exposure or environmental pollution.

   2. Burning of removed materials is not permitted on the Project Site.

3.6 CLEANUP AND REPAIR

A. Upon completion of demolition Work, remove tools, equipment, and demolished materials from the Project Site. Remove protections and leave interior areas broom clean.

B. Repair demolition performed in excess of that required. Return elements of construction and surfaces to remain to condition existing prior to start operations. Repair adjacent construction or surfaces soiled or damaged by selective demolition Work.

END OF SECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Specifications throughout all Divisions of the Project Manual are directly applicable to this Section, and this Section is directly applicable to them.

1.2 REFERENCE STANDARDS

A. The latest published edition of a reference shall be applicable to this Project unless identified by a specific edition date.

B. All reference amendments adopted prior to the effective date of this Contract shall be applicable to this Project.

C. All materials, installation and workmanship shall comply with all applicable requirements and standards.

1.3 QUALITY ASSURANCE

A. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.

B. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.

C. Field Constructed Mock Ups: Prior to installation of unit masonry, erect sample wall panels to further verify selections made under sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mock ups to comply with the following requirements, using materials indicated for final unit of Work:

1. Locate mock ups on Site in locations indicated or, if not indicated, as directed by Architect.

2. Build mock ups for the following types of masonry in sizes of approximately 4 feet long by 4 feet high by full thickness, including face and backup wythes as well as accessories.

   a. Each type of exposed unit masonry construction.

   b. Typical exterior face brick wall.

   c. Typical exterior face brick wall with framed window opening.

   d. Typical interior unit masonry wall.

3. Where masonry is to match existing, erect panels parallel to existing surface.

4. Notify Architect one week in advance of the dates and times when mock ups will be erected.

5. Protect mock ups from the elements with weather resistant membrane.

6. Retain and maintain mock ups during construction in undisturbed condition as standard for judging completed unit masonry construction.

   a. When directed, demolish and remove mock ups from the Project Site.

   b. Accepted mock ups in undisturbed condition at time of Substantial Completion may become part of completed unit of Work.

D. Preinstallation Conference: Conduct conference at the Project Site to comply with requirements of Division 01.

1.4 SUBMITTALS

A. Product Data:

1. Material certificates for the following signed by manufacturer and Contractor certifying that each material complies with requirements.

   a. Each different cement product required for mortar and grout including name of manufacturer, brand, type, and weight slips at time of delivery.

   b. Each material and grade indicated for reinforcing bars.

   c. Each type and size of joint reinforcement.
   Each type and size of anchors, ties, and metal accessories.

B. Samples:

1. Samples for initial selection purposes of the following:

   d. Unit masonry samples in small scale form showing full extent of colors and textures available for each different exposed masonry unit required.

   e. Colored masonry mortar samples showing full extent of colors available.

2. Samples for verification purposes of the following:

   a. Full size units for each different exposed masonry unit required showing full range of exposed color, texture, and dimensions to be expected in completed construction.

   b. Include size variation data verifying that actual range of sizes for brick falls within ASTM C 216 dimension tolerances for brick where modular dimensioning is indicated.

   c. Colored masonry mortar samples for each color required showing the full range of colors expected in the finished construction. Label samples to indicate type and amount of colorant used.

d. Weep holes/vents in color to match mortar color.

e. Accessories embedded in the masonry.

C. Record Documents:

1. Shop drawings for reinforcing detailing fabrication, bending, and placement of unit masonry reinforcing bars. Comply with ACI 315 "Details and Detailing of Concrete Reinforcing" showing bar schedules, stirrup spacing, diagrams of bent bars, and arrangement of masonry reinforcement.

2. Cold weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

3. Hot weather construction procedures evidencing compliance with requirements specified in referenced unit masonry standard.

1.5 DELIVERY, STORAGE AND HANDLING

A. Deliver masonry materials to Project in undamaged condition.

B. Store and handle masonry units off the ground, under cover, and in a dry location to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion, and other causes. If units become wet, do not place until units are in an air dried condition.

C. Store cementitious materials off the ground, under cover, and in dry location.

D. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.

E. Store masonry accessories including metal items to prevent corrosion and accumulation of dirt and oil.

1.6 PROJECT CONDITIONS

A. During erection, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.

2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches down face next to unconstructed wythe and hold cover in place.

B. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least 3 days after building masonry walls or columns.

C. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Remove immediately any grout, mortar, and soil that comes in contact with such masonry.

1. Protect base of walls from rain splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.

3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes from mortar droppings.

D. Cold Weather Construction: Comply with referenced unit masonry standard for cold weather construction and the following:

1. Do not lay masonry units that are wet or frozen.

2. Remove masonry damaged by freezing conditions.

E. Hot Weather Construction: Comply with referenced unit masonry standard.

1.7 ALLOWANCES

A. Furnish face brick, excluding special molded shapes.

PART 2 PRODUCTS

2.1 GENERAL

A. All materials shall meet or exceed all applicable referenced standards, federal, state and local requirements, and conform to codes and ordinances of authorities having jurisdiction.

B. Comply with referenced unit masonry standard and other requirements specified in this Section applicable to each material indicated.

2.2 BRICK UNITS

A. Comply with the following requirements applicable to each form of brick required:

1. Provide special molded shapes where indicated and as follows:

a. For applications requiring brick of form, color, texture, and size on exposed surfaces that cannot be produced by sawing standard brick sizes.

b. For applications where stretcher units cannot accommodate special conditions including those at corners, movement joints, bond beams, sashes, and lintels.

2. Provide units without cores or frogs and with all exposed surfaces finished for ends of sills, caps, and similar applications that expose brick surfaces that otherwise would be concealed from view.

B. Face Brick Standard: ASTM C 216 and as follows:

1. Grade and Unit Compressive Strength: Provide units of grade SW and minimum average net area compressive strength not less than the unit compressive strengths required to produce clay masonry construction of compressive strength indicated.

2. Type FBS (for general use in exposed masonry requiring wider variations in size and color ranges than Type FBX).

3. Type FBX (for general use in exposed masonry requiring minimum variations in size and color ranges).

4. Type FBA (for special architectural effects resulting from non-uniformity in size, color, and texture of individual units).

5. Provide bricks manufactured to the dimensions within the tolerances specified in ASTM C 216 for Standard Modular Brick; 3-5/8 inches thick by 2-1/4 inches high by 7-5/8 inches long.

6. Application: Use where brick is exposed, unless otherwise indicated.

7. Wherever shown to "match existing," provide face brick of matching color, texture, and size as existing adjacent brickwork.

8. Color and Texture: Match Architect's sample.

2.3 CONCRETE MASONRY UNITS

A. Comply with requirements indicated below applicable to each form of concrete masonry unit required.

1. Provide special shapes where indicated and as follows:

   a. For lintels, corners, jambs, sash, control joints, headers, bonding, and other special conditions.

   b. Bullnose units for outside corners unless otherwise indicated.

   c. Square edged units for outside corners, except where indicated as bullnose.

2. Size: Provide concrete masonry units complying with requirements indicated below for size that are manufactured to specified face dimensions within tolerances specified in the applicable referenced ASTM specification for concrete masonry units.

   a. Concrete Masonry Units: Manufactured to specified dimensions of 3/8 inch less than nominal widths by nominal heights by nominal lengths indicated on drawings.

   b. Prefaced Concrete Masonry Units: Manufactured to specified dimensions of 3/8 inch less than nominal widths by nominal heights by nominal lengths indicated on drawings, with prefaced surfaces having 1/16-inch-thick returns of facing to create 1/4 inch wide mortar joints with modular coursing.

3. Provide Type I, moisture-controlled units.

4. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.

a. Where special finishes are indicated, provide units with exposed faces of the following general description matching color and texture of Architect's sample.

i. Standard aggregate, ground finish

ii. Special aggregate, ground finish

iii. Standard aggregate, split face finish

iv. Special aggregate, split face finish

v. Standard aggregate, split ribbed finish

vi. Special aggregate, split ribbed finish

b. Where special patterns are indicated, provide units with exposed faces matching color, texture and pattern of Architect's sample.

B. Hollow Load Bearing Concrete Masonry Units: ASTM C 90, and as follows:

1. Unit Compressive Strength: Provide units with minimum average net area compressive strength not less than the unit compressive strengths required to produce concrete unit masonry construction of compressive strength indicated.

2. Weight Classification: Lightweight unless otherwise indicated or required by Project conditions.

C. Solid Load Bearing Concrete Masonry Units: ASTM C 90, and as follows:

1. Unit Compressive Strength: Provide units with minimum average net area compressive strength not less than the unit compressive strengths required to produce concrete unit masonry construction of compressive strength indicated.

2. Weight Classification: Lightweight unless otherwise indicated or required by Project conditions.

D. Prefaced Concrete Block: Lightweight concrete units indicated below with manufacturer's standard smooth resinous tile facing complying with ASTM C 744:

1. For units on which prefaced surfaces are molded, comply with the following:

a. Hollow Load Bearing Concrete Block: ASTM C 90

b. Unit Compressive Strength: Provide units with minimum average net area compressive strength not less than the unit compressive strengths required to produce concrete unit masonry construction of compressive strength indicated.

2. Color and Pattern: Match Architect's sample

3. Color and Pattern: Provide color and pattern selected by Architect from manufacturer's full range of standard colors and patterns.

4. Available Products: Subject to compliance with requirements, prefaced concrete masonry units that may be incorporated in the Work include, but are not limited to, the following:

a. "Astra Glaze," Trenwyth Industries, Inc.

b. "Spectra Glaze II," The Burns & Russell Co.

2.4 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold weather construction. Provide natural color or white cement as required to produce required mortar color.

B. Mortar Cement: U.B.C. Standard No. 21-14

1. For pigmented mortars, use premixed, colored martar cements of formulation required to produce color indicated, or if not indicated, as selected from manufacturer's standard formulations. Pigments shall not exceed 5 percent of mortar cement by weight for mineral oxides nor 1 percent for carbon black.

C. Ready Mixed Mortar: Cementitious materials, water, and aggregate complying with requirements specified in this article, combined with set controlling admixtures to produce a ready mixed mortar complying with ASTM C 1142.

D. Hydrated Lime: ASTM C 207, Type S

E. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4 inch use aggregate graded with 100 percent passing the No. 16 sieve.

1. White Mortar Aggregates: Natural white sand or ground white stone

2. Colored Mortar Aggregates: Ground marble, granite, or other sound stone, as required to match Architect's sample.

F. Aggregate for Grout: ASTM C 404

G. Colored Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with record of satisfactory performance in masonry mortars.

H. Water: Clean and potable

2.5 REINFORCING STEEL

A. Provide reinforcing steel complying with requirements of referenced unit masonry standard and this article.

B. Steel Reinforcing Bars: Material and grade as follows:

1. Billet steel complying with ASTM A 615

2. Epoxy coated billet steel complying with ASTM A 615 and ASTM A 775

3. Grade 60

C. Deformed Reinforcing Wire: ASTM A 496

D. Plain Welded Wire Fabric: ASTM A 185

E. Deformed Welded Wire Fabric: ASTM A 497

2.6 JOINT REINFORCEMENT

A. Provide joint reinforcement complying with requirements of referenced unit masonry standard and this article, formed from galvanized carbon steel wire, coating class as required by referenced unit masonry standard for application indicated.

B. Description: Welded wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10 feet, with prefabricated corner and tee units, and complying with requirements indicated below:

1. Wire Diameter for Side Rods: 0.1483 inch (9 gage)

2. Wire Diameter for Cross Rods: 0.1483 inch (9 gage)

3. For single wythe masonry provide type as follows with single pair of side rods:

a. Ladder design with perpendicular cross rods spaced not more than 16 inches on center.

b. Truss design with continuous diagonal cross rods spaced not more than 16 inches on center.

4. For multiwythe masonry provide type as follows:

a. Tab design with single pair of side rods and rectangular box type cross ties spaced not more than 16 inches on center; with side rods spaced for embedment within each face shell of backup wythe and ties extended to engage the outer wythe by at least 1½ inches.

b. Acceptable products include Masonry Reinforcing Corp. "Series 800", Dur O waL "Ladur-Eye", or Hohman & Barnard "Hookit with 2Z Ties".

2.7 TIES AND ANCHORS, GENERAL

A. Provide ties and anchors specified in subsequent articles that comply with requirements for metal and size of referenced unit masonry standard and of this article.

B. Galvanized Carbon Steel Wire: ASTM A 82, coating class as required by referenced unit masonry standard for application indicated.

C. Galvanized Steel Sheet: ASTM A 366 (commercial quality) cold rolled carbon steel sheet, hot dip galvanized after fabrication to comply with ASTM A 525, Class B2 (for unit lengths over 15 inches) and Class B3 (for unit lengths under 15 inches), for sheet metal ties and anchors.

2.8 ADJUSTABLE ANCHORS FOR CONNECTING MASONRY TO STRUCTURAL FRAMEWORK

A. Two-piece assemblies as described below allowing vertical or horizontal differential movement between wall and framework parallel to plane of wall, but resisting tension and compression forces perpendicular to it.

B. For anchorage to concrete framework, provide manufacturer's standard with dovetail anchor section formed from sheet metal and triangular shaped wire tie section sized to extend within 1 inch of masonry face and as follows:

1. Furnish dovetail slots to concrete trade for installation.

2. Acceptable products include Masonry Reinforcing Corp. "1304/2102", Dur O waL "D/A100/D/A720 723", or Heckman "100/103".

C. For anchorage to steel framework provide manufacturer's standard anchors with crimped 1/4 inch diameter wire anchor section for welding to steel and triangular shaped wire tie section sized to extend within 1 inch of masonry face and as follows:

1. Acceptable products include Masonry Reinforcing Corp. "1000, Type 1/1100", Dur O waL "D/A100/D/A720 723", or Heckman "100/103".

2.9 RIGID ANCHORS

A. Provide straps of form and length indicated, fabricated from metal strips of following width and thickness.

1. 1½ inches wide by ¼ inch thick.

2. As indicated.

2.10 ADJUSTABLE MASONRY VENEER ANCHORS

A. Provide two piece assemblies allowing vertical or horizontal differential movement between wall and framework parallel to plane of wall, but resisting tension and compression forces perpendicular to it; for attachment over sheathing to metal studs; and with the following structural performance characteristics:

1. Structural Performance Characteristics: Capable of withstanding a 100 pound/foot load in either tension or compression without deforming over, or developing play in excess of, 0.05 inch.

B. Provide anchors and ties as specified below with all components hot-dipped galvanized after fabrication. Size ties to extend to within ¾ inch of outside face of brick veneer.

1. Brick Veneer Anchors at Metal Stud Back Up Construction: Flexible two piece anchors consisting of 3/16 inch diameter trapezoidal shaped wire ties and 16 gage minimum steel strap designed for screw attachment into metal stud framing.

a. Acceptable products include Hohman & Barnard "DW 10/VWT", Masonry Reinforcing Corp. "1004/1100", or Dur O WaL "D/A213-.5/D/A701 708".

2. Brick Veneer Anchors at Solid Back Up Construction: Flexible two piece anchors consisting of 3/16 inch diameter trapezoidal shaped wire ties with 16 gage channel locking tab and 16 gage minimum steel "channel slot" designed for surface attachment to concrete or CMU back up.

a. Acceptable products include Masonry Reinforcing Corp. "1302/2103", Dur O WaL "D/A901/918 921", or Heckman "132/129".

C. Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene washer, #10 diameter by length required to penetrate steel stud flange by not less than 3 exposed threads, and with the following corrosion protective coating:

1. Organic polymer coating with salt spray resistance to red rust of more than 800 hours per ASTM B 117.

2. Organic Polymer Coated Steel Drill Screws:

a. "Traxx," ITW Buildex

b. "Dril Flex," Elco Industries, Inc.

2.11 MISCELLANEOUS ANCHORS

A. Unit Type Masonry Inserts in Concrete: Cast iron or malleable iron inserts of type and size indicated.

B. Dovetail Slots: Furnish dovetail slots, with filler strips, of slot size indicated, fabricated from 0.0336 inch (22 gage) sheet metal.

C. Anchor Bolts: Steel bolts complying with A 307, Grade A; with ASTM A 563 hex nuts and, where indicated, flat washers; hot dip galvanized to comply with ASTM A 153, Class C; of diameter and length indicated and in the following configurations:

1. Headed bolts.

2. Nonheaded bolts, straight.

3. Nonheaded bolts, bent in manner indicated.

2.12 POSTINSTALLED ANCHORS

A. Anchors as described below, with capability to sustain, without failure, load imposed within factors of safety indicated, as determined by testing per ASTM E 488, conducted by a qualified independent testing laboratory.

1. Type: Chemical anchors.

2. Type: Expansion anchors.

3. Type: Undercut anchors.

4. Corrosion Protection: Carbon steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (5 microns) for Class SC 1 service condition (mild).

5. Corrosion Protection: Stainless steel components complying with ASTM F 593 and ASTM F 594, Group 1 alloy 304 or 316 for bolts and nuts; alloy 304 or 316 for anchor.

6. For cast in place and post installed anchors in concrete: Capability to sustain, without failure, a load equal to 4 times loads imposed by masonry.

7. For post installed anchors in grouted concrete masonry units: Capability to sustain, without failure, a load equal to 6 times loads imposed by masonry.

2.13 EMBEDDED THROUGH-WALL FLASHING MATERIALS

A. Copper Fabric Laminate: 5 ounce copper sheet bonded with asphalt between 2 layers of glass fiber cloth.

1. "Copper Fabric," Afco Products Inc.

2. "Type FCC Fabric Covered Copper," Phoenix Building Products

3. "Copper Fabric Flashing," Sandell Manufacturing Co., Inc.

4. "York Copper Fabric Flashing," York Manufacturing, Inc.

B. Adhesive for Flashings: Of type recommended by manufacturer of flashing material for use indicated.

2.14 MISCELLANEOUS MASONRY ACCESSORIES

A. Expansion and Control Joint Fillers:

1. Premolded Expansion Joint Filler: Closed cell polyethylene foam material with a density of ±2 psf, and compatible with most sealants. Acceptable products include Sonneborn "Sonoflex F" and Williams Products Inc. "Expand O Foam 1380 Series".

2. Construction Joint Filler: Closed cell expanded neoprene foam material with a density of 15 to 35 psf, flame resistant, and compatible with most sealants. Acceptable products include Williams Products Inc. "Neoprene Type NN1" and Rubatex Corp. "R 1800 FS".

3. Premolded Control Joint Strip: Solid rubber strips with a Shore A durometer hardness of 60 to 80, designed to fit standard sash blocks and maintain lateral stability of masonry wall. Provide strips in width approximately 2" less than thickness of masonry wythe. Acceptable products include Dur O waL "Rapid Control Joint" and Hohman & Barnard "QS Series".

B. Bond Breaker Strips: Asphalt saturated organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

C. Weep Holes: Provide one of the following at Contractor's option:

1. Aluminum Weep Hole/Vent: One piece L shaped units made to fit in a vertical mortar joint from sheet aluminum and consisting of a vertical channel with louvers stamped in web and a flat horizontal; prepainted prior to installation, in color to match that of masonry or mortar as selected by Architect.

   a. "Louvered Weephole", Masonry Reinforcing Corp.

2. Plastic Weep Hole/Vent: One piece flexible extrusion manufactured from ultraviolet resistant polypropylene co polymer, designed to weep moisture in masonry cavity to exterior, sized to fill head joints with outside face held back 1/8 inch from exterior face of masonry, in custom color to match that of masonry or mortar as selected by Architect.

   a. "Cell Vent," Dur O Wal, Inc.

D. Cavity Drainage Material: To prevent mortar from blocking cavity weep holes, provide one of the following:

1. 1-inch-(25-mm-) thick, reticulated, nonabsorbent mesh, made from polyethylene strands and shaped to maintain drainage at weep holes without being clogged by mortar droppings. Product: "Mortar Net".

2.15 INSULATION

A. Loose Granular Perlite Insulation: ASTM C 549, Type II (surface treated for water repellency and limited moisture absorption) or IV (surface treated for water repellency and to limit dust generation).

B. Loose Granular Vermiculite Insulation: ASTM C 516, Type II (surface treated for water repellency and limited moisture absorption), Grade 3 (Fine), complying with 29 CFR 1926 by containing less than 0.10 percent by weight of asbestos and that demonstration shows will not release asbestos fibers in excess of 0.1 fibers per cubic centimeter under reasonably foreseeable Site conditions.

C. Extruded Polystyrene Board Insulation: Rigid cellular polystyrene thermal insulation with closed cells and integral high density skin, formed by the expansion of polystyrene base resin in an extrusion process to comply with ASTM C 578, Type IV; in manufacturer's standard lengths and widths; thicknesses as indicated.

D. Molded Polystyrene Board Insulation: Rigid, cellular thermal insulation formed by the expansion of polystyrene resin beads or granules in a closed mold to comply with ASTM C 578, Type I; in manufacturer's standard lengths and widths; thicknesses as indicated.

1. Provide specially shaped units designed for installation in cores of concrete blocks.

E. Adhesive: Type recommended by insulation board manufacturer for application indicated.

2.16 MORTAR AND GROUT MIXES

A. Do not add admixtures including coloring pigments, air entraining agents, accelerators, retarders, water repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.

B. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar indicated below:

C. Proportions listed are in the following order, by volume of cementitious materials: (Portland Cement):(Hydrated Lime or Lime Putty):(Aggregate). Aggregate volume is based on the sum of the separate volumes of other cementitious materials.

1. Limit cementitious materials in mortar to portland cement lime.

2. Use Type M mortar for masonry below grade and in contact with earth, and where indicated: (1):(1/4):(2 1/4 to 3).

3. Use Type S mortar for reinforced masonry: (1):(1/4 to 1/2):(2 1/4 to 3).

4. Use Type N mortar for all other exterior and interior walls: (1):(1/2 to 1 1/4):(2 1/4 to 3).

5. Colored Pigmented Mortar: Select and proportion pigments with other ingredients to produce color required. Do not exceed pigment to-cement ratio of 1:10, by weight. Match Architect's sample.

D. Provide grout complying with ASTM C 476, of consistency indicated or, if not otherwise indicated, of consistency (fine or coarse) at time of placement which will completely fill all spaces intended to receive grout.

1. Provide grout in the following proportions, by volume: (1 part portland cement):(0 to 1/10 part hydrated lime or lime putty):(aggregate, 2½ to 3 times the sum of the volumes of other cementitious materials). Add coarse aggregate in the proportion of 1 to 2 times the sum of the volumes of other cementitious materials for "coarse" grout.

2. Use fine grout in grout spaces less than 2 inches in horizontal direction, unless otherwise indicated.

3. Use coarse grout in grout spaces 2 inches or more in least horizontal dimension, unless otherwise indicated.

PART 3 EXECUTION

3.8 PREPARATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other specific conditions, and other conditions affecting performance of unit masonry.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of unit masonry.

B. Examine rough in and built in construction to verify actual locations of piping connections prior to installation.

C. Do not proceed until unsatisfactory conditions have been corrected.

3.9 INSTALLATION

A. Installation shall meet or exceed all applicable federal, state and local requirements, referenced standards and conform to codes and ordinances of authorities having jurisdiction.

B. All installation shall be in accordance with manufacturer's published recommendations.

C. Comply with referenced unit masonry standard and other requirements indicated applicable to each type of installation included in Project.

D. Thickness: Build cavity and composite walls and other masonry construction to the full thickness shown. Build single wythe walls to the actual thickness of the masonry units, using units of nominal thickness indicated.

E. Build chases and recesses as shown or required to accommodate items specified in this and other Sections of the Specifications. Provide not less than 8 inches of masonry between chase or recess and jamb of openings and between adjacent chases and recesses.

F. Leave openings for equipment to be installed before completion of masonry. After installation of equipment, complete masonry to match construction immediately adjacent to the opening.

G. Cut masonry units with motor driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining construction. Use full size units without cutting where possible.

H. Matching Existing Masonry: Match coursing, bonding, color, and texture of new masonry with existing masonry.

3.10 CONSTRUCTION TOLERANCES

A. Comply with construction tolerances of referenced unit masonry standard.

3.11 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint widths and for accurate locating of openings, movement type joints, returns, and offsets. Avoid the use of less than half size units at corners, jambs, and where possible at other locations.

B. Lay up walls to comply with specified construction tolerances, with courses accurately spaced and coordinated with other construction.

C. Bond Pattern for Exposed Masonry: Lay exposed masonry in the following bond pattern; do not use units with less that nominal 4 inch horizontal face dimensions at corners or jambs.

1. One half running bond with vertical joint in each course centered on units in courses above and below.

2. Stack bond

3. One third running bond

4. As indicated on drawings

D. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4 inch horizontal face dimensions at corners or jambs.

E. Stopping and Resuming Work: In each course, rack back 1/2 unit length for one half running bond or 1/3 unit length for one third running bond; do not tooth. Clean exposed surfaces of set masonry, wet clay masonry units lightly (if required), and remove loose masonry units and mortar prior to laying fresh masonry.

F. Built In Work: As construction progresses, build in items specified under this and other Sections of the Specifications. Fill in solidly with masonry around built in items.

1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.

a. At exterior frames insert extruded polystyrene board insulation around perimeter of frame in thickness indicated but not less than ¾ inch to act as a thermal break between frame and masonry.

2. Where built in items are to be embedded in cores of hollow masonry units, place a layer of metal lath in the joint below and rod mortar or grout into core.

3. Fill cores in hollow concrete masonry units with grout 3 courses (24 inches) under bearing plates, beams, lintels, posts, and similar items, unless otherwise indicated.

3.12 MORTAR BEDDING AND JOINTING

A. Lay brick units with full mortar coverage on bed and head joints. Furrowing of joints will not be permitted.

B. Lay hollow concrete masonry units as follows:

1. With full mortar coverage on horizontal and vertical face shells.

2. Bed webs in mortar in starting course on footings and in all courses of piers, columns, and pilasters, and where adjacent to cells or cavities to be filled with grout.

3. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.

C. Cut joints flush for masonry walls to be concealed or to be covered by other materials, unless otherwise indicated.

3.13 STRUCTURAL BONDING OF MULTIWYTHE MASONRY

A. Use individual metal ties installed in horizontal joints to bond wythes together.

B. Use continuous horizontal joint reinforcement installed in horizontal mortar joints for bond tie between wythes.

C. Use either of the structural bonding systems specified above.

D. Use structural bonding system indicated on Drawings.

E. Corners: Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.

1. Provide continuity with horizontal joint reinforcement at corners using prefabricated "L" units, in addition to masonry bonding.

F. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as follows:

1. Provide individual metal ties.

2. Provide continuity with horizontal joint reinforcement using prefabricated "T" units.

G. Nonbearing Interior Partitions: Build full height of story to underside of solid floor or roof structure above and as follows:

1. Install pressure relieving joint filler in joint between top of partition and underside of structure above.

3.14 CAVITIES/AIR SPACES

A. Keep cavities/air spaces clean of mortar droppings and other materials during construction. Strike joints facing cavities/air spaces flush.

B. Tie exterior wythe to backup with individual metal ties. Stagger alternate courses.

C. Tie exterior wythe to backup with continuous horizontal joint reinforcing.

D. Install vents in vertical head joints at the top of each continuous cavity/air space. Space vents and close off cavities/air spaces vertically and horizontally with blocking in manner indicated.

3.15 CAVITY WALL AND MASONRY CELL INSULATION

A. On units of plastic insulation, install small pads of adhesive spaced approximately 1' 0" on center both ways on inside face or attach to inside face with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

1. Fill all cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

B. Pour granular insulation into cavities as shown to fill void spaces completely. Maintain inspection ports to show presence of insulation at extremities of each pour area. Close ports after complete coverage has been confirmed. Limit fall of insulation to one story in height, but not to exceed 20 feet.

3.16 HORIZONTAL JOINT REINFORCEMENT

A. Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8 inch on exterior side of walls, 1/2 inch elsewhere. Lap reinforcing a minimum of 6 inches.

B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

C. Provide continuity at corners and wall intersections by use of prefabricated "L" and "T" sections. Cut and bend reinforcement units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

3.17 ANCHORING MASONRY TO STRUCTURAL MEMBERS

A. Anchor masonry to structural members where masonry abuts or faces structural members to comply with the following:

1. Provide an open space not less than 1 inch in width between masonry and structural member, unless otherwise indicated. Keep open space free of mortar or other rigid materials.

2. Anchor masonry to structural members with flexible anchors embedded in masonry joints and attached to structure.

3. Space anchors as indicated, but not more than 24 inches on center vertically and 36 inches on center horizontally.

3.18 ANCHORING SINGLE WYTHE MASONRY VENEER

A. Anchor single wythe masonry veneer to metal studs with masonry veneer anchors to comply with the following requirements:

1. Fasten each anchor section through sheathing to metal studs with 2 metal fasteners of type indicated.

2. Embed tie section in masonry joints. Provide not less than 2 inch air space between back of masonry veneer wythe and face of sheathing.

3. Locate anchor section relative to course in which tie section is embedded to allow maximum vertical differential movement of tie up and down.

4. Space anchors as indicated but not more than 16 inches on center vertically and 18 inches on center horizontally with not less than one anchor for each 3 square feet of wall area. Install additional anchors within 12 inches of openings and at intervals around perimeter not exceeding 8 inches.

B. Install vents at the top of each continuous air space in masonry veneer walls.

3.19 MOVEMENT (CONTROL AND EXPANSION) JOINTS

A. Install control and expansion joints in unit masonry where indicated. Build in related items as the masonry progresses. Do not form a continuous span through movement joints unless provisions are made to prevent in plane restraint of wall or partition movement.

B. Joint Spacing: If location of control joints and expansion joints is not shown, place vertical joints spaced not to exceed 35 feet on center and horizontal joints not to exceed story height.

1. Locate control joints in face brick at all points of discontinuity of back up construction, vertical and horizontal.

C. Form control joints in concrete masonry as follows:

1. Fit bond breaker strips into hollow contour in ends of block units on one side of control joint. Fill the resultant core with grout and rake joints in exposed faces.

2. Install preformed control joint gaskets designed to fit standard sash block.

3. Install special shapes designed for control joints. Install bond breaker strips at joint. Keep head joints free and clear of mortar or rake joint.

D. Form expansion joints in brick made from clay or shale as follows:

1. Build flanges of metal expansion strips into masonry. Lap each joint 4 inches in direction of water flow. Seal joints below grade and at junctures with horizontal expansion joints, if any.

2. Build flanges of factory fabricated expansion joint units into masonry.

3. Build in joint fillers where indicated.

4. Form open joint of width indicated but not less than 3/8 inch for installation of sealant and backer rod. Maintain joint free and clear of mortar.

E. Build in horizontal pressure relieving joints where indicated; construct joints by either leaving an air space or inserting nonmetallic 50 percent compressible joint filler of width required to permit installation of sealant and backer rod.

1. Locate horizontal pressure relieving joints beneath shelf angles supporting masonry veneer and attached to structure behind masonry veneer.

3.20 LINTELS

A. Install steel lintels where indicated.

B. Provide masonry lintels where shown and wherever openings of more than 12 inches for brick size units and 24 inches for block size units are shown without structural steel or other supporting lintels. Provide precast or formed in place masonry lintels. Cure precast lintels before handling and installation. Temporarily support formed in place lintels.

1. For hollow concrete masonry unit walls, use specially formed bond beam units with reinforcement bars placed as indicated and filled with coarse grout.

C. Provide minimum bearing of 8 inches at each jamb, unless otherwise indicated.

3.21 THROUGH-WALL FLASHING/WEEP HOLES

A. Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.

B. Prepare masonry surfaces so that they are smooth and free from projections that could puncture flashing. Place through wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with adhesive/sealant/tape as recommended by flashing manufacturer before covering with mortar.

C. Install flashings as follows:

1. At masonry backup construction, extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 8 inches, and through the inner wythe to within ½ inch of the interior face of the wall in exposed masonry. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2 inches, unless otherwise indicated.

2. At sheathing backup construction, extend flashing from exterior face of outer wythe of masonry, through the outer wythe to the face of the sheathing, and turn up a minimum of 8 inches onto the sheathing.

a. Fully adhere flashing to substrate with adhesive; using a roller or other device to ensure full and complete adhesion.

b. At joints, lap flashing sheets a minimum of 4 inches onto adjacent sheet and seal with adhesive.

3. At lintels and shelf angles, extend flashing a minimum of 4 inches into masonry at each end.

4. At heads and sills, extend flashing as specified above unless otherwise indicated but turn up ends not less than 2 inches to form a pan.

5. Turn down sheet metal flashings at exterior face of masonry to form drip.

6. Strip in top edge of flashing installed against inner face of cavity with mastic and reinforcing fabric.

D. Install weep holes in the head joints in exterior wythes of the first course of masonry immediately above embedded flashings and as follows:

1. Form weep holes by using open head-joints in brick veneer.

2. Form weep holes with product specified in Part 2 of this Section.

3. Space weep holes 24 inches on center.

4. In uninsulated cavities/air spaces place cavity drainage material immediately above flashing embedded in the wall, as masonry construction progresses, to splatter mortar droppings and to maintain drainage.

E. Install reglets and nailers for flashing and other related construction where shown to be built into masonry.

3.22 INSTALLATION OF REINFORCED UNIT MASONRY

A. Install reinforced unit masonry to comply with requirements of referenced unit masonry standard.

1. Provide continuous vertical reinforcing as indicated on the Drawings or otherwise required, including additional reinforcing bars at corners, around openings, at attachments of other work, and similar work.

2. Install bars to provide proper embedment and laps where indicated as "continuous reinforcing".

3. Fill cores containing vertical reinforcing with grout to full height of wall.

B. Temporary Formwork: Construct formwork and shores to support reinforced masonry elements during construction.

1. Construct formwork to conform to shape, line, and dimensions shown. Make sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.

C. Do not place grout until entire height of masonry to be grouted has attained sufficient strength to resist grout pressure.

D. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and other temporary loads that may be placed on them during construction.

3.23 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or if units do not match adjoining units. Install new units to match adjoining units and in fresh mortar or grout, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point up all joints including corners, openings, and adjacent construction to provide a neat, uniform appearance, prepared for application of sealants.

C. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.

2. Test cleaning methods on sample wall panel; leave ½ panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.

3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking tape.

4. Wet wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clear water.

5. Clean brick by means of bucket and brush hand cleaning method described in BIA "Technical Note No. 20 Revised".

6. Clean concrete masonry by means of cleaning method indicated in NCMA TEK 45 applicable to type of stain present on exposed surfaces.

D. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure unit masonry is without damage and deterioration at time of Substantial Completion.

END OF SECTION

SECTION 040523-MASONRY ACCESSORIES
GOVERNMENT OF THE U. S. VIRGIN ISLANDS, DEPARTMENT OF PUBLIC WORKS
PROJECT NAME
Project Location, U.S. Virgin Islands

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Rainscreen Drainage Planes:

1. Full Brick Veneers:
   a. Sure Cavity. (SC 5016 and SC 5032)
   b. 10MM Sure Cavity. (SCMM 2516 and SCMM 2532)
   c. Gravity Cavity. (GC 1816 and GC 1832)
2. Full Stone Veneers:
   a. 10MM Sure Cavity. (SCMM 2516 and SCMM 2532)
3. Adhered Thin Brick, Adhered Thin Manmade Stone, Adhered Thin Natural Stone and Three-Course Stucco Veneers:
   a. Sure Cavity. (SC 5016 and SC 5032)
   b. Gravity Cavity. (GC 1816 and GC 1832)
4. Cladding (Cladded Siding):
   a. Sure Cavity. (SC 5016 and SC 5032)
   b. Sure Cavity No Fabric. (SC 5016NF and SC 5032NF)
   c. Gravity Cavity. (GC 1816 and GC 1832)
   d. Gravity Cavity No Fabric. (GC 1816NF and GC 1832NF)

B. Single-Wythe (CMU or Jumbo Brick) Wall Drainage Plane:

1. Interior Above Grade (CMU or Jumbo Brick) Wall:
   a. Perforated Control Cavity. (PCC 4816)
   b. Perforated Control Cavity. (PCC 4832)
   c. 10MM Perforated Control Cavity. (PCC 2416)
   d. 10MM Perforated Control Cavity. (PCC 2432)
2. Interior Below Grade Drainage Plane:
   a. Control Cavity. (CC 4800)
   b. 10MM Control Cavity. (CC 4810)

3. Interior Below Grade (Basement) Floor Retrofit Cap Slab Slip Sheet/Drainage Plane:

    a. Control Cavity. (CC 4800)

    b. 10MM Control Cavity. (CC 4810)

C. Exterior Horizontal Low Slope Drainage Plane and Slip Sheet:

1. Sure Cavity. (SC 5016 & SC 5032)

D. Window Rough Opening Sill Drainage Plane:

1. Window Drainage Plane. (WDP 5000)

E. Weep Systems:

1. Full Brick Veneers:

    a. Cavity Weep. (CV 5010)

    b. Wall Opening Weeps. (WOW 9095)

2. Full Stone Veneers:

    a. Stone Cavity Weep. (SCV 5012)

    b. Wall Opening Weeps. (WOW 9095)

3. Adhered Thin Brick, Thin Manmade Stone, Thin Natural Stone and Three Course Stucco Veneers:

    a. Wall Opening Weeps. (WOW 9095)

    b. L & R Weep Screed. (LR 3501)

4. Hollow Core Masonry Units (CMU - Jumbo Brick) as Single Wythe Walls:

    a. Cavity Weep. (CV 5010)

5. Hollow Core Masonry Units (CMU - Jumbo Brick) as Veneers:

    a. Core Cavity Weep. (CCV 5020)

6. Hollow Core Masonry Units (CMU - Jumbo Brick) as Below Grade Foundation Walls:

    a. Vent Mat. (VM 9025)

7. Steel Lintel:

    a. Head Joint Weeps. (HJW 3845)

8. Concealed Steel Lintel:

b. Concealed Steel Lintel/Shelf Angle Weep System. (CLW 9040)

9. Shelf Angle:

a. Head Joint Weeps. (HJW 3845)

b. Vent Strip. (VS 3845)

10. Concealed Shelf Angle:

a. Concealed Steel Lintel/Shelf Angle Weep System. (CLW 9040)

b. Vent Strip. (VS 3845)

F. Masonry Accessories:

1. L & R Weep Screed. (LR 3501)
2. Weep Screed Deflector. (WSD 1309)
3. Edge Metal. (MEM 3168)
4. Vented Edge Metal. (VMEM 3168)
5. Moisture Diverter. (DS 2858)
6. Mortar Belt. (MB 3550)
7. Trash Mortar Diverter. (TMD 9548)
8. Floor Edging. (FE 8555)
9. H Cove. (HC 3504)
10. Sump Basket. (SF30PR)

1.2 RELATED SECTIONS

A. Section 03 30 00 - Cast-in-Place Concrete.

B. Section 04 20 00 - Unit Masonry.

C. Section 04 70 00 - Manufactured Masonry.

D. Section 06 10 00 - Rough Carpentry.

E. Section 07 27 00 - Air Barriers.

F. Section 09 26 00 - Veneer Plastering.

G. Section 09 66 16 - Terrazzo Floor Tile.

1.3 REFERENCES

A. ASTM International (ASTM):

1. ASTM C 1338 - Standard Test Method for Determining Fungi Resistance of Insulation Materials and Facings; 2008.
2. ASTM D 1621 - Standard Test Method for Compressive Properties of Rigid Cellular Plastics; 2010.
3. ASTM D 4533 - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 1996 (2209).
4. ASTM D 4632 - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 1991 (2008).
5. ASTM D 4833 - Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products; 2000 (2007).
6. ASTM SEQ CHAPTER 1E 96/E 96M - Standard Test Methods for Water Vapor Transmission of Materials; 2005.
7. ASTM E 2273 - Standard Test Method for Determining the Drainage Efficiency of Exterior Insulation and Finish Systems (EIFS) Clad Wall Assemblies; 2003.
8. ASTM G 154 - Standard Practice for Operating Fluorescent Light Apparatus for UV Exposure of Nonmetallic Materials; 2000a (2006).

B. CAN/CGSB 148.1 No. 7.3 - Methods of Testing Geotextiles and Geomembranes Grab Tensile Test for Geotextiles; 1992.

C. ICC-ES EG 114 - Low Temperature Flux.

1.4 SUBMITTALS

A. Submit under provisions of Section 01 30 00 - Administrative Requirements.

B. Product Data: Manufacturer's data sheets on each product to be used, including:

1. Preparation instructions and recommendations.
2. Storage and handling requirements and recommendations.
3. Installation methods.

C. Shop Drawings: Provide drawings of special joint conditions.

D. Sustainable Design Submittals:

1. Submit invoices and documentation from manufacturer of the amounts of pre-consumer and post-consumer recycled content for products specified.

2. Submit invoices and documentation showing manufacturing locations and origins of materials for products manufactured and sourced within 500 miles of project location.

E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: Minimum 5 year experience manufacturing similar products.

B. Installer Qualifications: Minimum 2 year experience installing similar products.

C. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship.

1. Finish areas designated by Architect.

2. Do not proceed with remaining work until workmanship is approved by Architect.

3. Refinish mock-up area as required to produce acceptable work.

1.6 PRE-INSTALLATION MEETINGS

A. Convene minimum two weeks prior to starting work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Delivery and Acceptance Requirements: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

B. Storage and Handling Requirements: Store materials in clean, dry, inside area in accordance with manufacturer's instructions. Protect materials from damage during handling and installation.

1.8 PROJECT 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 recommended limits.

1.9 SEQUENCING

B. Ensure that products of this section are supplied to affected trades in time to prevent interruption of construction progress.

1.10 WARRANTY

A. Manufacturer Warranty: Submit manufacturer's standard 20 year limited warranty.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturer: Masonry Technology, Inc, which is located at: 24235 Electric St. P. O. Box 214; Cresco, IA 52136; Toll Free Tel: 800-879-3348; Tel: 563-547-1122; Fax: 563-547-1133; Email:request info (info@mtidry.com); Web:www.mtidry.com

B. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 RAINSCREEN DRAINAGE PLANE - SURE CAVITY (SC 5016 AND SC 5032)

A. Description: Maintains separation between thin veneer cementitious materials and moisture resistance system on structural substrates creating drainage plane system for cavity moisture to drain down and out of wall.

B. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations and a spunbond polypropylene fabric, charcoal color, attached on one side with a 4 inch (102mm) overlapping skirt on one edge.

1. Roll Length: 50 feet (15.24 m).
2. Roll Width: 15.75 inches (324 mm) (SC5016).
3. Roll Width: 31.5 inches (800 mm) (SC5032).
4. Squared - Channel Depth: 3/16 inch (4.76 mm).

C. Performance Criteria:

1. Fungi Resistance: No Growth; ASTM C 1338.
2. Ultra-Violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.
3. Drainage Efficiency with EIFS Cladding: Pass; ASTM E 2273.
4. Water Vapor Transmission: ASTM E 96/E 96M.
   a. 9.60 grains/hr sq ft.
   b. Permeance (perms) grains/hr sq ft - 23.45 in Hg.
   c. Permeability perm-inches - 8.79.
5. Load: 583 lbf at 10 percent strain; ASTM D 1621.
6. Compressive Strength: 36.1 psi at 10 percent strain; ASTM D 1621.
7. Compressive Modulus: 362 psi; ASTM D 1621.
8. Fabric Tearing Strength: 42.2 lbs, maximum; ASTM D 4533.
9. Breaking Load: ASTM D 4632.

a. Machine Direction: 207 lbs.

b. Transverse Direction: 156 lbs.

10. Puncture Resistance: 44.4 lbs; ASTM D 4833.

11. Low Temperature Flex: No cracks in area of bend; ICC-ES EG 114.

D. Description: Maintains separation between thin veneer cementitious materials and moisture resistance system on structural substrates creating drainage plane system for cavity moisture to drain down and out of wall

E. Materials: High impact polystyrene sheets, 0.024 inch (0.61mm) thick, formed with corrugations and a spunbond polypropylene fabric, charcoal color, attached on one side with a 4 inch (102mm) overlapping skirt on one edge.

1. Roll Length: 25 feet (7.6 m).

2. Roll Width: 15.75 inches (324 mm) (SCMM2516).

3. Roll Width: 31.5 inches (800 mm) (SCMM2532).

4. Angled - Channel Depth: 7/16 inch (11mm).

F. Performance Criteria:

1. Fungi Resistance: No Growth; ASTM C 1338.

2. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

3. Drainage Efficiency with EIFS Cladding: Pass; ASTM E 2273.

4. Water Vapor Transmission: ASTM E 96/E 96M.

5. 4.14 grains/hr sq ft.

6. Permeance (perms) grains/hr sq ft - 10.12 in Hg.

7. Permeability perm-inches - 4.47.

8. Compressive Strength: At 10 percent strain; ASTM D 1621.

9. 4.9 psi (SCMM 2532).

10. 5.6 psi (SCMM 2516).

11. Puncture Resistance: 44.4 lbs; ASTM D 4833.

12. Low Temperature Flex: No cracks in area of bend; ICC-ES EG 114.

13. Tensile Strength: 10 kN/m; CAN/CGSB 148.1 No. 7.3.

14. Elongation at Maximum Load: 32 percent; CAN/CGSB 148.1 No. 7.3.

2.3 RAINSCREEN DRAINAGE PLANE - GRAVITY CAVITY (GC 1816 AND GC 1832)

A. Description: Maintains separation between thin veneer cementitious materials and moisture resistance system on structural substrates creating drainage plane system for cavity moisture to drain down and out of wall.

B. Materials: High impact polystyrene sheets, 0.024 inch (0.61mm) thick, formed with corrugations and a spun bond polypropylene fabric, white color, attached on one side with a 4 inch (102 mm) overlapping skirt on one edge.

1. Roll Length: 76 feet (23 m).

2. Roll Width: 15.75 inches (324 mm) (GC 1816).

3. Roll Width: 31.5 inches (800 mm) (GC 1832).

4. Curved - Channel Depth: 1/8 inch (3.25 mm).

C. Performance Criteria:

1. Fungi Resistance: No Growth; ASTM C 1338.

2. Ultra-Violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

2.4 CLADDING RAINSCREEN DRAINAGE PLANE - SURE CAVITY NO FABRIC (SC 5016NF & SC 5032NF)

A. Description: Creates a 3/16 inch (4.8 mm) vertical void. A continuous and predictable separation between the backside of the rainscreen (cladding siding veneer) and the face of the (WRB, rigid insulation, etc.).

B. Materials: High impact polystyrene sheets, 0.024 inch (0.61mm) thick, formed with corrugations.

1. Roll Length: 50 feet (15.24 m).

2. Roll Width: 15.75 inches (324 mm) (SC 5016NF).

3. Roll Width: 31.5 inches (800 mm) (SC 5032NF).

4. Squared Channel Depth: 3/16 inches (4.76mm).

C. Performance Criteria:

1. Fungi Resistance: No Growth: ASTM C 1338.

2. Ultra-Violet (UV) Exposure: No peeling, chipping, cracking, flaking, pitting, crazing erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

3. Drainage efficiency with EIFS Cladding: Pass; ASTM E 2273.

4. Water Vapor Transmission: ASTM E 96/E 96M.

5. 9.60 grains/hr sq ft.

6. Permeance (perms) grains/hr sq ft - 23.45 in Hg.

7. Permeability perm-inches - 8.79.

8. Load: 583 lbf at 10 percent strain; ASTM D 1621.

9. Compressive Strength: 36.1 psi at 10 percent strain; ASTM D 1621.

10. Compressive Modulus: 362 psi; ASTM D 1621.

11. Breaking Load: ASTM D 4632.

12. Machine Direction: 207 lbs.

13. Transverse Direction: 156 lbs.

14. Puncture Resistance: 44.4 lbs; ASTM D 4833.

15. Low Temperature Flex: No cracks in area of bend; ICC-ES EG 114.

2.5 CLADDING RAINSCREEN DRAINAGE PLANE - GRAVITY CAVITY NO FABRIC (GC 1816NF & GC 1832NF)

A. Description: Creates a 1/8 inch (3.25 mm) vertical void. A continuous and predictable separation between the backside of the rainscreen (cladding/siding veneer) and the face of the (WRB, rigid insulation etc.).

B. Materials: impact polystyrene sheets, 0.024 inch (0.61mm) thick, formed with corrugations.

1. Roll Length: 76 feet.

2. Roll Width: 15.75 inches (324 mm) (GC 1816NF)

3. Roll Width: 31.5 inches (800 mm) (GC 1832NF)

4. Curvred - Channel Depth 1/8 inch (3.25mm).

C. Performance Criteria:

1. Fungi Resistance: No Growth; ASTM C 1338.

2. Ultra-Violet (UV) Exposure: No peeling, chipping, cracking, flaking, pitting, crazing erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

2.6 SINGLE-WYTHE MOISTURE CONTROL - PERFORATED CONTROL CAVITY (PCC 4816 & PCC 4832)

A. Description: Maintains separation between interior surface of single-wythe concrete masonry unit (CMU) substrate and moisture sensitive interior finished walls creating drainage system that allows moisture to drain down and out of walls.

B. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations and a cross-woven polyolefin fabric, green color, attached on one side with a 4 inches (102 mm) overlapping skirt on one edge.

1. Roll Length: 50 feet (15.24 m).

2. Roll Width: 15.75 inches (324 mm) (PCC4816).

3. Roll Width: 31.5 inches (800 mm) (PCC4832).

4. Squared - Channel Depth: 3/16 inch (4.76 mm).

C. Performance Criteria:

1. Fungi Resistance: No Growth; ASTM C 1338.

2. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

3. Load: 583 lbf at 10 percent strain; ASTM D 1621.

a. Compressive Strength: 36.1 psi at 10 percent strain; ASTM D 1621.

b. Compressive Modulus: 362 psi; ASTM D 1621.

2.7 SINGLE-WYTHE MOISTURE CONTROL - 10MM PERFORATED CONTROL CAVITY (PCC 2416 & PCC 2432)

A. Description: Maintains separation between interior surface of single-wythe concrete masonry unit (CMU) substrate and moisture sensitive interior finished walls creating drainage system that allows moisture to drain down and out of walls.

B. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations and a cross-woven polyolefin fabric, green color, attached on one side with a 4 inches (102 mm) overlapping skirt on one edge.

1. Roll Length: 25 feet (7.62 m).

2. Roll Width: 15.75 inches (324 mm) (PCC2416).

3. Roll Width: 31.5 inches (800 mm) (PCC2432).

4. Angled - Channel Depth: 7/16 inch (11 mm).

A. Performance Criteria:

1. Fungi Resistance: No Growth; ASTM C 1338.

2. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

3. Compressive Strength: At 10 percent strain; ASTM D 1621.

a. 4.9 psi (PCC 2432).

b. 5.6 psi (PCC 2416).

2.8 CAVITY DRAINAGE PLANES - CONTROL CAVITY (CC 4800)

A. Description: Provides separation between wood framing, insulation and gypsum board from concrete or masonry wall substrates and providing ventilation of these cavities.

B. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations.

1. Roll Length: 50 feet (15.24 m).

2. Roll Width: 31.5 inches (800 mm).

3. Squared - Channel Depth: 3/16 inch (4.76 mm).

C. Performance Criteria:

1. Fungi Resistance: No Growth; ASTM C 1338.

2. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

3. Load: 583 lbf at 10 percent strain; ASTM D 1621.

a. Compressive Strength: 36.1 psi at 10 percent strain; ASTM D 1621.

b. Compressive Modulus: 362 psi; ASTM D 1621.

2.9 CAVITY DRAINAGE PLANES - 10MM CONTROL CAVITY (CC 4810)

A. Description: Provides separation between wood framing, insulation and gypsum board from concrete or masonry wall substrates and providing ventilation of these cavities.

B. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations.

1. Roll Length: 50 feet (15.24 m).

2. Roll Width: 31.5 inches (800 mm).

3. Angled - Channel Depth: 7/16 inch (11mm).

C. Performance Criteria:

4. Fungi Resistance: No Growth; ASTM C 1338.

5. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

6. Compressive Strength: 5.4 psi at 10 percent strain; ASTM D 1621.

2.10 HORIZONTAL LOW SLOPE DRAINAGE PLANE AND SLIP SHEET FOR STONE OVERLAYS - SURE CAVITY (SC 5016 AND SC 5032)

A. Description: Creates a horizontal void between the bottom side of the stone overlay or overlay setting mortar and the waterproofing system. It is a drainage plane and a slip-sheet.

B. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with a 4 inches (102 mm) overlapping skirt on one edge.

1. Roll Length: 50 feet (15.24 m).

2. Roll Width: 15.75 inches (324 mm) (SC 5016).

3. Roll Width: 31.5 inches (800 mm) (SC 5032).

4. Squared - Channel Depth: 3/16 inch (4.76mm).

C. Performance Criteria:

1. Resistance: No Growth; ASTM C 1338.

2. Ultra-violet (UV) Exposure: No peeling, chipping, cracking, flaking, pitting, crazing erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

3. Drainage Efficiency with EIFS Cladding: Pass; ASTM E 2273.

4. Water Vapor Transmission: ASTM E 96/E 96M.

5. 9.60 grains/hr sq ft.

6. Permeance (perms) grains/hr sq ft - 23.45 in Hg.

7. Permeability perm-inches - 8.79.

8. Load: 583 lbf at 10 percent strain; ASTM D 1621.

9. Compressive Strength: 36.1 psi at 10 percent strain; ASTM D 1621.

10. Compressive Modulus: 362 psi; ASTM D 1621.

11. Tearing Strength: 42.2 lbs, maximum; ASTM D 4533.

12. Breaking Load: ASTM D 4632

13. Machine Direction: 207 lbs.

14. Transverse Direction: 156 lbs.

15. Puncture Resistance: 44.4 lbs; ASTM D 4833.

16. Low Temperature Flex: No cracks in area of bend.

2.11 WINDOW SUB-SILL DRAINAGE PLANES WINDOW DRAINAGE PLANE (WDP 5000)

A. Description: Creates a horizontal and vertical void that separates the bottom side of the window frame from the top (slope to drain) sill pan flashing and the back side of the veneer from the face of the sill pan flashing.

B. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations and bent into L-Shape, 5 inches (127 mm) wide by 9 inches (229 mm) high, to fit on top of sub-sill area of window rough opening prior to window installation.

1. Length: 4 feet (1.2 m).

2. Curved - Channel Depth: 1/8 inch (3.25mm).

3. Window Drainage Plane - WDP 5000

C. Performance Criteria:

1. Fungi Resistance: No Growth; ASTM C 1338.

2. Ultra-Violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

2.12 WEEP SYSTEM FOR FULL BRICK VENEERS

A. Cavity Weep (CV 5010):

1. Description: Forms the bottom side of the bed joint of mortar to create tunnels/channels that reach from the face of the masonry unit (brick) to the backside of the masonry unit into the cavity of the full brick veneer wall or into the vertical drainage plane (the rainscreen drainage plane) created by Sure Cavity (SC 5016 or SC 5032) or 10MM Sure Cavity (SCMM 2516 or SCMM 2532) or Gravity Cavity (GC 1832)

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations.

a. Weep Legs: 2-1/4 inches (57 mm) wide at 9-1/2 inches (242 mm) on center.

b. Continuous Belt Width: 1 inch (25 mm).

c. Overall Width: 6 inches (152 mm).

d. Length: 25 feet (7.6 m).

e. Squared - Channel Depth: 3/16 inch (4.76 mm).

f. Color: Translucent.

3. Performance Criteria:

   a. Fungi Resistance: No Growth; ASTM C 1338.

   b. Ultra-violet (UV) Exposure: No Cracking, checking, crazing, erosion or other characteristics that might affect performance; ASTM G 154.

B. Wall Opening Weeps (WOW 9095):

1. Description: Forms the bottom side of the bed joint of mortar to create tunnels/channels that reach from the face of the masonry unit (brick) to the back side of the masonry unit into the cavity of the full brick veneer wall or into the vertical drainage plane (the rainscreen drainage plane) created by Sure Cavity (SC 5016 / SC 5032), Gravity Cavity (GC 1832) or 10MM Sure Cavity (SCMM 2516 or SCMM 2532).

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations and bent into L-Shape, 9 inches (229 mm) on one leg by 5 inches (127 mm) on other leg.

   a. Width: 2 1/2 inches (63.5 mm).

   b. Squared - Channel Depth: 3/16 inch (4.76mm).

   c. Color: Translucent.

3. Performance Criteria:

   a. Fungi Resistance: No Growth; ASTM C 1338.

   b. Ultra-violet (UV) Exposure: No Cracking, checking, crazing, erosion or other characteristics that might affect performance; ASTM G 154.

2.13 WEEP SYSTEMS FOR FULL STONE VENEERS

A. Stone Cavity Weep (SCV 5012):

1. Description: Forms the bottom side of the bed joint of mortar to create tunnels/channels that reach from the face of the masonry unit (full depth stone 3 inches (76 mm)minimum 10 inches (254 mm) maximum) into the cavity at the backside of full depth stone veneer or into the vertical drainage plane (the rainscreen drainage plane) created by 10MM Sure Cavity (SCMM 2516 or SCMM 2532)

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations.

   a. Weep Legs: 2-1/4 inches (57 mm) wide at 9-1/2 inches (242 mm) on center.

   b. Continuous Belt Width: 1 inch (25 mm).

   c. Overall Width: 12 inches (305 mm).

d. Length: 25 feet (7.62 m).

e. Squared - Channel Depth: 3/16 inch (4.76 mm).

f. Color: Translucent.

3. Performance Criteria:

a. Fungi Resistance: No Growth; ASTM C 1338.

b. Ultra-violet (UV) Exposure: No Cracking, checking, crazing, erosion or other characteristics that might affect performance; ASTM G 154.

B. Wall Opening Weeps (WOW 9095):

1. Description: Forms the bottom side of the bed joint of mortar to create tunnels/channels that reach from the face of the masonry unit (full depth stone 3 inch minimum to 6 inches (76 mm) maximum) into the cavity at the backside of the full depth stone veneer or into the vertical drainage plane (The rainscreen drainage plane) created by 10MM Sure Cavity (SCMM 2516 or SCMM 2532).

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations and bent into L-Shape, 9 inches (229 mm) on one leg by 5 inches (127 mm) on other leg.

a. Width: 2 1/2 inches (63.5 mm).

b. Squared - Channel Depth: 3/16 inch (4.76 mm).

c. Color: Translucent.

3. Performance Criteria:

a. Fungi Resistance: No Growth; ASTM C 1338.

b. Ultra-violet (UV) Exposure: No Cracking, checking, crazing, erosion or other characteristics that might affect performance; ASTM G 154.

2.14 WEEP SYSTEMS FOR ADHERED THIN BRICK, THIN MANMADE STONE, THIN NATURAL STONE AND THREE COURSE STUCCO VENEERS

A. Wall Opening Weeps (WOW 9095):

1. Description: Forms the bottom edge of scratch coat of mortar and the bottom edge of the adhered thin brick, thin manmade stone, thin natural stone and three course stucco veneer adhering mortar and grouting mortar at horizontal terminations (tops of windows - door and wall openings and at horizontal top surfaces of non-frost affected details (stoops - ledges etc.) to create tunnels/channels that reach from the face of the adhered veneer into the vertical drainage plane (the rainscreen drainage plane) created by Sure Cavity (SC 5016 or SC 5032) or Gravity Cavity (GC 1832).

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations and bent into L-Shape, 9 inches (229mm) on one leg by 5 inches (127mm) on other leg.

   a. Width: 2-1/2 inches (63.5 mm).

   b. Squared - Channel Depth: 3/16 inch (4.76 mm).

   c. Color: Translucent.

3. Performance Criteria:

   a. Fungi Resistance: No Growth; ASTM C 1338.

   b. Ultra-violet (UV) Exposure: No Cracking, checking, crazing, erosion or other characteristics that might affect performance; ASTM G 154.

B. L & R Weep Screed (LR 3501):

1. Description: A sheet metal device that creates a bottom of adhered thin brick, thin manmade stone, thin natural stone and three course stucco veneer wall termination detail, that encapsulates and weeps the bottom edge of the WRB, the bottom edge of the rainscreen drainage plane Sure Cavity (SC 5016/SC5032) or Gravity Cavity (GC 1832), The bottom edge of the self-furring expanded metal lath and scratch coat, a metal detail that bridges the construction joint created by the bottom of the wall sheathing and the top outside edge of the foundation wall.

2. Material: 26 gauge galvanized steel, bent into "V" shaped channel, with long vertical leg and short leg at 70 degree angle out from other leg and slots punched into bottom edge.

   a. Length of Long Vertical Leg: 3-1/2 inches (88.9 mm).

   b. Anchor Holes in Vertical Leg: 3/16 inch (4.76 mm) diameter.

   c. Vertical Spacing: 1-5/16 inches (33.3 mm) apart.

   d. Horizontal Spacing: 2-3/4 inches (69.8mm) apart.

   e. Length of Short Leg: 1-1/32 inch (26.19 mm).

   f. Length of Slots: 1 inch (25.4 mm)

   g. Space between Slots: 1-3/4 inches (44 mm).

   h. Length: 8 feet (2.4 m).

2.15 WEEP SYSTEMS FOR HOLLOW CORE MASONRY UNITS (CMU - JUMBO BRICK) AS SINGLE WYTHE WALLS

A. Cavity Weep (CV 5010):

1. Description: Forms the bottom side of the bed joint of mortar on the exterior face shell to create tunnels/ channels that reach from the outside surface of the exterior face shell into the open core of a single wythe (CMU or jumbo brick) wall.

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations.

   a. Weep Legs: 2-1/4 inch (57 mm) wide at 9-1/2 inches (242 mm) on center.

   b. Continuous Belt Width: 1 inch (25 mm).

   c. Overall Width: 6 inches (152 mm).

   d. Length: 25 feet (7.6 m).

   e. Squared - Channel Depth: 3/16 inch (4.76 mm).

   f. Color: Translucent.

3. Performance Criteria:

   a. Fungi Resistance: No Growth; ASTM C 1338.

   b. Ultra-violet (UV) Exposure: No Cracking, checking, crazing, erosion or other characteristics that might affect performance; ASTM G 154.

2.16 WEEP SYSTEMS FOR HOLLOW CORE MASONRY UNITS (CMU - JUMBO BRICK) AS VENEERS

A. Core Cavity Weep (CCV 5020):

1. Description: Forms the bottom side of the bed joint of mortar on the interior and exterior face shell to create tunnels/channels that connect the cavity, to the core, to the exterior of the hollow core masonry unit veneer wall. The cores/cells of the masonry units shall be no less than 3 inches (76.2 mm) wide.

2. Material: High impact polystyrene sheets, 0.024 inch (0.61mm) thick, formed with corrugations.

   a. Weep Legs: 2-1/2 inches (63.5 mm) wide, offset on each side of continuous belt at 9-1/2 inches (241.3 mm) on center.

   b. Continuous Belt Width: 2 inches (50.8 mm).

   c. Overall Width: 12 inches (304.8 mm).

   d. Length: 25 feet (7.6 m).

   e. Squared - Channel Depth: 3/16 inch (4.76 mm).

   f. Color: Translucent.

3. Performance Criteria:

   a. Fungi Resistance: No Growth; ASTM C 1338.

   b. Ultra-violet (UV) Exposure: No Cracking, checking, crazing, erosion or other characteristics that might affect performance; ASTM G 154.

2.17 WEEP SYSTEMS FOR HOLLOW CORE MASONRY UNITS (CMU - JUMBO BRICK) AS BELOW GRADE FOUNDATION WALLS

A. Vent Mat (VM 9025):

1. Description: Forms the bottom side of the bed joint of mortar on the interior face shell to create tunnels/ channels that connect the core to the interior surface of the foundation wall and interior edge of the footing.

2. Material: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations.

   a. Weep Legs: 2-1/4 inches (57 mm) wide at 4-1/2 inches (114.3 mm) on center.

   b. Continuous Belt Width: 2-1/2 inches (63.5 mm).

   c. Overall Width: 11-1/2 inches (292 mm).

   d. Length: 25 feet (7.6 m).

   e. Squared - Channel Depth: 3/16 inch (4.76 mm).

   f. Color: Black.

3. Performance Criteria:

   a. Fungi Resistance: No Growth; ASTM C 1338.

   b. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

2.18 WEEP SYSTEM FOR STEEL LINTEL

A. Head Joint Weeps (HJW 3845):

1. Description: Is a 3/8 inch x 3/8 inch spacer that is installed in each head joint of brick course laid dry on a flashing system that covers a steel lintel. It maintains a 3/8 inch high void in the bottom of the head joint of mortar from the exterior surface of the full brick veneer back into the vertical void created by the rainscreen drainage plane Sure Cavity (SC 5016/SC 5032), 10MM Sure Cavity (SCMM 2516/SCMM 2532) or Gravity Cavity (GC 1832).

2. Materials: Acetac, 0.24 inch (0.6 mm) thick.

   a. Width: 3/8 inch (9.5 mm).

b. Height: 3/8 inch (9.5 mm).

c. Length: 4 1/2 inches (114mm) to 9 inches (228 mm).

d. Color: Light gray.

2.19 WEEP SYSTEM FOR CONCEALED STEEL LINTEL

A. Concealed Steel Lintel/Shelf Angle Weep System (CLW 9040):

1. Description: Forms the bottom side of the bed joint of mortar and the front nose of the bed joint of mortar to create tunnels/channels from behind the lip of a lip brick at the front of the steel lintel into the vertical void created by rainscreen drainage plane Sure Cavity (SC 5016/SC 5032) or 10MM Sure Cavity (SCMM 2516/SCMM 2532) or Gravity Cavity (GC 1832).

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations and bent into L-Shape, 5 inches (127 mm) or less on one leg by 9 inches (229 mm) or less on other leg.

   a. Length: 4 feet (1.2 m).

   b. Curved - Channel Depth: 1/8 inch (3.25 mm).

3. Performance Criteria:

   a. Fungi Resistance: No Growth; ASTM C 1338.

   b. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

2.20 WEEP SYSTEM FOR SHELF ANGLE

A. Head Joint Weeps (HJW 3845):

1. Description: Is a 3/8 inch x 3/8 inch spacer that is installed in each head joint of brick course laid dry on a flashing system that covers a shelf angle. It maintains a 3/8 inch high void in the bottom of the head joint of mortar from the exterior surface of the full brick veneer back into the vertical void created by the rainscreen drainage plane, Sure Cavity (SC 5016/SC 5032) or 10MM Sure Cavity (SCMM 2516/SCMM 2532) or Gravity Cavity (GC 1832).

2. Materials: Acetac, 0.24 inch (0.6mm) thick.

   a. Width: 3/8 inch (9.5 mm).

   b. Height: 3/8 inch (9.5 mm).

   c. Length: 4-1/2 inches (114 mm) to 9 inches (228 mm)

   d. Color: Light gray.

B. Vent Strip (VS 3845):

1. Description: Forms a flexible joint and maintains ventilation opening at top of masonry veneer or underside of the expansion pad mounted on the underside of the shelf angle from outside surface of the brick veneer into the cavity of the full brick veneer or into the vertical drainage plane created by the rainscreen drainage plane Sure Cavity (SC 5016/SC 5032) or 10MM Sure Cavity (SCMM 2516/SCMM 2532) or Gravity Cavity (GC 1832).

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61mm) thick, formed with corrugations.

   a. Width: 4-5/8 inch (117 mm).

   b. Length: 50 feet (15.2 m)

   c. Curved - Channel Depth: 1/8 inch (3.25 mm).

3. Performance Criteria:

   a. Fungi Resistance: No Growth; ASTM C 1338.

   b. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

2.21 WEEP SYSTEM FOR CONCEALED SHELF

A. Concealed Steel Lintel/Shelf Angle Weep System (CLW 9040):

1. Description: Forms the bottom side of the bed joint of mortar and the front nose of the bed joint of mortar to create tunnel / channels from behind the lip of a lip brick at front of the steel lintel into the vertical void created by rainscreen drainage plane Sure Cavity (SC 5016/SC 5032) or 10MM Sure Cavity (SCMM 2516 /SCMM 2532) or Gravity Cavity (GC 1832).

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations and bent into L-Shape, 5 inches (127 mm) or less on one leg by 9 inches (229 mm) or less on other leg.

   a. Length: 4 feet (1.2 m).

   b. Curved - Channel Depth: 1/8 inch (3.25 mm).

3. Performance Criteria:

   a. Fungi Resistance: No Growth; ASTM C 1338.

   b. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

B. Vent Strip (VS 3845):

1. Description: Forms flexible joint and maintains ventilation opening at top of masonry veneer or underside of the expansion pad mounted on the underside of the shelf angle from outside surface of the full brick veneer into the cavity of the full brick veneer or into the vertical drainage plane created by the rainscreen drainage plane, Sure Cavity (SC 501 /SC 5032) or 10MM Sure Cavity (SCMM 2516/SCMM 2532) or Gravity Cavity (GC 1832).

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations.

   a. Width: 4-5/8 inch (117 mm).

   b. Length: 50 feet (15.2 m)

   c. Curved - Channel Depth: 1/8 inch (3.25 mm).

3. Performance Criteria:

   a. Fungi Resistance: No Growth; ASTM C 1338.

   b. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

2.22 MASONRY ACCESSORLES

A. L & R Weep Screed (LR 3501):

1. Description: A sheet metal device that creates a bottom of thin veneer wall termination detail that encapsulates and weeps the bottom edge of the WRB, the bottom edge of the rainscreen drainage plane Sure Cavity (SC 5016 / SC 5032) or Gravity Cavity (GC 1832). The bottom edge of the self-furring expanded metal lath and scratch coat, a metal detail that bridges the construction joint created by the bottom of the wall sheathing and the top outside edge of the foundation wall.

2. Material: 26 gauge galvanized steel, bent into "V" shaped channel, with a long vertical leg and a short leg at 70 degree angle out from other leg and slots punched into bottom edge.

   a. Length of Long Vertical Leg: 3-1/2 inches (38 mm).

   b. Anchor Holes in Vertical Leg: 3/16 inch (4.76 mm) diameter.

      i. Vertical Spacing: 1-5/16 inches (33.3 mm) apart.

      ii. Horizontal Spacing: 2-3/4 inches (69.8 mm) apart.

c. Length of Short Leg: 1-1/32 inch (26.19 mm).

d. Length of Slots: 1 inch (25.4 mm).

e. Space between Slots: 1-3/4 inches (44 mm).

f. Length: 8 feet (2.4 m).

B. Weep Screed Deflector (WSD 1309):

1. Description: Formed metal termination material that provides mechanical termite barrier, used with weep screed to deflect drainage water away from foundation wall.

2. Material: 26 gauge galvanized steel, bent into "L" shaped channel, with long vertical leg and short leg at 120 degree angle out from other leg.

a. Length of Long Vertical Leg: 3 1/2 inches (88.9 mm).

b. Anchor Holes in Vertical Leg: 3/16 inch (4.76 mm) diameter.

i. Vertical Spacing: 1-5/16 inches (33.3mm) apart.

ii. Horizontal Spacing: 2-3/4 inches (69.8mm) apart.

c. Length of Short Leg: 51/64 inch (20.24 mm)

d. Length: 8 feet (2.4m).

C. MTI Edge Metal (MEM 3168):

1. Description: Formed metal termination to accommodate rainscreen drainage plane material.

2. Material: 26 gauge galvanized steel, bent into "J" shaped channel, with long vertical leg and short leg at 5 degree angle out from other leg.

a. Length of Long Vertical Leg: 3-21/32 inches (92.9 mm).

b. Anchor Holes in Vertical Leg: 3/16 inch (4.76 mm) diameter

i. Vertical Spacing: 1-5/16 inches (33.3 mm) apart.

ii. Horizontal Spacing: 2-3/4 inches (69.8 mm) apart.

c. Length of Short Leg: 3/8 inch (9.5mm)

d. Width at Bottom: 11/32 inch (8.6mm).

e. Length: 8 feet (2.4m).

D. Vented MTI Edge Metal (VMEM 3168):

3. Description: Formed metal termination to accommodate rainscreen drainage plane material and weep.

4. Material: 26 gauge galvanized steel, bent into "J" shaped channel, with long vertical leg and short leg at 5 degree angle out from other leg and slots punched into bottom edge.

   a. Length of Long Vertical Leg: 3-21/32 inches (92.9 mm).

   b. Anchor Holes in Vertical Leg: 3/16 inch (4.76 mm) diameter

      i. Vertical Spacing: 1-5/16 inches (33.3mm) apart.

      ii. Horizontal Spacing: 2-3/4 inches (69.8 mm) apart.

   c. Length of Short Leg: 3/8 inch (9.5 mm)

   d. Width at Bottom: 11/32 inch (8.6 mm).

   e. Length of Slots: 1 inch (25.4 mm)

   f. Space Between Slots: 1.75 inches (44.45 mm).

   g. Length: 8 feet (2.4 m).

E. Moisture Diverter (DS 2858):

1. Description: Forms a diversion for moisture above wall openings such as windows and doors, directing the moisture to one side of opening and away from these moisture sensitive wall details.

2. Materials: 26 gauge galvanized steel, bent into "L" shaped channel, with long vertical leg and short leg at 65 degree angle out from other leg.

   a. Length of Long Vertical Leg: 1-7/8 inches (47.6 mm).

   b. Length of Short Leg: 5/8 inch (15.9 mm)

   c. Length: 4 feet (1.2 m).

F. Mortar Belt (MB 3550):

1. Description: Forms a barrier within cores of CMU to suspend and trap mortar occurring within cells.

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61mm) thick, formed with corrugations.

   a. Width: 3-1/2 inch (89 mm).

   b. Length: 50 feet (15.2 m).

c. Squared - Channel Depth: 3/16 inch (4.76 mm).

d. Color: Black.

3. Performance Criteria:

a. Fungi Resistance: No Growth; ASTM C 1338.

b. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

G. Trash Mortar Diverter (TMD 9548):

1. Description: Formed in a "V" Shape to hold and encapsulate trash mortar and prevent mortar bridging within 1-1/2 inch (38.1 mm) to 3 inches (76.2 mm) wide cavity air space.

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations and bent into V-Shape, with 8-1/2 inches (216 mm) back leg and 5-1/2 inch (140 mm) front leg. Contains weep holes at 2-1/2 inches (63.5 mm) on center in bottom of "V" and at 1 inch (25.4 mm) on center up each leg.

a. Length: 4 feet (1.2 m).

b. Squared - Channel Depth: 3/16 inch (4.76 mm).

c. Color: Black.

3. Performance Criteria:

a. Fungi Resistance: No Growth; ASTM C 1338.

b. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

H. Floor Edging (FE 8555):

1. Description: Forms horizontal and vertical ventilation channels at edge of concrete floors at foundation walls and prevents attachment, moisture and thermal transfer, and shrinkage cracking along this edge.

2. Materials: High impact polystyrene sheets, 0.024 inch (0.61 mm) thick, formed with corrugations and bent into L-Shape, with 9 inches (229 mm) on one leg by 5 inches (127 mm) on other leg.

a. Length: 4 feet (1.2 m).

b. Squared - Channel Depth: 3/16 inch (4.76 mm).

c. Color: Black.

3. Performance Criteria:

d. Fungi Resistance: No Growth; ASTM C 1338.

e. Ultra-violet (UV) Exposure: No Peeling, chipping, cracking, flaking, pitting, crazing, erosion or other deleterious effects were observed under a 5X magnification; ASTM G 154.

I. Cove (HC 3504):

1. Description: Forms displacement channel at edge of slab concrete for wet basement renovations creating passageway for water to flow to gas sealed sump basket.

2. Material: Extruded PVC, 0.06 inch (1.52 mm) thick and in an "h" shape to sit on top of footing with vertical leg against the foundation wall.

a. Length of Vertical Leg: 3.03 inches (79.96 mm).

b. Radius of Cove: 1-11/16 inches (43.13 mm).

c. Width at Bottom: 3-3/8 inches (86.49 mm).

d. Vertical Offset from Front to Rear: 1/2 inch (13.21 mm).

e. Length: 4 feet (1.2 m).

J. Sump Basket (SF30PR):

1. Description: Formed tall basket with non-corrosive, nylon encapsulated inserts to protect stainless steel bolts and washers. Lid of basket is thick and strong with an easy grab handle and provides access panel for sump pump and electrical supply, gas tight with gaskets, and provides water discharge and gas vent port.

2. Materials: Structural foam.

a. Diameter: 18 inches (457 mm).

b. Height: 30 inches (762 mm).

c. Capacity: 30 gallons (114 L).

PART 3 EXECUTION

3.1 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.3 VERIFICATION OF CONDITIONS

A. Verify that field conditions are acceptable and are ready to receive this work.

B. Verify that related items provided under other sections are properly sized and located.

3.4 DRAINAGE PLANE INSTALLATION

A. Install systems in accordance with manufacturer's instructions and as follows.

1. Rainscreen Drainage Planes for Full Brick Veneers:

   a. Install first course of rainscreen drainage plane with fabric side facing to weather with 4 inches (102 mm) fabric skirt overlapping continuous belt of Cavity Weep (CV 5010).

   b. Install successive courses so 4 inches (102 mm) long fabric skirt overlaps top edge of lower course of rainscreen drainage plane -- Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532), or Gravity Cavity (GC 1816 or GC 1832).

   c. Install weeps for full brick veneers, Cavity Weep (CV 5010), atop flashing with continuous belt centered in cavity and weep legs extending out from exposed face of full brick veneer a minimum of 1 inch to 1-1/2 inches (25 mm to 38 mm).

   d. As an Contractor Option to Cavity Weep (CV 5010) at the bottom of wall and as a weep system to accommodate the top of wall openings details, install Wall Opening Weeps (WOW 9095), 10-1/2 inches (267 mm) on center with appropriate leg 5 inches or 9 inches (127 mm or 229 mm) extending up the backup wall behind Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532), or Gravity Cavity (GC 1816 or GC 1832) and horizontal leg 5 inches or 9 inches (127 mm or 229 mm) extending out from face of brick veneer a minimum of 1 inch or 1-1/2 inches (25 mm or 38 mm).

   e. Tool joints and lightly score weep legs at face of brick veneer and crack off by pushing downward while mortar is still plastic.

   f. Finish tool joints and brush brick wall.

   g. Install the required accessories to accommodate wall opening and top of wall detail etc.

2. Rainscreen Drainage Planes for Full Stone Veneers: 10MM Sure Cavity (SCMM 2516 or SCMM 2532)

   a. Install first course of rainscreen drainage plane over appropriate weather resistant barrier (WRB) and flashing system with fabric side facing to weather with 4 inches (102 mm) fabric skirt overlapping continuous belt of Stone Cavity Weep (SCV 5012).

   b. Install successive courses so 4 inches (102 mm) long fabric skirt overlaps top edge of lower course of rainscreen drainage plane -- Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532), or Gravity Cavity (GC 1816 or GC 1832).

c. Install weeps for full veneers, Stone Cavity Weep (SCV 5012), atop flashing with continuous belt 1/2 inch (12 mm) from rear of cavity and weep legs extending out from exterior face of full stone veneer.

d. As an Contractor Option to Stone Cavity Weep (SCV 5012) at the bottom of wall and as a weep system to accommodate the top of wall opening details, install Wall Opening Weeps (WOW 9095), 10-1/2 inches (267 mm) on center with appropriate leg 5 inches or 9 inches (127 mm or 229 mm) extending up the backup wall behind 10MM Sure Cavity (SCMM 2516 or SCMM 2532) and horizontal leg 5 inches or 9 inches (127 mm or 229 mm) extending out from the exterior face of full stone veneer a minimum of 1 inch to 1 1/2 inches (25mm to 38mm).

e. Install mortar bed joint atop weep assembly and lay stone veneer.

f. Tool joints and lightly score weep legs at face of stone veneer and crack off by pushing downward while mortar is still plastic.

g. Finish tool joints and brush stone wall.

h. Install the required accessories to accommodate wall opening and top of wall detail etc.

3. Rainscreen Drainage Plane for (Adhered) Thin Brick, Thin Manmade Stone, Thin Natural Stone, and for Three-Course Stucco Veneers.

a. Weep Screed - L & R Weep Screed (LR 3501)

i. Install L & R Weep Screed at bottom of (adhered) thin brick, thin stone, thin natural stone or three-course stucco veneer wall with a 3-1/2 inches (89 mm) back flange transitioning the construction joint created by the top outside corner of the foundation wall and the bottom edge of the wall sheathing.

ii. The 3-1/2 inches (89 mm) back flange should be fastened to the framed sheathing only with approximately 1-1/2 to 2 inches (38 to 50.8 mm) overlapping down over face of foundation.

b. Rainscreen Drainage Plane: Sure Cavity (SC 5016 or SC 5032) or Gravity Cavity (GC 1816 or GC 1832).

i. Install Cavity or Gravity Cavity over acceptable weather resistant barrier (WRB) and flashing system, with fabric side facing to weather.

ii. Back wrap 4 inches (102 mm) fabric skirt at bottom edge.

iii. Sure Cavity or Gravity Cavity and the WRB should overlap 3-1/2 inches (89 mm) back flange of L & R Weep Screed (LR 3501).

iv. The back wrapped bottom edge of Sure Cavity or Gravity Cavity should be fully embedded in bottom of L & R Weep Screed.

c. Wall Opening Weeps (WOW 9095)

i. Install Wall Opening Weeps (WOW 9095) with 9 inches (229 mm) vertical leg up on wall on weather resistant barrier (WRB) and flashing and 5 inches (127 mm) horizontal down on flashing and extending perpendicular out from face of wall 10-1/2 inches (267 mm) on center.

ii. Clean out mortar from top slot of horizontal leg between application of scratch coat and adhering and joint grouting mortar application. Cut off horizontal leg at wall line while grouting mortar is still plastic and finish tool joint.

4. Rainscreen Drainage Plane for Cladded Siding

a. Install Sure Cavity (SC 5016) (SC 5032) or (SC 5016NF) (SC 5032NF) or Gravity Cavity (GC 1816) (GC 1832) or (GC 1816NF) (GC 1832NF) with fabric facing to the weather (if fabric specified) over the appropriate weather resistant barrier (WRB) or rigid insulation, etc.

b. Install Sure Cavity or Gravity Cavity with 4 inches (102 mm) fabric skirt back wrapped as a bug screen on the bottom of first course (for both fabric and non-fabric systems).

c. Install Vented MTI Edge Metal (VMEM 3168) with 3 inches (76 mm) back flange transitioning the construction joint created by the top outside corner of the foundation wall and the bottom edge of the wall sheathing.

d. The 3 inches (76 mm) back flange shall be fastened to the framing sheathing only with approximately 1 inch (25 mm) overlapping down over the face of the foundation.

e. Install back-wrapped bottom edge of the first course of Sure Cavity or Gravity Cavity into the bottom of "J" channel of the Vented MTI Edge Metal.

f. Install successive courses of Sure Cavity or Gravity Cavity with 4 inches (102 mm) fabric skirt overlapping the top edge of the previous course.

g. Install the required siding starter strip over the bottom edge of Sure Cavity or Gravity Cavity installed in the Vented MTI Edge Metal.

h. Install cladded siding.

5. Drainage Plane for the Interior Surface of an Above Grade Single-Wythe (CMU or Jumbo Brick) Wall:

a. Install Perforated Control Cavity (PCC 4816 and PCC 4832) or 10MM Perforated Control Cavity (PCC 2416 - PCC 2432) with the fabric facing to the interior of the living area.

b. Install Perforated Control Cavity with the 4 inches (102 mm) fabric skirt tucked behind the top edge of the fabric of the course below it.

c. Fasten Perforated Control Cavity 1 feet (305 mm) on center.

d. Install first course of Perforated Control Cavity with the 4 inches (102 mm) fabric skirt back wrapped.

e. Install of Perforated Control Cavity with the bottom edge approximately 4 inches to 6 inches (102 mm to 152 mm) below bottom elevation or concrete floor.

f. Install the first course of Perforated Control Cavity with the bottom edge into the drain field of the perimeter sub slab drain field drain tile system.

g. All wall openings shall be furred out to meet approximate interior finish plane.

h. Install Perforated Control Cavity with the edges abutting furred outsides and bottoms of all openings.

i. Install Moisture Diverter (DS 2858) with a 1/4 inch (6.24 mm) slope to drain per foot to the interior surface of single wythe wall, approximately 4 inches to 6 inches (102 mm to 152 mm) above furred out wall openings, with the ends of the moisture diverter extending 4 inches to 6 inches (102 mm to 152 mm) passed the outside edge of wall opening side furring.

j. Install approximately 4 inches to 6 inches (102 mm to 152 mm) wide flashing tape over top edge of the Moisture Diverter (DS 2858).

k. Install corrugated plastic bottom edge of Perforated Control Cavity into Moisture Diverter (DS 2858) with 4 inches (102 mm) fabric skirt overlapping Moisture Diverter.

6. Drainage Planes for Interior of Below Grade (Basement) Walls and Concrete Floor Overlay Concrete Cap Slabs:

a. Install Control Cavity (CC 4800) or 10MM Control Cavity (CC 4810) to the interior of basement walls.

b. Fasten Control Cavity 1 foot (305 mm) on center.

c. Overlap bottom edge of first course 1 inch to 2 inches (25 mm to 51 mm); start coursing at top of wall.

d. Overlap ends 1 inch to 2 inches (25 mm to 51 mm).

e. Position bottom edge of bottom course of Control Cavity behind vertical leg of Floor Edging (FE 8555) on top surface of footing with the outside horizontal leg extending past the interior edge of footings.

7. Horizontal Drainage Planes for Interior Below Grade Basement Floor Retrofit Cap Slab Slip Sheet/Drainage Plane:

a. Install Control Cavity (CC 4800) or 10MM Control Cavity (CC 4810) to prepared basement floor.

b. Fasten Control Cavity as required to control movement when installing cap slab.

c. Overlap edges and ends 2 inches to 3 inches (51 mm to 76 mm).

d. Overlap floor edging (FE 8555) at perimeters 4 inches to 5 inches (102 mm to 127 mm).

e. Install cap slab.

8. Horizontal Drainage Planes and Slip Sheets Low Slope Stone Overlays on Verandas:

a. Install Sure Cavity (SC 5016 - SC 5032) to low slope horizontal waterproofing system on deck of veranda.

b. Lay loose, do not fasten.

c. Overlap shingle-fashion with slope.

d. Install stone bedding mortar and stone.

9. Window Sub-Sill Drainage Plane (Rainscreen Drainage Plane for Window Rough Opening Sill. View examples at http://www.mtidry.com/hyperspecs/ and Wall Openings.

a. Install Window Drainage Plane (WDP 5000) on the horizontal and vertical surfaces of the waterproofing system (sill pan) at bottom of window rough opening.

b. Minimize fastening vertical leg only.

c. Fabricate horizontal leg of window drainage plane to fit dimensions of horizontal plane of rough opening.

d. Install window.

B. Interface with Other Work: Provide proper installation of other materials and work as required for a complete and properly functioning system.

C. Install systems in accordance with manufacturer's instructions and as follows:

1. Weep System for Full Brick Veneers:

a. Rainscreen Drainage Plane: Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532) or Gravity Cavity (GC 1832)

i. Install rainscreen drainage plane with fabric side facing to weather with 4 inches (102 mm) fabric skirt overlapping continuous belt of Cavity Weep (CV 5010).

ii. Install 4 inches (102 mm) fabric skirt to overlap top edge of lower course of rainscreen drainage plane, Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532) or Gravity Cavity (GC 1832).

b. Install weeps for full brick veneers, Cavity Weep (CV5010) atop flashing with continuous belt centered in cavity and weep legs extending out from exposed face of full brick veneer a minimum of 1 inch to 1-1/2 inches (25 mm to 38 mm).

c. As an Contractor Option to Cavity Weep (CV 5010), at the bottom of wall and as a weep system to accommodate the top of wall openings details, install Wall Opening Weeps (WOW 9095) 10-1/2 inches (267 mm) on center with appropriate leg 5 inches or 9 inches (127 mm or 229 mm) extending up the backup wall behind Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532), or Gravity Cavity (GC 1832) and horizontal leg 5 inches or 9 inches (127 mm or 229 mm) extending out from face of full brick veneer a minimum of 1 inch to 1-1/2 inches (25 mm to 38 mm).

d. Install mortar bed joint atop weep assembly and lay brick veneer.

e. Tool joints and lightly score weep legs at face of full brick veneer and crack off by pushing downward while mortar is still plastic.

f. Finish-tool joints and brush brick wall.

g. Install required accessories to accommodate wall opening and top of wall detail, etc.

2. Weep Systems for Full Stone Veneers:

a. Rainscreen Drainage Plane: 10MM Sure Cavity (SCMM 2516 or SCMM 2532).

i. Install rainscreen drainage plane over appropriate weather resistant barrier (WRB) and flashing system with fabric side facing to weather with 4 inches (102 mm) fabric skirt overlapping continuous belt of Stone Cavity Weep (SCV 5012).

ii. Install 4 inches (102 mm) fabric skirt to overlap top edge of lower course of rainscreen drainage plane 10MM Sure Cavity (SCMM 2516 or SCMM 2532).

b. Install weeps for full stone veneers, Stone Cavity Weep (SCV 5012), atop flashing with continuous belt 1/2 inch (12 mm) from rear of cavity and weep legs extending out from exterior face of full stone veneer.

c. As an Contractor Option to Stone Cavity Weep (SCV 5012) at the bottom of wall and as a weep system to accommodate the top of wall opening details, install Wall Opening Weeps (WOW 9095), 10-1/2 inches (267 mm) on center with appropriate leg 5 inches or 9 inches (127 mm or 229 mm) extending up the backup wall behind 10MM Sure Cavity (SCMM 2516 or SCMM 2532) and horizontal leg 5 inches or 9 inches (127 mm or 229 mm) extending out from the exterior face of full stone veneer a minimum of 1 inch to 1-1/2 inches (25 mm to 38 mm).

d. Install mortar bed joint atop weep assembly and lay full stone veneer.

e. Tool joints and lightly score weep legs along face of full stone veneer and crack off by pushing downward while mortar is still plastic.

f. Finish-tool joints and brush stone wall.

g. Install required accessories to accommodate wall opening and top of wall details.

3. Weep Systems for Adhered Thin Brick, Thin Manmade Stone, Thin Natural Stone and Three Course Stucco Veneers.

a. Weep Screed - L & R Weep Screed (LR 3501)

i. Install L & R Weep Screed at bottom of adhered thin brick veneer wall, with 3-1/2 inches (88.9 mm) back flange transitioning the construction joint created by the top outside corner of the foundation wall and the bottom edge of the wall sheathing.

ii. The 3-1/2 inches (88.9 mm) back flange shall be fastened to the framed sheathing only, with approximately 1-1/2 to 2 inches (38 to 50.8 mm) overlapping down over face of foundation.

b. Rainscreen Drainage Plane: Sure Cavity (SC 5016 or SC 5032) or Gravity Cavity (GC 1832)

i. Install Sure Cavity or Gravity Cavity over appropriate weather resistant barrier (WRB) and flashing system with fabric side facing to weather.

ii. Back wrap 4 inches (102 mm) fabric skirt at bottom edge.

iii. Sure Cavity or Gravity Cavity and the WRB shall overlap 3-1/2 inches (88.9) back flange of L & R Weep Screed (LR 3501).

iv. The back wrapped bottom edge of Sure Cavity or Gravity Cavity should be fully embedded in bottom of L & R Weep Screed.

c. Wall Opening Weeps (WOW 9095):

i. Install Wall Opening Weeps (WOW 9095) with 9 inches (229 mm) vertical leg up on wall on weather resistant barrier (WRB) and flashing and 5 inches (127 mm) horizontal leg down on flashing and extending perpendicular out from face of wall, 10-1/2 (267 mm) inches on center.

ii. Clean out excess mortar from top slot of horizontal leg between application of scratch coat and adhering and joint grouting mortar application. Cut off horizontal leg at wall line while grouting mortar is still plastic and finish tooling mortar joint.

4. Weep Systems for Hollow Core Masonry Units (CMU - Jumbo Brick) as a Single Wythe Wall:

a. Cavity Weep (CV 5010) installed in conjunction with a through wall Z flashing system. Installed on the first course above a bond beam.

i. Install Cavity Weep (CV 5010) on the lower horizontal surface of the Z flashing.

ii. Position Cavity Weep (CV 5010) with the back of the 1 inch (25 mm) continuous belt 1/2 inch (12 mm) from the vertical surface of the Z flashing and the 6 inches (152 mm) legs extending out from the exterior face of the wall.

iii. Cut down to the appropriate height Sure Cavity (SC 5016) or 10MM Sure Cavity (SCMM 2516) and install to the vertical surface of Z flashing trim 4 inches (102 mm) fabric skirt to overlay Cavity Weeps 1 inch (25 mm) continuous belt.

iv. Install mortar bed joint atop weep system and lay CMU.

v. Tool joints and lightly score weep legs along face of CMU wall and crack off by pushing downward while mortar s still plastic.

vi. Finish-tool joints and brush wall

vii. Install required accessories to accommodate wall opening and top of wall details.

b. Cavity Weep (CV 5010) install on the top of a CMU bond beam with the top surface of the grouted bond beam struck off with a 1/4 inch (6 mm) slope to drain to the exterior of the wall.

i. Install Cavity Weep (CV 5010) on the top surface of the sloped to drain water proofed bond beam.

ii. Center 1 inch (25 mm) continuous belt of Cavity Weep on CMU wall with 6 inches (152 mm) legs extended out past the exterior surface of the wall.

iii. Install mortar bed joint atop weep system and lay CMU.

iv. Tool joint and lightly score weep leg along face of CMU wall and crack off by pushing downward while mortar is still plastic.

v. Finish-tool joints and brush wall.

vi. Install required accessories to accommodate wall opening and top of wall details.

5. Weep System for Hollow Core Masonry Units (CMU - Jumbo Brick) as a Veneer.

a. Rainscreen Drainage Plane: Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532) or Gravity Cavity (GC 1832).

i. Install Sure Cavity or Gravity Cavity with fabric side facing the weather with 4 inches (102 mm) fabric skirt over lapping the ends of the legs of the Core Cavity Weep (CCV 5020) that extend into the cavity.

b. Core Cavity Weep (CCV 5020):

i. Install Core Cavity (CCV 5020 on a water stop / flashing at the bottom of an open core of a CMU wall designed and constructed as a veneer.

ii. Position Core Cavity Weep (CCV 5020) with the 1-1/2 inches (38 mm) center belt centered on the open core of the CMU used as a veneer. Core / Cell of veneer CMU shall be a minimum of 3 inches (76 mm) inside diameter with one of the opposing weep legs extending into the cavity and other opposing leg extending out past the exterior face of the veneer wall.

iii. Install mortar bed joints atop weep system and lay CMU.

iv. Tool joints and lightly score weep legs along exterior face of CMU veneer wall and crack off by pushing downward while mortar is still plastic.

v. Finish-tool joints and brush CMU veneer wall.

vi. Install required accessories to accommodate wall opening and top of wall details.

6. Weep Systems for Hollow Core Masonry Units (CMU - Jumbo Brick) as a Below-Grade Foundation Wall:

a. Vent Mat (VM 9025):

i. Install Vent Mat (VM 9025) on footing with the 1-1/2 inches (38 mm) continuous belt centered on wall with the weep legs extending past the interior face of the CMU wall and over the interior edge of the footing.

ii. Install mortar bed joint atop weep system and lay CMU.

iii. Finish-tool joints and clean excess mortar off footing.

iv. Install required accessories to accommodate wall opening and top of wall details.

7. Weep System for Steel Lintels (When masonry units are laid dry/no bed joint of mortar on flashing):

a. Rainscreen Drainage Plane: Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532) or Gravity Cavity (GC 1832).

i. Install Sure Cavity or Gravity Cavity on vertical surface of flashing, WRB and vertical leg of steel lintel with 4 inches 9102 mm) fabric skirt overlapping the back ends of the Head Joint Weeps (HJW 3845).

ii. Trim 4 inches (102 mm) fabric skirt to appropriate length.

b. Head Joint Weeps (HJW 3845):

i. Install Head Joint Weeps as spacers at each head joint, beginning with the first head joint on steel lintel.

ii. Position Head Joint Weeps with the front end flush with the exterior face of full brick veneer and the back end extending into cavity or vertical void created by Sure Cavity or Gravity Cavity.

iii. Strengthen up first course of masonry units.

iv. Spread bed joint of mortar on top of first course of masonry units.

v. Tuckpoint bed joint of mortar into head joints.

vi. Tool finish mortar joints.

vii. Install required accessories to accommodate wall opening and top of wall details.

8. Weep System for Concealed Steel Lintels:

a. Rainscreen Drainage Plane: Sure Cavity (SC 5016/SC 5032), 10MM Sure Cavity (SCMM 2516/ SCMM 2532) or Gravity Cavity (GC 1832).

i. Install Sure Cavity or Gravity Cavity on vertical surface of flashing, WRB, and vertical leg of steel lintel with 4 inches (102 mm) fabric skirt overlapping the back edge of Concealed Steel Lintel / Shelf Angle Weep (CLW 9040).

ii. Trim 4 inches (102 mm) fabric skirt to appropriate length.

b. Concealed Steel Lintel/Shelf Angle Weep (CLW 9040):

i. Install Concealed Steel Lintel/Shelf Angle Weeps on horizontal leg of steel lintel over drip plate and flashing system.

ii. Cut (CLW 9040) to required size.

iii. Position (CLW 9040) with the front nose edge over the front edge of the lintel flashing and the back edge into the vertical void created by the Sure Cavity (SC 5016/SC 5032), 10MM Sure Cavity (SCMM 2516/SCMM 2532), or Gravity Cavity (GC 1832).

iv. Spread bed joint of mortar and lay masonry unit (lip brick).

v. Finish tool joint

vi. Clean out and finish-tool mortar joint up under lip of lip brick.

vii. Install required accessories to accommodate wall opening and top of wall details.

9. Weep System for Shelf Angle (when masonry units are laid dry/no bed joint of mortar on flashing):

a. Rainscreen Drainage Plane: Sure Cavity (SC 5016/SC 5032), 10MM Sure Cavity (SCMM 2516/ SCMM 2532) or Gravity Cavity (GC 1832).

i. Install Sure Cavity or Gravity Cavity on vertical surface of flashing, WRB and vertical leg of shelf angle with 4 inch fabric skirt overlapping the back ends of the Head Joint Weeps (HJW 3845).

ii. Trim 4 inches (102 mm) fabric skirt to appropriate length.

b. Head Joint Weeps (HJW 3845):

i. Install Head Joint Weeps as spacers at each head joint, beginning with the first head joint on shelf angle.

ii. Position Head Joint Weeps with the front end flush with the exterior face of full brick veneer and the back end extending into cavity or vertical void created by Sure Cavity or Gravity Cavity.

iii. Strengthen up first course of masonry units.

iv. Spread bed joint of mortar on top of first course of masonry units.

v. Tuckpoint bed joint of mortar into head joints.

vi. Tool finish mortar joints.

vii. Install required accessories to accommodate wall opening and top of wall details.

c. Vent Strip (VS 3845):

i. Fasten Vent Strip (VS 3845) to bottom of expansion pad that is adhered to bottom side of shelf angle.

ii. Position Vent Strip with front edge extending past front edge of expansion pad and back edge extended into vertical void created by Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532), or Gravity Cavity (GC 1832

iii. Lay up top course of brick and tuckpoint mortar on top joint.

iv. Finish tool joint

v. Cut off excess vent strip even with face of full brick veneer

vi. Install required accessories to accommodate wall opening and top of wall details.

10. Weep System for Concealed Shelf Angle:

a. Rainscreen Drainage Plane: Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532), or Gravity Cavity (GC 1832)

i. Install Sure Cavity or Gravity Cavity on vertical surface of flashing, WRB, and vertical leg of shelf angle lintel with 4 inches (102 mm) fabric skirt overlapping the back edge of concealed steel lintel / shelf angle weep (CLW 9040).

ii. Trim 4 inches (102 mm) fabric skirt to appropriate length.

b. Concealed Steel Lintel / Shelf Angle Weep (CLW 9040).

i. Install Concealed Steel Lintel / Shelf Angle Weeps on horizontal leg of shelf angle over drip plate and flashing system.

ii. Cut (CLW 9040) to required size.

iii. Position (CLW 9040) with the front nose edge over the front edge of the shelf angle flashing and the back edge into the vertical void created by the Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532), or Gravity Cavity (GC 1832)

iv. Spread bed joint of mortar and lay masonry unit (lip brick).

v. Finish tool joint.

vi. Clean out and finish-tool mortar joint up under lip of lip brick.

vii. Install required accessories to accommodate wall opening and top of wall details.

c. Vent Strip (VS 3845):

i. Fasten Vent Strip (VS 3845) to bottom of expansion pad that is adhered to bottom side of shelf angle.

ii. Position Vent Strip with front edge extending past front edge of expansion pad and back edge extended into vertical void created by Sure Cavity (SC 5016 or SC 5032), 10MM Sure Cavity (SCMM 2516 or SCMM 2532), or Gravity Cavity (GC 1832)

iii. Lay up top course of brick and tuckpoint mortar on top joint.

iv. Finish tool joint.

v. Cut off excess vent strip even with face of brick veneer.

vi. Install required accessories to accommodate wall opening and top of wall details.

d. Interface with Other Work: Provide proper installation of other materials and work as required for a complete and properly functioning system. Install systems in accordance with manufacturer's instructions and as follows.

11. Weep Systems for Thin Veneers (Thin Brick - Thin Stone - Stucco):

a. Weep Screed - L & R Weep Screed (LR 3501).

i. Install L & R Weep at bottom of thin veneer wall with 3-1/2 inches (88.9 mm) back flange transitioning the construction joint created by the top outside corner of the foundation wall and the bottom edge of the wall sheathing.

ii. The 3-1/2 inches (88.9 mm) back flange should be fastened to the framed sheathing only with approximately 1-1/2 to 2 inches (38 to 50.8 mm) overlapping down over face of foundation.

b. Weep Screed Deflector (WSD 1309).

i. Install Weep Screed Deflector at bottom of thin veneer wall with back flange transitioning the construction joint created by the top outside corner of the foundation wall and the bottom edge of the wall sheathing.

ii. The 3-1/2 inches (88.9 mm) back flange is installed behind the 3-1/2 inches (88.9 mm) back flange of the L & R Weep Screed (LR 3501).

iii. The Weep Screed Deflector is fastened (nailed) to the framing wall only.

iv. The Weep Screed Deflector should overlap the foundation wall approximately 1-1/2 inches to 2 inches (38 to 50.8 mm).

12. Edge Metal (MEM 3168) for enclosing the edge of Sure Cavity (SC 5016 or SC 5032) or Control Cavity (CC 4800) on the rake edge of sloped roof and the vertical edge of wall panel:

a. Edge Metal (MEM 3168) used on the rake edge of roof.

i. Install Edge Metal on top of the rake roof edge drip cap or roof edge.

ii. Apply flashing tape to the interior edge of Edge Metal and the interior edge of the rake roof Edge Metal and onto the roof deck.

iii. Install roofing paper over the interior edge of rake roof Edge Metal.

iv. Install edge of Sure Cavity (SC 5016 or SC 5032) or Control Cavity (CC 4800) over nailing flange and into Edge Metal.

v. Install roofing shingles.

b. Edge Metal (MEM 3168) for enclosing Sure Cavity (SC 5016 or SC 5032) or Control Cavity (CC 4800) at the edge of a wall panel.

i. Install Edge Metal on the vertical edge of a wall panel over end cap edge metal.

ii. Apply flashing tape to the interior edge of Edge Metal and onto wall sheathing.

iii. Install WRB over the interior edge of Edge Metal.

iv. Install edge of Sure Cavity or Control Cavity.

v. Install siding.

13. Vented Edge Metal (VMEM 3168) for enclosing and weeping the bottom edge of Control Cavity (CC 4800) at the edge of roof overhang or Sure Cavity (SC 5016 or SC 5032) at the bottom of wall panels:

a. Vented Edge Metal (VMEM 3168) use on bottom edge of roof.

i. Install Vented Edge Metal on top of the drip cap or roof edge metal on the bottom edge of roof.

ii. Position bottom edge of water stop/ice shield over nailing flange of Vented Edge Metal.

iii. Install roofing papers over water stop/ice shield and nailing flange of Vented Edge Metal.

iv. Install bottom edge of first course of Sure Cavity or Control Cavity into Vented Edge Metal.

v. Install shingles.

b. Vented Edge Metal (VMEM 3168) use at bottom of wall.

i. Install Vented Edge Metal at bottom of wall to transition construction joint created by bottom edge of sheathing and top outside edge of foundation wall.

ii. Apply flashing tape to the top edge of Vented Edge Metal and onto sheathing.

iii. Install WRB over 3-1/2 inches (88.9 mm) back flange of Vented Edge Metal.

iv. Back-wrap 4 inches (102 mm) fabric skirt of Sure Cavity for bug screen.

v. Install edge of Sure Cavity or Control Cavity over nailing flange and into Vented Edge Metal.

vi. Install siding.

14. Moisture Diverter (DS 2858) for thin veneers:

a. Install Moisture Diverter directly above wall openings such as windows and doors and not in contact with mounting flanges or flashing systems.

b. Install Moisture Diverter providing a watertight seal against weather resistant barrier on masonry and concrete substrates and flash the top on sheathing substrates.

c. Install Moisture Diverter with 1/4 inch per foot (6.35 mm per 305 mm) slope-to-drain and extend sides at least 4 inches (102mm) beyond door and window mounting flange and trim boards on both sides.

d. Install required accessories such as rainscreen drainage plane and flashing for complete installation.

15. Mortar Belt (MB 3500) for trash mortar control in CMU Walls

a. Install Mortar Belt centered on CMU wall every 4 to 6 courses.

b. Do not use when CMU cells are less than 5 inches (17mm) wide.

c. Install necessary accessories for complete installation.

16. Trash Mortar Diverter (TMD 9548) for trash mortar control in cavity walls with air spaces (cavities) of 1-1/2 inches (38 mm) to 3 inches (76 mm):

a. Install Trash Mortar Diverter into wall cavity with "V" in downward position and with short leg edge to the weather side.

b. Install Trash Mortar Diverter in a (checkerboard) or (stair step) or (architect approved) pattern within the wall cavity.

c. Install necessary accessories such as wall ties and flashing for complete installation.

17. Floor Edging (FE 8555) for interior of below grade (basement) moisture management:

    a. Install along the perimeter of concrete floor against the concrete masonry foundation wall on footing with short leg vertical and long leg horizontal.

    b. Fasten Floor Edging to wall at 2 feet (0.61 m) on center.

    c. Install top of Floor Edging vertical leg at least 1 inch (25.4 mm) higher than concrete slab.

    d. Install top edge of Floor Edging at least 3 inches (76.2 mm) higher than bottom of weep cores.

    e. Install necessary accessories such as Control Cavity (CC 4800) and Vapor retarder, Mortar Belt (MB 3550) and Vent Mat (VM 9025) for complete installation.

18. H-Cove (HC 3504) for interior below grade (basement) moisture management restoration:

    a. Remove concrete floor slab along perimeter and as indicated for renovation work.

    b. Clean debris from area, footing and wall.

    c. Provide small weep penetrations into cores of CMU wall at lowest level possible in every core.

    d. Install H-Cove with the vertical leg flat against the (drainage plane) Control Cavity (CC 4800) on the foundation wall with front lip atop the footing.

    e. Anchor the vertical leg through the drainage plane and into the foundation wall substrate.

    f. Pre-drill the holes using a masonry bit and fasten lightly to not crush the drainage plane.

    g. Field fabricate 45 degree corners and other connections as necessary to sump basket drain.

    h. Install adhesive tape over each connection.

    i. Upon completion of floor edge drain installation re-pour concrete patch as required.

    j. Install necessary accessories such as drainage plane Control Cavity (CC 4800) and sump basket for complete installation. Refer to other sections for additional information.

19. Sump Basket (SF 30PR) for interior below grade (basement), to be used in conjunction with drain field drain tile system:

    a. Install Sump Basket plumb and level in location as indicated on drawings.

    b. Do not use when CMU cells are less than 5 inches (127 mm) wide.

    c. Install necessary accessories for complete installation. Refer to other sections for additional information.

D. Interface with Other Work: Provide proper installation of other materials and work as necessary for a complete and properly functioning system.

3.5 PROTECTION

A. Protect installed thin veneer system from damage during construction.

B. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

END OF SECTION

EARTHWORK

Government of the Virgin Islands, Department of Public Works

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Clearing trees, brush, and other vegetation

B. Removing stumps and root systems

C. Removing surface debris and rubbish

1.2 REFERENCED SECTIONS

A. FHWA FP-14 Standard Specifications for Construction of Roads and Bridges on Federal Highway Projects, 2014 edition

1.3 SUBMITTALS

A. Submit Staging Plan if stumps are to be ground for mulch showing proposed staging areas and duration of activities.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.4 PREPARATION

A. Identify all existing utilities, structures, vegetation, and other features designated to remain.

3.5 PROTECTION

A. Protect existing utilities, structures, vegetation and other features designated to remain.

B. Protect benchmarks, survey stakes and the like from damage and displacement.

C. Paint all cut or damaged surfaces larger than 1-1/2 inches on trees or shrubs selected to remain with an approved wound dressing.

3.6 TEMPORARY EROSION CONTROL

A. Conform to the requirements of USVI, DPNR, FP-14 and the project's "Earth Change" permit for temporary erosion control measures.

3.7 CLEARING

A. Clear all trees, vegetation (except grass), down timber, snags, and brush within areas required for access to and execution of the work except for areas or features designated to remain.

B. Trees, brush, and other vegetation in areas to be cleared shall be cut off flush with or below the ground surface.

C. Trim dead branches 1-1/2 inches or more in diameter and such other branches as may be shown on the Plans from trees designated to remain

D. Limbs and branches to be trimmed shall be neatly cut close to the trunk or main branch. Paint all cuts 1-1/2 inches or more in diameter with an approved wound dressing.

3.8 GRUBBING

A. Remove all stumps, root systems, matted roots, debris, and rubbish to 18 inches below the bottom of excavation (or original ground surface, if no excavation is required).

B. Fill and compact all depressions resulting from grubbing operations to conform to adjacent soil conditions.

C. Perform all operations so as to minimize loss of topsoil.

3.9 DISPOSAL

A. No burning of cleared or grubbed material will be allowed on site.

B. All cleared and grubbed materials shall become the sole property of the CONTRACTOR and shall be removed from the site.

C. If grinding stumps for mulch, conform to the approved Staging Plan for grubbing operations.

D. Contractor shall secure a waste disposal permit from the Waste Management Authority.

END OF SECTION

PART 1 GENERAL

1.1 REQUIREMENTS INCLUDED

A. Without limiting the generality thereof, the work under this Section includes the furnishing of all labor, equipment, supplies and materials and the performing of all operations in connection with but not necessarily limited to the following items:

1. Rock blasting and removal as required, for excavation to the lines and grades indicated on the Drawings. Note: Rock blasting will not be allowed for this project.

2. Excavation and disposal of unsuitable or excess materials. Excavation of all traces of loam within the excavation and fill limits. Removal of all excess materials.

3. Excavation, fill, and compaction as indicated or required for the grading of the new paved drives, walks and parking areas.

4. Base and sub-base course material under pavements, slabs and footings, including compaction.

5. Dewatering and control of water for all construction operations.

6. Protection of existing buildings, pavements and utilities to remain.

7. Dust and environmental controls.

8. Trench and pit excavation, bedding, and backfill for all utilities, including compaction.

9. Sheeting, shoring and bracing of structural and trench excavations.

B. Subsurface investigations have been executed and the results are included on the Drawings. These results are furnished for the Contractor's general information only. The Engineer assumes no responsibility for their completeness, accuracy or correctness.

1.2 JOB CONDITIONS

A. Utilities:

1. The locations of known buried water lines, sewer lines, telephones cables, storm drains, culverts, gas mains, electric conduits, and other and other utilities are shown on the Drawings. No guarantee is made as to the correctness of the locations shown and to the completeness of the information given. The information shown is based upon a boundary survey done by BGM Engineers and Surveyors dated May 1, 2014. It is also based upon field observation and interviews with the Owner.

2. Discontinue excavation by machinery when the excavation approaches pipes, conduits, or other underground structures of which the approximate locations are known. Use manual excavation methods to locate the obstructions.

B. Existing Structures:

1. Perform excavation in such a manner that will prevent any possibility of undermining and disturbing the foundations of any existing structures and any work previously completed under this Contract.

2. Where existing buildings and other structures are in close proximity to the proposed construction, exercise extreme caution and utilize sheeting, bracing, and whatever other precautionary measures that may be required.

C. Repairing Damage:
Repair, or have repaired, all damage to existing utilities, structures, lawns, other public and private property which results from construction operations, at no additional expense to the Owner, to the complete satisfaction of the Engineer, the utility company and the property owner.

D. Do not leave any trenches open overnight.

E. Trench Bracing:
Properly support all trenches in strict accordance with all pertinent rules and regulations. Brace, sheet, and support trench walls in such a manner that they will be safe and that the ground alongside the excavation will not slide or settle, and that all existing improvements of every kind, whether on public or private property, will be fully protected from damage. In the event of damage to such improvements, immediately make all repairs and replacements necessary to the approval of the Engineer and at no additional cost to the Owner.

PART 2 - PRODUCTS

2.1 FILL MATERIAL

A. Approval Required:
All fill material shall be subject to the approval of the Engineer.

B. Notification:
For approval of fill material, notify the Engineer at least four working days in advance of intention to import material, designate the proposed borrow area, and permit the Engineer to sample as necessary from the borrow area for the purpose of making acceptance tests to prove the quality of the material.

2.2 ONSITE FILL MATERIAL

A. In general, all on-site fill material shall be soil or soil-rock mixture that is free from organic matter and other deleterious substance. It shall contain no rocks or lumps over six inches in greatest dimension, and not more than 15% of the rocks or lumps shall be larger than 2 1/2 inches in greatest dimension. No on-site fill shall be placed without the approval of the Engineer.

B. The Contractor shall not have any right of property in any suitable materials taken from any excavation. Do not remove any such materials form the construction site without the approval of the Engineer. This provision shall in no way relieve the Contractor of his obligations to remove and dispose of any material determined by the Engineer to be unsuitable for backfilling.

2.3 BORROW AND BEDDING MATERIAL

A. Work Included:

Provide, place and compact borrow and bedding material in authorized excavation(s) below normal depth and in other location(s) as shown on the Drawings and/or as requested by the Engineer and/or as specified herein.

B. Gravel Borrow:

1. Well graded granular material suitable for placement in authorized excavations below the bottom of the bedding layer to replace deficient excavated material, for service road construction, and other designated uses.

2. Conform to requirements of ASTM D-1241-68, Type I, Gradation B or C.

C. Screened Gravel or Crushed Stone (Bedding Material):

1. Screened gravel or crushed stone shall be well graded in size from 1/4 inch to 3/4 inch.

2. Clean, hard, and durable particles or fragments.

3. Sieve Analysis:

Sieve Designation	%Passing by Weight Square Opening
1"	100
3/4"	90-100
3/8"	20-55
No.4	0-10
No.8	0-5

D. Sand:

1. Clean, hard and durable particles or fragments.

2. Sieve Analysis:

Sieve Designation	%Passing by Weight Square Opening
3/8"	100
No.4	95-100
No.16	50-85
No.50	10-30
No.100	2-10

E. Common Borrow:

1. Common borrow shall consist of earth suitable for embankment construction. It shall be free from perishable rubbish, peat and other unsuitable material.

2. The moisture content shall be enough to provide the required compaction and stable embankment.
In no case shall the moisture content exceed 4 percent above optimum.

3. The optimum moisture content shall be determined in accordance with AASHTO T 180, Method C or D.

2.4 OTHER MATERIALS

A. All other materials, not specifically described but required for a complete and proper installation, shall be provided as selected by the Contractor subject to the approval of the Engineer.

B. Embankment Material:
Obtain prior approval and instructions from the Engineer prior to undertaking the excavation for pipe placement of any fill material that has been in an embankment less than one year.

2.5 UNSUITABLE MATERIAL

A. If, in the opinion of the Engineer, the material encountered above the indicated grade shown on the Drawings for excavation is unsuitable material, remove the material to the widths and depths as directed by the Engineer. Replace this material as specified in the "Backfilling, Compaction, Control and Testing" Section of this Division.

B. If, in the opinion of the Engineer, the material encountered at or below the indicated grade shown on the Drawings for excavation is unsuitable material, remove the material to the full width of the trench and to a minimum depth of 12-inches below the pipe. Replace this material with thoroughly compacted, suitably screened gravel or crushed stone bedding material.

C. All excavated materials designated by the Engineer as unsuitable shall become the property of the Contractor and disposed of at locations acceptable to or designated by the Owner, at no additional cost to the Owner.

PART 3 - EXECUTION

3.1 EXCAVATION- EARTH

A. General:

1. Unless otherwise specifically directed or permitted by the Engineer, begin excavation at the low end of sewer lines and proceed upgrade.

2. Perform excavation for sewers in a logical sequence.

B. Amount of Excavation:

1. Trench Width:
As shown on the Drawings or as specified for pipe installation.

2. Trench Depth:
As shown on the Drawings.

3. Open Excavation:

a. The extent of open excavation shall be controlled by prevailing conditions.

b. Open excavation shall, at all times, be confined to the limits prescribed by the Engineer.

4. Unauthorized Excavation:

a. Backfill to the specified grade any excavation beyond the limits stated above and as shown on the Drawings (unless specifically ordered by the Engineer) with thoroughly compacted crushed stone or screened gravel.

b. Backfilling unauthorized excavation shall be at no additional cost to the Owner.

C. Shoring and Bracing:
As the excavation progresses, install such shoring and bracing necessary to prevent caving and sliding and to meet the requirements of the State and OSHA safety standards.

3.2 EXCAVATION- LEDGE

A. Work Included:

1. Excavation work in ledge includes the removal of ledge and rock required for the installation of pipes and/or structures.

2. "Ledge" and "rock" includes any natural compound, natural mixture, and chemical element in excess of two yards in volume and required to be excavated that, in the opinion of the Engineer, can be removed from its existing position and state only by blasting, drilling and blasting, wedging, drilling and wedging, wedging and breaking with power hand tools, or by extending the use of an approved excavating machine beyond normal and design wear and tear. No boulder, ledge, slab, or other single piece of excavated material less than one cubic yard in total volume shall be considered to be rock unless, in the opinion of the Engineer, it must be removed from its existing position by one of the methods mentioned above.

3. All trench excavation shall be classed as earth or ledge.

B. Related Work Specified Elsewhere (When Applicable):

1. The use of explosives is not allowed.

2. Traffic regulation, when applicable, is specified in Division l.

3. When applicable, clearing, removal and replacement of paving, trench excavation, earth, backfilling, dewatering, borrow and bedding material, manholes and catch basins are specified in the appropriate Sections in this Division.

4. Pipe and pipe fittings, valves, gates and hydrants, when applicable, are specified in Divisions 2 and 15.

C. Existing Structures:

1. Perform excavation in such a manner that will prevent any possibility of undermining and disturbing the foundations of any existing structures and any work previously completed under this Contract.

2. Where existing buildings and other structures are in close proximity to the proposed construction, exercise extreme caution and utilize whatever precautionary measure that may be required.

D. Repairing Damage:
Repair, or have repaired, all damage to existing utilities, structures, lawns, and other public and private property which results from construction operation, at no additional expense to the Owner, to the complete satisfaction of the Engineer, the utility company, property owner, and the Owner.

E. Use of Explosives:
The use of explosives on this project is prohibited. However, when the use of explosives is necessary for the prosecution of the Work, exercise the utmost care not to endanger life or property. The Contractor shall be responsible for any and all damage resulting from the use of explosives. Approval must be obtained from the Owner and other regulatory agencies prior to considering the use of explosives.

1. Store all explosives in a secure manner, in compliance with all State and local laws and ordinances, and legally mark all such storage places. Storage shall be limited to such quantity as may be needed for the work underway.

2. Designate as a BLASTING AREA all sites where electric blasting caps are located and where explosive charges are being placed. Mark all blasting areas with signs as required by law.

3. Place signs as required by law at each end of the blasting area and leave in place while the above conditions prevail. Immediately remove signs after blasting operations or the storage of caps is over.

4. Notify each property owner and public utility company having structures in proximity to the site of the work sufficiently in advance to enable the companies to take such steps as they may deem necessary to protect their property. Such notice shall not relieve the Contractor of any of his responsibility for damage resulting from his blasting operation.

5. Warn all persons within the danger zone of blasting operations and do not perform blasting work until the area is cleared. Provide sufficient flaggers outside the danger zone to stop all approaching traffic and pedestrians. Provide watch people during the loading period and until charges have been exploded. Place adequate protective covering over all charges before exploding.

3.3 BACKFILLING, COMPACTION, CONTROL AND TESTING

A. Work Included:
Backfilling work includes backfilling trenches and/or excavation around structures with suitable material removed in the course of excavating and other suitable material.

B. Related Work Specified Elsewhere (When applicable):

1. Traffic regulations are specified in Division 1.

2. Clearing, removal and replacement of paving, when applicable, are specified in the appropriate Sections in this Division.

C. Quality Assurance:

1. Where backfill is required and/or where shown on the Drawings, compact fill to an in-place density not less than 95 percent of the maximum density of the material in accordance with ASTM D1556 Method "B", unless otherwise indicated on the Drawings or herein.

2. Determine in-place density in accordance with ASTM DI556 or by other methods as approved by the Engineer.

3. Have density testing performed by an independent soils laboratory as approved by the Engineer, at no additional cost to the Owner.

4. Locations of tests (when applicable):

a. Average of one test between each manhole for interceptor sewers.

b. Average of two tests between each manhole for sewer laterals.

c. Average of one test on each side of each manhole in addition to b. above.

D. Performance:

1. General:

   a. Provide and place all necessary backfill material.

   b. Do not allow large masses of backfill material to be dropped into the excavation, as from a grab bucket, in such a manner that may endanger pipes and structures.

   c. Place material in a manner that will prevent stones and lumps from becoming nested.

   d. Completely fill all voids between stones with fine material.

   e. Do not place backfill on or against new concrete until it has attained sufficient strength to support loads without distortion, cracking, and other damage.

   f. Deposit backfill material evenly on all sides of structures to avoid unequal soil pressures.

   g. Place screened gravel, crushed rock, crushed stone, gravel borrow or sand in layers of uniform thickness not greater than 6 inches or as shown on the Drawings.

   h. Thoroughly compact each layer by means of a suitable vibrator or mechanical tamper.

   i. In excavations below normal depth or where unsuitable materials are excavated, gravel borrow may be used unless groundwater makes such usage impossible. If such is the case, then screened gravel or crushed stone shall be used.

   j. Do not backfill with, or on, frozen materials. Remove, or otherwise treat as necessary, previously placed material that has frozen prior to placing backfill.

   k. Do not mechanically or hand compact material that is, in the opinion of the Engineer, too wet. Do not continue backfilling **until** the previously placed and new materials have dried sufficiently to permit proper compaction.

   l. When original excavated material is unsuitable use only approved gravel borrow for backfilling.

2. Sheeting:

   a. Leave sheeting in place when damage is likely to result from its withdrawal.

   b. Completely fill with suitable material and thoroughly compact all voids left by the removal of sheeting.

3. Backfilling in Paved Areas:

   a. Backfill trenches in streets and other paved areas by moistening and compacting each layer to a minimum of 95% of the modified Proctor for the material.

   b. Backfill in such a manner as to permit the rolling and compaction of the filled trench with the adjoining material to provide the required bearing value for paving immediately after backfilling is completed.

   c. Where required, place excavated material that is acceptable to the Engineer for surfacing or pavement sub-base, at the top of the backfill to the depths as directed by the Engineer. Bring the surface to the required grade and rake out and remove stones.

4. Backfilling Trenches in Non-paved Areas:

   a. Grade the ground to a reasonable uniformity.

   b. Leave the mounding of 1” per 1’ of trench depth over the trenches in a uniform and neat condition, satisfactory to the Engineer.

5. Bedding & Backfilling Pipelines:

   a. Install pipe bedding and cushion and primary backfill in accordance with 1 (g) above.

   b. Deposit and thoroughly compact the remainder of the backfill in 12 inch layers.

6. Placing and Compacting Backfill:

   c. Water Jetting:

      i. Backfill by water jetting shall not be used.

   d. Puddling:

      i. Backfill puddling shall not be used.

   e. Tamping:

      i. Deposit and spread the backfill material in uniform parallel layers not exceeding 6 inches thick.

      ii. Tamp each layer as required to obtain a thoroughly compacted mass.

      iii. If necessary, furnish and use in adequate number of power driven tampers, each weighing at least 20 lbs.

   f. Rolling:

      i. Compact material by rolling only when the width and depth of the excavation are sufficient to accommodate the rollers, dozers, mechanical tampers, or other similar powered equipment, as may prove to be acceptable, and when it can be performed without causing damage to pipes installed in the excavation.

      ii. Deposit and spread the backfill material in uniform parallel layers not exceeding 8 inches thick.

      iii. Roll each layer as required to obtain a thoroughly compacted mass.

g. Other placing and compacting methods may be employed only when approved by the Engineer.

7. Improper Backfill:

h. When excavation and trenches have been improperly backfilled, and when settlement occurs, reopen the excavation to the depth required, as directed by the Engineer.

i. Refill and compact the excavation or trench with suitable material and restore the surface to the required grade and condition.

j. Excavation, backfilling, compacting work and testing performed to correct improper backfilling shall be performed at no additional cost to the Owner.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Temporary erosion control measures

B. Coordination of temporary and permanent erosion control measures

1.2 REFERENCES

A. FHWA FP-14 Standard Specifications for Construction of Roads and Bridges, on Federal Highway Projects, 2014 edition.

1.3 SUBMITTALS

A. Erosion Control Plan:
Submit prior to commencing affected work a schedule based on Project conditions showing proposed methods, sequencing, and coordination of temporary and permanent erosion control measures.

PART 2 PRODUCTS

2.1 MATERIALS

A. Stone Check Dams:
Composed of stone 3/4 - 1 inch in diameter free of organic material, debris, waste and conform to ASTM C33; stone size No. 67.

B. Sandbags:
Heavy cloth bags of approximately one cubic foot capacity filled with sand or gravel.

C. Matting:
Composed of straw, twisted craft paper, jute yam, wood excelsior, glass fiber, or plastic film.

D. Mulch:
Mats, netting, straw or hay, bark chips, wood fiber, or other acceptable material. Do not use musty, moldy, caked, or otherwise low quality material.

E. Temporary Grass:
Suitable quick-growing species providing a temporary cover which will not compete with permanent grass sown later.

F. Silt Fence:

1. Propex Silt-Stop, Mirafi 1OOX, or approved equal.

2. Supports shall be in accordance with the manufacturer's recommendations, or as required for adequate performance.

G. Erosion Control Blankets:

1. Erosion Control Blankets used in swales shall be made of 100% straw with associated netting and/or thread.

2. Erosion Control Blankets used on level spreaders shall be jute or excelsior matting.

H. Temporary Drains:

1. Flexible drains shall consist of collapsible neoprene pipe, minimum 3 inches in diameter or approved equal.

2. Drains under traffic areas shall consist of corrugated metal of a gauge consistent with the loading conditions.

PART 3 EXECUTION

3.1 GENERAL

A. Do not start work until Erosion Control Plan has been approved.

B. Conduct all operations in a manner and sequence that minimizes disturbance of existing protective vegetation.

C. Install permanent erosion control features at the earliest practical time. Use temporary erosion controls:

1. To control erosion when it is not practical to install permanent erosion control features.

2. To control temporary erosion not associated with permanent erosion control.

3. To correct unsatisfactory conditions that develop during construction.

D. Maintain and supplement as necessary all erosion control features and devices required to effectively prevent migration of sediment from the work area throughout the life of the Contract.

3.2 INSTALLATION OF TEMPORARY EROSION CONTROLS

A. Temporary Grass:
Install in accordance with Section 02930 where shown on the Plans or as required to stabilize disturbed slopes. Seed all slopes before they reach 30 feet in slope length.

B. Sediment Check Dams:
Install check dams in ditches, swales, along the toe of embankments, and at other locations required to effectively control erosion.

C. Slope Drains:
Construct temporary slope drains where shown on the Plans or where necessary to control erosion. Protect outlets with riprap.

D. Silt Fence:
Install where shown on the Plans and at other locations as necessary to control erosion. Support in accordance with manufacturer's recommendations.

E. Mulch:
Install immediately after each area has been properly prepared. When seed for erosion control is sown prior to placing the mulch, the mulch shall be placed 48 hours after seeding.

F. Erosion Control Blankets:

Install along the bed of swales or level spreaders when called for on the Plans.

1. Swales shall be prepared and seeded in accordance with Section 02930 prior to installation of erosion control blankets. Install blankets starting at the upstream end unrolling downstream.

2. Level Spreaders: Place two strips of jute or excelsior matting along the lip of each level spreader.

3. Blankets should not be stretched but allowed to lay loosely on the soil surface to achieve maximum soil contact. Overlap and secure the blankets to the ground in accordance with the manufacturer's recommendations.

END OF SECTION

PART 1 GENERAL

1.1 DESCRIPTION

A. This section describes excavating, backfilling, and installing utility warning tape and locate wire for underground utilities and structures.

B. If the Contractor encounters suspected contaminated soil in the work area beyond that mentioned in the contract documents, the Contractor shall immediately stop all work in the area of the suspected contamination and notify the Port. Contaminated soil is soil that produces fuel or chemical odors, produces an oil sheen on the surface of water, has staining, contains debris or other visible indicators, or soil designated as contaminated.

1.2 REFERENCES

A. AASHTO: American Association of State Highway and Transportation Officials

1. AASHTO T027: Standard Method of Test for Sieve Analysis of Fine and Coarse Aggregates

2. AASHTO T099: Standard Method of Test for Moisture-Density Relations of Soils Using a 2.5-kg (5.5-lb) Rammer and a 305-mm (12-in.) Drop

3. AASHTO T180: Standard Method of Test for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in.) Drop

B. ASTM: American Society for Testing and Materials

1. ASTM D698: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))

2. ASTM D1556: Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method

3. ASTM D1557: Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN-m/m3))

4. ASTM D2922: Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

C. OSHA: Occupational Safety and Health Administration

1.3 SUBMITTALS

A. Submit manufacturer’s product data for utility warning tape, utility locate wire, and electrical splices.

PART 2 PRODUCTS

2.1 TRENCH EXCAVATION MATERIAL

A. Soil material, regardless of condition, excavated from subgrade to the bottom of the trench; or, where there is no subgrade, from original ground to the bottom of the trench.

2.2 UNSUITABLE MATERIAL

A. Trench excavation material designated as not usable for backfill.

B. Material excavated below the bottom of the trench designated as not usable for foundation or backfill.

2.3 TRENCH STABILIZATION

A. 6"-3/4" pit run or crushed rock. Not more than 10 percent passing a #200 sieve.

2.4 BEDDING

A. Crushed aggregate: 3/4"-0" for sewer pipe; 3/4"-0" for water lines.

2.5 BACKFILL

A. Native

1. Approved trench excavation material. Material shall not contain particles larger than 3/4".

B. Imported

1. Crushed aggregate: 3/4"-0" for sewer pipe; 3/4"-0" for water lines. Water lines shall be covered 6 inches, minimum, with 3/4"-0" before changing to another material.

2. Sand conforming to the following gradation limits AASHTO T 27:

SIEVE SIZE	PERCENT PASSING
No. 10	95-100
No. 40	50-100
No. 60	20-40
No. 200	0-5

2.6 UTILITY WARNING TAPE

A. Use 3-inch wide, 3.5 mil thick non-metallic plastic tape for all utilities 4 feet deep or less. For utilities more than 4 feet deep, use 6-inch wide, 3.5 mil thick non-metallic plastic tape. Tape should be imprinted continuously along its length with: "CAUTION - STOP DIGGING - BURIED [(GAS), (WATER), (SEWER), (ELECTRIC), (TELEPHONE)] LINE BELOW," or similar.

1. Acceptable Products/Manufacturers:

a. Brady "Identoline"

b. Services and Materials "Buried Underground Tape"

c. Somerset (Thomas & Betts) "Protect-A-Line"

d. Or equal.

2.7 UTILITY LOCATE WIRE

A. Use stranded copper type XHHW AWG size No. 10. Locate wire does not require direct burial listing. Locate wire shall be in colors specified below.

B. Electrical Splicing: Use mechanical compression splice with waterproof heat-shrink jacket designed for underground burial. Splice by Burndy, jacket by 3M, or equal.

C. Utility locate wire tag shall be non-corrosive metal or plastic tag with a permanent stamped label reading "Locate."

2.8 TAPE AND WIRE COLOR CODES

A. Use the following APWA color codes for utility warning tape and utility locate wire:

1. GAS = Yellow

2. WATER = Blue

3. SEWER AND SUBDRAINS = Green

4. ELECTRIC = Red

5. TELEPHONE/SIGNAL = Orange

PART 3 EXECUTION

3.1 TRENCH EXCAVATION

A. Dig trench to lines and grades established on the drawings or as directed.

B. Trench width shall be as shown on the drawings. If not shown on the drawings, trench width shall be as follows:

1. Not less than the outside diameter of the pipe plus 12 inches.

2. Not more than the inside diameter of the pipe plus 30 inches, to a point 12 inches (minimum) above the top of the pipe, unless otherwise approved.

C. Trench length shall be sufficient to allow for satisfactory construction and inspection of the project, without endangering other construction work or adjacent facilities.

D. Slope trench walls to OSHA standards or shore trench walls.

E. Restore unauthorized excavation made below grade to the required design grade at no additional cost to the Port.

F. Separate and stockpile approved trench excavation material for reuse as backfill.

G. Haul excess trench excavation material suitable for backfill to the disposal site as directed by the Owner's Representative.

H. Haul other excess trench excavation material and unsuitable excavation material off Port property and dispose of in accordance with Section 015000, Temporary Facilities and Controls.

I. Use hand methods for excavation that cannot be accomplished without endangering existing or new structures or other facilities.

3.2 REMOVAL AND REPLACEMENT OF UNSUITABLE MATERIAL

A. Unsuitable Trench Excavation

1. Remove, haul off property and dispose of properly offsite.

2. Replace with excess approved common excavation material from other portions of the project or imported backfill as directed.

3. Compact as specified below.

B. Unsuitable Trench Bottom

1. Excavate to established and approved lines and limits. Dispose of properly offsite.

2. Backfill with trench stabilization material and compact as specified.

3.3 TRENCH PROTECTION

A. Provide materials, labor, and equipment necessary to protect trenches at all times.

B. Sheeting and Bracing

1. Furnish and install sheeting and bracing as required to prevent caving or sloughing of trench walls.

2. Solid-sheet trench, if necessary, to preserve a suitable grade for the pipe. Drive far enough below grade to prevent inflow of material from outside of trench lines.

3. Remove sheeting and bracing from trench before or during backfilling operations unless otherwise directed.

3.4 PIPE BEDDING

A. Bed pipe according to specifications.

B. Place bedding material to a uniform grade. Compact to 92 percent of maximum density as measured by AASHTO T-180 (ASTM D1557).

C. Shape bottom of trench or bedding so that the lower quarter of the pipe circumference is in continuous contact with the bottom of the trench.

3.5 BACKFILLING

A. Notify the Owner's Representative and DPNR at least 24 hours in advance of backfilling.

B. Conduct utility check tests before backfilling. Backfill and compact trench before acceptance testing.

C. Place pipe zone backfill uniformly on both sides of the pipe in 6-inch uncompacted lifts until 12 inches over the pipe.

D. Solidly ram and tamp backfill into spaces around pipe and related structures.

E. Backfill trench with lifts up to 12 inches, loose measure.

F. Protect pipe from lateral movement, damage from impact, or unbalanced loading to avoid displacement of pipe and structures.

G. Do not place backfill against concrete structures until the concrete has cured for at least 14 days or has reached 90 percent of its designed strength.

H. Maintain backfilled trench surface between any two successive manholes until the following operations have been completed and approved.

1. Service connections installed, backfilled, and compacted, including water settling when required.

2. Construction of manholes and appurtenances.

3. Hydrostatic or air testing.

4. Cleanup and restoration of all physical features.

5. Utilities restored to their original condition or better.

6. All work required between the two manholes accomplished.

I. Maintain backfilled trench surface between any two successive valves until the following operations have been completed and approved.

1. Service connections installed and backfilled.

2. Valves, valve boxes, and hydrants installed.

3. Hydrostatic testing.

4. Flushing and sterilization.

5. Cleanup and restoration of all physical features.

6. Utilities restored to their original condition or better.

7. All work required between the two valves accomplished, including restoration of surface to specified condition.

3.6 COMPACTION

A. The Owner may conduct in-place density tests in accordance with ASTM D2922 or D1556 requirements.

B. Compact backfill deeper than 4 feet below subgrade to 92 percent of maximum density, unless otherwise directed.

C. Compact the backfill from subgrade to a depth of 4 feet below subgrade to 95 percent of maximum density as measured by AASHTO T-180 (ASTM D1557), unless otherwise directed.

D. Compacting trench backfill under flooding water is an acceptable means of compaction.

E. For compaction testing, excavate test pits in the backfill as directed to demonstrate that the specified compaction has been obtained for the entire depth of the backfill. Density tests may be taken in a lift of compacted backfill immediately before placing the next lift. In general, one successful test for the entire backfill depth and three successful tests at lesser depths per 400 linear feet of pipe installed will be required. Additional successful tests at lateral crossings at various depths may also be required. All costs in connection with excavating test pits, shoring, backfilling, and from standby time during field density test shall be considered as incidental to backfill.

F. If required compaction density has not been obtained, remove the backfill from trench or structure, replace with approved backfill, and compact to the specified density. Then, should routine field densities taken during the course of construction show the specified compaction is not being obtained because of changes in soil types or for any other reason, the compacting procedure will be modified. In no case will excavation, pipe-laying, or other operation be allowed to proceed until the specified compaction is attained. Changes in methods may be required to accommodate changes in soil conditions.

G. Any subsequent settlement of trench or structure backfill during the maintenance period shall be considered to be the result of improper compaction and shall be promptly corrected.

3.7 UTILITY WARNING TAPE AND UTILITY LOCATE WIRE INSTALLATION AND TESTING

A. Utility Warning Tape:

1. Install utility warning tape as shown on the drawings.

2. Utility warning tape is not required on irrigation branch lines.

B. Utility Locate Wire:

1. Install the utility locate wire along the full length of all utilities being installed.

2. Install utility locate wire along the top of the utility in a manner that will avoid damaging the wire during compaction of the trench.

3. Splice new utility locate wires into existing utility locate wires at tees or other locations where the utilities connect.

4. Bring the locate wire up inside each manhole, vault, valve box, handhole, pull box, or similar structure along the route of the utility. Terminate the wire for each utility entering the structure as shown on the drawings.

5. Permanently attach utility locate wire tags between 2 and 6 inches from the end of the wire.

6. Where utilities enter a building, bring locate wire to grade level 5 feet from the building and install in a water valve type box or equal.

C. Utility Locate Wire for Non-Metallic Conductors:

1. Install utility locate wire where metallic conductors in existing conduits are replaced with non-metallic conductors.

2. Procedure for pulling new utility locate wire through existing infrastructure:

a. Attach utility locate wire externally to non-metallic conductor or inner-duct and pull through system.

b. If an existing multi-cell conduit does not have locate wire and is being loaded with non-metallic conductors, pull a utility locate wire through one of the existing cells.

c. Bring the locate wire up inside each manhole, vault, valve box, handhole, pull box, or similar structure along the route of the utility. Terminate the wire for each utility entering the structure as shown on the drawings.

D. Utility Locate Wire Testing:

1. Test utility locate wire network using standard utility locating equipment.

2. Verify that all connections for test equipment are accessible and installed in accordance with the drawings and specifications.

3. Verify continuity in the wire network by tracing all installed wire.

4. Repair or replace deficiencies.

5. Submit documentation showing that all test equipment connection points have been installed properly and all wires have been successfully traced.

3.8 REMOVAL AND PLUGGING OF ABANDONED PIPES, CONDUITS, CULVERTS, AND MISCELLANEOUS STRUCTURES

A. Removal of Abandoned Pipes, Conduits, and Other Items:

1. Trenching: Abandoned pipes and conduits encountered during trench excavation shall be removed the full width of the trench. If a pipe is encountered by multiple trenches, remove pipe the full width of affected area.

2. Excavation: Abandoned pipes or portions of other items exposed during excavation shall be removed a minimum of 2 feet back of face of slope or 2 feet below subgrade.

B. Cap or plug the ends of partially removed pipes, culverts, conduits, and miscellaneous structures with concrete to produce a watertight seal.

C. Contact the Owner's Representative for direction if unidentified utilities are uncovered during the work.

D. Dispose of removed pipes, conduits, culverts, and miscellaneous structures off site, at no additional cost to the Owner.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. Flowable fill (cement stabilized backfill).

1.2 RELATED SECTIONS

A. 312000 - Earth Moving

B. 033001 - Reinforced Concrete

1.3 ACTION SUBMITTALS

A. Submit the following:

1. Material certifications. A complete list of materials including type; brand; source and amount of cement, fly ash, pozzolans, and admixtures; and applicable reference specifications shall be included in the mix design submittal. Provide design mixes and test reports.

2. Batch tickets.

3. Field test reports (if required per 3.5)

1.4 DESCRIPTION

A. Flowable fill is a self-leveling slurry of cement, fly ash, aggregates, admixtures, and water with low final strength that can be hand dug later.

B. Flowable fill may be used for trenches, pipe structures, fill for abandoned water and sewer lines, and other works where cavities exist and firm support is required.

C. The use of flowable fill around or adjacent to utility lines or structures shall be reviewed and approved by the appropriate LANL Utilities and Infrastructure system representative. Flowable fill shall not be around or adjacent to utility lines that have requirements for movement.

1.5 QUALITY ASSURANCE

A. When work or portions of work of this section are completed and require testing, notify the Owner's Representative.

B. Ensure all required cast-in-place concrete, embedment items, and utility work has been completed prior to placing flowable fill.

1.6 JOB CONDITIONS

A. Perform concrete washout, trucks and mixers, in a designated and controlled area to prevent the runoff of washout material and the co-mingling of unset concrete with storm water. Properly dispose of all hardened excess concrete.

PART 2 PRODUCTS

2.1 MATERIALS

A. Cement: ASTM C 150, Type I or Type II.

B. Fine and Coarse Aggregates: Conform to ASTM C 33. Provide a uniform mixture of fine aggregate or fine and course aggregate, as determined by ASTM D 422.

Aggregate Mixture Gradation Requirements

Sieve Size	Percent Passing
1 inch	100
3/8 inch	95 – 100
No. 4	80 – 100
No. 8	60 – 95
No. 16	45 – 80
No. 30	25 – 60
No.50	5 – 45
No. 100	5 – 35
No. 200	0 - 30

C. Water: Potable water that is clean and not detrimental to concrete.

D. Fly Ash: Conform to ASTM C 618, Class C or Class F.

E. Air Entrainment: Conform to ASTM C260. Air entrainment may be between 6 and 25 percent. Air entraining is not required for below grade installation in areas not subject to freeze/thaw cycles.

2.2 PROPORTIONING AND PHYSICAL PROPERTY REQUIREMENTS

A. Provide a flowable fill mix design in accordance with the following limits:

1. Cement, maximum 50 lbs/yd3

2. Fly ash, from 150 lbs/yd3 to 300 lbs/yd3

3. Air content, optional

4. Slump, from 6 to 11 inches

5. Water/Cement ratio, proportioned by weight to produce a slump within limits.

6. Consistent aggregate throughout the concrete mixture

7. Compressive strength will not exceed 150 psi at 28 days.

2.3 FLOWABLE FILL

A. Mix and deliver flowable fill in accordance with ASTM C94.

B. Use set retarding admixtures during hot weather only when approved by the Owner's Representative.

C. Do not use calcium chloride as an admixture.

D. Add air-entraining agent if required to produce a flowable mix.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that all items of cast-in-place concrete, grading, trenching, and all utilities and other embedded items are in place prior to placing flowable fill.

B. Utilities that are subject to required movement (e.g., steam and condensate lines), shall not be embedded in flowable fill or otherwise have restricted movement.

C. Flowable fill shall not be used as a substitute for sand bedding or earth backfill for primary utilities unless approved by the Owner's representative.

3.2 PREPARATION

A. Remove all loose material from the uneven tuff and the concrete structures.

B. Set elevation marks or otherwise determine the proper top elevation for the flowable fill.

3.3 PLACEMENT OF FLOWABLE FILL

A. Notify Owner's Representative a minimum of 48 hours prior to placement of flowable fill.

B. Flowable fill may be placed by direct discharge from the truck, by pumping, or by other approved methods.

C. The flowable fill shall be placed in a uniform manner that will prevent voids or segregation of the bedding and filling material. If required, the flowable fill shall be consolidated with internal vibrators.

D. Pipes, reinforcement, inserts, or other embedded parts shall be placed, supported, and secured in a manner that shall prevent the flowable fill from displacing, sagging, or from floating embedded items.

E. Flowable fill shall be brought up uniformly to the fill line shown on the plans. Formed walls or other bulkheads shall be constructed to withstand the exerted hydrostatic pressure and confine the material within a dedicated space.

F. Placement of flowable fill shall start only when weather conditions are favorable. The temperature shall be at least 35 degrees F and rising. Flowable fill shall not be placed on frozen ground or when it is raining.

3.4 CURING AND PROTECTION

A. Immediately after placement, protect flowable fill from premature drying, excessively hot or cold temperatures and mechanical injury.

B. The flowable fill shall not be subjected to load and shall remain undisturbed by construction activities for at least 24 hours after placement.

3.5 FIELD QUALITY CONTROL

A. Testing of flowable fill is not necessarily required. If testing is required, the Subcontractor shall employ an independent testing agency to perform compressive strength test cylinders.

B. For field testing use a standard (15 lb) T-post driver to drive a #6 reinforcing bar with a flat end into the flowable fill material 24 hours after placement. Lift the driver until the bottom of the driver is even with a mark located 6 inches below the top of the rebar and then allow it to fall under its own weight. Remove and replace the flowable fill if fewer than 6 blows or more than 25 blows are required to drive the rebar 12 inches into the fill.

C. Provide unobstructed access to work and cooperate with appointed firm.

3.6 DEFECTIVE FLOWABLE FILL

A. Do not accept or place defective flowable fill that is not in conformance with acceptance criteria. Return the fresh flowable fill to the supplier.

B. Defective flowable fill is material having excessive honeycomb, embedded debris, higher than maximum compressive strength, or not conforming to required lines, details, dimensions, tolerances or specified requirements. Repair or replace defective flowable fill as directed by the LANL STR.

C. Replace flowable fill not in conformance with details, tolerances, and other construction requirements at Contractor's expense.

END OF SECTION

PART 1 - GENERAL

1.1 SECTION INCLUDES

A. This WORK shall consist of temporary measures needed to control erosion and water pollution. These temporary measures shall include, but not be limited to, berms, dikes, dams, sediment basins, fiber mats, netting, gravel, mulches, grasses, slope drains, and other erosion control devices or methods. These temporary measures shall be installed at the locations where needed to control erosion and water pollution during the construction of the PROJECT, and as directed by ENGINEER, and as shown on the DRAWINGS.

B. The Erosion Control Plan presented in the DRAWINGS serves as a minimum for the requirements of erosion control during construction. CONTRACTOR has the ultimate responsibility for providing adequate erosion control and water quality throughout the duration of the PROJECT. Therefore, if the provided plan is not working sufficiently to protect the PROJECT areas, then CONTRACTOR shall provide additional measures as required to obtain the required protection. CONTRACTOR shall include in the BID price for erosion control a minimum of all items shown on the Erosion Control Plan and any additional items that may be needed to control erosion and water pollution.

1.2 RELATED SECTIONS

A. The following is a list of SPECIFICATIONS which may be related to this section:

1. Section 31 11 00, Clearing and Grubbing.

1.3 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. Virgin Islands Department of Parks and Natural Resources (DPNR).

1.4 SUBMITTALS

A. Submit the following information:

1. Erosion Control Plan.

2. Construction schedule for Erosion Control per Article Scheduling.

3. Sequencing Plan per Article Scheduling.

4. Plan for disposal of waste material per Article Scheduling.

5. Product data for materials proposed for use.

6. All applicable permits for Erosion Control.

1.5 REGULATORY REQUIREMENTS

A. Construction Dewatering Industrial Wastewater Permit:

1. CONTRACTOR shall apply for and obtain a Construction Dewatering Permit from the Virgin Islands Waste Management Authority (WMA).

2. All costs for this permit shall be the responsibility of CONTRACTOR.

3. CONTRACTOR is legally obligated to comply with all terms and conditions of the permit including testing for effluent limitations.

4. CONTRACTOR shall allow the WMA and DPNR or other representatives to enter the site to test for compliance with the permit.

5. Non-compliance with the permit can result in stoppage of all WORK.

B. In the event of conflict between these requirements and erosion and pollution control laws, rules, or regulations of other Federal, State, or local agencies, the more restrictive laws, rules, or regulations shall apply.

1.6 SCHEDULING

A. Sequencing Plan:

1. CONTRACTOR shall submit a sequencing plan for approval for erosion control in conformance with CONTRACTOR's overall Construction Plan for approval by OWNER.

2. Changes to the Erosion Control Sequencing Plan may be considered by OWNER only if presented in writing by the CONTRACTOR.

B. Temporary Erosion Control:

1. When so indicated in the CONTRACT DOCUMENTS, or when directed by ENGINEER, CONTRACTOR shall prepare construction schedules for accomplishing temporary erosion control WORK including all maintenance procedures.

2. These schedules shall be applicable to clearing and grubbing, grading, structural WORK, construction, etc.

C. CONTRACTOR shall submit for acceptance the proposed method of erosion control on haul roads and borrow pits and a plan for disposal of waste material.

D. CONTRACTOR shall be required to incorporate all permanent erosion control features into the PROJECT at the earliest practicable time as outlined in the accepted schedule. Temporary erosion control measures shall then be used to correct conditions that develop during construction.

E. WORK shall not be started until the erosion control schedules and methods of operations have been accepted.

PART 2 PRODUCTS

2.1 MATERIALS

A. All materials shall be submitted for approval prior to installation.

B. Materials may include hay bales, straw, fiber mats, fiber netting, wood cellulose, fiber fabric, gravel, and other suitable materials, and shall be reasonably clean, free of deleterious materials, and certified weed free.

C. Grass Seed:

1. Temporary grass cover (if required) shall be a quick growing species, suitable to the area, in accordance with local criteria and permit requirements, which will provide temporary cover, and not compete with the grasses sown for permanent cover.

2. All grass seed shall be approved by ENGINEER and in accordance with local regulations prior to installation.

E. Fertilizer and soil conditioners shall be approved by ENGINEER and in accordance with local regulations prior to installation.

PART 3 EXECUTION

3.1 GENERAL

A. All temporary and permanent erosion and sediment control practices shall be maintained and repaired as needed to ensure continued performance of their intended function.

B. OWNER will monitor CONTRACTOR’s erosion control and WORK methods.

1. If the overall function and intent of erosion control is not being met, OWNER will require CONTRACTOR to provide additional measures as required to obtain the desired results.

2. Costs for any additional erosion control measures shall be paid for at contract unit prices.

C. The erosion control features installed by CONTRACTOR shall be adequately maintained by CONTRACTOR until the PROJECT is accepted.

D. Working In or Crossing Watercourses and Wetlands:

1. Construction vehicles shall be kept out of watercourses to the extent possible.

2. Where in-channel WORK is necessary, precautions shall be taken to stabilize the WORK area during construction to minimize erosion.

3. The channel (including bed and banks) shall always be stabilized immediately after in-channel WORK is completed.

4. Where a live (wet) watercourse must be crossed by construction vehicles during construction, a Temporary Stream Crossing shall be provided for this purpose.

3.2 PROTECTION OF ADJACENT PROPERTIES

A. Properties adjacent to the site of a land disturbance shall be protected from sediment deposition.

B. In addition to the erosion control measures required on the DRAWINGS, perimeter controls may be required if damage to adjacent properties is likely, and may include, but is not limited to:

1. Vegetated buffer strip around the lower perimeter of the land disturbance.

a. Vegetated buffer strips may be used only where runoff in sheet flow is expected and should be at least twenty (20) feet in width.

2. Sediment barriers such as straw bales, erosion logs, and silt fences.

3. Sediment basins and porous landscape detention ponds.

4. Combination of above measures.

3.3 CONSTRUCTION

A. Stabilization of Disturbed Areas:

1. Temporary sediment control measures shall be established within five (5) days from time of exposure/disturbance.

2. Permanent erosion protection measures shall be established within five (5) days after final grading of areas.

B. Stabilization of Sediment and Erosion Control Measures:

1. Sediment barriers, perimeter dikes, and other measures intended to either trap sediment or prevent runoff from flowing over disturbed areas shall be constructed as a first step in grading and be made functional before land disturbance takes place.

2. Earthen structures such as dams, dikes, and diversions shall be stabilized within five (5) days of installation.

3. Stormwater outlets shall also be stabilized prior to any upstream land disturbing activities.

C. Stabilization of Waterways and Outlets:

1. All onsite stormwater conveyance channels used by CONTRACTOR for temporary erosion control purposes shall be designed and constructed with adequate capacity and protection to prevent erosion during storm and runoff events.

2. Stabilization adequate to prevent erosion shall also be provided at the outlets of all pipes and channels.

D. Storm Sewer Inlet Protection: All storm sewer inlets which are made operable during construction or which drain stormwater runoff from a construction site shall be protected from sediment deposition by the use of filters.

E. Construction Access Routes:

1. Wherever construction vehicles enter or leave a construction site, a Stabilized Construction Entrance is required.

2. Where sediment is transported onto a public road surface, the roads shall be cleaned thoroughly at the end of each day.

3. Sediment shall be removed from roads by shoveling or sweeping and be transported to a sediment controlled disposal area.

4. Street washing shall be allowed only after sediment is removed in this manner.

3.4 DISPOSITION OF TEMPORARY MEASURES

A. All temporary erosion and sediment control measures shall be disposed of within thirty (30) days after final site stabilization is achieved or after the temporary measures are no longer needed as determined by OWNER.

B. Trapped sediment and other disturbed soil areas resulting from the disposition of temporary measures shall be permanently stabilized to prevent further erosion.

C. Substantial Completion of Erosion Control Measures:

1. At the time specified in the CONTRACT DOCUMENTS, and subject to compliance with specified materials and installation requirements, CONTRACTOR shall receive a Substantial Completion Certificate for temporary erosion control measures.

2. Maintenance of Erosion Control Measures after Substantial Completion: CONTRACTOR shall be responsible for maintaining temporary erosion control measures as specified in the DRAWINGS and CONTRACT DOCUMENTS until such time as WORK has been accepted by OWNER as specified in Section 01 77 00, Closeout Procedures.

D. Final Completion and Acceptance of Erosion Control Measures:

1. After ENGINEER and OWNER have determined that the drainage area has stabilized, CONTRACTOR shall remove all remaining temporary erosion control measures.

2. Any damage to the site shall be repaired to the satisfaction of ENGINEER and at no cost to OWNER.

END OF SECTION

PART 1 GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Polymer-based sheet barrier system.
2. Soil treatment.
3. Wood treatment.
4. Bait-station system.
5. Metal mesh barrier system.

B. Related Requirements:

1. Section 061000 "Rough Carpentry" for wood preservative treatment by pressure process.
2. Section 076200 "Sheet Metal Flashing and Trim" for custom-fabricated, metal termite shields.

1.3 PREINSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components, and profiles for termite control products.
2. Include the EPA-Registered Label for termiticide products.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Product Certificates: For each type of termite control product.

C. Soil Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:

1. Date and time of application.
2. Moisture content of soil before application.
3. Termiticide brand name and manufacturer.
4. Quantity of undiluted termiticide used.
5. Dilutions, methods, volumes used, and rates of application.
6. Areas of application.
7. Water source for application.

D. Wood Treatment Application Report: After application of termiticide is completed, submit report for Owner's records and include the following:

1. Date and time of application.
2. Termiticide brand name and manufacturer.
3. Quantity of undiluted termiticide used.
4. Dilutions, methods, volumes used, and rates of application.
5. Areas of application.

E. Bait-Station System Installation Report: After installation of bait-station system is completed, submit report for Owner's records and include the following:

1. Location of areas and sites conducive to termite feeding and activity.
2. Plan drawing showing number and locations of bait stations.
3. Dated report for each monitoring and inspection occurrence, indicating level of termite activity, procedure, and treatment applied before time of Substantial Completion.
4. Termiticide brand name and manufacturer.
5. Quantities of termiticide and nontoxic termite bait used.
6. Schedule of inspections for one year from date of Substantial Completion.

F. Research/Evaluation Reports: For metal mesh barrier system.

G. Sample Warranties: For special warranties.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A specialist who is licensed according to regulations of authorities having jurisdiction to apply termite control treatment and products in jurisdiction where Project is located and who employs workers trained and approved by manufacturer to install manufacturer's products.

1.7 FIELD CONDITIONS

A. Soil Treatment:

1. Environmental Limitations: To ensure penetration, do not treat soil that is water saturated or frozen. Do not treat soil while precipitation is occurring. Comply with requirements of the EPA-Registered Label and requirements of authorities having jurisdiction.

2. Related Work: Coordinate soil treatment application with excavating, filling, grading, and concreting operations. Treat soil under footings, grade beams, and ground-supported slabs before construction.

1.8 WARRANTY

A. Termite Infestation Warranty: Manufacturer warrants that their ASTM E 1745 classified polymer-based sheet barrier system, constructed without chemical termiticides, will prevent under-slab termite infestation caused by termite penetration of the barrier material. If subterranean termite damage is discovered and certified during warranty period, manufacturer’s warranty shall at least provide for a refund of the purchase price or replacement of the barrier material.

1. Warranty Period: 60 days from installation, whichever occurs first.

B. Soil Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied soil termiticide treatment will prevent infestation of subterranean termites, including Formosan termites (Coptotermes formosanus). If subterranean termite activity or damage is discovered during warranty period, re-treat soil and repair or replace damage caused by termite infestation.

1. Warranty Period: Five years from date of Substantial Completion.

C. Wood Treatment Special Warranty: Manufacturer's standard form, signed by Applicator and Contractor, certifying that termite control work consisting of applied wood termiticide treatment will prevent infestation of subterranean termites, including Formosan termites (Coptotermes formosanus). If subterranean termite damage is discovered during warranty period, repair or replace damage caused by termite infestation and treat replacement wood.

1. Warranty Period: 12 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain termite control products from single source.

2.2 POLYMER-BASED SHEET BARRIER SYSTEM

A. Polymer-Based Sheet: Multi-layered, 15 mil (0.381 mm) thick, polyolefin plastic extrusion termite barrier system; ASTM E 1745, Class C, under-slab vapor retarder.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Stego Industries, LLC; Pango Wrap or comparable product.

a. Properties:

b. Water Vapor Permeance: 0.010 perms (0.576 ng/Pa*s*sq. m) in accordance with ASTM E 1249.

c. Puncture Resistance: 3.39 lb (1538 grams) in accordance with ASTM D 1709.

d. Push-Through Puncture: 30.93 lbf (137.6 N) in accordance with ASTM D 4833.

e. Tensile Strength: 48.6 lbf/in (8.51 kN/m) in accordance with ASTM D 882.

f. Permeance After Conditioning: 0.010 perms (0.576 ng/Pa*s*sq. m) in accordance with ASTM E 154, Sections 8, 11, 12 and 13.

g. Methane Transmission Rate: 227.8 GTR in accordance with ASTM D 1434.

h. Radon Diffusion Coefficient: 0.000000000215 sq. ft/s (0.00000000002 sq. m/s) in accordance with test K124/02/95.

2.3 SOIL TREATMENT

A. Termiticide: EPA-Registered termiticide acceptable to authorities having jurisdiction, in an aqueous solution formulated to prevent termite infestation.

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

a. BASF Corporation.

b. Bayer Environmental Science.

c. Ensystex, Inc.

d. Syngenta.

2. Service Life of Treatment: Soil treatment termiticide that is effective for not less than five years against infestation of subterranean termites.

2.4 WOOD TREATMENT

A. Borate: EPA-Registered borate termiticide acceptable to authorities having jurisdiction, in an aqueous solution for spray application and a gel solution for pressure injection, formulated to prevent termite infestation in wood.

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

a. Ensystex, Inc.

b. Nisus Corporation.

c. NovaGuard Technologies, Inc.

2.5 BAIT-STATION SYSTEM

A. Description: EPA-Registered system acceptable to authorities having jurisdiction. Provide bait stations based on the dimensions of building perimeter indicated on Drawings, according to product's EPA-Registered Label and manufacturer's written instructions.

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

a. BASF Corporation.

b. Dow Chemical Company (The).

c. Ensystex, Inc.

2.6 METAL MESH BARRIER SYSTEM

A. Stainless-Steel Mesh: 0.025-by-0.018 inch (0.64-by-0.45 mm) mesh of 0.08-inch (2.0-mm) diameter, stainless-steel wire, Type 316.

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

a. Termimesh USA Inc.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Applicator present, for compliance with requirements for moisture content of soil per termiticide label, interfaces with earthwork, slab and foundation work, landscaping, utility installation, and other conditions affecting performance of termite control.

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

3.2 PREPARATION

A. General: Prepare work areas according to the requirements of authorities having jurisdiction and according to manufacturer's written instructions before beginning application and installation of termite control treatment(s). Remove extraneous sources of wood cellulose and other edible materials, such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil within and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended in writing by termiticide manufacturer.

1. Fit filling hose connected to water source at the site with a backflow preventer, according to requirements of authorities having jurisdiction.

3.3 INSTALLING POLYMER-BASED SHEET BARRIER SYSTEM

A. Install polymer-based sheet barrier system to provide a continuous barrier to entry of subterranean termites, according to ASTM E 1643 and manufacturer's written instructions.

3.4 APPLYING SOIL TREATMENT

A. Application: Mix soil treatment termiticide solution to a uniform consistency. Distribute treatment uniformly. Apply treatment at the product's EPA-Registered Label volume and rate for maximum specified concentration of termiticide to the following so that a continuous horizontal and vertical termiticidal barrier or treated zone is established around and under building construction.

1. Slabs-on-Grade and Basement Slabs: Underground-supported slab construction, including footings, building slabs, and attached slabs as an overall treatment. Treat soil materials before concrete footings and slabs are placed.

2. Foundations: Soil adjacent to and along the entire inside perimeter of foundation walls; along both sides of interior partition walls; around plumbing pipes and electric conduit penetrating the slab; around interior column footers, piers, and chimney bases; and along the entire outside perimeter, from grade to bottom of footing.

3. Crawlspaces: Soil under and adjacent to foundations. Treat adjacent areas, including around entrance platform, porches, and equipment bases. Apply overall treatment only where attached concrete platform and porches are on fill or ground.

4. Masonry: Treat voids.

5. Penetrations: At expansion joints, control joints, and areas where slabs and below-grade walls will be penetrated.

B. Post warning signs in areas of application.

C. Reapply soil treatment solution to areas disturbed by subsequent excavation, grading, landscaping, or other construction activities following application.

3.5 APPLYING WOOD TREATMENT

A. Wood Treatment: Apply wood treatment after framing, sheathing, and exterior weather protection is completed but before electrical and mechanical systems are installed.

B. Application: Mix borate wood treatment solution to a uniform consistency. Apply treatment at the product's EPA-Registered Label volume and rate for the maximum borate concentration allowed for each specific use so that wood framing, sheathing, siding, and structural members subject to infestation receive treatment. Apply treatment to the height of 8 feet (244 mm) above grade.

1. Framing and Sheathing: Apply termiticide solution by spray to bare wood and with complete coverage.

2. Heavy Wood Members: For wood greater than 4 inches (100 mm) thick, inject termiticide gel solution under pressure into holes of size and spacing required by manufacturer for treatment.

3. Exterior Uncoated Wood Trim and Siding: Apply termiticide solution to bare wood only when forecasted weather conditions indicate no precipitation or fog before application of seal coat. After 48 hours, verify that surface is sufficiently dry for seal coat and apply seal coat of paint as specified in Section 099113 "Exterior Painting."

3.6 INSTALLING BAIT-STATION SYSTEM

A. Bait-Station System: Install during construction to determine areas of termite activity.

B. Place bait stations according to product's EPA-Registered Label and manufacturer's written instructions, in the following locations:

1. Conducive sites and locations indicated on Drawings.

2. In and around infested trees and stumps.

3. In mulch beds.

4. Where wood directly contacts soil.

5. Areas of high soil moisture.

6. Near irrigation sprinkler heads.

7. Each area where roof drainage system, including downspouts and scuppers, drains to soil.

8. Along driplines of roof overhangs without gutters.

9. Where condensate lines from mechanical equipment drip or drain to soil.

10. At plumbing penetrations through ground-supported slabs.

11. Other sites and locations as determined by licensed Installer.

C. Spacing: Place bait stations according to manufacturer's written instructions and at a frequency no less than the following:

1. One bait station per 8 linear feet (2.4 linear meters).

2. One cluster of bait stations per 20 linear feet (6.1 linear meters), with no fewer than three bait stations per cluster.

3.7 INSTALLING METAL MESH BARRIER SYSTEM

A. Install metal mesh barrier system to provide a continuous barrier to entry of subterranean termites, according to manufacturer's written instructions.

1. Fit mesh tightly around pipes and other penetrations and terminate at slab and foundation perimeters.

2. Install mesh under the perimeter of concrete slab edges and joints after vapor retarder and reinforcing steel are in place.

3.8 PROTECTION

A. Avoid disturbance of treated soil after application. Keep off treated areas until completely dry.

B. Protect termiticide solution dispersed in treated soils and fills from being diluted by exposure to water spillage or weather until ground-supported slabs are installed. Use waterproof barrier according to EPA-Registered Label instructions.

3.9 MAINTENANCE SERVICE

A. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include 12 months' full maintenance by skilled employees of termite-control-treatment Installer. Include annual maintenance as required for proper performance according to the product's EPA-Registered Label and manufacturer's written instructions. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.

B. Continuing Maintenance Proposal: Provide from termite-control-treatment Installer to Owner, in the form of a standard yearly (or other period) maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.

1. Include annual inspection for termite activity and effectiveness of termite treatment according to manufacturer's written instructions.

END OF SECTION